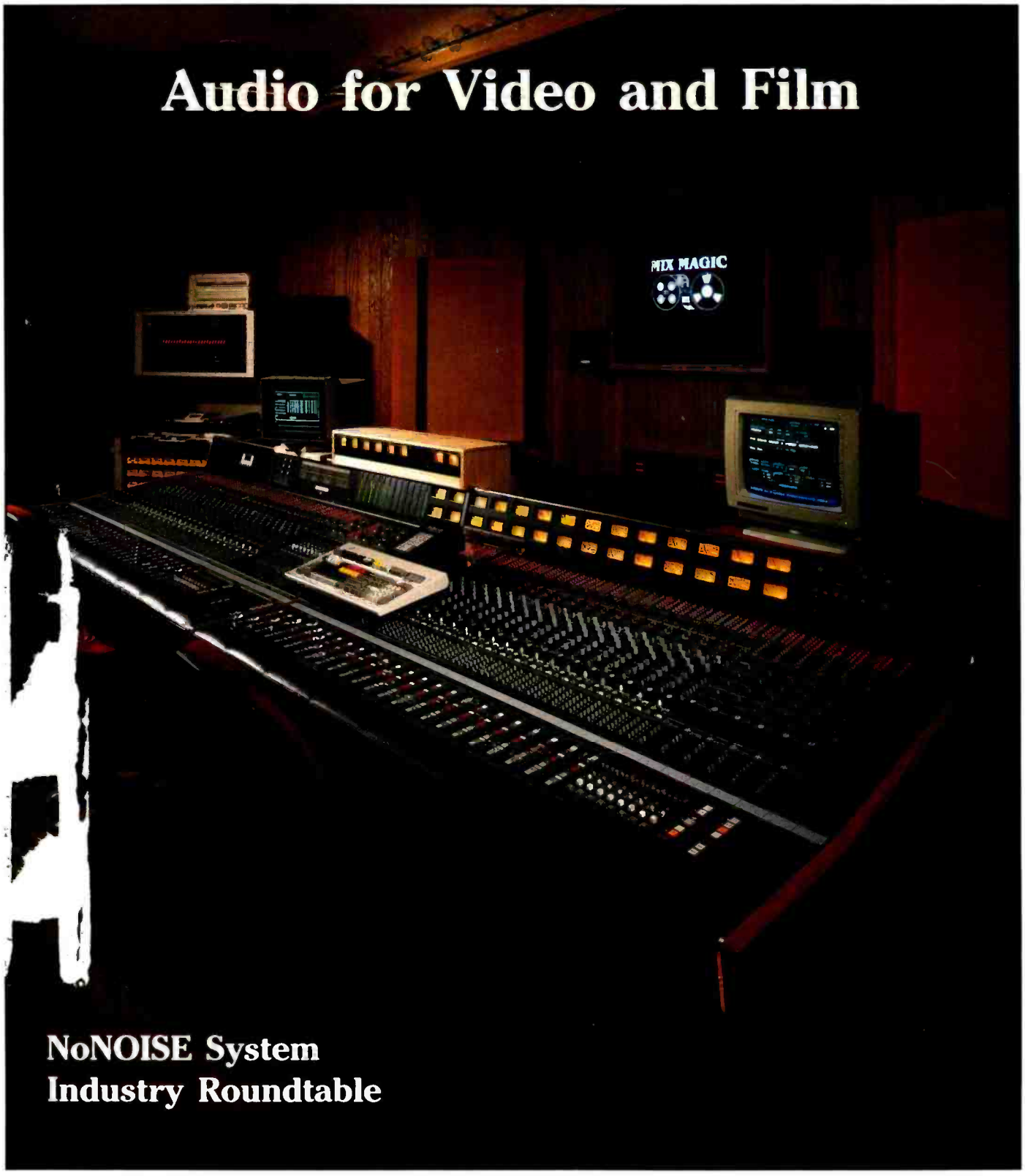
September 1989

Recording
ENGINEER/PRODUCER

The Applications Magazine for Audio Professionals

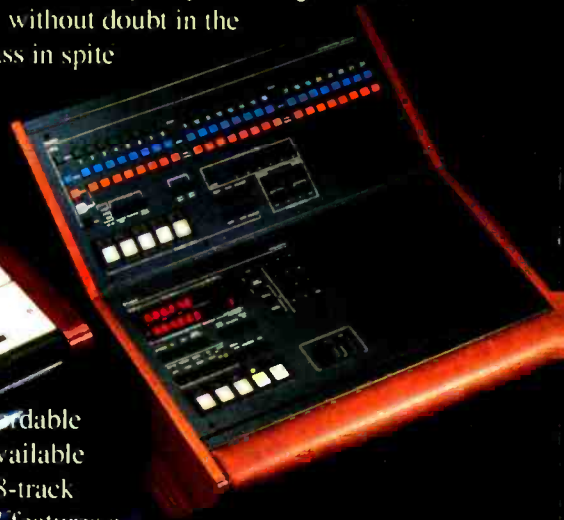
$4.00

AN INTERTEC PUBLICATION



Attention Otari and Sony/MCI Customers:

'Now you can afford Studer quality and performance'



Studer quality and performance has just entered your price range with the affordable—*very* affordable—A827 studio recorder, the first new multichannel from Studer since its standard-setting A820-24.

Superior sound for music recording. The A827 is just plainly ahead of the competition. And why shouldn't it be? With the same transport and head assembly, the same audio quality as its big brother, the A827 is without doubt in the Studer class in spite of its affordable price. Available in 24, 16 and 8-track versions, the A827 features a computer controlled transport with 3 tape speeds, varispeed, switchable Dolby HX® Pro and phase compensated audio electronics.

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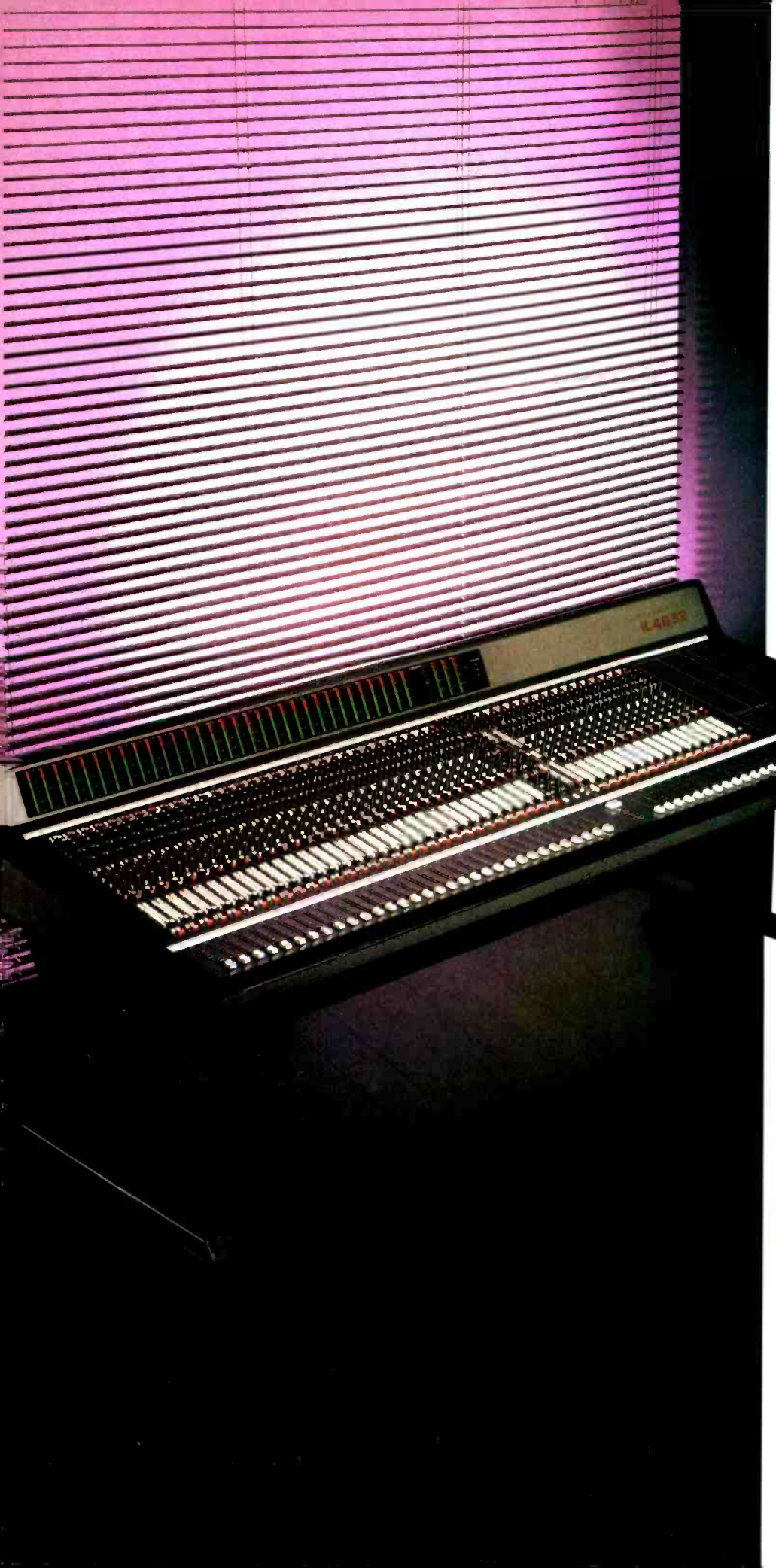

IT'S THE LITTLE THINGS ABOUT THE IL SERIES THAT YOU'LL APPRECIATE.

Take a close look at the Soundtracs IL Production console. An outstanding console that's achieving acclaim amongst commercial recording studios around the World. Designed to meet a production climate that's radically changing with engineering that matches efficiency with vision.

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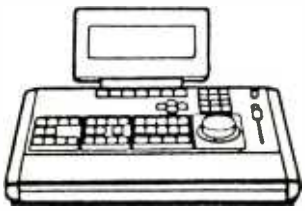

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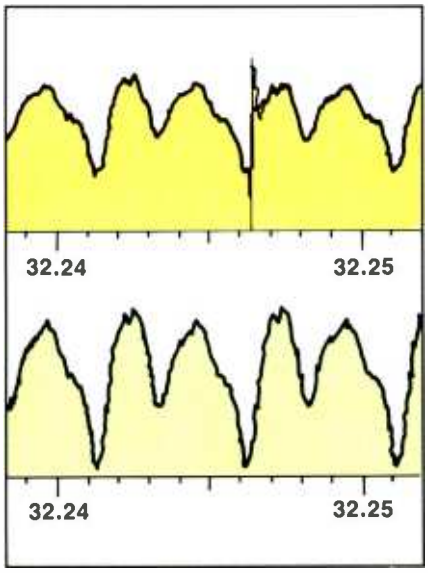

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Studio A at Mix Magic, Hollywood, featuring a Sound Workshop custom console.

Volume 20, No. 9

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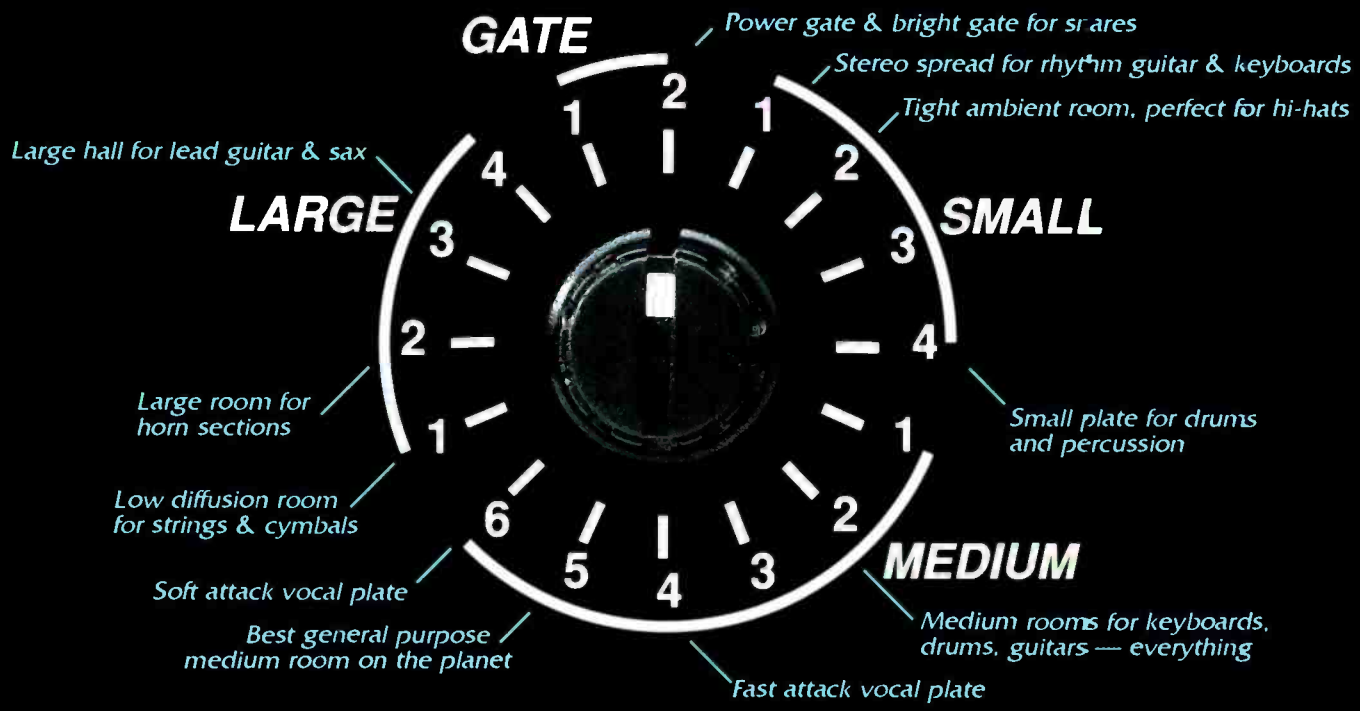

That's what professional studio owners, record producers and experienced engineers are saying about the Alesis MICROVERB® II Digital Reverb. They're used to spending $2000 to $10,000 on a digital reverb. But it's not expensive reverb they're after...it's great *sounding* reverb. Deep, rich, dense. Full of character. The sound that MICROVERB® II delivers in dead quiet 16 bit stereo.

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Every sound engineer needs a silent partner.

An investment in a recording console represents a partnership you plan to live with for some time. Which is why the Sony MXP-3000 series console is a sound business decision.

Its design concept is based extensively on sonic performance. Boasting features such as low-noise hybrid amplifiers, gold-plated connectors and large crystal oxygen-free interconnect cables that produce unparalleled sound quality. These ingenious features tell the inside story as to why this console is so quiet. And countless installations tell the outside story as to why this console is so successful.

Of course, sonic performance isn't the only story behind our console. Flexibility is a necessity in the creative recording process, as well. Naturally, the MXP-3000 offers a host of flexible features at an unmatched value.

For instance, you have your choice of five distinct equalizers, and five different channel input modules. Plus, there are many other options available to suit your individual needs. All of which come housed in an ergonomically designed control surface.

For a demonstration of the quietest addition to your control room, contact your Sony Professional Audio representative. Or call 1-800-635-SONY.

And remember, when you want a quiet mixer to back you, put a Sony MXP-3000 in front of you.

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L
R

Editorial

Home Studio Competition

What constitutes unfair studio competition? Is it OK for an artist to demo a song at home? Is it OK for that artist to have some friends come in and lay down additional tracks? Is it OK for an engineer/producer to take those tracks to his home studio for further development? Is it OK for the artist to record entirely new material at the producer's studio? Is it OK for the engineer/producer to mix those songs at his home studio for demo and label presentation? Is it OK for the engineer/producer to take those tracks into a commercial facility studio for overdubs and a final mix?

Activity in home studios has grown to a point where large and medium-sized commercial studios are feeling the pinch (or sensing the future pinch) of lost revenues. In response, some are moving to censure home studio recording services.

Basically, the commercial studios argue that the home studios pose unfair competition, as they operate with greatly reduced overhead. From a legal point of view, the commercial facilities claim the home studios are functioning in violation of zoning laws, as they are commercial ventures located in residential-zoned areas.

To begin with, the truth is that today hundreds of thousands, if not millions, of Americans run commercial ventures of various kinds from their homes. And in some cases, tax and zoning laws are interpreted to allow as much free enterprise as possible, and are fairly liberal on what constitutes a home-based business. Another important point to keep in mind is that there is obvious demand for the low-cost, low-pressure production facilities made possible by the evolution of low- to medium-cost hardware and software.

If the larger facilities are really struggling to survive, it is probably because owners and/or management—hoping to attract and maintain "monster" clients—have invested in equipment so expensive that the loss of even a few hours of billable time could makes a difference between showing a profit and bankruptcy.

In reality, such clientele may not even exist. The days when a group would go into a commercial studio to write and record an album are gone for all but a few supergroups. It is just too expensive. Unwilling to gamble on new talent, the major record labels have become little more than distribution companies for known quantities.

Activity in home studios has grown to a point where large and medium-sized commercial studios are feeling the pinch (or sensing the future pinch) of lost revenues.

Today, producers themselves have to bear the expense of recording new artists. They have far more at risk than the major labels, and if they are to continue cultivating new talent, naturally they must take every advantage. The existence of home studios is crucial for experimentation and preparation.

It is ironic that in the supposedly "free-spirited" audio industry there is a movement to crush the entrepreneurial initiative that was once the foundation of our industry.

It is no secret that large, established companies often use their political, as well as economic, clout to suppress competition. It is also no secret that the smaller businesses within an industry are generally the ones that keep things from getting stale by kicking the larger ones in the butts.

I say, if these guys think they can produce competitive products from their homes, let them try. (Is it not blatant hypocrisy that in some cases, the very people who are now making a fuss over the home studios started their businesses in garages or back bedrooms?)

Building and maintaining a home studio is no easy task. Contrary to what the commercial facilities would have us believe, running a home studio involves genuine overhead and risk. Home studios still have to pay for hardware, utilities, insurance, labor and supplies. Some of these expenses may be scaled down, compared to those of large facilities, but their capabilities and rates are usually scaled down as well. Home studio owners, in fact, may have some tax *disadvantages* if not incorporated or registered as commercial businesses, due to the non-deductible or non-depreciable nature of certain expenses.

Eventually, we should see the proliferation of home studios level off. It doesn't take long for the novice studio owner to realize just how difficult it is to build and maintain a multitrack studio. Also, some of these guys might become so successful they need to move out of their homes into larger, more traditional, commercial locations.

For the moment, the bottom line is that these producers and other home studio owners have seen a niche—one that allows both creativity and independence—and they have been willing to take a chance. There is an often-quoted phrase that applies to this conflict: "Find a need and fill it." The onus on any facility owner, at whatever level or location, is to fulfill the needs of some segment of the market. This is what the home studios are doing, and what the commercial facilities must do to reestablish their reason for existence.

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The impressive new AT4031 Studio Cardioid Capacitor Microphone.

Our new AT4031 makes a great first impression. And it builds from there. The sound is effortless and natural over the entire spectrum of voices and musical instruments. It's the result of wide, flat frequency response, low distortion, and excellent dynamic range.

Very fast transient response

The outstanding performance is the product of uncommon precision inside the fixed-charge element. The diaphragm is only 0.00016" thick (just 4 *microns*), including the ultra-thin vacuum-deposited gold conductive layer. Very fast transient response and wide bandwidth are assured. With its high sensitivity (−44 dBm) and low distortion, the AT4031 meets the stringent dynamic range demands of today's storage and playback media.

Uniform, predictable performance

You'll find the AT4031 very easy to use. The uniform, predictable cardioid pattern translates into off-axis attenuation, not coloration. An integral second-order high-pass filter lets you roll off the bass at 12 dB per octave, when wind noise or room rumble must be controlled. An effective foam windscreen is also standard.

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The AT4031 is intended for those professionals who will accept no compromise in performance, yet need a tough, reliable microphone. But, listen for yourself. Based on extensive field tests in studios and on stages around the country, we think you'll agree that what you hear is precisely what you need...the new AT4031 Studio Cardioid Capacitor microphone.

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GUEST EDITORIAL

Boycotting Montreux

Did you find this invitation in your post this week?

"You are cordially invited
to attend a
Pro-Audio/MI/Broadcast/Post
Production Trade Show."

Delete as appropriate, and pray that the dates don't overlap the way your job responsibilities do. Come to think of it, don't you find an invitation just like it in your mail *every* week? The only problem is, you *do* have another show penciled in on your calender for that week. And guess what. One is in Los Angeles, the other in New York. Darn it.

Still, it's always a pleasure to go to the trade shows. First of all, there is the sense of discovery. The venues are especially picked for their labyrinthine complexity. Why hold a convention in a convention center when you can use hotel rooms? They provide the thrill of the chase. It's just a shame that you're on a limited schedule. But you never know, you might stumble across the very thing that you came to see.

It's marvelous to think about the forethought and ingenuity that must go into organizing a show at a venue like Montreux. Obviously, not too many places fit the bill. A checklist is the only way to define the perfect locality.

1. Venue must be at least 50 miles from the nearest airport. Preferably across twisting mountain roads.
2. There should be insufficient hotel accommodations for exhibitors. (Visitors can stay in another town.)
3. There should not be a conference center big enough to house the show (a master stroke here).
4. The local authorities must be willing to let us build a large wooden hut without air conditioning to house the event.
5. Always put safety first—there should be at least one wooden fire escape.
6. There should be only one service elevator so that exhibitors on the top floor have to come out weeks before the event to set up their booths.

It's hard to imagine that many venues measure up to the standards required. Still, we know we can rely on show organizers to find one.

Recently, a group of British pro audio manufacturers paused to ask each other if they felt that the industry was getting the service that it deserves from these shows. To our surprise, we found that we all shared the same bad experiences.

Despite having a healthy disrespect for committees, we decided that the time had come to take action to get things changed. The result was the formation of the Pro Audio Exhibitors Group (PAEG). Our aim is simple: to constructively influence the organization of trade shows so that they are convenient for our customers to visit, and for us to exhibit at. At our inaugural meeting, the next European AES meeting was high on the agenda. The venue is Montreux. It didn't take long for a unanimous resolution to be passed that, as much as we wanted to support the AES Convention, we were not willing to participate in a show at this venue.

We'd set ourselves the objective of being constructive about shows, so we approached the AES with our views.

"You know that Montreux is unsuitable for a convention," we said. "How about changing it?"

We were told that it was too late.

"Alright, then how about this. If we can find someone else to take the Montreux site and also find a more suitable venue, then will you change?"

The answer was still no.

Feelings are running high about shows in the United States, also. The manufacturers that were approached for support in rejecting the Montreux venue were no less vehement. Most of them also pointed out that the New York Hilton is an unsuitable venue for a gathering. Everyone seemed to find relief in the idea that maybe there was something that could be done about the shows. After all, whatever happened to democracy?

Sadly, none of us are asked to vote about the management of conventions. Despite the fact that professional associations are there to serve the interests of their members, and that manufacturers fund them by supporting their events, they haven't been allowed to have a voice.

Our industry is a remarkable one. It can be characterized by the many remarkable people who care deeply for the quality of their work. We want to give those people the best service that we can because we believe that what we do is worthwhile and important.

Isn't it about time our professional bodies and other exhibition organizers thought the same way?

RE/P

Antony David is chairman of Pro Audio Exhibitors Group and sales director of Solid State Logic.

NEWS

Group purchases console assets

A new company has purchased the assests of the Quad Eight console division of the Mitsubishi Pro Audio Group. The company, known as Quad Eight Electronics, will be headed by Bill Windsor, formerly of Mitsubishi.

Mitsubishi will continue to manufacture Westrex consoles, while Quad Eight will manufacture Westar consoles, under the Virtuoso name, and the FilmStar film re-recording console.

Quad Eight's address is 225 Parkside Drive, San Fernando, CA 91340; 818-898-2341; fax 818-365-8310.

SPARS holds workstation conference

The Society of Professional Audio Recording Services will host a technical conference and audio workstation interface on Sept. 23 and 24 in Chicago. The conference, which will be chaired by Universal Recording's Murray Allen, is designed to help determine product development in the 1990s.

The topic on Saturday, Sept. 23, is "Audio Workstations—The Audio Solution for Video Post-Production." The topic for Sunday, Sept. 24, is "All Right, We've Seen It—How Do We Pay For It?" All events will take place at the Midland Hotel in Chicago. For more information, contact SPARS at 4300 10th Ave. N., Suite 2, Lake Worth, FL 33461; 407-641-6648.

Commodore demonstrates MIDI tool kit

Commodore demonstrated at Summer NAMM a prototype of a MIDI Programmer's Tool Kit, a MIDI device driver designed to utilize the multitasking capability of the Amiga computer.

Developed by Carnegie Mellon researcher Roger Danneberg under a grant from Commodore, the kit is a software interface that allows the Amiga to talk with external MIDI hardware. According to the company, the kit will shorten the development process for developers who wish to port over existing software or create new software for the Amiga.

The kit was scheduled to be available in the summer.

UCLA students to record at the Record Plant

"Record Production at The Record Plant: From Tracking to Mixdown" is a new 5-session UCLA Extension course allowing students to produce and record two songs apiece. Participants will record basic tracks, overdub and mix by computer, using SSL and Neve consoles. The final mixes will be done in both analog and digital forms, including DAT, so that the class can evaluate and compare the two. Students will be allotted time to compile their own automated mix on a final tape to take home. Michael Braunstein (Frank Zappa, Stephen Stills, Barry Manilow, D'Molls) is the instructor.

Admission to this class is by consent of the instructor based on a resume and telephone interview. The deadline for applications is Oct. 11, and the course will begin Nov. 4. The course fee, which includes four studio sessions, is $645. Resumes should be sent to: Record Production at the Record Plant, Performing Arts, UCLA Extension, 10995 LeConte Ave., Room 437, Los Angeles, CA 90024. For details, call 213-825-9064.

Equipment stolen in armed robbery

On June 20, the following equipment was stolen from Harris Audio in Atlanta. Anyone who is contacted regarding any of the equipment on this list should call Detective Jones of the Atlanta Police Department, 404-658-6660, or Michael Harris at Harris Audio—Miami, 305-944-4448.

The equipment is listed by manufacturer, model number or name and serial number:

• Adams-Smith Zeta-Three, #31415.

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RECORDING ENGINEER/PRODUCER is edited to relate recording science to recording art to recording equipment, as these subjects, and their relationship to one another, may be of value and interest to those working in the field of commercially marketable recordings and live audio presentation. The editorial content includes: descriptions of sound recording techniques, uses of sound recording equipment, audio environment design, audio equipment maintenance, new products.

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AVAILABLE NOW

AKAI MAKES DIGITAL MULTI-TRACK AFFORDABLE

Akai Digital is now delivering the A•DAM System: the first professional, expandable digital recording system in a compact package. A•DAM utilizes the advanced tape technology of the 8mm video tape, which is easily available at stores everywhere. A•DAM offers 12 to 36 digital audio tracks in a modular system that can be rack-mounted for portable operation.

The A•DAM System consists of the DR1200 Digital 12-Track Recorder, DL1200 Programmable System Controller, and DM1200 Meter Bridge. The DL1200 not only serves as a 104-memory autolocator, but as the control center for up to three DR1200 recorders! No external synchronization is required for 36 track operation. But, of course, the DR1200 is fully compatible with SMPTE synchronizers.

The A•DAM System has the specs you expect with a professional digital multitrack system: 16-bit linear resolution, 44.1 kHz and 48 kHz sampling rates, and more than 90 dB dynamic range. Best of all, the A•DAM System is the **most affordable** digital multitrack system on the market.

A•DAM has arrived. See the new standard in digital technology ***today*** at your Authorized Akai Digital Dealer.

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NEWS

- Aphex 612, #05490.
- Aphex 800, #AX800-1024.
- Calzone 165-space rack, no number.
- dbx 929, #2150.
- dbx FS900, #0619.
- Drawmer 1900, #1308.
- EAW MS-30R monitor, number unknown.
- Eventide H-3000B, #B 1958.
- Hafler P-500, #Z 1816803 or -4.
- Klark-Teknik parametric EQ, #DN 410-546.
- Lexicon LXP-1 (2), #15200 series.
- Lexicon MRC, number unknown.
- Meyer 833 studio monitors, #080336-080337.
- Meyer A 833 CEU, #580243.
- Meyer M1-A, #85339 or 7.
- Meyer MS-1000, number unknown.
- Meyer UM-1, #84029.
- Meyer UPA-1, number unknown.
- Mogami 16 pr. cable, 200 feet.
- Nakamichi MR-1B tape deck, number unknown.
- Otari MTR-10, #18820461 F.
- Otari MX-5050 B II (no tacho roller), #188 A 0097 K.
- Otari MX-55 TM, #18950353 F.
- Otari MX-80/24, #188704630.
- Otari MX-80/24 without remote, #18730488 B.
- Otari MX-80/32, #18600322 A.
- Ramsa 840, #891090.
- Ramsa power supply, #891090.
- TAC/Amek 36/24 Matchless console, #M3290.
- Technics SL-P 1300, #AW 8420 N 096.

News Notes

ProSystems has named four representatives to handle its product line: Online Marketing, Wadsworth, OH, western Pennsylvania, Ohio, West Virginia, Indiana and Kentucky; Essential Marketing, St. Joseph, MO, southern Illinois, Missouri, Kansas, Nebraska and Iowa; On The Road Marketing, Upper Montclair, NJ, northern New Jersey, New York City, and Rockland and Westchester counties, NY; and Audio Associates, Fulton, MD, southern New Jersey, eastern Pennsylvania, Maryland, Virginia, Delaware and Washington, DC.

Mark IV Industries has acquired the assets of Electro Sound's audiotape duplication hardware division. The division will continue to manufacture and market its systems at its Sunnyvale, CA, facility, and will report operationally to **Gauss**, another Mark IV company.

New England Digital has formed a London-based distribution company, New England Digital U.K. Ltd., to directly oversee sales of NED products in the United Kingdom and Europe. The company says that sales are up 100% in the United Kingdom and 200% in Europe.

