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THE RECORDING INDUSTRY MAGAZINE

# Mix

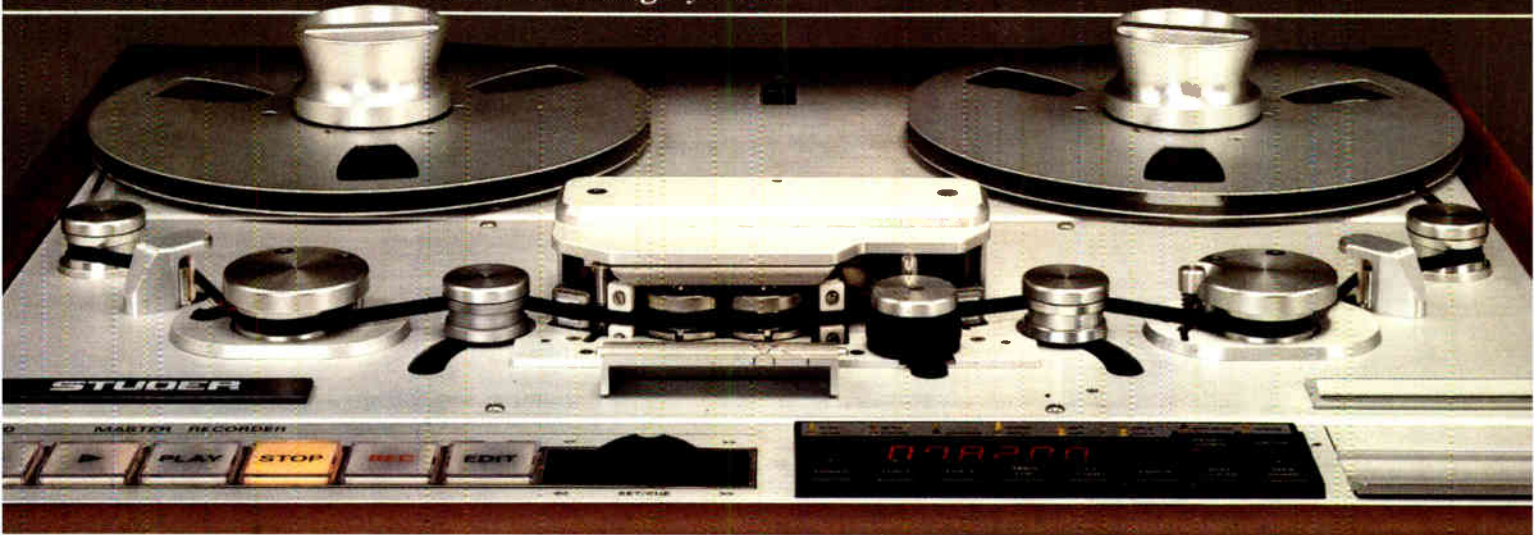
Interview: Neil Young

**Studio Design Issue**  
**Listings: Designers/Suppliers**  
**Orchestral Recording**  
**Control Room Acoustics**

067682 MXAUG  
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**Thomas Dolby**  
**Prince's Stage Sound**  
**Ray Charles**  
**Paul Horn**

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# The hardware is typically Studer. The software is simply astounding.

The transport mechanics in our new A820 Analog Master Recorder are solid, stable, and precision-crafted in the Swiss tradition. That's all typically Studer. What's new is an ingenious network of software-controlled operating systems.

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Also Noteworthy. The A820 incorporates Studer's new generation of phase compensated audio electronics, available with either transformer or active balanced inputs and outputs. In sound quality, the A820 takes a quantum leap ahead of recorders made just a few years ago. Options for the A820 include a center-track SMPTE time code channel and test generator.

The Payback. The "hardware" in the Studer A820 is made to give you dependable service for years to come. That's the Studer tradition. Plus, with its advanced software, the A820 also does more different jobs,

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For more information on the new A820 Analog Master Recorder, please contact: Studer Revox America, 1425 Elm Hill Pike, Nashville, TN 37210; (615) 254-5651.

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World Radio History

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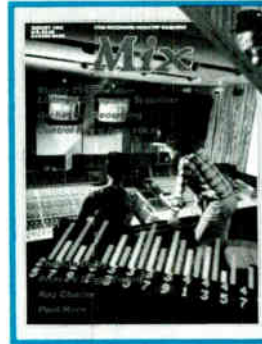
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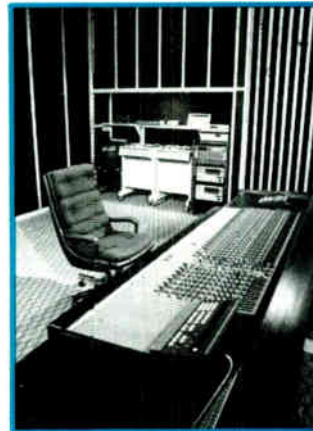


**Cover:** Studio 2 control room at Abbey Road Studios in London features a Solid State Logic mixing console. **Photo by:** John Price  
**Corner photo:** Neil Young by Rose Clayton

One of the most talked about tours of recent years was surely Prince's mammoth "Purple Rain" trek across America. Volumes have been written about those concerts and the surrounding hoopla, but for the first time anywhere, *Mix's* George Petersen examines the audio side of that tour through detailed discussions with two of Prince's engineers, David Hewitt and David Tickle. Petersen probes the tour's state-of-the-art sound system and looks into the remote recording Prince did on the road for his latest LP. That article appears on page 83.



The special focus of this issue is **studio design** and so we offer a number of articles related to that area. In a special forum, **audio retailers** talk about equipment trends, what's hot and what's not (page 128). William Johnston talks about "Electronic Acoustical Modification" (page 42) and John McCarty takes a detailed look at Indiana's TRC Studios to see how one studio has incorporated some of the latest technological advances made by the government into its design (page 20). Ken Pohlmann discusses those maddening **spikes and surges** in his "Audio Applications" column (page 14), and of course, we have detailed **Listings of Studio Designers and Suppliers** (page 136).



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# OUR NEW BABY

Announcing the arrival of the MTR-90's little brother; Otari's one inch, 16 channel MX-70. A multitrack mastering recorder that lets you do virtually anything you want to do in audio, affordably.

The MX-70, specifically designed for multitrack recording, derives its features from our experience with MTR-90 customers and their applications. For example, the "70's" microprocessor controlled constant tension transport is ideal for use with SMPTE time code-based video editing systems, machine controllers, and synchronizers. Its "3-way" design (1 inch 16 track; 1 inch 8 track, and 1/2 inch 8 track) allows conversion right in the studio, so if need be, each session could be done on a different format. And as your needs change, this machine will stay with you all the way up to 16 tracks—you won't be left behind as your business grows.



The new MX-70 for Recording Studio, Audio Post Production, and Broadcast Production. You can see why we're so proud of our new baby. We know you will be too. From Otari: The Technology You Can Trust. Otari Corporation/recording, 2 Davis Drive, Belmont, CA 94002, 415/592-8311, Telex: 910-376-4890.

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# CURRENT

## NARAS Trustees Meet

Mike Greene, former president of the Atlanta chapter of the National Academy of Recording Arts and Sciences, as well as co-founder of the Video Music Channel and executive producer of Atlanta's Crawford Communications, has been elected NARAS National President at the recent trustee's meeting in Tucson, AZ. Other new officers include Eddie Lambert as first vice president and Marilyn Baker as secretary/treasurer.

In other business the trustees approved a referendum that would permit membership for artists, directors and line producers of music videos and added new Grammy categories for best new classical artist and best polka recording. A five-year contract with executive producer Pierre Cossette for the Grammy Awards telecast was also approved, and plans for other TV programs were discussed, including one built around the Academy's lifetime achievement award.

In his duties as president, Greene plans "to investigate, as soon as possible, a potential for expansion of the Academy in the United Kingdom, Japan and other international markets."

## SPARS Plans Database

The 3M Corporation has provided a grant to the Society of Professional Recording Studios to establish a studio industry market statistical database. SPARS will survey manufacturers and a wide variety of production studios to determine what data will be usable, valuable and obtainable. A questionnaire will be developed from this input and sent to over 5,000 audio and video production facilities. The data obtained from the questionnaire will be published in an annual slated for release in February of 1986.

SPARS plans also call for installing the studio listing portion of the database as a service on the IMC computer network. SPARS executive director, Gary Helmers, stated, "There are a large number of touring artists and other entertainment business professionals utilizing the network; the online database will enable them to locate quickly the studio with the services and

equipment they need, while on the road in any market."

One of the primary purposes of the database, according to Helmers, will be to provide recording operations with the market information they need for structuring financing, planning expansion and developing business plans.

## Compusonics Demonstrates Long Distance Digital Recording

The Denver, Colorado-based Compusonics Corporation has announced the successful long distance demonstration of their patented, high fidelity digital audio recording system for music. The "Telerecording" demonstration was conducted at the AT&T Bell Laboratories in Holmdel, New Jersey. Using AT&T's Accunet Switched 56 service, which permits voice, data and video information to be transmitted at 56 kilobits per second over AT&T digital switched network facilities, Compusonics digitally transmitted music over a 100-mile circuit, to and from New York City.

In the test, Compusonics first digitally recorded a Glenn Miller Orchestra song on a 5¼" floppy disk. The

song was then transmitted over the Accunet Switched 56 line and re-recorded on a second 5¼" floppy disk.

## Sony Intros New DASH Recorders

Sony Corporation has announced plans to market new two-track digital audio stationary head recorders in the fourth quarter of 1985. The PCM-3202 Twin DASH two-track recorder, running at 15 ips, and the 7.5 ips PCM-3102 will feature both electronic and mechanical editing. The latter machine, with three hours of record/play time, is designed specifically for applications such as tape duplication and broadcast, where extended play time is required.

The move was prompted by recent recommendations by both SPARS and the APRS for features and conveniences seen important by the organizations' member studios. Sony plans to alert prospective clients to the inconsistencies between the formats, encouraging the buyer to decide which machine is most appropriate for the needs. A switchable DASH two-track with enhanced editing capabilities is also planned for a summer 1986 release by Sony.



*Sony PCM-3102 DASH digital two track recorder.*

# INDUSTRY NOTES

*The Plant Studios*, in Sausalito, CA has launched *Plant Services*, a 24-studio maintenance service for preventative work as well as emergency service. The operation is headed up by **Dr. Richie Moore** and will serve private as well as public studios within a 40-mile radius of Sausalito. For more information, call (415) 332-6100. . . **Wolff Associates**, of Springfield, VA, has purchased the *API* product line from Southlake Technologies, Inc. (Datatronix, Inc.) and plans to add new products including retrofits for the older consoles to the "new" API line. They can be reached at (703) 689-0448. . . **Flanners Pro Audio** will be hosting the *Midwest Music Expo*, a conference for musicians, record companies, sound reinforcement and pro audio specialists, September 20-22 at the Hotel Continental in Chicago. For more information, call (414) 785-9166. . . **Artisan Sound Recorders**, the Hollywood music recording and mastering facility of *Kendun Recorders*-Burbank, has been purchased by the *LaTorre* family of El Paso, Texas. **William Rogers** has been appointed general manager and **Greg Fulginiti**, director of mastering for the new company. . . **Jack Hunt**, formerly with *Mobile Fidelity Sound Labs*, has rejoined *Alshire International* in Burbank, CA as mastering supervisor. . . The former *Audio Video Resources* in San Francisco is offering a \$300 reward to anyone who comes up with the best name for their reorganized facility. Call (415) 781-2603 for details. . . The non-profit *Interactive Video Association* has been

formed as a forum for individuals and organizations to communicate on the industry's developments. They can be reached at P.O. Box 1333, South Bend, IN 46624. . . **Camille Perillat** has joined the magnetic tape division of *Ampex Corp.* as associate administrator, marketing communications. . . The Queen's Award for Export, Britain's highest industrial honor, has been awarded to both *Soundcraft Electronics* and *Advanced Music Systems*. . . **The Real World Technologies Group, Inc.** has moved to larger quarters at 130 McCormick Ave., Suite 109, Costa Mesa, CA 92626. . . **Test Instruments, Inc.** has been formed to service operations with a wide variety of testing and measurement devices. They can be reached at P.O. Box 458, Mantua, OH 44255, (800) 241-1773. . . **Shape Inc.** has been granted a patent for a new design audio cassette designed to improve tape azimuth, height, tilt, tangency and contact variables. . . **Jeff Evans** has been chosen VP of systems products for *Audio Intervisual Design*, the L.A.-based professional audio dealer and systems developers. . . **Terry O'Kelly**, after more than a year as a product manager for *BASF Flexible Media*, has rejoined the company's audio/video department to oversee sales of professional products. . . **Crown International, Inc.** has appointed **Patti Smith** to the position of purchasing agent. . . **Jim Holt** has been named director of marketing for *Electro-Voice, Inc.'s* music, professional, pro sound reinforcement and commercial business sectors. . . New York-

based *I Contact* is matching up live sound engineers with summer tours. Call (212) 935-2962 for information. . . **Broadcast Marketing Associates**, the San Jose-based distributor of audio and video equipment has opened a branch office at 131 Townsend Street in San Francisco, CA 94107, (415) 543-3191. . . **Re-cortec, Inc.** has announced the appointment of **Mathew S. Ceterski** as vice president of marketing. . . **EECO Inc.** has announced the appointment of **Jim Peacher** as western regional sales manager for its video products division. . . **Digital Entertainment Corp.** has appointed **Cary Fischer** to the position of regional manager for the Hollywood sales and support office. . . **SLM Electronics**, manufacturers of *Crate* amplifiers and *Audio Centron* sound reinforcement gear, has hired **Stefen Paun** into their R&D department. . . **Jonathan Wisniewski**, former lab manager for JRF Magnetic Sciences, and **Christopher Rappolt** have formed *AMP Services*, a precision head reconditioning facility located at 6270 Wauconda Way West, Lake Worth, FL 33463, (305) 964-5414. . . **Ann Schwarz** has been appointed director of advertising and merchandising for *MCA Home Video*, following a seven-year stint with *Pacific Arts Video Records*. . . **Jonathan P. Kendall** has joined equipment vendor *Audiovisual Washington* as director of the presentation systems group. . . San Francisco's *Realtime Video Productions* has announced that **Giff Cummings** has been named director of sales.

## M I X M A G A Z I N E S T A F F

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National Editorial, Advertising and Business Offices: 2608 Ninth Street, Berkeley, CA 94710. Telephone: (415) 843-7901  
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# SESSIONS

## NORTH CENTRAL

Heartland recording artist *Prodigal* has begun laying tracks for their third LP, *Just Like Real Life* in Cincinnati at *Fifth Floor Studios* with *Gary Platt* producing and engineering... *Hanf Recording Studios* of Toledo, the oldest and largest audio recording studio in the Toledo area, has changed its name to *Audio-Com, Inc.* effective immediately... At *Sweetwater Recording Studio* in Fort Wayne, IN, singer/songwriter *John Lay* was in working on some of his original songs with engineer *Chet Chambers* at the board... *Solid Sound, Inc.* of Ann Arbor, MI, has completed an industrial film soundtrack for *Hiram Walker*, featuring impressionist/comedian *Fred Travalena*. *Rob Martens* engineered... *Knightclub* has just released their first album, recorded at *Sunset Recording* in Lagrange, IL. The engineer for the project was *Mark Maclean*... *Jor/Dan Studios* in Wheaton, IL, hosted *Saturday Night Live* personalities *Al Franken* and *Tom Davis* with the band *Badmouth* recording tracks for the soon-to-be-released Columbia picture, *Datenaught*. Producer for the session was *Jerry Garcia* of Grateful Dead fame... Producer *Kraig Wall* put the finishing touches on midwest rock and roll artist *Tommy Eglin's* latest efforts "Your Money Can't Buy My Love" and "Two Hearts," at *Sound Ideas Productions Studio* in Sioux City, IA...

## SO. CALIFORNIA

At *Preferred Sound* in Woodland Hills, *Laura Branigan* was in with producer *Gary Usher* and engineer *David Devore* working on background vocals for Branigan's next LP... RCA artist *Kenny Rogers* tracked at *Sunset Sound* in Hollywood for his upcoming LP. Rogers and *George Martin* produced with *Terry Christian* engineering, *Stephen Shelton* assisting... Since opening a few months ago, *Master Control* in Burbank has had *Don Henley* in with *The Textones* for their new A&M/Gold Mountain LP with *Jimmy Iovine* producing, *Joe Chiccarelli* at the desk with *Steve Hug* assisting... At *Group IV Recording* in Hollywood, composer *Alan Silvestri* mixed the feature film *Back to the Future* with engineer *Dennis Sands*, assisted by *Andy D'Addario*, and *Bones Howe* for Amblin Productions... *Kommunity F.K.* was in at *Skip Saylor Recording* in L.A. mixing an album with producer *Jules Chaikin* for Auspex Music. *Skip Saylor* was behind the board... At *Crystal Studios* in Hollywood was

Weather Report's *Wayne Shorter* recording his solo album. *Howard Siegel* was engineering and *Jim McMahon* assisting... *Weddington Studios* in North Hollywood recently had Warner Bros. artist *Jack Wagner* in working on the studio's 32-track digital Mitsubishi, with producers *Cliff Magness* and *Glen Ballard*, and engineer *Francis Buckley, Jr.*... At *Image Recording* in Hollywood *Pat Glasser* produced *Night Ranger's* third album for Camel/MCA; *John Van Nest* at the board, assisted by *Steve Krause*... *Mikey Davis* of Talon Productions manned the controls at *Baby O Recorders* in the Berwin Entertainment Complex for the group *Burn*, formerly *Hellion*, with *Dana Strum* producing...

## SOUTHEAST

At *Treasure Isle Recording Studio*, Nashville, *Shane Keister* completed the film score for *Dr. Otto and the Riddle of the Gloom Beam*, a feature for Guerilla Productions. *Richard Schirmer* engineered, assisted by *Tom Harding*... *Glen Campbell* cut tracks for his new album, with *Jim Cotton* and *Joe Scaife* engineering, *Harold Shedd* producing at the *Music Mill* in Nashville... *Stevie & the Hotheads* recently recorded their first 45 for Sweaty Records at *Morrisound Studios*, Tampa, FL. *Chet Bennett* of CBS Records produced the sessions with *Rick Miller* engineering... *Wally Cleaver's Recording Studio* in Fredericksburg, VA continues work on *Gary Herrewig's* latest project, and *Gene Ryder* is laying tracks for his LP. *Peter Bonta* is engineering on both of these sessions... Arista Recording artists *Krokus* did pre-production for their next album with *Jack Holder* and *Don Smith* behind the console at Memphis' *Sounds Unreal*... Mixing tracks for his album at North Miami's *International Sound* was *Phillip Michael Thomas* (Tubbs of *Miami Vice*) with *Geoffrey Chong* at the board... On hand at *Florida Sound* in Clearwater were *The Sunairs*, a local group shopping for a label deal. The session was engineered by *Chuck Cavanaugh*, chief engineer at the studio... At the *Soundshop* in Nashville were *Ronnie Mcdowell* and *Buddy Killen* producing "One Big Family," to aid the World Hunger Fund. Also a video was done in connection with the record... *Hidden Meaning Studios* in Warner Robins, GA had *Doc Holiday* in mixing down some tracks. *David Norman* produced and engineered... Recent clients at Ft. Lauderdale's *New River Studios* included Nempereor Records artists *The Romantics* in overdubbing and mixing their new album. Co-producing and engineer-

ing duties were shared by *Pete Solley* and *Gordon Fordyce*, assisted by New River's *Ted Stein*. Also, *Bob Seger* was in overdubbing his next LP. *David Cole* engineered, assisted by *Ted Stein*... *Commercial Music Productions, Inc.*, a Columbia, SC-based production company, finished production of a music image package for WTVM-TV in Columbus, GA, at *GEM Recordings* in Columbia... At the *Creative Workshop* in Nashville, *The Judds* completed their new R.C.A. album with *Brent Maher* producing... Mastering engineer *Randy Kling* of *Disc Mastering Inc.*, Nashville, has been busy on an album project featuring Number One hits by country stars like *Dolly Parton*, *Waylon Jennings*, *Elvis Presley*, *Razzy Bailey*, *Alabama*, *Earl Thomas Conley*, and *Charley Pride*, among others... At *Woodland Sound Studios* in Nashville, producer *Kelso Herston* was in and out working on jingles for Sears, Ford Motor Company, Lowenbrau Beer, Bojangles, and Wisc. Power & Gas Company. Engineering was *Travis Turk*...

## SOUTHWEST

*Planet Dallas Studios & Publishing Companies* have been open since January 1985 and have been working with Texas-based bands and writers, among them, *The Escorts* and *The Tribe*. Recently in from Los Angeles working with *The Tribe* was engineer/producer *Henry Lewy*, known for his work with Neil Young, Joni Mitchell and others... *The English Band* called *Rivendell Recorders* (Pasadena, TX) their home for a month recently. *Joe English* and *George Cocchini*, together with *G. Brian Tankersley*, produced the tracks for the band's new LP... Voted by the Texas Music Association the top sound engineer for 1985, *Phil York* engineered *Robert Lee Kolb & Local Heroes'* first album at *Crystal Clear Studios* in Dallas... At *Dallas Sound Lab*, producer *Bob Farrar* recorded film scores for General Dynamics and M Corporation on 24-track digital with *Rusty Smith* of the Dallas Sound Lab engineering... Recent activity at *Goodnight Dallas* included producer *Randy Wills* in session cutting overdub Kurzwel tracks for an upcoming album by *Elizabeth Seales*, and a video album for *Joe Atkinson*. Engineering was by *Ruben Ayala*... Sessions at *Lone Star Recording* in Austin took on a European flavor as *Bad Sign*, a rock group from Finland, recorded and mixed their album, *Travelin' Bone* with producer *Vince McGarrey* and engineer *Jay Hudson*... Dallas' *Castle Re-*

—PAGE 164





*What drives successful people?*

An age old question that can now be answered in literal terms; the people are Showco, the answer is Crown.

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Innovative Crown technology shaped by advice from Showco has produced a more powerful, lighter and smaller amplifier ideal for the touring professional. Higher power, less weight and less rack space translate into critically needed efficiency on the road.

Currently on tour with the largest system ever designed for indoor arenas, Showco once again relies on the power and dependability of the Crown product. 134 Crown PSA-2s and 28 new Micro-Tech 1000s supply the power -- in excess of 200,000 watts to drive over 16 tons of loudspeakers.

The performance of the new MT-1000 further strengthens the dependability of Crown amplifiers. The only reason Showco has had to touch their new amps is to move them. And move they have, 78 shows in 52 cities without a failure of any kind. Not surprising for a Crown product but unheard of in any product fresh from the assembly line. Months of Showco's heavy duty field testing has established the MT-1000's reliability even before it hit the market.

At your next concert take a look beyond the performers; chances are you will find Showco and the driving force of Crown.

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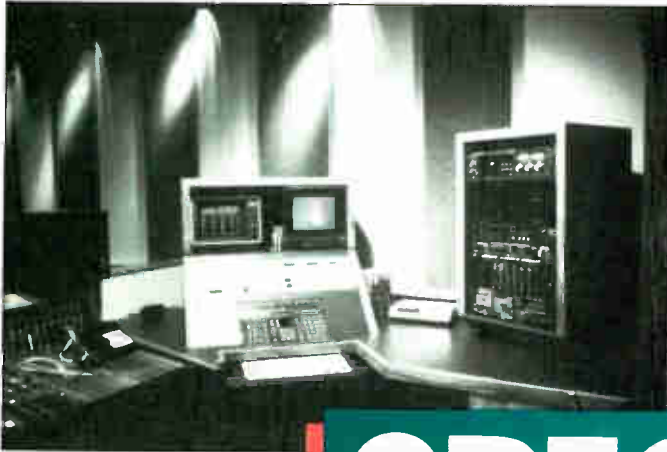


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World Radio History

# STUDIO NEWS



Audio sweetening room for Atari, Inc. corporate facility designed by Randy Sparks of RLS Acoustics of San Francisco. The audio equipment was supplied and installed by Sound Genesis of S.F.



Celebration Recording in New York City recently installed the new Westlake BBSM-12 monitoring system (with spring-loaded shock mounts), and powered by two Hafler PH 500s. Design and installation of the new system was by Al Fierstein of Acoustilog, NYC. The original room design was by Maurice Wasserman.

## SPECIAL EDITION

### A Sampling of New Rooms for '85



(Left) New Age Sight & Sound is Atlanta's first digital multi-track studio, and features the Southeast's first Sony PCM 3324 recorder as well as a Sound Workshop 50 input console. The facility was designed by Jerry Milam, who recommended the studio install RPG diffusers on the back wall of the main control room. New Age has only been open since spring.



Abba's Polar Studios in Stockholm, Sweden took delivery of the first Calrec UA8000 48-channel console, to go along with the studio's 3M digital recording system.



Cougar Run is a new 24-track studio built in a 25-year-old estate overlooking beautiful Lake Tahoe (Incline Village, Nevada). Owner Jody Everett Peterson selected Carl Yanchar and Lakeside Associates to design the facility, which is equipped with a Neve 8108 with NECAM I, a Studer A800 III and such perks as a heated pool, hot tub and, of course, access to Tahoe. The picture above shows the studio just before completion.



Omega Studios has a new location in Rockville, Maryland, just 15 minutes from Washington D.C. Featuring four studios equipped with a wide variety of top gear (Studer and MCI recorders, an API board with a Neve console expected early next year), Omega's primary acoustical designer was John Gardner. Upon completion, Omega's rooms will be able to handle everything from huge orchestras to video sweetening sessions.



(Left) Showcase Audio/Video Systems' installation at JBS Recording Studio in Atlanta has a number of unique features. The studio is built in an old movie theater, so it has a high ceiling, wood floors and naturally good acoustics. The spacious control room is equipped with an Amek console and two interfaced 16-track Otari MX-70s.



Studio B at Triad Studios (Redmond, Washington) features an LEDE control room along with an acoustically open studio of more traditional design but with flexible acoustics. Control room and studio (outfitted with all the latest state-of-the-art equipment) are suspended on a concrete "floating" floor. Studio B was designed by Tom Hall and Larry Nefzger.

(Right) Located in Alsip, Illinois, ARS Recording Studio (formerly Timbre Recording) has had its control room completely redesigned and rebuilt by owner and chief engineer Gary Cobb, with consultation by Doug Jones of Electro Acoustics Systems. The "new" control room utilizes an LEDE design aided by Sonex and RPG Systems QRD diffusors. The room is equipped with a Trident Series 70 console.



# YOUR WORLD



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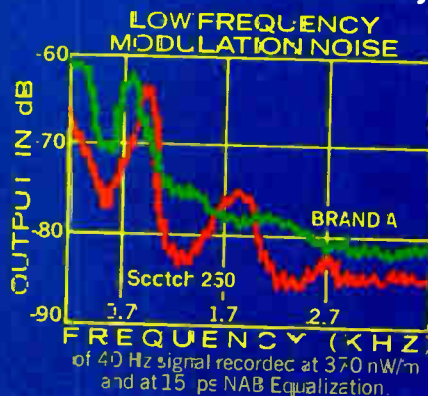
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# AUDIO-APPLICATIONS

by Ken Pohlmann

You're talking to a guy who rides large displacement motorcycles too fast for complete control. Moreover, I'm totally uninsured. That's right—anti-social, and irresponsible, too. Insurance? Does Allstate issue policies for Russian roulette players?

On the other hand, I'm a lot more careful when it comes to electronic equipment. I've witnessed three micro-computers, two printers, and a stereo system expire at the hands of sudden, cruel fate. Even if I haven't reconciled my own mortality, I have reconciled (and paid for) theirs. Now all of my gear

has line spike and surge protection, with hash filters thrown in, too. The point is that digital electronic equipment is vulnerable to both annoying and catastrophic interference from power line problems. And the danger is from both without and within; black-outs and brown-outs are beyond your control, but your own equipment radiates interference which can cause problems. As studios become increasingly filled with computers, digital recorders, and digital synthesizers, your liability is multiplied. When designing a new studio, build in line protection; in existing studios, add it on.

Partly, it's a question of probability.

between electrically different objects; it might measure a million amperes, and several million volts, providing instantaneous power of a trillion watts. A direct hit isn't required for damage; a strike anywhere in a local utility network can cause a spike up to 5,000 volts, lasting 100 microseconds, to head right up your power cord. The result can be catastrophic or insidious; for example, components may become marginal, to fail later, intermittently.

The other odds which must be considered are non-lightning induced, man-made fluctuations in line voltage. Spikes can also occur through switching off of inductive loads; when a transformer or motor coil is de-energized, the collapsing magnetic field sends a voltage spike back through the line of perhaps 3,000 volts or more. This spike in the circuit could affect other circuits as well; wiring capacitance can couple transients from one wire to another, or from a wire to ground. Thus vacuum cleaners and similar appliances are potentially lethal to sensitive digital equipment. Having equipment problems? It might be the guy next door keeping his rugs clean.

Other man-made line variations proliferate. Aside from black-outs, and brown-outs (5% to 15% voltage reduction), surges above nominal line voltage, and sags below it can occur. Surges and sags are long duration (compared to transients) problems stemming from load fluctuations in the network; their magnitude depends on the

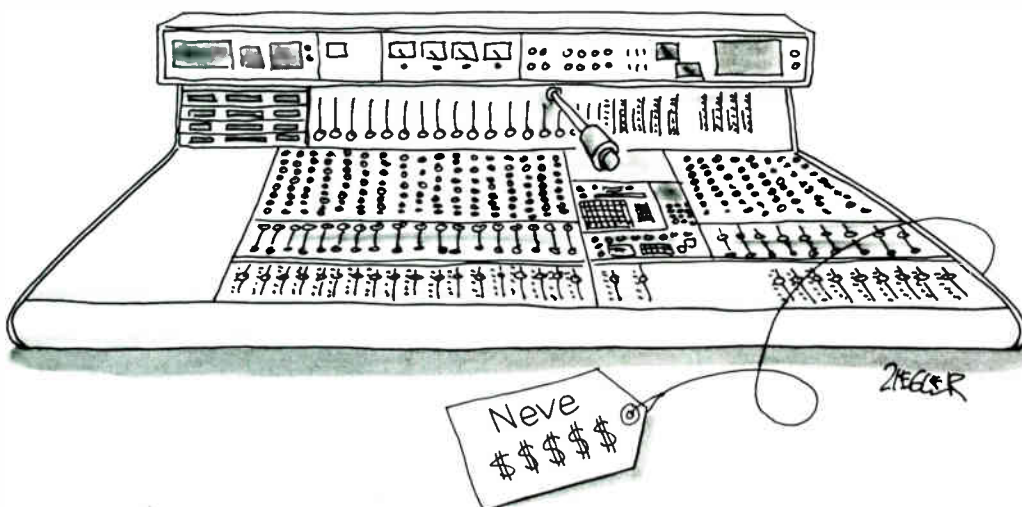
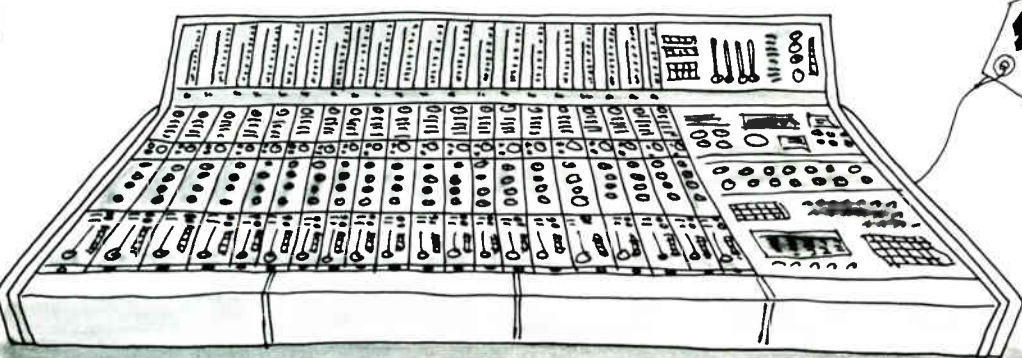
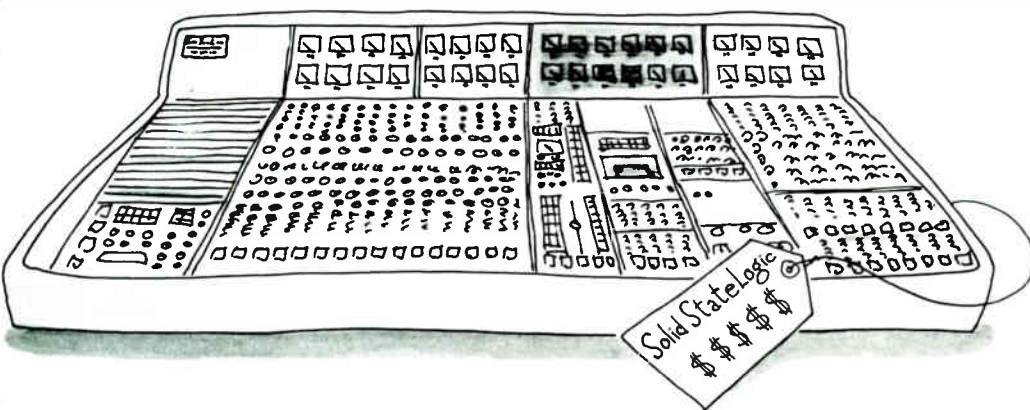
## SPIKES, SURGES SAGS AND HASH

For example, lightning strikes can occur anywhere, but they tend to favor certain unlucky areas. Figure 1 shows the relative frequency of lightning strikes in the U.S. There is no truth to the rumor that South Florida became a 100% area only after I moved here a few years ago. Lightning is a discharge



# These three consoles have a lot in common.

## However, one costs much less.



Of the many console manufacturers active today, only three companies had the same inclination years ago to design their consoles around the precision and flexibility of digital control. All three have proven track records backed up by numerous commercial successes. All three are known for their continuing commitment and investment in the R&D and updating of their digitally-controlled console systems.

More importantly, all three are universally recognized for a higher standard of practical functionality and sonic purity achieved through unique approaches to circuitry and signal flow.

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As computer technology invades our industry, many other manufacturers are beginning to incorporate digital control into their products. However, only three companies have years of experience in this area and are today issuing second and third generation systems.

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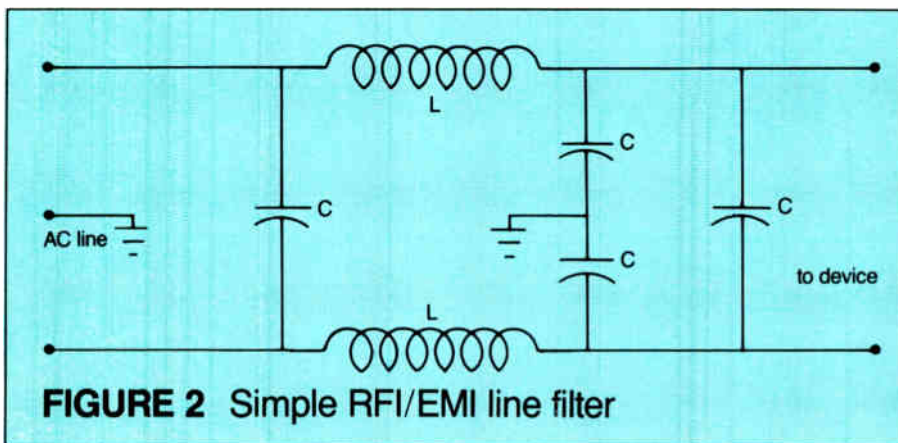
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size of the load. The starting current of a motor, a refrigerator or air conditioner for example, can cause a sag, manifested by a momentary dimming of lights. A sag might measure as a 20% reduction in line voltage, lasting hundreds of milliseconds. Surges typically are caused by a sudden decrease in utility demand; an overvoltage exists until the system can compensate. Both sags and surges might occur as a result of a lightning strike as the system tries to cope. The further away you are from a power plant or substation, the greater the chance of fluctuation.

Thanks to modern technology, our part of the solar system is increasingly noisy; our electrical equipment and broadcasting systems radiate made-for-TV movies and other junk out into space. Unfortunately, our own equipment is as receptive to this hash as passing spacecraft. The following are hash sources: motors, small electrical appliances, police or CB radios, commercial broadcasts, corroded light sockets and cords, fluorescent lights, SCR or triac dimmers, welders, diathermy machines, X-ray machines, photocopying machines, DC switching power supplies, internal combustion engines, any digital electronic equipment. We may classify the noise as RFI (radio frequency interference), EMI (electro-magnetic interference), or EMP (electro-magnetic pulse). Whatever its incarnation, it may be understood as high frequency interference with frequency greater than 10 kHz and it may be broadcast from the source, or carried directly through power lines. While direct damage seldom occurs as a result of hash or line interference, it can disrupt the operation of digital equipment.

As I've mentioned, digital equipment itself is a prime course for electrical interference, FCC requirements notwithstanding. With system clock frequencies of 1 to 10 MHz, and the resulting harmonics, broadband interference up to 54 MHz (channel 2) or beyond can be anticipated. Digital

gates open and close at high speed—a rate equal to radio frequency interference; that confusion between normal digital signals and generated noise can cause equipment errors internally, and in surrounding equipment.

A simple AM radio can be used for EMI testing; tune it to the loudest noise, and wander around looking for sources. Not only will digital equipment radiate noise, but connecting cables are culprits as well. A simple computer/printer cable can be an efficient electro-magnetic broadcasting system. Furthermore, an AC cord can radiate noise (especially if it's long, and ungrounded). The complexity of the problem is apparent when it is considered that the hash can radiate from the source, couple from line to line, and be disseminated directly through connecting cabling. Not only is digital equipment a prime culprit, it is also more susceptible to noise than ordinary appliances. Electric typewriters, fans, and lights are virtually immune but your \$10,000 keyboard is highly vulnerable.

What kinds of problems can occur? Anything from flakiness to annihilation. Integrated circuits are thoroughly checked before leaving the fabrication plant, but a certain percentage must appear at the low end of the reliability scale. A marginal chip may fail when subjected to the stress of power line problems. Aging due to normal wear and tear is accelerated by overvoltage conditions caused by surges and spikes. More severe overvoltages damage power supply components as well as chips. If there is no filter, or some low impedance path to ground, it will use the device as its sink. A rectifier diode might fail while running only a fraction of its rated current, voltage regulator integrated circuits and transistors will blow while they weren't even running warm—all thanks to power surges or spikes.

Even a powered-down device can be critically damaged; the surge may arc across the power switch, applying

high voltage to the device. A lightning strike may cause a common-mode voltage surge in which both power lines are raised in a high potential relative to earth. The high voltage may cause arcing across conductors and ground destroying anything which happens to be between a conductor and ground. And, of course, even non-damaging interference takes its toll in terms of lost programs and data.

Now that we've outlined the problems, what can be done? Let's go through the list again, looking for prevention and protection. Lightning is potent stuff, but some simple measures can go a long way. Lightning rods are designed to provide an attraction point and current shunt. The rod itself is a sharp-pointed copper shaft connected by a copper cable to copper-plated steel rod buried in the ground. When mounted at the highest point on a structure, the rod offers a zone of protection around it; larger structures require multiple rods. Because of the extreme voltages present in a lightning strike, flashover can carry high voltage to conductors a foot away. Furthermore, induced surges can spring up in any nearby conductors; further protection is required in addition to lightning rods.

For increased protection against lightning strikes, or any kind of power surges, transient suppression is required. Lightning arrestors such as zeners, thyristors, or varistors should be placed across the AC line, and between AC lines and ground. A high-power zener network can be located across power supply secondaries, or between rectified outputs and ground. A heavy-duty solution to consistent problems is the installation of a constant-voltage transformer; the effect of both surges and sags can be minimized. Isolation transformers provide an ideal way to protect equipment from power fluctuation.

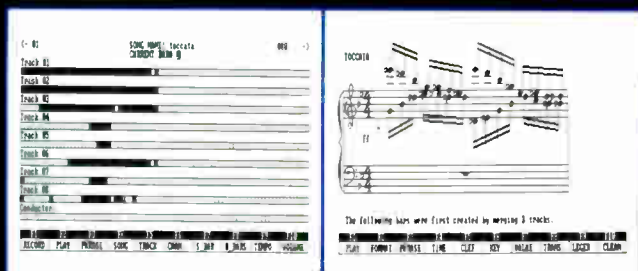
Low-pass filters are effective against both transient and noise problems; 60 Hz is passed whereas high frequencies are attenuated; this is accomplished by a high series input impedance, and low shunt impedance to ground. A parallel capacitor or series coil is the simplest example; for example, veteran TTL builders are well familiar with the 0.01 microfarad capacitor between the power busses and ground to suppress switching transients. More typically in protection devices, L, T or Pi sections are employed; although the filter should be installed at the point where the line enters the equipment's casing, it is usually inserted at the power receptacle. An example of a RFI/EMI filter is shown in Figure 2.

Hash filters can be installed in the device under attack; however, a more enlightened approach counter-attacks by eliminating hash at the source. Any



# M P S

In this confusing new world of music software someone has finally created a computer program that is so powerful that it allows musicians to forget about learning computers and get back to what they like doing best—music. Only now with more control and creative potential than ever before. Behind this program is the same company responsible for some of the music industry's greatest achievements. The company, of course, is Roland. And the product is called MPS. It stands for the Music Processing System. What if a musician could harness the same computer power to create music that writers use in word processing? That's exactly what MPS does. It gives you the creative freedom to develop, edit and shape your ideas into a complete piece of music, all under computer control, totally at your direction. Working together with Roland's MPU-401 intelligent interface, any IBM PC (or compatible) computer and your MIDI instruments, MPS takes you every step of the way from first inspiration to a beautifully realized printed score. The MPS system's power is unleashed in its three operating



modes: Song, Score and Print. All modes are totally interactive, so that any change made in one is automatically made in the others. In the Song Mode, you assemble musical phrases into complete compositions. Use any MIDI instrument as an input device. Once phrases are entered, they can be altered, edited, combined and recombined at will. MPS Software gives you eight tracks to fill with music. Each track can be assigned to any of 16 MIDI channels and used to drive any MIDI instrument. Merge tracks or phrases as needed and reassign MIDI channels to check out how a passage sounds on different instruments. A clear, concise on-screen display keeps you up to date on track status on a measure-to-measure basis. The process continues as you move on to the Score Mode. Here, the music you've created becomes a graphic score, which can be further polished and perfected. You define keys, clefs and time signatures, transpose octaves, assign accidentals and rests...even change the direction of note flags and stems for a highly legible, musically correct score. There are three different areas on the staff to spell out song lyrics, verbal cues and instructions—everything you want to put into words. When you've finished perfecting your score, you're ready for the MPS Print Mode. Everything you've put into your on-screen score can be transformed into an attractive hardcopy printout via the MPS Hi-Resolution Print Mode. As always with MPS software, you're in control. "Cut and paste" your score to meet your own specific needs. You can print out single parts for individual players or a complete score representing your entire composition. Print copies on your computer's standard printer with or without song lyrics or in any quantity you desire. Break into the future of electronic music production—harness the power of Music Processing with the MPS—the Roland of Music Software. For more information contact: RolandCorp US, 7200 Dominion Circle, Los Angeles, CA 90040 (213) 685-5141. Hardware Required: IBM-PC or full compatible (256K minimum, up to 640K), 2 disk drives recommended, IBM color graphics card and CRT monitor, Roland MIF-IPC interface card, Roland MPU-401 MIDI Processing Unit, Any MIDI-equipped Instrument(s), Optional dot matrix graphics printer (IBM compatible).

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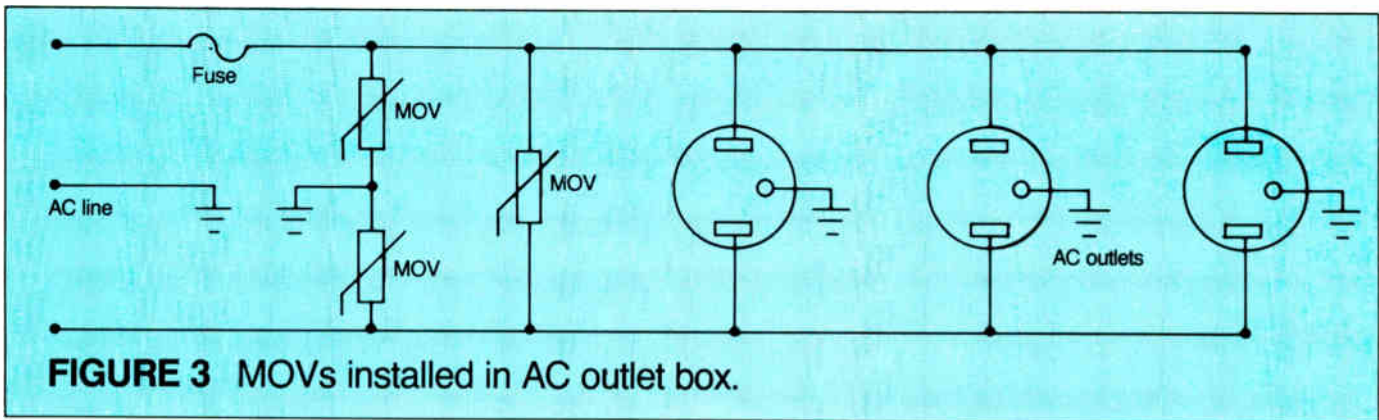


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World Radio History



**FIGURE 3** MOVs installed in AC outlet box.

defective wiring should be replaced, filters should be placed on noisy tools or equipment, all covers and shields should be securely fastened, and grounding rules should be scrupulously followed to minimize interference. A summary of RFI/EMI protection includes the following: Enclose sources and receivers within a shield, filter all incoming and outgoing leads, use shielded coax cable for high frequencies, and twisted leads for lower frequencies, use single-point grounding, eliminate ground loops, keep signal sensitive leads short.