Focusrite has resumed shipments of its ISA modules, which will continue to be personally certified by Rupert Neve, the company's founder and now a consultant to the company. The modules are available domestically through Sonic Image, 1100 Wheaton Oaks Court, Wheaton, IL 60187; 312-653-4544.

RPS Communications, a public relations and marketing consulting firm to the pro audio industry, has moved to 520 Arthur St., Centerport, NY 11721; 516-423-4038; fax 516-423-6155.

Mackie Designs is a new company formed by Greg Mackie, the founder of TAPCO. The company's first product, the CR-1604 compact mixer, was introduced at Summer NAMM. The company's address is 7512 218th SW, #5, Edmonds, WA 98020; 206-771-4927.

SGAudio, Chicago's newest pro audio dealership, carries products from TimeLine, Crown, Beyer, AKG, Ashly, Furman, Rane, Neotek and Sennheiser. In addition to equipment sales, rentals are available through Rent FX, located at SGAudio's offices. The company's address is 445 W. Erie St., Suite 201, Chicago, IL 60610; 312-266-1901; fax 312-266-1904.

Aphex Systems has moved to larger quarters at 11068 Randall St., Sun Valley, CA 91352; 818-767-2929; fax 818-767-2641.

Stewart Electronics has appointed two rep firms to handle its product line. Online Marketing, Wadsworth, OH, will cover Ohio, West Virginia, Indiana, Kentucky and western Pennsylvania. Lienau Associates, Columbia, MD, will cover Maryland, Virginia and Washington, DC.

Korg hosted a two-week course in July at Duquesne University in Pittsburgh, covering the M1 workstation. Topics included recording basics, recording and sampling, effects, MIDI, keyboards, compositional harmony, electronic orchestration and synthesizer ensemble.

Recent projects for the **Joiner-Rose Group** include the mass communications teaching facility at Middle Tennessee State University, Murfreesboro; NFL Films, Mt. Laurel, NJ; Tony Silver Films, New York; and Zomba Enterprises, New York.

Solid State Logic has opened a London office at 5 Southwick Mews, Sussex Village, Paddington, London W2 England. An office has also been opened in Toronto at 36 Toronto St., Suite 850, Toronto, Ontario M5C 2C5 Canada; 416-363-0101; fax 416-360-3838.

Telex Communications is now a standalone company afer a stock distribution to shareholders of Memorex Telex, the previous owner, and to Telex management. The company will continue to use its corporate name and use the Telex trademark.

Coda Music Software's Finale music notation software received the 1989 World Class award in the music category by Macworld magazine.

Passport Designs has acquired Music Data Corporation.

Greencorp Magnetics, an Australian magnetic tape manufacturer, has appointed Fujii International, Northridge, CA, as its U.S. marketing and sales representative.

People

Paul McGuire, formerly vice president of marketing at Electro-Voice, has been promoted to executive vice president.

Kevin Kent has been appointed vice president of marketing at Imagine Marketing Co.

Studer Revox has announced two appointments. **David Purple** has been named sales rep for the newly formed Nashville-South territory. **Joe Bean** has been promoted to Eastern sales manager.

Rick Plushner has been named national sales manager for PCM Products at Neve.

Colin Pringle, Solid State Logic's head of marketing, has been appointed to SSL's board of directors.

Lisa Van Cleef has joined Meyer Sound Labs as director of advertising and publicity.

JBL has announced several appointments. **Jim Chase** has been named western regional manager. **Tim Crable** has been named customer service manager. **Steve Bartlett** has been named electronic product manager for JBL and UREI.

Jorgen Ravn has been named sales director at Valley International. REP

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MANAGING MIDI

By Paul D. Lehrman

Bridge to Transporter...

Automation by MIDI is now a fact of life for many studios. Control of processors, equalizers and mixers from a MIDI controller or sequencer, using standard MIDI commands—controllers, notes and program changes—has finally been accepted as a legitimate way of doing things. Not coincidentally, it is now also within a lot more folks' budgets than ever before.

But there's one area of studio automation in which MIDI control is still pretty much a pipe dream: transport control. Although a number of people are trying, no one has yet come up with a usable protocol that will let you remotely control your multitrack, mastering or video deck from your computer, using standard MIDI commands.

The trick is not how to do it technically—that's easy. Like anything else in this business, the trick is how to do it in a way that everyone else can accept and support.

Why would you want transport control? Because it's a logical extension of the computer-based studio. With synthesizers doing the music, samplers doing the effects and processors doing the processing (all under MIDI control from a computer running a lovely user-friendly program), the idea of having to deal with a separate control panel for tape transports and other mechanical devices seems almost primitive.

In most current applications, you have to constantly keep in mind what's controlling what and which "Play" button has to be hit first if everything is going to work right. That's positively Neanderthal.

Think about how much easier life would be if all that were transparent to the user. Transport control is not just a question of telling a deck when to start and when to stop. You also need to be able to handle locate functions ("I'm starting my sequence halfway through, come and meet me there"); individual track record-enables (128 of them would be nice and will soon be necessary); punch-in and -out points on each track; and perhaps varispeed control and tape/source monitor switching.

Which means there are two issues: How should the hardware be designed to deal with MIDI control messages, and what form should those messages take? The hardware already exists. Every tape deck now coming to market has a socket on it for external control. It's not a MIDI socket, but it could be. Several manufacturers are making (or at least talking about) little outboard "black boxes" that will convert MIDI to their control protocol.

Transport control is a logical extension of the computer-based studio.

The engineering involved is trivial, and if manufacturers thought there was a market for it, they could just as easily put that intelligence inside the deck. (By the way, the reports circulating recently that one low-priced 8-track deck will sync to MIDI Time Code are erroneous—the deck will read MIDI messages, but it won't sync. We'll get to why this is a good thing in a moment. You heard it here last, I hope.)

There are also ways of imposing hardware on decks that don't have full external control capability. Every deck has at least *some* remote capability, and you can at least wire switches to the "Play" and "Stop" buttons, and set them to respond to MIDI commands. Wire the fast wind buttons, add a black box with the ability to read tach signals coming from the deck's capstan and you have some locate capabilities as well.

On the software side, the MIDI specification already has some provisions for transport control. "Start" and "Stop" commands are sent by sequencers to drum machines and other sequencers, and there's no reason that tape decks couldn't respond to them as well. The MIDI Time Code spec includes "full messages" that send a SMPTE number, usually when a device is first started or stopped. A deck receiving such a message could easily autolocate to that point if it were programmed to do so.

But more data than that need to be sent, and so other ways of getting it out are necessary. One solution that does *not* make sense to me is to use system-exclusive commands, as one tape deck manufacturer is starting to do. Yes, it means that its decks can be totally controlled from a computer, but what about the sequencer I want to use on the computer at the same time? If I want the sequencer to send out a "Start Tape" command, it would have to be rewritten to send out the manufacturer's system-exclusive codes every time I hit the "Play" button.

I doubt any sequencer manufacturer is going to bother to do that, not unless *every* tape deck maker adopts the same codes, and that seems highly unlikely. (That's why they call it "exclusive.") We must have a system that everyone can accept. It should be simple, easy to implement and as universally useful as possible. There are holes in the MIDI spec, in the form of certain System Common and System Real Time messages, that could be used for transport-automation commands, or possibly some new controller types could be defined.

The MIDI Time Code spec already provides for Setup messages, designed to allow cue lists containing commands such as punches to be downloaded into devices before a sequence starts. These can certainly be used by transports in an off-line manner (although the transports would themselves have to have time-based memories), and perhaps they could be modified somewhat to allow on-line use.

There is a third issue, which fortunately is a little easier to decide: When it comes to timing information, who's in charge, the sequencer or the tape deck? Although it would be nice for a tape deck to synchronize to MIDI Time Code commands coming from a sequencer, this doesn't seem very practical. MIDI Time Code is wonderful stuff for doing event synchronization, but its quarter-frame resolution just isn't good enough for doing *speed* synchronization—our ears are much more attuned to microscopic pitch differences than they are to timing differences, and the word's greatest analog tape deck syn-

Paul Lehrman is *RE/P's* electronic music consulting editor and is a Boston-based producer, electronic musician and free-lance writer.

chronized to MIDI Time Code would sound, as one engineer put it, "like a cheap cassette deck with low batteries."

Presumably, software could be built into tape transports that could compensate for resolution and jitter problems, but frankly, I don't see much chance in convincing any hardware manufacturers to bother to do so. No, it's best to stick with SMPTE time code, with its phase-lockable, crystal- or frame-rate-derived, $^1/_{80}$th-frame resolution to do the sync work. Which of course means that our MIDI transport controller must be able to work in two directions at once: sending commands to the tape deck and receiving time code data *from* the tape deck (and passing it on to the sequencer).

When it comes to timing information, who's in charge, the sequencer or the tape deck? The struggle to achieve MIDI transport control is part of the perception that MIDI is still "semi-pro."

Plus, our tape deck will have to send a "ready" pulse to the sequencer every time you relocate the tape or the sequence, or no one will know where the hell anyone else is. In many ways the struggle to achieve MIDI transport control is part of the perception that MIDI is still "semi-pro."

Right now, trying to convince Sony or Studer to put a MIDI In jack on a 48-track digital deck would probably, as one observer put it, "just make them laugh." But new tools require new techniques, and hard-disk recording systems, samplers with huge capacities, and sophisticated real-time-controllable signal processors are already causing many of us to rethink the way we produce sound and music. MIDI control of tape transports should be a serious part of that rethinking.

RE/P

SPARS ON-LINE

By Jim Pace

Digital Dreams and Nightmares

Remember the first time you heard about digital audio? It's an everyday term now, but just a few years ago it was a mysterious new concept greeted with blind eagerness, as well as a lot of skepticism. If you go back to those thrilling days, you probably remember some horror stories and a lot of criticism—much of which was well-founded.

I was one of those grunt soldiers in the advance guard, and believe me, not all was quiet on the Western front. I worked for the first digital audio house in Hollywood, and we had to convince people that we were offering something special. Back then, all we had was a PCM-1600 processor, some standard U-matic VTRs and a video editor accurate to a whopping $^1/_{30}$ of a second (on a good day).

In my first session, I had to provide digital playback to master an LP. I not only had to learn about digital audio, but video, too. Plugging in the PCM-1600/BVU-200A was quite the braintease at the time. "Sync—what's that? Could you explain E-to-E? You mean that's not input?" It's a cinch today, but audio people weren't speaking video very well at the time. We even thought to spray the shag carpets with antistatic gas to stop the annoying pops and ticks that appeared in our recordings. Looking back, I realize how crazy that sounds, but it worked—I think.

There were problems we weren't prepared to deal with. We never seemed to have all the pieces necessary to make the job sound good, without being incredibly difficult. Tape analyzers, fast synchronizers and format standards were late entries into digital systems. The first digital editors were slow and clumsy, and didn't improve quickly, simply because the manufacturers didn't sell enough product.

We asked ourselves, "What good is this technology anyhow? And what is it all leading to? What's a compact disc and who needs it?" There I was trying to explain the reason for all this procedural torture: "Soon you would be able to cue up, in any sequence, a clone of your master mixes in a second or two and have more than 70 minutes of program material on an LP."

How soon we forget how little we knew. Emerging digital recording techniques were confusing because the formats themselves were different. Sketchy information based on conjecture didn't help. Remember these gems of prediction? "It'll sound exactly like your master." "CDs will cost only $4!" " We'll put our entire sound effects library on CD—all 1,200 hours." "We're going to send HDTV movies via satellite with digital audio on F-1."

Well, as the technology continues to *emerge*, we are not yet free from wild, wacky and inflated claims. Therefore, we need to be cautious, yet open-minded, and not so cynical as to miss the opportunities that creativity can provide. This is true for technical people, as well as the artists they support. From a simple talkback switch to the most elaborate satellite schemes, it is all a contribution to the evolving creative process.

I can remember an exceptional demo at the New York AES just a few years ago. We eagerly anticipated the new hard disk workstation, but, unfortunately, it sounded so bad we were insulted. Now, a surprising number of studios can almost build their own. It wasn't a perfected concept when it was introduced, but the idea certainly is maturing.

There was an incredible amount of negativity when the idea of digital audio was first suggested: "The labels won't go for digital. It'll hurt their sales." "It'll never work." "You just can't make music out of numbers." "But I always EQ everything this way, it sounds good on my analog tape." "This is too expensive, I'll go out of business!" "Yeah, sounds good, but who else can hear the difference?"

Well, digital audio worked well enough to kick vinyl out of the stores, replace analog tape as the production distribution medium, instigate new workstation technologies, and spur a resurgence of not only back catalog releases, but boost sales of current releases. It also has become the most convenient form of playback to date.

Do you remember what you thought when digital first came out? Have your opinions and criticisms changed? Try to gauge the changes you have made in your methodology, ways of thinking and work style so you can apply it to your future. We all need to learn from our mistakes, because things have not stopped changing. In fact, the changes are accelerating.

Simply put, digital has come a long way in a very short time. It would have come much further and much faster if we had been prepared. Some people didn't care, but look around today. Are your colleagues just guys off the street with little training, or are they people with a solid background in audio? Are they "happened to be here" types, or are they people with talent, education and a dedicated attention to new technology? Seems impossible, but hasn't this group of fanatics created (gasp) a respected technological industry with major worldwide impact?

Just what is next for digital audio? Transcendental bitrays with reverse osmosis matrix-sampled arrayflex scanners? Seriously, we can look for more specialized workstations, a movement toward high density disk and RAM storage, and far better converter systems. Why? Because that's where the problems are. Are these new devices just around the corner? Maybe not, but give us 10 or 20 minutes. Audio technology is changing as fast as the creative material it records.

One significant and exciting development is that finally some of the new product is homegrown. It's also good that we are developing quality educational programs. Ever notice how the technology centers of Northern California and New England, where all the newest toys are being made, are near the major academic centers? As Americans, we need to focus more on good training and education. SPARS cares enough to help promote education, qualified testing and serious internship programs. It doesn't take a great visionary to see strength in our future, but there aren't any shortcuts.

No product is ever finished and no single person has all the answers. But collectively, we do have answers, talent, resources and creativity. Let's remember how skeptical and divided we were when digital audio began, and get together to do it right the next time we have the chance to contribute. RE/P

Jim Pace is vice president of Audio Intervisual Design in Los Angeles.

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UNDERSTANDING COMPUTERS

By Jeff Burger

Choosing a MIDI Interface

Last month I discussed the advantages of using computers over their hardware counterparts for sequencing tasks. This month, let's take a look at equipping a computer for the job.

To turn your computer into a MIDI device, an interface is required. The first task of any MIDI interface is to connect the computer and a MIDI device. For computers such as the IBM PC and the Apple II, the MIDI interface is a card that is installed in one of the computer's internal slots. Similar to modems, MIDI comes in two types. One allows the computer to accept the standard 5-pin MIDI connection right on the rear panel. The other must be tied, via an umbilical cable, to an external box that has the MIDI and sync connections.

On computers such as Apple's Macintosh and Commodore's Amiga and 64, self-contained MIDI interfaces connect right to the computer's serial port, either directly or via a cable. This is typically a less expensive way to go, because the UART (universal asynchronous receiver/transmitter) required for MIDI is already included in the serial port circuitry of these computers. (It is worth noting that the Yamaha CI and the Atari models have built-in MIDI ports.)

Once the hardware is conformed, the data flow itself has to match the rest of the MIDI world. All MIDI interfaces transceive data at 31.25kbaud (bits per second) to comply with the MIDI spec. For reference, the standard baud rates used in telecommunications are 1200 baud and 2400 baud.

MIDI jacks

One major difference between MIDI interfaces is the number of MIDI jacks. Virtually all MIDI interfaces have MIDI In and Out. MIDI Thru is still found on some, but its usefulness is dwindling. In the Dark Ages of MIDI, you sometimes had to use the MIDI Thru jack to hear instrument sounds while recording, then switch the instrument to the MIDI Out jack on playback. This ridiculously tedious process has been virtually eliminated by combining Thru capabilities into the MIDI Out jack. Most sequencing software now have the ability to toggle the Thru function on and off (known as a software Thru).

But even with software Thru, the average MIDI professional has more MIDI devices than are acceptable in a Thru chain —requiring the addition of a MIDI Thru box that acts as a splitter/amplifier. The greater the number of MIDI Outs on the computer interface, the lesser the need for these external Thru boxes.

Tape sync is a highly desirable feature for professional applications, making possible synchronized overdubs and playback.

At the same time, the need for multiple MIDI Ins becomes apparent when you want to record several MIDI instruments simultaneously. Another application of multiple inputs is to use one to accept performance and another to accept MIDI Sync. In these cases, the interface must have the ability to merge the two inputs.

In the Macintosh community, an interesting trend is developing because the computers actually have two serial ports. As a result, many sequencer programs support two discrete MIDI busses of 16 channels each—effectively creating a 32-channel MIDI system. (See "Computer/Studio Interfacing at Studio Malibu" in the June issue.) This not only leads to the concept of using two interfaces, but some manufacturers are now combining two interfaces into one box. As MIDI systems become larger and more complex, this is destined to become an important trend.

Just about the time you've got your MIDI interface plugged happily into your serial port, you find it's time to send a modem transmission or print a file. Some interfaces eliminate this swapping problem by incorporating a serial Thru that allows the user to switch between MIDI and these other devices from the front panel.

Synchronization

Standard MIDI Sync is handled by the MIDI In and Out jacks. Tape sync is a highly desirable feature for professional applications, making possible synchronized overdubs and playback. SMPTE is, of course, the preferred method, given its status as the industry synchronization standard. With the proper software, the SMPTE time code will appear right on the sequencer screen.

Also, most manufacturers that incorporate SMPTE in their MIDI interfaces include the ability to convert it to and from MIDI Time Code (MTC) for event-oriented tasks. (See "The Marriage of SMPTE and MIDI" in this issue.) This is highly recommended if post-production work is in your present or future.

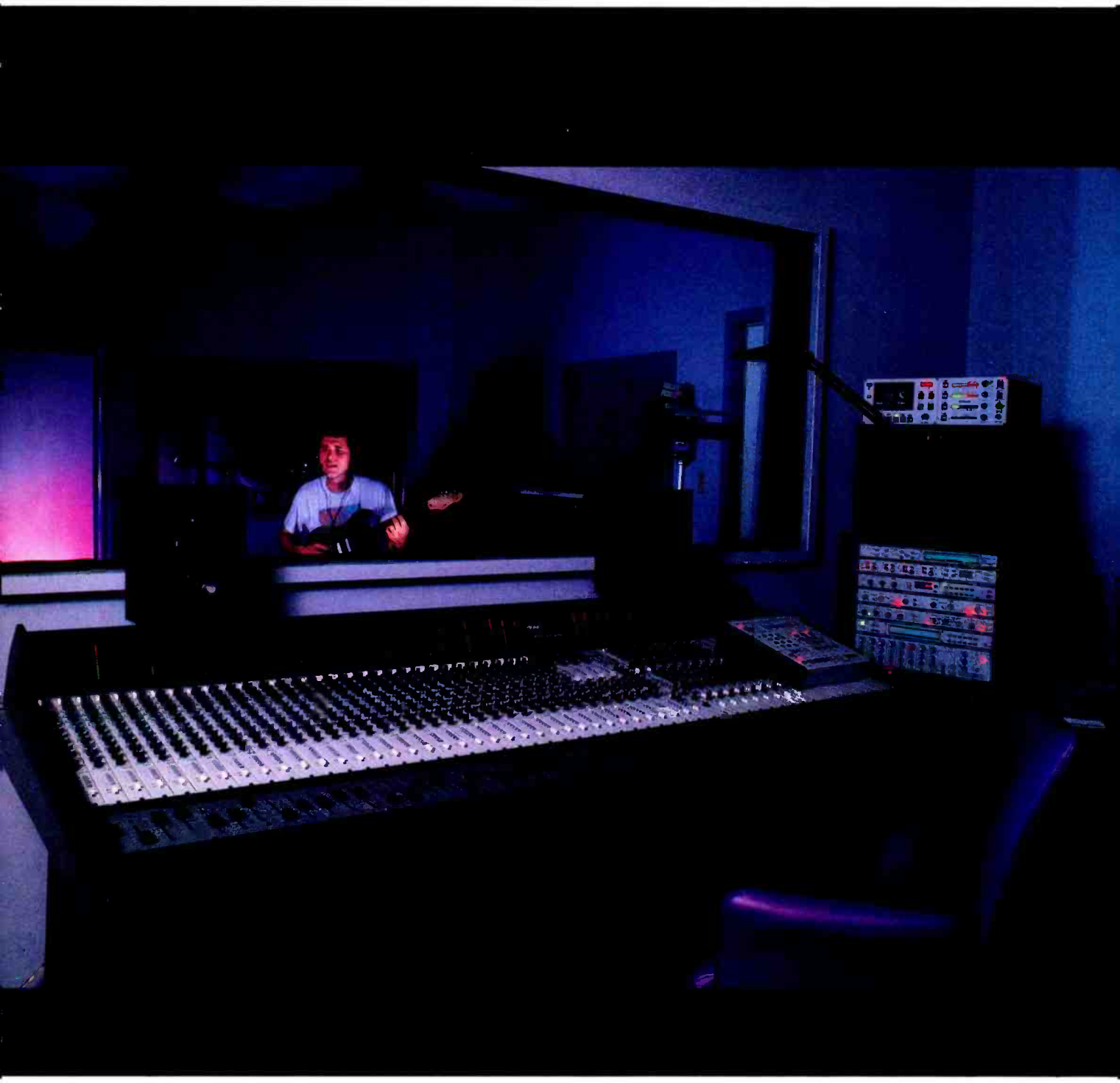
More pedestrian synchronization methods still exist. Generic tape sync and FSK (frequency-shift keying) work at 48ppq or 96ppq (pulses-per-quarter note), the same as sync on pre-MIDI drum machines. This is a "dumb" pattern of identical clicks that offer no way for the sequencer to know where it is once the composition is started. A newer variation on the theme employs an "intelligent" FSK that has song pointer information encoded to provide location information. The problem is that these formats are proprietary to each manufacturer —defeating the common purpose of MIDI and SMPTE as industry standards. If you go to the trouble of purchasing an interface that features FSK, why not choose an interface with standard SMPTE and be done with it? The price difference is negligible.

One last point about sync—an audible click track is very important when working in any kind of professional environment. Attempting to listen to the beeping of the speaker in your computer doesn't cut it. Exceptions to this are computers, such as the Amiga, that have both internal synthesizers to produce the click and standard audio jacks that you can patch into the board. Click In, while much more rare, allows the sequencer's tempo to be driven by external audio clicks such as those produced by a digital metronome or miked kick drum.

As always, when planning a purchase, the best rule of thumb is to consider your future needs when evaluating your present ones.

RE/P

Jeff Burger is *RE/P's* computer consulting editor and is president of Creative Technologies in Los Angeles.



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Electronic Editing: States of the Art

By Laura Wirthlin

The great interest in hard disk editing systems has led to a perception that they have supplanted tape-based editing—one that is far from reality.

In the early days of digital audio, several editing methods were explored by designers, manufacturers and users. Soundstream provided an early hard disk editing system, while mainstream audio manufacturers developed razor blade editing and videotape-based electronic editing systems. (While not conventionally considered electronic editing, razor blade editing involves a machine-directed electronic edit—or crossfade—when a splice is detected.)

At the same time, enterprising users of digital audio recording equipment, especially the F1 system, performed simple edits by treating the digital audio as a video signal. But because video editing—not to be confused with videotape-based electronic editing—is restricted to frame-accurate edits, it cannot provide the word-level resolution necessary for audio. Also, video editing does not provide for crossfading, which leaves the signal unstable at the edit point. In general, this type of editing is useful only for compiling complete sections of program material.

Videotape-based editing systems, the first widely available electronic editing systems, supported CD mastering and became the de facto standard. These systems combined video editing and digital audio technologies in an innovative way. They maintained the advantages of digital audio, accomplished the task of editing and allowed one system to be used from recording through manufacturing. There were two first-generation systems available, the JVC AE-900 and the Sony DAE-1100/1100A.

Still, there were many disadvantages in the use of these systems. Because of limitations in processing and memory, com-

Laura Wirthlin is a mastering engineer at CMS Digital in Pasadena, CA, and a freelance writer.

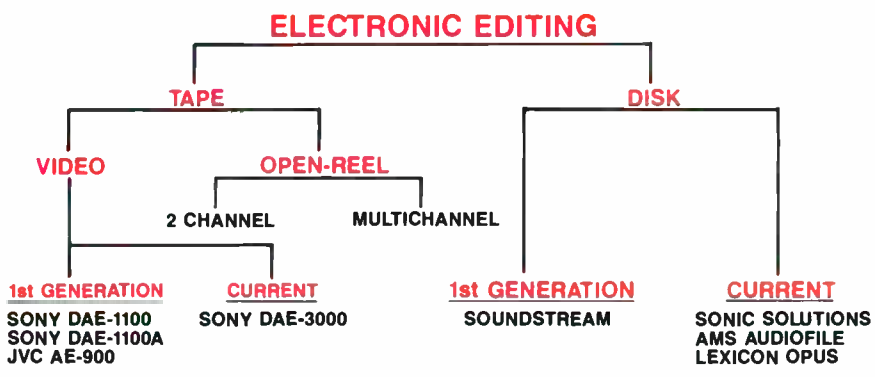

Figure 1. Hierarchical table of electronic editing systems.

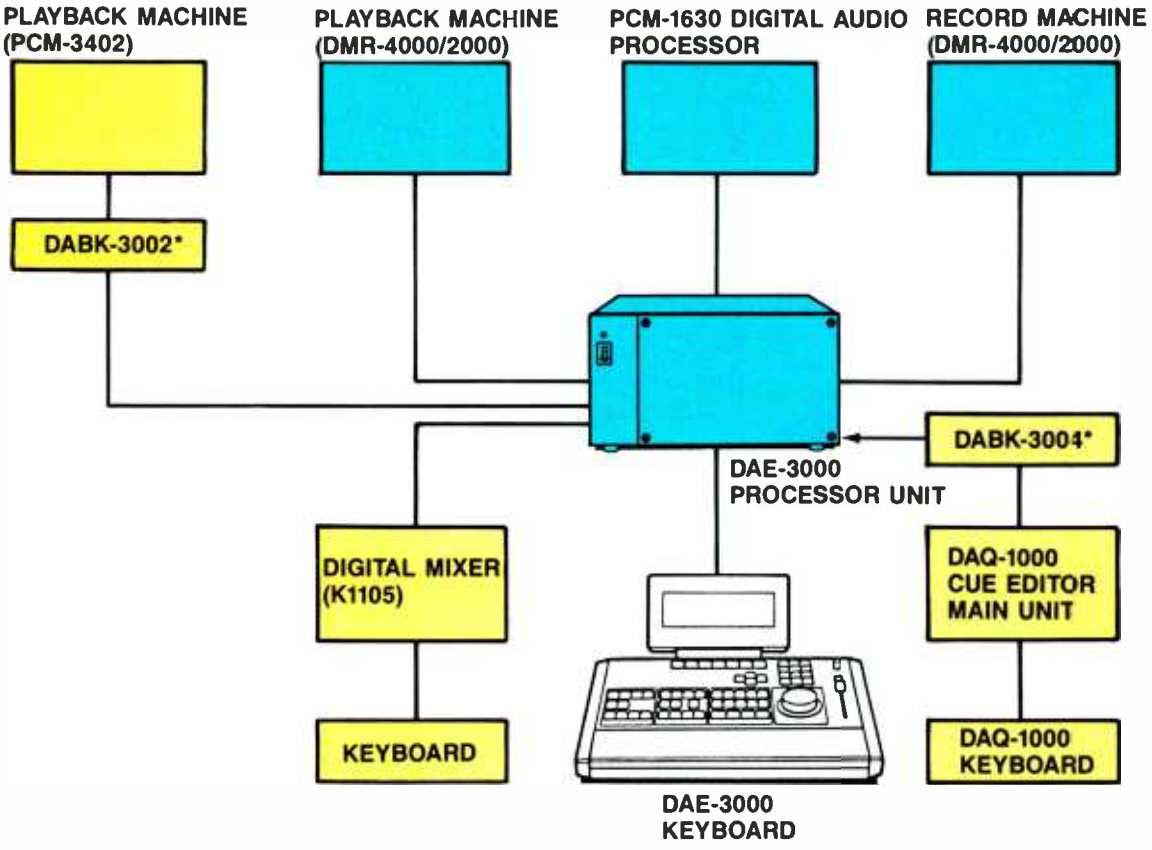

Figure 2. *A typical system configuration for the DAE-3000.*

promises were necessary in the audio quality of the working memory (8- or 16-bit mono monitoring with extremely limited resolution when scrubbing) and fader, the flexibility of crossfades, search and pre-roll options, and in the speed of operation. (Early systems must replace the working memory with short-duration, 16-bit stereo audio in order to execute previews and edits.)

Following advances in signal processing and memory, several companies began to address these limitations by developing hard disk (HD) editing and production systems based on microcomputer technology. In general, these systems feature improved memory and processing, with different companies offering users a variety of implementations. The introduction of hard disk editing systems has attracted great interest, leading to a perception that they have supplanted tape-based editing. This perception is far from reality.

There remains a large volume of tape-based work. CD manufacturers require a tape that meets specific requirements such as continuous time code; specific lengths of pre- and post-roll time code; and a sampling frequency of 44.1kHz, not 44.056kHz. Only a small percentage of these are downloaded from HD systems.

Record companies and independent mastering facilities also use tape-based systems far more than HD systems. Studios record primarily onto tape and provide a master tape to a record company, mastering facility or manufacturer. For these reasons alone, it is worthwhile to examine the state of tape-based editing systems when considering the present and future of electronic editing. More importantly, first generation tape systems and HD systems are not the only options.

Many edits now performed somewhat easily would have been impossible with earlier systems.