In addition to filters, crowbar circuits and voltage clampers are used to sup-

press transients. Crowbars use a thyristor or spark gap to divert transients; it is critical to insure that the protection device can operate quickly enough to catch spikes; for example, SCRs and triacs are often too slow. Metal oxide varistors (MOV) are voltage clamping devices; they operate similar to a back-biased zener diode. Below the threshold voltage, it is an open circuit; above the threshold it conducts and thus absorbs the transient, dissipating it as heat. An MOV can respond to a transient in a few nanoseconds, with peak current capacities up to 50,000 amperes with a wide variety of operating voltages.

For the buck, the MOV is perhaps the most effective insurance you can buy. It guards against high energy power line transients and can be installed in existing power strips. For example, the General Electric V130LA10A MOV will clamp to 340 volts at 50 amperes in 35 nanoseconds; it's available from Radio Shack (part number 276-570) for a few bucks. Three of them should neatly fit inside a power strip; wired between the hot, neutral, and ground wires as shown in Figure 3. Of course, an MOV does not guard against hash; a separate line filter must be employed as well, as described above.

When specing power protection devices, you must determine how many output watts your application requires. Add up the ampere ratings of the equipment to be protected on a line and multiply by the voltage (120) and throw in some headroom; the resulting figure is an approximation of the wattage required to operate the devices, and the rating required of the protection device. A good protection device should offer the following: fast response to repeated voltage spikes, and high frequency filter for incoming and outgoing noise.

Line protection: You can pay a little for it now. Or you can pay a lot for it later. Fortunately, catastrophes only happen to other people. Now, time for a motorcycle ride. It's a hot day; I don't think I'll bother with a helmet. ■

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## They know why...

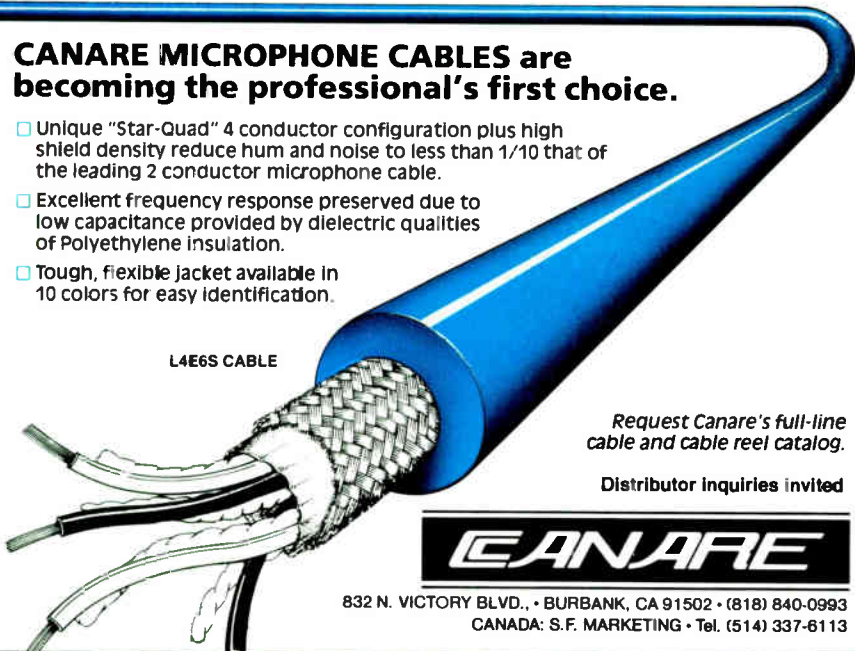
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PHOTO: MCGUIRE STUDIO

**Rear view of Studio A control room with D'Antonio quadratic residue diffusers.**

involved in each of TRC's upgrades and expansions since 1973, Schatzlein naturally conferred with Milam regarding his plans. "Jerry's part of the 'family' here," says Schatzlein. "We just wouldn't consider a major move or equipment acquisition without involving him."

**Mortuary Site Rejected**

Initial plans were to relocate both 24-track rooms in a downtown building that had housed a mortuary. A local developer planned to restore the building and lease it to TRC. At Schatzlein's request, Milam asked Berger to check out the acoustic feasibility of the place.

"It was a beautiful old building," Berger says, "with stained glass windows and ornate cornice work." But the acoustic problems were formidable. The building fronted on a busy street, so additional windows of heavy laminated glass would have been needed to cover the stained glass. Isolation from low frequency noise would also have been a problem, says Berger, "because the structure is rather flimsy by studio standards." A plan to pour a resiliently-mounted concrete slab over the wooden floor at ground level was nixed by structural engineers since supports in the basement were inadequate.

"It would have cost \$100,000 just to bring the building up to the level of a new shell, from the acoustic standpoint," says Schatzlein, so that site was abandoned. During a visit to Indianapolis, however, Berger happened to look at space adjacent to TRC's Studio B and told Schatzlein he thought that would be quite appropriate for the new Studio A. Studio B is located in a business/industrial park of concrete block buildings with 20-foot warehouse ceilings.

"Our clients like 'B', so the prospect of not having to move or change it much was appealing," says Schatzlein. The firm was able to get space adjoining Studio B for a total of 8,000 sq. ft. at ground level, on a nine-year lease. This allowed 6,000 sq. ft. for the two 24-track rooms, with the remaining space divided into two stories and occupied by the two smaller studios, corporate offices, and support facilities.

**Selecting Design Concepts**

With the site selected, Milam and Berger went to work on the plans for the new Studio A. "They really had to convince me on LEDE," says Schatzlein. "I've tended to believe the bad things I've heard about those rooms, and I just didn't want one." Berger insisted that properly-designed LEDE control rooms best achieve the objectives which define the optimum music mixing environment. According to Berger, those objectives are:

1) Control of short reflections into the mixing environment, so they do not interfere with the direct sound. This, he says, provides "even power distribution over a wide frequency bandwidth throughout the listening area."

2) Creation of "appropriate" ambience, to facilitate subjective judgments ("the room can't be anechoic"). This amount of "liveliness" allows proper judgments regarding microphone placement during recording and the addition of electronic reverberation during remix.

3) Insure that the room's ambience is diffuse as well as optimally delayed in time after the direct sound. This provides assurance that the ambient energy in the control room will not "overpower or degrade the program material."

4) Minimize hard "slap" reflections, so that the room is inert and "free from unnatural resonances and low frequency buildup."

"LEDE was originally perceived as a panacea for the correction of all control room ills," says Berger. "So it became a political issue, with almost everyone taking a firm stand either 'for' or 'against.' But practically everybody is building rooms now that incorporate at least some of the same concepts, whether they're calling them 'LEDE' or not." ("LEDE" and "Live End/Dead End" are trademarks of Synergetic-Audio-Concepts, San Juan Capistrano, CA).

The talk didn't convince Schatzlein.

He flew to Dallas to evaluate Dallas Sound Labs, a studio designed by Joiner-Pelton-Rose using LEDE criteria, and came away impressed. "The 'sweet spot' was really big," he says. "The producer was getting the same flat response and stereo perspective as the engineer." But he remained concerned about the uncertainty of controlling back-wall reflections in this type of room.

**Quadratic Diffusers Make the Difference**

Milam and Berger convinced Schatzlein of their ability to take LEDE technology a step further in the TRC room by installing quadratic residue diffusers (QRDs), made by Peter D'Antonio's RPG Industries, in appropriate locations on the live rear wall. "I just wasn't sure about LEDE until quadratics," says Milam. "It sometimes seemed to be a hit-or-miss proposition, depending upon a hodge-podge of polycylindrical diffusers and angled panels on the back wall. With quadratics we're into a new wave of design. It's like coming out of the voodoo and into reality."

QRDs scatter an incident broad spectrum of audio frequency waves in a hemispherical pattern, just as the undersurface of the "Stealth" bomber will diffuse radar waves rather than sending reflections back to the source.

Milam says it's taken time to gain the confidence to employ QRDs to full benefit in LEDE rooms. The diffuser arrays are expensive (TRC has 14 at up to \$900 each), so nobody wants to install more than are needed. "Studio design requires a balance of budget, client acceptance, and acoustical science," says Berger. "People have used these diffusers sparingly in the past to a good advantage, but the configuration at TRC seems optimal for the present state of the art."

**Selecting a Builder**

Having settled on design concepts, Schatzlein went in search of a builder. After evaluating a dozen contractors, TRC hired Stephco Construction of Indianapolis, headed by Chuck Ballard. "This is the fourth time we've built or completely rebuilt a multitrack room," Schatzlein says, "and we've used a different builder each time. I know what these guys try to do. The minute you glance away they start cutting corners on the acoustic specs, because they just can't believe things really need to be done to those kinds of tolerances. But Chuck is different." A musician himself, Ballard showed a real concern for acoustic considerations as well as aesthetics and musician comfort in the TRC rooms. He's now working as a consultant on several major studio construction projects around the country.

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PHOTO: MCGUIRE STUDIO

**Studio A employs Lombard Diffusers mounted in standard suspended ceiling grids.**

The live part of the room is dominated by the QRDs, while the front (dead) part makes innovative use of absorptive panels created for this project by Working Walls (Cleveland, OH). The panels are six inches thick and covered with fabric of TRC's burgundy and grey colors. They contain various absorptive materials in layers as specified by Berger, and fasten to the control room walls with Velcro. The attachment design allowed for prefabrication of the panels in the Working Walls plant, and will allow for easy replacement in the event of future damage or wear.

### Studio A

Flexibility was important in the design of Studio A, since TRC's clients include everything from rock bands to symphony orchestras. Schatzlein wanted a room that was more "live" than the old Studio A, or even than Studio B, to facilitate recording of strings. Yet provisions had to be made for cutting "tight" rhythm section tracks.

The result is a room that is large (roughly 35 x 43 x 14 ft.), and which has both a large drum booth and an iso-booth. The drum booth has its own independently-isolated concrete floor overlaid with hardwood. An oversized window (1/2" sound-rated laminated glass in each wall) provides an excellent sight line into the main room, and an overhead acoustic diffuser system smoothes the booth's decay times. The vocal booth has direct sight lines into the control room and a sliding glass door into the studio. An adjacent piano alcove for the nine-foot Baldwin concert grand features a proprietary overhead acoustical trap.

The main room offers a variety of "live" and "dead" areas, as determined by wall and floor treatment, massive flip panels on one wall, and overhead diffusers. The diffusers, manufactured by Lombardo Diffusor Corporation, mount in standard suspended ceiling grids. The traditional studio cloth walls have been replaced with prefabricated panels made by Working Walls. A unique "step-down" HVAC return and proprietary air diffusers insure that air handling system noise is undetectable even during digital recording of strings.

"Hard" floor surfaces are achieved with Norament synthetic, imported from Germany. In addition to superior acoustic properties, the Norament is extremely durable, as proven by its performance in Amsterdam's Schiphol Airport.

Studio lighting is provided by a theatrical lighting system with eight

### Milam and Berger on "Isolation"

Were there any special isolation problems at TRC? "The outside environment is pretty quiet right now, although we had to keep in mind that somebody could put a machine shop in next door or the airport approach patterns could change to our detriment," Berger says. "But compared to the other location under consideration, this was far superior." The major concerns about isolation were within the TRC complex, which includes four studios and control rooms.

Milam and Berger agree that there is a lot of confusion regarding the rating of walls for sound transmission. "Sound Transmission Class" (STC) is the most commonly-cited measurement, but is not necessarily the best way to rate studio walls, according to Berger. STC is weighted toward the mid-range frequencies, and would be better named "Speech Transmission Class," he says. The criteria were originally developed to measure effectiveness of office walls, and have limited applicability to recording studios. "Low frequency noise control is more important in recording studios," Berger explains. "The lower the problem frequency is, the more expensive the noise control."

Berger's firm is a major consultant on noise exposure to airports, land developers, the Department of Defense, and others. That experience helps them in predicting environmental problems for studios as well as in planning for isolation between rooms in a studio complex. Berger felt that there should be a minimum transmission loss of 72 dB between the inside and outside of a

control room for the TRC project. His lab predicted 74 dB of isolation for Control A at TRC, and tests on the room following its completion have confirmed that figure.

There are some popular misconceptions about isolation, according to Milam and Berger. "In all the magazines you see a block wall with gyp (sheet rock) on either side," says Berger. "That's worse than one block wall and one gyp wall, according to reproducible test data that have been out for 25 years." TRC's Control A front wall is composed of a grout-filled block wall and a sheet rock wall, separated by an air space. Windows are 1/2" sound-rated laminated glass (in each wall). Control monitors, the independent HVAC systems, and the entire studio ceiling are suspended on resilient isolators.

### Control A

TRC's Control A is built according to LEDE criteria, and measures roughly 20 x 22 x 14 ft. (see floor plan). The floor is lightweight concrete, poured on resilient isolators resting on the building's main slab. Walls are grout-filled concrete block (inside), and sheet rock (outside). The outside walls rise from floor to roof deck, and are sealed airtight to the roof around the bar joists. A dedicated high-volume low-velocity HVAC system rests on resilient isolators on the roof and serves this room only. Acoustically-treated ductwork is used, releasing fresh air in a forward direction from high in the back of the room and collecting air from low in the back above the tape machines.

circuits on each of two scenes. A solid state lighting control panel is located behind the mixing desk.

### Designed for Digital

Schatzlein insisted that the rooms be acoustically and electronically quiet enough for eventual installation of digital recording equipment, though he doesn't feel Indianapolis is ready to pay for digital recording right now. The entire A.C. electrical system is wired to hospital-grade grounding codes, with Studio and Control A on their own isolation transformer. Audio cables run in chases along the base of the studio walls, to minimize the number of wall penetrations. Ninety-six mike lines come from various input panels in the studio, drum booth, and isobooth to punchblocks in a shielded cabinet in a loft above the control room, and are routed from there to the console.

### Equipping the Room

The old Studio A had a Harrison 3232, while Studio B uses an MCI JH-528. Schatzlein and his engineers agonized over a replacement for the Harrison. "The 'digital control of analog audio' consoles are an expensive interim step on the way to completely digital boards," says Schatzlein. "When we go digital we'll go all the way." TRC clients and engineers liked the Harrison, and were reluctant to part with it. "A lot of the newer boards, at least in the \$200,000 range, aren't built as well as the 3232," says Andy Symons, TRC chief engineer. The board's Allison automation had proved reliable. And the TRC staff points out that the best-selling LP of all time, Michael Jackson's *Thriller*, was recorded on a 3232.

After much deliberation, TRC embarked on an ambitious plan to re-fit the Harrison board. "Our goal was to bring it up to today's specs without losing its character as a vintage Harrison," says Symons. That involved replacing every capacitor and every pot in the board, and fitting new Allison ECG-202 VCAs. The new VCAs made other circuit changes possible, to increase headroom and transparency while decreasing noise and distortion. The patchbay was overhauled, and the wooden parts of the board refinished in grey laminate to match the burgundy/grey color scheme in the new control room. "We even re-upholstered the armrests," says Symons, who reports that he and TRC maintenance engineer Kevin Van Wyk spent hundreds of hours and several thousands of dollars in parts for overhauling the board.

TRC selected JBL 4435 monitors, and Berger specified bi-amplification. Berger is insistent on critical placement of the monitors (see July 1984 *Mix* article), and has measured differences

of up to 28 dB in frequency-dependent power responses of popular monitors "depending upon where you mount them." Surveyor's sighting equipment was used to position TRC's monitors to within tolerances of one millimeter. The speakers are mounted in specially-designed steel frames suspended on resilient isolators for mechanical isolation from the studio construction, but acoustically coupled to the control room walls with barium-loaded vinyl.

An exhaustive 72-hour series of tests conducted prior to opening the room demonstrated the expected flat frequency response over a wide range of listening positions within the control room. The White 4001 equalizers in the monitor chain are used only when

producers want to duplicate a familiar but non-linear curve from another room. Furthermore, the uniformity of frequency-related decay times makes the room very "honest" in its portrayal of echo and other effects.

Schatzlein says TRC clients are "ecstatic" about the room. "We've got ourselves a hit," he reports. Clients are particularly enthusiastic, he says, about the stereo perception in the control room. "Stereo placement is very accurate from a wide range of listening positions, yet you are not conscious of the speakers as discrete sources of sound. The music comes at you from the entire front wall of the control room, with each track placed just where you panned it." ■

## MILAM AUDIO

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Mr. Gary Schatzlein  
TRC Studios  
Indianapolis, Indiana

Dear Gary,


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As always, it was a pleasure to work with you and Michael, and all of the very professional TRC staff.

Your comments regarding the new MCI/Sony digital compatible analog and digital products are appreciated. I will keep you informed as it all becomes available.

Sincerely,



Jerry Milam

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# CONTROL ROOM MONITORING SYSTEMS

The philosophy, as well as the implementation, of Control Room (CR) monitor design has been a controversial subject. As the acoustical aspects of control room design and monitoring have been subjected to the sincere opinions, theories, and styles of engineers and designers, various approaches to CR monitor design have been developed. Up to this point, CR monitor designs can be found which have various levels of tonal coloration, transient reproduction accuracy, imaging coherency, linearity, and distortion.

The current market demands for higher musical and production quality, made possible through digital as well as advanced analog recording techniques, require significant advancements and unifying approaches to control room and CR monitor design. Higher levels of accuracy within all acoustical aspects of the control room monitoring system (the CR monitor and room design) are necessary if the engineer/producer is to be fully equipped to produce to the quality levels allowed and required by advanced digital recording technologies.

## APPROACHES TO HIGHER ACCURACY

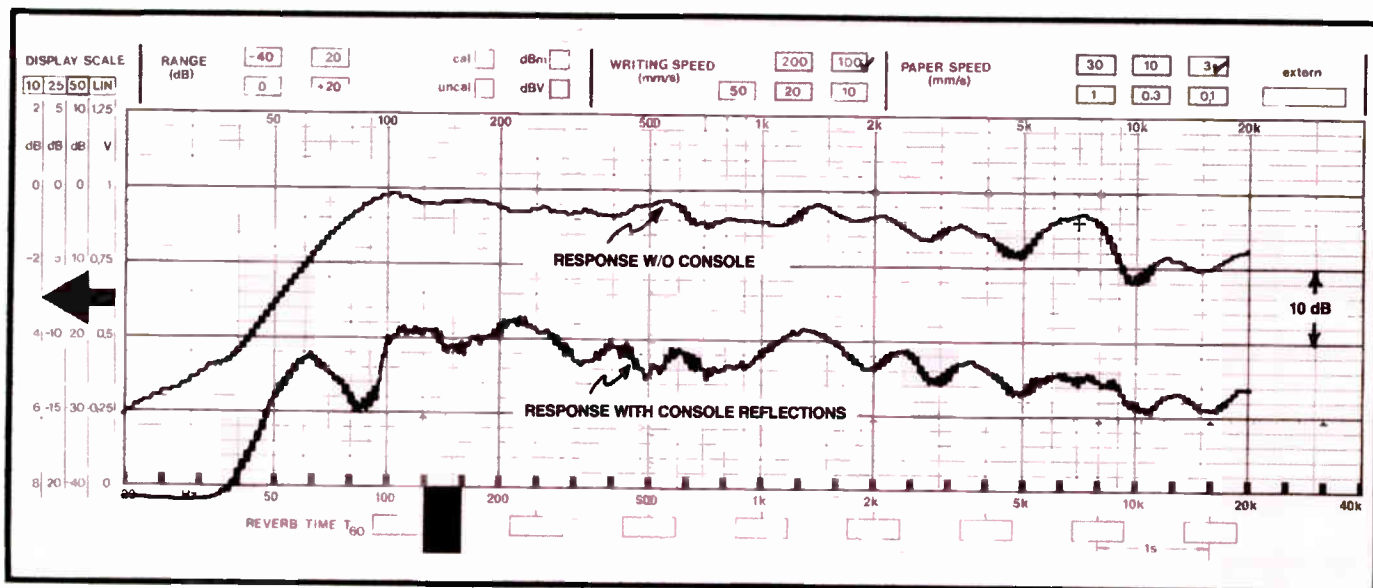
by Bill Morrison

The control room monitoring system is a critical, yet fundamental tool required to reveal the sonic truth. The listener must hear in exacting detail and resolution the musical outputs from microphones, the musical effects produced by signal processors, the sonic results of mixing, and the sonic truth of what is ultimately being recorded. If the control room monitoring system is not accurate in its dynamic, tonal, phase, imaging, or transient re-

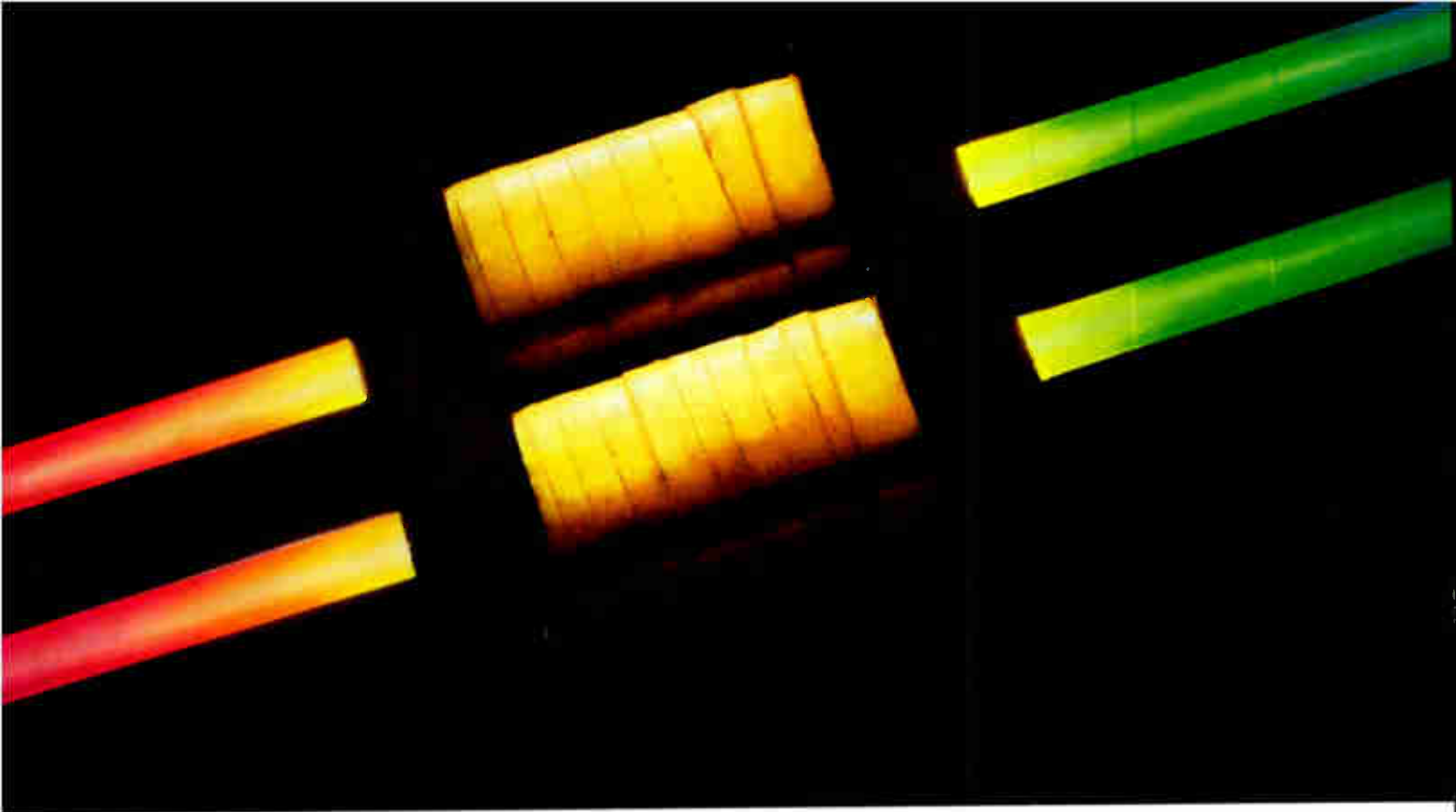
production, the engineer/producer is in the position of basing technical and creative decisions upon "garbage" information. The potential result is the introduction of production mistakes, musical inaccuracies, and a less than optimum end product.

The accuracy of a CR monitoring system can be simply defined in terms of a comparison between the input electrical signal to the monitoring system (the musical signal which is to be recorded) and the acoustical output as measured at the listening position. If the monitoring system is accurate, the monitoring system will reproduce an exact acoustical analog of the input electrical signal at the listening position. This level of accuracy can be described as waveform accuracy. From a scientific standpoint, accuracy at the waveform level requires that the monitoring system, over the musical dynamic and frequency spectrum, be linear (distortion and compression free), have a uniform steady-state frequency response (tonal accuracy), and have a linear phase response (transient and imaging accuracy).

**Figure 1: Acoustical reflections from the console have an effect upon the monitoring accuracy of nearfield loudspeakers.**







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CR monitoring accuracy is objectively testable through properly configured listening tests as well as through instrumentation-based tests. These tests, in order to be valid, must allow a comparison between the electrical input signal to the monitor system and the resulting acoustical output. Such tests are described in Appendix A. Be advised that ordinary listening tests or 1/3 octave analysis techniques are grossly inadequate to evaluate the accuracy of CR monitor systems. That a CR monitoring system "sounds great" or that it "sounds like the live performance" or that it produces a "flat" 1/3 octave real time analyzer display does not necessarily indicate monitoring accuracy.

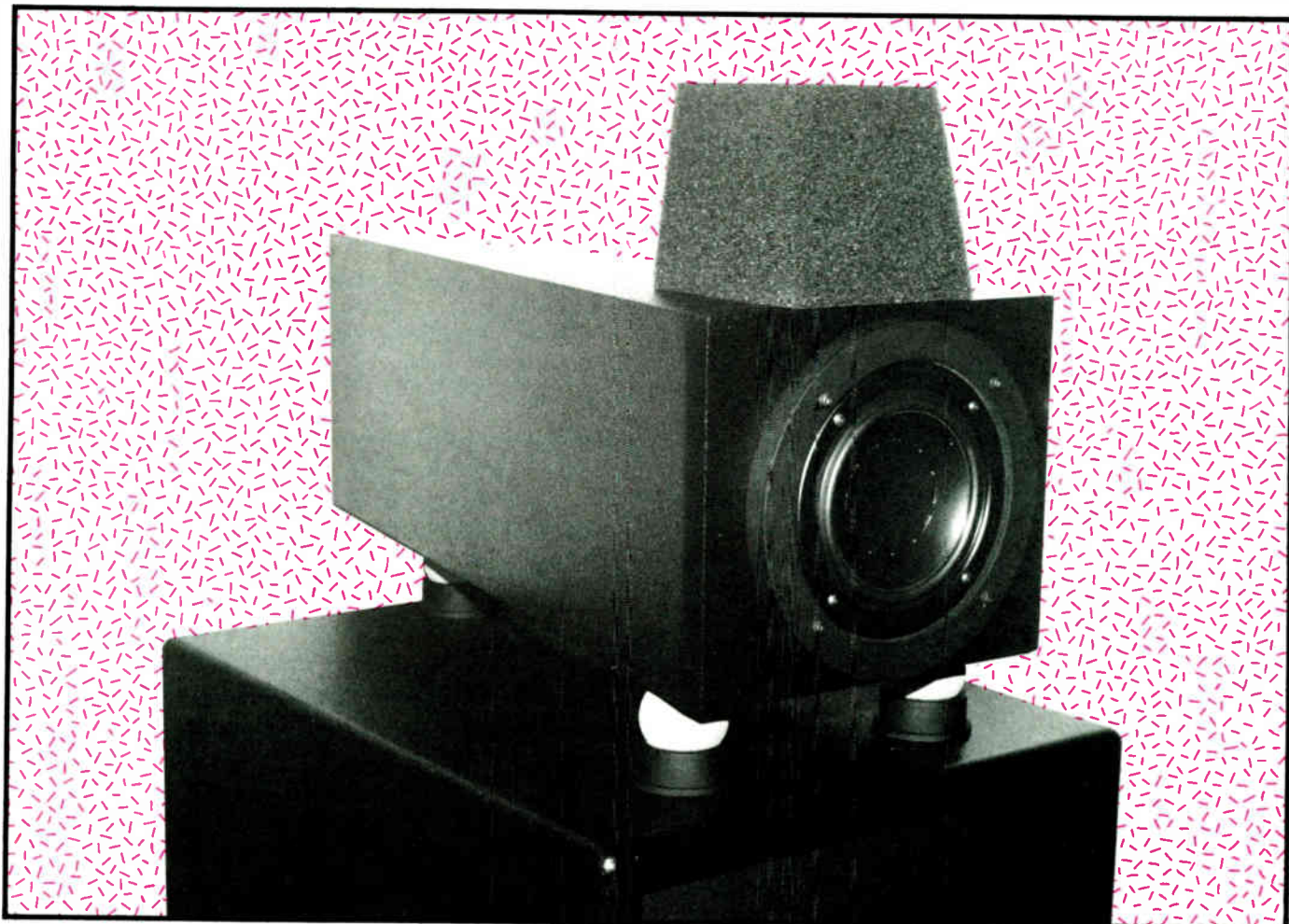
Assuming that accuracy at the waveform level can be approached within the design of a CR monitor, we must then insure that the control room's acoustical environment does not significantly perturb the CR monitor's direct radiation to the listening position. This requires, within the design of the control room, uniform radiation loading, control of reflections, control of diffrac-

*That a CR  
monitoring  
system "sounds  
great" does  
not necessarily  
indicate  
monitoring  
accuracy.*

tion effects, properly engineered absorption characteristics, and highly damped room eigenmodes. Unfortunately, traditional control room and CR monitor designs do not meet or address these accuracy requirements. The traditional and typical control room has been designed more for pseudo acoustical and dramatic cosmetic reasons than for the purpose of allowing the CR monitors to present an accurate acoustical signal to the listener. As a result, most control rooms exhibit detrimental resonances, reflections, and diffraction effects. These acoustical problems, combined with inherent flaws in traditional CR monitor design, result in significant monitoring inaccuracies.

The traditional and predominant wall-mounted CR monitor system in use today is basically a refined version of a theater loudspeaker system designed in the 1940s. The traditional monitor system incorporates 15-inch drivers in a fourth order vented enclosure with a crossover transition (active or passive) at 400Hz (or above) to a midrange compression horn and high frequency tweeter. Examples of this

**Figure 2: Free field monitors which meet high accuracy requirements allow the advantages of nearfield monitoring with the SPL and bandwidth capabilities of large monitor systems (shown with acoustical shielding removed).**





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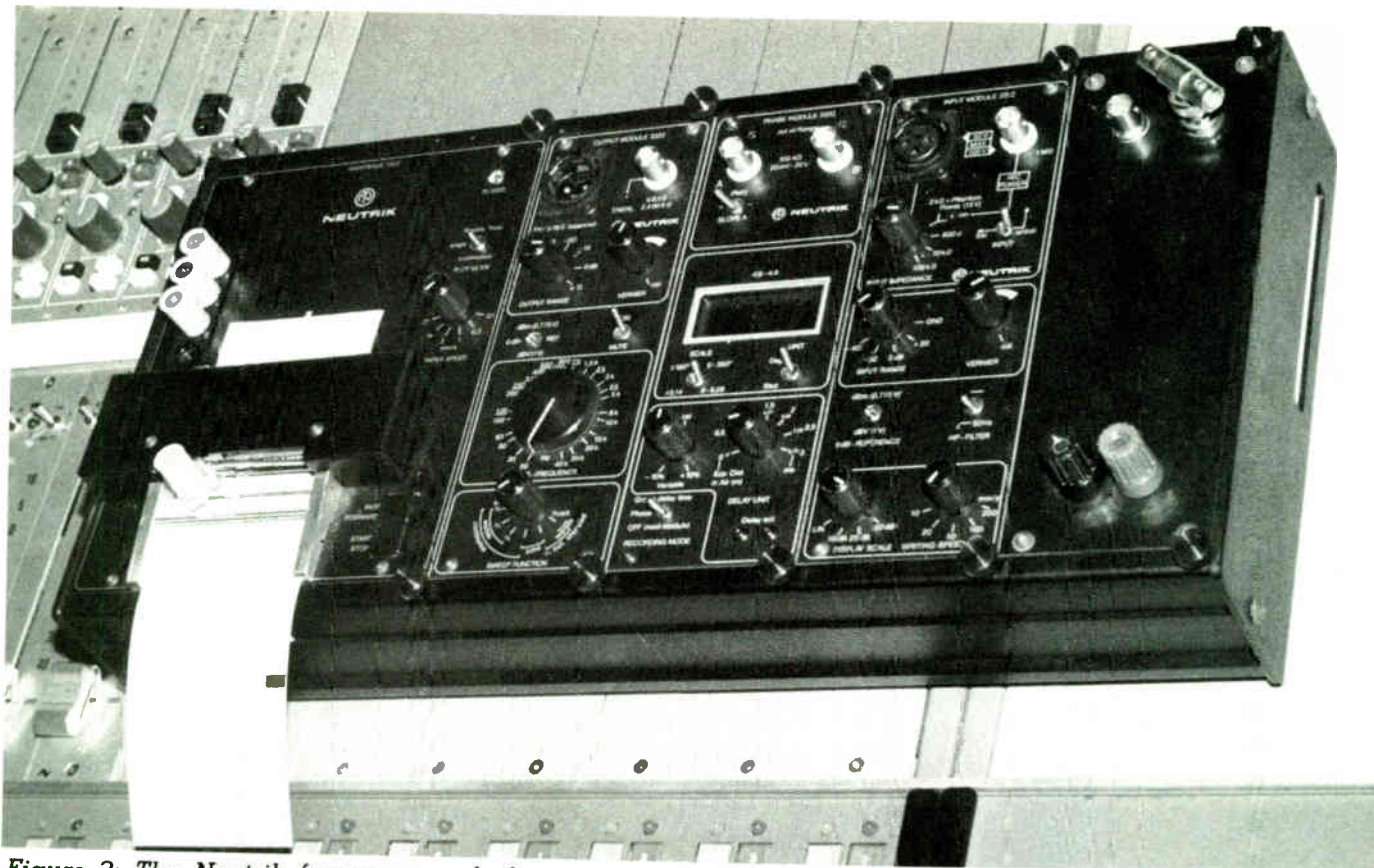


Figure 3: The Neutrik frequency and phase response instrument allows aspects of monitoring accuracy to be analyzed and documented.



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type of monitor system are currently being produced and marketed by numerous manufacturers and "name" designers.

Inaccuracies inherent in the design approach of the traditional CR monitor are exemplified by the use of fourth order vented bass enclosures, by the use of compression horn systems, by poor electrical and acoustical crossover characteristics, by inherent driver inaccuracies, and by noncoherent acoustical time arrivals from drivers.

The use of fourth order vented alignments for bass reproduction results in non-optimum phase characteristics and transient response ringing. The resulting inaccuracies are poor bass definition, a dominant bass coloration, and bass transient "overhang." Other inaccuracies found in the traditional CR monitor result from the use of compression horns. High Q internal resonances within the compression driver and throat areas of the horn produce transient ringing and frequency response anomalies which are inaccurate, offensive, and fatiguing. In addition, high sound pressure levels produced within the horn throat force air into nonlinear behavior.

The traditional CR monitor system's crossover from low frequency drivers to midrange drivers at 400 Hz or above is at a much higher frequency than optimum. This high crossover frequen-

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cy requires the low frequency drivers, which must produce high cone excursions for low frequency reproduction, to also reproduce a significant portion of the voice range. The result of low frequency cone excursions and simultaneous midrange reproduction from the same cone is the production of bass induced intermodulation and doppler distortion. In addition to these forms of midrange distortion, the operation of the bass drivers above their piston band results in irregular amplitude and phase characteristics where cone body breakup and cone suspension resonances occur.

Crossover networks (active or passive) which are employed in traditional CR monitors are usually 12 dB/octave and are not phase accurate through the crossover region. This, combined with mechanical driver misalignments, results in poor phase and time domain performance for the system. The consequences are inaccurate left-to-right sound stage imaging, inaccurate front-to-back depth imaging, and inaccurate reproduction of complex transient waveforms which have Fourier spectral components spanning the crossover region.

Attempts to salvage the traditional CR monitor design have included substituting various manufacturer's drivers, using various amplifiers, trying different cable systems, using wood horn designs, trying various horn flare geometries, attempting driver time alignments, using 1/3 and 1/6 octave first arrival equalizations (or worse—room equalizations), and various crossover designs. The results of these attempts to achieve higher accuracy from the traditional CR monitor system may produce some levels of improvements, but when analyzed with high resolution acoustical instrumentation and valid, objective listening tests, the futility of these attempts is revealed. These "band aid" type of improvements simply do not address the inherent inaccuracies of traditional CR monitor design approaches.

Many engineers, in addition to using the traditional wall-mounted CR monitoring system, are using, to some degree, nearfield monitors. The use of nearfield monitors varies from their use as analytical mixing tools to their use as typical "cheapo" speakers.

Nearfield monitors do minimize the effects of poor control room design and allow the listener to essentially receive the direct radiation (except for console reflection and diffraction effects) from the monitor; however, the use of nearfield monitors typically results in some monitoring inaccuracies. The crossover frequency from bass to midrange or treble drivers is usually as high or higher than the traditional wall-mounted CR monitor. The result is the introduction of bass intermodulation distortion

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to midrange reproduction. Drivers are typically operated beyond their piston band with crossover transitions having serious frequency and phase response anomalies. Most nearfield monitors have a limited and inaccurate low frequency reproduction capability. Low power handling in the design of most nearfield monitors (both thermal and cone excursion limitations) results in a limited dynamic range as well as dynamic compression (a form of non-linear behavior—see Appendix A). The results are monitoring characteristics, tonal and distortion related, which vary with the average and peak SPL level of the program material's spectral content.

The positioning of nearfield monitors upon the console results in a transition from nearly full-space to half-space radiation for frequencies with wavelengths that are less than one half of the smallest front baffle dimension. Unless compensation is introduced, the spectral output from the monitor is disproportionately greater (+3 dB) as the nearfield operates into a half space. Reflection and diffraction effects from the console create additional monitoring inaccuracies. Figure 1 demonstrates the effect of the console upon the measured frequency response of a Fostex RM780, one of the better console-mounted loudspeakers.

New approaches to CR monitor design which address the inherent flaws of traditional wall-mounted CR monitors as well as nearfield monitors and which are incorporated in the design of our firm's custom CR monitors include the following: Low frequency reproduction is handled either by QB-3 vented alignments or by aperiodic (non-ringing) acoustic suspension, transmission line, or servo-controlled designs. The QB-3 vented alignment results in improved transient reproduction accuracy, bass definition, and bass detail as compared to the fourth order designs used in traditional CR monitors. Even higher levels of transient response accuracy are achievable through *properly designed* aperiodic sealed systems, transmission line designs, and servo-controlled low frequency systems.

Advanced crossover designs are incorporated which provide high slope (18 dB or greater), 80-120 Hz, phase accurate transitions from low frequency drivers to midrange drivers. This insures that low frequency drivers are not operated above their piston band and that bass cone excursions do not introduce intermodulation and doppler distortion to the midrange of the audio spectrum. Crossover transitions to all drivers within the system are handled similarly to insure that all drivers are operating within their piston band and within a range in which they are accu-

rate and distortion free. In general, proper crossover-to-driver matching, coherent driver time arrivals, and phase accurate crossover transitions are employed and are necessary for the design of accurate CR monitor systems.

High power handling cone and dome-direct radiators are incorporated within high accuracy CR monitor designs instead of compression horn drivers. Recent advances in cone materials and voice coil power handling in direct radiator drivers allows compression horn drivers to be eliminated from CR monitor design (forever). The direct radiators (cone and dome types) do require higher power to produce horn-equivalent SPL levels; however, the significant reductions in coloration, harshness, distortion, and listener fatigue, when compared to horn drivers, are well worth the price of higher powered amplifiers.

The development of new driver technologies may provide even higher levels of CR monitoring accuracy. Our firm is now investigating ribbon drivers, electrostatically-driven membranes, and electrostatically-driven ionized plasmas. Such driver technologies may provide additional advancements in the accuracy of CR monitors; however, objective listening tests and

scientific acoustical measurements of linearity, amplitude, and phase response must be used to evaluate the merits of these technologies.

These new approaches to more accurate CR monitor design, as well as our own proprietary design advances, have been designed, installed, and performance certified as wall-mounted monitoring systems in several recording studios and mastering labs. Unfortunately, such installations into previously designed control rooms can be costly as it is usually necessary to custom construct and design the CR monitor for optimum performance. In many cases, major design modifications or acoustical treatments to the control room are necessary.

A less costly approach incorporates the same design refinements which are incorporated in our custom wall-mounted CR monitors into a "free field" design. The free field design approach can be described as an advanced nearfield design with acoustical shielding to minimize room and console effects. When properly designed, such a system is capable of high accuracy monitoring without requiring major modifications to the control room. An example of a free field CR monitor (designed for Warner Brothers) is shown in Figure 2.

—PAGE 38

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—FROM PAGE 35

This specific system is tri-amplified and incorporates a ribbon tweeter, a polypropylene midrange driver in a lead-lined transmission line enclosure, and a transmission line subwoofer system. This "free field" design is capable of 132 dB SPL output, has a frequency response from 25 Hz to 65 kHz, and is phase accurate to within 5 degrees.

The benefits of high accuracy monitoring systems for use in the recording, mixing, and production of music certainly justifies the efforts required. For existing facilities, the accuracy of the CR monitoring system or systems should be evaluated and documented through the series of tests described below.

This usually requires the services of an acoustical consultant equipped with the required high resolution acoustical instrumentation and a knowledge of valid acoustical measurement techniques. If such tests reveal serious inaccuracies within the CR monitoring system, or if it is known in advance of any testing that such inaccuracies exist, a high accuracy wall-mounted or a free field monitor system should be considered. In either case, the installation of a high accuracy monitoring system is a critical necessity if the highest potential for production and recording quality is to be achieved.

### Accuracy Tests for CR Monitoring Systems

The following listening and instrumentation-based tests are designed to assess the accuracy of CR monitoring systems by comparing an input signal to the CR monitoring system with the resulting acoustical output. These tests, in order to be valid, must incorporate highly accurate electronics and an accurate microphone. Electronic instrumentation designed for acoustical measurements with accuracy traceable to the National Bureau of Standards is manufactured by Bruel & Kjaer of Denmark. Crown, Neutrik, IQS, and other companies also manufacture accurate test equipment which can be used for these tests. The Neutrik 3300 is shown in Figure 3. The only microphone which I can recommend for CR monitor testing is the Bruel & Kjaer 4133 1/2-inch air condenser microphone. This instrumentation microphone has the required amplitude and phase response accuracy necessary for CR monitoring tests.

### The Objective Listening Test

The objective listening test allows an observer to make an audible comparison between a musical input signal to the CR monitor and the CR monitor's acoustical output. For this test a switching arrangement is set up which allows

the tester to listen to the input signal at the CR monitor and then switch to listen to the CR monitor's output—as picked up by the Bruel & Kjaer 4133 microphone. Audible differences between the input and the output of the CR monitoring system represent inaccuracies introduced by the CR monitoring system. This test should be performed by using a wide range of musical program materials and SPL levels. Note that the absolute accuracy of the headphones is not a critical requirement for this test to be valid; however, the higher the quality of headphones, the better the resolution for detecting CR monitoring inaccuracies.

### Amplitude or Frequency Response

A basic measurement used to help evaluate the tonal accuracy of CR monitoring systems is a high resolution chart recording of the system's steady-state amplitude or frequency response. In this test, the CR monitor is driven by a constant amplitude sine wave generator which sweeps logarithmically from 10 Hz to 20 kHz. Through the use of an air condenser microphone, a measurement amplifier, and a chart recorder, the amplitude of the acoustical output from the CR monitoring system versus the driven frequency is plotted on a chart. If the CR monitoring system is perfectly accurate, the amplitude of the acoustical output from the monitor system will, just as is the input to the CR monitor, be a constant amplitude over the audio frequency spectrum.