Concurrent with the development of HD editing systems have been many advances in tape editing. It is now possible to electronically edit some open-reel recordings with even greater flexibility than the original videotape-based editors. Word-level accurate transfer editing and punch-ins, with a variety of crossfades, are available on some multitrack machines, while on-board electronic editing, featuring 16-bit stereo RAM and rehearsal functions, is available in a 2-channel, open-reel recorder.

It is still possible to perform razor edits, but the instability of this method and improvements in electronic editing capabilities make it increasingly uncommon. Open-reel recorders do not possess all the functions of a more advanced videotape-based editing system, but their capabilities benefit a wider variety of projects. Currently, the only alternative to HD editing systems is the Sony DAE-3000.

The Sony DAE-3000

During the time that electronic editing was functionally limited to first-generation tape systems, editors (human ones)

developed a wish list that combined the best features of available systems. Although individuals disagreed about which electronic editor was best, there was a strong, albeit informal, consensus about how to make a better one.

The most important requirements were a 16-bit stereo working memory with rehearsal, a 16-bit re-dithering fader, more crossfade options and a faster response time. Better search, pre-roll and autolocation functions were also concerns. In short, operators wanted their electronic editing systems to match the audio quality and ease of use of the best analog tape machines, while retaining and expanding the advantages of digital audio. The DAE-3000, the direct descendent of the first electronic editing systems, fulfilled the above wishes and a number of others.

Improved search functions offer 12 seconds of 16-bit stereo RAM (six seconds each for source and master machines); adjustment of the edit point by scrubbing at three levels of sensitivity; auditioning of half or all of the memory (at continuously variable speed); and offset during continuous repeat or by numerical entry.

Improved editing functions include crossfades from 0ms to 999ms in one millisecond steps, interchannel balance adjustment, programmable fades, variable dither and multiple insert modes. Other functions such as crossfade-time selection are indicated on the display screen. These features allow the operator to enter commands efficiently and offer virtually instantaneous response.

The slowest function, printing the edit, begins three to five seconds after the command is given (a great improvement over the 30 seconds required by first-generation systems). Improved autolocation functions make it possible to locate the upcoming take while setting the edit point for the master tape.

During the initial period of use, most editors operate the DAE-3000 in the same manner as first generation systems, although the improved search facilities make location of the edit point more accurate and efficient. As new features are discovered, additional search techniques are adopted, new crossfades are favored and automated fades are used to enhance level-matching.

Processing must be evaluated on the basis of audio quality, flexibility, speed, cost-effectiveness and adaptability.

The most noticeable result may be increased efficiency, particularly in CD preparation and simple editing, but the artistic and technical quality of the edits is also improved. At this level, attention can be given to using autolocation for still greater efficiency, selecting pre-roll times to match musical structures, adjusting edit points numerically for fine resolution and precise repeatability, and changing dither modes to complement source material.

As both basic and advanced functions are integrated into the editing routine, it becomes apparent that many edits now performed with something approaching ease would have been impossible with earlier systems. Simple edits also benefit, as even the most basic edits can now be made better than before.

But just as electronic editing makes its users more aware of the advantages of analog editing, the DAE-3000 makes its users appreciate some of the useful features provided on earlier videotape-based editing systems. Features sacrificed on the initial introduction included a 5-second pre-roll option (the DAE-3000 originally permitted 0s to 59s pre-rolls, but at five seconds, the machines frequently unlocked and recycled), the possibility to set autolocation points for either machine (source or master) during any operation (originally the DAE-3000 permitted setting points only for the machine selected), and direct numerical entry of the edit point.

A major complaint about the DAE-3000 was that, because the memory is continuously updated during Play, printing the edit causes the edit points to be cleared. This seemed harmless enough to designers, but in practice, engineers had discovered a number of uses for retaining the edit points, such as reprinting an edit involving a difficult fade or looping a section of source material.

Updated firmware (EPROMs) restored these features and added more. The shortest available pre-roll, also the new default setting, is now six seconds—the time at which the machines consistently lock. Autolocation points can be set for either player or recorder, regardless of which machine is selected. Edit points can be entered numerically. And most importantly, previous edit points can be saved in three ways: Memory Lock, which prevents their erasure; Last Edit Point, which displays time code and crossfade information to be entered numerically; and Edit Point Recover, which automatically reloads the memory.

In addition, several parameters that originally appeared on the Edit Set-up display screen now appear as functions available from the Basic screen, making changes in pre-roll time and memory-rehearsal repeat features simpler. (This can also be a disadvantage, however, as it is now necessary to page through the Basic screen's functions to get to some that may be favorites.) Also, the default insert mode is now manual, which is probably an improvement for editors who compile composite digital onto pre-striped tape.

New error messages have been added, further reducing puzzlement when a com-

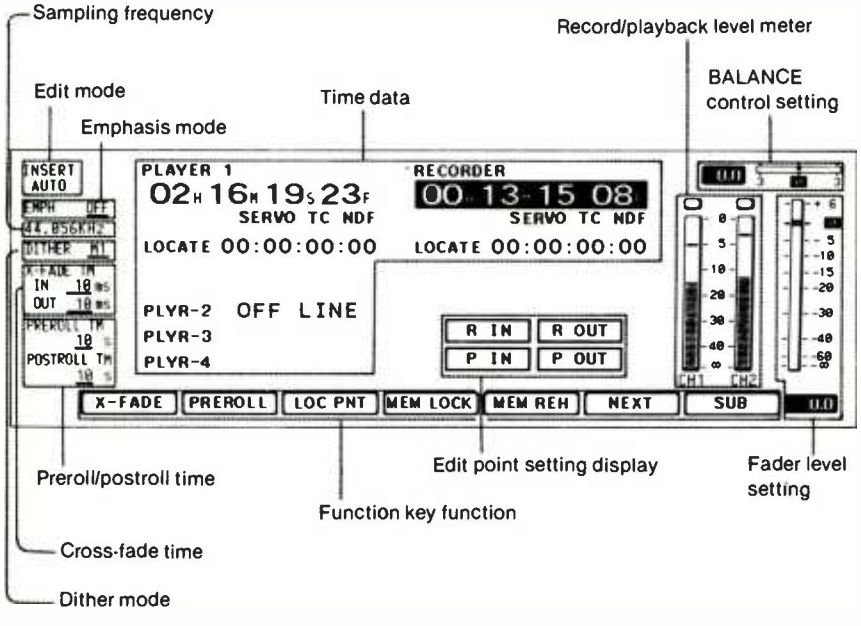

Figure 3. The DAE-3000 basic screen.

APPRECIABILITY

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TOM McCORMACK, THE BURBANK STUDIOS, CA

DEPENDABLE

"Reliability is a major concern in day to day operation. The GML system has been nearly flawless."

TETSU TAKAHASHI, SEDIC STUDIOS, TOKYO

PRECISION

"Fader and Mute accuracy so precise, my confidence in the system to reproduce every detail is unquestioned."

BRUCE SWEDIEN, MIXER, CA

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"GML's ability to convert SSL and Necam mix disks allows us to maintain compatibility, assuring room to room flexibility for our clients."

STEVEN BRAMBERG, ATLANTIC STUDIOS, NYC

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"It provokes an environment that enhances the creative process..."

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mand is not executed immediately. This feature is useful to prevent the minor—or major—pilot errors that may occur because of increased operating speed. Additional tests make diagnosis of system problems easier. (I have yet to have a system problem, but it is reassuring to know that extensive diagnostics are available if needed.) Be warned, however, to turn down the monitoring level before the main unit test. Perhaps in the future, a warning could be displayed on the test menu screen.

Tape vs. hard disk

A comparison of the DAE-3000 with current HD options yields some surprising results. The two most-discussed advantages of HD systems—sophisticated processing and speed—are not as simple as they first appear. In addition, ergonomics and system compatibility have become increasingly important concerns.

One important feature of HD systems is that they are largely software driven. Using advances in digital audio processing and microcomputer technology, it is theoretically possible to design an electronic editor with processing as sophisticated as its human programmer. Although compromises are imposed by the memory and computational limits of the hardware, software-driven systems certainly can offer more options than first generation tape-based editors. It is also possible, however, to design a software- (or firmware-, in the case of the DAE-3000) driven tape editor.

Thus, while most agree that hardware-driven electronic editing will no longer advance the state of the art, the processing of HD systems is not inherently superior to that of tape systems. Rather, processing must be evaluated on the basis of audio quality, flexibility, speed, cost effectiveness and adaptability.

More powerful editing systems tend to magnify existing difficulties, increasing the significance of functional design.

HD systems are generally thought to offer greater speed by virtue of random access. They do offer non-sequential, almost instantaneous access to the contents of their memories—which vastly increases the amount of available working memory. But disk capacity limits the amount of accessible source material. Projects involving several hours of source material may have to be edited in sections, downloaded to tape, then reloaded for final assembly.

In addition, if multiple projects are in progress simultaneously, they may have to be up and downloaded for each editing session. Some systems are capable of loading one project while processing another, which increases efficiency but complicates session scheduling.

Conversely, a tape-based editing system requires sequential access, limited by the fast-wind or autolocation speed of the tape machines. Tape does provide, however, a different type of random access: Large amounts of source material for one or more projects may be accessed simply by changing tapes. In addition, multiple machines can be used to further decrease access time.

Access to processing should also be considered when evaluating the speed of any HD or tape-based electronic editing system. The time required to audition and alter parameters has a great effect on editing efficiency, as demonstrated by the increase in speed obtainable with an improved tape system. After the source material has been located and the editing parameters determined, a disc system can perform the entire edit instantly, while a tape system must still transfer the edit in real time.

This may not be a significant disadvantage, however, as most engineers will want to audition a project at least once before releasing it. Again, system design and implementation has a greater effect on actual working speed than does the choice of storage medium.

Ergonomics affects both the effective and efficient use of the processing available, and should be considered as important as the previous factors. The similarity of many HD systems to personal computers can be an advantage to the computer-literate user with no previous experience in electronic editing.

That some HD systems more closely resemble computers than audio equipment, however, can prove to be a disadvantage. Features that cannot be easily and appropriately applied in production applications will not be of great practical value, although they may provide models for future designs.

On a smaller scale, the computer-like features of early tape editors complicated the problems of limited processing and speed, and made the initial period of use an ergonomic nightmare. More powerful editing systems tend to magnify existing difficulties, increasing the significance of functional design.

System compatibility is yet another im-

The Sony DAE-3000 Digital Audio Editor.

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portant consideration. Some HD systems offer outstanding programs for multitrack production, mixing and equalization, which are invaluable in complex projects. These features can be used most effectively only if the internal programs are compatible with the necessary external source and destination hardware and with each other. Otherwise, interface difficulties may prevent an individual feature, however useful, from being used for a simpler project for reasons of cost effectiveness.

To date, tape-based electronic editing systems have been dedicated devices. (While tape editing systems are dedicated devices, many additional uses can be found for 12 seconds of 16-bit stereo RAM.) If multitrack production, mixing and equalization are needed, additional equipment must be added to the basic editing system. This component approach allows use of the same equipment for various functions throughout the recording-editing-production-mastering process, but requires external interfacing.

The capability to integrate additional functions into tape or HD editing systems is valuable, but the compatibility of the entire system, from recording session through manufacturing, must be considered when evaluating the editing and production aspects.

The future

New tape and HD systems offer revolutionary improvements in electronic editing. Still, while system designers and manufacturers are updating and refining their products, system users are updating and refining their needs (and wants). Again, users want to combine and expand the best aspects of all available systems.

On a small scale, those features include:
- 16-bit (or more) stereo RAM.
- A combination of search modes.
- Waveform displays for visual cues.
- Instant printing and rearranging of program material.
- Extensive audition and review modes.

On a grander scale, they include:
- The best editing and production applications of HD systems.
- The best recording, post production and manufacturing uses of tape.
- The clarity and speed of predetermined algorithms.
- The flexibility to alter some parameters. This would allow the possibility of an automation system to set default parameters for specific users or projects (and to store lists of edits performed and generate project logs) or for the development of add-on software packages.
- The non-sequential access and the working memory of disk.
- The transportability and storage capacity of tape.

Finally, as the systems become more complex, add internal diagnostic programs.

There are several possible reasons why disk systems have not replaced tape systems in general use. Digital technology now provides a mainstream approach to audio, and its users, given the option, are seeking a mainstream-compatible approach to electronic editing. Tape-based editing systems are, for many, an evolutionary upgrade resulting in a revolutionary improvement in overall capabilities. In the future, traditional video-style and razor blade editing will gradually disappear as more users have access to some form of electronic editing.

Within the field of electronic editing, creative processing is becoming a matter of priorities. The definition of random access is expanding to include more than non-sequential access to program material. When users demanded razor blade editing, it was not the razor blade they wanted, but the audio quality, ease of use and speed. Now, when users demand the features of tape or hard disk systems, it is not necessarily the tape or disk they want, but a powerful, flexible and usable system that is efficient and cost effective...and that sounds good! RE/P

Glossary

Electronic editing systems: tape and hard disk systems that edit digital audio by electronically copying and manipulating the source material. This generally includes word-level accurate location of edit points, calculation of crossfades and fadeouts, and the generation of control data.

Hard disk systems: electronic editing systems that use a hard disk drive during the editing process for source and master material. Source material is loaded onto a disk for editing, then the master material is transferred from the disk to its final format.

Open-reel systems: electronic editing systems that use open-reel (stereo or multichannel) digital audio formats during the editing process for source and master material.

Preview: auditioning the edit prior to execution. Generally a function of tape systems in which the signal is played back from the tape, allowing a longer audition than is possible in the rehearsal mode.

Re-dithering: adding dither to the edited signal to improve the signal-to-error ratio. Particularly useful toward the end of fadeouts.

Rehearsal: auditioning the edit prior to execution, generally a function in which the signal is played back from RAM.

Scrubbing memory: RAM used to audition and adjust the edit point. Named for the "scrubbing wheel" or "scrubber" used to make adjustments.

Tape systems: electronic editing systems that use digital audio tape for source and master material during the editing process. Includes both videotape and open-reel systems.

Videotape systems: electronic editing systems that use videotape-based digital audio formats (usually U-matic) as source and master material during the editing process.

Word-level accuracy: for practical purposes, manipulation of digital audio in its fundamental form. Resolution may be described in quantities of several words because of the structure of the format.

Working Memory: RAM used to audition and adjust edit point.


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The Marriage of SMPTE and MIDI

By Jeff Burger

SMPTE to MIDI conversion devices must reconcile the different ways these formats look at time.

Every time you turn around in the Land of Technology, a new standard has evolved to make life better, faster, cheaper or smoother. Along with the problems these new schemes solve, an equal number of difficulties arise when using them with the current, great-standard-to-beat-all-standards. Such is the case with the tape machines and the MIDI sequencer.

The original MIDI spec had MIDI Clock (also known as MIDI Sync) provisions for synchronizing devices such as sequencers and drum machines. This series of timing pulses is transmitted from master to slave, 24 times per quarter note. You might think of this as a metronome spewing out a stream of "96th" notes. (There is no such thing as a 96th note. Strictly speaking, the musical term for a note of this duration is a "triplet 64th".) The accompanying Start, Stop and Continue commands do exactly what you might expect. Pressing Start on the master tells the slave to begin advancing one 96th-note increment for each subsequent clock pulse it sees until a Stop command is issued. Continue tells the slave to pick up the same process from where it left off.

But in this scenario, communications break down when the master and slave are arbitrarily parked at different points in the composition. To deal with this problem, the original MIDI spec (version 1.0) includes Song Position Pointer. After relocation (for those sequencers that support Song Position Pointer), the master sends out a message to the slave that indicates its position according to how many 16th notes (groups of six MIDI Clocks) have passed since the beginning of the composition. The slave locates to the same point and chases the master accurately on a Continue command.

MIDI/tape compatibility

The first big hurdle in the courtship of MIDI and tape is the incompatibility of MIDI's digital format with analog tape. Tape sync devices were therefore developed to write and read a series of analog pulses on tape, which corresponded to MIDI Clock pulses. This association suffered from the same problems common to synchronizing pre-MIDI drum machines and sequencers to tape. (Machines like the LinnDrum, TR-808 and DMX/DSX used 24, 48 or 96 pulses-per-quarter for sync.)

First, once the sync track was laid, you were locked into that tempo. Secondly, these identical pulses were indistinguishable from one another. MIDI devices still had no way of chase-locking during a tape rewind or fast-forward operations. Users were forced to return to the beginning of the composition for each replay. Needless to say, this was not everyone's concept of an ideal relationship.

Predictably, several manufacturers have come up with methods of encoding Song Pointer messages into an FSK tape sync format to facilitate chase-locking MIDI devices to tape. Unfortunately, this has not been addressed in the MIDI Spec, and each manufacturer uses a proprietary format that is incompatible with the competition. In addition, these methods still leave you with a fixed tempo, once the tape is striped.

SMPTE/MIDI conversion

When professionals think of successfully implemented synchronization standards, SMPTE time code wins hands down. Obviously, the logical thing to do is to unite SMPTE with the newer MIDI standard. This union is implemented with a SMPTE-to-MIDI converter. The first thing such a device does is convert the analog SMPTE signals into digital signals for MIDI. Far more importantly, these units reconcile two different ways of looking at the world.

SMPTE is based on the real-time precepts of hours:minutes:seconds:frames. SMPTE is absolute and doesn't change its time base any more than a digital clock does. MIDI, on the other hand, is a relative

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musical measurement. As discussed earlier, the only chase-lock mechanism MIDI supports is Song Pointer (with location to the closest 16th note) and MIDI Clock (sync to 96th-note pulses). Upon further examination, one of the foundations of music is tempo, which is specified in beats per minute. The minute represents the common platform between these two standards.

Quite simply, SMPTE dictates what a minute is. The SMPTE-to-MIDI converter specifies what to do with that minute—how many beats per minute and, by extraction, how many MIDI Clock pulses per second (or frame) to send to the MIDI slaves. One thing to keep in mind is that tempo is relative to SMPTE time rather than real time. That means that if the tape stretches so does the time base and, therefore, the tempo as well.

Here's an example: 120 beats per minute (bpm) at 30fps SMPTE. Dividing 120bpm by 60 seconds per minute results in two beats per second. There are 24 MIDI clocks per beat and, assuming the beat value is a quarter note, that means 48 MIDI clocks per second. A second contains 30 frames, resulting in 1.6 MIDI clocks per frame. Additional number crunching is done to calculate MIDI Song Pointer to facilitate MIDI chase-lock at any point on the tape.

Unlike the standard tape sync discussed earlier, striping a tape with SMPTE TC allows you to change the tempo on your MIDI gear before committing those tracks to tape, because the converter is dictating the tempo. Most SMPTE-to-MIDI converters also provide the user with the ability to change the tempo and meter at specified points.

For example, a song may begin in 4/4 time, at a tempo of 120bpm, and later change to 3/4 time at 83bpm. This use of tempo maps and meter maps is very important when it comes to film and TV cues, which must conform to given lengths. More advanced units offer the ability to automatically scale the tempo between two points at a given rate and curvature for perfect accelerandos and retards.

The newest member of the family

As with any relationship, SMPTE and MIDI have not coexisted without problems. One important example is that after you've gone to all this trouble of translating realtime information to relative musical references, some MIDI applica-

The Tascam MIDiiZER Synchronizer.

tions are still best dealt with in the time domain.

MIDI Time Code

In the last year or so, the union of SMPTE and MIDI fostered an offspring—MIDI Time Code (MTC). For all practical purposes, this provides a way of sending SMPTE-like information via MIDI. Like SMPTE, MTC provides an absolute reference of hours:minutes:seconds:frames. The biggest difference is in the way they are transmitted. SMPTE is an analog signal, while MTC is transceived in a digital stream of serial information just like other MIDI data. The inner workings of MTC are as transparent to the user as Song Position Pointer.

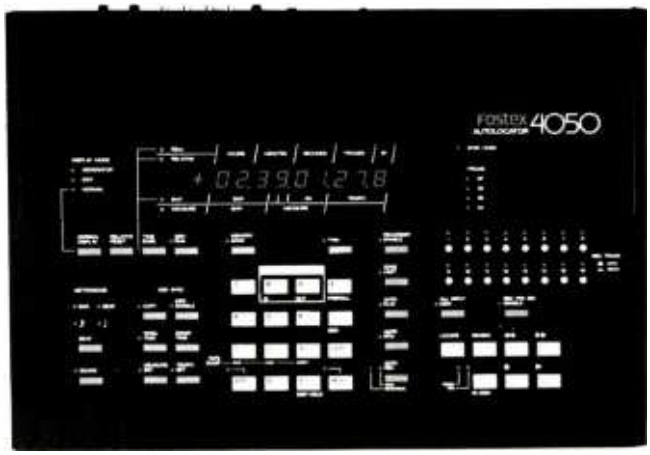
Like all MIDI data, the first byte of an MTC message is a status byte that tells the receiving device how to deal with successive data. MTC consists primarily of Full Messages and Quarter-Frame Messages. The Full Message is a 10-byte message that specifies the SMPTE format (24, 25, 29.97 or 30fps) along with the current location in hours:minutes:seconds:frames.

However, the bandwidth of MIDI makes it prohibitive to send this Full Message for each frame. A Quarter-Frame Message is a 2-byte piece of data sent every quarter frame naturally. A total of eight of these messages are compiled to represent a complete hours:minutes:seconds:frames location ID every two frames. The Full Message is sent only periodically (in many cases, only when a tape is first started or when it stops), with the smaller Quarter-Frame Messages doing most of the work. The Full Message is still required to lock a MTC device to SMPTE on start-up. For this reason, MTC typically takes at least several frames to lock up.

MIDI Time Code comes in very handy in today's electronic post-production environment. One application is automated mixdown against time code, using a MIDI-controlled mixer. In the context of film or TV music, it's much more appropriate to control a fade or MIDI-controlled effects device within the context of SMPTE.

A more universal application is electronic sound effects. Programs such as Digidesign's Q-Sheet A/V for the Macintosh provide for an automated hit list. Given the appropriate SMPTE-to-MTC converter, these types of software programs allow the sound effects editor to enter a series of time code events into an on-screen list. The events can be entered manually after a window-dub spotting session or in real time, by pressing a key on the computer while watching the picture. In the later case, the event can be edited to nudge it to the exact frame desired. Each list event includes a reference to given channel and note numbers for firing a MIDI sampler.

Some of the more ambitious variations on this theme incorporate an off-line/on-line concept. A single playback device is used to log individual sound effects, one pass at a time, with an inexpensive off-line (computer and one sampler) system. In practice, you might load-up some gunshot samples and log all needed gunshot events into the hit list while hearing them fire. Next you might load all the car door slam sounds, logging all the car door events while hearing the slams, but not the gun shots. Finally, you take the hit lists into the on-line room, which has a rack of samplers and CDs, and let the computer fire everything in realtime.



The Fostex model 4050 Autolocator with SMPTE Generator/Reader.

The Adam-Smith Zeta Three with remote.

Applications

There are many things to consider if you plan to have SMPTE and MIDI in your studio. The biggest difference in SMPTE-to-MIDI converters is whether the device in question is a stand-alone unit, for use with dedicated hardware sequencers, or an interface for personal computers.

The stand-alone units have at least one MIDI In jack to accept your controller, as well as a SMPTE In. Mechanisms are provided to log a tempo and meter (and sometimes maps for both), as well as a SMPTE offset point at which the unit begins sending MIDI Clocks to the slave. These MIDI Sync and MIDI In signals are merged internally and sent from the unit's MIDI Out to the slave's MIDI In. You'll quickly appreciate a unit that has a front-panel window that displays the time code and facilitates easier programming of other parameters. Products such as the J.L. Cooper PPS-100, Tascam's MIDiiZER, Fostex's 4050 Autolocator, and Adam-Smith's Zeta Three have such displays.

The computer-based units typically serve the dual role of MIDI interface and

SMPTE-to-MIDI converter. These units have few physical controls because they materialize on the computer screen. While some programs support them directly, most of these units come with pull-down desk accessory programs that allow access to the converter controls from within any program. Multiple-merged MIDI Ins are common, and multiple, individually addressable MIDI Outs are even more prevalent, providing for more than 16 discrete channels. (See this month's "Understanding Computers" column for more details.) If MIDI Time Code is supported, it is often sent and received through different ports than the ones being used for performance data. This is done to eliminate clogging of the MIDI data stream.

A major advantage of using MTC with a computer-based sequencer is that, because the sequencer does not need to deal with clocks and pointers, tempo maps can be created and edited inside the software itself, which is usually much more flexible and easier to work with than a hardware-based converter. Additionally, while hardware converters can only store one tempo map and set of offsets at a time, and therefore must be re-loaded or re-programmed every time you load a different sequence, a MTC-compatible sequencer will store a tempo map as *part* of a sequence—recalling it automatically, every time the sequence is loaded.

J.L. Cooper's PPS-100.

If you're just doing rock 'n' roll or simple post, most devices will give you the simple chase-lock you need. If you're scoring against picture, do yourself a favor and get a unit that supports tempo and meter mapping. If you don't need it now, you will.

Another interesting feature on some units is the ability to generate a tempo map via a physical tap or audio signal input. This could be a click from pre-SMPTE tracks or something like a kick or snare drum hit from a live drummer.

There are several other things to consider relative to these technologies. Although most SMPTE-to-MIDI devices generate time code, not all can regenerate fresh time code in a sort of "flywheel" mode when they encounter tape dropout. Nor do all devices read and write all four SMPTE formats. Some allow striping the tape at a user-specified offset point. Certain devices support the older PPQ and FSK sync signals as well as accepting MIDI Sync. You might even want to look for something as mundane as whether the unit can output a common metronome pulse.

As with any relationship, there are a few ups and downs when uniting SMPTE and MIDI. In general, the outlook for the future of these two popular technologies is a bright one, given the universal acceptance of SMPTE as a synchronization standard and MIDI as a musical communications standard.

RE/P

Sonic Restoration through NoNOISE

By John Monforte

New techniques in digital signal processing allow "after-the-fact" treatment of recordings to increase signal clarity.

In the late 1970s, Dr. Tom Stockham of Soundstream remastered old Caruso recordings after processing them to reverse the resonant effects of the original recording horn. This process, called deconvolution, required recording the impulse response of the recording horn and calculating its frequency transfer function. A digital filter with the inverse of that function was then used to process the recording.

Stockham's was a pioneering effort. Traditional, manual editing was used to remove pops and clicks, leaving the program slightly shorter. The entire process was time consuming, and the results were less than perfect. Although digital signal processing seemed to lend itself to the field of sonic restoration, little more was done until recently, when Andy Moorer of Sonic Solutions devised a system called NoNOISE to reduce the degree of noise present in old recordings.

John Monforte is *RE/P*'s technical editor and director of recording services at the University of Miami.

The NoNOISE system is not a box into which a signal is fed and magically transformed into wonderful, noiseless music at the output. It is a system of signal processing techniques that can be applied to a recording. It is essentially a "toolbox" of computer programs that allows an operator to manipulate sound on a machine equipped with Motorola's 56000 DSP chips and a large hard disk storage system.

System set-up

A typical processing session begins with recording the original source material onto a conventional PCM mastering format such as the Sony SDIF-II (1630 format). It is also preferable to record a stretch of "silence" (that is, noise without any signal) from the original sessions, if any is available.

The choice of masters has a very significant effect on the quality of the final product. As with any noise reduction system, the capability to distinguish noise from

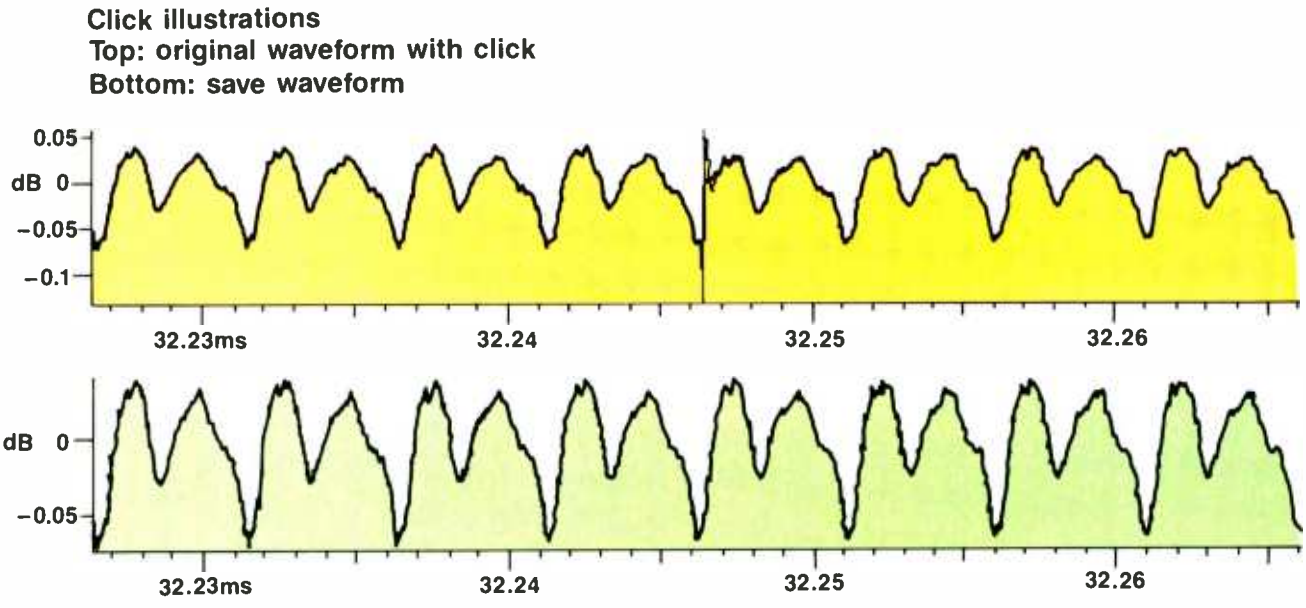


Figure 1. *Click illustrations showing an original waveform and the changes apparent after NoNOISE reconstruction.*

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signal is reduced as the level of signal approaches that of the noise. Original master tapes are preferred over cutting masters; mag film is preferred over optical prints. Dubs of a master should be avoided. Equalized masters tend to complicate matters because of their equalized noise spectrum. If the recording requires equalization, it is best added after noise has been reduced.

De-clicking

The first step in the restoration process is declicking. The recording is examined manually to locate pops and clicks. The offending portions are marked off before and after the click, on the nearest cycle. New cycles, based on the spectrum of adjacent cycles, are then calculated using a resynthesis program. (See Figure 1.) Unlike editing methods, the system preserves the original feel and tempo because the process does not shorten the program.

While magnetic tapes may be relatively free of pops and clicks, master lacquers and optical tracks may have many. In such cases, another piece of NoNOISE software is used to automate the process. This software defines the parameters of potential pops and clicks, enabling the computer to search and de-click unattended. Of course, the results must be carefully auditioned to be sure that transients in the program haven't also been removed.

The real power of the system lies in its denoising software, which, subjectively, can reduce noise by 20dB. (The degree of dehissing is proportional to the acceptable degree of signal degradation.) The process can best be understood by examining the operation and limitations of its analog equivalent.

Gating and masking

The simplest form of noise reduction is the noise gate. If the level of a program signal level falls below a set threshold, the noise gate—via a voltage-controlled amplifier—either reduces the signal a predetermined amount or shuts it off entirely. The idea is that when the program level is loud enough (above the threshold), accompanying noise is sufficiently masked by the program material. But when the signal falls below the threshold, that same noise becomes intrusive and must be dealt with. The noise gate does this by muting the entire signal.

This on/off action can be intrusive. Musical instruments have sustain. Also, the environment in which they are recorded may be reverberant. Thus, a signal may be present and still quite audible even after it has fallen well below the noise threshold. At this point, the noise gate would have muted the output, resulting in the audible removal of the tail end of a decaying sound. This is often referred to as "breathing," and is something that can be heard on today's popular recordings as a special effect, usually on drum tracks.

Breathing can be made less obtrusive by slowing the attack and release times of the noise gate so that transitions are more gradual. But the sonic penalties of this simplest version of level control remain clearly audible.

Another shortcoming of gating and masking techniques is their inability to deal with noise modulation—the problem that occurs when the signal is in a different frequency range from the noise. The noise that accompanies the recording of a single organ pedal is a good example. In such instances, noise can be heard even when the program level is loud because the psychoacoustic effect of masking does not occur. The hiss level can be heard to rise and fall as the pedal is played. The solution to this problem is to split the signal

into individual bands and process each band independently. After this is done, the outputs can be recombined.

Noise reduction: a misnomer

Complementary noise reduction systems, noise gates and even NoNOISE are all just refinements of the level control process. The term noise reduction, used for the complementary systems, is really a misnomer. What occurs in each of these systems is a combination of program gating and masking. No attempt is made to un-mix the noise and signal. The sole determinant that decides whether there is signal or noise is the level of the program at a given instant of time. Noise is, of course, always present in the recording.

In some instances, such as airplane cockpit "black box" recordings, the noise can be louder than the signal. In instances like these, the assumption that noise is the stuff that is present when there is no signal is no longer valid. Before a system that depends on level control can work effectively, it must ensure that the noise level is generally much less than the signal level. When it is determined that noise is the dominant signal, level control systems merely reduce the composite level. True noise reduction would perhaps rely on techniques such as autocorrelation, which can be used for cleaning up pictures from space probes, but is not used in any audio noise reduction system at this time.

The effectiveness of level control systems rests on their ability to perform masking and level changes in a manner benign to the ear. The NoNOISE system performs this kind of psychoacoustic sleight of hand with a subtlety previously impossible. NoNOISE applies the tools of digital signal processing to make a noise reducing system that leaves much of the desired signal unchanged. Here, band splitting is employed in a manner that would be too extreme and detrimental to the signal if done by analog means.

Signal splitting

The signal is separated into 2,000 bands, called bins in DSP terminology. (You can compare this to Dolby A, which splits the signal into five bands.) Each bin is individually examined for signal content. This is where the noise sample of the original recording comes into play; the noise signature of the recording can be analyzed by splitting the noise into the same 2,000 bins.

The threshold levels required for each bin are taken by examining the noise level found in that part of the spectrum. This way, each bin is optimized for the noise character present at the frequencies in question. If hum and its harmonics are present, their respective bins will have higher threshold levels. If the equalization characteristic of a recorder gives noise that is not the same at all frequencies, the differing thresholds can be accommodated. You can now think of the program being split into its different harmonic components instead of different bins, so the spaces between the harmonics can be examined independently of the music. (See Figure 2.)

When a musical signal is present, the processor will pass the pitches related to the spectrum of the instruments being played. At all the frequencies that do not fall within the harmonic content of the desired program signal, the noise can be removed by reducing the gain. In this way, even when significant amounts of program material are present, substantial quantities of noise can be removed. Thus, reliance on masking is reduced and noise modulation is lowered to barely perceptible levels.

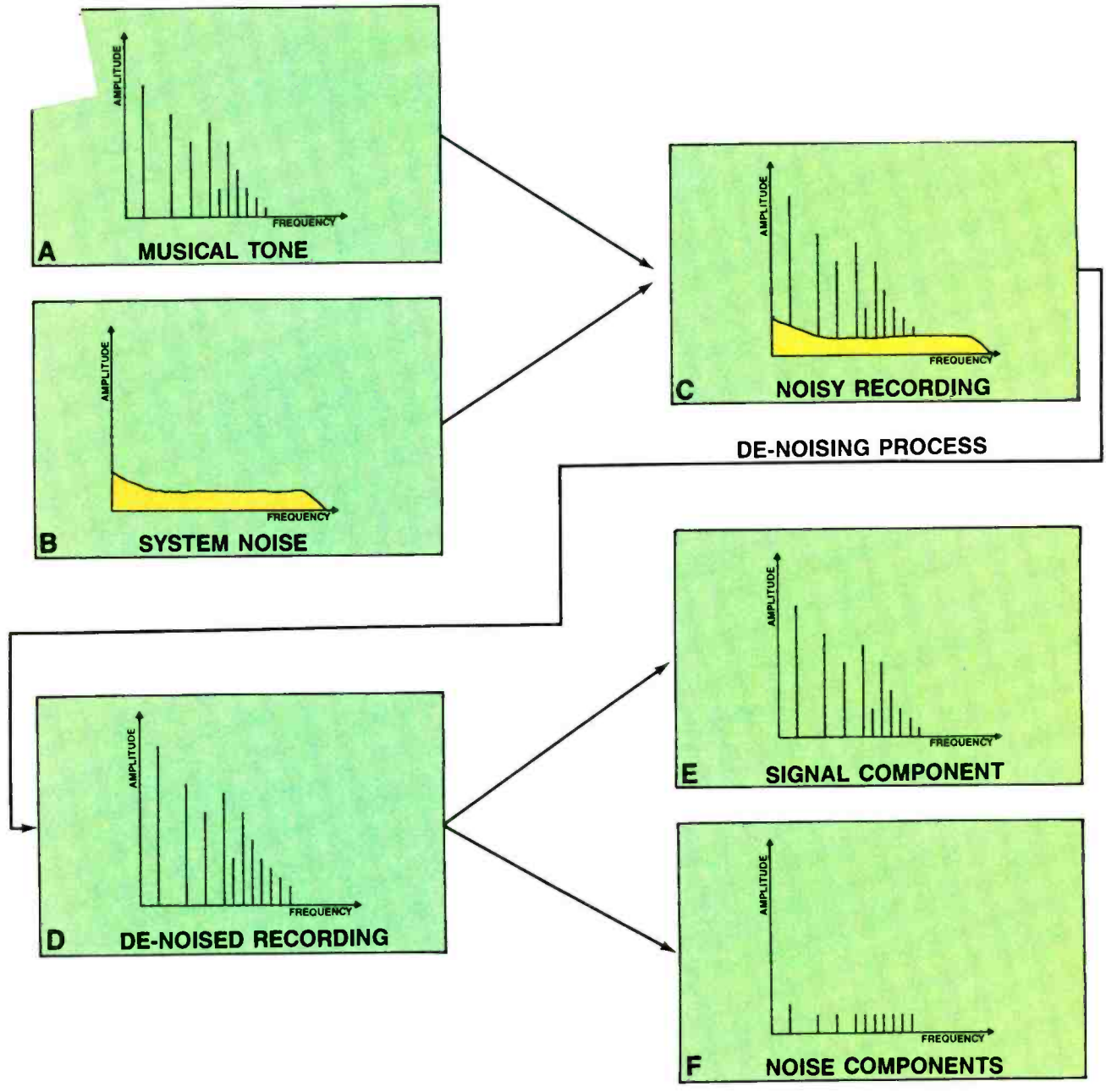

Figure 2. A noisy recording (C) is produced when musical signals (A) combine with system noise (B). The de-noising process removes noise in the spaces between the music harmonics, leaving a recording (D) that consists of the original signal (C) and residual noise of the same frequencies (F).

Digital filtering

The sharp filtering required by this process would be complex and cumbersome if done by analog means, assuming it could be done at all. Even if you could get sharp filters and tune them in a stable manner, all analog filtering is subject to phase shifts and group delays; when reassembled, the signal would be corrupted. The more radical the filtering, the greater the phase shift and group delay.

Digital filters can be made free of phase shift and group delay, and are amazingly benign to the sound. If you get a chance to audition digital filtering, try making a narrow-Q cut in a sensitive frequency range such as 3,000Hz. Surprisingly, it will be nearly inaudible when compared to the source.

Using DSP techniques, these filters can be made with extreme accuracy. NoNOISE performs more than 53 million calculations for each second of program material. At present, it takes eight hours to process one hour of program. Real-time operation is not yet possible, but advances in computer technology may allow it in the near future.

Hums and buzzes

Another related program can be used to eliminate hums, buzzes and other kinds of "pitched" noises, such as camera and fan noise. Hum, for example, can be removed by turning off the bins that contain 60Hz and its harmonics, regardless of the presence of signal. Of course, some signal is lost in the process, but the narrowness of the bands makes the audible change negligible. For instance, the nearest musical pitch to the hum frequency is 64Hz.

NoNOISE is an excellent example of the application of signal processing in a manner that heretofore has been impossible without the power of digitized audio. In the near future, a growing segment of the audio industry will apply digital signal processing to audio signals to restore or artistically enhance program material.

RE/P

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Outdoor Sound Reinforcement for the Pacific Symphony Orchestra

By David Scheirman

With proper planning, a symphony orchestra can successfully co-exist with a full-bandwidth concert system with compact, multisource delayed subsystems.

The enthusiasm of the American public for outdoor symphonic performances has given sound reinforcement technicians a true challenge: how best to amplify and distribute the sound of a symphony to a large audience, while preserving the natural sonic character of the performance.

Nearly every conductor feels that his situation is unique, and in some ways this is true. But, while every orchestra has a distinctive style, there are proven methods for presenting symphonic music to large audiences in outdoor venues.

Physical constraints

The use of sound reinforcement systems for outdoor symphonic events requires careful attention to some basic physical principles:

1. Without the advantages of an enclosed space, the sound is subject to linear dissipation over distance (based on the inverse square law).
2. An outdoor environment usually is anechoic, with no reverberant field to enhance and support the symphonic musical ensemble.
3. As the number of microphones increases, the available gain before feedback is diminished.
4. The closer the loudspeaker system is to the open microphones on stage, the greater the chance for feedback, or "howling." A higher degree of corrective equalization may be required, thus decreasing the naturalness of the sound.
5. If the monitors are confined to the stage area, coverage will be extremely uneven. Those persons close to the stage may experience harsh, overly loud sound, while those persons in the rear may have to strain to hear. A distributed sound system can solve this problem, but can also introduce others if improperly designed or adjusted.

David Scheirman is *RE/P*'s live sound consulting editor and president of Concert Sound Consultants, Julian, CA.

System design strategy

In 1988, the Pacific Symphony Orchestra of Orange County, CA, elected to produce an outdoor summer season. The 15,000-seat Irvine Meadows Amphitheatre was contracted for the concert series. Joseph Magee Audio Engineering was contracted to produce the series; the author was contracted as sound reinforcement director.

We each had similar ideas regarding the presentation of symphonic music in an outdoor setting. To start with, we knew that a reliable, modern touring-style sound system would be the most appropriate, given the quick setups and teardowns involved. The game plan that we settled on centered on several basic policy and hardware decisions:

1. A portable acoustic shell consisting of flat hinged panels would be erected to "contain" the sound, to decrease environmental noise onstage, and to enable the musicians to perform in a manner similar to the indoor environment to which they are accustomed.
2. There would be a minimum number of open microphones. To pick up the natural acoustic sound of the orchestra on stage and to maximize gain before feedback, no close-miking techniques would be used. Proven, classical methods of stereo-pair mic placement would be employed, with additional area mics placed only as needed.
3. To ensure there would be no artificial sound leakage into the highly sensitive microphone setups, no stage-monitor system would be used during performances. Foldback communication systems for the conductor and performers would be used only during rehearsals.
4. The microphones would be of the highest possible quality, with great attention paid to placement. From mic to cable to pre-amp to mixing console, emphasis would be placed on achieving the best possible signal-to-noise ratio, using the cleanest possible electronics.
5. To build an outdoor soundfield that simulated that of a concert hall, programmable stereo digital reverberators and delay units would be used.
6. For maximum control and flexibility, each loudspeaker subsystem, including delay ring and front-fill systems, would have dedicated equalization and delay processing available at the mixing console.
7. Direct-radiating bass and mid-bass

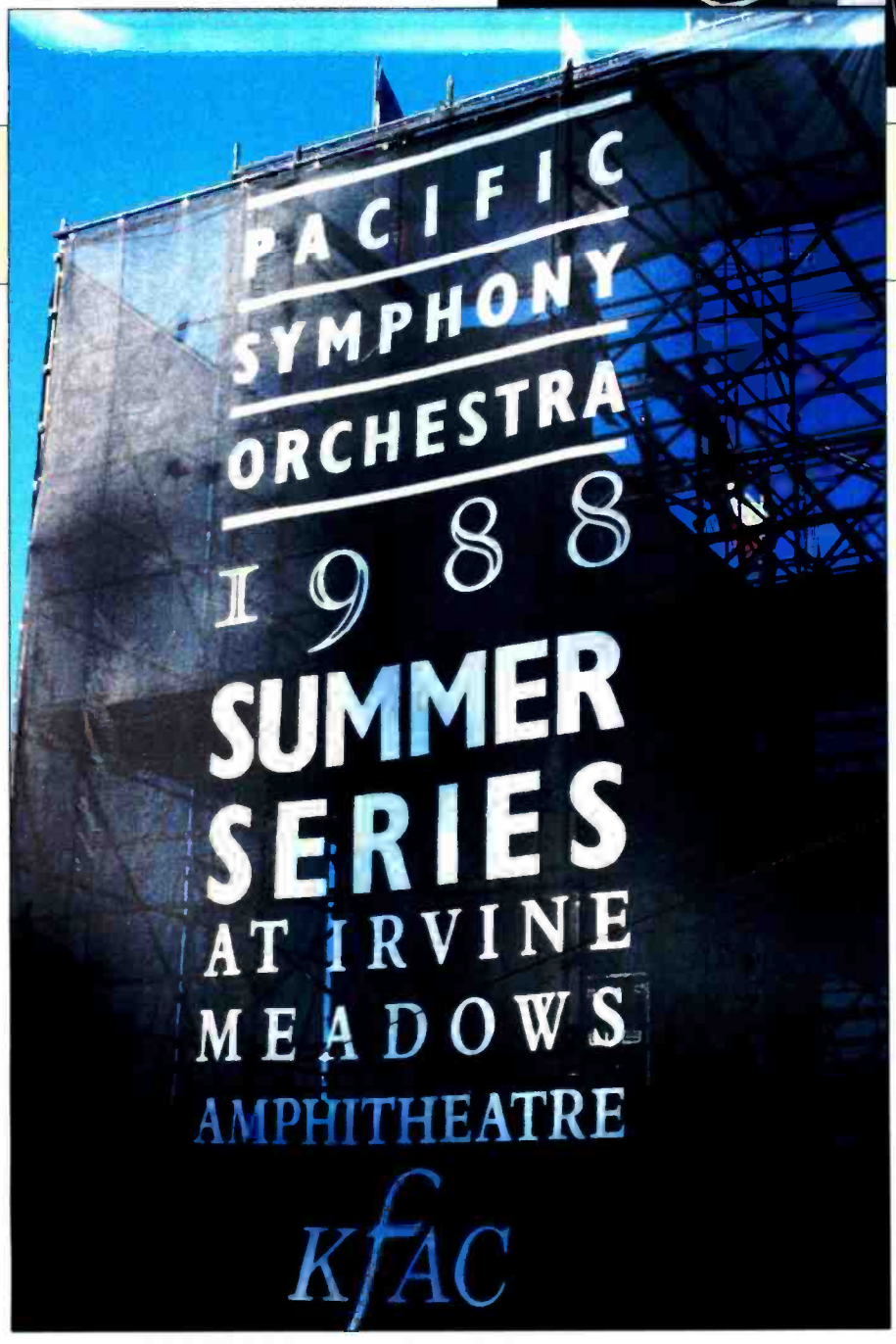

Photo 1. *Ramsa WS-A80 compact speaker enclosures were used for the delay ring. Here, a stagehand attaches custom mounts.*

enclosures would be used for their smooth frequency response characteristics (as compared to horn-loaded coloration).

8. An overhead central cluster would be added to the traditional left/right units offstage, enabling a summed L/R mix to be introduced from a high source. This would give control over both the apparent height and depth of the soundfield. (See Figure 1.)

9. Several small speakers, suspended above the seating area, would allow a finely mixed blend of sound to cover the rear areas of the audience without high sound pressure levels. Digital delay lines would be used for time-compensation to synchronize the arrival of the original stage sound with the distributed, reinforced sound in all parts of the audience. (See Figure 2.)

10. Although the program material would vary widely during the course of the series, consistency from event to event was important. For this reason, all level, equalization and delay settings would be documented after each concert—to be used as starting points for the next.

11. To ensure that any changes, such as ensemble speaker placement and stage roof height could be readily achieved, the audio production contract would include language assuring the necessary minimum parameters for quality system performance.

With these ideas in mind, additional site inspections were undertaken and rehearsals were observed. The system design was

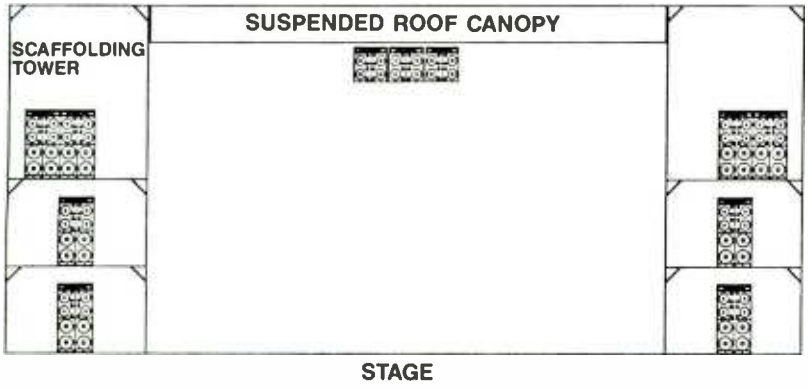

Figure 1. Main stage loudspeaker arrays (left/center/right).

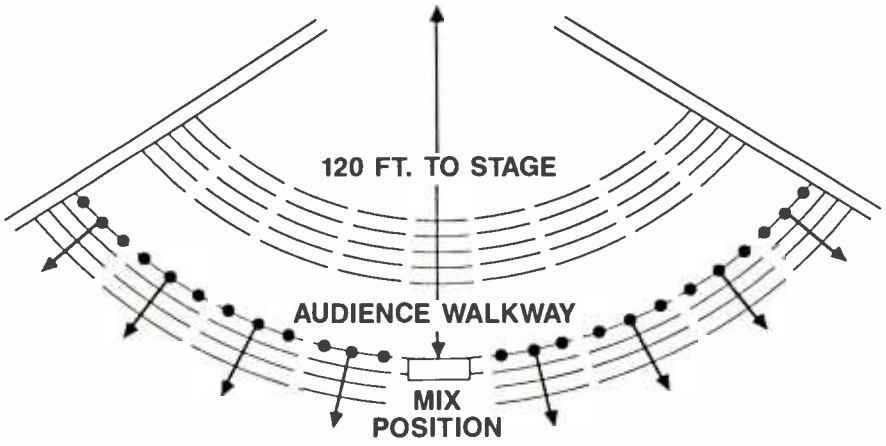

Figure 2. The delay ring comprised 24 speaker locations, set in an arc in the audience area approximately 120 feet from the stage area.

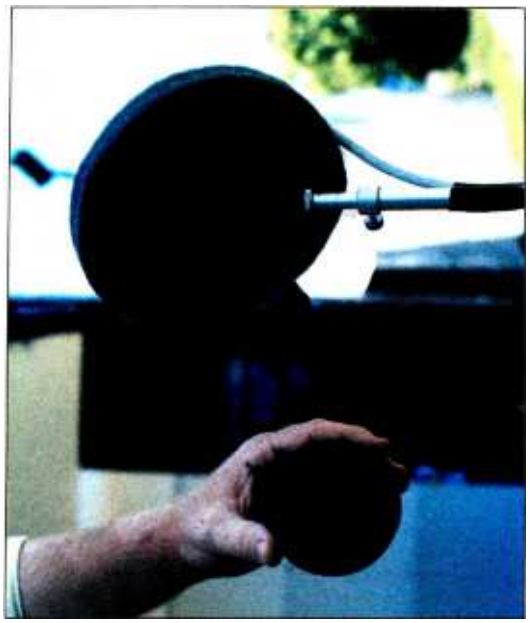

Photo 2. Foam discs were slipped over the body of the omni microphones. This served to cut wind noise and to attenuate off-axis high frequencies.

formalized, and hardware fabrication and rentals were arranged.

The shows were scheduled to run from early July to mid-September. An advance working day was scheduled before the first performance. All other concerts required that the sound system be installed and removed on the performance date.

Sound Image of San Marcos, CA, was chosen as the subcontractor to supply a 4-way active direct-radiating modular loudspeaker system with associated cabling, electronics and a 4-man crew. For the distributed delay subsystems, the compact WS-A80 loudspeaker from Ramsa was chosen. (See Photo 1.)

Main stage system

Sound Image's main Phase-Loc sound system was arrayed at the stage location. The system comprised a 2-box modular setup with wedge-cut (trapezoidal) enclosures. The angled sides enabled wide coverage while taking up a minimum amount of horizontal space on the scaffolding.

Each bass enclosure housed four 18-inch loudspeakers in a well-braced, vented box; the mid/high enclosure contained four 15-inch loudspeakers, two 2-inch compression drivers on custom horns and four high-frequency compression tweeters. The two enclosure types are identical in size, allowing interchangeable placement within the speaker stacks. (See Figure 4.)

A total of 19 enclosures were used, eight base and 11 low/mid/high. The vertical arrays on either side included eight enclosures arranged on three levels of scaffolding. Of the eight, four were placed on the top level, with two each on the levels below. The three remaining enclosures were used in a central overhead array, hung at a higher level. Each of the three arrays had a separate crossover, equalizer and delay adjustment. Yamaha's YDD-2600 digital delay unit was used for adjusting each subsystem, including the delay ring. (See Figure 5.)

The YDD-2600 offered several features, including adjustable delay times that could be adjusted in both milli- and microseconds and flexible input/output configurations, with individual level controls for each channel. The device was used in a 4-input mode with one stereo and three mono outputs; a data-entry and display pad remote control was available on a long cable for easy operation in the house mixing area; and the unit's internal microprocessor could automatically calculate and display delay time settings when distances were entered.

Input levels were used on the main system power amplifiers to individually set output levels for each pair of main speaker

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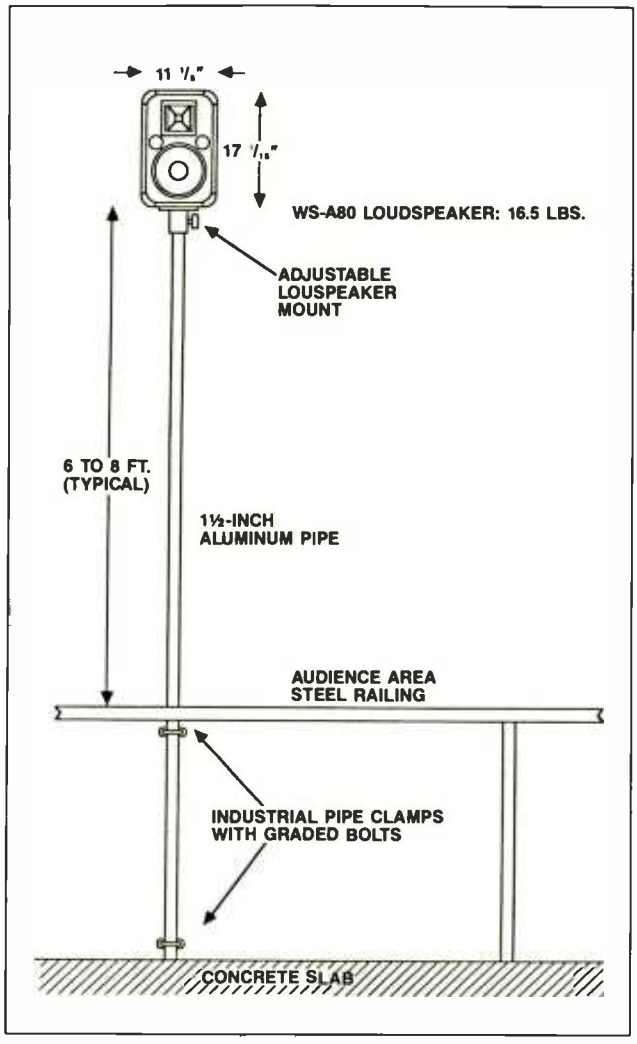


Figure 3. The WS-A80s were mounted atop metal poles. Each speaker could be adjusted in both the vertical and horizontal plane.

enclosures. A fine level of adjustment was required for balancing in the audience area. As we worked with the system during setup for the first performance, we determined that amps with wide-range detentable input attenuators were the most satisfactory for this application.

The main system used QSC model 3350 and 3800 amplifiers for a maximum of 36,100W of available power. Typically, each amplifier channel was opened to only 25% of its maximum level, for several reasons.

First, even the most dynamic music to be performed would not require that much headroom (not even the 1812 Overture!). Second, the sensitive nature of the microphones and their relatively close proximity to the speaker arrays dictated that feedback absolutely not be allowed to occur. If it did, and the amplifiers were operating at full power, the effect on both the loudspeaker system parts and the musicians' hearing could be disastrous.

Finally, even considering performance dynamics, the low-level nature of the program material meant that the system would be "idling." To ensure that the front-end system electronics and mixing console would be operating at an average zero VU meter reading (for optimum audio signal transfer and best signal-to-noise ratio), reducing the power amplifier levels enabled all control functions at the house mix position to be used in a "normal" fashion.

Overall, the main sound system was chosen not for its high sound-level capabilities, but for coverage and multilevel source abilities to present an apparent soundfield with good "depth" and stereo imaging.

A small auxiliary system was placed in front of the stage area, to serve a group of high-priced tables known as the "donor system." These high fidelity speakers were operated at a very low level. They served to provide a sense of quality and intimacy to an exclusive seating zone that was reserved for financial supporters of the symphony.

The delay subsystem

Weighing only 16.5 pounds and measuring approximately 11″×17″, the WS-A80 appeared to be a good component for a delay system that would include 24 pole-mounted speaker locations. The 2-way bass reflex enclosure has a rated frequency response of 65Hz to 20kHz, and a continuous program input power rating of 160W. Custom mounting poles and brackets were designed and fabricated, allowing each loudspeaker to be angle-adjusted vertically and horizontally. (See Figure 3.)

The mounting poles were located along the arc described by an audience walkway, approximately 120 feet from the stage. Clamped into place on the railing, these poles supported the loudspeakers approximately 10 feet above the ground. A forklift was used to install the enclosures on top of the poles. Custom-fabricated wiring harnesses were created to make the installation of the delay system go quickly.

The 24 delayed enclosures were wired in groups of four, with all wire bundles returning to a rack located at the house mix position. Three WP-9220 dual-channel amplifiers powered the delay system and each group of speakers was individually adjustable. A Klark-Teknik ⅓-octave graphic equalizer was dedicated for use on the delay subsystem.