A variation of this test is the swept warble response. In reflective environments, phase interactions between the direct signal from the CR monitors and reflected signals from the room produce narrow band cancellations and reinforcements in the measured steady-state frequency response. To minimize the effects of these narrow band phase interactions, the swept sine wave can be frequency modulated or "warbled". The resulting chart recording, depending upon the amplitude and rate of the frequency warble, is much smoother than the actual steady-state frequency response measurement.

Other techniques for measuring the frequency response of CR monitoring systems include FFT (Fast Fourier Transform) and TDS (Time Delay Spectrometer) methods. FFT techniques typically use impulse signals as the test signal to the CR monitor. The CR monitor's time domain impulse response, as picked up by a microphone and digitally stored, is then, through FFT computer calculations, spectrally analyzed. By analyzing specific time windows of the CR monitor system's impulse response, first arrival, room reflections, and other time-related phenomena may be analyzed.

TDS frequency response measurement techniques allow the same type

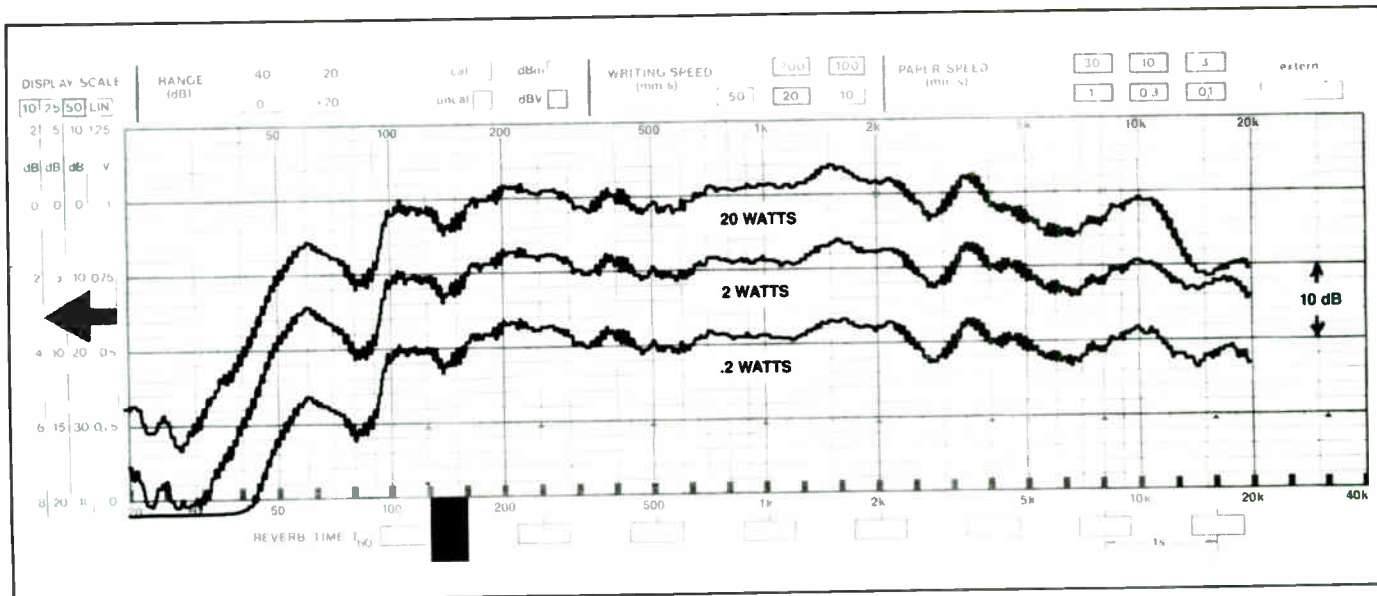


Figure 4: As input levels become higher, monitor systems exhibit compression, resulting in nonlinear behavior.

of frequency response measurements which FFT measurement techniques allow. TDS measurements use swept sine waves as the input signal and perform an analysis of the CR monitor system's acoustical output through the use of a frequency displaced (with respect to the input swept sine signal) swept filter. In both TDS and FFT measurement techniques, care must be taken to understand and use time windows of

analysis which yield valid and meaningful results and to understand the trade-offs in resolution between spectral accuracy and the time windows employed.

The frequency response test, as a basic test method, is capable of revealing great information about the CR monitor's inherent performance as well as determining the effects of the control room upon the monitoring

accuracy. Frequency response plots of the left and right CR monitoring systems should be plotted upon a single chart along with a plot of the acoustical summation of the left and right CR monitoring systems. This allows a comparison of the left-to-right stereo matching as well as revealing left-to-right crossover/driver/room phasing problems. A comparison between on-axis chart recordings of the CR monitor's

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nearfield frequency response and the frequency response as measured at various on-axis positions in the control room (including the listening position) allows room effects to be analyzed. Multi-colored frequency response plots of each driver's response through its respective crossover network combined with a plot of the CR monitor system's frequency response allows crossover transitions to be analyzed.

### Phase Response

The phase response of the CR monitoring system is a measurement of the time delay, expressed in phase angles of the input signal, between the electrical input signal to the CR monitoring system and the acoustical output from the CR monitoring system. The phase

response is measured through the use of swept sine waves or through computer calculations upon the impulse response of the system. The first arrival phase response from the CR monitoring system should be linear such that the first derivative of phase with respect to frequency (called group delay) is zero. Plots of phase response or of group delay reveal time domain-related inaccuracies in crossover design, inaccurate physical alignments of drivers, and phase effects from room reflections. Phase accuracy in a monitoring system is required in order for the Fourier components of musical transients to be accurately reproduced. Accurate phase response is also critical to stereo imaging accuracy as it is the proper time relationships between acoustical

signals which allows the human hearing mechanism to coherently position sounds.

### Linearity

The linearity of a CR monitoring system is a measure of how proportional the CR monitoring system's response is with respect to input signals. Disproportionate or nonlinear behavior from the system results in distortion products. The actual characteristics and mechanisms of the monitor's nonlinearities determine the severity and type of distortion products which are produced. A measurement of the distortion generated by a CR monitor in reproducing a test signal can be accomplished by measuring the residual spectral output from the monitor which is not a part of the input spectrum. This residual output can be expressed as a percent of the input signal's amplitude and plotted as a function of frequency and of driven amplitude level.

Distortion measurements such as intermodulation, transient, difference frequency, out-of-band noise, etc. represent distortion products generated by the monitor's attempt to reproduce complex, music-like test signals. Such tests are important in determining the refinements to CR monitor design which should be addressed. Once a distortion product can be identified and measured, design refinements can usually be incorporated to minimize the distortion.

Dynamic compression is a form of nonlinear behavior which is characterized by less-than-proportional acoustical output from the CR monitor as the input amplitude is increased. This phenomenon can be observed by plotting a series of response curves which represent increases in the power input. As the input power increases, the acoustical output should track the input increases. As input levels become higher, monitor systems will exhibit compression—a restriction in the ability of the system to linearly respond to increased power inputs. This is usually caused by the heating of voice coils or by driver excursion limitations. The result is a change in the shape of the response curve. Figure 4 shows an example of compression in a nearfield monitor. Note that at a 20 watt input level the tweeter's output above 10 kHz is reduced. ■

Bill Morrison is the president of Acoustical Physics Laboratories—a design and engineering firm located in Doraville, Georgia. He holds a Master's Degree in Physics from the Georgia Institute of Technology and specializes in the design, installation, and performance certification of control rooms and control room monitoring systems.

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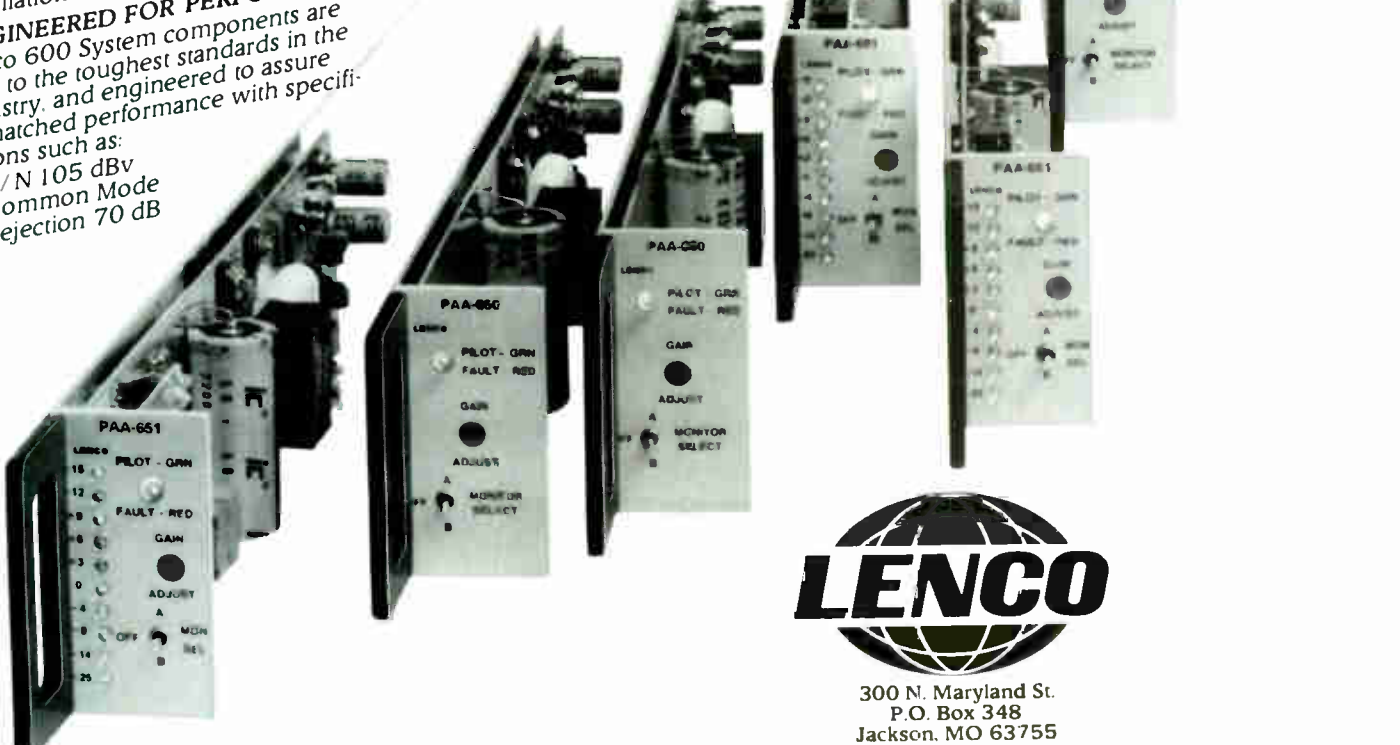
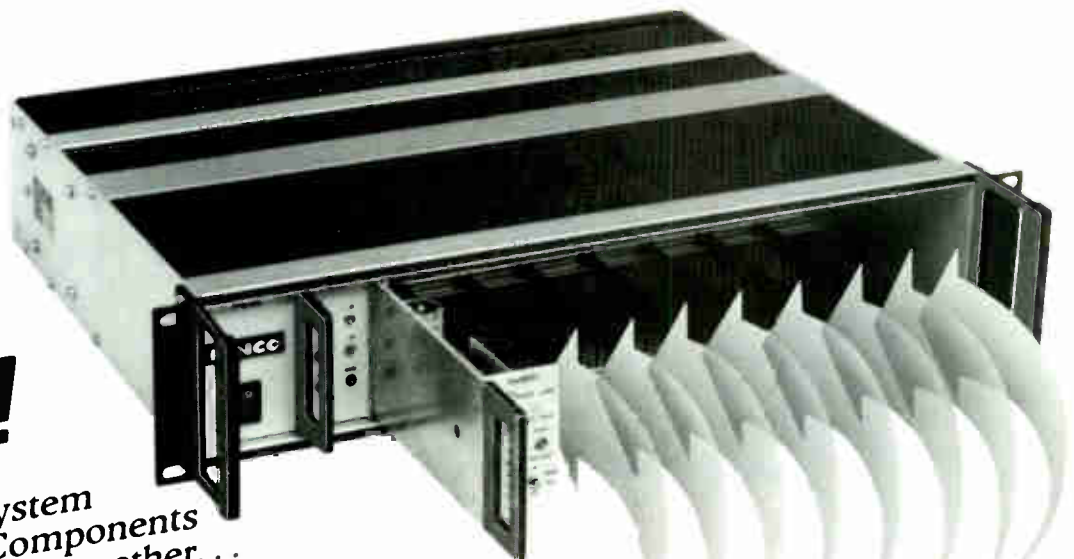
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# ELECTRONIC ACOUSTICAL MODIFICATION

## *Is there a future in the studio?*

by William Johnston

In these days of rising building costs and a demand for flexibility, studios everywhere are searching for a solution to the age-old constraints of acoustics. Gone are the days of the nearly anechoic studio, completely devoid of reflections and reverberation; likewise the days of completely live rooms are numbered. Furthermore, most small and medium-sized studios cannot afford to build two separate recording rooms, each featuring a contrasting acoustical medium. The cost is just too high for materials, the real estate and labor. Thus, many studios try to straddle the fence by creating a single room which has a live end and a dead end. This, when combined with variable absorbers, can change the acoustics of a room to a moderate degree. Yet this method can be expensive and inefficient.

So, how can a studio create the ability to record a commercial jingle in the

afternoon, and the Budapest String Quartet at night? The answer may lie in the area of electroacoustics, a relatively new science, which has been used to modify the acoustics in concert halls since 1964. It has been used to correct existing facilities which were deficient, and to create multi-purpose halls capable of everything from speech/lecture acoustics to liturgical music.

Psychoacoustic research by German physicist Manfred Schroeder has shown that when not told of an electronic modification, people's conception of a concert hall's acoustics changed consistently for the better after the system's implementation. In the original installation of Assisted Resonance at Royal Festival Hall in London, no one was told of the electronic enhancement. Meanwhile, both critics and musicians began commenting on the improved sound of the hall. At a recent installation at the Hult Center for the Performing Arts in Eugene, Oregon, the man-

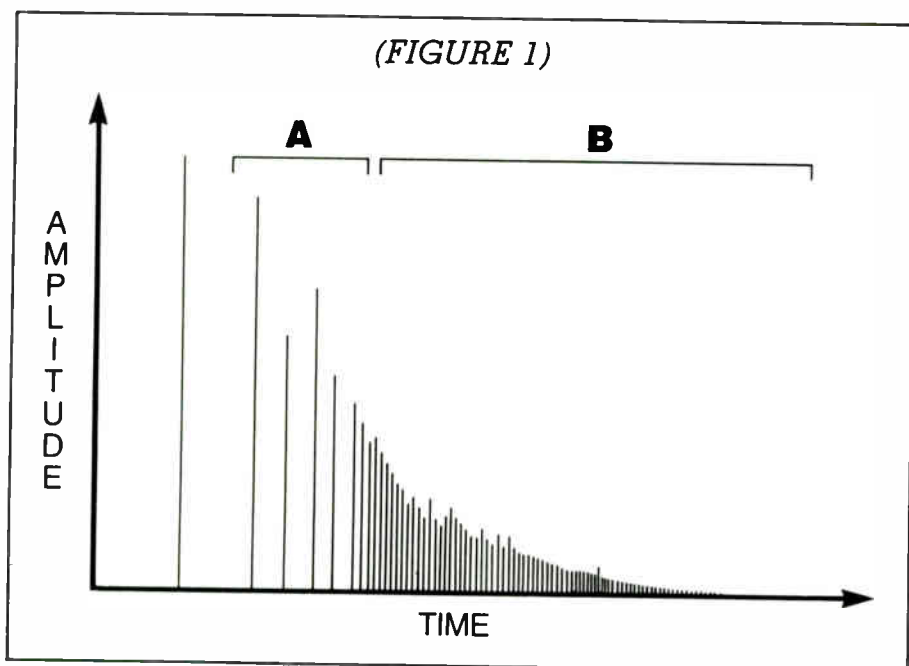
agers have avoided the performers' fear of the system by not telling them about it. What you don't know can't hurt you, right?

Yet, according to acoustical consultant Chris Jaffe, an expert in electroacoustics, "Electronic acoustics is not a panacea. It is not a substitute for natural acoustics, allowing the architect to ignore the physical requirements of good acoustics. [Electronic acoustics] is just one of the many tools we have at our disposal. Why not use it where appropriate?" And, the modern recording studio, with its ever-increasing need for flexibility and the high standards demanded by the digital revolution, seems to be an obvious candidate for this electronic assistance. These systems could be made available to existing studios who desire the option of increased reverberation and stronger wall reflections, or to new studios designed with the system from the ground up.

### ELECTRONIC ACOUSTICAL MODIFICATION DEFINED

There are two discrete, yet interacting systems which can be used to enhance the apparent size, reflections, and reverberation of an environment. If we rummage through our old Acoustics 101 notes we will remember that reverberation can be represented as a series of strong initial reflections, followed by a series of diffuse reflections which decay exponentially (figure 1). Thus, in order to recreate the apparent reverberation in a room, we must simulate the early reflections in one system (A), and the diffuse reverberation in another (B). The interaction of the two should closely approximate the natural phenomenon, as shown in figure 1.

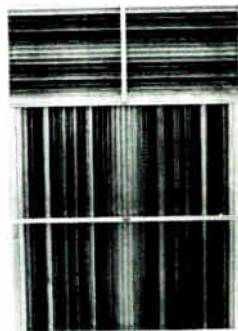
The first implemented system, called Assisted Resonance (AR) by designer P.H. Parkin of the Building Research Station, centered only on the diffuse reflections (B). Parkin's design utilized a normally undesired audio property: acoustical feedback. Parkin used a series of controlled feedback loops con-



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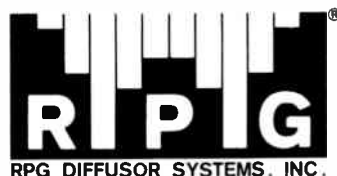
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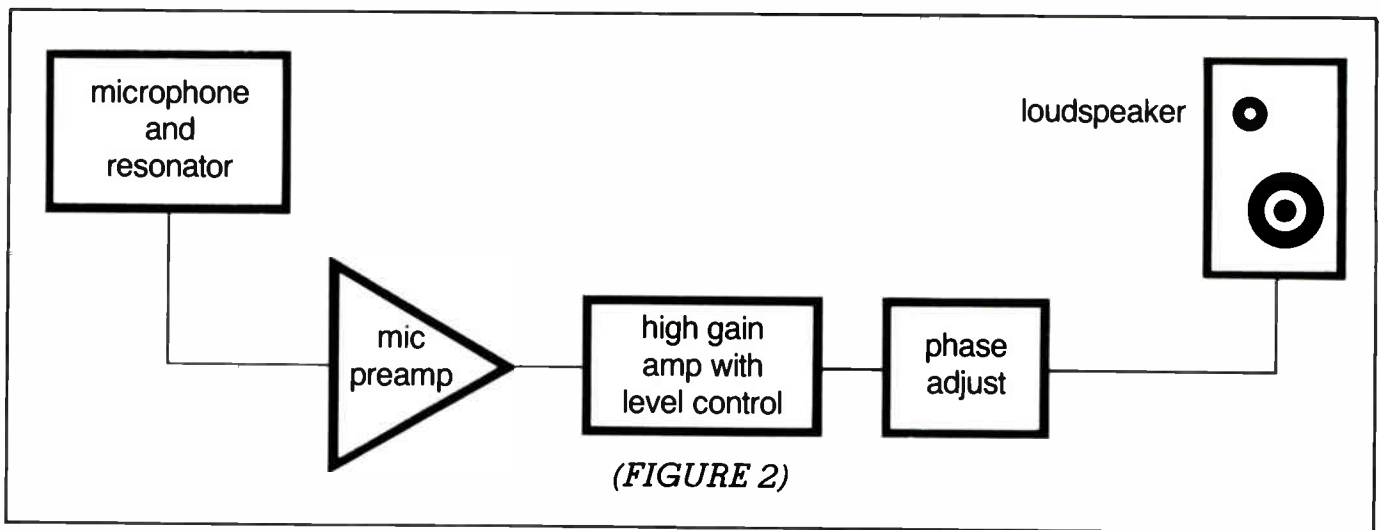
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sisting each of a microphone, a mechanical equalizer, an amplifier, and a loudspeaker spaced throughout the lower audio band. By tuning each feedback "howl" to a specific frequency, Parkin was able to significantly increase the decay time in the hall. This is shown in figure 2.

The second, more recent system, developed by Chris Jaffe, is known as the Electronic Reflected Energy System (ERES), which is a long name for a fairly simple, yet effective idea: To create artificial reflections from a wall through

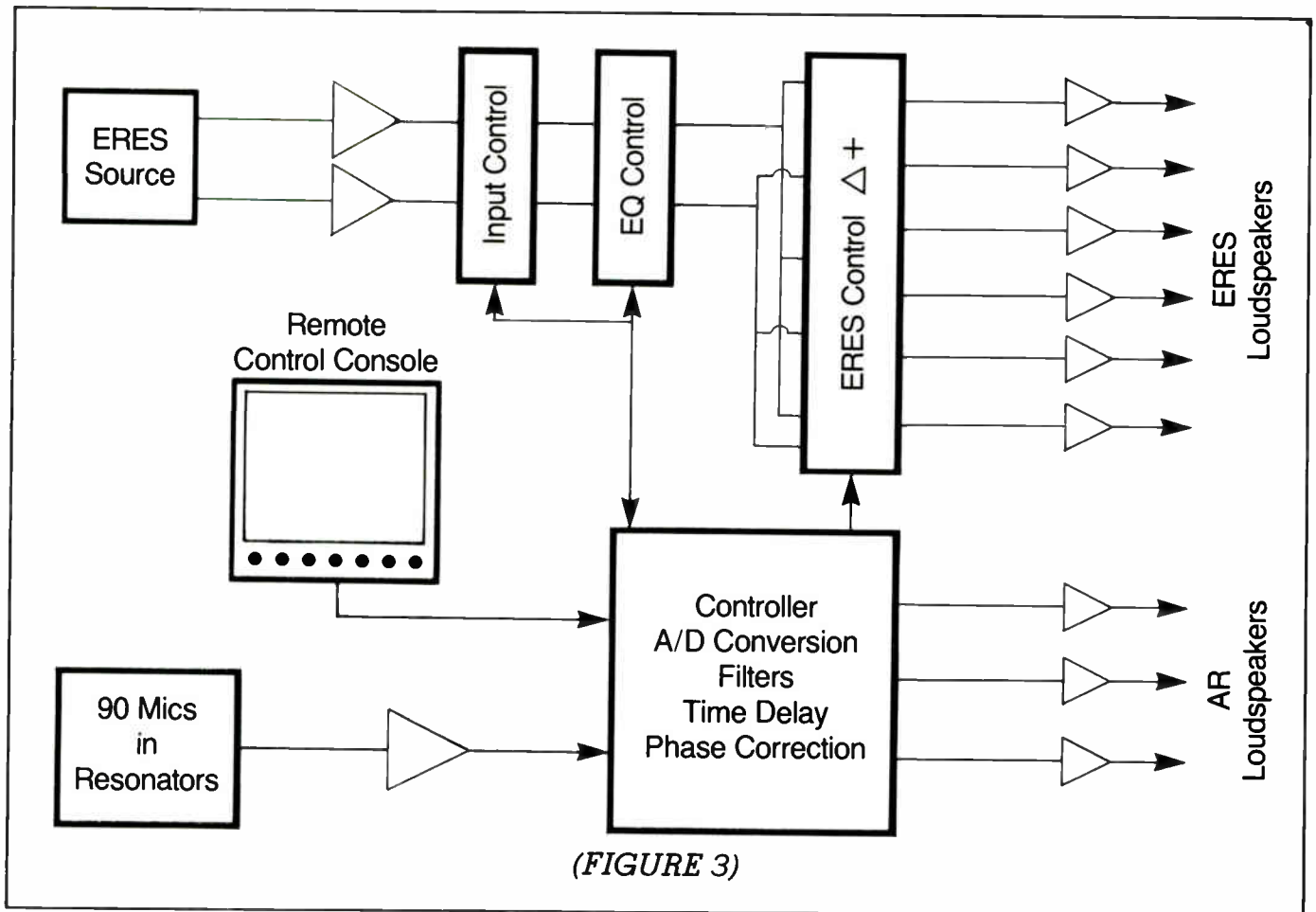
the use of digital delay lines, and to change the apparent absorption coefficient of the wall by the use of equalization. Thus, by adjustment of the level, length, and color of the equalization, the apparent distance between a wall and a listener can be changed, as well as the apparent composition of the wall surface.

Therefore, Assisted Resonance can give a room greater warmth and volume, while the ERES system can make a room seem narrower and more intimate. A contradiction? Actually, the

early reflection and the even decay of sound is characteristic of the best concert halls built, and is important to clarity, articulation and warmth in the recorded medium. A closer look at these two systems will help underscore their utility, and the limitations of acoustical enhancement.

**DETAILS OF THE ASSISTED RESONANCE SYSTEM**

Assisted Resonance attempts to modify the acoustics of the space, rather than modify the sound delivered to the





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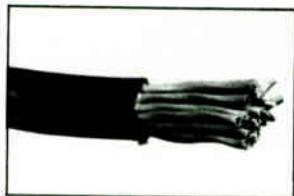
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space. The feedback of each loop in the system is adjusted so it occurs at the frequency at which the in-phase loop gain is at a maximum. Thus, any increase in the system's gain will increase that frequency's reverberation. Furthermore, by adjusting the system to be perfectly in-phase, any phase drift in the system will merely result in a decrease in gain, rather than a drift toward uncontrolled feedback by approaching the loop gain maximum.

The reverberation of each individual channel can be increased by the factor "R" where,

$$R = \frac{\text{assisted reverberation time}}{\text{natural reverberation time}}$$

Then, the loop will operate at approximately  $20 \text{ LOG}(R / R-1)$  below uncontrolled feedback. Therefore, for small increases in the reverberation time, the system will operate well below feedback, while large increases require one to operate closer to uncontrolled feedback. For instance, if the reverb time is to be doubled, ( $R = 2$ ), the channel could be operated at a safe 6dB below feedback. If, however,  $R = 3$ , a more dangerous level of 3.5dB below feedback is achieved.

Yet, as the loop gain is increased, the Q of the loop increases as well causing the frequency characteristics of the whole system to have a comb-like response. This would cause the number of channels required to increase tremendously, and costs would rise tremendously as well.

In the original Royal Festival Hall application, each of the channel microphones were unfiltered. It was felt that by placing the microphone at the pressure maxima of the particular frequency, it would ensure that each channel would deal only with its own wavelength. Yet, by the time six or seven channels had been installed in this manner, they all combined to feedback at a frequency of their own choosing. The interference between the channels was lessened by the use of Helmholtz and simple tube resonators. Ideally, the resonators respond to a 4% bandwidth, with a Q of 25.

The original channel spacing at the Royal Festival Hall was about 2-3 Hertz. This was based on studies by Shroeder and Kuttruff who showed that the transmission response between any two points in a given space has peaks which may be expected to occur at an interval of:

$$f = \frac{3.91}{\text{reverberation time}} \text{ Hertz}$$

Yet, in subsequent tests and installations, the channel spacing has been developed along an equal percentage

interval rather than an equal frequency interval due to the exponential response of the ear. This results in a cost-saving reduction of the numbers of channels required, and adequately covers the necessary audio band. In practice, a spacing of about 2% beginning at 40 Hertz, moving to a 4-5% spacing at 1800 Hertz is used. In all cases, Assisted Resonance above 2,000 Hertz is unnecessary. The lowest bands from 40-250 Hertz contribute the most to the sensation of resonance, while the higher frequencies are less important due to the increasing effects of the molecular absorption of air.

The large number of channels needed (usually around 75 channels), obviously makes the equipment somewhat expensive. Yet, each channel can be simple and of low cost and power. The response of neither the amplifier nor the loudspeaker need be very flat, since each channel deals with a small frequency area. In practice, an amplifier with a 4% frequency spacing was never asked to deliver more than 15 watts, yet a 50 watt amplifier has been used for a safety margin and distortion's sake. In the Royal Festival Hall, a 20 watt amplifier was sufficient. The exact amount of wattage needed for any application must be calculated by the chosen microphone's output, the speaker efficiency, the frequency mode maximum in phase level, and the amount of reverberation desired. In a studio application, a 20-35 watt amplifier should be enough power since the space is significantly smaller than a concert hall. The primary requirements of the amplifier are that it exhibits high gain stability and phase stability over time.

Incorporated into every amplifier is a low noise pre-amp, a high gain op-amp, a phase adjustment from 0-180 degrees, and a series of resistor values which is selectable for the desired amount of gain.

The loudspeakers' main criterion is a high efficiency in the frequency area that it must drive. Since good frequency response and low distortion are not as important, the speaker selected may have an effective efficiency as much as ten times greater than an ordinary loudspeaker.

The final placement of the assisted resonance system must be as far from the audience, performers and recording microphones as possible. The AR system microphones must be located well past the direct to reverberant critical distance, in the far field where the direct sound has the least effect on the channel input.

Therefore, the logical placement is near the ceiling. While all the energy will be driven from above, this is not noticeable. No doubt this is partly due

to the Haas effect, but another factor must be considered. Since each microphone is driving an actual room mode, the energy arriving at the listener may be coming from an entirely different direction. This is aided by the omnidirectional nature of low frequencies.

The exact adjustment of the microphone placement can be quite tricky. One of the main problems is a room's inability to recreate the same room modes over time. This, coupled with the interaction between the channels, demands that the system be adjusted over the period of several weeks.

By maintaining these parameters, and by spacing each mutually connected loudspeaker and microphone as far from each other as possible, the corresponding resonant mode will be ensured of reaching out into the general volume of the room. The placement of adjacent channels (with respect to frequency) far from each other will also help create an even distribution across the room and minimize channel interference.

### ERES EXPLAINED

The design of ERES is less involved. It is necessary to pick up the direct, balanced sound of the source with a microphone. In a concert hall, this is usually located up in the orchestral shell, about 20 feet above the stage. The object here is to catch a typical direct wave, and then process the sound digitally. The sound may now be delayed, amplified, and equalized. These signals are then fed to loudspeakers mounted on each wall from which a reflection is desired. Assuming the wall's actual absorption is fairly dead, ERES can time the release of the "wall" reflection. In addition to this echo, ERES can delay the lowest frequencies for a slightly separate release. This is an important attribute of the best concert halls, and is essential in post-1800 classical music to convey the warmth and depth of the music.

Obviously, in the studio, one would not be limited to using only one microphone source to capture the sound. A series of hanging microphones throughout the room could be used, or any signal could be routed from the audio console to the delay networks, giving the engineer full control of the source, equalization, and level of reflection desired.

If the reflections take much longer than 25-30 milliseconds, the Haas law of localization will be defeated. Experiments have shown that even if the reflected sound is louder than the initial direct sound, but the time difference is less than 30 milliseconds, the source localization will be preserved. The height of the loudspeaker is not as

important as its horizontal dimension. Since the human ear is not able to precisely localize the height of a sound source when it is less than 45 degrees above horizontal, the speakers can be placed fairly high on the wall, well out of the path of travel. Thus, assuming the time of the reflection is correct, there should be no problem with fixation or localization of any loudspeaker. They should act as a "natural" wall reflection, which we normally ignore psychoacoustically. Therefore, the engineer would have control over which walls in the studio were "live" and which were "dead."

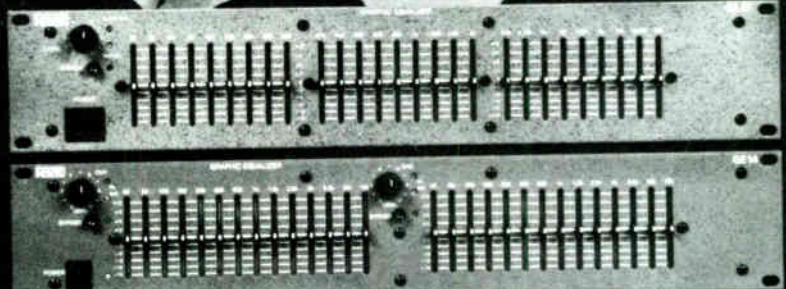
### CONCLUSIONS

Figure 3 is a block diagram of a complete artificial resonance system, integrated with the ERES system that is installed at the Hult Center in Eugene, Oregon. This system is available from AIRO Limited and any need of a hall or room becomes simply a matter of initial tuning and software.

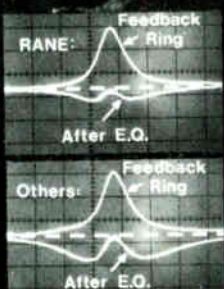
In the studio, these systems could add a new degree of versatility. The

—PAGE 170

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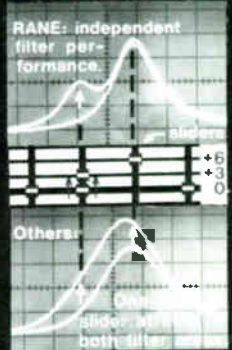
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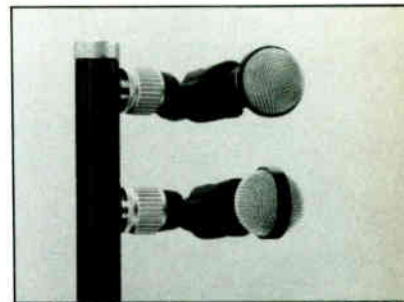
Epitomizing the warm, detailed sound of ribbon mics, the Beyer M 500 can enhance a vocal performance and capture the fast transients of "plucked" stringed instruments and embouchure brass. Its diminutive, durable ribbon element can also withstand extremely high sound pressure levels.

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The range of Beyer ribbon microphones.  
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# CLASSICAL M·U·S·I·C

## RECORDING • TECHNIQUES

by Ron Streicher

### Introduction:

#### The Philosophy of Recording

When planning a recording session, the producer and engineer immediately encounter the primary dilemma confronting the recording process: Is the recording intended to be a "creative" product or a "recreative" one? In the former case, the whole gamut of available technology is open without necessarily any concern for a "realistic sonic perspective." The final product, after all, will be a new creation—emanating from the imaginations of the artists (and producers/engineers) involved.

With the recording of a symphony orchestra, or any "acoustical music" ensemble, however, the process is more constrained: the performance still may be a "new" creation—one that has not previously existed in the "real world"—or it may be of a more traditional nature. The decision is crucial, for nothing relating to the recording project can proceed until it has been made.

The basic difference between a "creative" recording and a "recreative" one is that the former brings something new to the listener—something which need have no reference to any previous musical experience. The latter, however, must draw upon the traditions of several centuries which dictate that certain sonic "conventions" must be preserved. It is this—the "recreative recording"—which is most appropriate for the genre we usually refer to as "classical" music.

Having said that, however, I do not mean to rule out the use of advanced technology to accomplish such recordings. On the contrary, a good "recreative classical" recording places perhaps the highest demand on our technical resources, for what music

  
Recreative  
classical  
recording  
places  
perhaps the  
highest  
demand on  
our technical  
resources.

has more dynamic or spectral range than a full symphony orchestra? What music is more subtle than a string trio or wind quintet? What sound is more natural than the unaccompanied human voice?

Furthermore, the "recreative" recording process does not forbid the use of special miking techniques to "enhance" an otherwise sonically uninteresting or deficient recording environment. The discrete use of secondary

microphones is fully compatible with the primary stereo pair(s) described later. (The operative word in the previous sentence is "discrete.")

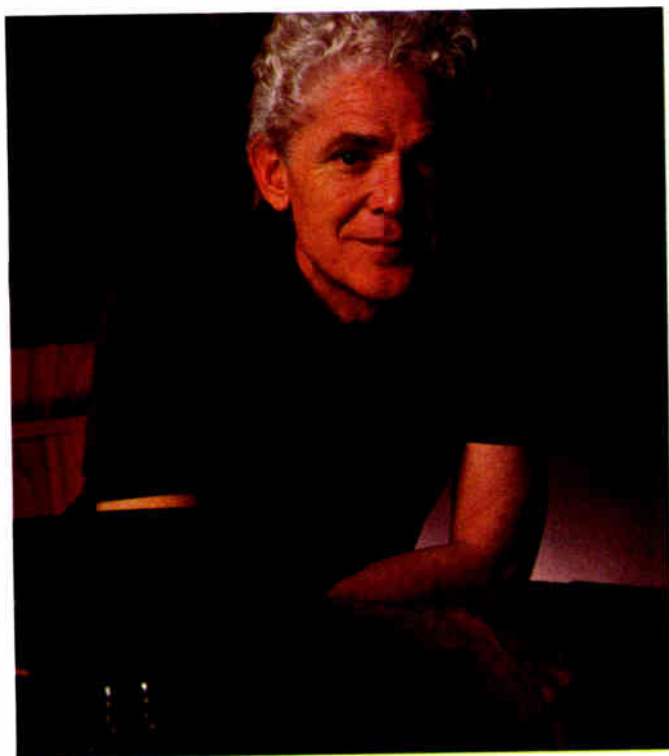
The oft-used term (all too frequently in the pejorative sense) "purist recording" means only that the sound which results should be as free from the artifacts of the recording process as is possible. Modern technological advances in the recording art and science have thus given us marvelous tools with which to accomplish this goal. No, it is not the technology which determines the results of our art—it is our application of that technology.

#### The Scope of the Recording:

Enough said of the philosophy of recording. The topic at hand is *how* to go about making a recording of "classical" music. Once you've decided that yours is to be a "recreative" recording, the next detail to consider is where and how the performance is to be recorded. The scale of the music is the first element in the process: what are the performing forces required? Is the recording to be of a live performance (i.e. with an audience) or is it a special session? Are the musicians accomplished performers—and are they operating under an AF of M contract? What are all the arrangements which need to be made? These are some of the pragmatic issues you must consider before pulling the first microphone from the locker. (For more information concerning pre-production planning, refer to my article "Location Recording Practices: A Tutorial" in the June, 1985 issue of *Mix*.)

As to the specifics of the recording itself, the first aspect to consider is the scale of the recording: if it is of a large ensemble such as a full symphony orchestra, the final sound should reflect

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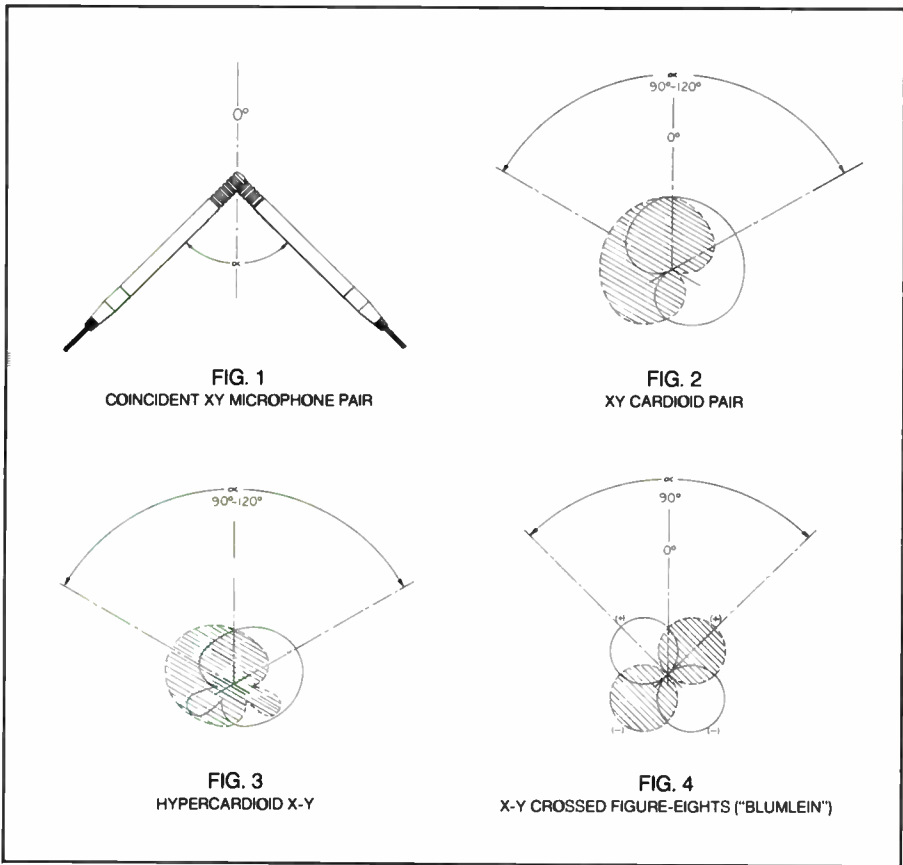
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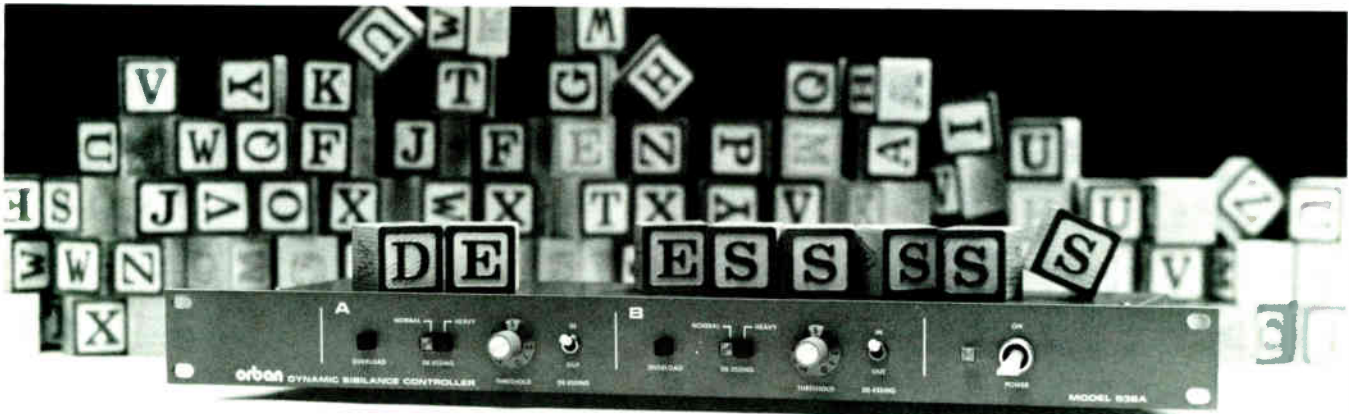
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that perspective in both size and power. Similarly, but on the other side of the issue, a small ensemble, such as a string trio or solo instrument, should also sound in the proper perspective. (A solo piano, for instance, does not stretch from one end of the room to the other, and therefore should not span the full width between the two loudspeakers of the listener's living room. With a large pipe organ, on the other hand, it is quite proper to present a "broader" image to the listener.) Proper microphone technique is the key to these sonic determinations, and it is in this realm that I will spend much of the rest of this article.

**Microphone Techniques:**

The basic method of making a stereo recording of a "live musical experience" is to take two microphones, place them in front of the performer(s) and connect them to the two tracks of a stereo recorder. In this modern age of multitrack recording, this may seem simplistic, but it is a method that has served well for decades, and is often overlooked by today's overzealous engineer. There are, of course, many types of mikes to use for that basic pair, and many ways to place them. (There is also a valid argument to be made for multi-



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mike/multitrack methods, and I will cover these later.)

### Coincident Configurations:

As the term implies, coincident microphone configurations employ two microphones which are placed in close proximity to one another, usually one directly above the other. [Figure 1] With this arrangement, there is minimal time/phase differential between the two mikes for sounds arriving along the horizontal plane. Directional information is thus determined solely by the differences in sound pressure level between the two microphones; this is also referred to as "intensity stereo," since directional cues rely only on the intensity of the sound at the mikes. Spaced microphones rely on both intensity and time of arrival (or phase) to provide directional cues. (These techniques will be covered later.) The two microphones used for these configurations should be matched, and may be of any directional pattern or operational type.

The most common coincident pair is configured with cardioid microphones, with an included angle between 90° and 120°. [Figure 2] In this way, there is a good forward pickup, with a range of "spread" from fairly narrow to wide—depending on the angle used. This is a very natural sounding perspective, and is quite useful in noisy environments.

The general rule for placing this configuration is to begin at a height just above the head of the tallest performer, and five to ten feet downstage (i.e. in front) of the closest performer. I must stress here that this position (and any such initial suggestion given in the remainder of this article) represents only the *starting* point for placing the microphones. The optimum location for the mikes must be determined by carefully listening to them as you move them about—in all directions—until you find the "one right spot" where everything sounds properly balanced. Remember, with only two microphones the performers must balance their performance among themselves. You can only distort that balance with improper mike placement; you cannot improve it.

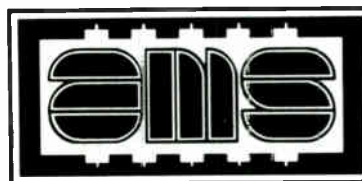
The included angle between the mikes should be determined by aiming their principal axes of pickup at a point just inside the outer extremes of the performing group. Thus, the closer the mike to the performers, the wider the angle; the farther away, the narrower the angle must be.

A comment is needed here about room acoustics, for the art of proper mike placement is only partly involved with the proper pickup of the performers. It is also dependent on the proper *avoidance* of unwanted sounds: air conditioning, audience noise, exces-

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sive reverberation, etc. Obviously, the farther the mikes are from the performers, the more "extraneous" sound they will "hear"; the closer they are, the more "direct" sound they will receive from the performers. This balance between "direct" and "ambient" sound is the essence of a pleasing, articulate, and natural sounding recording of a "live" ensemble. When in doubt, it is always safer to make a recording which is somewhat "dry," since reverberation can be added (artificially) later; an overly reverberant recording, however, is forever.

There is, of course, another way to accomplish a "closer" sound, and that is by using a microphone with a "tighter" polar pattern, such as a hypercardioid. [Figure 3] As you can see, there is a narrower region of pickup in front of the mikes, so they will tend to have a bit more "reach" than cardioid mikes. Thus, they can be placed somewhat farther from the performers, and maintain the same sense of presence as cardioids. This is useful in situations where the mikes must—for whatever reason—be located at some distance from the musicians.

Hypercardioids are also somewhat more "dead" to the sides (around 120° - 135° off the primary axis) so that they are

often very useful when dealing with noises coming in from these directions. Note, however, that these mikes have a small lobe to the rear, so that they tend to pick up a bit more of the space directly behind them than do cardioids.

Another common microphone used in coincident pairs is the bi-directional (or figure-eight) microphone. This mike is often overlooked by today's engineers, but it is a very useful tool. (In fact, this was the polar pattern specified by Alan Blumlein in his historic patent of 1931, wherein he developed techniques for stereo recording, film production, and disk cutting—some 20 years before they came into general use!) [2] When configured as a "Blumlein pair," [Figure 4] crossed bi-directional mikes produce what is sometimes credited as the "most natural" of all stereo perspectives, affording both an excellent sense of presence to the performance and a spacious feeling of the environment unequaled by any other miking technique. [3]

However, this same sense of spaciousness can get you into trouble if the environment is too live, or has an unpleasant character. Notice that the rear lobes of bi-directional mikes have the same sensitivity as those in front; thus, their pickup to the rear is just as prominent. This means that these mikes

can be placed closer to the performers, to maximize presence, yet provide an excellent sense of the space in which the performance is taking place. Caution: herein lurks potential danger—these rear lobes have reversed polarity and channel orientation relative to the front, and thus severe imaging problems can result if they are not placed carefully. Keep in mind the rules for "direct-to-reverberant" sound, and listen carefully before rolling tape! And one final caveat: beware of narrow halls or strong reflections directly from the sides, as these enter the stereo pair *out-of-polarity* and can cause drastic sonic degradations.

One more intensity stereo configuration remains to be discussed. This is the M/S (or Mid/Side) technique created by using a forward-facing directional microphone (the M mike) together with a bi-directional microphone (the S mike), oriented laterally (90°). [Figure 5] The outputs of these two mikes are then put through a sum-and-difference matrix to produce conventional left and right signals. (From the figure, Left = M+S, and Right = M-S.) There are numerous advantages to this technique, the most significant being the absolute monaural compatibility it affords; this is of primary importance when the recording is for

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broadcast, and should always be an important consideration for any recording. [4]

#### Near-Coincident Techniques:

Similar to those discussed above, these techniques also employ two directional microphones, placed in close proximity to one another. The difference here is that they are configured side-by-side, are angled outward from each other, and have a small spacing between them, usually seven to twelve inches. The two most common of these configurations are known as ORTF and NOS, named for their French and Dutch broadcasting origins respectively. [Figures 6 and 7] Like coincident configurations, these rely heavily on intensity differences for their directional cues, but as the mikes are separated in space, they also possess phase (time) differences, which provide these pickups with an "airiness" not afforded by intensity stereo.

As with their coincident counterparts, the recommended initial placement is generally slightly in front of and above the performers, with the angle of the two mikes including the arc of the sound stage. Again, experiment with placement, to find the "right spot." These techniques are often the "safest" to use when recording in a new environment, or if a sound check is not possible: if placed in any reasonable location, they will likely give a very pleasing result.

#### Spaced Microphones:

Developed during the pioneering days of stereo by the engineers at Bell Laboratories, this is another of the primary miking techniques. Originally configured with two omnidirectional mikes [Figure 8] this technique is frequently augmented with a third, center omni mike to reduce the "hole-in-the-middle" and improve the center-stage imaging inherent in the two-mike pickup.

The difference in time of arrival (phase) of the soundwave as it reaches the separate microphones plays a critical role in determining directional cues, and is often of greater importance than the intensity of the soundwave. It is also this differential in the arrival times which creates one of the major problems inherent with spaced mikes: for frequencies whose half-wavelengths equal integral multiples of the distance between the mikes, phase anomalies can occur, resulting in cancellations, or "comb-filtering" within the overall spectral response. Also, due to the incoherence of the phase of the soundwaves as they are recorded by the mikes (and later reproduced by the loudspeakers) there results an ambiguity of the imaging within the stereo soundstage.

Omnidirectional mikes, of course, pick up equally in all directions and, thus, spaced omnis will need to be

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placed carefully with respect to the "direct-to-ambient" sound ratio. Generally, they need to be somewhat close to the performers, and this also dictates that they be placed quite high above them, in order to maintain an equality of the distance from the mikes to both front and rear extremes of the ensemble.

The use of cardioid mikes allows for a somewhat more distant placement from the performers, while hypercardioids allow for even greater distance. This can be useful if the mikes must be kept "out of the shot" in televised recordings. These directional patterns are also beneficial when ambience or audience noises must be minimized.

### Multi-Miking:

Multi-microphone techniques have developed into a genre all their own in recent years. It is not uncommon today for more microphones than performers to be present at a recording session. Although there is a certain validity to this method for "rock" music, where the recording process itself is as much (or more) a part of the music as is the contribution of the musicians, this is not the case with most "classical" music. (Here, the traditional nomenclature tends to become inadequate: the term "classical" no longer applies to such composers as Subotnick, Reich, or Xenakis, for example.)

I leave the decision of multi-miking to the requisites of the individual situation. If the music or the performance is such that basic stereo miking techniques are not adequate to the task, then of course multi-miking is mandated.

Keep in mind, therefore, that what you do as the balancing engineer has just as much—if not more—to do with what the listener will hear as anything the performers do onstage. This means that you have now become a part of the performance itself, and you should have an intimate knowledge of the music being played. The ability to read a score is, in my opinion, not merely helpful in this instance—it is absolutely necessary.

### Recording Considerations:

In the following sections, I will offer some general guidelines (based on my own experience) for making "classical" music recordings of various ensembles. There is no magic in these recommendations; they are just things that have worked and continue to be reliable. Use them as you will, and feel free to experiment.

#### 1. Different Ensembles: Size, Perspective, Balance:

As stated earlier, the recorded perspective of a "classical" music ensemble (or any "acoustical" music ensemble, be it folk, jazz, or whatever) should bear a specific relation to the size of the original

performance. Thus, for chamber music or solo performers, a single coincident pair is usually the only miking needed; placed properly to maintain an even balance of the ensemble—and the proper direct-to-reverberant sound ratio—this technique will produce an accurate and pleasing result. If additional ambience is desired, a second "ambience pair" can be discretely added into the mix. (Don't overlook the application of a "Blumlein pair" as the main mike pair, placed so as to accomplish both tasks.)

A full symphony orchestra can also be properly miked with a single pair, given proper musical balance and good

acoustics. More often than not, however, additional mikes will be needed to achieve a good recorded balance. Frequently a "sweetener" pair will be needed over the woodwinds to add "a little presence" since this section is generally far upstage. Likewise, additional microphones might be necessary to "tighten" the percussion, or to "bring out" the orchestral keyboard instruments (piano, celeste, xylophone, etc.). In a concert hall with "flabby" bass, a mike on the principal contrabass will often add just what's needed to bring that entire section into focus.

Add a chorus and/or soloists, and some additional mikes might be needed to provide the clarity or balance lacking in the "real" recording environment.

If all this begins to sound like "multi-miking" techniques... it is. Once you get beyond the original stereo pair, any added mikes (no matter how few) must be kept in the proper perspective: they must not be allowed to contribute more to the total recording balance than is appropriate to the natural acoustical balance. If they exceed this, the final result will be a distortion of what the composer and/or conductor intended.

#### 2. Superimposing Stereo Pairs:

One of my favorite methods of adding "sweetener" mikes is by superimposing stereo pairs. By this, I mean that I will start with a primary stereo pickup and then add another (usually coincident) stereo pair to the mix. These mikes should not increase the level of their subject, but should be brought in "just enough" to add only the desired presence.

This technique is particularly pleasing when used for a soloist, as it places him firmly in the stereo space, without the "cardboard cutout" feeling so often conveyed by a single, panpotted microphone. (Be sure to balance the solo mike pair so that the position of the soloist does not "wander" within the overall stereo image as these mikes are brought into the mix, or as the performer changes dynamics.)

#### 3. Session -vs- Concert: Placement of Performers:

Given the situation of recording a live concert, there is little the recording engineer can do to rebalance the ensemble to "suit" the recording. The live audience is—in these circumstances—the primary audience; the recording is secondary. Placement of performers on the stage is generally determined by the conductor, based upon visual as well as aural considerations. If there is a rehearsal, however, the opportunity does exist to correct for certain balance problems onstage. Discuss the specific situation with the conductor and see if a

—PAGE 124

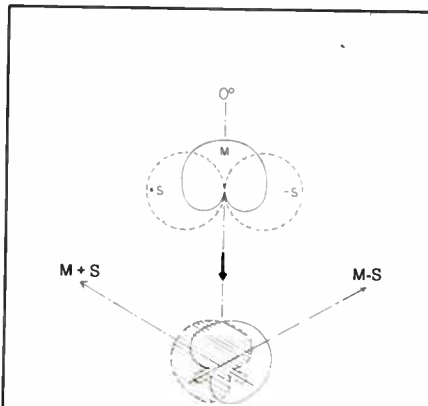


FIG. 5  
M-S CONVERSION TO X-Y

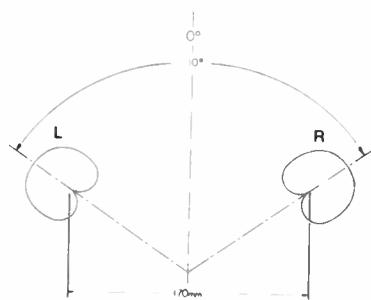


FIG. 6  
O.R.T.F. CONFIGURATION

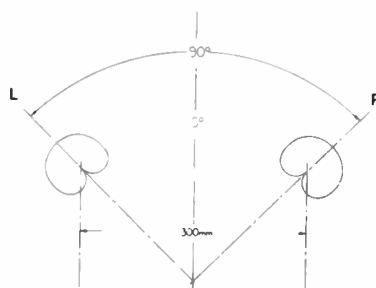


FIG. 7  
N.O.S. CONFIGURATION

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thomas dolby's

# ELABORATE COLLABORATION

by Iain Blair

**TAKE 1:** Thomas Dolby, sporting an enormous fright-wig and looking for all the world like a Mad Professor, races around the Grammy stage in front of Stevie Wonder, Herbie Hancock, and Howard Jones.

**TAKE 2:** Wearing a plain cloth cap, and quietly sipping tea in his rented house high up in the Hollywood Hills, Thomas Dolby explains just how thrilled he is to be co-producing Joni Mitchell's new album.

Dolby and the likes of Wonder and Hancock surrounded by banks of the latest electronic equipment? OK, but Dolby and Joni Mitchell? Too far fetched?

But then Dolby is nothing if not eclectic, and it's far from easy to put this synthesizer *wunderkind* in any musical niche (which is just how he likes it.) After all, this is the guy who played synthesizer on such diverse projects as Malcolm McLaren's *Duck Rock*, *Foreigner 4* and Joan Armatrading's *Walk Under Ladders*, as well as blinding a lot of people with his own science.

• • •  
*How did you hook up with Joni Mitchell? It would seem to be an unlikely collaboration.*

Yeah, although in fact, I've always been a big fan of hers, since I was 14 or 15. I knew all her piano parts, and I'd go and see her every time she played Britain. And then I covered her song "Jungle Line" back in '79. It's funny, 'cause around the same time, all those bands like Adam & the Ants and Bow Wow Wow were getting into all the Burundi rhythms and beats, and she'd already done it back in '72, using real Burundi drummers and a few synthesizers over the top of her "jazz-beat" lyrics. So, to me, because she's so totally out of touch with the current music scene, Joni's often lucidly ahead of her time, although to most people she's considered as more in the great folk tradition.

Anyhow, while I personally regard her as an innovator, I also felt that over the last couple of albums she'd slightly lost that edge, and that maybe she could use a few suggestions regarding new instrumentation and sounds, etc. In fact, I'd made the suggestion about a year ago by proxy, but never heard anything back. Then this engineer friend of mine who worked on my last album called up and said she was interested in using a lot of Fairlight and keyboards on her new album, and would I like to get involved. So naturally I said yes, especially as I thought it'd be an interesting combination.

*What sort of working methods did you employ in the studio?*

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It was a matter of adapting to her style at the same time as introducing her to my ways of recording. For instance, in the past, she's usually recorded piano or guitar and voice first, and then sweetened it by using different instruments to layer and build up the track. But I tried to encourage her to do away with her traditional type of accompaniment altogether, and just bring it down to the raw elements of the sequencers, drum programs and percussive sounds, and then build up from there.

*Did you approach her vocals in any special way?*

Well, I found out that there are really a lot of very interesting phonetic noises she can make with her voice that she's never tried using much before, and one of the beauties of the Fairlight sampling technique was that we could put them to use. So when she heard a melody line, instead of bringing in a sax or a guitar to play it, we'd sample her own voice and use that instead. The result gives the album an incredibly intimate feel, because although there are a lot of electronics in there and all the drums are synthesized, it also has this very organic feel as the human voice elements are making up a lot of the textures.

*You co-produced the album?*

Yes, along with Larry Klein, her husband, and engineer Mike Shipley. As it turned out, I did a variety of things, from arranging songs, to programming synthesizers and finding sounds for her. Other times, I'd leave the studio altogether, as she likes to put down her vocals on her own. Working with her was a great experience, though, and pretty different to what I'm used to. As a musician she's totally intuitive in that she doesn't read music, or speak any musical language or have a musical vocabulary that most people would understand. But she can come up with ideas, both vocally and instrumentally, that, although they defy any logic, are absolutely wonderful. And I think she's rightfully protective of that quality—she doesn't really want to "join the club" as far as music is concerned, but just to go with what works for her. The thing is, most musicians, even if they don't read or communicate in traditional accepted terms, at least have a common language. But Joni talks more like a painter, in terms of colors and textures. She'd say something like, "This string part we're putting down is a little bit nylon sounding to me—I was really hoping for a more 'crinoline' sound." Or "I think we need a browner kind of sound for this particular section,

something a bit more murky down there, perhaps with little flashes of crystal light on top..." And that's how she communicated her ideas and feelings. Initially, I found it slightly uncomfortable, but gradually I also started to do things in a visual way...it was very stimulating.

*Were you surprised that you worked so well together?*

Not really, because I think one of my best talents is being able to collaborate with lots of different people. I find that I can usually zoom in on their taste, their own ways of listening to things, and then add my own ideas. I think the last thing she actually wanted was to work with someone who was completely fluent in all the hi-tech electronic hardware and techniques, and just let them come in and take over, so to speak. It still had to basically come from her, so very often I'd just program a certain sound for her, and she'd come over and play around with it for awhile, and a few hours later, she'd have changed it completely and put down a whole new part.

At the other end of the spectrum, I went back to just being a player on some things. She's used to working with the likes of Jaco Pastorius and Wayne Shorter, so she's very into spontaneous musicianship. So overall, my jobs were varied. Some were purely academic, just programming the various machines, while others would be completely intuitive—she'd say, "Try something on this, but if it doesn't happen after a couple of takes, forget it." So it was extremely varied and demanding work for me.

*Did you write anything together?*

There was no need, as Joni already had tons of songs—in fact, the trouble is she kept writing new ones which superseded the ones we've already recorded! But when I recorded her "Jungle Line," I also recorded a song I wrote called "Urban Tribal" which was very influenced by her and which kind of complements "Jungle Line" lyrically. She heard it, loved it, and now she wants to put it on the album as well, so I've suggested doing it as a duet. If we get it done in time and there's room, it'll be there. If not, it'll probably land up on my next solo album.

*When's her album due out?*

Sometime later this year I think. The great thing about working with Joni is that she doesn't have a whole lot of record company or management pressure on her to deliver "product." No one talks to her about radio play, or album promotion or synchronizing tours, etc., which is very refreshing. And to me, her talents are so intangible that they wouldn't be enhanced by all

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the usual rubbish of deadlines, etc.

*You also recently collaborated with funkmeister' George Clinton?*

Yeah, I did that album just before I started working with Joni, and it was quite an experience!

*How did that come about?*

We met each other one night at a video show, and it turned out we were both fans of each other's music. You see, as a kid, I traveled a hell of a lot—my father is an archaeologist—and the best radio stations in Europe were the American Forces stations, so I started listening to a lot of the soul/funk/R&B tracks they played, and that's how I got so interested in the lineage from James Brown, through Sly & the Family Stone, to George Clinton and Parliament, etc. Anyway, we hit it off, and started working on all these crazy tracks together. I suppose I played David Niven to his Richard Pryor!

*How was he to work with in the studio?*

Great—but totally mad and crazy. Again, like Joni, he's a hard person to communicate with in orthodox musical terms, but his face lights up when you play something he likes, and it gives you such a charge that it really helps bring out the best in you. We actually went fishing a lot of the time—George is really into it, as well as UFOs. He has all these totally bizarre stories about aliens landing on his car. I actually went and played a gig with him after we finished the album. It was a James Brown Testimonial in Washington, D.C., and there was a huge crowd—about 20,000—far more than I'd ever played to, and only about seven white people! I ended up performing a version of "Sex Machine" in my very best Oxford accent, and there was James Brown himself watching from the side of the stage! It was pretty amazing, and I loved working with him.

*You obviously enjoy working in totally different areas of music.*

You're right. There's no one single style. It's more the oddballs in each category! For instance, I recorded that Dan Hicks song, "I Scare Myself," on *The Flat Earth*, 'cause I really like him, although I'm not generally a big jazz or swing western fan.

*Who are you listening to at the moment?*

Well, I like a few out of the current crop of British bands, such as New Order and Everything But The Girl, and I still like Siouxsie & The Banshees. There aren't too many American bands that interest me, although I've always quite liked Talking Heads. But then I

—PAGE 64

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feel they've gone off the boil a bit over their last few albums. Basically, I have varied tastes. I love the new Peter Gabriel album, although he doesn't even sing on it, and I've always loved Eno. Like me, his strength is as a collaborator—he's a man after my own heart—and his best work has been with other artists like Bowie, Devo and Talking Heads. Personally, I don't have a lot of time for his solo "ambient" experimental stuff.

*So you see yourself as largely a collaborator?*

I think so, yes. I always viewed my solo albums as something I return to every couple of years, after all the joint projects in the meantime which have hopefully opened up all sorts of new avenues and ideas. For instance, I just completed this big video project with a Japanese artist called Torushi Sakamoto.

*How did that come about?*

When I finished touring last year, I ended up in Japan, and went to visit him. I'd already met him. His wife sang on an early record of mine, and he asked me to write and direct a video for this new single he had called "Field-work." Then, a few weeks later, he called me in London and asked me to do an English vocal on the track, so we agreed to meet in New York and work on the project together. As it turned out, we both checked into the same hotel under assumed names, and then couldn't find each other! Anyway, when we did eventually get together, we both realized that we had a very strong cinematic idea to the song which couldn't just be conveyed through the lyrics, so in the end it grew into this eight-minute film epic.

*What's the storyline?*

Sakamoto plays the part of a Japanese soldier found on a Pacific island in the early '50s by some American Marines, and he doesn't know that the war's over. That's a true story, but what happens next is all imagination. He's taken to New York and interrogated, and then allowed to go back. But he decides he'd rather stay in New York and live off his CIA pension. We then cut to the present day, where I play one of these survivalists—a guy who can live off the land for months at a time, just eating roots, etc!—and I become totally obsessed with the old soldier, because he's actually lived like that for years on the island. So, I start stalking him and watching him, and eavesdropping on his conversations, etc. I won't reveal what happens, but you can see there's quite a bit of dialogue, and the actual song doesn't begin until about half-way through.



PHOTO: RICHARD HAUGHTON

We ended up shooting it all in L.A. because we both were in town working on other projects, and a lot of the downtown section looks just like New York anyway. We also eventually rewrote the music around the vocal and lyrics, and as I was then in London and he was in Tokyo, the easiest way to do it was to send our Fairlight discs back and forwards, so that we could each adapt our own parts after listening to what the other person was doing. Using the E-mail system is even quicker. I just plug a little Radio Shack computer into my phone. I mixed the song after he'd sent me the track sheet in the E-mail, and after I'd written the concept for the video on my word processor, I then sent it back to him on the same system. It's really quite amazing. None of this would have been possible a few years ago, and soon it'll be possible to link a Fairlight to the phone and transmit directly like that through a modem.

*You seem pretty busy with all these different projects. What's happening with your solo career?*

I'm just about to start work on my new album, which I'll be recording at my own studio in London, the one I've been building. It's a dedicated studio which I won't rent out, and I'm really looking forward to getting in it. The problem is that I've got so much equipment now, it's a real pain tearing it down and setting it up all the time, so it was the logical next step to put it all in one place.

*What sort of equipment are you using?*

A Soundtracs computer-automated console for a start. I really need computer automation because I like to run everything live—even when I'm making records, I'll record the vocals but everything else will go down live in the mix. So the Fairlight will be running live, and all the sequencers and drum machines, etc., and the only thing coming off the tape will be the vocals. And in order to write that way and produce it, you need very sophisticated and comprehensive mixing facilities. You literally just don't have enough fingers to punch in all the channels and effects, etc. for different parts of a song. And the Soundtracs board is basically the most affordable computerized mixing desk there is, although there are more and more of them coming on the market now.

*What about synthesizers and keyboards?*

The Fairlight CMI system is my main workhorse, and that gets used all the time. For sounds that require a longer sampling time, I use an AMS unit which is essentially an echo unit, but you can also use it to sample at a very high quality, up to about 21 seconds, and you can also play it with a keyboard. I've got a bunch of different keyboards, especially a lot of Roland gear which is what I started out with. I recorded the whole of the *Blinded By Science* album using a full-voice Roland synthesizer which has been superseded about five times now, but I think the sounds still hold up pretty well.

*And drums?*

I tend to experiment a lot and use a lot of different combinations. For instance, I'll take the toms off an Oberheim DMX, and the snare off something else, and just mix it all until I like it. The last thing I want is to get drums that sound just like everybody else's.

*Have your studio techniques changed much over the past few years?*

I find I'm tending to MIDI a lot of stuff together now. In the past, my technique for sounds was always to layer them. I'd find a sound I particularly liked, and then find another compatible tone on a different keyboard. The great advantage of MIDI is obviously that if you sit down in front of the mixer with this one keyboard, you can be controlling all the guts of all these different keyboards at the same time, and by using the mixing desk switch them in and out and blend them to get the right sounds.

I'm also using a lot of PPG equipment now. They're this quirky German company who've somehow never managed to hook up with anyone who

can speak reasonably good English—and consequently, their manuals look like a thesis by some Hamburg University student! So it's pretty hard to get on with, but that's also what I like about it. It's the only keyboard that I've never really learned properly—all the others I know inside out, and exactly how to get any sound I hear in my imagination. But with the PPG equipment, you can twiddle one knob by mistake and the sound is radically altered. It's all very frustrating, but it also allows you to chance on things you never would if you were completely in control.

*You've got quite a reputation as being a tech-head. Is that how you see yourself?*

I suppose so, although I certainly don't like the idea of being categorized as a "whiz-kid synthesizer genius." I mean, I think the guitar has now become a kind of folk instrument of this generation, in that it's not particularly important whether someone's playing one or not. Whereas, if you happen to use electronics, you're very often pigeon-holed as "an electronics buff," and I think that scares a lot of people away from what I do.

*If you don't like to be labeled as a*

*synthesizer player, how do you see yourself?*

Good question! I think that the recording studio is really my main instrument, and no studio today is complete without all the electronic keyboards and synthesizers and sampling devices, etc. And they all pretty much do the same things now, and there's technically very little difference between them. Like I was saying, you can use an echo unit to sample sounds, for instance. So I don't think it'll be long before all this sort of equipment is automatically built into the mixing consoles so that you can assign it any way you want.

*What sort of direction is your new album heading in?*

It'll definitely be a lot more fun. The first album was obviously propelled by the success of "She Blinded Me With Science," and I think a lot of people bought it as a novelty record, only to then find my other sides on the rest of the album—the more intense, melodic, atmospheric flavors. And then my second album, *The Flat Earth*, was as atmospheric as I could get. Every song was in its own little pocket, with its own concept. Having got all that off my chest, I feel a lot more extroverted about this new album. I'd like it to be

comical, and have some of the humor I hopefully get in my videos, without compromising the musicianship.

*Any more tour plans after last year's success?*

Not for awhile, I don't think. I toured for over seven months last year, with a very complex live show which took three months alone just to put together and rehearse. I loved doing it, but it takes a lot of time out of other projects, and when I got back home eventually, I actually felt very out of touch with the whole music scene and what was going on, which depressed me. So I'm unlikely to try anything like that again! Next time, it'll be a lot looser, with a bunch of musicians I can just leave to their own devices, and let them develop more as a band without worrying so much about the visuals and synchronizing video clips, etc. What it comes down to is that although I enjoy touring and playing live, it's still a temporary thing for me—it's not top priority. Tours are largely forgotten after you've done them, and I always feel people are more likely to remember the girl they pulled that night than the particular arrangement you played! Whereas on the other hand, records last for years. ■

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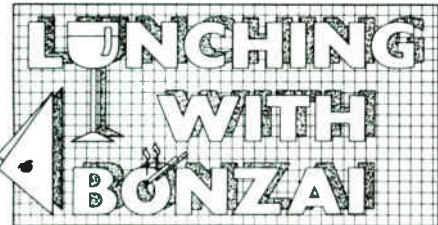
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# BLOWIN' IN THE WIND

# PAUL HORN



by Mr. Bonzai

Paul Horn takes his flute to Russia and mesmerizes audiences that haven't heard a jazz combo since 1927. He crosses the great walls into China and performs in schools, in temples and in the streets. He records in spiritual/acoustical monuments like the Great Pyramid and the Taj Mahal. He even plays for whales—and perhaps more importantly, they play for him.

His music is free and easy going, unselfconscious, yet internally disciplined. Paul Horn is a composed mixture of new age bohemian, hardcore jazzman and wandering beachcomber. Way back in the Chicago of the '50s he met a Zen priest who liked jazz. The priest appreciated his music and told Paul he was going to create a little enlightenment for him. This spiritual glimpse led to studies in Transcendental Meditation, trips to India, becoming a TM instructor at the request of Maharishi Mahesh Yogi, and a radical change in Paul's musical career.

To love life, or to love a person, there must be romance. The Chinese Book of Changes, the I Ching, says that the difference between seduction and courtship is perseverance. After all these years, Paul Horn is still courting the world through his music.

**Bonzai:** Where did you get your training and education?

**Horn:** My mother, Frances Sper, was a professional pianist. She made records in the '20s and had her own radio show in New York City. She played piano and sang and got married in '29. When I was born she stopped playing professionally, but the influence was there and she continued to sing and play around the house. We moved to Washington, D.C. when I was four and I started playing the piano. I took up the clarinet when I was 11 and started playing along with Benny Goodman and Artie Shaw records. Next, I took up the saxo-



phone and after high school I went to conservatory at Oberlin College in Ohio. I majored in clarinet but started playing the flute then. After Oberlin, I went to the Manhattan School of Music for my Master's Degree. I got a good classical background, but jazz was always my love. I played in bands and combos all through college. What I wanted to do in life was to play jazz.

**Bonzai:** What was your first significant gig or recording?

**Horn:** My first record date was early in 1956 for RCA with the Sauter-Finegan Band. I was with that band in New York for about six months. They were on their last legs by then and I happened to meet Chico Hamilton. He was very well known in those days with a new type of group. The music was called chamber jazz—cello, guitar, bass, drums and a woodwind player doubling on all the instruments I played. The band's reed player, Buddy Colette, was doing a lot of studio work and couldn't be on the road. I wanted to travel and it worked out well. That brought me to Los Angeles in October of '56 and I stayed with the band for two years. We made three or four records and I started to become known as an individual, because it was a small group, unlike the big bands. The flute

was just starting to come into its own as a solo jazz instrument and I guess I was one of the first to start doing records on my own. Chico's was one of the first groups to feature the flute as a special instrument and it got popular very quickly. I got in on the ground floor.

**Bonzai:** How did you make the transition from jazz appeal to reaching such large audiences?

**Horn:** The growth of audiences for solo flute led to the emergence of another career for me, but it happened very spontaneously. I did the solo flute album in the Taj Mahal in '68. It came out in '69 and became a big underground thing. It was different than anything that had been out there before—just solo flute and nothing else, and there were wonderful acoustics in the Taj Mahal, great echo and acoustics. A note could hang in the air for 28 seconds. It started a whole new trip for me.

**Bonzai:** How did you end up in India?

**Horn:** I was over in India doing my own spiritual pilgrimage and spending time with Maharishi Mahesh Yogi.

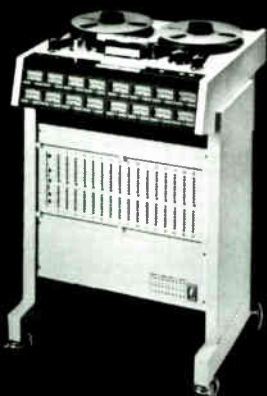
**Bonzai:** Did you spend any time with The Beatles?

**Horn:** Yes, when I went back for the second time in '68. That's when I did

the Taj Mahal album and The Beatles were there at the Maharishi's ashram. I got to know them quite well, and played music and hung out with them and all of that. They were incredibly popular throughout the world—even the people in a small Himalayan town knew about The Beatles. What I admired so much about them was their sincerity in studying with the Maharishi, especially George Harrison, who was probably the most spiritually oriented. He had spent time in Bombay studying with Ravi Shankar. Patti Harrison, George's wife at the time, had met the Maharishi and was responsible for bringing The Beatles to him.

We all ate in the same little dining area at the ashram, and we would all sit around in the evening listening to Maharishi talk. The Beatles were only part of a group of maybe 70-80 people and weren't given any special consideration. They enjoyed that. There was a certain awe associated with them, but after awhile people got over that, and it was just "Hello, Paul; Hello, John." I also respected the fact that they were really into their music. Even with all the fame and attention, they enjoyed getting together every day for the music—especially John and Paul. The Maharishi had set aside a little hut right at the edge of the Ganges as the music room.

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It was a very creative time for them and a lot of songs were written.

**Bonzai:** Did you play music with them?  
**Horn:** Yes, quite a bit, with George especially. We would play a lot of flute and sitar things. Donovan was over there at that time, too, and as a result of meeting him I did two tours with him in '69 and '71.

**Bonzai:** How did the Taj Mahal album come out?  
**Horn:** It didn't start as a planned album. I was in India for my second trip as producer of a film project about Maharishi. The film was never completed, but one of our locations was the Taj Mahal. I had been there before and remembered the really beautiful sounds. I had my flute and hoped to make a tape for friends back home. It was never conceived as an album, but we had some fine recording equipment and it came out quite well. So, it was a nice accident.

**Bonzai:** Exotic recording locales have become your trademark...  
**Horn:** It shows you what accidents can happen in life—how things unplanned can somehow be the most dramatic events of your life. Many people think that was the first album I did. Actually it was my fourteenth album. The ones before were basically straight ahead, traditional jazz albums, but this opened up a whole new area of exploration for me.

**Bonzai:** Acoustically speaking, what do you consider when you're looking for new places to record in?  
**Horn:** I'm cautious about that because I don't want it to be gimmicky. I also wonder how many solo flute albums I can do without it becoming boring. It has to be very selective—it was eight years before I did another one, in the Great Pyramid. It's a very special place and I thought there would be some interesting acoustics, and also a special ambience. It's not just a sound I'm looking for, although that's certainly part of it. There is a quality of the sound from the structure, the echoes and reverberations. There is also a spirit and a mystery of a building that becomes part of the music.

**Bonzai:** Have you read *A Search in Secret Egypt* by Dr. Paul Brunton? He was there in the '20s shortly after the inner chambers were first opened.  
**Horn:** Yes—he had some very frightening experiences in the King's Chamber, but nothing like that happened to me.  
**Bonzai:** Did you feel an affect on your playing?  
**Horn:** Yes. When I play I really get absorbed in the music; I get my ego out of the way. If I am aware of myself on a stage or in a recording studio, I can't

really get into the music. You get self-conscious or you get nervous, and something gets between you and the music. What I do is get out of my own way, so to speak. I get absorbed in the music, so that I'm lost. I'm almost in a trance, but I'm still aware. I want the music to come through me in a very open, clear way, as if I am a channel. I am the primary instrument and my flute is the second instrument. I just try to be open to the creative flow and these buildings become part of that.  
The Great Pyramid is a remarkably mysterious place, probably the most mysterious place on Earth. They don't know when it was built, how it was built, or why it was built. It becomes part of

the music if I can be open and not think about my feelings while I'm playing. Afterwards, I can say, "Well, how did that feel at the time?" It's certainly different than recording in a studio in Hollywood, but that also has its own feelings. So, yeah, the building becomes part of the music—somehow there's a little magic in there that wouldn't be there if I had done it somewhere else.

**Bonzai:** What room were you in?  
**Horn:** There are two main chambers in the Great Pyramid: the King's Chamber and the Queen's Chamber. I was in the King's Chamber, which is dead center in the middle of millions of tons of stone. There's a lot of energy and a lot of

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*Paul Horn*



PHOTO: MR BONZAI

power, and there's a lot of silence, especially at night when you're alone.

**Bonzai:** Did you record at night and did you have an engineer?

**Horn:** Yes, I was with David Greene, a wonderful recording engineer from Toronto. He's a friend of mine who had worked on other albums in the past. We got special permission to be alone in the Pyramid—just the two of us.

**Bonzai:** Were there any spirits walking in and out?

**Horn:** Well, we had our own personal experiences. I felt presences, if you want to put it like that. They were rather friendly and comforting. It seems that the Pyramid is like a mirror—if reflects each person differently. We spent a week in there during the days before the recording, getting familiar with the chambers. We didn't even know if we were going to get permission to record, but finally we found someone who could get us in there alone at night. I watched people come through and some would be quiet and wanted to sit and meditate. Others would start crying; some would say "Hallelujah, praise the Lord" and others would say, "Is this all there is to it?" People had their own reactions.

**Bonzai:** Let's touch on some other exotic locations—the China album is especially interesting with the sounds of the streets, the sessions in the temple, the strange instruments...

**Horn:** We recorded two solo flute tracks in the Temple of Heaven in Peking, now called Beijing, right outside of the Forbidden City. The temple is about 300 years old and was used by the emperor for special harvest prayers. It's circular and all wooden and

has its own special vibe and ambience. It had its own sound, but they wouldn't let me record at night when it was empty. I had to go there at 7:30 in the morning when no one was around and the temperature was about 20 degrees. It was so freezing that it's a wonder anything happened, but you have to transcend the discomfort and forget about it. We didn't have enough material for a complete solo flute album, so when I got back to Canada, where I live in British Columbia, I met a Chinese musician and professor named David Liang. He plays a number of obscure Chinese instruments so we collaborated. It's both East and West, in a Chinese way.

**Bonzai:** Has your academic training helped in playing ethnic instruments?

**Horn:** I play mostly traditional flutes—different sizes: alto, bass, piccolo. I haven't gotten into wooden flutes too much, but on the China album I play a Chinese flute. The basic Chinese flute is a simple piece of bamboo with six holes. Amazing things can be done with it, but it takes real mastery. I don't profess to be a master.

**Bonzai:** Glancing at your subconscious, who are your big musical influences?

**Horn:** I always loved the Impression-

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ists. Ravel is probably my all time favorite composer. Debussy, Scriabin, Eric Satie—that's a period I like. I also like early Stravinsky very much, and Bach and Bartok, some of Schoenberg. I'm a Romanticist; I like pretty melodies, pretty sounds, pretty harmonies. As far as jazz is concerned, Charlie Parker is my all time hero. And Miles Davis is way up there—especially early Miles. John Coltrane is a big influence, too.

**Bonzai:** Can you draw parallels between music and the visual arts?

**Horn:** No, not really—I'm not that familiar with the art world. I like early Picasso, where he says a lot with a few lines. I like R.C. Gorman, a Navaho Indian, whose work reminds me of Japanese Haiku. There is lots of space, and one line can conjure up so much form. I can relate that to music. Miles taught me that many years ago. I used to hang out with him in the early '60s. He was a big influence, not only because he was a hero of mine before that, but because I had the privilege of knowing him and being one of his intimate friends. I was very inspired and formed my own band, and wrote a lot of music in those years because of him. He was always talking about space and pointing out to me how young musicians often play so many notes. Like most people, I was impressed with technique, but then Miles would say, "So what?", his favorite expression. I began to focus on what he was doing and realized he didn't have great technique. He wasn't the technician Dizzy Gillespie or Clifford Brown were. But Miles stood out as an amazing talent and had the ability to wait and not play—to pick the right note at the right time and place in the right space. There aren't many people who can do that. It takes a lot more control and maturity to do that than to play a lot of fast notes.

George Shearing said that the true test of a musician's musicianship is being able to play a ballad. Some of the hardest classical pieces to play are the slow movements in a sonata or a symphony. You can fake your way through some of the fast stuff, but you can't fake your way through the slow. Everything is exposed and there you are standing naked. You can't hide behind anything. The tone is there for everyone to hear—your phrasing, your breath control, your intonation. The control and the patience is what shows up in the maturity of the musician.

**Bonzai:** What was it like playing for whales?

**Horn:** I live in Victoria, B.C., where they have been experimenting to see if communication can take place between whales and music. I've found that there is acknowledgement and reactions, a definite communication through music.

They would make sounds back to me when I played which were different each time. They pay attention and they are obviously interested in the music. They dance—there are little movements and playfulness in the water. Once a whale died and its mate was nearing death because of the loss. They claim that my flute playing brought the whale out of its depression.

What we really need to do is to relate to each other. We've got a long way to go. Music is definitely a universal language. I played 18 concerts in Russia in '83 with a straight ahead jazz quartet. My son Robin was the drummer on the tour along with David Friesen on bass and John Stowell on guitar. A lot of communication took place. People love the spirit of jazz. We played to three or four thousand people a night and I bet 95 percent of them were totally unfamiliar with jazz. But they connected with the spirit, the improvisation, the emotion, the feelings. There was a lot of warmth and communication with a supposedly dire enemy. What governments perpetuate among people—the power trips—have nothing to do with people. We buy into it, and many times don't have a real choice. It's important to be aware that people are the same all over the world. There may be religious, cultural, philosophical and racial barriers, but they are transcended when you get up and play some music, or dance, or put on a magic show, or get involved in sports. People can communicate right away. The Russians are afraid to die just as much as we are. They are afraid of war, they are happy, they're sad, they laugh, they cry...

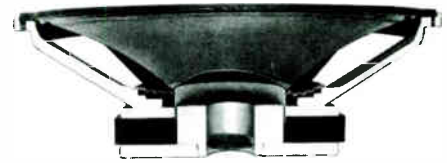
**Bonzai:** When you were in China, did you just wander?

**Horn:** Yes, I just went out and started playing—a pretty far out experience. I had never done it before, but now I know what a street musician feels like. It's harder than playing for a large concert audience. I also played in schools for little children, in colleges for older audiences, and at festivals.

**Bonzai:** What types of music did you play?

**Horn:** Just solo flute. Maybe I'd play some blues riffs, or just drift off and play free stuff like in the Taj Mahal, or maybe a tune like "Summertime." The people were very patient when I played the moody, meditative music, but what they really liked were funk things and blues—that had energy and rhythm to it. They started clapping their hands right away. The old concept of monasteries and temples does not reflect the China of today. China today is survival—a billion people trying to stay alive. They are "outside" not "inside." With all the teeming activity, they seem very

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calm and centered in themselves. They don't have much but they seem basically fulfilled. It's a communal society and they are very family-oriented—very different from Russia. They smile and laugh a lot and it's contagious. We have a thousand times more material success in the West, but it was there that I found myself laughing and smiling more than ever. It made me wonder.

**Bonzai:** Who is the most amazing artist you've worked with?

**Horn:** Duke Ellington. I did a recording with his band in the early '60s. Johnny Hodges was sick and I was called to take his place. The album was called *Suite Thursday*—an amazing experience. It took me awhile to appreciate Duke. It's easy to appreciate Count

Basie—a down home, groovin' blues band you can feel right away. With Duke, it's strange and beautiful and different. A genius musician that will go down in history as an incredible composer of American music.

When I played in his band it didn't sound like it did when I was outside listening. The voicing was so different. Sitting in the sax section, it was very difficult to relate to what was going on around me, and to play in tune, because he didn't voice things like regular sax sections. He might voice the first saxophone and the first trumpet together, and the second tenor and second trombone and third trumpet. All of these clusters were happening in a way I wasn't used to. When you're out front and hearing the whole thing it all

fits, but when you're sitting in the band it's strange.

Also, those guys had been playing together for so many years that they never needed to look at the written music. Musicians that play together for so long have a certain empathy and understanding. You can't put it down in notes. You could put five great superstar musicians in a band and it might sound terrible, but with Duke's band there was a certain undefinable connection. It's like when two people live together for awhile. They get to know each other so much that it's beyond what both of them are. The "x" factor starts working; there's a communication which is almost mystical. That was happening in Duke's band.

He was like a magnet. There are people out there in the world looking for someone that they can be with who will give them the opportunity to be part of something truly great. Duke was a leader. His band was drawn to him because he provided the space and the opportunity.

**Bonzai:** What are your plans for future location recording?

**Horn:** I'm planning some videos of my travels to different places, like the Arctic. I've been up there for a few concerts and I would like people to see as well as hear different cultures through music. Home video is going to open up a lot of opportunities that I would like to explore.

**Bonzai:** Do you have any words for aspiring musicians?

**Horn:** Much of the unhappiness in the world is caused because people don't do what they want to in life. Most people don't even know what they want to do. I think that if you're a musician, then number one, you're very fortunate in knowing what you want to do. My encouragement would be to go for your dreams. Give it a shot. There are no guarantees, but you shouldn't be sucked into a need for security, something to fall back on. Someone who studies medicine doesn't have something to fall back on if he can't become a doctor. It's crazy to put up barriers because you might not make a million dollars. Just do it, and if somewhere along the line life shows you that you shouldn't really be in music, well, you haven't lost anything. It's not a question of having failed. Life is just telling you "dead end—turn right." If that takes you into selling real estate, then be a happy real estate salesman. You can say, well, I gave music a try and had a good time—but if you don't give it a try, until the day you die, you will wonder what would have happened. That will plague you. So, just go for your dreams and don't let the record companies tell you what to do. ■

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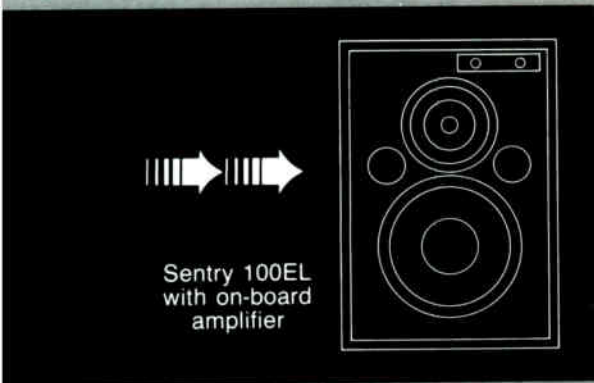
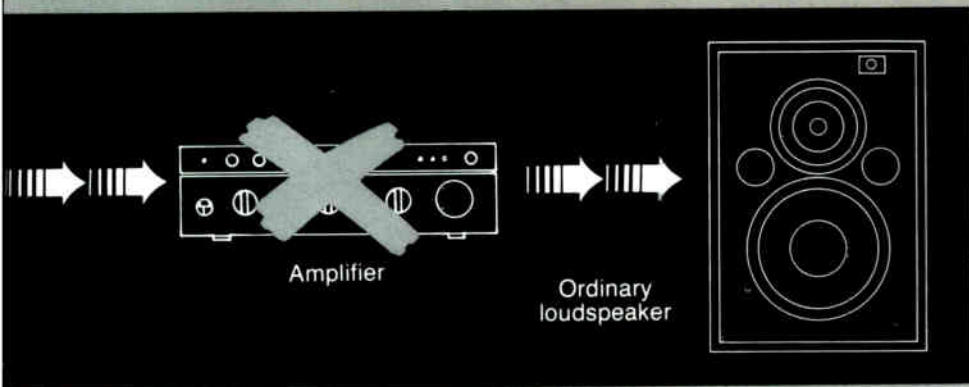
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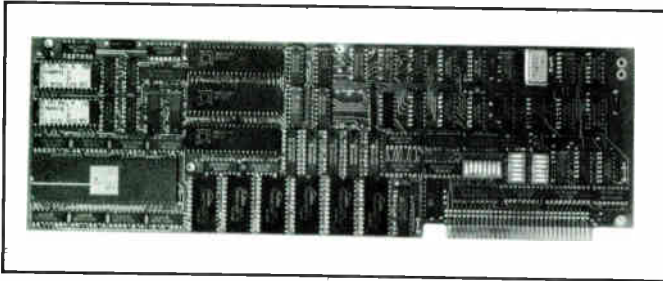
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## Wireworks TE-3 Cable Tester

The Wireworks TE-3 is a lightweight, pocket-sized tester which detects and identifies shorts, open circuits and out-of-phase wiring conditions in cables with XLR or 1/4-inch connectors. The unit is 1 1/2-inches smaller than its TE-2 predecessor and an internal nine-volt battery provides the power to test an average of 1,000 cables. The TE-3 is priced at \$99.