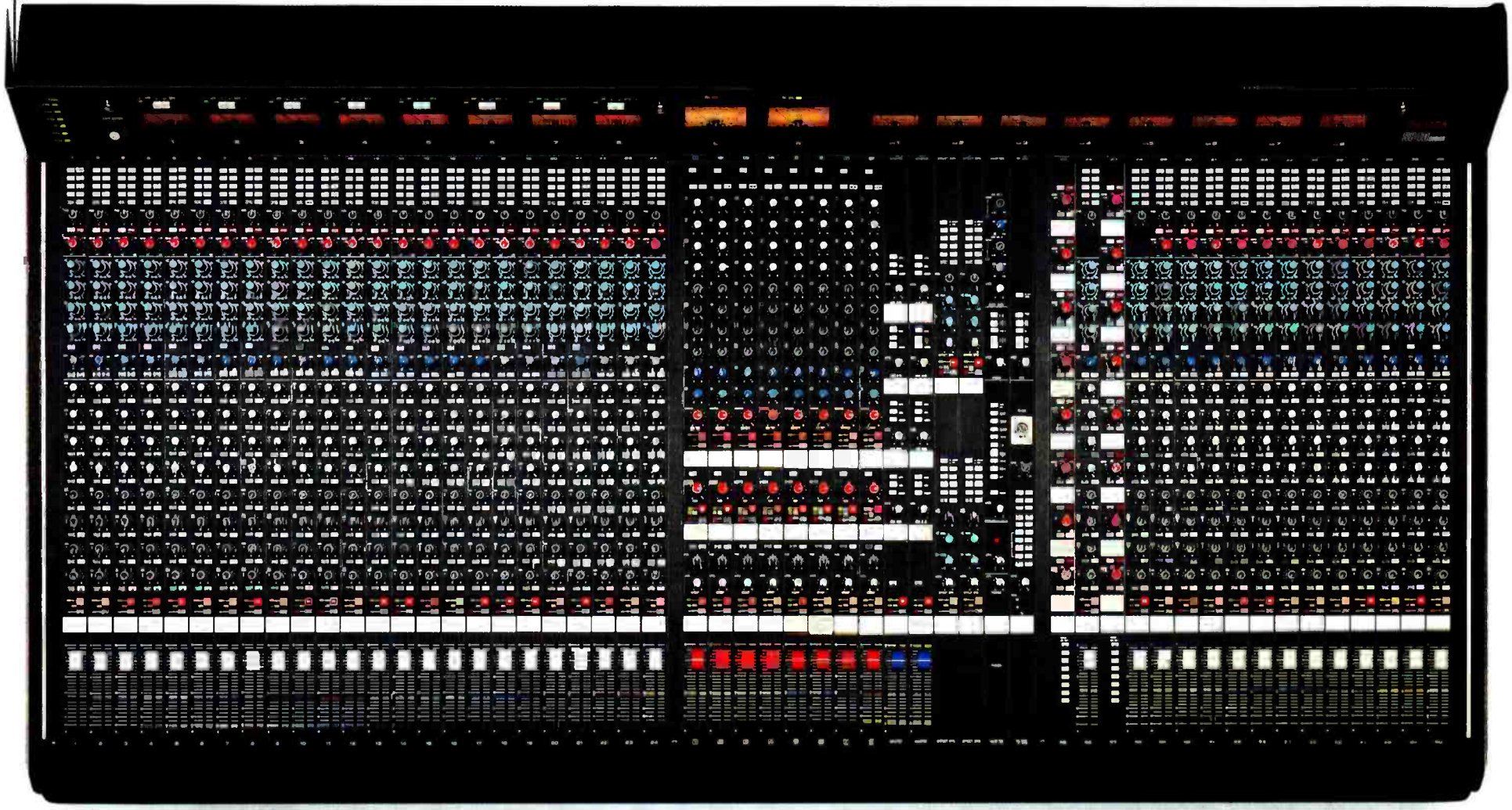
To provide supplemental sound to the farthest reaches of the audience area, Irvine Meadows has a permanently installed delay speaker system hanging from spotlight towers. This subsystem was used with separate EQ and delay processing to ensure adequate coverage at the rear of the seating area.

Microphone techniques

An important part of the system design was Magee's microphone selection and placement technique. Although the programs often had nearly 100 musicians performing on stage, the least possible number of microphones was used. Typically, fewer than one dozen Sennheiser, Coles and Schoeps mics were used for any given performance.

Magee's preference for the primary and secondary stereo pairs were the Sennheiser MKH20 and MKH40 (P48) studio condenser microphones. The main stereo system comprised two outer MKH20 omnis, spaced 20 feet apart and panned hard left and right. They were used with a pair of near-coincident MKH40s, set center stage and also panned hard left and right.

"The outer pair of omnis runs about 6dB hotter in the mix than the inner pair of cardioids," Magee says. "The MKH40s are set up with the mic capsules spaced only about 12 inches apart. This near-coincident system has an image very close to the widely spaced omni pair in terms of phase/image accuracy. Another pair of



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MKH40s was used upstage, in front of the conductor, to catch inner voices like the woodwinds, violas and second violins."

Each microphone was wired with runs of M-1000 Monster Cable and fed into Boulder-Jensen twin-servo pre-amplifiers located at the stage area. Monster Cable Pro-Link Series 1, set up in multipair snakes, was used to carry the input signals to the Ramsa WR-S840 console at the house mixing position.

"It's possible to use classical recording microphone techniques to reinforce the sound of a symphony in an outdoor setting, but the key is to have an exceptionally clean input signal path," Magee says. "Obtaining the best possible signal-to-noise ratio is critical. Without a very low noise system, it's really tough to reach the gain threshold needed to accurately present a well-defined soundfield."

When "spot" mics were required, a matched pair of Schoeps MK47 hypercardioid mics were used. Suspended about 10 feet above the deck, this setup was occasionally used above instruments such as the timpani. In some instances, spot mics were required for the piano, harp or in the bass section.

"The microphones actually in use for a particular program depended on the musical selections and their different instrumental characteristics," Magee explains. "Knowledge of the material helps make those choices. We may want to get a bit more emphasis or attack in some areas."

Solo vocalists were given the Coles 4038 stereo ribbon microphone. For choral groups, three spaced MKH20 Sennheiser omnis were suspended above the vocal risers. As with most of the mics used on the outdoor stage, specially crafted foam rubber discs were used. "The foam disc on the backside of the mic helps keep wind noise from being a problem, and it also attenuates the off-axis high end," says Magee. "In this manner we are able to pick up a large vocal group with the fewest microphones." (See Photo 2.)

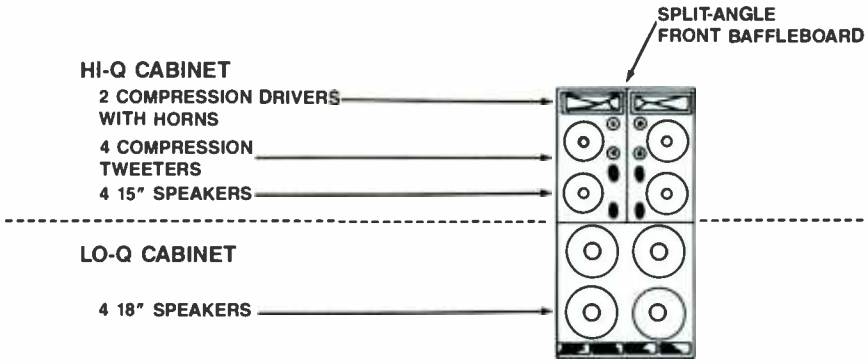


Figure 4. The direct-radiating Phase-Loc system is contained in two identically sized boxes. A cabinet pair houses four 18-inch speakers, four 15-inch speakers, two 2-inch drivers with horns, and four compression tweeters.

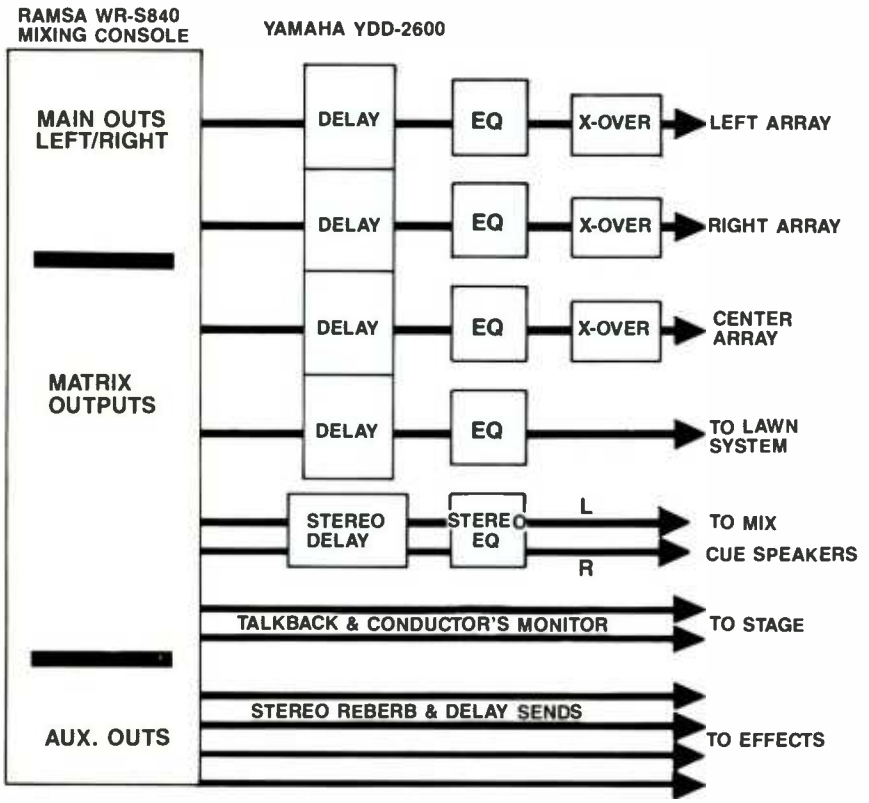


Figure 5. System signal flow diagram.

Mixing the performance

To prepare for the performance, test tones and noise bursts were used for subsystem and main array balancing. Once all the parts were functioning and adjusted correctly, prerecorded music was played through the system to check the area coverage.

"It's appropriate to test a system with music similar to the program material that it is designed for," Magee says. "The recent orchestral and choral CDs from London/DECCA and Telarc work well." Other test discs included the Telarc CD jazz/fusion sampler.

During the rehearsals before a performance, balances were set up using Sony MDR-V6 headphones. This occurred before the main speaker system was turned on.

"Setting up the stereo mix at the console, and making the fine microphone placement adjustments while listening to headphones, serves several purposes," Magee says. "First, the depth, timbre and balance can be fine-tuned without interference from the sound reinforcement system. Secondly, we can optimize the input to the system. Then, when we turn on the main system, we know that audible differences in the acoustical environment are the result of the sound reinforcement system, which can then be adjusted as necessary."

A Lexicon 480 digital reverb and a Ramsa 9375 digital delay unit were used as signal processing devices to help simulate the sound of a classical concert hall. "I modified one of Lexicon's concert hall programs, using return EQ cuts on the low mids and adding some high end," Magee says. "With an average broadband decay of three seconds, it sounds like a good hall that's not tubby and a little bright. I originally came in with more delays for use on subgroup mixes, but found out that I didn't need them. The simpler approach worked best."

A pair of WS-A80 loudspeakers was suspended in front of the mixing console and used as close-field monitors. This allowed us to hear what the console's output sounded like in the subsystem. The units also functioned as cue speakers.

Although the sound of the concert series was fairly consistent, the main sound system level, EQ and delay adjustments changed from show to show. This reflected varying audience sizes, programs, and environmental factors such as temperature and humidity.

"You can set up a beautiful mix while listening to a stereo far-field system, but everything can change," Magee says. "Being able to fine-tune the various subsystems to compensate for environmental changes is a key to making this concept work. I'd rather make those changes at the output stages of the whole system, than have to fix it at the console, channel by channel."

Using the system

Without the installed scaffolding and high roof at Irvine Meadows Ampitheatre, our task would have been more difficult and more costly. Being able to have the main left, right and center arrays as far from the musicians as possible (within the context of the stage and scaffolding) allowed us to achieve the system gain needed to create a rich, deep soundfield. The delayed subsystem was "feathered" in over this mix at the point in the audience where the main system's effect began to diminish. The third, rear ring (the house delay system) carried the sound of the show to the farthest seating areas.

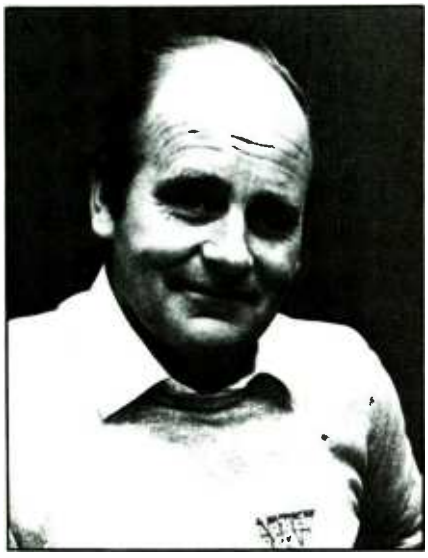
To borrow a phrase, "We have the technology." Why, then, are so many outdoor symphonic performances such a disappointment in the sound department? The primary reason is the lack of foresight on the part of the symphony management to address the sound reinforcement needs. Everyone knows that some sort of sound system will be required, yet few are aware of the budget, type of personnel and equipment necessary to get the best results for a symphony orchestra in large outdoor venues.

REP

State of the Industry: the British Perspective. Part 1

By Michael Fay

Four key members of the British professional audio community discuss the state of their industry.



Ken Townsend

Robin Millar

Colin Sanders

Phil Dudderidge

This past June, during the Association of Professional Recording Studios (APRS) trade show in London, *RE/P* held a round-table discussion at Abbey Road studios to discuss the state of pro audio in Britain. In attendance were Ken Townsend, general manager of Abbey Road Studios; Robin Millar, CEO of the Power Plant and Maison Rouge studios, and an APRS and British Record Producers Guild board member; Colin Sanders, chairman of Solid State Logic and a director of Quantel; and Phil Dudderidge, managing director of Focusrite Audio Engineering Ltd.

Beginning with reflections on the current economic climate within the industry, Part 1 includes comments on the overabundance of pop music studios, record company involvement in studio price-wars, trade organizations, and the growing need for professional business practices in studio management.

RE/P: *We invited you here today to get some first hand information on the state of the pro audio industry in Britain—information we hope will give added perspective to the state of the industry in the United States.*

Sanders: There is an odd paradox here. The financial world is saying that the sound and vision worlds are in a sort of unprecedented boom time. The record companies are making a lot of money all of a sudden, after a period of not making good returns. We are poised on a pretty big explosion in satellite television and cablevision. Basically, these are areas where there is renewed awareness of high quality sound. And yet, as an industry we say that things are bad, and indeed the figures reflect that. I have a bit of cautious

Michael Fay is the editor of Recording Engineer/Producer.

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optimism in that if we can harness the available opportunities, it needn't be a sorry story.

Dudderidge: My perspective is that perhaps we have reached maturity and there is a shake-out going on that is going to result in the less professional, less well-managed, less well-financed businesses falling away. Those which are well-financed and well-managed will remain.

Sanders: I agree with you that there's an industry shake-out. I think everybody believes that the shake-out should have happened about two or three years ago. Had it happened then, we might actually be better placed than we are now.

Millar: I very much endorse what Colin and Phil have said. From my point of view, it's clear that hysteria has set in in certain areas of the recording studio industry because of a certain amount of over-capacity.

***RE/P:** Over capacity in what respect?*

Millar: There are more recording studios available for hire in this country than the eight or nine major record companies can support. The mistake is that people are confusing that fact with thinking the entire industry is going to die. Some studios and some hardware manufacturers will inevitably disappear, but good, well-run professional organizations will remain.

Townsend: I've got a great degree of optimism at the moment. If we look at May of this year, I think it was the hottest summer since 1986. There has been a great over-capacity in one particular part of the market, which is pop recording; but there's a lot more to recording than just pop music. For example, at the moment, the classical market is extremely buoyant. A lot of this is due to compact disc.

A lot of the problems in the last few years stemmed from the fact that there have been a lot of re-issues. Record companies have made a fair degree of money out of delving into their back catalogs, but there is a limited period of time that they can do that. They have got to start looking for new artists again.

***RE/P:** Everyone seems to be keying in on the health of the music industry, but what we want to get into is the relationship between the manufacturers and the studio owners, engineers and producers—relative to the development and introduction of new technology. How do frequent hardware advances and updates affect your abilities to make a profit?*

Townsend: Well, we say "afford it!" It's really a matter of making sure you make the right profits. At Abbey Road, we have to make profits like everybody else. If we don't, we can't reinvest. Also, if you don't provide the service the client wants, you are doomed.

A&R departments of record companies have been in a position to actually get rates knocked down. But when the rates get knocked down, you get a situation where they are booking two or three different studios and playing one against the other to get even lower rates. Now, through the APRS, we are fighting back to a certain degree. We know the record companies have the money, so we are attempting to stop them from actually destroying an industry on which they are very dependent.

Millar: I think one of the biggest downfalls of the music studios and the manufacturers is a lack of market research. The level of market research in this industry would be inconceivable in any other. I'm not laying the blame on the manufacturers—I don't think anyone's any better than anyone else—but I went around the APRS all three days this week and talked to a lot of manufacturers who had new products on their stands. I asked them all the same questions: "Who is your target operation? Who is your market? What sort of price range or facility is this product going into? For what specific use have you made this piece of equipment?" With the exception of one person, I don't think I got a sensible and clear answer from anybody.

And I don't think it's the manufacturers any more than the studios. Studio owners will invest hundreds of thousands of pounds into a facility with no clear idea of what their client base is, or will be, for the three to five years that it will take them to repay that investment.

Sanders: I would support the manufacturers here. I believe the majority of manufacturers do not want to sell something that is inappropriate for a client, and I really think most manufacturers are pretty good about that. We (SSL) certainly wouldn't sell a console if the client couldn't afford it. We couldn't make a good business case from it. Frankly, if after 12 months they disappear, it's too embarrassing.

Millar: Colin, I think you are perhaps more conspicuous than you might think in that particular respect. Studios have gotten into financial difficulty not through manufacturer pressure, but generally through being product-driven and thinking "if we get this latest gadget that costs a couple of hundred thousand pounds, it's going to put us ahead of the game." The studios don't do any cost analysis.

Some of the financing incentives offered by some people selling very expensive hardware has dug a hole that a few studios have jumped into and are finding very difficult to get out of. They will make you offers the studio owners can't refuse. "Take this machine, give us 50 pounds, and pay nothing for six months." Then the bills start rolling in.

Sanders: Yes, you're right. I don't think that's a very responsible attitude.

Dudderidge: I've known a couple of fairly small studios that got lumbered with expensive digital machines that their client base couldn't afford to use. What they had hoped to do was elevate the profile of their client base. What they have forgotten is that the deal they got is available to everybody else, too—so it doesn't improve their opportunities.

Millar: I remember hearing Doug Dickey speak at the Digital Information Exchange two years ago on exactly this point. In fact, he practically got pulled off the stand by Sony because he was saying, "It is, in my view, completely irresponsible for the manufacturers of digital multitracks to be trying to persuade people to buy $250,000 machines to put into their facilities. They can't afford them; they won't get their money back."

***RE/P:** Does APRS represent studios, engineers, producers and manufacturers?*

Townsend: We have more than 200 members, of which the majority are studios. We cover about 85% of the leading studios in the country. Virtually all the major British manufacturers and a lot of rental companies are represented too. And we have a very active producers guild. We also have associate members—so it does cover a very wide spectrum of the recording field.

***RE/P:** How does the APRS represent the industry? Specifically, I understand that there is some pending legislation about controlling noise levels in the workplace that may affect recording studios.*

Townsend: We've employed Sandy Brown Associates to do an analysis and prepare a report involving about 20 different studios. When the report is complete, it will be made available to both our members and the government to see if, in fact, there is a problem. We don't think there is, because the standards set are based on average listening levels more than the level at any one moment.

We also have the withholding tax situation. When the government proposed some legislation, which we heard about at very late notice, we spent about 30,000 pounds and rustled up all sorts of support, and actually managed to overthrow it.

We are also, at the moment, using a company called Inter-Company Comparison to look at how this industry stands up in terms of its profitability. We'll have a proper report on this so we can actually look forward to the future investment of the studio world in general.

RE/P: *That report would certainly shed some light on the health and welfare of the industry.*

Townsend: In many ways, ours is very much a cottage industry. What nobody really knows is how big the industry really is. We have no idea of its turnover, we have no idea of how many people are employed. This is all part of the survey.

We are trying to establish that if, in fact, we went to the government to say we don't like this or that, we could be specific about the strength of our industry. Those are the facts we are trying to get together now, and which will be very important in the long-term development of the industry.

Sanders: Coming back to the talks of doom and gloom again, actually aside from the narrow band of pop recording, virtually every other sector of the recording industry—film, sound for vision and post production—is doing well.

Millar: Now that the record companies are making money, they are quite happy to sit back and gloat and watch the studios bicker among themselves because they are all offering pretty much the same equipment.

But actually, Colin, a few years ago, when Total Recall was first introduced, it became clear that the installation of a piece of surprisingly expensive central hardware could increase the profitability of a studio. The record companies were willing to dig much deeper into their pockets than would have been predicted. The jump in the hourly and daily rates they were expected to come up with from their key producers and engineers was really quite significant. But the increased practical applications of the console was something on which both the recording industry and the record companies became dependent. Specifically, Total Recall was a tool they could all point to and say, "Ah, we can see an advantage here."

Sanders: Interestingly enough, giving studios something that effectively enabled them to raise their rates worked very well, but only to a point. For a certain overly enthusiastic faction, it became more important to have fun doing the session than it was to take care of business. Once we got that faction, with the non-businesslike attitude, that small faction of the industry actually caused the price war. It wasn't because of the technology, it was actually just due to those types of people saying, "Well, I can't relate to the idea of a return on my investments."

Dudderidge: There's also a supply and demand situation. The record companies have their own self-interest to look after; and if there is an excessive capacity, you can't blame the people booking time for getting the best deal they can.

Sanders: But I would say the difference here is that perhaps our industry is not as tough as most. The problem is that it is such an enjoyable pastime, such an enjoyable job. Let's face it, it's great fun.

Dudderidge: One of the reasons why we have this over-capacity problem now is that making records is fun. What has changed over, say, the last 10 years, is that studio personnel tend not to be very involved in the process anymore. The majority of engineers are free-lancers and so the studios are becoming more like businesses. In the old days, apart from the big facilities, the guy who owned the studio was often the engineer behind the console. RE/P

In Part 2, the panelists discuss format standardization, the economic impact of freelance engineers, communication between studios and manufacturers and the conflict between art and business.

ENGINEER/PRODUCER INDEX

B

Chris Bailey (E/P): Box 424, Winooski, VT 05404; 802-862-8604. **Credits:** My Shadow (A), My Shadow (Chris Bailey Recording).

Bobby Benjamin (E): 5439 Whitsett Ave., #7, N. Hollywood, CA 91607; 818-796-3233. **Credits:** New World/Jeanette Acosta (CP-TV), Murphy's Law/ABC-TV (Studio Malibu); 2-Channel (CP-TV), Dodgers Baseball (Studio Malibu); Orion Pictures/Miles Goodman (PP-F), Dirty Rotten Scoundrels (Paramount Scoring); Rockwell International/Ed Bills (PP-CI), The Science Center (Studio Malibu); LJW/Dean Andre (PP-MV), The Living Word-Book of John (Studio Malibu).

Bob Blank (E/P): 1597 Hope St., Stamford, CT 06907; 203-968-2420. **Credits:** Elias Associates/Reebok (CP-TV), Reebok TV campaign (Vision Sound); Sandy Wilbur Music/Pitney Bowes (CP-TV), fax machine campaign (Hip Pocket, Blank Productions); Tetraplex/Killer Dead (PP-F), Killer Dead soundtrack (Blank Productions); Valentino Music (CP-TV), News Theme (Blank Productions); Lola Records (MP-SR), Work It (Blank Productions).

Arthur Boudine (E/P): 120 Virginia Ave., Dobbs Ferry, NY 10522; 914-693-8198. **Credits:** (PP-F), The Big Giver (Computer Arts); (PP-TV), Creative Profiles (Computer Arts).

C

Dan Clements (E/P): 4313 Valley Fair St., Simi Valley, CA 93063; 805-527-4479. **Credits:** Mrs. World Pageant (CP-TV), 1989 Mrs. World Pageant (AKR Studio); ASAP Family Treatment Center (CP-R), The Letter (AKR Studio); Zygon Corp. (PP-CI), Ultra Meditation III (AKR Studio).

Joseph J. Cuner (E/P): 52 Mansfield St. #3, Allston, MA 02134; 617-254-3844. **Credits:** Empire Records (MP-SR), Skip MacDonald (Downtown Recorders); Def/Jam Records/Aerosmith (MP-AT), Less Than Zero soundtrack (Downtown Recorders); Sena Fini (CP-TV), Purity Supreme spots (Downtown Recorders); Tanaka Records (MP-A), Edelston's Cronos (Downtown Recorders/Mission Control Studios); A&M Records/Steve Weisburg (MP-AT), Lost In The Stars (Downtown Recorders).

Dave Cwirko (E): 805 Hickory, Omaha, NE 68108; 402-346-9450. **Credits:** Ric Swanson & Urban Surrender (MP-A), Renewal (Studio C); Jim Payne KVNO Radio (R), Teknikolour Radio (Studio C).

Key

Name (Title Code): Address; phone number. **Credits:** Client/Artist (Credit Code-Subcode), Project Title (Facility Used).

Title Codes:

E (Engineer); P (Producer); E/P (Engineer/Producer).

Credit Codes:

CP (Commercial/Advertising Production).
Subcodes: R (Radio); TV (Television).

MP (Music Production).
Subcodes: S (Single); A (Album); AT (Album Track); AR (Album Remix); SR (Single Remix).

PP (Post-Production).
Subcodes: F (Film); MV (Music Video); CI (Corporate/Industrial).

D

Kevin Dawson (E/P): 1365 Fifth Ave., Suite 7L, New York, NY 10029; 212-348-9106. **Credits:** (MP-AR), K.T.L. (Tech Sound).

Mike De Leon (E/P): 14146 Woodstream, San Antonio, TX 78231; 512-492-0613. **Credits:** Claudia Maria (MP-S), Anything For You (MDLP); Michael Anthony (MP-S), Debut Cut (MDLP).

Bruce Dinehart (E/P): 2500 E. Vancouver, Broken Arrow, OK 74014; 918-355-3020. **Credits:** Kathleen Northern (MP-A), Oh That Men (A Place of Praise); Gene May (MP-A), untitled (A Place of Praise).

E

Thomas Earl (E/P): 4 Park St. Ext., Greene, NY 13778; 607-656-8336. **Credits:** Artists Against Dumping (MP-A), Paradise Lost (Random Bullet Recording); Thomas Earl (MP-A), Nowhere Cafe (Random Bullet Recording); Bill Mackechnie (MP-AT), Back In My Home Town (Random Bullet Studio); Bill Mackechnie (MP-AT), Captain MIDI (Random Bullet).

John Eden (E/P): 1402 Old Topanga Canyon Road, Topanga Park, CA 90290; 213-455-2044. **Credits:** Silent Running/Atlantic (P-MP) (Brooke House); Status Quo/Phonogram (P-MP), Just Supposin' (Marquee/London); Nazareth (P-MP), The Catch/Phonogram (Castle Sound); After The Fire/CBS (P-MP) (Skyline); Daniel LaVoie (P-MP), Ils'aiment (PSM).

Eric Elwell (E/P): 8725 W. 121st Terr., #806, Overland Park, KS 66213; 913-491-6640. **Credits:** The Backsliders (MP-A), untitled; The Love Squad (MP-A), untitled; The Euphoria String Band (MP), artist demo; Mary Beth Bethel (MP), artist demo; The Art Band (MP-A), Horror Vacuii.

F

Don Feinbert (E): 2011 Ocean Ave. #4B, Brooklyn, NY 11230; 718-376-5776. **Credits:** Debbie Gibson (MP-A), Electric Youth; Debbie Gibson (MP-A), Out Of The Blue; Samantha Fox (MP-AT), I Wanna Have Some Fun; Cover Girls (MP-S), Show Me; Brenda K. Starr (MP-AT).

Sam Fishkin (E/P): Samsonics, 1007 Sherman Ave., Evanston, IL 60202; 312-328-4810. **Credits:** Treatment (MP), Love Is A Game (Studiomedia); Steve Ford Music (CP-TV), McDonalds Scrabble (Chicago Recording Company); Steve Sperry & Co. (CP-TV), Busch Beer—Jamaica (Chicago Recording Company); Kapture Ensemble (MP-A), Kapture—An Aural Arts Ensemble (Samsonics/Sushi Street/JEM); Rhett Parish (CP-R), Illinois Bell—A Call For Help (RPM).

Ray Fister (E/P): 8339 S. 76th St., Milwaukee, WI 53132; 414-425-5482. **Credits:** Graf's Soda (CP-R), Good Guys Finish Thirst With Graf's (Creative Professionals); Lifeway Foods (CP-R), Kefir (CPI); International Design Forum (PP-CI), IDF Works (CPI); Dow Chemical (PP-CI), Audio Magazine (CPI); The Sittin' Ducks (MP), Live Rock 'n' Roll Hall of Fame Benefit (Remote/CPI).

Bill Ford (P): Box 1052, El Granada, CA 94018; 415-726-4786. **Credits:** The Fringe (MP-A), Hey, Open Up! (Bluejay/Euphoria).

H

Steve Hawk (E): Box 1841, Big Bear City, CA 92314; 714-585-9351. **Credits:** Chevy/James Lowe Productions (CP-TV), $1K Test Drive (Mansfield); Kingworld/Tom Moody Productions (CP-TV), Inside Edition (Locations, GMT); J.C. Penney/Mulvey Productions (CP-TV), Perm Sale (Mansfield); NYCA International (CP-R/TV), James Worthy (Location); Miller's Outpost (CP-TV), X-Mas –88 (Introvision).

Roger Heiss (E): 1316 N. Llybourn, Chicago, IL 60610; 312-664-5353. **Credits:** Darius Brooks (MP-A), Sound a Gospel (Tone Zone Recording).

I

David Ivory (E/P): Iris Sound, 237 Main St., Royersford, PA 19468; 215-948-3448. **Credits:** Life After Elvis (MP-A), Beyond Edukation (Iris Sound); The Zooboys (MP-A), Wild Kingdom (Iris Sound); Arthur's Museum (MP-A), Gallery Closed (Iris Sound/Sigma Sound); Bo Didley/Frank Davenport (MP-A), The Tongue and Groove Band (Iris Sound).

J

Andre Jacquemin (E/P): 68A Delancey St., London, England NW1-7-RY; 01-485-3733. **Credits:** MGM/John Williams (PP-A/F), A Fish Called Wanda; GWR Records/Girlschool (SR-A), Take A Bite; Ettinger Bros/Sheila Ferguson (S).

Jimmy Johnson (E/P): 1000 Alabama Ave., Sheffield, AL 35660; 205-381-2060. **Credits:** Lynyrd Skynyrd Tribute Tour (MP-A), Tribute Tour Live (Omega/Muscle Shoals Sound Studios); The Rossington Band (MP-A), Love Your Man (Muscle Shoals Sound Studios).