Circle #053 on Reader Service Card

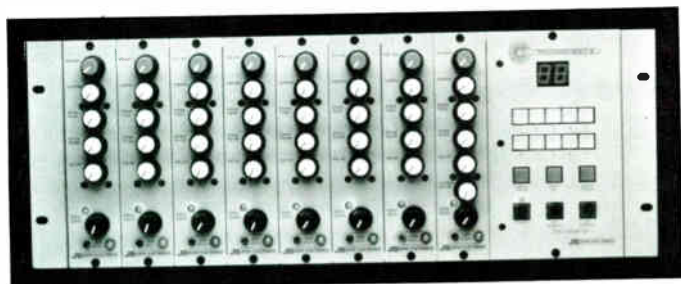


## D & R Electronics' Series 2000 Boards

The Series 2000 range of in-line mixing consoles from D & R Electronics (Amsterdam, The Netherlands) are scaled-down, non-modular versions of the company's Series 4000 boards. The 2000s feature four-band equalization and FSS (floating subgroup system), which allows the creation of a subgroup wherever necessary without patching. The series

is available in 10, 20 and 30 channel models, and includes an external power supply.

Circle #055 on Reader Service Card



## Cooper Sound Chest II

Europa Technology, of Venice, CA, is now distributing the J.L. Cooper Sound Chest II, a programmable MIDI drum computer consisting of individual voice modules under the control of a computer module. Triggered by drum pads, MIDI note on commands, and tape sources, the voice modules contain a basic drum sound and space for an additional sound chip set of the user's choice. Each voice module boasts extensive programming capabilities, including volume, tuning, dynamic tuning, dynamic filter, and decay rate. The Sound Chest II's MIDI features include send/receive program changes, MIDI channel select, individual note assignment, send/receive dynamic pad hit data, and MIDI enable/disable.

The rack-mountable Sound Chest II is available as a basic system with five voice modules and a computer module for a suggested retail price of \$2,995. Extra voice modules are priced from \$350 for a module without sound chips, to \$450 for a module with the Crash chip set.

Circle #056 on Reader Service Card



## "Mini-Loc" Recorder Controller

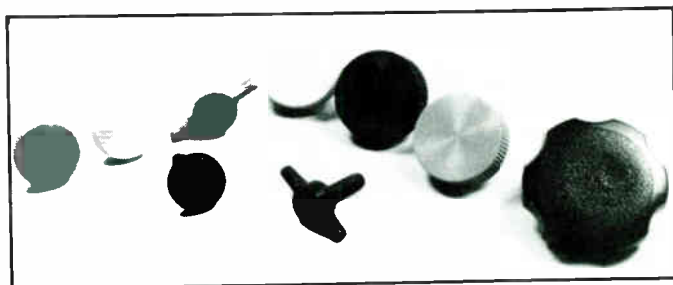
The SV-1000 "Mini-Loc" from Sound and Vision (Los Angeles, CA) is a digital tape counter that interfaces with a recorder's transport and record functions, enabling the programming of memory punch-in/out, or play/rewind points with repeatable precision. Features include an accurate digital tape counter, full transport, user preset play/rewind tape loops, auto record punch-in/out, return to zero, punch-out foot switch jack, LED function indicators and variable fast forward/rewind shuttle speeds. The SV-1000 interfaces with Tascam, Otari and Fostex recorders and is priced at \$275.

Circle #057 on Reader Service Card

## Agfa PEM 297 D Digital Tape

Agfa PEM 297 D, a new highly dependable digital audio mastering tape, has been introduced by the Magnetic Tape Division of Agfa-Gevaert, Inc., Teterboro, New Jersey. The 1/4" tape comes on 4,600 foot, 10 1/2" reels. The new material features fewer dropouts which lowers the need for error correction and reduces the possibility of program loss.

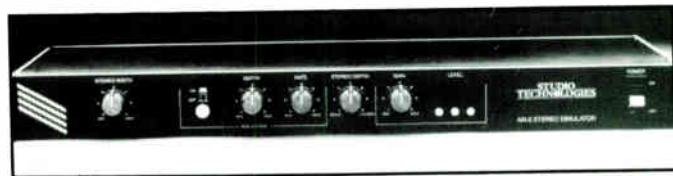
Circle #058 on Reader Service Card



## Replacement Boom Lockscrews

Black Audio Devices, of Glendale, CA, has introduced a solution to the frustrating problem of replacing lost or stripped microphone boom lockscrews. Since factory replacements can be hard to find, the Black Audio Devices line provides an alternative to retiring a boom from service, or finding a bolt and using pliers. These lockscrews grip securely on the boom shaft, so even heavy mikes won't slip, and are available to fit AKG-type booms in four styles and three colors, and Atlas-type booms in two styles and colors.

Circle #059 on Reader Service Card



## AN-2 Stereo Simulator

Studio Technologies, Inc., (Lincolnwood, IL) has introduced the AN-2 Stereo Simulator, a versatile processor designed to create a wide range of effects, including convincing stereo from any mono source. The resultant stereo signal is completely mono-compatible. In addition, the unit has a proprietary circuit to randomize the non-recursive filtering process, thus avoiding the harshness that can result from stereo simulation via delay lines.

Input and outputs are electronically balanced (selectable to -10 or +4 dBm) and manufacturer specifications indicate a dynamic range of 90dB and a 20 to 15k Hz ( $\pm$  2dB) frequency response.

Circle #060 on Reader Service Card

## Mitsubishi X-850 Digital Recorder

Digital Entertainment Corporation, a subsidiary of Mitsubishi Electric Sales America, has unveiled the new model X-850 32-track digital audio recorder with cut and splice facility. The new machine is fully compatible and electronically identical to the X-800 recorder, except for a new cosmetic appearance and the inclusion of the cut and splicing ability. The U.S. list price for the new model will remain at \$170,000, and the first machine was slated for delivery to Lion Share Studios in Los Angeles last month.

Circle #061 on Reader Service Card

## Omni Craft GTX Gates

Designed to fit into the two most common rack systems, the GTX(d) and GTX(K) modular noise gates from Omni Craft offer low noise and distortion through the company's proven optical control system. In addition to selectable gate and duck functions, the units also provide switches for inserting a high or low pass filter (or both) into the signal chain, substantially reducing the chance of accidental triggering. Some of the GTX series' other features include balanced inputs; adjustable range, release, and threshold controls; and simplified "traffic light" LED operating status indicators. The GTX units are list priced at \$275.



## Valley People Model 440 Processor

The Model 440 from Valley People, Inc., of Nashville, TN, is a single channel device offering the convenience of a peak limiter, a high quality compressor/expander package, and a dynamic sibilance processor, each controlling a common VCA. Sophisticated intercoupling of the unit's control circuitry allows the device to simultaneously operate in all of the processing areas. The compressor section features continuously variable threshold, attack time, ratio, and release time, as well as an interactive expander control which reduces residual noises which otherwise would have been pumped up by the process. The limiter section exhibits very fast attack characteristics (stated as typically under one microsecond/dB), continuously variable threshold, a fixed 60:1 ratio, and adjustable release time. According to the manufacturer, the dynamic sibilance (de-esser) processor can be effectively used on mixed program material, since it does not alter the tonal or spectral content while removing sibilants.

The Valley People Model 440 is priced at \$599, and electrically balanced input/outputs are standard, as are barrier strip connectors.

Circle #065 on Reader Service Card

## Recording Studio Management System

Pristine Systems, Inc., a Hollywood, California-based software publisher, have completed their automated micro-computer business system for the small to medium-size recording studio. The Recording Studio Management System includes studio bookings, work orders, billing, accounts receivable and payable, tape library management and financial reporting. The software package is completely integrated and available for use on any IBM compatible micro-computer. Turnkey systems are priced from \$7,000 to \$13,500, and customer modifications are available.

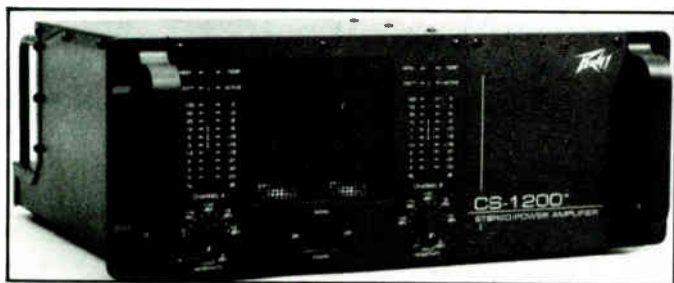
Circle #063 on Reader Service Card



## Audiopro AX-3 Crossover

The Audiopro AX-3 professional electronic crossover, distributed by Yorkville Sound, Scarborough, Ontario, Canada, is a single rack-space unit featuring 24 dB/octave rolloffs, zero phase shift at all crossover frequencies and rotary frequency controls which regulate digital tuning circuitry accurate to within one-sixth of an octave. The AX-3 also includes balanced and unbalanced inputs/outputs; push-button two-way to three-way conversion; a 10Hz/40Hz low cut selector; input level control with a two-color activity/clip LED; low, mid and high-frequency output level controls each with two-color activity/clip LEDs and output mute pushbuttons.

Circle #066 on Reader Service Card



## Peavey CS-1200 Amplifier

The CS-1200 is the latest entry in Peavey's line of CS-series power amplifiers. The unit features large, continuous-duty power transformers of a new semitoroidal type; Peavey's patented DDT™ compression circuitry; and the new "back porch" accessory plug-in patch panel for adding balanced input transformers, crossovers and special function modules. This seven-inch high rack mount amplifier weighs 70 pounds and is rated at 600 watts RMS continuous per channel into four ohms, and 1200 watts per channel (RMS continuous) into an eight ohm mono bridged load. The CS-1200 has a list price of \$1,199.50.

Circle #064 on Reader Service Card

## Klark-Teknik DN780 Software Update

Klark-Teknik, Electronics, of Farmingdale, NY, have introduced Version 1.5, a new software program which expands the versatility of their DN780 digital reverberator/processor. Newly added features include three gated decay programs, a memory lockout option, and a remote slider update. The gated decay programs include non-linear decay, reverse decay, and "Alive," a unique vocal program. The memory lockout feature allows the user to protect the settings on one or more memory locations, and the slider update permits the assignment of any program function to any fader on the remote control. All DN780 software updates are free from the manufacturer for a period of 18 months after purchase.

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by:

**Acoustical Physics Laboratories**

principal acoustician:

**Bill Morrison, MS Physics  
Georgia Institute of Technology**

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Control rooms are designed to minimally interact with the fundamental accuracy of the monitor system. Designs incorporate proper radiation loading, dampened room eigenmodes, diffraction controls, and dispersion controls. Studio designs feature adjustable reverberation times, variable early to late reverberation ratios, and high isolation neoprene/spring floating room construction.

For More Information:

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Circle #068 on Reader Service Card

## Audio-Technica AT853 Microphone

by William Johnston

When I was first confronted with the prospect of reviewing this microphone, I admit I had my reservations. I mean, aren't microphones supposed to be housed in large containers appearing to once have held vacuum tubes? And all engineers know that a microphone's performance is supposed to increase in a direct ratio to its weight, right? Besides, lavaliers have traditionally been known as the bastard child of the microphone family, lost somewhere between shotguns and the telephone.

Well, I was in for more than a few surprises with the AT853. First and foremost, this is not exactly a lavalier per se. The microphone was originally designed for use in sound reinforcement applications, professional recording studios, and for television work. Although it features an extremely low profile, don't be fooled (as I originally was) into assuming that its sound is a function of size. Throughout the years, lavalier microphones have been called on to perform in situations somewhat beyond their capacity. They have been stuffed into instrument "f" holes, taped to guitars, suspended over orchestras, and used anywhere where the sight of a microphone would be a sin, such as stage, TV and film applications. Yet, often these microphones were only intended to be draped around the neck of Dan Rather for limited range speech pickup, and don't live up to musical expectations. The AT853, however, is designed first as a good sound transducer, and secondly as a small microphone. Through careful design, Audio-Technica has been able to create a tiny, yet excellent multi-purpose microphone.

### Microphone Design

The AT853 is an electret condenser with a cardioid polar pattern. Audio-Technica increased both the frequency response and the transient response of the microphone over its predecessors through the use of a new, lower mass diaphragm. Moving the electret charge off the diaphragm and on to the fixed back plate allowed Audio-Technica to

lower the diaphragm mass by one-third, yielding a four micron-thick gold vaporized diaphragm. Furthermore, the new design helps to reduce distortion and alleviate the need for a high voltage power supply demanded by some early condenser configurations.

The AT853 is powered via the AT 8505 power module which is supplied with the microphone. This module allows the user to switch between a battery source in the module, or an external phantom power source. The battery required is an N.E.D.A. type 910 ("N") 1.5 volt, which will give approximately 2000 hours of intermittent use, using an alkaline or mercury-type battery. Although these batteries are readily available, you may not find them at your corner 7-Eleven at 2 A.M. Yet, since the current demands of the capsule are extremely low, the replacement period of the battery will be quite long.

When employing an external phantom power supply, a typical 9-52 volt supply is required. The use of such a supply will automatically bypass the battery in the power module. This is accomplished by a diode in the module circuitry allowing the battery to be

isolated for longer life during phantom power usage. The AT853 can also be powered without the use of the 8505 power module. A simple power source will suffice. This, however, will bypass the main advantage of the 8505 module: Since the AT853 is a cardioid, it exhibits proximity effect, and, since lavaliers are more often than not asked to do close miking (i.e. dropping down the bell of a saxophone), the 8505 is supplied with a low end cut to minimize the increased bass response.

In general, the overall frequency response of the AT853 is quite good. The microphone is relatively flat on axis between 60 Hz and 15 kHz ( $\pm 3$  dB). Below 60 Hz, there is a gradual roll-off, and above 15 kHz there is a fairly quick roll-off. The signal to noise ratio, however, is listed as "greater than 47 dB" at 1 kHz @ 10 dynes/cm/s<sup>2</sup>. While this microphone is obviously not intended for the next digital recording of Pavarotti, it is well suited to a wide variety of other applications.

The AT853 is able to take a maximum input level of 130 dB SPL (1 kHz @ 1% THD) which basically means that it will take a jet engine to overload the



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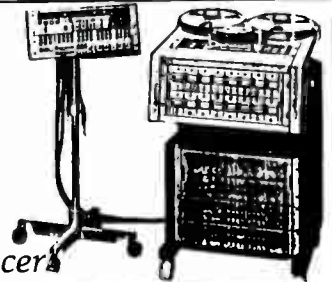


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microphone. A-T takes the trouble to include three standard sensitivity ratings in its specifications. The sensitivity rating is -50 dB (0 dB = 1 mW 10 dynes.cm/s<sup>2</sup>), the E.I.A. rating is -144.5 dB, and the open circuit sensitivity rating is 0.40 mV (-68 dB ref. 1 volt @ 10 dynes.cm/s<sup>2</sup>).

### Accessories

The AT853 comes equipped with a number of accessories. As if to get the point across that this is not a typical lavalier, no tie-clips or neck straps are included. The accessories that are included are meant to complement the microphone's intended applications, and were developed to give the microphone a low profile in situations where a larger microphone would be inadequate. These simple accessories help to increase the overall flexibility of the microphone.

First of all, the AT853 is permanently connected to a 25-foot cable which is then plugged into the 8505 power module via a three pin (TA3) type jack. Thus, the larger 8505 can be isolated away from the actual microphone setup. The power module then accepts a typical female XLR connector. The power module also comes with two

mounts, for attaching the module to a fixed object. The remaining accessories include a desk stand/microphone stand adapter, a windscreen, and an adjustable wire hanger for overhead applications.

### Evaluation

As Audio-Technica considers this an all-purpose microphone, I tested it in a variety of situations and it did well in all phases of this test.

To begin with, I used a pair of the microphones in an ORTF stereo mixing configuration and recorded a 20-piece chamber string orchestra. I considered this application to be the least likely use of the microphone, and really did not expect it to perform too well. Furthermore, perhaps to stack the deck in my favor, I used two Neumann U-87s for comparison. To my surprise, the AT853 sounded fairly smooth, except in the low end, to which I added some equalization. The Neumanns, of course, are hard to beat, and overall had a much warmer sound. The imaging of the two pairs, however, was fairly comparable. The biggest difference was in the noise floor. In such a critical application, the noise floor of the AT853 was clearly audible.

I then tested the microphone in several applications to which I felt it was more suited. I used the microphone on several live recording jazz concerts, in which sound reinforcement was utilized as well. The microphones worked well for both the recording and reinforcement of brass, exhibiting no undue feedback or discoloration of the sound. Considering the fair job that microphones did on the sound quality of the strings, I would recommend these microphones for any string, brass, woodwind or vocal section pickup. I also used (abused?) the microphones on kick drum and snare with fine results. In these close miking situations, I was glad that I had the low end cut option on the 8505, to minimize proximity. Also, in these multi-microphone, reinforcement situations, the noise floor is not as critical, and therefore posed no problems.

The only real problems that I had with the microphone was that I seemed to want more accessories. I guess that if they give you a few toys, you always want more. A tie clip or neck strap wouldn't have hurt, even if it seems to cheapen the image. Also, the power module mounts have no way to connect to a microphone stand directly, so the power module spent a lot of time on the floor, which is not ideal. As with many lavaliers, the cable is permanently affixed to the microphone. Personally, I would prefer about 10 feet of attached cable (rather than 25 feet) with a TA3 connector to a 15-foot extension. This would obviously mean another connector, but it would give more flexibility to the setup. Besides, 25 feet of thin cable can get very tangled very easily. The wire hanger, however, worked well and kept the microphone accurately pointed when hung. This is important for those who wish to set a microphone once, and leave it permanently hung (as in a church choir). Outdoors though, the light weight of the microphone and hanger could become a problem in high winds.

Overall, I would have to admit that I went from being skeptical about the microphone (before I heard it) to pleasantly impressed (after actually listening to it). As a lavalier, it is fantastic. And, viewing it purely as a microphone without regard to its size, it is quite good, a very flexible microphone. So I guess that finally we have a good, solid lavalier that we can tape onto trumpets, hang on a harp, drop over an orchestra, and abuse as we always have with lavaliers. But now, it can even sound good.

The AT853 has a suggested retail price of \$175.00 For more information contact Audio-Technica, U.S., Inc., 1221 Commercial Drive, Stow, Ohio 44224. ■

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"Our new Carver amp racks pack twice the number of channels in about the same truck volume as the conventional racks they replace. In addition the average power per channel has increased while the average weight per channel has decreased. In the low end, for example, we now have 1,200 watts per cabinet where 650 watts were previously available. They take less room on the truck, they weigh less and our systems have more headroom than before. The Carver amplifier has allowed us to take a significant step in improving our sound systems." **CLAIR BROTHERS**

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*Tom Whisner (owner) MANTICORE*

**In the Laboratory** The Carver PM-1.5 was rigorously tested by Len Feldman for MODERN RECORDING (February 1985). His laboratory test results also prove that the PM-1.5 really delivers. The following quotes from the Lab Report are reprinted with permission of MODERN RECORDING & MUSIC:—

"The first thing we noticed when we began to work with the Carver PM-1.5 was the ease with which the amplifier delivered almost limitless power to speaker loads which we had previously considered to be difficult to drive to loud levels. This is the sort of amplifier that just refuses to quit."

"The amplifier delivered a clean 480 watts per channel into 8-ohm loads with both channels driven for its rated harmonic distortion level of 0.5%. Even at the frequency extreme of 20 Hz, power output for rated THD was 470 watts as against 450 claimed by Carver. Furthermore, at rated power output, distortion decreased to an insignificant 0.015% at mid-frequencies and 0.007% at 20 Hz. When connected to 4-ohm loads, the PM-1.5 delivered 750 watts per channel for rated THD of 0.05%—far more than the 600 watts claimed by Carver. Clearly, when it comes to specs for a professional amplifier, Carver has taken a very conservative approach... All (manufacturer's claims) equaled or exceeded published specifications—usually by a wide margin."

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**\*Power:** 8 ohms, 450 watts/chan. 20 Hz-20 kHz both channels driven with less than 0.5% THD. 4 ohms, 600 watts/chan. rms 20 Hz-20 kHz both channels driven with less than 0.5% THD. 16 ohms, 300 watts/chan. 20 Hz-20 kHz both channels driven with less than 0.5% THD. 2 ohms, 525 watts/chan. at clipping, 1 kHz, with less than 0.5% THD. Note: 2-ohm specification for information purposes only. Operation at 2 ohms is permissible but not recommended. **IM Distortion:** Less than 0.1% SMPTE. **Frequency Response:** -3 dB at 3 Hz, -3 dB at 80 kHz. **Damping:** 200 at 1 kHz. **Gain:** 26 dB. **Noise:** Better than 115 dB below 450W A-weighted. **Input:** Balanced to ground, XLR or phone. **Impedance:** 15k-ohm each leg, balanced to ground. **Bridging:** 1200W into 8 ohms, 1000W into 16 ohms, accessed through rear-panel recessed switch. **Dimensions:** 19 in. wide, 3½ in. high, 10½/16 in. deep. Weight: 21 lbs.



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Introducing the new KLIPSCH KSM (left) and KSM-1 slant monitors.

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The real difference between these new monitors is in the bottom end. The KSM-1 has a larger (15") woofer and gives you a little deeper bandwidth making it ideal for monitoring kick drums, keyboards, and other instruments requiring extended bass response. In most applications, however, the low-end of the KSM is more than adequate.

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# SOUND ON STAGE



PHOTO: LEWIS LEE

by George Petersen

Prince's Purple Rain tour, certainly one of the most talked about live sound events of the past year, brought together a number of elements which clearly set it apart from the usual mega-concert series. Aside from the mammoth quadraphonic sound system put together by tour specialists Showco of Dallas Texas (featured on the cover of the June *Mix* and said to be the largest sound system of its type ever assembled for an indoor tour), a half-dozen of the hottest remote recording trucks in the nation were constantly kept busy by His Royal Badness' frenetic working schedule.

The recordings on the road included: tracking and mixing album cuts for two different LPs—"The Ladder" from *Around the World in a Day* and "4 the Tears in Your Eyes" from *We Are the World*; mixing, assemblage and editing

## ON THE ROAD WITH

# PRINCE

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## A CONVERSATION WITH ENGINEER DAVID TICKLE

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for *Around the World in a Day* and the forthcoming Sheila Escovedo release; backing instrumental tracks for Sheila E.'s appearance on the American Music Awards; a 17-minute live mini-video of "I Would Die for You" and "Baby, I'm a Star" for MTV; tape-delayed live video broadcasts for South American distribution (aired live to Europe and Australia); numerous soundchecks that became demo sessions; and an as-yet-unreleased audio/video documentation of the final show, held at the Orange Bowl in Miami on Easter Sunday. As anyone from a roadie to a featured headliner can attest, a major national tour can be an exhausting, difficult experience, but when combined with this kind of rigorous recording schedule and the pressures of completing a new album release, one can only begin to imagine the hard work and contributions of everyone involved with pulling off this totally first-class event.

Certainly one of the key figures on the tour was engineer David Tickle, who handled most of the live sound mixing, as well as a number of broadcast and recording dates. Tickle, who began his career by working with various British bands at the age of 16, found himself running Ringo Starr's studio at the superstar's Tittenhurst Park estate a year later. While there, he also learned the craft of producing, by working with notables such as Terry Melcher who did a project there at the time. Tickle then got a job with producer Mike Chapman and came to the States, engineering on records like Blondie's *Parallel Lines* and *Eat to the Beat*, The Knack's *Get the Knack*, Nick Gilder's "Hot Child in the City," and Exile's "Kiss You All Over." "It really was a very good year," comments Tickle.

He then left, to try his hand as an independent producer, scoring big with his debut, the highly successful *True Colours* LP by the Split Enz. Tickle has since produced for The Swingers (a popular Australian band formed by one of the original Split Enz members), Ellen Shipley, Vapors, and Red Rider. His most recent project (cut at Tittenhurst Park) is an album by Larry Galen, which had just been released in Canada at press time.

We talked to tour survivor David Tickle, who commented on his approach to live mixing, his live sound experiences with Peter Gabriel and Prince, and some of his insights on what it was like to be on the road with the Purple Rain tour.

**Mix:** How did you get started doing live shows?

**Tickle:** I went on the [Peter] Gabriel tour last year, which was the first real tour I'd ever done. Peter wanted somebody to "take the studio on the road," so I did Europe and the States with him, mixing live sound. We had 24 Solid State Logic gates, which normally you'd only find in the studio, specially built into racks, and we used them on the drumkits. It was pretty tricky to set up, especially with gated reverb and things like that going on, but the tour was really great fun, because the musicians were so good. I got along with those guys so well that I ended up wanting to do an album with them.

**Mix:** How did you become involved with Prince?

**Tickle:** Prince had been to the Gabriel show in Los Angeles and he heard the mixes I did there, and felt that was the sound he wanted live—a thick sound that was very controlled, and very clean: very articulated, like the album was. So they figured since I had done the Gabriel shows and used Showco,

## DAVID HEWITT: ROAD RANGER

A self-described lifelong "road ranger" with a background in auto racing, David Hewitt is a widely respected engineer with expertise earned by thousands of miles and countless gigs over 17 years of remote recording. His experience also includes a 12 year stint with the Record Plant, working with clients ranging from internationally renowned orchestras to major rock tours (such as The Stones '81 and

Record Plant New York Remote Division. We had gone out to Minneapolis on several occasions to record live shows for him—in fact, some of the tracks we recorded with him at the First Avenue Club were eventually used in the *Purple Rain* movie. He's a very inventive artist in that way—he'll use material from all over the place for different purposes. He's just amazing; you can never figure out all the possibilities this guy can come up with.

For example, Prince would sometimes soundcheck for a couple of



PHOTO: DAVID HEWITT

*Mixing Prince's appearance at the American Music Awards in the L.A. Record Plant #2 truck are David Tickle (left, at console) and recording consultant David Hewitt.*

The Who '82) and nationally televised award shows. In 1984, Hewitt left to focus full-time on his company (Remote Recording Services), which has been providing consultation and technical production services for the past seven years. At press time, Hewitt, who had just completed working on a Hall & Oates video shoot at the Apollo Theatre in Harlem, was involved in supplying a Sony 3324 digital multitrack for the production of a film with Laurie Anderson.

With a busy schedule of summer touring projects slated, Hewitt graciously took a few rare, non-hectic moments to comment about coordinating the multifaceted recording services the Prince tour required.

**Mix:** How did you become involved with the tour?

**Hewitt:** It came about primarily because I had done shows with Prince before, when I was running the

hours, but that consisted of working on new songs, and if we were there, we rolled tape on the soundcheck. If he got something that clicked, and he liked it, he would come back to it, do some overdubs and work it into a song. He always had something happening like that. There was never an empty moment. Like Mozart in *Amadeus*, who always had the tune complete in his mind, Prince would always have songs pre-composed, and teaching it to the band was all that stood in the way of recording it.

The determining factor in bringing me in on this tour is that he's totally spontaneous—although things like the satellite distribution had to be set up way in advance—but on the other shows, he'd say "OK, *this* is what we want to do," and I'd literally have to jump from that point, grab the available facilities, outboard packages, and crew,

—PAGE 86



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—FROM PAGE 84, HEWITT

and get them there on time, when he wanted them. It's that kind of specialty that led me to get involved with the tour, because we had done that a number of times before, and we've got the knowledge of the trucks and crews available nationally.

We were originally called in by Prince's management to work on the album that's out now [*Around the World in a Day*]. They had a deadline to meet, they were putting this tour together, and had disassembled the studio he had in his house. So I was contracted to get a truck out to where they were setting up for the tour rehearsals. They did extensive pre-production for the tour at the St. Paul Civic Center, which he leased for a couple of weeks. It was a valid way of testing the P.A. and the production. I hired Mobile Audio [of Rome, GA] to come up and we started cutting tracks, primarily on one tune ["The Ladder"] for about three to four days. Mainly it was like studio work—we just cut tracks while the band was on stage, and then

he'd come out to the truck and do a little overdubbing and mixing.

Prince has his own style, and he does a lot of the mixing himself. So Tickle empirically knew what would need EQ, and what didn't, and in what directions they wanted to go. Prince's concept was that it was the *work* that was important, and you had to find a way to make it happen. They were all very sharp and knew what they were hearing. It's his style that's more important than technology.

**Mix:** What specific tour dates were being recorded?

**Hewitt:** The next time they called us, we brought the same truck [Mobile Audio] to Washington, D.C., where they actually started doing overdubs in the booth—it's a 45-foot trailer with an overdub booth. We did a video utilizing the in-house video capability of the Capital Centre, which was all live-to-tape. I engineered that particular one, because Tickle was handling P.A. on that date.

We came back to St. Paul for the

—PAGE 88

and it was great, they'd use Showco. Although when he saw us, we were using a house system, not the Showco system. So he started to track me down and caught up with me. I was working in the studio with Genesis in England at the time.

Showco's a very good company, they really try hard and they've got a good product, but we had a few battles at first, 'cause I'm not a live engineer; it isn't my career. I really enjoy working in sound in whatever environment it's in, and mixing is mixing. Their attitude at first was that live sound is really different than studio, but it isn't—it's just *sound*. It's a bigger room, and you deal with that, but it's still sound. Once I got the credibility with them technically—and not just artistically—it helped everything.

**Mix:** If you mix a live show in stereo, doesn't that mean that half the seats are bad?

**Tickle:** No, because the Prince tour was a 360-degree show and our front fill—the main front P.A. which captures about 60 percent of the whole audience—was totally stereo. Once you're about 30 feet from the P.A., you can hear both sides and it sounds big. Plus you're getting the source directly off-stage from the ground support front fill in mono, so the further back you get, the more apparent it [the stereo image] becomes, and the bigger the picture. The side baskets and back fill were all mono, so if you sat on one extreme side, it would be in mono, but for 60 percent of the audience, there was a complete stereo picture.

Then we had a quadrasonic array at the back, which I used as a special effect. I would bring certain sounds in, such as guitar or echo, and pan them around. The whole idea was to make the whole audience feel like a real part of the show, as opposed to everything being at one end of the hall. Roy [Bennett], the lighting designer, had all these Telescans and would scan around the audience when I did certain effects, to make the audience part of the stage. I also had extra subwoofers on a send where I could feed into them and really make the auditorium rumble. It was quite amazing.

**Mix:** Who made the microphone selections for the tour?

**Tickle:** Prince chose the microphones. Because of the way he uses them, he wanted a specific microphone weight and we were able to put any capsule in them. The vocal mikes were Sennheisers. Cubby, Prince's sound engineer on stage, who got an excellent sound happening on the monitor system, was in charge of maintaining the mikes, and making sure we had the best cap-

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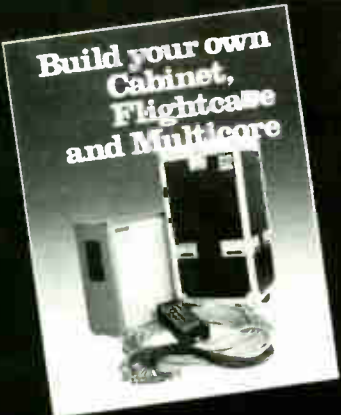
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sules in them, because they did get dropped and do break. Microphone selections were basically between Cubby and myself. I chose Crown PZMs for drum overheads—they have a certain sound I really like: they sound great

without having to EQ them. The snare was a Shure SM57; guitar and bass guitar, Sennheiser 421s. The bass was also direct.

Between Cubby and myself, we used an awful lot of DIs. Most of the

—FROM PAGE 86, HEWITT

Christmas stint in his home town. We set up and waited, but he chose not to work until Christmas Eve. We had to break the truck down and take it out to his house to do some work on Christmas Eve, which gives you some idea of that man's absolutely incredible work schedule.

Next we went to The Omni in Atlanta [January 7-8] with Mobile Audio to do another TV shoot with both Prince and Sheila E. I'm not sure that had a final destination, but with all of these things, we were doing a variety of production work—working on the album [*Around the World in a Day*], working on Sheila E.'s album, and doing various video tracks and live bits.

From Atlanta, we went on to Houston [January 10-17] and hired Le Mobile [North Hollywood, CA] for about a ten-day stint at The Summit, and they did various bits of production work and cut another track or two. There was a lot of editing and what not going on for both albums. It was relatively serene—we sat there for ten days while Prince ran in and out doing his work.

I sent Mobile Audio to Memphis on January 26 to record backing tracks for Sheila E.'s performance at the American Music Awards. We flew everything out to Los Angeles to do the show, which set up on the next day and took place on the 28th. For that particular gig, we rented the Record Plant L.A. #2 truck, and set that up strictly for Prince. He was about the only live act playing on that set, which got a little crazy because as you can imagine, those awards shows are banged out—most are done with tape playback/live vocals or totally tracked, but Prince refused to do that. He wanted a live performance, with that kind of pressure. It was a very high pressure situation, but even with all the usual dilemmas that go on in those kind of award shows, it did come off very, very well.

From there, we went back on the road, this time with my former mount—the Record Plant [NYC] "Black Truck"—to New Orleans [January 31-February 1] and did a TV shoot at the Superdome, a videotape of both Prince and Sheila E. This is also where he did ["4 the

Tears in Your Eyes"] the cut for the *We Are The World* album.

We flew out for the Grammy Award rehearsal on February 25th, with the ceremony on the next day. Once again that was the [LA] Record Plant #2 truck which was just for Prince. I think the album was out of the way at that point.

The next recording date was the satellite audio and video bounce to Europe, Australia, and the live tape eventually went out delayed to South America. It was from the Carrier Dome in Syracuse, NY, and we used the Record Plant [NYC] "Black Truck." This was a very large scale live-to-air show, the kind that makes every hair stand up and take notice, but it came off almost flawlessly.

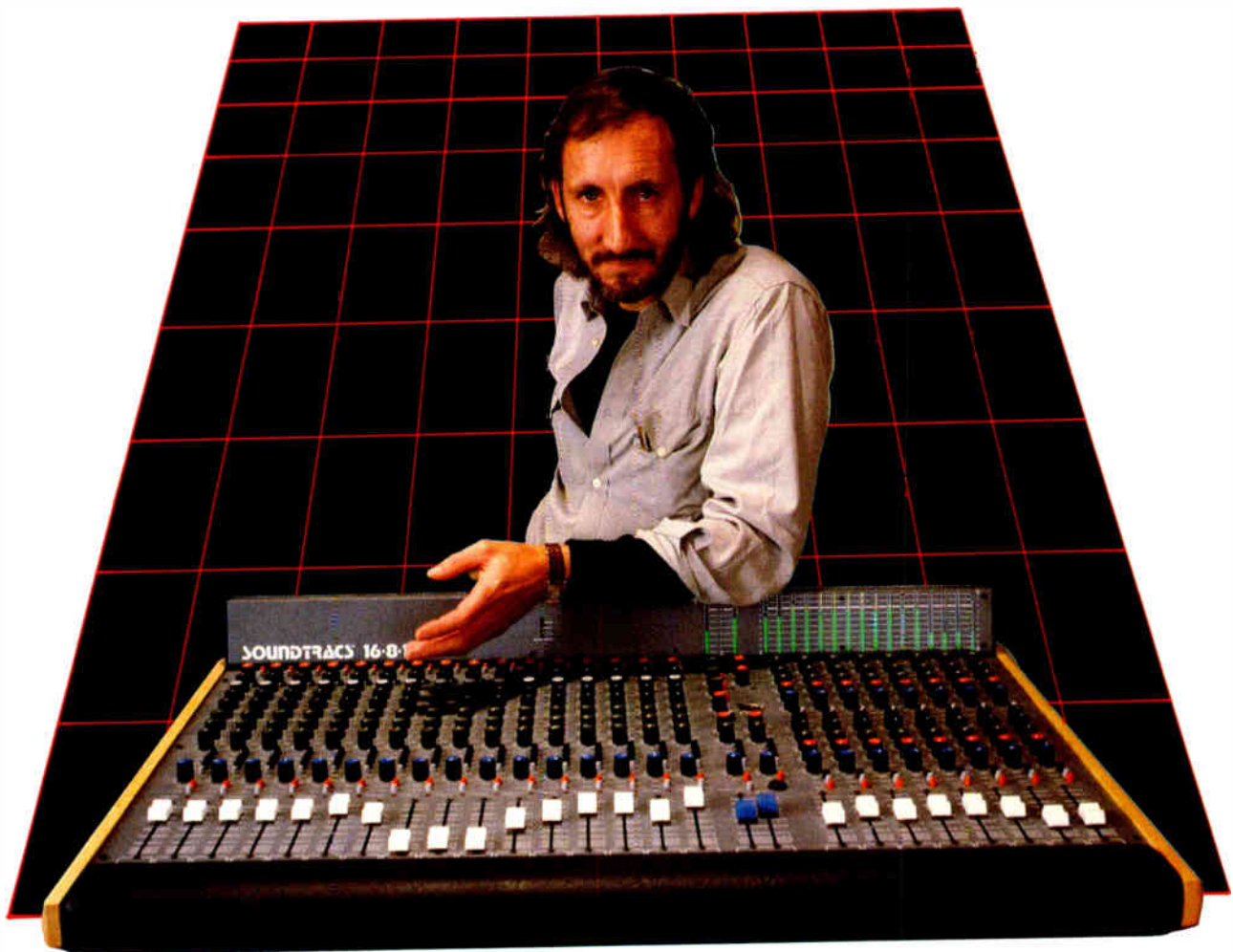
We took the "Black Truck" down to Miami for the last show, [also being videotaped] at the Orange Bowl on Easter Sunday [April 7, 1985]. I had to mix in the truck, because Tickle was handling the P.A. chores. He was doing everything—the live mix, running back to the truck, and then running off to some local studio—they were just like the "Whirling Dervish Brothers."

**Mix:** Isn't it hard to record and mix in so many different trucks during a tour and still have things sound consistent?

**Hewitt:** It is difficult, and what we usually did was to standardize on the smaller JBL monitors—4311s, and on some occasions, 4412s, 4413s—as well as Auratones. Each situation was slightly different—with different consoles and so on, but Tickle had done many shows with the band and really had them down. It's one of his fortes: he does studio work, P.A. work, remote work, and having done that sort of work myself for quite a few years, it does become quite a bit easier when you're on the road and you *have* to do it. There is no time for excuses, and you don't have three hours to dicker around with the EQ on the kick drum. The time's not there—you have to jump in, rough it out, and then get on to the next subject. Consequently, you get pretty good at finding the sound quickly, and Tickle nailed it down pretty quick.

—G.P.

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drum kit was DIs, because we had a real drum kit triggering a LinnDrum or whatever. The drum triggers were pretty much custom and were put together by [engineer] Susan Rogers, who works for Prince.

**Mix:** I understand that the soundchecks were run almost like rehearsals...

**Tickle:** That's right. Soundchecks weren't really sound "checks"—mostly him rehearsing different things, or just jamming, or sometimes recording. Quite often, we'd have a truck outside and I'd go out to the truck and we'd roll tape during a rehearsal. Very often we'd track in an afternoon and finish it up that night.

**Mix:** Did you ever go through "traditional" soundchecks?

**Tickle:** About five times during the tour, we had regular, traditional soundchecks where you'd go through every individual thing, stop everybody, and then see how it balances. Basically that wasn't comfortable for anybody. They're all musicians, and would want to get up there and play. I did it like we were in the studio where you solo everything. They just kept on playing while the monitors were happening.

**Mix:** Was that method faster?

**Tickle:** Not so much faster, but probably more accurate in terms of really hearing songs going on. You could

walk around the room and hear different songs, and hear different mixes with different dynamics, so it was more realistic. Focusing the speakers around the arena and doing time alignment on the speakers was actually the major part of the soundcheck.

**Mix:** Were there any halls in particular that stood out as being significantly better than others?

**Tickle:** It's difficult to say, because it depends on the performance of the band. We were in some halls that were really bad, but the shows were good. There weren't any halls that were really, really bad. With all the horror stories you hear about these big halls, you have to say "OK, it's a big hall"—and then listen to the sound of the room and shorten or lengthen the echoes on the drum kit or whatever and use the room as part of the sound.

So if it was very echo-ey, I'd cut my echoes short and percussive; and if it was a pretty dry room, I'd increase the reverb decay time to fill in for the hall.

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Waylon Jennings &amp; Neil Young

# NEIL YOUNG

## ARE YOU READY FOR THE COUNTRY (AGAIN)?

by Rose Clayton

Neil Young's music has always been enigmatic. It is, for example, often catalogued in most record stores under the style "MISC"—usually between The Who or Yes and Frank Zappa. Young, himself, is even at a loss as to how to describe his art.

"I have to be in the unclassified sec-

tion right off the top," Young admits, "but what I have tried to do is follow my instincts. What I feel like doing with music is what I've done. More and more lately I've come to enjoy the music I'm doing with my friends here in Nashville. It keeps coming back into my life over and over—one of the few things that has repeated—country music."

Young's involvement with country goes back some 20 years to the time he was a driving force in Buffalo Springfield, one of the bands generally credited with breaking ground for country rock. His work with Crosby, Stills, Nash & Young featured several countrified classics ("Country Girl," "Helpless," etc.) and throughout his long and intensely varied solo career, he has made continual forays into country on albums such as *Harvest* (which contained "Heart of Gold"), *Comes A Time*, *Hawks & Doves* and others. For his 1984 live shows he assembled a band that included both pedal steel guitar and a country fiddler, and he even played a number of dates with Johnny Paycheck opening and joining Young for a song or two. Making predictions about Neil Young's career is always a hazardous proposition since he continually confounds even his closest friends with his chameleon-like musical metamorphoses; he does, however,

seem content with his current infatuation with country because he believes these songs are truly coming from his heart.

"My good music comes from my heart and my mediocre music comes from my mind," says Young. Does he know the difference when he hears it? "Pretty much," he says. "It's just being able to deal with the fact that I have this song that's inferior because it's not real. Sometimes you try to record them anyway, but they're the ones you keep pounding away at and never get."

The best songs, his "good music," come easily he says. "Music is a funny thing. You can't ever say what is going to make music happen. Music is magic. No one can nail it down. I've made some of my best music when I was totally unhappy."

Young's latest project for Geffen (at this time still unnamed) appears to be from his more cheerful side.

"We're just having a great time," Young smiles. "We're just playing it straight because the songs are all songs that I really believe in. They mean something to me and to my family and to the musicians."

"We all play it live together and I was singing while they were playing," Young continues. "It was all happening at once. I feel real lucky to be able to



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PHOTO: RON DELANY

play with the people I'm playing with, and I'm real thankful that I was able to get the kind of sound that I was able to get here."

While Castle Recording, where the sessions took place, is one of Nashville's premier state-of-the-art studios, Young chose to cut his album with as little overdubbing as possible using as many as 33 players on a session at one time.

"A lot of records, even country records, that you hear today, are just machines playing away being directed by brilliant producers and being programmed by genius engineers, and it's coming from the mind," says Young. "They are saying, 'This will create a sound that will make everybody feel sad.' It's different than singing from your heart with everybody playing at once and feeling the song. It's a different approach. It's a human approach without the use of machines. I think machines are great. I love them. But right now they just don't fit with me." (You may recall that just three years ago Young put out a mainly electronic album, *Trans*.)

Young chose the same basic outline when he recorded *Comes A Time* in Nashville in '77 and has many of those same musicians playing on his new album. Why did he return?

"There is no place in the world like this," Young says enthusiastically. "This is Music City. There is no other Music City. Everywhere you go there's music.

There's music around the corner and in each building. People in restaurants are musicians, songwriters, publishers. They are everywhere. The whole town revolves around music. Some of the greatest musicians in the world live here. We had over two million dollars worth of violins in the room while we were playing—four Stradivariuses. Then we had some of the finest Martin guitars and one of Hank Williams' old guitars that I was using.

"There's just a feeling of heritage and quality of history that everyone is aware of here," says Young. "It really is the heart and soul of country music."

Though Young's admiration for Nashville apparently knows no bounds, he does not expect the country music establishment to accept him with open arms.

"They have no real reason to," he says. "What I am doing to them could just be construed as another phase I'm going through in my life. There are people in this town who are working with young struggling country artists. They are country through and through. They love country and they've never done anything else. Those are the people who deserve the support of this town and this music industry here in Nashville.

"If I sell records and do well in country music, it will only be on the merit of my music," Young says. "It won't be anything else that will help. No amount of famous people singing with me or any-

thing will ever make it important if the music isn't real and is not from the heart. That's what I think we've got here."

The "famous people" Young alludes to are none other than Waylon Jennings and Willie Nelson.

"Waylon and I met on the road a little over a year ago," Young recalls. "We just hit it off from the very beginning. We started working together. After one show I went to his bus and knocked on the door and said, 'Waylon, I want to sing with you.' I had been practicing 'Mammas Don't Let Your Babies Grow Up To Be Cowboys,' so I sang the part for him. I had it all down and everything—of course I had been practicing it in the wrong key—and when we got out on stage, it was in a totally different key, and I was the *worst*. I was just very funny. Everybody was laughing. I went out there and made a real fool of myself.

"But, then I got my part down and we realized what a good blend we have," he continues, now serious. "It's a real musical blend. I like singing with Waylon a lot. I called him and said, 'I'm coming to town. Are you going to be around to come down and see what you can do?' He just came down and he's putting in what he feels like putting in. It seems to be the right thing, and we're having a great time."

In addition to Waylon's duet, Young sings with Willie on "Real Cowboy," which also features Lynn Anderson. The track for that song was cut in Nashville and the tape shipped to Willie's Perdenales Studio in Austin where he and Young did vocal overdubbing.

"I don't know if there's a trend towards country or what it is," Young says. "I do know that when I was deciding to record in Nashville and telling my record company in Los Angeles that I'm going to do that no matter what and I hope you can get behind it 'cause this is me,' at the same time a lot of people were coming to Los Angeles from Nashville to record. I felt like I was the only one on the road going the other way. It felt great to me," Young smiles. "I'd rather be by myself going in a different direction. There's more room for me to do what I want when it's like that.

"I don't know what the trends in music are going to be," Young continues. "I hope my music is popular—that people like this record—but more important than that I can go to sleep at night knowing that I've done a great record and go home on the airplane and see my family and feel real good and just forget about it and think about the next one."

And what about Young's record label that filed a suit against him last year for what they called "musically uncharacteristic material"? Is it going to support Young country?

*Just The Right Mix*

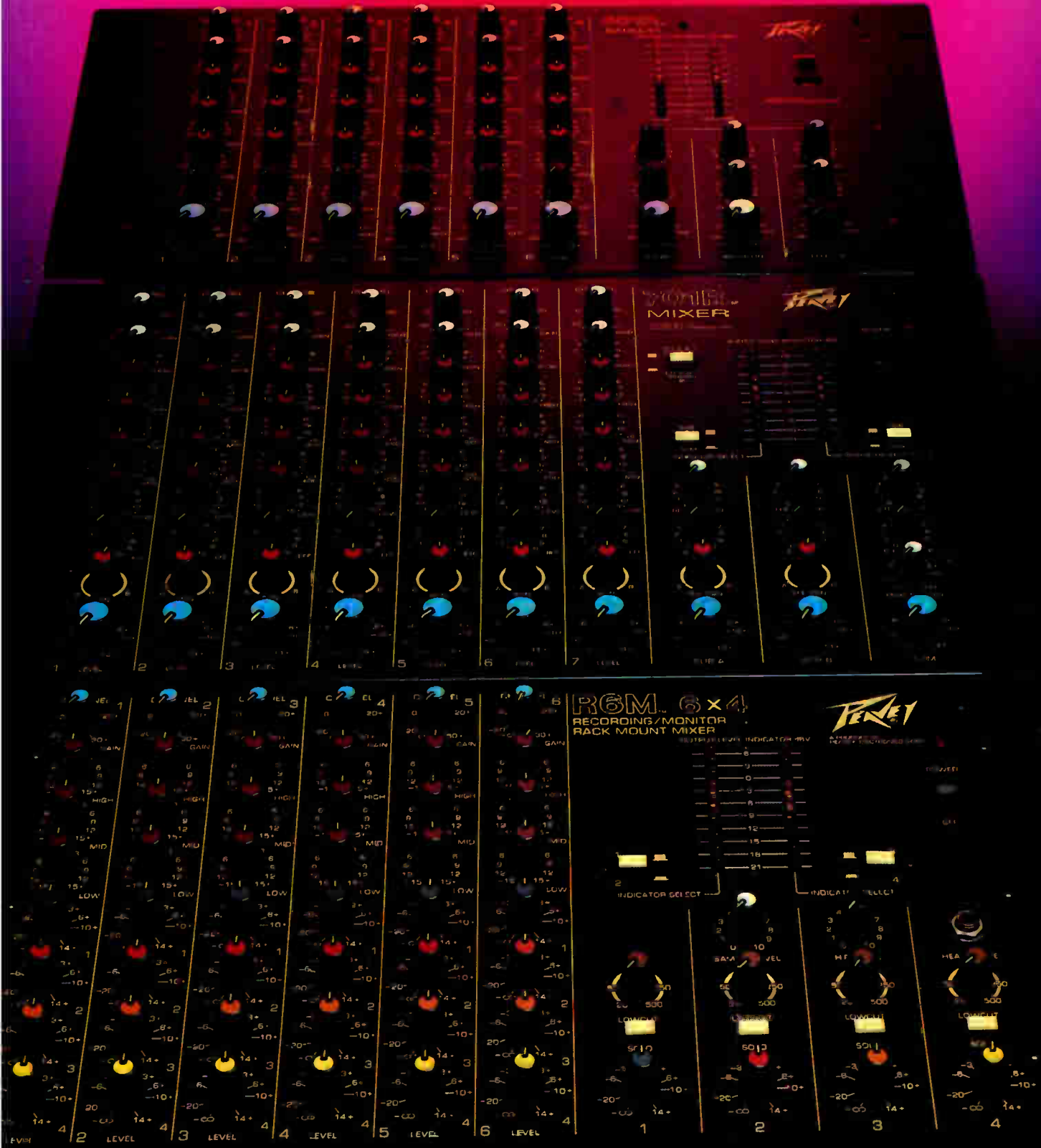
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"I think they will be very supportive of this album," answers Young. "For one thing, the whole lawsuit really made no sense. It was more a flashing of tempers on some level, more of an emotional outrage on a corporate level that they had to sue me for something—so they sued me for that.

"I had made two off-the-wall records in a row [*Trans* and *Everybody's Rockin'*]," Young explains. "So, okay, 'We got to get his attention somehow and bring him back to earth.' I'm sure that's what they were trying to tell me.

"They never really meant for me to leave the label or for them to get all my money or anything like that," continues Young. "They were just trying to manipulate me. For my own good they thought they could save me from some disaster course they thought I was on. But I just kept on going. I paid for my own sessions, and I went out on the road and played all the country dates and talked to the stations everywhere I went. I worked with Waylon and got to know more and more people and just became happier and happier with what I was doing.

"Pretty soon everybody just gave up and just called up and said, 'We're sorry and everything's OK, and let's just keep going,'" Young concludes. "They pay me a lot of money to make records and from the beginning I said, 'I'm going to make whatever kind of record I want to make because I can't go to sleep at night if I don't make the records I want to make.' They said they would pay me a lot of money to do that; so they paid me a lot of money, and I did that, and they panicked."

Young is gambling that his fans will support his new country project.

"I think they'll like it. It's a Neil Young album. That's what I really think it is. It's no more or less than that. It's just music and I love country music and this music sounds country. I can't say my rock 'n' roll audience is not going to like it, 'cause I think it's great music, and I think my audience knows great music when it hears it. They don't care whether it's rock 'n' roll, country, or folk—as long as it's *real* music."

It may take a while to measure the reaction of Young's fans to his brand of country music, but the response of the country musicians to Young was immediate and most complimentary.

"Neil's just great," says Waylon breaking into a big smile. "I think it is really good for country music to have Neil come here to record. I think sometimes we get in a rut where we just keep doing the same thing over and over. Neil's one-of-a-kind. He comes up with the most creative things and I think, 'Where did he get that?' It's so inspiring to me that I tell him he makes me want to go home and try and write something."

"There are some songs on the album that are pretty far out," adds Ben Keith, Young's pedal steel player and co-producer. "Most of them are pretty straightforward though—about love, life, and the pursuit of happiness. He got real excited the night he got here and wrote a song for him and Waylon to do the next day—'Where is the Highway Tonight.'"

"There is one song that goes back to the way the old Neil Young writes," says Keith. "Neil didn't know what to name it, and after they cut it Waylon said, 'Why don't you name that thing the 'Misfits,' that sounds like a good one to me.'"

"Musically it (the LP) is more like a group thing," Keith explains. "Neil plays a lot of guitar on it; it's just not as much as he used to do on his rock 'n' roll things which called for it. Also, one reason he wanted to play in Nashville is because he has such respect for the musicians here. He wanted to cut the album live so we could get energy from each other.

"It's getting so sterilized," Keith continues. "You just go in and cut the basic track and sometimes you don't even know who you've cut with. You never see who's playing bass or guitar because people come in on different days."

"I think it was the first time I have ever been on a record that I have seen the string players stay around and listen to the playbacks," says drummer Carl Himmel. "That's pretty heavy right there. There are several of them who have never played with a band. They have always done overdubbing. One of them commented, 'Look, the bass player is right in here with us.'"

Having a 33-piece live tracking session must have been a challenge for the staff, yet all the musicians remarked that Young's album was probably one of the smoothest they had ever worked.

"Technically it was difficult," says Keith Odle, second engineer. "Gene Eichelberger is the only engineer that I know of in Nashville who could have handled that much going on live. The idea was to get as much as we could during the track and work it out later knowing Neil didn't want to overdub. We used the Solid State console to the maximum.

"Another thing—we had a large number of singers doing background live," says Odle. "It's much harder to work that way than when you overdub and can concentrate on individual performance. But everybody involved was a real pro and they made it happen."

The session was unique, according to Odle, because it used the state-of-the-art version of the Sony dual 24-tracks locked together to be a 48-track operation. Those were pre-DASH format digital machines upgraded to DASH standards. ■

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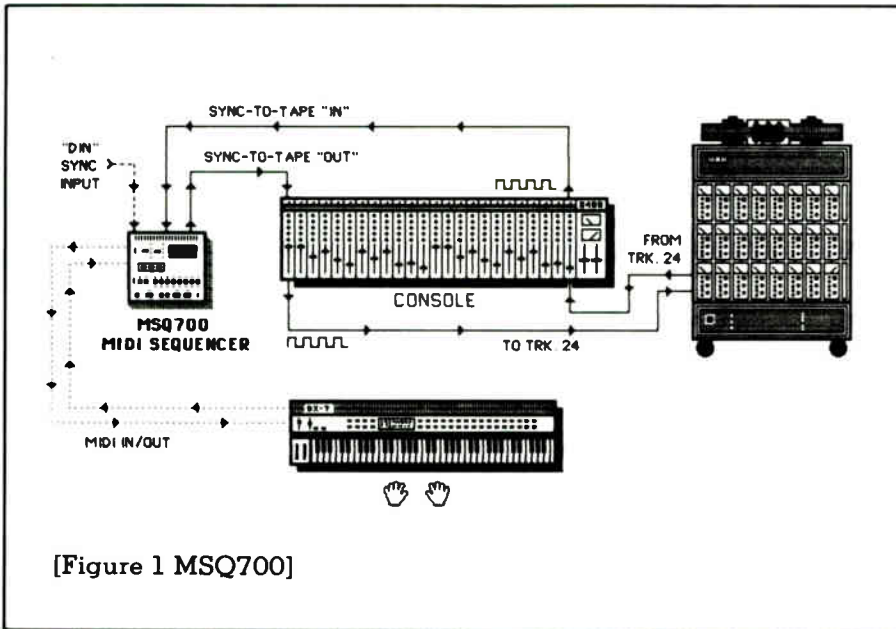
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[Figure 1 MSQ700]

"slave units." This "hierarchy" allows the computers to clearly understand which unit is giving commands, and which units obey them. In some cases, it is possible for the function of a unit to alternate; it may be the master for one overdub, and slave for another one. This almost always requires a change in wiring, or at least a change of settings so that the related devices understand which unit is now commanding.

Let's look at a typical computerized setup and how this hierarchy allows clock synchronization to occur.

Figure 1 shows a sequencer. In this case, a Roland MSQ700 MIDI sequencer. This sequencer can get its clock signal from any of several different sources, internal metronome, external sync, MIDI clock, or sync-to-tape code (FSK). Since it is the only device we are using at this time, it assumes the role of master in this configuration. To use this unit properly, you would first record its tape sync signal, set to the proper tempo. To overdub, send the sync signal back to the unit, selecting the tape sync input for the clock. When the MSQ "hears" the beginning of its sync tone from the multitrack tape, it automatically starts playing, "locking" itself to the tempo of the sync track.

That's fine for just one MSQ 700, but how about something a bit more complex?

Figure 2 shows such a setup; an MSQ700 and a Roland Rhythm Composer (TR808). In this case, you must make a choice: which unit will be the *master*, and which will be the *slave*? If you have already been recording with the MSQ 700's sync-to-tape code, it may be easier to retain the MSQ700 as the master unit. In this case, the setup will be like Figure 2A, with the MSQ 700 as master, feeding its DIN sync output (the 5-pin DIN connector), over to the TR808's DIN sync input. Since the MSQ700 will generate both a clock and a start/stop signal for the TR808, it will control it completely, and in perfect sync. (Remember to switch the TR808 sync connection to input, however, or the 808 will ignore the incoming sync signals!) In the case of the TR808, since it does not have provisions for sync-to-tape, this is probably the only way you could get these two devices to work together. If, however, your drum machine is like the TR909, and has provision for sync-to-tape, and sync in and out, you may elect to choose either unit

## Wiring Complex Computer Setups

Knowing *what* to connect is as important as knowing *how* to connect it.

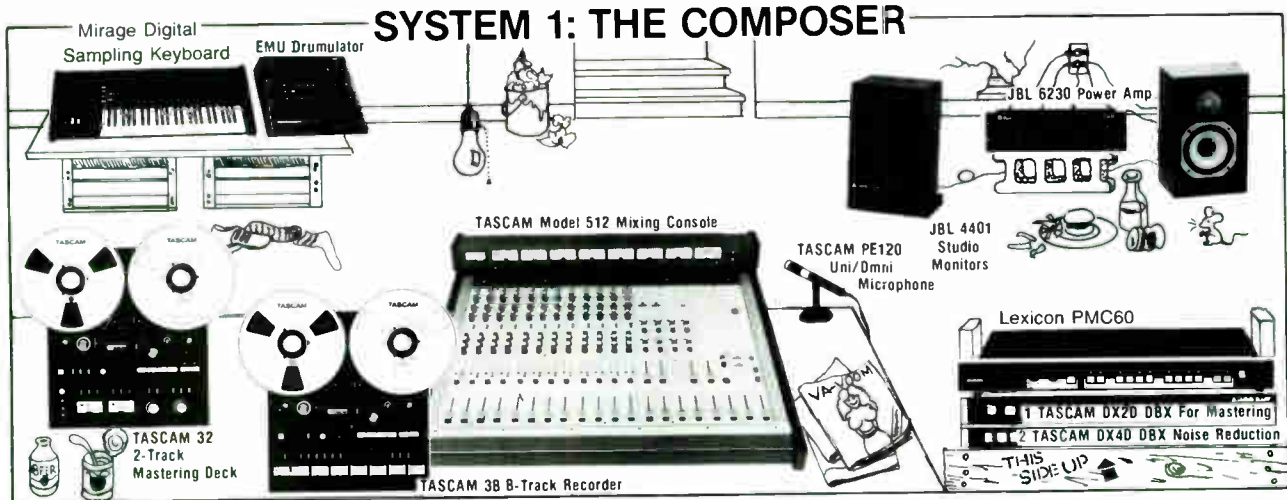
by Bruce Nazarian



Last month, we discussed the basics of how to use computers in recording. Understanding how to connect the various devices is as important as understanding how to run them. Inevitably, it comes down to wiring—whether you are using MIDI sequencers or drum machines, knowing how to connect them together can help you accomplish the desired recording goal.

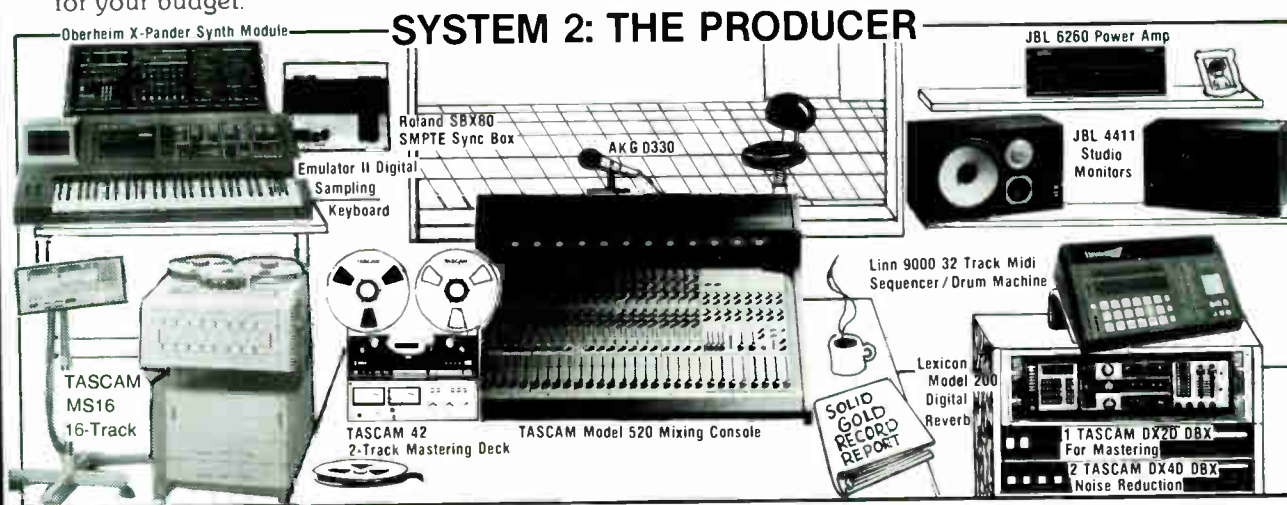
Knowing *what* to connect is as important as knowing *how* to connect it. The element that provides the common thread running between all computerized sequencers and drum machines is the *clock signal*. Equally important is understanding the "chain-of-command," so to speak, that is involved in almost every situation involving more than one computerized device, sequencer, etc., there must be a "master unit," to which all other devices are

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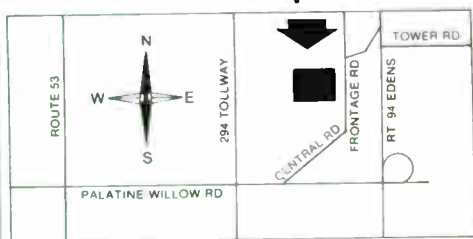
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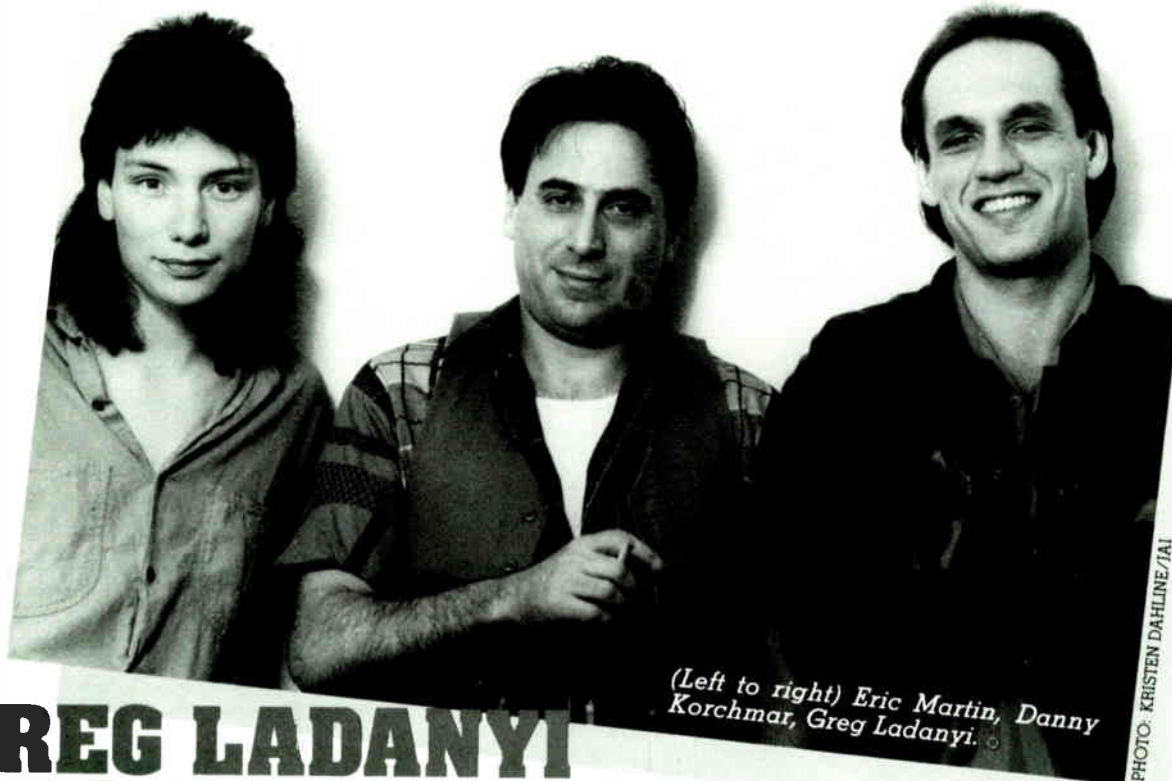


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(Left to right) Eric Martin, Danny Korchmar, Greg Ladanyi.

PHOTO: KRISTEN DAHLIN/JAI

## GREG LADANYI ENTERS A NEW PHASE

by Robyn Flans

Greg Ladanyi is moving into a new phase of his career. After dealing with a roster of established artists, he's enjoying the process of helping to develop the careers of lesser knowns.

Ladanyi and co-producer Danny Korchmar had free reign in creating a new direction for San Francisco Bay Area-based singer Eric Martin. Up to now, Martin, who is managed by the Journey organization, Nightmare, and whose last album was produced by Journey producer Kevin Elson, has understandably taken on characteristics of that sibling band. Upon hearing Martin's demo tape, however, Ladanyi instantly knew that had been the wrong approach.

"The soul I heard in this kid's voice..." Ladanyi trails off. "I knew it had to be an R&B record, and the only guy I know I can do that with is Kootch [Korchmar]. Eric's whole style of singing now has changed. He's not trying to be a big power singer, he's singing with that R&B soul. He's like a white

black kid. We took a song that was demoed up in San Francisco called 'Eyes of the World' and created the feel in that song, instead of it being a big power rock 'n' roll song. When we went to the solo, we used the Roland 707 guitar synthesizer, which played a melody solo, instead of someone wailing a guitar solo. Then this was where it was up to Eric as a singer to convince you that he is serious and real. The way the record was made, there was nothing to hide behind. He had to be who he is, and hopefully, giving him the room to do that, in what I did in terms of making the record, enhanced and created his own style."

If Ladanyi has an approach to production, it is to do just that: enhance an artist's style, by passively asserting his own style.

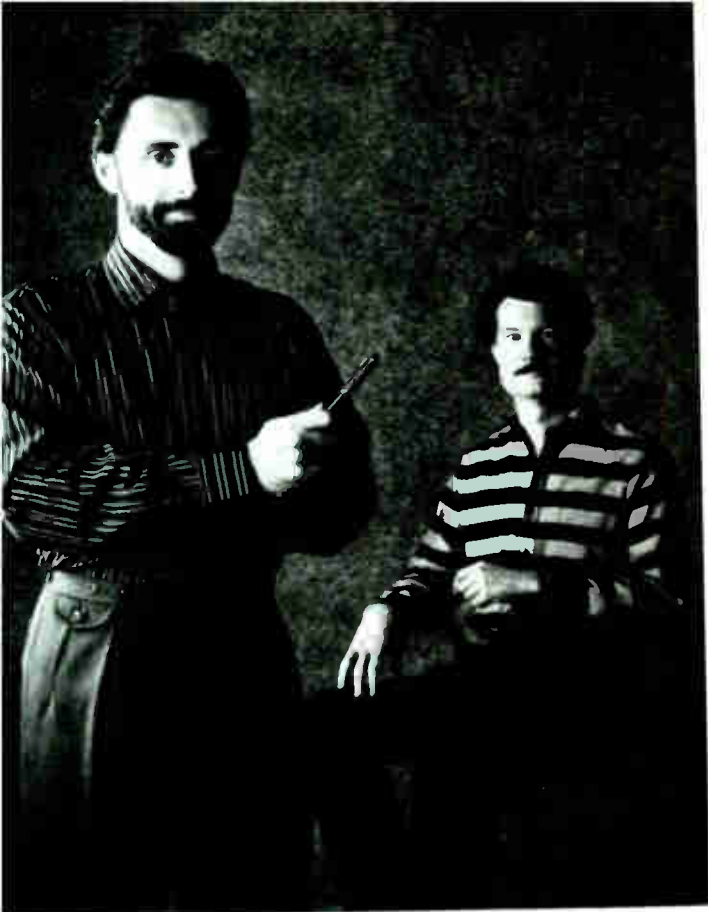
"It is developed around what the artists' style is supposed to be, because, after all, I'm not the artist. 'What does this song mean to you? How do you want this song to feel? How am I going to get this to that level?' It's impossible for me to do that if I forget to ask those

kinds of questions."

Ladanyi didn't know what kinds of questions to ask when he engineered his very first effort, a Captain Beefheart record. He had started in the business at 17, managing bands and booking them into local nightclubs. A couple of years later, he and a partner set up shop at Stronghold, a small rehearsal studio with a 4-track. The 4-track graduated to 8-, then 16-, and finally a 24-track studio. He was still booking bands, now around the country, when he began tinkering in the studio.

The Beefheart record, however, was a less than pleasurable experience. "My partner was supposed to do it and something happened where I ended up doing it. I was always the guy who had the air of 'I can cop anything,' because that's what I learned from playing the manager's games and getting people to believe in me very quickly. That was an account that we couldn't afford to lose because it was paying our bills. I'd be in the studio, messing around, getting the basic things down, but it was, 'I gotta go get a coffee,' and





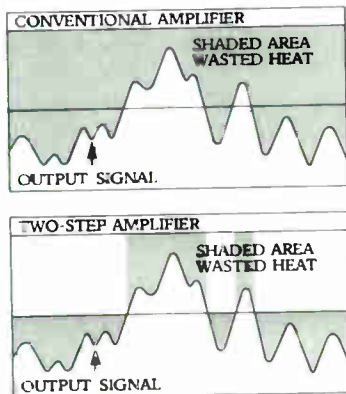
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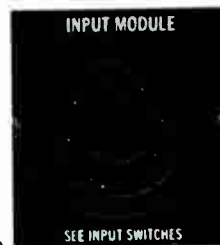
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I'd go call my partner. 'Real quick, how do I do this?'"

By 22, Ladanyi had become frustrated with the way their business was going and left to assist Dave Hassinger and Val Garay at the Sound Factory.

"After I was done working, I would literally sit in the studio from midnight until 4:00 or 5:00, just mixing tapes we had been working on. I did that for a good five or six months. I developed a sense of feel for balance and mixing while understanding what makes an artist try to do what he's trying to do."

It definitely paid off. It wasn't long afterwards that Ladanyi was asked to mix Jackson Browne's landmark album, *The Pretender*. That was followed by engineering *Running on Empty*, then co-producing *Hold On, Hold Out* and *Lawyers in Love*.

"I would say my role as co-producer with him was organizing the troops, trying to be there for Jackson for an objective opinion and really trying to develop a sound with him. None of his past records really came on sonically very much. And Jackson really came through with me, where he taught me a lot of

things about music, songwriting and words—why they're important and have meaning and substance. In turn, I gave him ways to figure out how to use echo, Harmonizers, delays and different things. It was an exchange of concepts that really meshed well together.

"The approach with Jackson on *The Pretender*, was to make a really solid foundation on the rhythmic end, where it had to have some feeling of liveness in it, almost like it was live, but be studio. You can do that through placement in the mix, where you might put a piano, for instance. Instead of the piano being in stereo, you might put it left center or right center, put the guitar on the right and just move things around until you find the right slot where you sit there and emotionally feel the vibe from the song. That's the method in which I go about trying to create a pocket for the singer/songwriter, so he can sing his song."

The other songwriter with whom Ladanyi is most identified is Don Henley; he worked on both of Henley's solo albums. With someone like Henley, it's easy for Ladanyi to put the focus on the song, which, to him, is the most crucial element of production.

"When I go to mix, the song is my emphasis. Some of the songs you have to mix aren't brilliant lyrically, but if you try to mess with a song that has real substance, number one, the artist will tell you, and number two, you're going to feel it. That's been my main concentration. I know I can do anything I want to do with technology, but that's not the point. Don, Danny and I went into the studio to do the dance mix of 'All She Wants To Do Is Dance' and it was hopeless. We turned it over to this guy named John Luwongo. He took the song, completely cut it apart and put things in other places. I felt, 'God, I don't want anything to do with that.' He was in the studio for 30 hours making this eight minute disco dance tune. It's good for the discos, but it's not something I really want to be doing. At that point, you're really taking apart a song and the song is no longer a big factor. That's not fun for me."

What is exciting now to Ladanyi is this new phase of his career. In addition to Eric Martin, Ladanyi is co-producing (along with David Paich and Steve Porcaro) a new A&M signed act, Logic.

"These two records are important to me because you can work with the great guys, but what deems you great? What makes you so special in the eyes of the world? Don Henley is Don Henley and Jackson Browne is Jackson Browne. Fortunately, I think I've been able to enhance their thing, but now it's time for me to give somebody else a chance." ■

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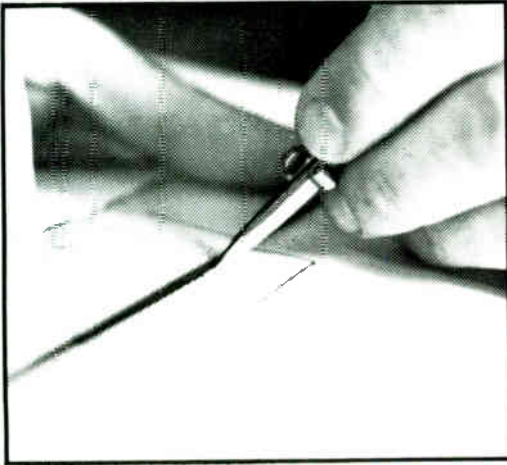
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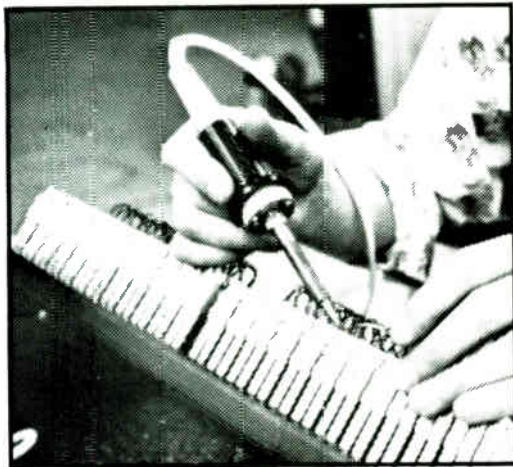


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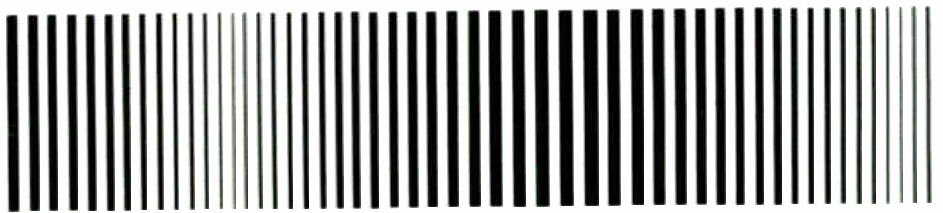
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## New Products, New Ideas

by Craig Anderton

**T**he search for an inexpensive guitar-to-MIDI converter continues. At the Winter 1985 NAMM show, Cherry Lane was showing a device called the Pitchrider (manufactured by the Canadian company IVL). This \$500 device tracks a monophonic sound source (voice, flute, etc.) and provides MIDI information for note on, note off, pitch, and level. I called the company about the suitability

of this device for single-note guitar playing; they said that it *can* work, but requires extremely clean playing so that only one string is vibrating at a time. Not to worry, though—they're working on a hex version for a guitar that is targeted to sell for under \$1000. Although you will need to use their add-on hex pickup and a multi-conductor cable, the pickup is quite small and mounts unobtrusively towards the bridge of the guitar. Planned introduction for the guitar-to-MIDI converter is at the Summer NAMM show (one month from the date of writing this column), and you can bet I'll be one of

the first people in line to check it out.

Yamaha will be among the many other companies introducing new products at NAMM. In the under \$1000 category (probably much less; pricing is not yet set), look for the TX7, a keyboardless DX7 packaged in a cute little wedge, and the QX7, a similarly packaged and priced two-track MIDI sequencer that's a "little brother" of the QX1 eight-track MIDI sequencer. Also expect the DX21, an "entry-level" FM synthesizer that's part of the DX7 family; and on the high-end front, Yamaha will unveil the DX5. This is basically two DX7s in a single package, but is still easily transportable (it's considerably smaller than their top-of-the-line DX1). In the rumors category, I've heard of a \$6,000 sampling keyboard à la Kurzweil and a guitar synthesizer; we'll see.

FM technology keyboards aren't the only items becoming more affordable... if you like Steinberger instruments more than their price, Hohner has received an exclusive license to use the Steinberger body shape and tuning system in their affordable Hohner Professional Series. The guitar will be available with a tremolo tailpiece designed specifically for the instrument. Both the guitar and bass are manufactured from solid maple, feature neck-through-body construction, and include two high impedance humbucking pickups.

ART has been enhancing their reverb software. The model DR2 digital reverb was originally specified as having three different room types but currently includes a total of nine unique rooms. Their flagship reverb, the O1A, is now up to software revision 2.4. This latest revision provides seven banks of seven presets for a total of 49 different room presets. Also, the smoothness and character of each room has been improved. Overall, with these improvements, the O1A is one of the more cost-effective digital reverbs going.

With a price drop from \$10,000 to \$7,995, the Quantec Room Simulator has become somewhat more affordable. (Incidentally, there's a JL Cooper-designed Quantec to MIDI adapter available for \$395.) Europa Technology also distributes the MDB Window Recorder, a 16-bit rack mount sampling device that samples up to six seconds of very high quality sound. The MDB responds to MIDI, CV/gate, and drum pad triggers. In other sampling news, I hear that Moog is working on a sampling keyboard.

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Fresh off the presses, the author's Digital Delay Handbook is a user friendly guide to getting the most from a DDL.

JL Cooper's "Expression Plus" includes eight VCAs which may be set to a preset level or controlled by MIDI controllers Pedal 1, Pedal 2, or Breath Controller. The EP responds to MIDI program change data; therefore, by running various instruments through the VCAs, you can have different preset levels for different songs or sections of songs. Also new from JLC: a 16 in/20 out MIDI switching box (designed with the QX-1 in mind) for \$1395, and a MIDI clock-to-standard click converter for \$195.

Mirage owners who want to get more out of their instrument will be interested in *Transoniq Hacker*, a newsletter based on the Mirage and featuring disk reviews, software applications, reviews of peripheral equipment, a free classified section for the disk-swappers in the crowd, and so on. \$15 brings you 12 issues. For more information, write TH at 5047 SW 26th Drive, Portland, OR 97201 or phone (503) 245-4763. If you'd like a sample issue, mention "MI Update" and they'll send you one for free.

And now for some self-promotion (hey — if I don't do it, who will?). My latest book, *The Digital Delay Handbook*, is available from the *Mix* bookshelf. It includes 69 unique delay line applications and is intended for those who want to get the most from these ubiquitous signal processors. (Incidentally, there are a couple of glitches in the first printing; on page 119 the reference to Fig. 9-4 should be to Fig. 9-3, and Fig. 9-4 should be on page 128.)

As this column is being written, in three weeks I'll be leaving for the summer NAMM show... so we'll have plenty to check out next issue. See you then.

—Craig Anderton

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## Gregg Rolie's Solo Return

by Hillel Resner

Gregg Rolie is looking, feeling and sounding good. After a little over four years of "semi-retirement," the former lead singer and co-founder of Journey and Santana will hit the stores this month with a new solo album, tailored to the musical tastes of the '80s.

Begun a year-and-a-half ago, the project finally coalesced in May of this year, when Rolie recorded the album's final three cuts with red-hot producer/engineer Bill Schnee. Rolie, Schnee and keyboardist/arranger Peter Wolf (Commodores, Starship) closeted themselves in Schnee's North Hollywood studio for three weeks and recorded the last three of the album's ten songs. At least two of the cuts—the uptempo rocker "Young Love" and the slower, slightly hypnotic "I Want to Go Back" (recorded previously by Billy Satellite) sound destined for lots of airplay on contemporary rock stations. Multiple layers of Synclavier, Yamaha DX7 and other synthesizers, stacked on a pro-

pulsive foundation of electronic drums, provide solid melodic and rhythmic support for Rolie's vocals—which sound stronger and more self-assured than they ever have. This may have been due in part, the singer thinks, to the relatively relaxed approach of recording with a three-man team.

"It was just Bill Schnee, Peter Wolf and me in a control room, surrounded by keyboards and equipment," Rolie says. "I learned a lot that I didn't know before. Being on your own is a real different ballgame when you're used to bouncing things off a band. Since I was 19 or 20 years old I've always been in a group. When you've got a few people it can be easier, and at the same time it can be hard to know what to do. I had never done that before."

Fortunately, according to Rolie, the participants were pretty much in accord about which way to go with the material, which made for a free-flowing project.

"I bet 90 percent of everybody's ideas are on there," Rolie said. "We were very much in agreement all the time, which made it slick. I consider Peter Wolf my 'band' at this point, because he did the drums, the synthesizers, the arrangements. And Bill Schnee made it very easy to record. I didn't feel any pressure, and therefore my vocals came out very relaxed, and yet real strong. We did very few takes."

The album's other seven tracks, recorded in 1984 with producer Kevin Beamish, provide something of a contrast, in terms of both musical approach and working methods. Rolie recorded for about two months with a large group of musicians, including bassist Dave Margen, drummer Mark Craney, and a platoon of guitarists that included Carlos Santana, Neal Schon, Craig Chaquico and Mark Ross.

"There's a lot of guitar on the other cuts," Rolie says. "It's real guitar-strong, and unfortunately, guitar nowadays doesn't seem the way to go as much as it is synthesizer. I love guitar, I grew up with that sound, but you have to be current."

As a result, Rolie's record company (CBS) brought him together with Schnee, who in turn introduced him to Peter Wolf. The result was the three new tracks, which together with the original seven provide a pleasing blend of sounds that should appeal to both longtime Rolie fans and the new wave of radio programmers.

The studio-oriented approach to the making of the album also fits into Rolie's career game plan:

"I've built image through a band," he says, "but what I'm trying to do now is build an image through a record. It's basically to set me up as a singer and player, but more a singer. I've never really had a focal point put on me. Hardly anybody knew that I sang 'Black Magic Woman' with Santana. People find that out and they say, 'That was you?'"

"The best part is the record company's behind it and everybody's in agreement. Now it's up to people, and whether they like it. I think we've got a real good shot at it." ■

## A "New" Beatles Album

by Rip Rense

Once upon a time back in the 1960s, a lot of people used to wait for new music by The Beatles the way kids used to wait for Christmas. The group's singles used to reach number one routinely through advance orders.

It's time to start waiting again.

For the first time since The Beatles broke up in 1970, their old record company has not only admitted having enough leftover songs for at least one new album, but is enthusiastically seeking to release them. The long and winding and often apocryphal saga of the band's unreleased music has finally taken an official turn for the turntable in 1985.

But before you start singing "It Won't Be Long"...

"We have put a suggestion to the relevant individuals and their representatives which has not met with their full approval at this time," said EMI Records general manager of public relations Brian Southall, reached in London. "And we're back to the drawing board. With their input, hopefully we'll see what we can come up with."

The "suggestion" Southall spoke of was a 13-song LP provisionally entitled *Sessions* (plus a single containing one song not on the album.) The "relevant individuals" who did not grant "full approval" to the project are Paul McCartney, George Harrison, Ringo Starr, and Yoko Ono (who represents John Lennon's estate.)



Sources said, incidentally, that the most "relevant" in this issue is McCartney, who happens to be EMI's most valuable client.

Fourteen new songs. At least...

Here's the scoop:

For years, EMI has admitted to owning a "few odd tracks" the band never issued—either for artistic reasons or merely because there were a few tunes too many for a given album. EMI has always poo-pooed the idea of releasing these tracks, brushing them off as historical curiosities and not up to the standard The Beatles held themselves to. Among these few numbers, the company grudgingly acknowledged over the years, were Mitch Murray's "How Do You Do It?" and Johnny Preston's "Leave My Kitten Alone."

For reasons never entirely clarified by EMI—possibly just a response to recurrent waves of Beatlemania—the company's "Beatles Committee" elected to release "How..." and "Kitten" as a single in 1980. Those plans were scrapped after the murder of Lennon for fear of exploiting the tragedy. Then, about a year later, there began another strange and poignant post-script to the Beatles' remarkable story.

"Some work was done," said Southall, "by a gentleman who has since passed away which indicated that there were a number of tracks—alternate versions, etc., in the studios in our possession."

The gentleman was a young Abbey Road Studios engineer named John Barrett. Barrett, fighting a losing battle with cancer, found himself unable to carry out his regular schedule while receiving treatments for the disease. EMI generously suggested an assignment that allowed him more flexible working hours. The assignment was to listen to the approximately 90 tapes left behind by The Beatles—nine years' worth—and catalog their contents. It became a labor of love.

"He spent a long time going through tapes and logs and various other things and discovered a number of... alternative takes that differed fairly significantly from the final released versions," said Southall.

Barrett also discovered at least one finished track that has never even been rumored to exist—not by the most fanatic collectors or highest EMI leaks—a Beatles version of the old Lloyd Price song, "Mailman Blues."

Barrett died before the work was finished. About a year's worth remains, and is being listened to now by other Abbey Road Studio officials. But the painstaking research by the late engineer woke up EMI to an amazing fact—one that collectors of Beatle bootleg LPs have maintained for years—



that there was enough recorded material in the form of finished songs to complete at least one more Beatles album.

"Yes, prior to that we had never believed there was sufficient material," said Southall. "It became apparent that there were a lot more versions of songs than probably we were even aware of."

EMI set to work. Under the guidance of Southall and the Beatles Committee, plans for an album were drawn up. Potential tracks were polished up and readied for release by longtime Beatles engineer Geoff Emerick. Several possible packages were considered before the LP known as *Sessions* was chosen. Seldom-seen photos of the group were retrieved from EMI archives, and a release date was set for November of 1984. That date was bumped, according to sources at Capitol Records, to make way for the release of McCartney's *Give My Regards to Broad Street* soundtrack. The new date, January '85, was cancelled after the project was rejected by the remaining Beatles and Lennon's estate.

But all is not lost.

"There are some discussions to take place over the possible content of the album," Southall said. "Hopefully, we will be able to come up with an album between us that will keep everybody happy, and can keep the fans happy, who have basically been looking for this product for a long time."

What? Discussions? The remaining Beatles, especially McCartney, have never endorsed the idea of releasing the group's leftovers. Yet a spokesman for McCartney reached in London confirmed that, indeed, "discussions are taking place" about the possible release of some kind of new Beatles LP. (Harrison and Starr could not be reached for comment. Elliot Mintz, spokesman for Yoko Ono, confirmed that Ono had rejected the pack-

age "along with the others," but added he was unaware of further discussion at this point.)