K

Karen Kane (E/P): 396 Broadway, Somerville, MA 02145; 617-628-6469. **Credits:** Kay Gardner (MP-A), Sacred Geometry (Universal); Southern Rail (MP-A),

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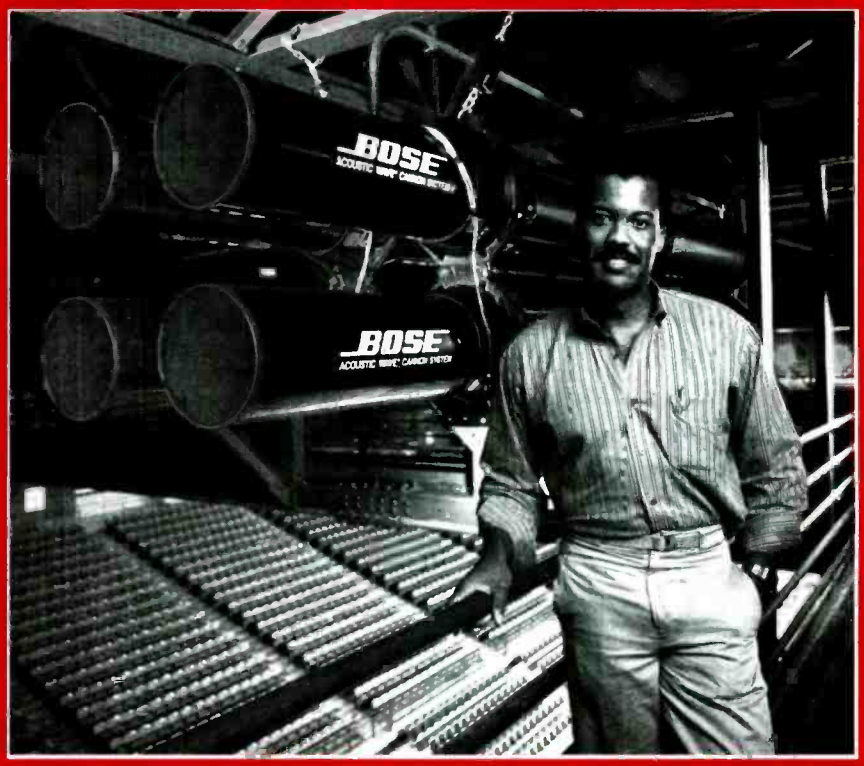

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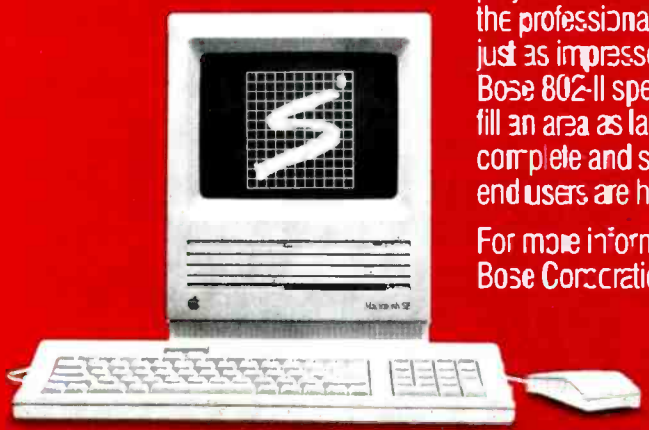

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ENGINEER/PRODUCER INDEX

Home (Syncro Sound); Laura Berkson (MP-A), Open Eyes (Air Sound); Mimi Baczewska (MP-A), Turning Tide (Universal); Wheeler & Carol (MP-A), Mystic Soul (Euphoria Sound).

Richard Kaye (E): 417 Teaneck Road, Apt. 2A, Ridgefield Park, NJ 07660; 201-440-8618. **Credits:** Liz Swados (PP-F), Children In Need (39th St. Music); O.C. Smith (MP-S), The Best Out Of Me (39th St. Music); Chuck Jackson (MP-S), How Long (39th St. Music).

Bob Ketchum (E/P): Box 28, Mountain Home, AR; 501-425-9377. **Credits:** Paperkid (MP-A), Grow Up (Cedar Crest Studio); Judge Parker (MP-S), My Missouri (Cedar Crest Studio); Shark Avenue (MP-S), Leanne (Cedar Crest Studio); Black Oak Arkansas (MP-AR), Live In England (Parralax); Cadillac Wheels (PP-MV), I've Always Been Crazy (Cedar Crest Studio).

L

Brian Ladd (E/P): Box 967, Eureka, CA 95502; 707-443-5366. **Credits:** Staalplaat/Blackhouse (MP-A), We Will Fight Back (Ladd-Frith); Geschmack/Blackhouse (MP-AR), 5 Minutes After I Die (Ladd-Frith); Red Rhino/PSY 231 (MP-A), PSY 231 (VP 231/Ladd-Frith); Red Rhino/Psyclones (MP-S), Panic In Detroit (Ladd-Frith); Red Rhino/Psyclones (MP-AR), Another Bridge (Ladd-Frith/Humboldt Records).

M

Clair Marlo (P): 7965 Ranchito Ave., Van Nuys, CA 91402; 818-909-0846. **Credits:** Dunhill/Harry Chapin (MP-A), The Last Protest Singer (Oceanway/Record One).

Ed Mashal (E/P): Box 4222, c/o Reel Harmon, Inc., Hollywood, FL 33083-4222; 305-238-4994. **Credits:** KTEL/Fool House (MP-A), Running On Soft Ground (Criteria/MSM); Elektra/Eagles (MP-A), Hotel California (Bayshore); RSO/Bee Gees (MP-A), Saturday Night Fever (Criteria); Joe Walsh (MP-A), But Seriously Folks (Bayshore); Outlaws (MP-A), various (Criteria/Bayshore).

Elizabeth Michael (P): 7220 Hollywood Blvd., Los Angeles, CA 90046; 213-851-7537. **Credits:** Mary Flash & The Maniacs (MP-A), Babylon's Light (Mary Flash Productions).

Francisco Miranda (E/P): Algeciras #38-701, Mexico, D.F. 03920; 905-598-3935. **Credits:** PolyGram/Veronica Castro (MP-A), Carinosamente (PolyGram Studio Mexico); BMG-Ariola/20 Finalistas (MP-A), 20 Finalistas Rock En Tu Idioma (PolyGram Studio Mexico); Magenta (MP-A), Magenta On The Raw (Studio 19/PolyGram Mexico); BMG/Ariola/La Cruz (MP-A), Rocko Lucion (Studio 19/PolyGram Studio Mexico); Melody/Lucerito (MP-A), 1988 (PolyGram Studio Mexico).

Karl Moet (E/P): 4868 Via Del La Luna, Yorba Linda, CA 92686; 714-777-3268. **Credits:** Red Flag (MP-SR), Russian Radio Control/Broken Heart (Formula-1); Bardeux (MP-SR), Bold As Love (Formula-1); Metal MC (MP-A/SR), Born to Party (Florentine Duck/Formula-1); Stacey Q (MP-SR/A), Better Than Heaven/Hard Machine (Formula-1); MTM (MP-TV), Source cues: St. Elsewhere/Hill Street Blues/Remington Steele (Formula-1).

Bill Montella Jr. (E/P): 151 Keeley Ave., Warwick, RI 02886; 401-738-6914. **Credits:** La Chance Family (CP-R), New Song (Wings As Eagles).

Robert B. Mugrdechian (E/P): 300 Glen Ave., Palisades Park, NJ 07650-1715; 201-461-0750. **Credits:** WHTZ/Z-100 Radio (MP-SR), Tone Loc—Funky Cold Medina (Clear Cut Recording); WHTZ/Z-100 Radio (MP-SR), Roxette—The Look (Clear Cut Recording); WHTZ/Z-100 Radio (MP-SR), Fine Young Cannibals—She Drives Me Crazy (Clear Cut Recording); WHTZ/Z-100 Radio (MP-SR), Sweet Sensation—Sincerely Yours (Clear Cut Recording); WHTZ/Z-100 Radio (MP-SR), Kon Kan—I Beg Your Pardon (Clear Cut Recording).

Kenneth E. Mullenix (E): Box 5027, Fort Lauderdale, FL 33313; 305-748-0885. **Credits:** Asbestos Training & Consulting Inc. (CI), AHERA Training Course (Seagull Productions); Canadian A&W (CP-F), Star Bear (Location, Key Biscayne, FL); The Home Show/ABC (TV), Back to Basics (Location, Sarasota, FL); State and Local Government Labor-Management Committee (TV), Together They Serve (Location, Dade County, FL); AFT Productions (PP-F), The Disturbance (Location, Broward County, FL, Studio Center).

N

Murray Nelson (E/P): #14 Oriole Road N., Lethbridge, Alberta T1H 4S3 Canada; 403-328-4261. **Credits:** Tyler Brownfield (MP-A), Nasty Boss (A Capella Music/XL Music); Terry Habdas (MP-S), She Said/You are the One (A Capella Music); Video Cinema (MP-R/TV); I Love Videos (A Capella Music); Wild Willy (MP-S), I Want to Bite With You Baby (A Capella Music); Galt Sternwheeler's Society (CP-TV), On the Muddy Old Man River (A Capella Music).

Roger Nichols (E/P): 424 Belle Point Drive, Nashville, TN 37221. **Credits:** Kaho Shimada (MP-A), Kaho Shimada (Kren Studios); Ricki Lee Jones (MP-A), Ricki Lee Jones (Studio 55); Paulo Ramos Band (MP-A), Paulo Ramos Band (Kren Studios); Tim Weston/Wishful Thinking (MP-A), Wishful Thinking (Kren Studios).

Dave Nodiff (E/P): 706 Waverly St., Framingham, MA 01701; 508-872-6843. **Credits:** OK Chorale (MP-AR), Live At the Rocking Horse (Studio N); S'Go (MP-AT), Daisy Records (Gravel Sound); Double Play (MP-AT), Double Play (Studio N); Newsong (MP-A), Newsong (Studio N); Team Ministry (MP-A), The Team (MCM, Studio N, Fishbrook).

O

Rod O'Brien (E/P): Streetwise Productions, 747 10th Ave., #17J, New York, NY 10019; 212-787-4127. **Credits:** MCA Records/Kill For Thrills (MP-A), Kill For Thrills (Oceanway Recording); A&M Records/Sergio Mendes (MP-AT), untitled (Power Station); SBK Music/Buster Poindexter (MP-S), Scrooged Soundtrack (Skyline Recording); PolyGram/Michael Monroe (MP-A), untitled (Atlantic Recording); A&M Records/Suzanne Vega (MP-A), Solitude Standing (Bearsville/A&M).

Richard Oliver (E/P): 854 Seventh Ave., Apt. #9, New York, NY 10019; 212-459-9643. **Credits:** Inside Yiannis Brain (MP-A), Rock 'n' Roll Vampire (Hip Pock-

et); Inside Yiannis Brain (PP-F), Rock 'n' Roll Vampire (Hip Pocket); Troma Films/Toxic Bad Girls (MP-S), Toxic Avenger II—Toxic Love (Hip Pocket); NuArt Films (PP-MV), Da Da Love (CMS Video); Tony Smythe & Co. (CP-TV), TV commercials (Hip Pocket/Smythe Studios).

Larry G. O'Rear (E/P): 5932 N. Grove, Oklahoma City, OK 73122; 405-721-3727. **Credits:** Lance Griffith and Midnight Prairie (MP-A), Lance Griffith and Midnight Prairie (Live at Tulsa City Limits).

P

Steve Pasierb (P): 3000 Chestnut Ave., #401, Baltimore, MD 21211; 301-243-1421. **Credits:** Rug Fair Orientals (CP-R), Story (Flite Three); Village at Elicton (CP-R), Paiter (Flite Three); Mount Clare Junction (CP-TV), Get It at the Junction (Big Mo/Flite Three); Fairfax City (CP-R), Easiest Place By Far (Commercial Refinery); Marc Train Service (PP-CI), My Baby Is A Marc Train (Flite Three).

Gene Perla (E/P): 20 Martha St., Woodcliff Lake, NJ 07675; 201-930-9149. **Credits:** Kreston/Lahm (PP-MV), Live At Jan Wallman's (The System); Dance Theater Workshop (MP), Ehud Benai and local music (The System); ACI Inc. (CP-TV), Pony Farm (The System); Nation-Wide Reporting and Convention Coverage Inc. (CP-TV), The Deposition (The System); BMI (MP-AT), Big Band (CMA).

Doug Pomery (E/P): 193 Baltic St., Brooklyn, NY 11201; 718-855-2650. **Credits:** The Sporting News, various jazz (MP-A), baseball songs (Clinton Recording); Red Eye Production/Swing Street Big Band (MP-A), Live At Trumpets (Remote); Jazzology Records/Marty Grosz (MP-A), Swing It (Brorby Studio); Stomp Off Records/Peter Ecklund (MP-A), Peter Ecklund and His Melody Makers (Union Temple).

R

Hector Riveroll (P): Gomez Farias No. 1, Mexico, DF; 905-548-3824. **Credits:** PolyGram/Shel Shapiro (MP-A), En Espanol (PolyGram Studio Mexico); BMG-Ariola/20 Finalistas (MP-A), 20 Finalistas Rock en Tu Idioma (PolyGram Studio Mexico); Magenta (MP-A), On The Raw (Studio 19/PolyGram Mexico); BMG-Ariola/La Cruz (MP-A), Rockolucion (Studio 19/PolyGram Studio Mexico); BMG Ariola/Rocco (MP-A), The First and the Last (Studio 19/Polygram Studio Mexico).

Steven Rosch (E/P): 6655-H Dobbin Road, Columbia, MD 21045; 301-596-2600. **Credits:** Grandma Viola (MP-S), Grandma's X-mas Wish (Roar Productions); Brad Sachs (MP-AT), Fatherhood (Roar Productions); Washington Homes (CP-R), Washington Homes Jingle (Roar Productions); Mellisa Baldwin/Gail Vogel (MP-S), All My Dreams (Roar Productions); Dan Winans/Steven Rosch (MP/CP-S/TV), Thank You For The Memories, Kareem (Roar Productions).

Arnold Rosen (E/P): 225 E. 57th St., New York, NY 10022; 212-683-6854. **Credits:** Serino Coyne Advertising (CP-R), New York Public Library (Superdupe II); YER (CP-TV), Colgate/Palmolive Shampoo; Lintas (CP-R), Eastern Airlines; Lintas (CP-TV), Diet Coke.

Rick Rowe (E/P): 149 W. Fourth St., New York, NY

ENGINEER/PRODUCER INDEX

10012; 212-420-9838. **Credits:** Lincoln Center Theatre/Sarafina (MP-A), Sarafina! Broadway cast album; BMG/Elvis Presley (MP-AR), The Alternate Aloha; NBC/Magicom/various artists (MP-TV), Super Bowl halftime show; NBC/Miss America Pageant/various (MP-TV), 1989 Miss America Pageant pre-records.

Tom Reeves (E/P): Box 564, Newburyport, MA 01950; 508-465-4347. **Credits:** Gary Lamb (MP-A), A Walk in the Garden (Different Fur); Heidi Mitchell (MP-A), Take a Walk (Splice of Life); Grade Ultra (MP-S), Hey Girl (Cat's Voice); Vis a' Vis (MP-A), Visage (Splice of Life); Clean Shot (MP-A), Clean Shot (Oak Grove).

Ira Cord Rubnitz (E): 13530 Leadwell St., #5, Van Nuys, CA 91405; 818-994-0424. **Credits:** Columbia/Andreas Vollenweider (MP-A), The Lion and the Lamb (Mad Hatter); Enigma/Brian Bromberg (MP-A), Basses Loaded (Sound City, Space Station); Who's the Boss (TV); Phil Upchurch (MP-AT) (Mad Hatter).

S

Mike Sargent (E/P): 150 W. 47th St., Suite 3F, New York, NY 10036; 212-768-1828. **Credits:** Caedmon Records (MP-A), Robot City (Soundscape/ProSound); Mort Marks (MP-A), The Sophist (Stickwork Studios/Profound); James Scott Productions/Paul Hart (MP-A), Variations on a Theme (Stick Work II); Saavik Films (PP-F), The Child Within (Stick Work II/Fantasy Audio); Andrew Meyers (MP-A), Casdade (Fantasy Audio/Cianimusica).

Joseph H. Seta (E/P): 4922 Hazeltine, #4, Sherman Oaks, CA 91423; 818-907-7109. **Credits:** K.D. Lang and the Reclines (MP-A), Absolute Torch-n-Twang (Vancouver Studios); Marc Anthony Thompson/Reprise Records (MP-A/SR), Watts and Paris (Skillet Turtle/Music Grinder Steana/Skip Saylor/The Chapel); Martini Ranch/Sire/Warner Brothers (MP-A/SR), Holy Cow! (Steana/Master Control/Skip Saylor); Lunatic Fringe/Metal Blade Records (MP-AT), Street Survivor (Cherokee); The New Monkees/Warner Bros. (MP-AT), New Monkees (Master Control).

J.S. Smith (E/P): Box 20331, Jackson, MS 39289-1331; 601-857-8573. **Credits:** MC/DJ Stan X (MP-S), You Got No Guts (XTC House); MC/DJ Stan X (MP-SR), Double Dome Dose (Maywood Studios).

Patrick L. Smith (E/P): 3207 W. Mona Lane, Knoxville, TN 37914; 615-521-6703. **Credits:** Spike Lee (PP/AR-F), Do the Right Thing (RCA); Marcus Roberts (MP-A), The Truth is Spoken Here (RCA/Mission Control); Branford Marsalis (MP-AR), Random Abstract (Mission Control); Branford Marsalis (PP-MV); Royal Garden Blues (Century III); Courtney Pin (MP-A) (RCA/Mission Control/Baby O).

Walter N. Sobczak (E/P): c/o Wellesley Sound Studios, 106 Ontario St., Toronto, Ontario M5A 2V4; 416-364-9533. **Credits:** Maze/Savage Steel (MP-A), Do or Die (Wellesley Sound Studio); Green Fuse/Storm Group (MP-A), Grind (Wellesley Sound Studios); First Priority (WEA)/Kenny Krush (MP-S), Time Has Come/Gunshot (Wellesley Sound Studios); First Priority (WEA)/Michie Mee & LA Luv (MP-S), Victory/On This Mic (Wellesley Sound Studios); First Priority (WEA)/Michie Mee & LA Luv (MP-AT), The Basement Tapes (Wellesley Sound Studios).

Paul Special (E): 197 E. Fourth St., New York, NY 10009; 212-505-8363; 212-219-2314. **Credits:** Island Records/Robert Palmer (MP-AR), Sweet Lies (Compass Point/Record Plant); HBO/Cinemax/Delilah Films (PP-F); All-Star Reggae Session (Location/Sunset Sound/Record Plant/Airdrome); WEA/Ross Wilson (MP-A) (Record Plant/Studio One); Island Records/Etta James (MP-A) Seven Year Itch (Compass Point); Glenn Jost (MP-A/AR); Re-Love (Red Dog/This Way Productions).

T

Michael Totten (E/P): 1500 E. Woodbury Road, Pasadena, CA 91104; 818-794-7748. **Credits:** Little Anthony (MP-AT), Last Unbroken Heart (Sound House); Sir Charles (MP-S), Baby Don't Run (Sound

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ENGINEER/PRODUCER INDEX

House); Don Marsh (MP-A), Hymnbook Sing-a-long (Sound House); Dan Oxley (MP-AT), Dan Oxley sampler (Sound House).

W

William F. Wagner (P): 14343 Addison St., Apt. 218, Sherman Oaks, CA 91428. **Credits:** Page Cavanaugh (MP-A), untitled (Sage & Sound); Sandy Graham (MP-A), untitled (Sage & Sound); Frank Sinatra (MP-A), untitled (Evergreen).

Dusty Wakeman (E/P): 1717 Lincoln Blvd., Venice, CA 90291; 213-306-0950. **Credits:** Dwight Yoakam (MP-A), Buenas Noches (Capital, Mad Dog); Lucinda Williams, Rough Trade (MP-A), Lucinda Williams (Mad Dog); Buck Owens (MP-A), Hot Dog (Capital, Mad Dog); Jim Lauderdale (MP-A); Point of No Return (Capital, Mad Dog); Lonesome Strangers (MP-AR), Lonesome Strangers (Mad Dog).

Donny Walker (E/P): 135 W. 72nd St., Suite #4R, New York, NY 10023; 212-580-1698. **Credits:** Mike Ray/Wendy-o-Williams (MP-A), Firestorm (Granet/707/SBM/Pyramid); The Bang Gang (MP-A), untitled (SBM/Pyramid/Music Pallace); The Pink (MP-A), Killing Floor (Sigma NY/Granet/707); Sea Monster (MP-A), Sex God Chant (Granet/707); Strike Twice (MP-A), Strike Twice (Granet/707/SBM).

Steve Wallace (E/P): 859 McCallie Ave., Suite 103, Chattanooga, TN 37403; 615-266-6534. **Credits:** Chattanooga Life & Leisure (CP-TV), Fifth Anniversary—Rod Stewart (Multi-Traxx Productions); J.D. Kinder's Furniture (CP-TV), Thomasville—40% Off (Multi-Traxx Productions); Hearty Life Cereals/Sovex (CP-TV), A New Day—Breakfast—Sovex (Multi-Traxx Productions); Ad Images (CP-R), Physicians Weight Loss Centers (Multi-Traxx Productions); Dalton Chrysler/Plymouth (CP-R), Super Coupe Weekend (Multi-Traxx Productions).

Dave Waterbury (E/P): 933 Florence St., Burbank, CA 91505; 818-841-3316. **Credits:** Hubert Tubbs, Tower of Power (MP-S), Hubert Tubbs (Quality Studios); Jeanie Carr (MP-A), Forbidden (Quality Studios).

Andrea Weatherhead (E/P): 4210 10th St. N.E., Washington, DC 20017; 202-635-7992. **Credits:** Syzygy (MP-A), Syzygy (Roar Productions); R.T. Flair (MP-A), R.T. Flair (Roar Productions); Secret Tongues (E-A), Tongue In Chic (Roar Productions); Tyrone McBryde (P-S), No More Drugs (Roar Productions); Dan Winans (CP-TV), Thank You For The Memories, Kareem (Roar Productions).

Jeffrey Weber (P): Box 1451, Beverly Hills, CA 90213; 805-497-1584. **Credits:** Gravity (MP-A), Gravity (Oceanway/A&M).

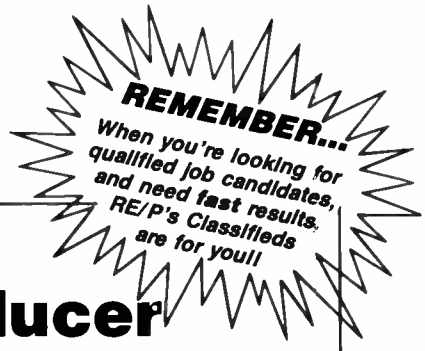
David B. Weeks (P): 182 Grand St., #324, Waterbury, CT 06702; 203-756-6525. **Credits:** Sonny Thompson (MP-AT), It's a Sure Thing (Inner City Sound/Normandy Sound).

Peter B. Wilder (E/P): 258 Pearl St., Burlington, VT 05401; 802-863-8652. **Credits:** Hasbro Canada (CP), Secrets (TKO Studios); Vermont Educational Television (CP-TV), Soundtrack, Title Sequence for Crossroads (Advance Floor Two); The Boyz (MP-A), No Trace (Northern Lites); Miss Bliss (MP-A), Red Carnations (Chas. Eller Studios).

Bernie Wright (E/P): 3430 S.W. Kelly, Portland, OR 97201; 503-248-0023. **Credits:** Kathy Philpott (MP-S), Footlights (PCC); Pam Ryan (MP-A), Silver and Gold (live); The Hymnals (MP-A), Page One (live); Sherry Cory (MP-A), I'd Rather Have You (live); Carol Jean Cox (MP-S), Eyes of the Night (Sutton Sound).

Steven J. Wytas (E/P): 165 Linden St., New Britain, CT 06051-2413; 203-224-1811. **Credits:** Turn of the Century Discs (MP-A), Raw Milk #1; Sons of Bob (MP-SR) (River Street); CCSU Symphony (MP-A), 1812 Overture/Fanfare for the Common Man; Loctite Corporation (PP-CI), Adhesive Applications (Group Telecasters).

The Engineer/Producer Index is a monthly department. To be listed, fill out the reply card located in the back of this issue. Please note that the Index is for individual engineers and producers; facilities should fill out the Tracks reply card.



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TRACKS

A

All Night Record: 208 ½ N. Washington, El Dorado, AR 71730; 501-862-0731; David Feinberg, operating exp. **Credits:** Michial Bell (PP-MV), Lou Rivera (RE/ME/AE: D. Feinberg, T.H. Williams); Rockin Guys (PP-MV), Monkeys Beating On Trashcans (RE: D. Feinberg/Tom Williams; ME/AE: Danny Grace); Nick Aisles and His Nupt Jeweltones (PP-MV), Long Walk (RE: D. Feinberg/T.H. Williams; ME: J.C. Jarboe; AE: H.M. Munford); WallaSound (PP-MV), Just Another Brick (RE: D. Feinberg/T.H. Williams; ME: H.M. Mumford; AE: D. Gaston Pagan); Howlin Mike (PP-MV), The Howlin Mike Sessions (RE: D. Feinberg, T.H. Williams; ME: H.M. Mumford; AE: D. Gaston Pagan).

ASL Mobile Audio: Box 791, Flushing, NY 11352; 718-886-6500; Steven Remote, chief engineer. **Credits:** Showtime/Lori Strauss Leukemia Foundation (TV-MV), Judy Collins Live From Avery Fisher Hall (RE/ME: Alan Silverman; AE: Steven Remote, Ralph La Rocca).

Audio Art Recording Studios: 403 S.W. Eighth St., Des Moines, IA 50309; 515-282-3223; Patrick McManus, co-owner. **Credits:** Kragie/Newell Advertising (PP-TV), The Time Is Right (RE/ME: Keith Brown); Busby Productions (CP/PP-TV), Townsend Engineering (RE: Keith Brown; ME: Keith Brown, Pat McManus); Kragie/Newell Advertising (PP-TV), Ruan CDL Test (RE/ME: Keith Brown); Morris Communications (PP/CP-TV), A Victime of Crime (RE/ME: Keith Brown; AE: Patrick McManus); Kragie/Newell Advertising (CP/PP-TV), Iowa Dept. of Economic Development (RE/ME: Keith Brown).

Audio Resource Honolulu: 1750 Kalakaua, Honolulu, HI 96826; 808-944-9400; Tony Hugar, manager. **Credits:** REO Speedwagon (PP-MV), Pacific Music Festival (Japan TV) (ME: Dave Devor; AE: Milan Bertosa); Meadow Gold Dairies (CP-R), Viva Milk (RE/ME: Milan Bertosa); DynoComm Productions (CP-TV), Day at the Beach (ESPN) (RE: Milan Bertosa; AE: Bobyn Davis).

B

BCS Studios: 11300 Hartland St., North Hollywood, CA 91605; 818-766-6000; Andrew Overton, studio manager. **Credits:** Professional fx Inc. (TV-PP), My Name Is Bill N. (RE: Steve Powell/Larry Owens); Professional fx Inc. (TV-PP), Snoops (RE: Steve Powell/Larry Owens).

Bruce Lamb Productions: 2906 N. State St., Suite 320, Jackson, MS 39216; 601-981-4656; Duane Lamb, co-owner/producer. **Credits:** Sabrina Amos (CP), This Is How You Make Me Feel (RE: Duane Lamb, Thomas Bruce; ME: Duane Lamb); Fortune (CP), Mary, I Want To Live (RE/ME: Duane Lamb); Tammie Donelson (CP), In Over My Head, All The Way Love (RE: Duane Lamb, Thomas Bruce; ME: Duane Lamb).

C

Clifton Music Production Co.: Box 22883-2902, Melbourne, FL 32902; 407-768-0000; Clif Johnson, owner. **Credits:** Silhouette Hair Designs (CP-R), jingle (RE: Clif Johnson, Jim Bertrand; ME: Clif Johnson, Craig Covert); Kenny McLaughlin (PP-MV), Child's Prayer/TNN (RE/ME: Clif Johnson; AE: Craign Covert); Brevard Communications (CP-R), jingle (RE/ME: Clif Johnson); Craig Covert (PP-MV), Covert Operations (RE: Clif Johnson; ME: Clif Johnson, Craig Covert); The Fountains of Melbourne (CP-R), jingle (RE/ME: Clif Johnson, Craig Covert).

Conti Studios: 509 N. Ridgewood Ave., Edgewater, FL 32032; 904-427-2480; Dick Conti, owner/president. **Credits:** Eagles Wings Productions (PP-F), Journey of Peace (RE/ME: Dick Conti; AE: Chris Conti); Marsha Riggs (PP-MV), I Want To Know You More (RE: Chris Cuchetti, Mark Nilan; ME: Chris Conti; AE: Gino Conti); Kathy Fisher (PP-MV), On Eagles Wings (RE/ME: Gino Conti; AE: Chris Conti).

Coupe Studios: 2539 Pearl St., Boulder, CO 80302; 303-447-0551. **Credits:** DDB-Needham Worldwide (CP-TV), McDonalds/Central Communication (RE/ME/AE: Kip Kuepper, Scott Roche, Patrick Cullie); Alpine Films (PP-F), Sailing Quarterly (RE/ME/AE: Kip Kuepper, Scott Roche, Patrick Cullie); Quarterdeck Systems (PP-CI), QD-TV (RE/ME/AE: Kip Kuepper, Scott Roche, Patrick Cullie); J. Walter Thompson (CP-TV), Go With The Leader (RE/ME/AE: Kip Kuepper, Scott Roche, Patrick Cullie); Oak Creek Films (PP-F), Man Who Swam The Grand Canyon (RE/ME/AE: Kip Kuepper, Scott Roche, Patrick Cullie).