Speculation is that the LP was rejected because it would not "play" like a Beatles album; that it wasn't up to snuff by Beatles standards. Indeed, the tracks—as they were listed on official "label copy" shipped by EMI to Capitol in Los Angeles—seemed to comprise more of a "leftovers" or "rarities" package than a carefully paced Beatles album. And here, courtesy of a source who obtained a copy of the list, are the titles:

The LP opened with what must have been EMI's idea of a joke, a Beatles version of Badfinger's "Come and Get It" (written by McCartney.) Then: "Leave My Kitten Alone," Harrison's "Not Guilty" (first recorded for *The White Album* in 1968, later re-recorded for the 1980 *George Harrison* LP), a different version of "I'm Looking Through You" from the *Rubber Soul* LP, and "What's the New Mary Jane" (the widely-bootlegged session with Lennon, Yoko Ono, and Harrison allegedly intended to deflate the deifying of The Beatles.) Side two: the much-bootlegged "How Do You Do It?" (rejected over George Martin's recommendation for The Beatles' second single in favor of "Please Please Me"), "Besame Mucho" (recording date uncertain), "One After 909" (an early version dating from March 5, 1963), "If You've Got Troubles" (a Lennon-McCartney number from 1965 featuring Ringo singing), "That Means A Lot" (a Lennon-McCartney tune later released by P.J. Proby), a quiet acoustic rendition of "While My Guitar Gently Weeps" (from 1968, with an extra verse), "Mailman Blues" from 1969, and a snippet of an original Christmas song used in the band's 1967 fan club Christmas message entitled "Christmastime is Here Again."

The collection is uneven. (The following information is based on listening to bootlegs of varying quality, and collectors' observations.) "Come and Get It" and "Christmastime" are interesting only as curiosities. "Kitten" is an all-out rocker, however, arguably better than a lot of tracks the band did release. (Illegal tapes of it surfaced on radio stations in New York, Houston, and Los Angeles.) "Not Guilty" is rumored to include Eric Clapton (Clapton and possibly Mick Jagger could be on one or two of the tracks, according to Southall, who added that even EMI doesn't know for sure.) "Mary Jane" is possibly the most bizarre and daffy track ever to bear the group's signature (and that includes "You Know My Name, Look Up the Number"). "How Do You Do It?" has a small, unexciting charm.

—PAGE 115

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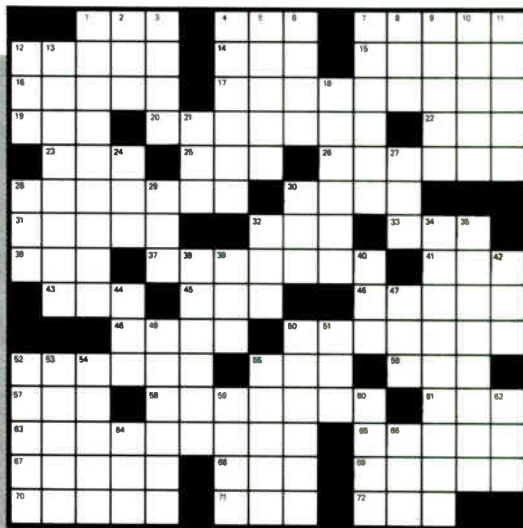
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**ACROSS**

1. Simon Le \_\_\_\_\_
3. Seafarer
7. Type of reverb
12. Film music
14. "Able was I \_\_\_\_\_"
15. Hourly
16. Branches
17. Large valve horn
19. Emissary (abbr.)
20. Three-stringed fretless Japanese lute
22. I was, to Nero
23. Musical measure
25. Place for iniquity
26. Members of the viol family
28. Sang Jingle Bells
30. Island or terrier
31. Nostalgic hit
32. Paris season
33. "\_\_\_\_\_ baue ganz auf deine Starke," (Mozart aria)
36. "\_\_\_\_\_ Goo Barabajagal," (Donovan tune)
37. Instrument whose name is Hawaiian for "ilea"
41. Western Hemisphere org.
43. L-P connection
45. "...he floats like a butterfly, and stings like a bee"
46. Founder of the Persian Empire
48. Irish
50. Lays a slab
52. Brought up
55. Ethiopian title
56. Producer \_\_\_\_\_ Fraboni
57. "Small \_\_\_\_\_" Bob Marley
58. Predecessor of the bassoon
61. Gold Bug author
63. Early members of the harpsichord family
65. Beer garden vessel
67. U.S. born British writer
68. Type of "bug"
69. Lend-\_\_\_\_\_ (FDR)
70. Oozes
71. Dandy
72. Unclose, to the poet

**DOWN**

1. Large valve horn
2. Sphere
3. Loch \_\_\_\_\_
4. Thrived
5. Left in \_\_\_\_\_ (demolished)
6. Salesmen
7. Fake
8. Chaney
9. Tempest spirit
10. Bullish prefix
11. St. \_\_\_\_\_ Fire (Michael Franks tune)
12. Patty Hearst captors
13. Hungarian orchestral instrument of the psaltery family
18. Inventor of the modern German bassoon
21. King Sunny \_\_\_\_\_
24. French king
27. Luau wear
28. Part of a gear
29. Rumanian monetary unit equal to approx. one U.S. cent
30. Jeanne d'Arc, e.g.
32. Yalie
34. Early name for the cornet
35. French oboe
38. Writer-director Larry of "The Big Chill" and "Silverado"
39. Rubber tree
40. Anti-radar acronym
42. Draft org.
44. Above, to Burns
47. "\_\_\_\_\_ Blues," Beatles tune
49. Equips again
50. Condiment
51. Id \_\_\_\_\_
52. Good press from the critics
53. "Kiss You All Over" band
54. John Denver LP
55. Scandinavian chieftain, first duke of Normandy
59. Large hook on a pole
60. Norway city
62. Compass pt.
64. Republican org.
66. Sam Snead starting point

—FROM PAGE 113

"One After 909" is a more sinewy and punchy rocker than the novelty-like version of 1969. "If You've Got Troubles" sounds like it's about half-way finished. "That Means A Lot" is pure 1965 *Help* or *Rubber Soul* Beatles, with a "Ticket to Ride" beat, lovely melody and lush harmony vocals. "Guitar" is perhaps more affecting in this small (solo?) setting, and includes the extra verse: "I look from the wings / At the play you are staging / While my guitar gently weeps / As I am sitting here doing nothing but aging / Still my guitar gently weeps..." No information was available about "Mailman Blues," other than it probably is on par with "Let It Be" sessions quality.

The single was to have been "Kitten" backed with an alternate version of "Obla-di, Obla-da," according to sources at Capitol.

Southall would only confirm that these are some of the tracks considered for release, and would identify no others in EMI's possession. However, several more of the EMI tracks were excerpted for the public during a tour of Abbey Road Studios in 1983. They include three very different versions of "Strawberry Fields Forever" (including the two that were patched together for the final release), "Lady Madonna," with a different vocal, and an earlier version of "She's a Woman." Also known to be among the EMI tracks, according to sources at EMI and Abbey Road Studios, are different renditions of "Penny Lane," and alternate versions of songs from the *Let It Be* sessions.

What might eventually be released is anybody's guess. Southall even said that EMI would welcome contributions from avid collectors, and from the remaining Beatles themselves (Harrison, for example, has said he owns the "best" recording of "Revolution"—acoustic, with Ringo on maracas.) Further, Southall expressed interest in reports that a well-known collector from Burbank, California owns acetates of two 1966 Beatles tracks entitled "Granny Smith" and "Mark One."

For the record, so to speak, there are new indications that other long-rumored material actually does exist. A new Beatles bootleg album includes a near studio-quality version of "Shout," McCartney singing a solo acoustic version of the song he gave to Mary Hopkin, "Goodbye," and—most importantly—a track labelled "Cat's Walk." Collectors believe "Cat's Walk" to be an early instrumental (probably with Pete Best drumming) from a legendary audition tape that supposedly includes titles like "I Lost My Little Girl" and "Thinking of Linking." "Cat's Walk" was given by Lennon and McCartney

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to the Chris Barber Band, which recorded a version in 1967.

Rumors of other material abound. Among the tunes most likely to exist—possibly in the vaults of what is left of Apple Corps. Ltd. in London—are “Shake, Rattle and Roll,” “Blue Suede Shoes,” and a remake of “Love Me Do,” all reported by The Beatles official publication in 1969 to have been finished for an oldies album.

Whatever does become available for an EMI album will not have to face two important obstacles: 1) Payment—the group members and Lennon’s estate will be paid according to their old contracts 2) Lawsuits—Southall said there are no indications that there will be any legal objection to the release

of more music by the remaining Beatles or Lennon’s estate.

So Southall remained optimistic—despite the setback, and so does someone with a good deal of expertise on the subject: Elliot Mintz. Mintz, who has done considerable research into leftover Beatles material, grew convinced long ago—after discussions with Lennon—that more songs will surface.

“Regardless of what EMI has done in its research, I must say that based on the work I’ve done, I don’t think anybody could possibly make a statement that there isn’t sufficient material for another album. Or that there aren’t undiscovered songs or pieces of music. John and Paul got together in front of a microphone the way you and I make

telephone calls, and there were reference track tapes running through all of those Beatles sessions.”

Mintz made a prediction:

“I know there are a lot of people who have a tremendous desire to hear more stuff, and that is a real concern,” he said. “I think the possibility of that happening in the future is probably good. I don’t think it’s curtains because this project can’t be released. I think there is considerably more stuff to come, but when it does, it should be the kind of stuff that would maintain the standard they all had established so long ago.”

## Ray Charles’ Country Supersessions

by Rose Clayton

“I had this dream—this vision of what I wanted to do before I leave this earth, but I never thought, even in the most minute way, that I’d get to do it,” says Ray Charles, one of music’s most eclectic virtuosos.

“When I signed with CBS, I mentioned it to Rick Blackburn as something I’d like to do in the future,” Charles continues. “Well, he says, ‘What would you think if I speak to some of those people for you?’”

The rest is history. Blackburn, vice president/general manager of CBS, Nashville, pieced together Charles’ dream of recording with some of his all-time favorite country singers. They named the album *Friendship* and it went on to hit number one on *Billboard’s* country LP charts.

For those who have not heard the record, it features Charles dueting with George Jones, Merle Haggard, Johnny Cash, Ricky Skaggs, Hank Williams, Jr., the Oak Ridge Boys, Janie Fricke, B.J. Thomas, Mickey Gilley, and naturally, Willie Nelson.

“Seven Spanish Angels,” the Charles-Nelson song was a number one country single and a popular music video. Gilley’s duet, “It Ain’t Gonna Worry My Mind” was released in early June as the fourth single from the album. Earlier 45s were Jones and Charles singing “We Didn’t See a Thing,” featuring Chet Atkins, and “Rock and Roll Shoes” with B.J. Thomas.

Rumors that he was committing “musical suicide” when he recorded *Modern Sounds of Country and Western Music* some 20 years ago were quickly dispelled when Charles’ cover of Hank Williams’ “I Can’t Stop Loving You” became a number one hit and

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stuck at the top of the charts for more than four months.

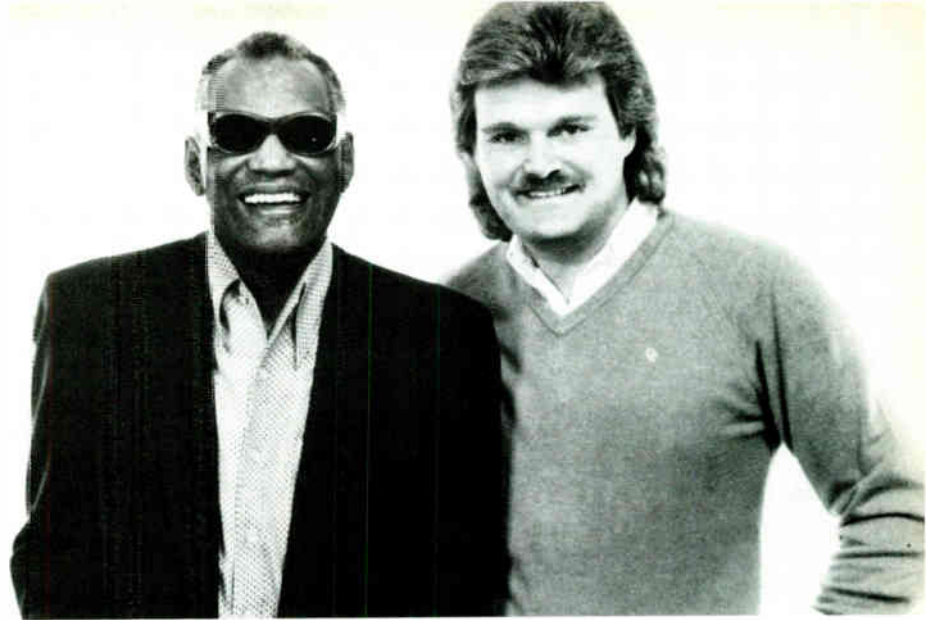
"I feel that my thing towards music is to record good music," Charles says. "I think Duke Ellington's music will be around 200-300 years. Why? Because it's good. I think this album is good. I feel as long as people can appreciate good music as we know it, it will be around forever."

The reason Charles is so optimistic about *Friendship* is that he thinks it has something for everyone.

"We have a good diversity of styles," Charles explains. "Take Ricky Skaggs. How bluegrass can you get? I love him! On the other hand you say, 'What about George Jones?' There he is, 'Mr. Country,' or Johnny Cash, who if he opens his mouth you know who he is; or Merle Haggard, who I think is *the* country balladeer. You know how smooth he is.

"And Willie Nelson," Charles continues. "There's a man who is outstanding, truly, and yet as we worked together there was no ego thing—no, 'I'm Mr. Big.' As a matter of fact, all these people I'm telling you about said, 'You tell me what you want. Show us how you want it done and we'll do it.' I think you can't get better than that. I got respect from everyone."

PHOTO: RON KEITH



Ray Charles with Ricky Skaggs

It was more than respect, however. *Friendship* was a meeting of the mutual admiration society.

"Getting to work with Ray Charles was a dream come true for me," says Ricky Skaggs. "Now if I can work with George Jones, I can die and go to heaven because I will have done everything I want to do.

"Ray's just so full of music all the time," Skaggs adds. "If he's not playing something on the piano, he's singing it; if he's not singing it, he's thinking it and wishing he was playing it.

"But," Skaggs warns, "he's very precise. If something is not right he will let you know. He loves feel and groove and he doesn't like to be pushed him-

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self. He likes to be the pusher. He's a leader."

Joe Bonsall of the Oak Ridge Boys says: "When we were asked if we wanted to be a part of the album we said, 'Yeah, to sing with Ray Charles? Set up the mikes we're coming.' It was a real thrill being led by Ray Charles—having him tell us how to sing our parts."

With Charles surrounding himself with so many country music heavies, one might wonder if he has found a permanent home, or if a *Friendship II* album might bring him together with top artists from other genres.

Just how deep is Charles' commitment to country music?

"The only commitment I have is to play whatever music I play to the best of my ability," Charles responds. "I have to say that I am a person that when I do whatever kind of music—jazz, blues, light opera, which I do—I give it everything I've got."

Charles says he is satisfied with *Friendship* because it represents a unified commitment.

"Everybody who was on the album was so in tune with me," says Charles. "I mean that sincerely. I'm not trying to feed you something plastic. We're in a profession where I know what you do and you know what I do and we cannot bullshit each other."

"It was the most unbelievable thing I've ever done. Everybody bent over backwards to give me what I wanted. That means—what they were telling me is—'Hey, we want your album to be the best it can possibly be.' I think that is the greatest tribute an artist can receive." ■

## Quantum Leap Ganging Up With Synthesizers

by David Goggin

Quantum Leap is a daring combination of talent and technology. Conceived and conducted by Ed Freeman, veteran L.A. musician/composer, the group's first project is entitled "The War on Attitude." A far cry from Freeman's past pop successes, such as producer of Don McLean's "American Pie," Quantum Leap breaks new ground both musically and technologically.

With L.A. Record Plant president Chris Stone as executive producer for the project, Freeman had access to a cornucopia of high-tech recording tools. To create the ultimate synthesizer sound, Freeman composed a complex collection of highly rhythmic avant-garde instrumentals and then joined forces with the cream of L.A.'s pro-

grammers, players and synth designers.

The music is hard to categorize. Unlike the familiar "theme and variation" style of composition, Quantum Leap takes a musical idea, progresses, distorts, twists and never returns to home base. The lush, alien musical landscapes conjure up images of bio-rhythmic cellular activity, subtle waves of movement beneath turbulent surfaces, new music echoing from nightclubs and temples on a distant planet.

At times, as many as 28 synthesizers, 9 programmers and 6 recording engineers were simultaneously employed to create the sounds of Quantum Leap. Miles of cable linked the Oberheims, Yamahas, Prophets, Korgs, Jupiters, Kurzweils, 360 Systems and Serge modular configurations together in a temporary mad scientist's lab at the massive Studio M scoring stage on Hollywood's Paramount movie lot. Conceived as a performance/recording project, Quantum Leap was also designed as a showcase for Chris Stone's studio leap into video and film scoring.

As Chris wandered among the cables, banks of synthesizers and team of programmers, there was silence in the studio. A Sony digital multitrack waited patiently as musicians programmed musical data under Freeman's direction. "This isn't a recording studio—it's

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**Ed Freeman conducts Quantum Leap at Record Plant Studio "M."**

a spaceship," quipped Stone.

"This album is an exploration and a celebration of future music," added Freeman. "Most composers are unfamiliar with recording technology and merely use the studio to capture what they have written. After 20 years in the studio, I decided to break down our barriers between composition and recording technique."

In particular, Freeman has applied his knowledge of orchestral music to synthesizers, driving them to the limits of cascaded interface. This is no collection of "bleeps" and "bloops." In some passages, scores of synthesizers have been combined and overdubbed to formulate music with the richness of a Stradivarius—yet with the bizarre quality of sounds we have never heard before.

Most of the music was written on a DSX sequencer. In a typical recording set-up, two or more interlocked DSXs were used to drive two or three Oberheim Xpanders, which convert the CV (control voltage) and gate pulses from the sequencer to MIDI information, which in turn was used to drive additional slave units. Often, 20 or more tracks of synthesizers were recorded, bounced down to two tracks, and the entire process repeated for different parts. To augment the synth sound, guitars, drums, percussion and a 20-voice choir were recorded live with real humans.

The synth team included Anne Graham, who designed the first MIDI interface for the Oberheim OB-8 and was on the design team for the Matrix-12 and the Oberheim Xpander, the pivotal instrument in the Quantum Leap assemblage. Joining Anne were Drew Neumann (freelance programmer for Fairlight Instruments), Eric Rasmussen, Blake Lewin (virtuoso on the Chapman "Stick"), Jim Mandell, Mark Mann and Susan Seamans (composer with L.A.'s Mark Taper Forum).

"The compositional challenge of Quantum Leap," says Susan Seamans, "was to mathematically interlock the sequences into a high-density wall of sound that could be washed with ever-changing subtleties of tone color."

Freeman sees Quantum Leap as an experiment with far-reaching consequences. In film scoring, the improvised, computer-assisted nature of the music greatly shortens studio time. As a performance group, Quantum Leap is suited for collaboration with dance groups or even symphony orchestras. Some musicians might read sheet music while others would sit at computer terminals. Interfaced with computer



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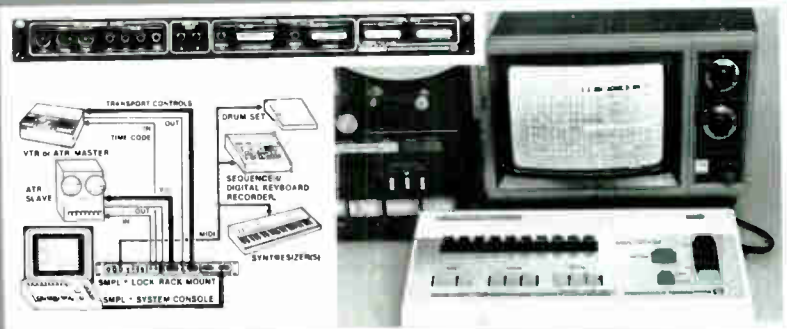
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graphics systems and video projectors, Quantum Leap could generate fresh visuals at each performance. On the commercial level, the concept group is appropriate for TV and radio ads, theme park soundtracks, and other multi-media applications.

"I use the studio as a compositional tool," says Freeman. "The future of music for records, films and video lies in the healthy collaboration between the human mind and computer intelligence."

**PRODUCT NEWS:**

**E-mu's Emulator II**

Like its predecessor, the Emulator II from E-mu Systems allows the user to digitally record any sound and play it back from its five octave keyboard. The II uses a new data encoding technique that results in increased frequency response with decreased digital distortion. A full 17 seconds of sampling time and up to a megabyte of storage is standard, as is a velocity sensing keyboard with programmable dynamic sensitivity.



The extensive modification of any sampled sound is enabled by the inclusion of filters, VCAs, envelope generators, and independent delayed LFOs for each of its eight channels. Any number of voices (limited only by available memory) can be assigned to the keyboard at one time, either with its own keyboard range, or stacked with other assigned voices. A unique "digital splicing" function allows the attack portion of one sound to be spliced to the sustain or decay portion

of another.

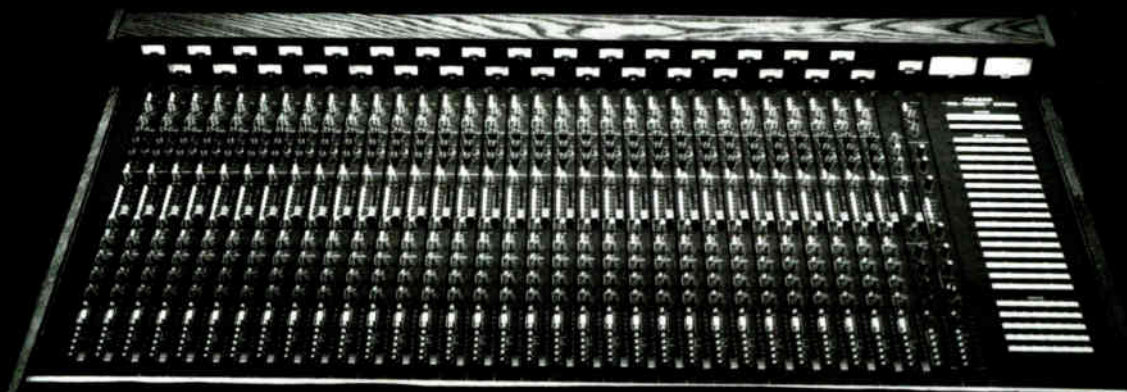
The Emulator II's track oriented sequencer includes editing and overdubbing capabilities, as well as programmable rhythm correction. Other features include RS-232 and MIDI interfacing; an integral SMPTE reader/generator; and a software-based design for future updates. The Emulator II is priced at \$7,995, and an optional second disk drive is \$650.

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## The Jon Butcher Axis Looks for the Magic

by David Goggin

*Along the Axis* is the third album from Boston heavyweight Jon Butcher, and the first to effectively explore the artist's amazing range. Butcher is a figurehead of the new generation of guitarists who actually grew up with the instrument. An accomplished virtuoso at 30, he has been playing—no, "living"—guitar since he was seven.

The new album blasts from the doors of the Pasha Music House, an interesting phenomenon in modern pop music. Pasha is a self-contained organization headed by Spencer Proffer, the president of the Pasha/CBS label, owner of the active Hollywood studio, producer, and a lawyer well-versed in the intricacies of entertainment law. Proffer was booted into the Heavy Metal Producer's Hall of Fame in the past few years with the multi-platinum Quiet Riot, but has turned out a steady stream of successes with such diverse acts as The Little River Band, Eddie Money, Billy Thorpe, W.A.S.P., and film scores with groups such as the Beach Boys, Heart and Cheap Trick. With Proffer at the helm, Pasha Music has a distinctive cohesiveness and unified vision.

For the Butcher project, Proffer handed over the engineering responsibility to Hanspeter Huber, who has been sharpening his skills at Pasha for the past three years. The key to the strength of this record is the triumvirate of Butcher, Proffer and Huber combining artistry, a longrange vision and technology in the appropriate places.

Jon Butcher is the pivot man in the four-man "Axis," providing the words, music and athletic musicianship. "Jon personifies the essence of fusion music in its truest sense," says Proffer. "He makes rock and roll with hypnotic rhythms, passionate vocals and intense atmospheres—the power of rock at its finest."

On "Stop," the album opens with an acappella vocal intro. One track of straight vocals is combined with six tracks heavily altered with backwards echo created by flipping the tape over, then doctored with pre-echo and whiz-



zing post-effects. When the Axis kicks in, it does so with a vengeance. "It's a total image cut," says Proffer, "meant to rivet the listener with Jon's personality—virtuosity with tasteful stylizations."

Butcher, a recent transplant to L.A., first gained national attention when Peter Wolf picked him out of the Boston clubs and hired his group to open for a J. Geil's Band tour. Critical acclaim and healthy chart action led to mass exposure on MTV and a big push from Capitol for the new album. As an aggressive guitarist, he performs and records with an arsenal of instruments custom-modified by himself, including two Stratocasters rebuilt from parts and a new Kramer.

"Kramer makes a production guitar that is brilliant—basic and free of gimmicks. The neck is unfinished in the back, the fingerboard is flat [not arched]

and the fret work is perfect—no filing necessary," Butcher says. "I did replace the pick-up to give it less distortion, but it's truly a guitar for the serious player. I have to continually redefine my playing and the Kramer was perfect for the fierce sounds—it brought some magic out of me."

On the title track, Butcher uses the Ebow, a device recently made popular with Big Country. "It electromagnetically aggravates the strings," Butcher explains. "You hold it in your right hand over the pick-up and use your left hand as the dictator. It makes a backwards guitar sound, but it's really different from the usual effects generators. It's nothing other than what you make of it, and relies on your imagination to make it happen."

*Along the Axis* is a guitar tour de force, but the imaginative playing is subservient to the overall sound of the album. There is a broad range of textures, from the melodic "Sounds of Your Voice" with it's Princely groove-oriented style to "Only the Fox," a driving and dancing number impeccably tailored for high-class club action. On "2 Hearts Running" he joins with Bowie vocal alumnus, Ava Cherry, whose album Butcher will sing and play on, as well as co-produce with Proffer for Pasha. The album closes with "The Ritual," a breathtaking instrumental odyssey with a surprising dash of the Orient and enough stereo fly-by to unbalance your system and rebalance your equilibrium.

At a time when album re-mixes for nightclubs and offshoot markets can create studio headaches, Huber engineered with great forethought. "On the drums especially, Hans infused a sound to grasp the AOR, CHR, and dance markets," Proffer says. "He focused on what we really needed for our target demographics and gave the record an easy future—we may not need any special re-mixes. Hans was passionate in his engineering, from pre-production to final master."

"This was the best recording experience I've ever had," reflects Butcher. "Spencer is one of the few producers who still sees records as an artistic medium. He's open-minded and ambitious, and Hans will be my engineer forever, if he will have me. I will try anything in the studio and he stayed with me step for step. He knows all the tricks, but the important thing is that he was sympathetic to my conceptions. Limitless imagination is the best effect in the recording studio." ■

# VIDEO NEWS



Ken Beckman's new dance video, produced in stereo on Betacam, is the video artist's second collaboration with pianist "Blue" Gene Tyranny. Tyranny's original jazz score for the piece was edited with location sounds of Tim Buckley's choreography, which includes something rarely heard in a music video—the sound of the dancers' feet. The program was funded by the NEA and will be released to home video after its PBS debut.

## AES Looks at Audio-for-Video

by Mia Amato

Live End/Dead End design for studio control rooms was the topic of a recent meeting of the New York AES, where a panel of studio designers and acoustic researchers offered their views on its application to audio-for-video mixing rooms.

"One of the things we strive for is a wider listening area," said **Kent Duncan** of Sierra Audio Acoustics. "For television work, it's important that all the people in the room—which usually means the producer, the director, the client—have to be able to hear good sound, not just the engineer."

**Peter D'Antonio**, of RPG Diffusor Systems, discussed his favored type of surface for control rooms, panels of narrow wells with rigid dividers. "Incidental sound is spread equally over a 180 degree angle and over a broad frequency range," he claimed. D'Antonio also favors "splayed front surfaces" to the fore of the console to control

sound reflections in the room. That design and the new surface material have been used in the design of an audio-for-video room at **TeleImage** in Dallas.

**Doug Jones**, a psychoacoustic researcher from Northwestern University's computer music studio, used a video graphics display to demonstrate how placement of a monitor can affect frequency perceptions. "TV sound is moving not so much to stereo but to 3-D sound effects, such as Ambisonics and Holophonics," he said. "I believe it will be imperative when mixing stereo for TV that we control early reflections so these 3-D images can be heard."

**Chips Davis**, designer of the first LEDE control room offered that Live End/Dead End considerations can provide the ideal "neutral" environment for sound mixing, while studio design troubleshooter **Alan Fierstein** of Acoustilog bent a few spines in the room with some blistering remarks on "certified" LEDE rooms. "Don't be misled by fancy test equipment and cryptic initials," he

warned the audience. "Take care not to let your brains and ears be fooled by hype."

All the panelists agreed that more diffusion can improve the mixing room or sweetening suite. Offered D'Antonio: "If you simply took an acoustic panel out of the ceiling and added a diffusor, you would increase the feeling of spaciousness and enhance the stereo in the room."

### IN THE STUDIOS...

Synclavier expert **Charles Hammer** has taken up residence at New York's **Sync Sound**, where he is available for music composing and sound effects work. Recent video projects at Sync Sound included a voice-over session with **Billy Joel** and **Christie Brinkley** which forms a kind of running narration on Joel's soon-to-be-released compilation video album. The studio also handled sweetening for **Bob Dylan's** clip, "Tight Connections," as well as for **Prime Cuts**, a jazz compilation tape for the home market, digitally mastered, featuring **Herbie Hancock** and **Miles Davis**.

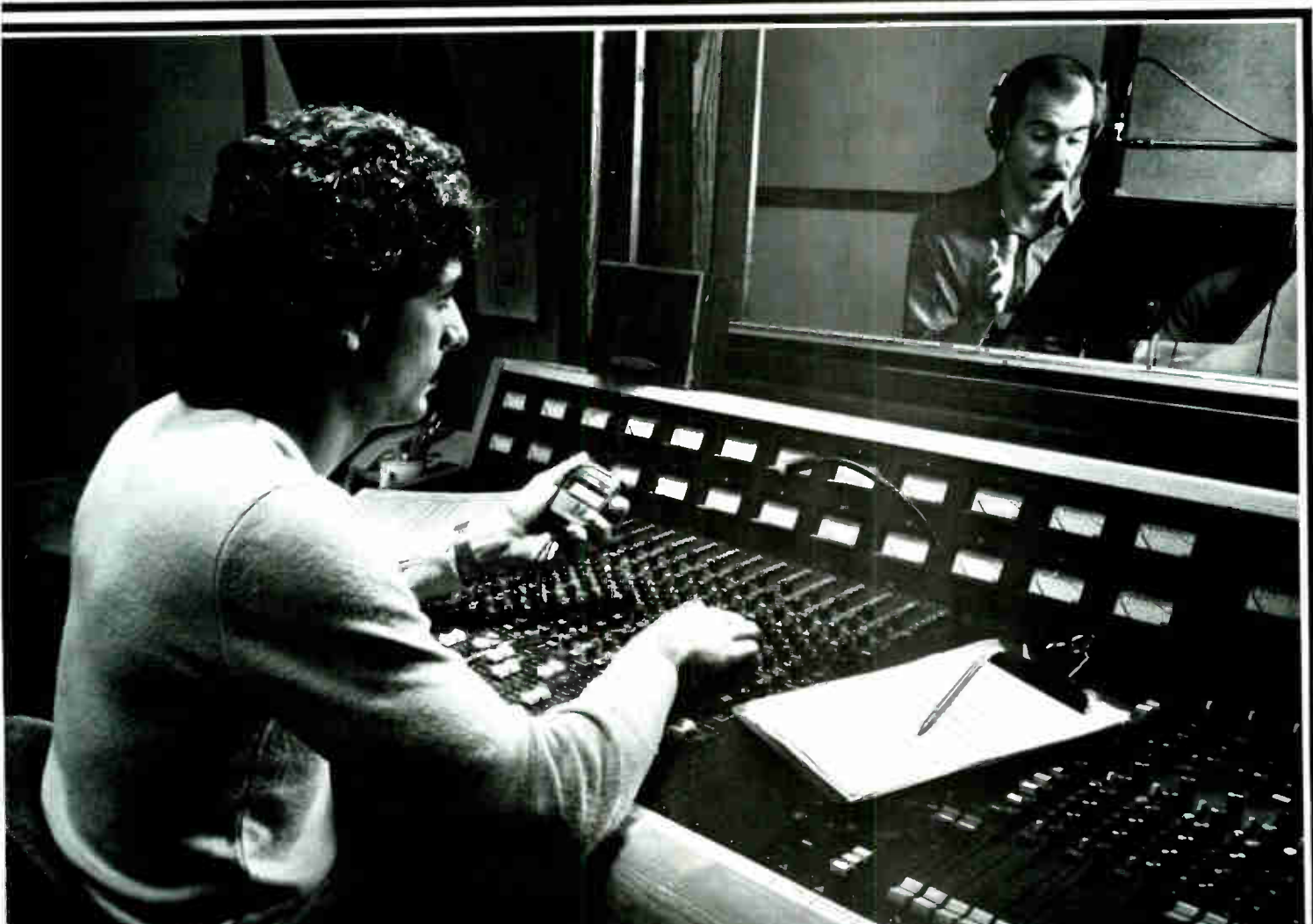
**Primalux Video** (New York) has added Betacam format editing and now offers half-inch component recording with Ikegami cameras. Burbank's **Rock Solid Productions** completed a behind-the-scenes documentary for **Kenny Loggins** on the making of his elaborate clip for the "Vox Humana" single.

In Dallas, **Video Post & Transfer** has installed the Montage Picture Processor; first job on the system was a five-minute video biography of artist Frederick Remington for the Amon Carter Museum of Fort Worth. **Positive Video** (Orinda, CA) has opened doors on **Positive Audio**, two 24-track video mixing rooms "designed specifically for audio for video" in its San Carlos stage facility. **Videofonics** (Raleigh, NC) now offers the sophisticated Bosch FGS-4000 three-dimensional computer graphics system.

**Video people...**it's musical chairs for directors in New York now that both Picture Music International and MGMMO have closed their Manhattan offices. Director **Jack Cole** and Producer **Paul Flattery**, along with PMI VP **Bob Hart**, return to LA under the name **Split Screen Productions**. **Millaney, Grant, Mulcahey**, and **Mallet** are now best reached through their London office; **Overview**, the "O" of MGMMO, continues to rep directors

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Howie Deutsch, John Diaz, Collin Cheevers and Julia Hayward.

### PCs FOR POST-PRODUCTION

We thought *Terrance Forgette* was pretty clever when he showed us how he rigged up his TRS-80 portable computer with a Sony BVH-1500 time code reader to automatically log edit points on video footage. Forgette is a news editor with CBS News' Los Angeles Bureau. "When tapes come back from the field, all I have to do is touch the space bar on the computer's keyboard and it will automatically store the frame numbers of all the good takes as I review the tape," he explained. "It saves a lot of time in the edit room later on, and sometimes I can log an entire reel while I'm rewinding it."

Now *Virtual Image Inc.* is making available a portable computer software program called *Scriptease* which can generate an edit list and serve as a time code reader in the studio or in the field. Abby Levine and Barry Minnerly are selling the program on a one-inch computer chip that can be plugged right into the back of Radio Shack's TRS-80 Model 100 portable computer.

"Most people still log tapes by watching a 3/4-inch window dub of the footage, constantly having to look up at the picture and then down to a piece of paper to write down the time code number of the frames for each scene," Levine said. "Now all you have to do is push a button as you're viewing, and the program will automatically store the time code number for the frame at the exact moment." Levine added that the computerized time code reader can be used "with any time code source" and that time code numbers need not be "burned in" on the videotape footage.

The computer keyboard can also be used to store notes on each edit point, such as "NG" or slate and scene numbers. One application to music video production would be using the portable computer in the field to make notes during live shoots; at the end of the day the program would print out a complete list of all scenes shot, with notes. "The Model 100 can store about 20 pages of script notes," Levine said. "We were recently doing some work with CTW and the continuity person on the shoot kept a week's worth of notes in the computer."

**Video Music Seminar:** The Rock-america Video Music Seminar runs August 4-6 at the Roosevelt Hotel in New York City. Sessions include day-long hands-on hardware workshops, seminars on cable TV, corporate underwriting, club video and black music videos. For more information, call (212) 475-5791. ■

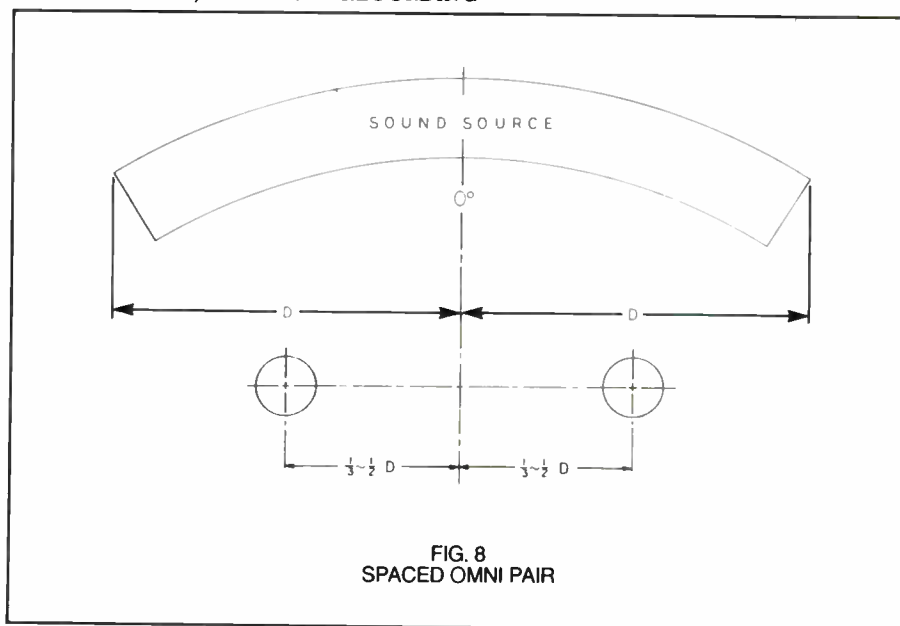


FIG. 8  
SPACED OMNI PAIR

solution can be worked out; I have found that this will usually improve the audience's enjoyment of the performance, as well as produce a better recording. If this is not possible, the use of additional microphones is called for.

During a recording session, all the rules can change. However (there's that word again) be very careful in rearranging a musical ensemble which is accustomed to a particular configuration. A string quartet, for example, always seats itself in a certain order; try to change it, and the performance will suffer.

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## Miking is the most crucial aspect of the recording process, and the only way to learn is to try various procedures.

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The same is true for a full symphony orchestra. There are some liberties which can be taken with placement of the instruments or sections, but keep in mind one primary fact: *the musicians must be able to hear one another.*

Conventional studio techniques (isolation gobos and headphone cue feeds) generally won't work here, since most "classical" musicians can't or won't play with headphones. It is best to discuss these situations with the conductor or orchestra manager well before the session; this will avoid costly (with regard to both time and morale) delays when the musicians arrive.

Placement of a chorus and/or soloist should be similarly treated. With these

differing ensemble forces, it is frequently beneficial to arrange the chorus facing the orchestra. This not only lets each group hear the other, but also provides some "free isolation" when directional mikes are employed. The soloist should always be near the conductor (in the "normal concert position") so that the musical communication between the two artists is not impeded. The musical balance between the two is primarily the conductor's responsibility, but careful use of a solo "sweetener" can add the needed "lift" required for the recording.

### 4. Two-Track -vs- Multitrack:

If more than two mikes are used, there are, obviously, two ways to record them: direct-to-two-track (i.e. a "live" mix) or logged onto a multitrack, for later remix. The former is, to my taste, more fun; the latter, more safe. If multi-miking, I frequently will do both: record a live stereo mix, and "cover myself" with a multitrack backup...just in case. There is little else to say about this, except that if the stereo mix works—and it will, if the miking is properly done—the job is finished. With a multitrack recording, remixing is always necessary, and this usually will take far more time than the original recording.

### 5. Visual Considerations:

When the recording is to be made at a concert with an audience—or if television is involved—the visual aspect of the miking must also be considered. (This, obviously, is not a problem with a session recording.) Usually, the main visual objection will be to the principal stereo pair since, properly placed, this is "front and center" in the picture, and is difficult for cameras (or audiences) to avoid seeing. Audiences are generally quite forgiving, and will not "take notice" of the mikes; they are (or should be) engrossed

in the performance taking place in front of them, and their eyes naturally wander all over the stage.

Television cameras (and their associated lighting and artistic directors) are more often sources of contention. *Diplomacy is the only solution to this problem.* Try to "negotiate" a position for the mikes which will serve your needs for proper sonic perspective, but still be "as unobtrusive as possible" to the cameras. Today, most directors are enlightened to quality sound, and will not object unless the mike(s) directly obstruct the faces of the performers.

Occasionally you may come up against a more obstinate attitude: "I don't want to see any mikes in the shot... ever!" When this happens, you could respond with the following: "Do you want to hear the music, or is this program 'M-O-S'?" ("M-O-S"—a film term meaning silent picture, without sound)... *Diplomacy*... Better to try something else, when possible.

Since this will be a broadcast recording, the M/S miking technique, using a (hyper)cardioid pattern for the M signal, is most appropriate; this can be accomplished with a single stereo microphone (I prefer the AKG C-422) suspended high enough above the ensemble to remain out of a tight camera shot, yet close enough to produce a reasonable pickup. Alternatively coincident or near-coincident hypercardioids can be suspended somewhat higher above the ensemble. (The Schoeps MK-41 capsule suspended by a KC-5 "Colette" cable is an excellent choice for this technique).

Finally, the multi-mike technique, with several small, unobtrusive mikes "buried" within (or above) the ensemble, may be the only way to save the recording. If this is the case, make the best of a bad situation, but remember about balancing a multi-microphone pickup.

#### 6. Additional Broadcast Considerations:

Whether for radio or television broadcast, additional mikes will be necessary for hall ambience and audience response. My suggestion here is to use a "Blumlein pair" spaced directly behind the main pickup (at an appropriate distance for the venue) and kept very low in the mix during the performance, so that the time delay between the primary pickup and this one does not introduce unwanted phasing or echoes into the recording. Bring it up for audience applause, etc.

Another technique I have found to be satisfactory is two spaced bi-directional mikes, aimed so that their "dead plane" is aimed directly at the performance stage; thus, their active pickup is solely of the hall ambience and/or audience. Again, do not use too much of these mikes during the performance, as time delay problems can still result.

#### Some Concluding Thoughts:

There is a great deal more which can be said about all of these techniques, but space does not permit here. (Several good texts are available which discuss these—and other—techniques in great detail; some of these are listed in the references at the end of this article.) What must be remembered from all of this, is that miking is the most crucial aspect of the recording process, and the only way to learn is to try various procedures. Put out mikes and listen to them; move them around, and listen again. And again. And again... ■

*Since 1977 Ron Streicher has been audio consultant to the Mann Music Center summer concert series of the Philadelphia Orchestra. Prior to that he was chief engineer for the Los Angeles Philharmonic Orchestra's radio broadcasts for KPFK-FM. Mr. Streicher served as vice-chairman for the 78th AES Convention this past May, and chaired the Microphone Technology session of AES the previous year.*

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1. This and subsequent diagrams are taken from "Basic Stereo Microphone Perspectives: A Review," presented with co-author Wes Dooley to the 2nd AES International Conference in May, 1984, and published in the Journal of the Audio Engineering Society, Vol. 33, No. 7/8; 1985 July/August.

2. British Patent Specification no. 394, 325, by Alan Dower Blumlein, December 14, 1931.

3. Refer to the paper "Stereo Microphone Techniques: Are the Purists Wrong?" by Stanley P. Lipshitz, presented to the 78th Convention of the AES, May, 1985, preprint no. 2261 (D-5).

4. For a detailed discussion of the M/S technique, refer to "M/S Stereo: A Powerful Technique for Working in Stereo," an article which I co-authored with Wes Dooley, published in the Journal of the Audio Engineering Society, Vol. 30, No. 10; October, 1982, pp. 707-718.



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Crawford Post Production in Atlanta is one of the most technically advanced audio-video facilities in the Southeast, boasting two fully equipped audio studios, (one with a Neve console and Studer recorders) and everything necessary for film and video post-production work.