D

Dan Dean Productions: 2134 Sixth Ave. W., Seattle, WA 98119-2814; 206-282-6584; Dan Dean, president. **Credits:** King TV 5 (CP-TV), Home Team '89 (RE: D. Dean, L. Nefzger; ME: D. Dean); Sea Game (CP-TV), Great Deal Campaign (RE: D. Dean, L. Nefzger; ME: D. Dean); Hutson Inc. (CP-TV), 7-Up Marathon (RE/ME: D. Dean); Metro (CP-R), Wheels On The Bus Blues (RE: D. Dean, L. Nefzger); Dairy Queen (CP-TV), DQ Squeeze :30 (RE/ME: D. Dean).

G

Gallaudet University TV: 800 Florida Ave. N.E., Washington, DC 20090; 202-651-5115; Ves Bennett, director of engineering. **Credits:** Public Broadcast System (TV-F), Deaf Mosaic (monthly series) (RE: Dick Farber, Ves Bennett; ME: John Mullen; AE: Thao Ngyuen, Jeffrey Johnson).

K

KMA: 1650 Broadway, Suite 1204, New York, NY 10019; 212-265-1570; Michael Case Kissell, producer/owner. **Credits:** Electra Records (MP-A), Ernie Isley (RE/ME: David Dachinger); White Mountain Films (PP-F), In The Blood/Babatunde Olatunj (RE: Andrew Halbreich); Sand Hill Cinema (PP-F), Belt Shots (RE: Andrew Halbreich); American Adventure Productions (CP-TV), Mutual of Omaha's Wild Kingdom (RE: David Dachinger; AE: Andrew Halbreich); George Washington Carver (MP-A), Modern Agriculture (RE: Andrew Halbreich).

L

Landmark Communications Group: Box 148296, Nashville, TN 37214; 615-868-0425; Bill Anderson Jr., president. **Credits:** Joanne Cash Yates (CP-TV), Joanne Cash Yates Live...With Johnny Cash (RE: Bill Anderson Jr.; ME: P.C. Salter); Tennessee Christian Medical Center (PP-CI), Give To Life (RE: Bill Anderson/J. David Chilton); Randy Weiss (PP-MV), Christmas Contrast (RE/ME: P.C. Salter); Right To Life Organization (CP-TV), Right To Life (RE/ME: P.C. Salter); Teddy Nelson (PP-MV), Louisiana's Callin' (RE: Ronny Light; ME: Nick Borgen).

N

National Video Center/Recording Studios Inc.: 460 W. 42nd St., New York, NY 10036; 212-279-2000; Stephen Ostrow, vice president of sales. **Credits:** NBC (PP-TV), Vital Signs (ME: Bill Ivie); WPIX (PP-TV), Two-Way Television (ME: Bill Ivie); Phoenix Communications (PP-TV), The Great American Baseball Quiz (ME: Bill Ivie); Young and Rubicam (CP-TV), AT&T campaign (RE/ME: Gary Chester; AE: Mike Boris); DFS (CP-TV), Lucky Charms campaign (RE/ME: Gary Chester; AE: Mike Boris).

Nine Pines Recording: 1721 Olean Rd., South Wales, NY 14139; 716-652-3750; Paul J. Rich, owner. **Credits:** Helen's Sweet Shop (CP-R), Helen's Sweet Shop (RE/ME: Bill E. Bakker); Topps Building Supplies (CP-R), Topps Building Supplies (RE/ME: Paul J. Rich/Bill E. Bakker); Sandy Janice (PP-MV), So In Love (RE: Paul J. Rich; ME: Paul J. Rich/Bill E. Bakker); Pizza Palace (CP-R), Pizza Palace (RE: Paul J. Rich; ME: Paul J. Rich/Bill E. Bakker).

O

On-Trax: 9340 Narnia Drive, Riverside, CA 92503; 714-687-5506; Brad Williams, producer. **Credits:** UFO Computers (CP-TV), UFO Spots (RE: Sol Taraboulos; ME: Brad Williams); Riverside Co. Philharmonic (CP-

Key

Facility Name: Address; phone; contact name/title. **Credits:** Client (Credit Code-Subcode), Project Title (Recording Engineers; Mixdown Engineers; Assistant Engineers).

Codes

CP (Commercial/Advertising Production).
Subcodes: R (Radio) TV (Television).

PP (Post-Production)
Subcodes: F (Film) MV (Music Video) CI (Corporate/Industrial)

R), McCullum Auditorium Concerts (RE/ME: Brad Williams).

Osburn Video Sweetening: 53 Skyview, Cleveland, MO 64734; 816-658-3327; Denny Osburn, producer. **Credits:** Hallmark Cards (CP-CI), Party Express (RE: Ron Dabbs); Van Chevrolet (TV-CI), :30 Spot (RE: Denny Osburn); Empire District Electric (TV-PP), several :30 Spots (RE: Jim Wheeler/Denny Osburn); Children International (CP-R/TV), TV & radio spots (RE: Dan Stark/Denny Osburn); Hallmark Cards (CP-MV), Shoebox (RE: Denny Osburn).

P

PSI Recording Studios: 136 Arlington St., Boston, MA 02116; 617-423-0007; John P. Parla, vice president. **Credits:** Hill, Holliday Advertising (CP-R), Massachusetts State Lottery—Jokers Wild-Standup (RE/ME: D. David Porter); Mullen Advertising (PP-F), U.S. Trust Court Room (RE: dB Sound NY; ME: Vin Parla Jr.); Hill, Holliday Advertising (CP-TV), Boston Globe Travel (RE/ME: D. David Porter).

R

Radio Active Productions Recording Studio: Box 2523, Marathon Shores, FL 33052; 305-743-7808; John Bartus, owner. **Credits:** WFKZ Sun 103 Radio (CP-R), Tradewinds Plaza Jingle (RE: John Bartus, Roy McAdams; ME: John Bartus); Key of Sea Music Center (CP-R), Dusty's Lost His Mind (RE/ME: John Bartus); Stock Island Chevron/Wail 99 (CP-R), License to Fill (RE/ME. John Bartus, Roy McAdams).

S

Sadler Recording Studio: 118 E. 28th St., New York, NY 10016; 212-684-0960; John Sadler, president. **Credits:** Rebo Studio (PP-F), Yoko Ono's film Homeless (RE/ME: Rick Klejmont); Fancy Free Music (CP-TV), Getty Free Glasses demo (RE/ME: Rick Klejmont); Marty Costello Productions (PP-CI), Citibank Training Tapes (RE/ME: Rick Klejmont); David Falcon Associates (CP-TV), Wendy's TV spot (RE/ME: Rick Klejmont); MJA Advertising Associates (CP-R), Potamkin Toyota (RE/ME: Rick Klejmont).

Sear Sound: 353 W. 48th St., Sixth Floor, New York, NY 10036; 212-582-5380; Walter Sear, owner. **Credits:** Reeltime Films (PP-F), Banned (RE: Walter Sear/Bill Titus; ME: Ivan Ortiz); Funahara & Associates (PP-F), The Enemy (RE: Steve Lindsey); Double Helix Films (PP-F), Fast Food (RE: Walter Sear; AE: Ivan Ortiz); Films Around the World (PP-F), Home Movies (RE: Walter Sear).

Sound Emporium Studios: 3102 Belmont Blvd., Nashville, TN 37212; 615-383-1982; Gary Laney, manager. **Credits:** RCA (CP), Keith Whitley (RE/ME: Gary Laney, Garth Fundis); RCA (CP), Joel Sonnier (RE: Tim Farmer, Bill Halverson; AE: Lineel Stone); W.B. (CP), Mark O'Conner (RE/ME: Ed Seay; AE: Todd Swolar, Lineel Stone, Dave Sinko); A&M (CP), David Wilcox (RE/ME: Pat McCarthy; AE: Dave Sinko); Ron Chancy Productions (AP), Pillsbury, McDonalds (RE/ME: Billy Sherrill; AE: Lineel Stone, Dave Sinko).

A Street Music: 701 Seventh Ave., 9W, New York, NY 10036; 212-764-3872; Bill Grabowski, owner. **Credits:** Fast Films (PP-F), The Whole Truth (RE: John Uhl/Bill Grabowski; ME: Bill Grabowski; AE: Terry Selders); Watermark Video (TV-CI), Taiwan Symphony (RE/ME: Skip Plant).

Studio A: 5619 N. Beech Daly, Dearborn Heights, MI 48127; 313-561-7489; Marilyn Morgeson, owner/manager. **Credits:** Competitive Edge (CP-R), Southern California GMC Trucks (RE: Mario Resto; ME: Randy Poole); Coventry Productions (CP-TV), Le Run Bicycle (RE: Mario Resto, Randy Poole; ME: Randy Poole); Simon Michaelson Zieve (CP-R); Big Boy Classical/Gourmet Burger (RE: Eric Morgeson, Mario Resto; ME: John Jaszcz); Unisys (PP-CI), Micro A (RE: Randy Poole, Mario Resto; ME: Randy Poole); Berline Group (CP-R), Duraliner Truck Bed Liners (RE: Mario Resto, Randy Poole; ME: Randy Poole).

T

Toby's Tunes: 2325 Girard Ave. S., Minneapolis, MN 55405; 612-377-0690; Harley "Toby" Toberman, owner. **Credits:** Radisson Hotels (PP-CI), Radisson Sales Meeting (RE/ME: Toby Toberman); Northern States Power (CP-R), Rate Comparison (ME: Toby Toberman); Combined Services (PP-CI), Sheldon Theater (RE/ME: Toby Toberman); CMFZ (CP-TV), Treflon Magic (RE/ME: Toby Toberson); Bell South (PP-CI), Sales Meeting (RE/ME: Toby Toberman).

Touchwood International (Music) Ltd.: Park St., Stow on the Wold, Cheltenham, Glouchestershire, GL54 1AQ, England; 44-451-30221; K.M. Dixon, managing director. **Credits:** Dixon & Bramble (CP/PP-MV/R/TV), Ten Moons Found (RE/ME: K. Dixon, I. Bramble; AE: S. Dixon); Dixon & Catlin (CP-R/TV), Com/Radio-Film-Com TV (RE: K. Dixon; ME: K. Dixon, M. Lindsay; AE: S. Dixon, D. Catlin); Cry-Hade's (PP-MV), Chipping Norton—Live (RE: K. Dixon, D. Kalali; ME: K. Dixon; AE: S. Dixon); Dixon & Colbourne & Dixon (CP-MV), Waterline/Don't Touch Me Anymore (RE: K. Dixon; ME: K. Dixon, M. Lindsay; AE: S. Dixon); Dongle on the Rocks (CP-MV), How To Keep Your Dongle Safe (RE: K. Dixon; ME: K. Dixon, M. Lindsay; AE: S. Dixon).

W

WaveTech Recording: 3130 Skyway Drive, Suite 602, Santa Monica, CA 93455; 805-925-4244; Rob Ibsen, president. **Credits:** DEN-MAT Corporation (PP-CI), 5 Surface Bonding (RE/ME: Rob Ibsen; AE: Doug Tomooka); DMCD (CP-TV), Rembrandt Toothpaste (RE/ME: Rob Ibsen; AE: Doug Tomooka).

White Rose Studio: 1901 Crested Butte, Edmond, OK 73034; 405-282-2729; Craig C. White, owner. **Credits:** Woody Lingle (CP-R), Celco Safety Lights (RE/ME: Craig White); Media Music Works (CP-TV), The Choice Smorgasboard (RE/ME: Scott Minor); Studio II Productions (CP-R/TV), Opening Night New Year's Eve Event (RE/ME: Scott Minor).

Tracks is a monthly department. To have your facility listed, fill out the reply card located in the back of this issue. Please note that Tracks is for facilities only; individual engineers and producers should fill out the Engineer/Producer Index reply card.

STUDIO UPDATE

Northeast

Ferne Freidman, assistant editor at **Broadway Video** (New York), was awarded a Daytime Emmy Award for "Outstanding Achievement in Live and Tape Sound Mixing and Sound Effects" for her work on the Children's Television Workshop's "3-2-1 Contact." *Brill Building, 1619 Broadway at 49th Street, New York, NY 10019; 212-265-7600; fax 212-713-1535.*

The Edison (New York) has added Dolby SR noise reduction. The facility recently celebrated its third anniversary. *228 W. 47th St., New York, NY 10036; 212-921-0505.*

Nutmeg Recording (New York) is in the middle of a renovation that includes the addition of a second 24-track video sweetening room. *45 W. 45th St., New York, NY 10036; 212-921-8005.*

Dreamland Recording Studio (Bearsville, NY) has added GML 8200 mic pre-amps and parametric EQs, a Panasonic SV-250 portable DAT machine, Sanken CU-41 and sm2 microphones, and a Bryston 4-B power amp for the main monitors. The mains have also been rewired with Monster Cable. *Box 383, Bearsville, NY 12409; 914-338-7151.*

Red Rock Recording (Saylorsburg, PA) has added a Panasonic SV3500 DAT machine, an Eventide 949 Harmonizer, two UREI LA-3s, a BBE 802 and an Alesis Quadraverb. *Route 1, Box 208, Saylorsburg, PA 18353; 717-992-5777.*

39th Street Music Productions (New York) has added a 56-input SSL console with G Series Computer and Total Recall. Also new is a Studer A800, a Panasonic 3500 DAT machine, a Lexicon 480XL and an E-mu Proteus. *260 W. 39th St., 17th Floor, New York, NY 10018; 212-840-3285.*

Sleepy Hollow Sound (Dobbs Ferry, NY) is now offering remote recording services at a flat rate. The rate change is designed to give clients a fixed price before the project begins. *39 Cedar St., Dobbs Ferry, NY 10522; 914-693-8537.*

Sound on Sound Recording (New York) has purchased a Yamaha C7 grand piano. *322 W. 45th St., New York, NY 10036; 212-757-5300.*

Broadway/57 Recording (New York) is the new name of Giant Sound Recording. The facility is now solely owned by Douglas Pell and Joe Salvatto. New equipment includes two Neve 1073 mic pre-amps/EQs, two UREI LA 3As, an AMS RMX reverb and an RCA 77 mic. A 24-track Synclavier/MIDI suite is being planned.

Southeast

Strawberry Skys Recording Studio (West Columbia, SC) has added an AKG ADR-68K effects processor with 32 seconds of sampling time, a Panasonic

SV3500 DAT machine, a Studio Technologies Mic Pre-Eminence mic preamp and a Neumann U87 mic. Another iso booth has been added to the main studio area. *1706 Platt Springs Road, West Columbia, SC 29169; 803-794-9300.*

Air Show (Springfield, VA) has installed Digidesign's Sound Tools system running on an Apple Macintosh computer. Other additions include a Sony PCM-2500 DAT machine, and Sennheiser MKH-30P and MKH-40P microphones. *7021 Woodland Drive, Springfield, VA 22151; 703-642-9035.*

Midwest

Hatchery Studios (Warren, MI) has acquired a 28-input Neotek console with a built-in patchbay and 4-band sweepable EQ. Also new are two Lexicon LXP1 effects processors with MRC remote, a Fostex 4030/35 synchronizer, a dbx 166 stereo compressor/limiter and an Apple Macintosh Plus with a 20MByte hard drive. *2175 Michael, Warren, MI 48091; 313-754-8200.*

Paisley Park (Minneapolis) has completed an expansion of Studio B. The API DeMedio console was enlarged to 48 channels, with 80 inputs; GML Moving Fader Automation was installed. New equipment includes various outboard gear, Dolby SR noise reduction and an Eventide H-3000 Harmonizer.

Southern California

The Post Group (Los Angeles) has named Jerry L. Burdick executive vice president. *6335 Homewood Ave., Los Angeles, CA 90028; 213-462-2300.*

Hit Single Recording Services (San Diego) has added a Sony APR-5002 2-track recorder, a Lexicon 480L, a 3M M79 24-track, Valley Gain Brain IIs and a Neumann TLM-170i mic. *College Grove Center, Lower Court 4, San Diego, CA 92115; 619-265-0524.*

Location Recording Service (Burbank) has added CD submastering to its lacquer mastering facility with the addition of a Sony PCM 1630 digital processor, two DMR-4000 ¾-inch recorders and a Sony PCM 2500 DAT machine. *2201 W. Burbank Blvd., Burbank, CA 91506; 213-849-1321; fax 818-845-8357.*

The Pasha Music House (Hollywood) is a new 24-track studio and in-house production company. The facility includes two studios, in-house engineers and support staff. Karen Chamberlain is manager of studio and operations. *5615 Melrose Ave., Hollywood, CA 90038; 213-466-3507; fax 213-469-0122.*

Record Plant (Los Angeles) has returned the operation of Scoring Stage M to Paramount Pictures. The stage is located on the Paramount lot. The move is part of Record Plant's decision to concentrate on

STUDIO UPDATE

its studios and equipment rental division. *1032 N. Sycamore, Los Angeles, CA 90038; 213-653-0240.*

Rumbo Recorders (Canoga Park) has reopened Studio A. The control room has been remodeled and re-equipped, and the studio has been acoustically redesigned to increase natural reverberation. A 60-input Neve V Series console with Flying Faders automation has been installed. *20215 Saticoy St., Canoga Park, CA; 818-709-8080.*

Northern California

Poolside Studios (San Francisco) is the first installation site for the Crescendo audio mixing system, manufactured by Euphonix. *2269 Chestnut, #310, San Francisco, CA 94123; 415-931-9390.*

The Farm (El Cerrito) has updated Studio A. New equipment includes Casio FZ-1 samplers with extended memory updates and processing, SCI synthesizers and outboard gear from Roland, Alesis and ART. Also new are mics from Shure, Audio-Technica, Crown and Electro-Voice. *1760 Elm St., El Cerrito, CA 94530; 415-237-3457.*

Northwest

Miramar Images (Seattle) has relocated its corporate offices to 200 Second Ave. W., Seattle, WA 98119; 206-284-4700.

Manufacturer and dealer announcements

Soundmaster has installed 7-machine audio editing systems at NBC-TV in New York and Yorkshire Television in England.

Pro audio dealer **Washington Professional Systems** has installed a Lexicon Opus at Henninger Video, Arlington, VA. A Sony APR-24 and Soundcraft 6000 console has been delivered to International Studios, Kensington, MD, and a Sony MXP-3000 console and APR-24 have been delivered to Master Project, Washington, DC.

Neve has installed the first VPR console at The Enterprise, Burbank, CA. A 60-input V Series console has been installed at Topanga Skyline Recording, Topanga Park, CA.

Focusrite Audio Engineering has received an order for 16 EQ modules from Pete Townshend for his Eel Pie Studios, London.

GLW Enterprises has placed the first Harrison SeriesTen console at Eastside Sound, New York.

Alpha Audio has placed a BOSS/2 system at New Age Sight and Sound, Atlanta.

Sony has delivered an MXP-3036 console to Estudio Cadena, Monterey, Mexico.

Magno Sound and Video, New York, has purchased a **New England Digital** Synclavier and Direct-to-Disk system.

Amek/TAC has received Mozart console orders from The Bakery, Hollywood; Canadian rock band Frozen Ghost, Toronto; Mirage Studio, Oldham, England; Sing Sing Studios, Melbourne, Australia; and producer Mark Jolley, for his private studio.

Georgetown Masters, Nashville, has purchased two **Sony** PCM-3348 48-track DASH recorders. Disc Mastering, Nashville, has purchased a DAE-3000 audio editor.

Lexicon has sold an Opus Digital Audio Production System to Sound Mirror, Boston.

AKG Acoustics has sold ADR 68K digital reverbs to Planet Dallas Studios, Dallas; Cotton Hill Studios, Albany, NY; Invincible Productions, San Diego; Crystal Clear Sound, Dallas; The Ethical Pool, Los Angeles; and Ardent Recordings, Memphis, TN.

Amek has sold a Mozart console to The Bakery, Hollywood. It is the first Mozart to be installed in the United States.

Solid State Logic has received console orders from Power Station, New York; Record Plant Recording Studios, Hollywood; Aire LA, Los Angeles; Hit Factory, New York; Tarpan Studios, San Rafael, CA; Paul Dean, Vancouver, British Columbia; Effanal Music, New York; Century III Teleproductions, Orlando, FL; Landmark Sound, Virginia Beach, VA; Phase One Recording Studios, Toronto; Tone Zone Studio, Chicago; TV Ontario, Toronto; Jim Vallance, Los Angeles; Vintage Recorders, Phoenix, AZ; Universal City Studios, Universal City, CA; Buena Vista Studios, Burbank, CA; JDH, Los Angeles; Fox Television Center, Hollywood; Post Logic, Hollywood; Canadian Broadcasting Corporation, Toronto; and NBC Television, Burbank, CA.

Manny's Pro Audio Division has delivered equipment to Q1 Productions, New York, and Wild Sound Studios, Asbury Park, NJ.

Wadia Digital has installed the first link of a fiber optic network at Masterfonics, Nashville. The first connection is a 100-foot run linking Mastering Room I with the Tape Copy Room.

Audio Kinetics has installed an ES 1.11 synchronizer system at Anglia Television, the 150th unit sold since its introduction.

Digital Audio Research has sold 4-channel SoundStation IIs to Pelican Studios and Pullman Video, both of London.

AMS has received AudioFile orders from Soundelux, Los Angeles; Sync Sound, New York; National Video Industries, New York; Omni Technology, Gallatin, TN; Digitec Audio, Puerto Rico; Toy Specialists, New York; and Innervision, St. Louis.

New England Digital has sold two Synclavier 3200 systems to EFX Systems, Hollywood. The purchases are EFX's fifth and sixth, making it the world's largest NED investor.

Neve has delivered the first VR consoles to Cherokee Recording, Gibson Productions, Lucasfilm, Estefan Enterprises, Full Sail Center for the Recording Arts, Conway Recording, The Chase Group, Preferred Sound, Streeterville Studios and Capitol Records. CBS Records Studios has taken delivery on a third Digital Transfer Console. Hollywood Center Studios and WFTV in Orlando, FL, have purchased 5106 consoles. CBS-TV has ordered a 51 Series console. V Series consoles have been sold to New Age Sight & Sound, and The Tape House, Photomag Division.

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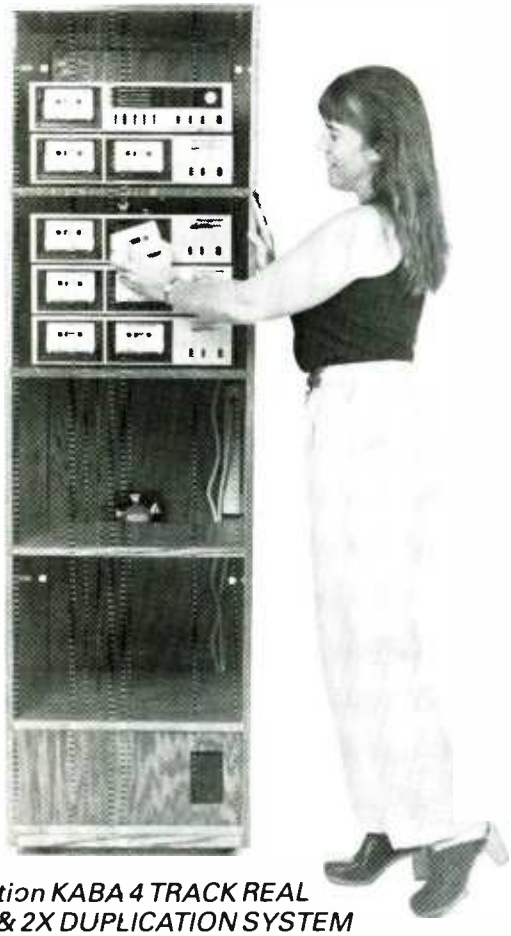

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Circle (34) on Rapid Facts Card

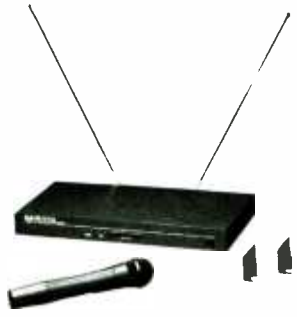
THE CUTTING EDGE

By Laurel Cash

Summer NAMM goodies

EV shows wireless vocal mic

Electro-Voice has introduced the MS-1000 wireless vocal microphone with the N/D 757 capsule. The MS-1000 is a dual-receiver, true-diversity system with two receivers on the front end. To virtually eliminate dropouts, the receiver with the strongest signal is automatically chosen. The receivers are said to provide high selectivity for rejection of adjacent and interfering signals to assure interference-free operation in harsh RF environments.



According to Claude Kleiman, wireless marketing manager, the company feels it has brought the finest wireless microphone to the professional market. EV says state-of-the-art technology and designs have been incorporated, not the least of which is the excellent N/D757 capsule, in creating the system.

The transmitter delivers 50mW of output power, which is the legal maximum output for a wireless system. According to EV, this provides excellent range and virtually eliminates dropouts. To delete popping noises, the transmitter has separate RF-on and mic-on switches and operates for up to 10 hours on a single 9V alkaline battery.

Laurel Cash is RE/P's executive consultant and a Los Angeles-based free-lance writer.

The 19-inch rack-mountable MS-1000 operates in the VHF range, 165MHz to 216MHz. The system has a switchable mic/line XLR output, line-level ¼-inch output, detachable antenna and an internal power supply.

Circle (150) on Rapid Facts Card

Tascam 1-inch 24-track recorder

In a landmark move, Tascam has introduced the MSR-24 1-inch, 24-track recorder at a price that is roughly half of most current 2-inch, 24-track machines.

This allows potential users the option of 24 tracks for less money than many 16-channel decks. The MSR-24 uses 1-inch tape on 10½-inch reels and operates at either 7½ips or 15ips.

With built-in professional dbx Type 1 noise reduction, an S/N of 108 dB, A-weighted at 15 ips, is said to be achieved. Using 8-bit microprocessor technology, Tascam claims that the digital control of the record and erase bias envelopes of the record and erase heads will produce noiseless and gapless punch-ins and -outs.

The company also states that the bias oscillator ramp-up rate is adjusted for optimum performance regardless of tape speed. A spot-erase function is also included, reported to be noise-free, which makes it possible to erase specific sections of previously recorded tracks. The MSR-24's transport system uses direct-drive, high-torque capstan motors. This reportedly delivers fast and accurate tape handling, even when full reels are used.

Transport control is said to result in fast response times when switching from fast-forward to play modes. Extra versatility is provided with a pitch control system (VSO) that allows accurate adjustments over a 15% range. For external control, the MSR-24 can interface with standard SMPTE time code-based synchronizers.

The 2-head recorder uses Tascam's proprietary large-core design heads from hard permalloy material for superior wear characteristics and sound quality, especially when working with low frequencies. The MSR-24 was scheduled to be available in August at a suggested retail price of less than $15,000.

Circle (151) on Rapid Facts Card

Atari laptop computer

In an apparent move to compete with Yamaha's C-1 portable computer, Atari has introduced the Stacy laptop computer.

Based on the energy-saving CMOS version of the Motorola 68000 microprocessor, running at 8MHz, the Stacy is Mega- and ST-compatible. The Stacy includes a high resolution, back-lit monochrome liquid crystal display. The system can be connected to all standard Atari monitors, both monochrome and color, and to an external power supply.

The system operates with Atari's standard GEM interface, featuring an integrated trackball to replace the Atari mouse. One megabyte standard memory and an integrated 3.5-inch disk drive is included. There is also a built-in floppy port (for an optional second floppy disk drive) and a built-in hard disk port for an optional hard drive.

Circle (152) on Rapid Facts Card

RE/P

The 87th Convention of the
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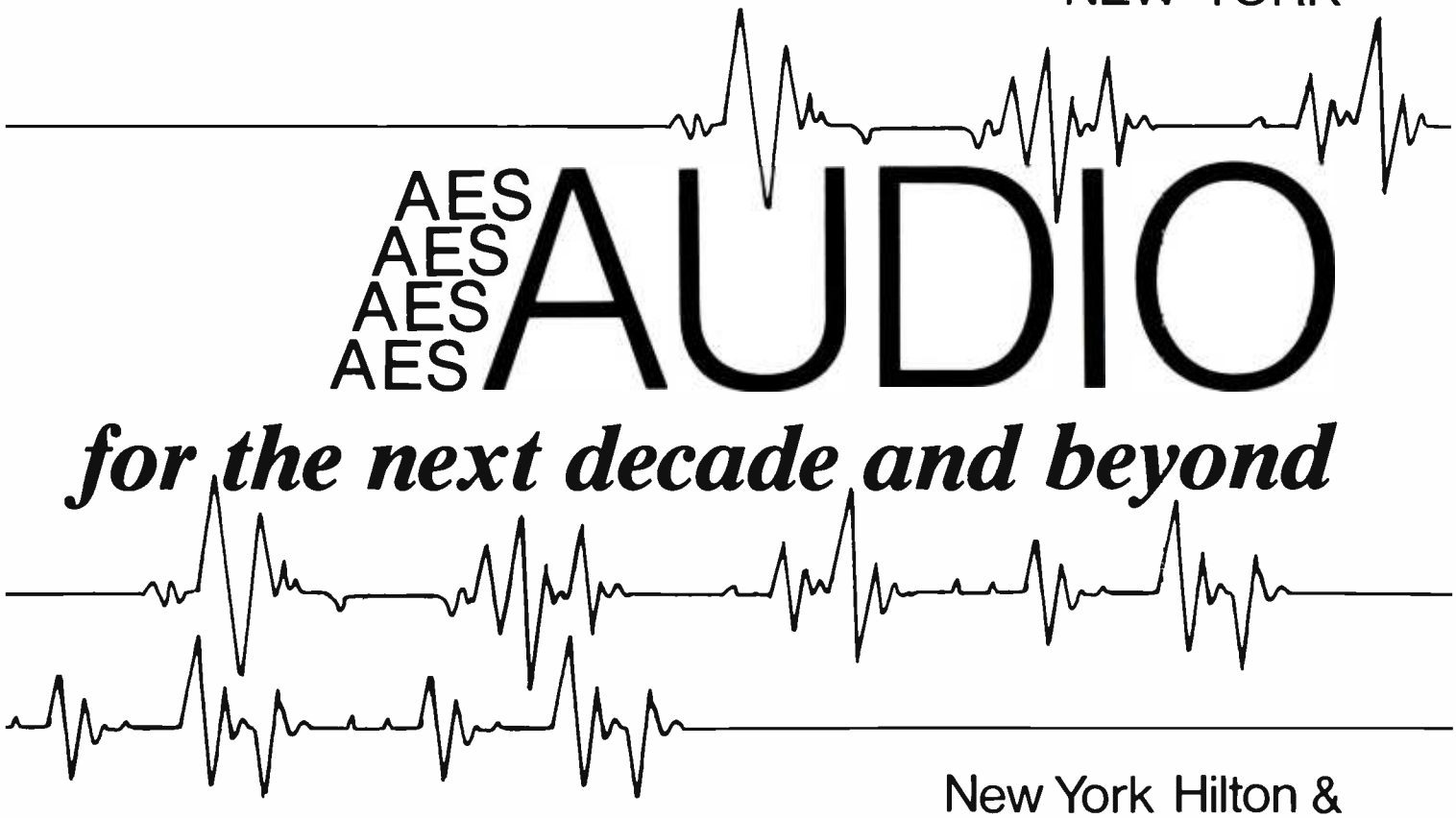

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NEW PRODUCTS

Computer Automated Patching Systems

Azimuth Productions' line of Computer Automated Patching Systems makes possible the digitization of patching and repatching audio and video equipment. An engineer can patch or repatch an entire console and outboard effects with the touch of a button, a SMPTE pulse or MIDI trigger. Other system features include a built-in SMPTE generator, internal disk drive for patch pattern storage, a high resolution color monitor and a rack-mounted silent ink-jet printer for hard copy output of patch sheets, timing sheets and track assignments.

Circle (130) on Rapid Facts Card

Community RS880 loudspeaker system

The 3-way full-range loudspeaker system is designed in a trapezoidal enclosure. The loudspeaker features various options including Penn Fab D-rings and internal steel trussing, which makes the enclosure suitable for flying arrays. Adding to its versatility is the availability of two high-frequency coaxial horns, a 90×40 and a 60×40. Four individual transducers comprise its 3-way design. Suggested retail price is $1,999. Also available is the 880EQ dedicated dynamic equalizer device, priced at $279.

Circle (132) on Rapid Facts Card

Denecke time code readers

The TC-MAXI and the TC-MIX studio time code readers feature a variable intensity 4-inch LED readout displaying longitudinal time code (SMPTE or EBU) from 1/20th to 50× speed in forward and reverse. The TC-MAXI, listed at $1,650, reads hours, minutes, seconds and frames. The TC-MIX, listed at $1,040, reads minutes and seconds. Both units feature a remote intensity control with TC input and TC/user select switch.

Circle (135) on Rapid Facts Card

Electro-Voice S-1202ER speaker

The S-1202ER full-range, 12-inch, 2-way speaker is the latest addition to the Extended Range speaker line. The new speaker features the DH2010A titanium-diaphragm, high-frequency compression driver coupled to a 90°×40° constant-directivity horn. The PRO circuit protects the DH2010A compression driver from overload. The crossovers feature heavy-gauge inductors, high-power resistors and high-voltage capacitors. The S-1201ER has a 300W EVM-12S Pro-Line woofer capable of withstanding 1,200W peaks and producing a maximum SPL of 125.5dB.

Circle (138) on Rapid Facts Card

Audio-Technica wireless mic systems

Audio-Technica U.S. has introduced a line of wireless microphone systems engineered for signal clarity, reliability and versatility. The line includes a true diversity receiver with a standard body pack (model ATW1031) or hand-held (ATW1032) transmitting systems. The UniPak transmitter features internally adjustable gain, allowing a player to fine-tune the system to the particular characteristics of his instrument pickups or amplification equipment. A protective case mounts to a belt or guitar strap, and the system comes with connecting cable with a locking-type miniature plug for use with guitars and other high-impedance sources.

Circle (131) on Rapid Facts Card

Kenwood R-DAT error-rate counter

The DR-5755 R-DAT error-rate counter is designed for the R-DAT system designer, tape manufacturers and the recording industry. The unit measures C1/C2 block error rates on inputs of PCM equalized NRZI signals from an R-DAT deck. The system is optimal for evaluating regenerated R-DAT system mechanical units or tapes. The DR-5755 also features track linearity, track pitch and signal envelope.

Circle (136) on Rapid Facts Card

J.L. Cooper MAGI II

The MAGI II console automation system interfaces with any console to provide SMPTE-locked fader and mute automation. The system consists of rack-mounted dbx VCAs, the MAGI II controller unit, a remote fader unit and software, which runs on an Apple Macintosh or Atari ST. Features include fader read, write and update modes, fader sub-grouping, full SMPTE synchronization and automatic disk archiving. The system is available in 16-, 32-, 48- and 64-channel configurations.

Circle (153) on Rapid Facts Card

Stewart half-rack power amplifiers

Stewart's PA series, the company's first power amps, provide up to 200W of power in the half-rack format by using a "switching" power supply. All models are available with balanced or unbalanced inputs, discrete Class A/B design, no current limited and built-in thermal protection. All amps have a 2-year warranty.

Circle (154) on Rapid Facts Card

Stewart phantom power supply

The BPS-1 is a single-channel, battery-powered +48V phantom power supply designed for applications where ac-powered units would not be practical. The unit operates with two 9V alkaline bat-

NEW PRODUCTS

teries, which will last for up to 200 hours. Additional features include a detachable belt clip, a power status LED indicator and a lightweight aluminum chassis. The BPS-1 carries a 2-year warranty.

Circle (155) on Rapid Facts Card

Korg RE1 remote editor

The RE1 is a dedicated remote editor for the Korg M3R, which provides comprehensive editing and control of all parameters. All operations are assigned to six separate editing groups. To tweak a sound program, users press the function switch that corresponds to the desired parameter. The parameters are controlled by eight sliders, which facilitate intuitive editing.

Circle (156) on Rapid Facts Card

DSP System One from Cadence

Available from Cadence Systems, the DSP System One is a 16-bit, wide-bandwidth stereo effects sampler and generator. It comes with 128 installed effects, including delay, reverb, flange and sampling. The unit can be programmed, and user programs can be stored in non-volatile RAM. Standard memory is 64K, although the unit is available with 128K and 256K. Suggested retail price is $899.

Circle (158) on Rapid Facts Card

Audio Accessories patchbay

Audio Accessories has developed a series of pre-wired patchbays that use Krone punch-down terminal blocks. The bays are available in two formats, with either a connect or a disconnect block, and with 24, 26 or 32 long-frame ¼-inch jacks per row. The patchbays can be supplied in a self-contained chassis or with a cable harness between the panel and the hinged backplate.

Circle (157) on Rapid Facts Card

Electron Processing wireless antenna

The company has introduced two active antennas that improve reception and range for wireless mic systems. The antennas cover all wireless frequencies from 0.5MHz to 800MHz, and an internal active amplifier provides a minimum 14dB signal boost. The Super Vak-Tenna is standard, and has two suction cups for temporary mountings. The Super Vak-Tenna-MM has a mounting bracket for permanent installations. Prices start at $149.95, with quantity discounts available.

Circle (164) on Rapid Facts Card

DDA touring consoles

DDA has introduced two consoles for live sound, the Arena Monitor and the Arena VCA house console. The Monitor is a 16-output board with EQ on all 16 outputs and an 18-way meter panel. It is available in formats up to 44/16/2. The Arena VCA, designed to be used as a house mixer, is an 8-group mixer that uses an additional eight VCA/mute groups for use in programming level and mutes. Also included are eight aux returns, eight aux sends and fully balanced I/O. Both use Penny & Giles faders.

Circle (165) on Rapid Facts Card

Celestion SR Compact speaker

The SR Compact is the company's smallest and most efficient enclosure in the SR series. Weighing seven pounds, the unit uses the same driver design as the larger SR speakers, with a single 5-inch concentric dome radiator. Power handling is 100W, with an 80Hz to 20kHz frequency response and an maximum SPL of 111dB. The driver's unified coil/dome structure is naturally time-aligned, reducing the phase and frequency aberrations common to multi-way systems.

Circle (166) on Rapid Facts Card

Radian Monitor Standard series

The Monitor Standard series is a coaxial system based on the company's 2-way coaxial loudspeakers. High-frequency material is reproduced by a compression driver that uses the company's HH phasing plug, which delivers smooth and extended frequencies over a 120° dispersion angle. The woofer uses an edgewound copper wire voice coil wound on a high-

temperature Kapton/Nomex laminated former. The monitors include models with 8- and 10-inch coaxial speakers. Future models will feature 12- and 15-inch coaxials.

Circle (167) on Rapid Facts Card

Ashley Audio FET2000M

The FET2000M MOS-FET power amplifier's circuitry was reconfigured utilizing CAD technology, resulting in improved signal-to-noise performance and increased headroom. The recessed meter panel provides an accurate tool for monitoring levels, while step-attenuator controls have been added for more predictable setups. The unit offers balanced XLR connectors, TRS phone jacks, as well as mono/briding switching.

Circle (137) on Rapid Facts Card

"No Magnets" shipping labels

Available from Black Audio Devices, the labels protect sensitive recorded tapes and computer disks from accidental erasure during shipment or in the mail. The bright red accent catches the attention of shippers, and the internationally recognized warning symbol alerts all package handlers to the potential for damage. The labels are available in packs of 10 and in rolls of 100 and 1,000.

Circle (162) on Rapid Facts Card

RTC1 remote from Yamaha

The RTC1 is a MIDI-based control unit that adds new features and capabilities to the DMP7, DMP7D and DMP11 processors. The unit allows centralized control of up to four mixers and adds "analog-like" control of EQ, pan and special effects settings. Additionally, the unit provides fader grouping, single-control crossfade and linked stereo input channel operation. Suggested retail price is $1,095.

Circle (161) on Rapid Facts Card

Pro 4 sequencing software

Passport Designs has released Pro 4, a sequencing system for the Macintosh that provides an integrated track editor for re-

NEW PRODUCTS

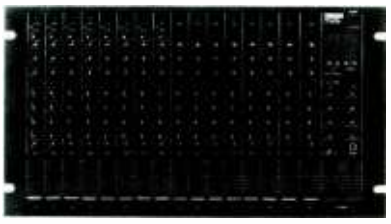
cording and playback, notepad, song editing and graphic- and event-based editing. The Track Editor provides a fast way of creating songs, as it displays the structure of the song and allows users to edit measures using cut, copy, paste and mix command. SMPTE features include cue sheet facility using event markers, the capability to sync to SMPTE via MIDI Time Code and compatibility with all four SMPTE formats.

Circle (159) on Rapid Facts Card

Yamaha MV1602 mixer

The 16-input mixer has two mixing buses and four aux sends from each input. Inputs 1-8 are mic/line-selectable with adjustable gain and have a peak overload LED for optimum level matching. Inputs 9-14 are line inputs with a 20dB pad. Inputs 15-16 are ganged stereo inputs. The main outputs have both balanced XLR and unbalanced ¼-inch phone jacks. Suggested retail price is $1,195.

Circle (163) on Rapid Facts Card



Crown Com-Tech power amps

Crown has introduced four models in the Com-Tech line: the CT-200, -400, -800 and -1600, with each number standing for the maximum average of watts the unit produces in mono mode. All amps use the Multi-Mode circuitry found in the Macro-Tech amps. Output Device Emulator Protection protects the units from overheating and damage from overload. The amps can be installed in a standard 19-inch rack. Suggested retail prices range from $740 to $1,880.

Circle (168) on Rapid Facts Card

Tascam CD-401 CD player

The professional CD player features 18-bit, 4× oversampling with the company's zero distortion circuitry and a 3-beam tracking head. Additional features include XLR-balanced outputs and an accessory jack for remote starts. A remote control is also available for wired or wireless operation. The player is available in a rack-mount chassis. Suggested price is $799.

Circle (169) on Rapid Facts Card

Shure L series wireless system

The L series is designed to offer professional features at a moderate price. Four systems are available. Systems LS13 and LS14 are designed for guitars and instruments, and are priced at $360 and $495. The LS13/839 and LS14/839 are lavalier systems and are priced at $445 and $580. The systems are available in six stock frequencies, and other frequencies may be special-ordered.

Circle (171) on Rapid Facts Card

Signal intensifiers for wireless mics

Electron Processing has introduced two RF pre-amplifiers that intensify the wireless signal for improved performance. The RFW series provides 15dB of gain over all wireless frequencies. Coverage from 1MHz to 1,300MHz is continuous and with a 2.8dB noise figure. The standard RFW model contains a single amplifier, while the RFW-DD containes two separate, isolated amps that are designed for dual-diversity systems. The RFW costs $169.95, and the RFW-DD costs $224.95, with quantity discounts available.

Circle (170) on Rapid Facts Card

ProSystems FP speaker enclosures

The company has introduced five models in the FP line, which feature Fibrelite construction and the company's compression drivers and horns. The FP 151 and FP 251 are 2-way systems featuring full high-pass and low-pass crossovers, and biamp capability. The 151 costs $320 and the 251 costs $396. Other models include the FP 351 Penatrator ($570), a 3-way system; the FP 181 low-frequency cabinet ($396); and the FP 121M 2-way floor monitor ($206).

Circle (172) on Rapid Facts Card

Electro-Voice summation system

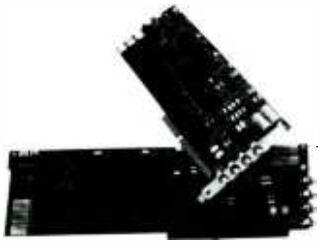
The DH1A/2MT acoustic summation system consists of two DHAmt-16 drivers mounted on an MTA-22 Manifold Technology adapter. It avoids interference by combining the outputs of two drivers into a single horn, with low distortion. The result, according to the company, is a compact, lighweight system that delivers high SPLs. The company's PROTEF top-plate coating on the DH1Amt-16 lubricates any accidental voice-coil contact with the magnetic structure.

Circle (173) on Rapid Facts Card

DAL Desktop Recording Board

Digital Audio Labs' Desktop Recording Board plugs into an IBM AT or compatible, allowing the PC-based user to record pro-quality digital audio. Two channels of audio are digitized and sent to the hard disk in real time. Three sampling rates are software-selectable: 44.1kHz, 32kHz and 48kHz. Sampling is by two separate 16-bit A/D converters running at 2× oversampling, followed by a digital filter. Price is $1,295 in singles and $795 in 100s.

Circle (174) on Rapid Facts Card



FOR-A AFV-500 mixer

The AFV-500 is an audio-for-video mixer that allows the control of audio effects with the same precision that video effects are now produced. The unit provides "key frame" programming of audio setups, which can be implemented automatically by a computerized editing system. Users can program source assignment, levels, EQ, panning and other functions with smooth transitions between key frames. A Motorola 68000 CPU controls the processing hardware and communicates with the

control panel CPU, the video editing system CPU and a personal computer for offline storage.

Circle (175) on Rapid Facts Card

JBL low-frequency transducers

JBL's 12-inch model 2206, the 15-inch model 2226 and 18-inch model 2241 incorporate new Vented Gap Cooling technology in an improved Symmetrical Field Geometry (SFG) magnetic structure. The cooling technology pumps air through the magnetic gap and directly over and around the voice coil to provide immediate heat transfer. The magnetic structure improvements have created a lighter speaker with lower distortion characteristics, according to the company.

Circle (177) on Rapid Facts Card

Mackie Designs CR-1604 mixer

The CR-1604 is a rack-mountable 16-channel mixer with seven aux sends per channel, 4-bus main output, 3-band EQ, true stereo solo, true constant power panning and dealed rotary controls. The first six channels feature studio-grade, EIN −129dBm phantom-powered mic preamps. Suggested retail price is $999.

Circle (176) on Rapid Facts Card

Nady 650

The 650 VHF Wireless System features true diversity reception for drop-out free performance and includes newly developed filtering circuitry that allows up to 10 units to function together onstage. The systems operate on VHF highband channels from 151MHz to 216MHz, with wide choices of channels offered. The 650 receiver can be powered by 110 or 230 Vac current, and was built using Nady's noise-reduction circuitry for dynamic range of 120dB. List price for the 650 GT Instrument System is $599; the 650 LT Lavalier System is $639; the 650 HT Handheld System is $659.

Circle (192) on Rapid Facts Card

Hybrid Arts MIDI editor program

GenEdit, a universal MIDI patch editor and sound librarian, is for use with the Atari ST and Macintosh personal computers. GenEdit utilizes MIDI System Exclusive commands to allow it to edit any MIDI de-

NEW PRODUCTS

vice available now or in the future that implements these commands. A Template Editor lets the user create a virtual control panel for any MIDI instrument, including synthesizers, drum machines, effects devices and mixers. Twelve preset templates are included with the program, including templates for the Korg M-1 synthesizer, Yamaha DX-7 synthesizer and DMP-7 digital mixer. GenEdit for the Atari is listed at $249; the Macintosh version is $349.

Circle (193) on Rapid Facts Card

RSP Technologies 2400 Enhancer

Model 2400 is a multiband stereo enhancer that features Rocktron's patented hush noise reduction, a sum difference mode that can provide stereo imaging effects, selectable frequency phase mode for phase notching and tonal coloration. The enhancer also features mix controls which provide for low/mix and high/mix adjustments, balanced or unbalanced inputs and outputs.

Circle (198) on Rapid Facts Card

HME RP755 power station

The RP755 4-channel power station is the newest addition to the 700 series cabled intercom line. The station has a matrix assignment panel that allows the operator to assign 12 stations or groups to one of the four independent intercom lines or two private lines. The unit will provide power for up to 64 belt-pac headset stations with the call light function or up to 200 belt-pacs if the call light feature is not used. Short circuit and over-temperature protection is provided by a current foldback circuit.

Circle (196) on Rapid Facts Card

Polydax dome tweeter

The 1-inch DTW 100 TI 25 BA CAV FF dome tweeter has a diaphragm that is composed of a soft polymer with a thin coating of titanium. The coating increases the stiffness of the dome structure, but adds little to the overall moving mass. It also features a vented pole piece that loads into a tuned cavity on the back of the magnet. This feature reduces distortion around the resonant frequency extending the bass end response. The tweeter has a recommended crossover point of 1,500Hz and has an SPL of 88dB.

Circle (199) on Rapid Facts Card

Cinedco Audiflex

Designed for dialog, the Audiflex memory/hard-disk based digital sound editing workstation offers CD quality in a 16-bit 40kHz sampling. The system allows editors to input any compatible CMX, ISC or EDL list, providing manual or automatic assembly. Audiflex features a built-in sampler and Fill Bin, and offers system capacity of 30 to 120 minutes per track with four to eight channels available.

Circle (194) on Rapid Facts Card

Winsted Corporation Tapehook and Rail System

This system is designed to accommodate any brand of tape case and provides a safe and convenient way to organize a tape library in limited space. The TapeHook features a pressure-sensitive backing for application. It then snaps into place on the wall-mounted extruded aluminum taperail for storage. It is available in two sizes to fit most tape cases.

Circle (200) on Rapid Facts Card

HME RW760 interface unit

The RW760 is a rack-mountable interface unit that allows the HME 700 Series intercom products to connect to 2-wire, noncompatible 3-wire, 4-wire or telephone intercom systems. The unit includes a modular phone plug and the feature of capturing and holding the telephone line. In the 2-wire mode, the RW760 connects telephone systems to the standard 3-wire intercom system. The 4-wire mode will connect to all 4-wire telephone systems. An ac adapter is available to power the unit if it is not being powered by the 3-wire intercom line.

Circle (195) on Rapid Facts Card

Audio-Technica ATM25 microphone

The ATM25 is a moving coil dynamic mic with a hypercardioid pickup pattern that is designed to be used with highly dynamic instruments that generate high SPLs, such as kick drums, timpani, acoustic and electric bass, harp, piano and tuba. The narrow acceptance angle of the polar pattern allows users to focus the mic on the desired sound source to control feedback, provide more flexible working distances and reject unwanted sounds outside the pickup pattern.

Circle (160) on Rapid Facts Card

Publications

Disc Makers catalog

Disc Makers has published a complete catalog detailing all its audio and video manufacturing services, including prices for cassette, LP, compact disc and video manufacturing.

Circle (139) on Rapid Facts Card

ADC patching catalog

ADC Telecommunications has released a catalog on its line of audio and video patching products. Also included is a section on jack and plug cleaning, drawings and schematics.

Circle (179) on Rapid Facts Card

Shure audio guide

Shure has released the "Guide to Better Audio," which is designed to improve audio in video productions. Included are mic tips, using an audio mixer and which cables and connectors can help achieve optimum results. The 25-page booklet is free.

Circle (178) on Rapid Facts Card

Benchmark product catalog

Benchmark Media Systems' 1989 catalog details the company's entire product line. Photos and specifications are included.

Circle (180) on Rapid Facts Card

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NEW PRODUCTS

Hardware and software updates

New options for Orion consoles

Orion Research has released three new options for its NewsMaker software-based audio consoles. The Fault Recovery System protects operators against power failures. The MM-16 Mix-Minus Matrix adds an additional 16 mix-minus sends to any NewsMaker console. A floor stand with space for a meter panel and external signal processing equipment has also been added.

Circle (181) on Rapid Facts Card

Nady 101/201 update

Nady's 101 and 201 wireless systems can now be used with the AKG C-409 horn mic, allowing horn players to use the 101 or 201 LT system. The 409 has the same element as the AKG C-410 lavalier, but has a gooseneck clip to fit on the horn mouth.

Circle (182) on Rapid Facts Card

Price reduction for Coda Finale

The price of Coda's Finale music notation software has been reduced from $1,000 to $599. For registered users who purchased the software before June 15, Coda has created the Finale Founders Program, which offers three premiums at no charge, including a Finale 2.0 upgrade, the complete Finale Font Set or PAN Network signup fees.

Circle (183) on Rapid Facts Card

Soundtracs ERIC automation update

Level 2 of the console automation system, known as ERIC2, allows the recording of all console recalls, setups and mutes against time code. The system also reads and generates all forms of time code, and all events are recorded down to half-frame accuracy, preventing mute delays. The automation can be fitted to any ERIC console.

Circle (184) on Rapid Facts Card

Neotek console frame designs

Neotek has introduced a new frame design for the Elite, Elan, Esprit and Essence consoles, which allows for custom design. Relocated internal or remote patchbays, 19-inch rack bays, custom desks and integrated digital workstations can be accommodated.

Circle (185) on Rapid Facts Card

Tascam MIDiiZER

After overcoming some software hurdles that delayed its market introduction, Tascam's MTS-1000 MIDiiZER was scheduled to be delivered in August. The unit offers MIDI-to-time code and tape transport synchronization and control capabilities. Suggested retail price is $1,999.

Circle (186) on Rapid Facts Card

New warranty for Crown amps

Crown is now offering a 3-year, no-fault warranty on all amplifiers, which can be

upgraded to include an additional three years. The no-fault coverage guarantees that if an amp fails for any reason, the unit will be replaced or repaired.

Circle (187) on Rapid Facts Card

Electro-Voice N/D mic update

EV has introduced a special on/off switch for the N/D357S and N/D757S mics. The switch is located on the microphone collar and away from the handle, eliminating accidental turnoff.

Circle (188) on Rapid Facts Card

Tascam DA-50 update

Tascam has added a third sampling rate to its DA-50 R-DAT recorder. In addition to sampling at the standard baud rates of 32kHz and 48kHz, the digital audio tape deck now records at the rate of 44.1kHz, permitting two-track mastering direct to compact discs with no additional interface required. It also features an oversampling digital filter, four direct-drive tape transport motors, a remote control unit and a 7-way power supply system with independent transformers for the digital and analog circuitry.

Circle (133) on Rapid Facts Card

Celestion SR Series

The SR3 PA cabinet and the SRC3 loudspeaker processor have been added to Celestion's SR Series of loudspeakers. The units are designed for high-quality stage monitoring applications, especially ideal for fill-in of live/pre-recorded material broadcast. The SR3 contains an 8-inch, full-range loudspeaker with a 60Hz frequency response. The elliptical shape of the HF dome radiator resists the ringing and break-up modes that cause distortion.

Circle (134) on Rapid Facts Card

Upgraded MIDI interface from CMS

Computer Music Supply has introduced an improved MIDI interface that is Roland-compatible and can be expanded. The CMS-401/2 includes all the features of the CMS-401, the single input/output card. Suggested retail price is $159.

Circle (189) on Rapid Facts Card

SCSI option for Kurzweil K250

Kurzweil has introduced an SCSI option for the K250, allowing the unit to be connected to SCSI-equipped hard drives to store data. Up to six hard disks can be daisy-chained.

Circle (190) on Rapid Facts Card

Price reduction for Tascam ATR-80

Tascam has reduced the price of the ATR-80 analog 24-track from $40,000 to $35,000. According to the company, the reduction is designed to maintain market excitement for the company's high-end analog products as the shipment date nears for the DA-800 DASH recorder.

Circle (191) on Rapid Facts Card

RE/P

LETTERS

Shakeout in Utopia

From: David Porter, president, Music Annex, San Francisco.

The July editorial was courageous and, more importantly, long overdue. I believe that few audio trade magazines would have the courage to print your material for fear that the hardware manufacturers who support those magazines would cry foul. You are to be commended.

As a SPARS member, I have had the opportunity to meet with both manufacturers and other studio owners in private "off-the-record" meetings; many of us agree with you that pro audio is not the growth industry we have all been led to believe it is. When was the last time we were allowed to read about a studio that failed? What we see instead each month, issue after issue, are the success stories of new "dream studios" with all the latest gear and the new owner's statements about how healthy the market is and how this venture was going to fill some technological void in the market.

I would like to see some follow-up stories to see how some of these operations survived the business reality of a dilute market and a customer base that constantly erodes and transforms itself into competition either as a private studio or a new commercial venture. It all looks so glamorous on the surface (i.e. the cover of a magazine), but how did they do after 12 to 18 months of making payrolls and realizing that they really can't sell it 16 hours a day, seven days a week, for card rate like the salesman said they could?

I would like to see an emphasis put on professionalism in our industry, and, as the editorial said, "weed out the impostors, charlatans, frauds, hustlers and wannabees." As witnessed by the recent wave of mergers and acquisitions within the industry, I believe there will be consolidation and that a natural selection process will develop, where some very powerful players will emerge and many of the "also rans" will be forced to get out of the game. I also believe that, as the consolidation process deepens, some very creative people operating small boutique companies will flourish with innovative and market-driven products and services. Those caught in the middle may be in trouble.

I believe the above scenario will apply to both manufacturers and facilities alike, but on a different scale. In our short history, innovation has often come from boutiques (the Paul Buffs and the George Massenburgs) long before the giants were able to respond. There is a need for both cultures, but the middle ground is becoming a very frightening place indeed. The next hurdle for many of us will not be so much technological as it will be a matter of economics.

From: Hal Jepsen, Hal Jepsen Productions, Malibu, CA.

"Shakeout in Utopia" goes on the wall. The concept applies to everything from new cereals and TV snacks to the B-2 Bomber.

My favorite song on my first soundtrack album was recorded with one microphone. Overall balance and EQ are incredible. It was for fun, but the engineer knew what he was doing. One million dollars of "bells and whistles" doesn't make *anyone* competent. Sir Arthur Conan Doyle wrote, "Mediocrity knows nothing higher than itself."

Spacing for fidelity

From: J. Russell Lemon, Carlsbad, CA.

I have been recording for many years, and there are situations in which slightly spaced mics give better fidelity than mid-size (MS) recordings. Before I say anything else, I will admit that MS recordings have the greatest accuracy in localization and that MS recordings are indicated when monaural playback is probable. But when separation of channels is guaranteed, spaced miking of instruments with multiple sound sources will preserve a greater fidelity.

Several years ago, I recorded a flute-piano duet. I miked both instruments with a stereo pair of spaced mics. During the recording, I noticed that the level of the flute into the right mic would be less on some notes, and the level of the flute into the left mic would be less on other notes. The flute has two sources of sound, which create an uneven polar pattern which cancels in directions dependent on frequency. A single distant mic recording of a flute has an uneven response!

Spaced mics offer space diversity the same way as multiple antennas for an FM wireless mic. When one antenna loses power, the other takes over. When we listen live, we have the same advantage. When one ear is in a null, the probability is that our other ear will not be. Thus, slightly spaced mics offer a more even sound in a full stereo system. The image location of a spaced mic recording wanders because of directional nulls, but notes are not lost. MS recordings accurately present the image locations, but an MS recording has the same uneven frequency response as a single monaural mic because both mics (M & S) are in the same units.

Later that same day, I recorded a choir. The recording was of secondary importance to the sound reinforcement of that choir spread across a large stage. To avoid feeding adjacent mics into the same channel, the mics from left to right were panned full left, full right, full left, full right, etc. This greatly reduced the frequency distortion that occurs from those choir members almost equidistant from two mics feeding the same channel. The localization was inaccurate, but the result put the audience into some great music. MS puts the music in front of the listener, spaced mics put the listener into the music.

Teaching sound reinforcement

From: Flawn Williams, Chicago.

In the June Letters, David Scheirman asked readers to respond about ongoing training in sound reinforcement. I teach such a course at the Augusta Heritage Arts Workshops in Elkins, WV, each summer.

For several years, we held colloquiums about sound systems; last year, for the first time, we formalized it into a 2-day course for 15 students. This year, we've expanded the category to include a weekday seminar (held each afternoon after the students' regular music classes) and a hands-on workshop. Both are booked up solid.

People interested in being kept informed of future workshops can write to the Augusta Heritage Center, Elkins, WV 26241. We're considering adding a weekday full-time (30-hour) course next summer, if interest justifies it. RE/P

Send letters to RE/P, 9221 Quivira, Overland Park, KS 66215. Letters may be edited for length and clarity.

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The Series 6000 input module gives you programmable electronic muting under optional MIDI control, solo-in-place to get a clear picture of your progress, and a patented active panpot with isolation of 90 dB (1kHz).

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When you specify Soundcraft's Series 6000, with options including 16 to 56 channels, stereo input modules, and built-in patchbay, you'll find it an affordable slice of progress. Series 6000, simply the most comprehensive production console in its class.

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