Studio Consultants, Inc. of NYC has done acoustic consultation and design for numerous facilities, including San Juan, Puerto Rico's Ochoa Recording Studios, whose Studio D is pictured here. The studio has an API 3232 custom console and Ampex tape machines. The main room is quite live, with slatted surfaces used for absorption and diffusion. The Ochoa project is Studio Consultants' largest installation to date.



Pearl Sound, in the Detroit suburb of Canton, MI, features a Sierra design with a fully trapped ceiling and Sierra/Hidley monitors with TAD components. The studio has all Studer recorders and a custom Neotek console. The main studio has a solid oak floor built on floating concrete, and curved oak walls.

(Left) The trend towards larger control rooms equipped with multiple keyboard set-ups is in evidence at Kajem Studios in Gladwyne, PA (near Philadelphia). Kajem is also the only studio in the area equipped with an SSL board. The recorders are Studer and Tascam. The studio was built in the original Derringer gun factory.



New York City's Unique Recording now has an SSL 4000E console with Total Recall to go along with its MTR-90 24-track recorder, BTX Softouch and cornucopia of out-board gear and musical instruments. The studio was outfitted by Martin Audio, Audiotechniques, Manny's and Sam Ash; design was by Bobby and Joanne Nathan, co-owners of the studio.



Under the direction of co-owner Paul Wickliffe, NYC's Skyline Studios now boasts an SSL 4000E console to go along with its complement of tape machines that includes Studer A80 multi-track 1/2-inch and 1/4-inch mastering machines. Installation of the SSL made a few changes in the control room necessary, including the construction of a sound and environmentally isolated computer room.



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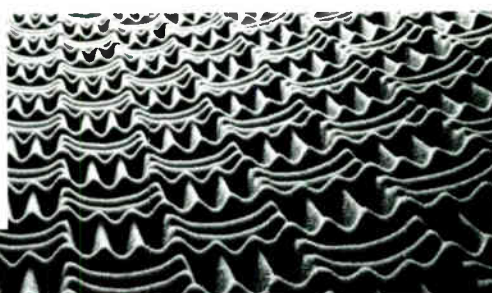
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**Mix**

# New Directions in Audio:

## Dealers Speak Out

Along with the continual advancements in product technology over the past decade, audio dealers have also been changing with the times. While a brisk amount of sales activity still remains in simple sound reinforcement and recording systems, many customer queries today involve the complex interfacing of keyboards, MIDI peripherals, video, computers, automation, and multiformatted audio in both the analog and digital domains. Manufacturer brochures, trade shows, and industry periodicals can do much to steer the bewildered consumer in the right direction, but in truth, a dealer's recommendation is probably the single most influential factor in affecting an equipment purchase. Establishing a rapport with a knowledgeable dealer you can trust is an important step in a relationship that can grow along with a studio's needs.

—PAGE 130



### Professional Audio Services & Supply: A Store in a Studio

A lot of audio and MI dealers offer listening rooms and studio mock-ups to afford customers the opportunity of checking out equipment in a "real life" situation. A few retailers have even added working studios to their businesses, but Professional Audio Services & Supply, a dealer in Burbank, CA, recently took a different route, by relocating their entire operation into one of the studio sites that had been vacated by nearby Kendun Recorders.

PASS owner Bob Hacken ex-

plained how the move came about: "We had been actively looking for a facility for the past year or so, and my realtor told me about this 'funny building' that had strange walls and weird-shaped rooms which would serve well for office space. He thought it had been used for video work. We went over, and as we pulled up, I realized it was Kendun. We immediately went for it because it was perfect. It just needed a good cleaning and some exterior paint."

Currently, PASS utilizes the former

quad disk mastering room for equipment demonstrations, while the facility's main control room and two studios are leased to Take One Recording Studios, a long-time PASS client. Hacken notes that the arrangement has worked out well for all concerned: "We've transformed the quad room—while keeping all the acoustics intact—and faced the equipment on two halves of the room, utilizing the two stereo imaging areas. The front left/right is for high end equipment and the rear left/right section for the mid- to low-end equipment. But it's *not* a studio—it's strictly a tool where the prospective buyer can evaluate the equipment in a proper acoustic environment, which is very rare."

According to Hacken, customer impressions of the facility have been quite favorable so far. "It's incredible—they're totally impressed. Clients feel this is exactly what they need and spend a lot of time making a proper evaluation, bringing in their own tapes if they wish, because we have every format that's available. It's not like walking into a music store where you've got guitars jamming and drums bashing away in the background and the noise spills over. Here the equipment is in a room unto itself—you close the airlock doors and it's just you and the salesperson. It's a very nice environment."



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—FROM PAGE 128, DEALERS

With their constant contact with dozens of manufacturers, and after years of listening to customers' input and requirements, audio dealers are in a unique position to give a meaningful evaluation of current trends in the industry. We talked to a number of audio dealers around the country, eliciting their insight about client expectations, changes underfoot in the marketplace, and a few predictions of what may be to come in five years. It may be interesting to look back at this forum a half-decade from now, just to see how well they all fared.

*Mix: Have you noticed a change in your customer base over the past five years?*

**John Loeper, Flanners Pro Audio, Waukesha, WI:** "I've noticed more of a change in customer attitude than in the customer base. A lot of people are looking for less service and lower prices and unfortunately that puts a service-oriented dealer such as ourselves in a precarious position. Having to go head to head against some of the 'box sellers' in the country becomes extremely difficult. For me to substantiate having top notch technicians and service people on staff, and to support sales efforts with knowledgeable people becomes difficult.

"With products becoming more sophisticated and requiring more technical support, the [box sellers'] customer is going to feel it when a product goes down and they have to wait for the manufacturer to service it. Coming from a studio background, I can say that downtime can really cost you money. If you're down for a day, you've lost a day's income. To compete with a box house and still offer expert service is suicidal!"

**Bob Todrank, Valley Audio, Nashville:** "We now do a lot of equipment sales and facility design for the broadcast and video post market, especially from the high technology side. We're heavily into synchronizer sales and digital control of products rather than turntables and cart machines. We're also doing some commercial sound, again from a higher technology side than small PAs. Our market has expanded, but we're still strong in the recording studio area: it's our bread and butter."

**Henry Root, Hy James—The Audio Professionals, Farmington Hills, MI:** "The television people are much more interested in audio than they were three or five years ago. We're seeing more of the home studio-type places, an area that was strictly MI gear five years ago. We're also seeing a lot more people from the MI market, mostly out of sheer desperation: they can't get the

information they need out of MI stores, so they come to us."

*Mix: How has the pro audio market been affected by the popularity of home studios?*

**Courtney Spencer, Martin Audio, New York City:** "From our point of view, the home studio today is best described as a private use or artist studio. A couple of years ago, home studios were more in the vein of someone building a studio and also trying to rent it out for 15 bucks an hour. Fueled by advancements in synthesis and sampling keyboards, the need for acoustic space is not the issue it used to be. For us this has been a very large growth area, and you can almost plot this increase as a nearly-coincident trend with the rise of sophisticated synthesizers, particularly those which are economically accessible. Many of these studios are full 24-track, with an artist or producer as a typical owner and at any given time, we have four or five of these types of studios in the works."

**David Angress, Sound Genesis, San Francisco:** "A lot of artists are adding multitrack facilities to their homes so they can do creative work before going in and spending big dollars in the studio. For years we've also been putting in systems for bands who live in different areas: they would each have a four- or eight-track studio and would send tapes back and forth. In the late '70s, we put together a system for the Doobie Brothers, where each one got an Otari eight-track and a console and could send tapes around. It's not a larger part of our business than it used to be, but it continues to be a significant part."

**Bob Ulius, Leo's Audio and Music Technologies, Oakland, CA:** "We're a strong supplier to home studios as well as strictly professional studios—if anything the home market has increased our business. I would say that the larger studios are diversifying—they can't support their large overhead because of this trend to put together smaller, privately-owned studios that are perhaps more productive. Today, more and more people are creating their own software in their own location and amortizing the cost of the equipment rather than studio time. We've been on the forefront of working with musicians on the smaller studios, since we sell not only professional recording equipment, but also specialize in keyboards, which are becoming more and more a staple piece of gear in a recording studio, as are computers and software."

**Todrank:** "In Nashville, we're definitely seeing more people building home studios, and a lot of them tend to be people who are associated with, or

—PAGE 132



*The Music Source*

## Space Allocation in a Modern Recording Studio

by Jim Wolfe

For fifteen years the Music Source has been recording rock bands and commercials in Seattle. For the past several years we have been acquiring a fairly vast array of synthesizers, drum machines, sequencers, etc. (As a keyboard player and studio owner, I love those toys!) It has always seemed to me that the best place for all that stuff is in the control room, not

just for engineer/players like myself, but since the sound is best in front of the monitors, why put the synthesist out in the studio with headphones?

So little by little our wall space started to get eaten up with keyboard racks. The acquisition of our Kurzweil 250 last October was the last straw: there was room for either the instrument or the player—not both.

It was definitely time for us to remodel or move, and since I own the building that houses the studio it was to our advantage to start knocking out walls. The question was how to divide up the 1200 square feet of available space.

Our basic shell was a rectangle approximately 28 by 44 by 15 feet high. We decided to allocate almost one half of the total square footage to a control room large enough to house all our keyboard racks plus the Kurzweil and leave room for a few new toys.

When I first laid out this sketch it looked like a reasonable compromise. Our studio wasn't huge, but we don't usually have more than five or six people playing at once, and often many of them are in the control room either going direct or with the amps in the studio.

Seeing it on paper was one thing,

the actual reality of a control room that large was another. When the plasterboard was going up I couldn't tell if I'd made a mistake or not, but now that it's done and operational I realize what a smart move it was.

We now have the largest control room in the Northwest. There's room for as many clients, account execs, producers, writers, musicians, engineers, roadies or groupies in that control room that any album or jingle date could ever require. It's big and airy and all of our clients love it.

So far we haven't needed any more space in the recording room than we have, and if there are occasions where that room is too small, it's more than compensated for by the daily joys of walking into that big control room.

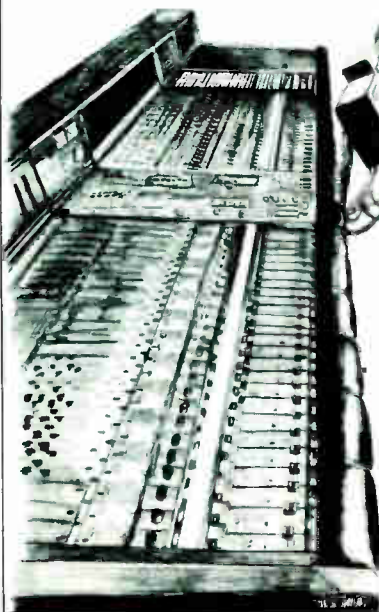
So the point is this: the classical approach to studio space allocation has been—little control room, big studio. I think that for '80s music production this is no longer the correct balance. Direct-Inject is the name of the game, so let's devote the square footage to its best use—bigger control rooms. We did, and there are no regrets.

*Jim Wolfe is the president, Music Source, Inc.*

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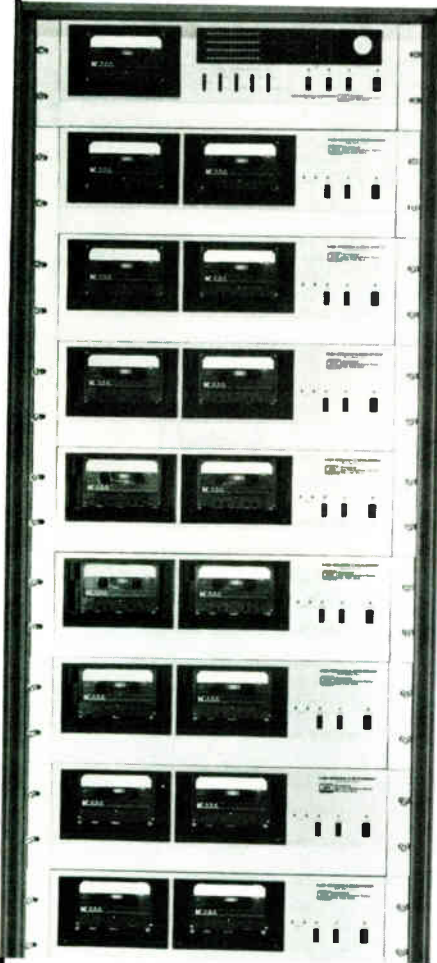
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—FROM PAGE 132, DEALERS

the PCM60, has been an excellent seller —in fact, so good that it takes a while to get them. The Eventide Clockworks SP 2016 is another digital processor which has been doing very well."

**Spencer:** "Digital is the key word, especially in reverb, where sales are almost all digital now—the sales of plates and so forth have pretty much dried up. Obviously, when you deal with dynamics —compression, limiting, and so forth—it's still analog, but digital is what the market is looking for in signal processing. Four years ago, it was almost impossible to sell a \$10,000 digital processor, and now we can't get enough of them."

**Mix: What are the customers' attitudes about digital recording?**

**Loeper:** "There's a tremendous amount of interest in digital audio. I think the price is inhibitive, but most people are asking for information about where it's going, what's happening price-wise, and what's available. Some manufacturers have shown product, but haven't delivered any: Sony comes to mind with their digital two track, which won't be available until fall. This hurts the marketplace to a certain extent, because there was a lot of excitement when it was first introduced, and that has started to diminish over a period of time. I still think that digital multitrack and two track—as far as being an item that's going to sell on a wide basis—is still some time away, at least in the Midwest."

**Root:** "Most customers are looking the other way in this marketplace. We've sold a few of the dbx 700 units, but at this time there are no other digital recorders (in this area) other than the inexpensive PCM units. We're not in L.A. or New York—the market here is nowhere near as healthy."

**Todrank:** "Nashville tends to be a follower, rather than a leader market. We tend to be pretty conservative in purchasing here, and wait to see what the two coasts do, so digital recorders are still pretty slow here. We don't try to convince our customers not to buy digital, although we do counsel them to be quite careful in their considerations. Most of the people are waiting for trends, to see if any one of the particular machines becomes a favorite, or if prices come down a little. The people here are also figuring that we have one more round of analog left before it's all digital, and we have seen a significant increase in MTR-90 (Otari) sales in the past eight to 10 months. People here would like to see an established digital standard, although I don't have much hope for that happening."

**Angress:** "Customers are looking at digital recorders as very interesting devices which they will end up buying

once they become cost-effective and some of the things in the marketplace have settled down. A lot of customers are using the Sony PCM-F1-type units and the Nakamichi DMP-100, but activity on multitracks at this point is limited to the extreme high end of the market. Frankly, I still think digital recorders have a way to go—in terms of the way they operate and the way they're built—to be able to give customers the same advantage per dollar that you get from a good analog deck now."

**Spencer:** "Digital today is considerably stronger than it was a year ago—there's a lot more potential to be realized, but that may be a function of prices coming down somewhat. It's also a function of better understanding of the technology. People still harbor suspicions as to the permanence of the various standards, and a majority of the studios are playing the waiting game. There's a bit of uncertainty as to how long any standard in place today will remain, and where prices will be a year from now. The nature of the studio business is such that if digital is not a necessity, that studio owner will wait, given the presumption that prices will be lower and the question of what machine to buy will become clearer. But I think that's changing rather quickly, and by the end of the year a lot more will be able to be said about these trends, after the Sony and Studer DASH two tracks become available."

**Ulius:** "We're right in the middle ground of the changeover. I, for one, feel like I've bought my last LP: I'll buy nothing but CDs from now on. The digital recording process is gaining much more acceptance as the process becomes more economical. Sony has one machine (DASH two track) under \$20,000 which we should have shortly. The major studios across the country have already caught on, as evidenced by the popularity of the Sony 3324 and Mitsubishi machines out there, and the next level of studios are about to catch on. We're about two years away from it filtering down to a large percentage, say 70 to 80 percent of the marketplace. Obviously it's the wave of the future."

**Mix: What kind of gear will we be seeing in five years?**

**Root:** "We're going to be seeing a whole lot more digital recording, and somehow we're going to see a price break. CompuSonics, even though it's not cheap right now, has one particular two-track machine storing on floppies and selling for \$2700. I also find the AMS AudioFile unit to be very exciting—it's an amazing tool for a small production company. The technology is there: it's just a matter of marketing."

**Angress:** "In terms of signal process-

ing, everything will be digital. While microphones and loudspeakers will continue to advance, I don't see their basic technology changing. Mixing consoles are going to have more digital control over analog circuitry, but purely digital mixing consoles are going to remain extremely expensive and limited for a long time. The key there is digital control, which allows you to do a lot of things and manipulate signals while keeping the audio in the analog domain. Certainly there will be a lot more digital recorders, which will continue to improve and come down in price, although I don't know whether five years from now is the point when the mass market will start buying digital and shunning analog.

"There are going to be some really neat effects editing systems coming out. You're familiar with SoundDroid, but SoundDroid is a quarter-million-dollar device before you add a bunch of options to it. It certainly is not addressing the mass market. It's also using a lot of storage devices and a lot of hard disks, as the hard disk can operate faster and hold more data. As people come up with hipper ways of addressing it and doing editing, that type of system is going to exist at a much lower cost. You'll have to give up certain features it has, like length of recording time and some of the ways you can manipulate it to come up with a system that costs much less, but it won't take long."

**Loeper:** "Digital is here and here to stay. Everybody recognizes that, and the kind of gear people will be looking for in five years is the kind that can interface keyboards with the special effects devices that musicians use to create their sounds. Equipment will have to be compatible with MIDI interfaces, and most of the gear out in five years will be computer controlled. The days of manual operation are numbered—people will sit down at a computer terminal and run their studio and record that way. The technology is there now, and if the manufacturers can sell it at a competitive price that people can pay, then it will happen sooner."

"As a whole, studios have not addressed the capabilities of MIDI yet, and a lot of the manufacturers that make the recording equipment haven't either. They're starting to, with the samplers that are out now, but they have to address the issue even further. This is where a lot of the marketplace will go. I also see the control room of the future being nothing more than an extension of the actual studio, with a multiple of keyboard pieces and processors filling up the control room. One of the things in a threatened state is the microphone, especially with the increasing numbers of projects being done direct."

**Ulius:** "In five years we're going to be putting down audio and video in the same medium, be that tape-based, erasable laserdiscs, or whatever. We're already just beginning to see people building pieces towards that direction and it's not that far away. Just as five years ago people said we'd now start to see digital, in five years we'll start to see audio and video being totally married, inseparable. It may even arrive in less than five years—we have MTV and Friday Night Videos now, and we're a couple of years away from having 40 available channels by satellite or whatever, that are music-based. This will increase the demand for software and for knowledge. The market is clamoring for equipment that makes it easier and more affordable to do audio and video at the same time."

**Todrank:** "One thing that will be emerging is other forms of digital recording. We'll see new storage mediums which will bring the price down. In the console end, we'll see much more in the assignable techniques, like the Harrison Series 10 and the Calrec assignable console. Console sizes in the next five years will have to come down, because control room acoustics are getting better every day, and the console is still the most significant detriment to control room acoustics. Most of my major customers are looking forward to smaller consoles with more facilities, and the only way to do that is with some sort of assignable control-type console."

**Spencer:** "Equipment in five years will integrate sound creation, manipulation and storage into one system, which is the sort of technology that Synclavier or SoundDroid embodies. Storage will obviously be a random access system—whether disk, optical systems or hard knows what—you'll be able to get from point A to point B in a matter of milliseconds. Editing and all other functions will be automated and integrated into a single control system."

"The recording of instructions to synthesizers or samplers as opposed to recording the actual audio waveform, is a trend that offers a lot of power, and that power will be significantly enhanced over the next five years. I would also expect signal processing to become a part of that integrated system, with perhaps certain items being available through external signal groups, all under software control. We'll see a similar situation to what's happened in video, where the owners of Mirage processors often have software writers on staff, creating their own programs to go with the library of effects that come with the unit. I think we may be seeing more of that in audio, where studios differentiate themselves via the software they develop."

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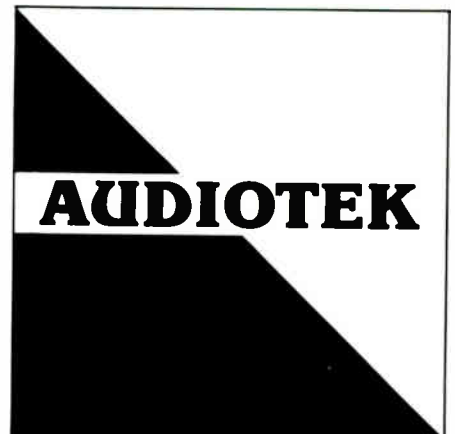
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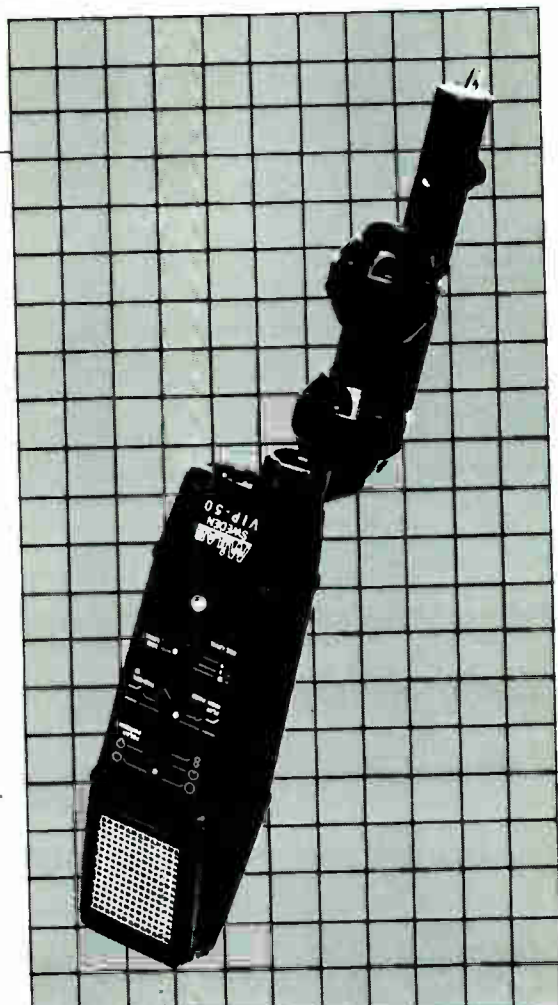
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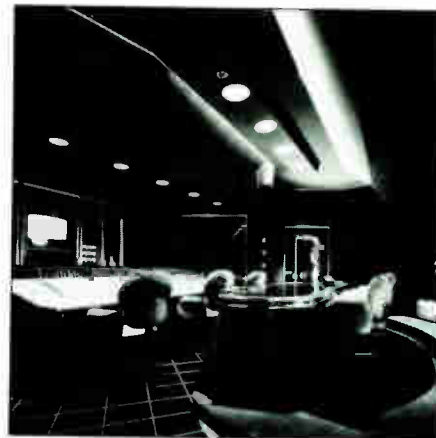
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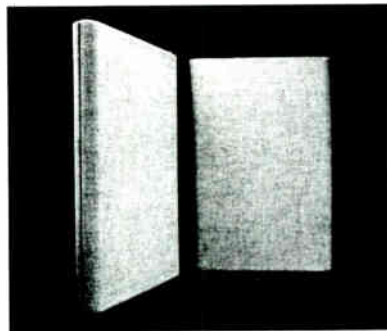
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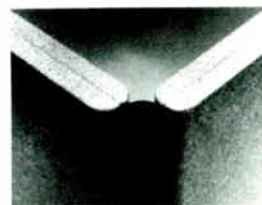
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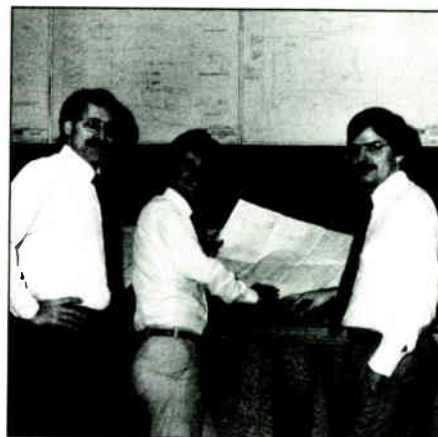
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**Services offered, credits, specialization:** The Toy Specialists is a rental company specializing in all the latest musical instruments, such as the Linn 9000, Emulator II, Simmons SDS-7, TX-816, and the DX7; the most up-to-date synchronizing equipment, such as the SRC, SBX-80, various Dr. Clicks; not to mention some of the classics, such as the LinnDrum, Prophet-5, OBX-a, OB-8, MiniMoog and of course, assorted toys, such as DMX, DSX, MSQ-700, SDS-5, MX-1 Trigger and the list goes on.

The Toy Specialists also provide technical assistance to all their clients, in addition to expert programming and pre-production.

Some of the Toy Specialists' most recent projects have included Julian Lennon, Foreigner, Yoko Ono, Mick Jagger, KISS, Carly Simon and many others.

## VICTOR'S PRO AUDIO

*SD, SES, EI*  
235 Franklin Ave., Ridgewood, NJ 07450  
(201) 652-5802

Contact: James Hovey

**Services offered, credits, specialization:** Victor's is NJ's most comprehensive music store for the recording professional. Our pro-audio & keyboard departments offer a full line of the gear you need with every salesperson a specialist in his field. Your most technical problem is no problem because we personally use every piece we sell including Otari, Neumann, Lexicon, UREI, JBL, dbx, Valley People, Tascam, Fostex, AKG, Crown, Sennheiser, Toa, Klark-Teknik, U.S. Audio, Urse Major, Aphex, Roland, Voyetra, Sequential, etc... Standard services include custom wiring, calibration, and in-house repairs. In our newly completed pro-audio showroom, you can get your hands on the controls of every piece of gear we sell, or just sit back and listen to our extensive library of test tapes. Not sure how that gear will sound in your environment, or equipment broken? Established customers are always entitled to our unique loner policy. Victor's hates down-time as much as you do! Call (201) 652-5802.



**LEGEND:** SD: Studio Designer; AC: Acoustical Consulting; SES: Studio Equipment Supply; EI: Equipment Installation/Maintenance/Serviceing

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### WEST WIRES RECORDING

*SD, EI*  
1716 Elm St., Allentown, PA 18104  
(215) 435-1924

Contact: Wayne A. Becker

### WESTEC AUDIO/VIDEO

*SD, AC, SES, EI*  
1841 Broadway Suite 1203, New York, NY 10023  
(212) 586-1662

Contact: Mr. David Bellino

**Services offered, credits, specialization:** Proudly serving the broadcast and postproduction industries for over 15 years, Westec Audio/Video provides the industry with the utmost professionalism in sales, service and consultation. Sales engineering can provide state-of-the-art equipment, in-depth design and consultation with creative financing to fulfill any requirements. A comprehensive service center

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*SD, AC, SES, EI*  
13630 W. Dixie Highway, N. Miami, FL 33161  
(305) 891-6201

Contact: Neil Richards

### ALPHA AUDIO

*SD, AC, SES, EI*  
P.O. Box 6306, Pensacola, FL 32503  
(804) 358-3852

Contact: Eric Johnson

### ALPHA AUDIO

*AC, SES, EI*  
2049 W. Broad St., Richmond, VA 23220  
(804) 358-3852

Contact: Eric Johnson

### AUDIO, LIGHT & MUSICAL

*SES*  
3301 N. Military Hwy., Norfolk, VA 23518  
(804) 853-2424

Contact: Jim McDonald

### AUDIO SYSTEMS

*SES, EI*  
205 22nd Ave. North, Nashville, TN 37203  
(615) 320-1600

Contact: Jack Tenzel

### BAE INC. (BLEVINS AUDIO EXCHANGE)

*SES, EI*  
1717 Elm Hill Pike, Suite B-9, Nashville, TN 37210  
(615) 361-8429

Contact: Randy Blevins

### CATES MUSIC CENTER

*SES, EI*  
305 W. Walnut St., Johnson City, TN 37601  
(615) 928-8821

Contact: Norma N. Cates

### DIGITAL ASSOCIATES' AUDIO RENTAL

P.O. Box 422, Spring Hill, TN 37174  
(615) 256-4487

Contact: Rick Horton, Mike Poston

### EDUCATIONAL ELECTRONICS CORPORATION

*EI*  
216 Oak Ave., P.O. Box 23217, Harahan, LA 70123  
(504) 737-4545

Contact: Donald I. Geier

### ELECTRIC MOUNTAIN SOUND, INC.

*AC, EI*  
2021 12th St., Sarasota, FL 33577  
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Contact: Terry F. Donato

### ELECTRONIC SYSTEMS LABORATORIES INC.

*SES*  
110 S.W. 21st Terrace, B-107, Ft. Lauderdale, FL 33312  
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Contact: Lutz H. Meyer

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Contact: Perley E. Eppley, Sr.

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(404) 956-7725  
Contact: Richard Schmidt

209 Oxmoor Cir., Suite 708, Birmingham, AL 35209  
(205) 942-2824  
Contact: Jim Robinson

2866 Dauphin St., Suite A, Mobile, AL 36606  
(205) 476-2051  
Contact: Richard Brown

5401 Southern Comfort Blvd., Tampa, FL 33614  
P.O. Box 24336, 33623  
(813) 885-1411  
Contact: Fran Fehr

1031 NW 91st Terrace, Gainesville, FL 32601  
(904) 378-2896  
Contact: Jerome Hoffman

1605 S. Bumby Ave., Orlando, FL 32806  
(305) 896-7414  
Contact: Jean Stervinou

1657 NW 79th Ave., Miami, FL 33126  
P.O. Box 523297, 33152  
(305) 591-3637  
Contact: Russ Thom

5441 Pepsi St., New Orleans, LA 70123  
(504) 733-7265  
Contact: Kenny Shewmake

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Nashville, TN 37210  
(615) 883-9175  
Contact: George McCrary

100 Greenbrier Dr., Knoxville, TN 37919  
(615) 523-3107  
Contact: Tom Owens

5105 McClanahan Dr., Suite J-1, N. Little Rock, AR 72115  
(501) 758-3234  
Contact: Harold Cole

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(919) 725-2306  
Contact: L.E. Hancock

**MASTER AUDIO INC.**  
*SES, EI*  
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(404) 876-1644  
Contact: Bob Richardson

**NATIONAL AUDIO TECHNOLOGY & ELECTRONICS CO. (NATECO)**  
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P.O. Box 1327, Holly Hill, FL 32017  
(904) 255-2240  
Contact: Nate Mudge

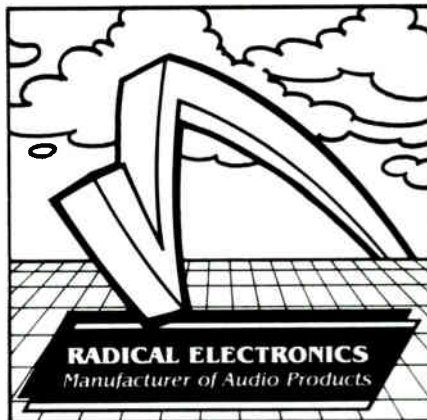
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110 South West 21st Terrace, B-107, Ft. Lauderdale, FL 33312  
(305) 583-0626  
Contact: Gregg Lamping

**PARAGON MUSIC CENTER**  
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2139 W. Hillsborough Ave., Tampa, FL 33603  
(813) 876-3459  
Contact: Dick Rumore

**PHASE AUDIO**  
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1545 Monroe, Memphis, TN 38104  
(901) 726-1900  
Contact: Murphy Odom, Chip Benson

**PRECISION SOUND DESIGN, INC.**  
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(912) 236-4406  
Contact: Ferman Tyler

**PROFESSIONAL SOUND SERVICES**  
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(305) 891-2206  
Contact: Mark Weber



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(703) 573-6948  
Contact: David Eltroth

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410 Elm Ave. S.W., Roanoke, VA 24016  
(703) 343-1102  
Contact: Howard Beasley, Harold Thompson

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P.O. Drawer P, N. Miami Beach, FL 33160  
(305) 945-9774  
Contact: Seth Snyder

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1001 S. Independence Blvd., Charlotte, NC 28202  
(704) 375-8662  
Contact: John Saviano, David Bustle

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*SD, AC, SES, EI*  
10201 Rodney Blvd., Pineville, NC 28134  
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Contact: Cal Walker  
**Services offered, credits, specialization:** S.C.M.S. specializes in turn-key production facilities and broadcast studio packages. We are authorized dealers for most major lines of recording and broadcast equipment and have on-call one of the foremost acoustic consultants in the U.S. Our experience comes from years (20) in the broadcast and production fields, and also current hands-on work in our own commercial production facility. Check out our ad in this issue, and give us a call.

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Attention:

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The annual listings for your region will be published in the November issue of **Mix**. If you have not yet received a questionnaire, and wish to be listed, call Lauri Newman at:

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Contact: Lewis Frisch, Kevin Witt

Services offered, credits, specialization: Showcase is the South's fastest growing pro audio/video sales, service and installation company. We offer solutions with a combination of quality equipment, personal service and after-the-sale support. From a mike cable to a complete audio/video post-production facility—Showcase will handle all your needs in a fully professional manner. Our clientele is a "Who's Who" of recording studios, postproduction, and broadcast users throughout the Southeast.

Featured authorized equipment lines include Otari, Otari MTR, the full line of Amek mixing consoles, Hafler, Crest, Cipher Digital (BTX), Neumann, Yamaha, EAW, Fostex, dbx, Aphex, Shure, Soundcraft, Nakamichi, Valley People, and many others. Our video department features JVC, Panasonic, Fairlight, and more.

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(305) 331-6380

Contact: Mr. Hillary (Mel) Smith

SOUND & COMMUNICATIONS, INC.  
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5466 N. State St., Jackson, MS 39206

SOUND TRAX, INC.  
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1626 Glenwood Ave., Raleigh, NC 27608  
(919) 832-9953

Contact: Don Stone

SPECTRUM SOUND, INC.

SD, AC, SES, EI  
429 Space Park North, Goodlettsville, TN 37072  
(615) 859-4381

Contact: Ken Porter

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Contact: W.T. Menasco, AES member

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1717 Elmhill Pike Suite B-9, Nashville, TN 37210  
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Contact: John Alderson

SYNERGETIC SERVICES, INC.

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Contact: Ross or Eileen Alexander

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Services offered, credits, specialization: Recording studio equipment, broadcast audio equipment, ENG/EFP equipment, noise control, design/consultation, most major lines, leasing available, production experienced staff.

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(813) 238-7085

Contact: Fred Grunewald, Bill Gillespie

3160 Bee Ridge Rd., Sarasota, FL 33579

(813) 921-5714

Contact: Nick Ferlicchi

### TRACKSIDE ENGINEERING

SD, SES, EI

2652-C S. Cobb Dr., Smyrna (Atlanta), GA 30080  
(404) 436-3024

Contact: Les Duncan

### TW RICH

EI

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(305) 439-4592 after 5:00

Contact: Thomas D. Rich

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—CONTINUED FROM PAGE 149

**Services offered, credits, specialization:** Consultation, specification, budget, design, custom work, installation. Consultation, specification, budget: Full Compass Systems, Ltd. offers expert help in the specification of equipment for any production facility to fit any budget. Design control room layout for best human engineering. Design studio layout for best efficiency and co-existence with video production. Custom work: Full Compass Systems, Ltd. will modify existing equipment or create equipment that may not exist. Installation: expert wiring of patch fields and system interface. Full Compass Systems, Ltd. offers rebateable against purchase consultation. Attention to budget and appropriateness are first criteria.

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SD, AC  
P.O. Box 273, Hilliard, OH 43026  
(614) 876-1057  
Contact: Gary Hedden

**Services offered, credits, specialization:** Due to active participation in current music production, GHL is particularly qualified to develop a design which is sensitive to a client's unique preferences and needs. GHL does not retail any equipment nor does GHL subscribe to any rigid approaches to acoustic design or control room geometry. Credits include several artist's personal rooms, Hedden West, the Diskworks, The Malt Shop, Bison Recording, Full Sail's, Dream Machine



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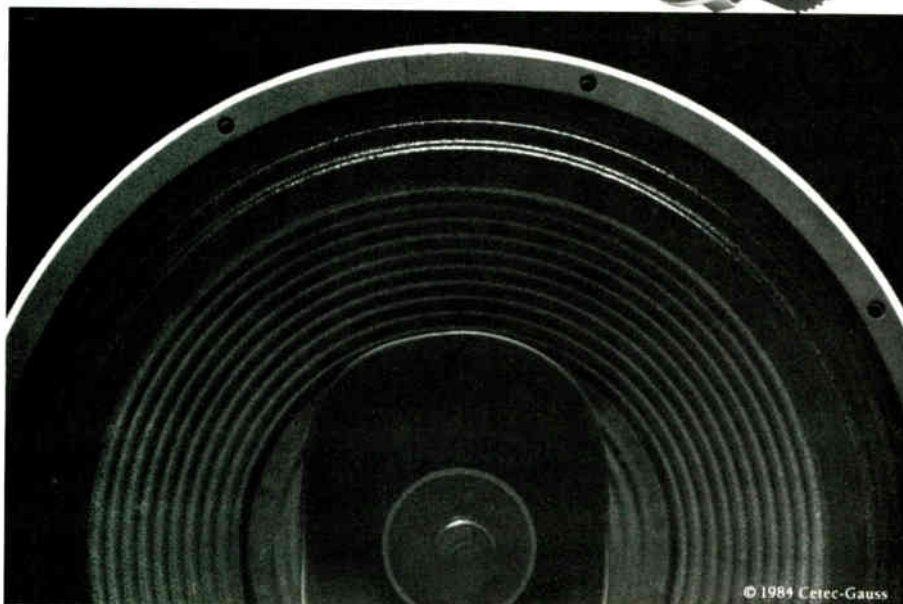
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Contact: Kevin Meeks, David Wright  
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(402) 399-8028  
Contact: Pete Franks, John Knuth

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SD, AC, SES, EI  
1470 Valle Vista Blvd., Pekin, IL 61554  
(309) 346-3161

**MONTREUX MUSIC INC.**  
SES, EI  
3648 Rochester Rd., Troy MI 48084  
(313) 689-6644, 689-6645  
Contact: Bob Crane

**MUSIC CASTLE, INC.**  
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1418 N. Woodward, Royal Oak, MI 48067  
(313) 543-5070  
Contact: Tim Flaharty

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(513) 256-8731  
Contact: Perry Scott  
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Contact: Ronald J. Bartlebaugh

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(312) 869-4793  
Contact: Orville Pibbs

**PI AUDIO**  
SES  
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(216) 741-1400  
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—CONTINUED ON PAGE 152

## USED RECORDING EQUIPMENT FOR SALE

### MICROPHONES

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Aengus wired for 16x8x16 has 8x8x8 in place, 2 phono inputs with map EQ • MCI 542 with 28 I/O modules • API 20 input 8 groups, 16 monitor 550 EQ • Trident Series 80 6 years old • Trident Series 80 B as new • API, Neve, etc. ...Call for details.

### TAPE RECORDERS

24 tracks: Otari MTR-90 MK 2 24 track; MCI 24 track JH-114 with auto locator. 16 tracks: Ampex MM1100 \$9,000, with remote/autolocate; JH114-16 1979 w/autolocate III. Other: Scully 280-8 w/4trk & 2 trk heads. Studer A80 8 track, 3M M64 4 track, 3M M64 2 track. Cassette decks: Technics RS 45, Hitachi D7500.

### OUTBOARD GEAR

DeltaLab DL-1 digital delay • Eventide 1745M digital delay • Eventide Instant Phaser • AKG BX-10 reverb • UREI 1109 cards • Orban de-esser • RCA BA6A limiter • EMT stereo plate reverbs • Roland SPH323 stereo phaser • MXR digital delay • UREI Little Dipper • Lexicon 122S DDL.

### RACK MOUNT EQUALIZERS

Furman PQ-6 parametric • UREI 545 parametric • Pultec HLF-3 hi/lo filter • Altec graphic • Furman parametric • U.A. 550 hi/lo filter • White 3400 1/3 octave graphic.

### RACK MOUNT LIMITERS

Decca tube limiter • Electrodyne compressor limiter • Pye limiters • Altec tube limiter.

### EQUALIZER MODULES

Melcore GME • API 550 • Map EQ • Altec 9061A • Orange County sweep EQ • B & B EQF-1.

### LIMITER MODULES

Allison Gain Brain 1 • Orange County comp/limiter • API 525C • API 525A.

### AMPLIFIERS

McIntosh MI-75 • McIntosh MC-75 • McIntosh MC-30 • McIntosh MC-40 • Crown IC-150 preamp • Crown D-60 • Langevin AM-16 • Marantz 240 • Crown SA 30-30.

### CONSOLE COMPONENTS

Neve 1058 input module • API 515Q assign module • API 512 input module • API 325 line amp cards • API 312-5 line amp cards • API 575 oscillator.

### MISCELLANEOUS

Pultec MH-4 mixer • Stephens VSO as is.

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LEGEND: SD: Studio Designer; AC: Acoustical Consulting; SES: Studio Equipment Supply; EI: Equipment Installation/Maintenance/Serviceing

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 6311 N. O'Connor Rd., LB 50, Irving, TX 75039  
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 Contact: Mike Simpson, Richard Avery, Jeff Jones  
**Services offered, credits, specialization:** Midcom, Inc. exists in three divisions. First, Midcom provides sales, engineering and service for the finest lines of audio available including Otari, MTR Series, Soundcraft, Neve, Lexicon & Audiotronics. In fact, because of our reputation in customer service, Neve has selected Midcom as their only distributor in the U.S. outside of East and West coast district sales offices. Midcom also maintains a large rental inventory to service any requirement. Our stock includes wireless microphones, two-way "walkie-talkies," eng mixers, Lexicon PCM 60, 200 & 224XL, RTS, Clear-Com and RTA's. The third division of Midcom incorporates our 48-track audio remote truck. This mobile facility is available for production, postproduction, and remote recording throughout the Southwest.

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 Contact: Mr. Bob Herrick

The graphic for Polyline Corp. features a collection of audio equipment including a reel-to-reel tape machine, a cassette tape, a CD, and a vinyl record. The text 'Polyline Corp.' is written in a large, bold, stylized font. Below it, the text 'REELS & BOXES FOR AUDIO AND VIDEO TAPE' is written in a bold, sans-serif font. Further down, it says 'PROFESSIONAL QUALITY ALL SIZES' and 'Shipped from Stock (312) 297-0955'. The address '1233 Rand Road Des Plaines, IL 60016' is listed at the bottom.

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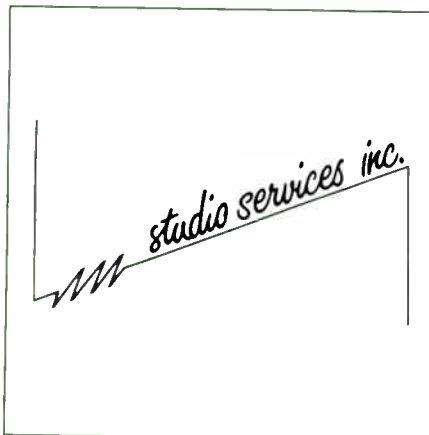
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Contact: Dennis Lowe

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STUDIO SERVICES, INC.  
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Contact: Ron Lagerlof

Services offered, credits, specialization: We are a full-service professional audio organization staffed by top-flight recording engineers, studio managers and equipment designers, offering state-of-the-art pro audio equipment, technical service, systems installation and custom special products. Through our parent company, Studio Supply, Nashville, we offer studio designs by Tom Irby, whose most recent Texas accomplishments include Willie Nelson's studio near Austin and Mickey Gilley's club and studio in Pasadena. Studio Services manager, Ron Lagerlof, has installed studios for Dallas Sound Lab, Studio Centre, Omega Audio, TM Productions, Sunrise Studios and Sierra Audio. Our product line includes, but is not limited to: AMS, Audio & Design/Calrec, Haller, Harrison, Sanken, Sony, Soundtracs, Ursa Major, and US Audio. SSI is dedicated to serving, and servicing, the Texas, Oklahoma and Louisiana area and are interested in each customer from microphones to mixer to multitrack to monitors, analog to digital, radio or records, and audio for video.



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Contact: Rolly Brook, Ron McKay  
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—CONTINUED ON PAGE 156

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—CONTINUED FROM PAGE 154

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 Contact: Michael R. Lane

**L.A. SOUND CO.**  
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 Contact: Richard Rakle

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 Contact: G.L. Augspurger

**Services offered, credits, specialization:** This consulting group is headed by well-known acoustician and studio design expert, George L. Augspurger. His wide experience with commercially successful TV, film and recording studios covers every major record label as well as the most prestigious independent studios. Projects currently underway include four major recording complexes, a number of studio remodeling designs, acoustical consultation for auditoriums and film sound stages, two TV sweetening room designs, and acoustical corrections in three existing studios. Perception Inc. provides professional consulting and design services to architects, builders and studio owners; it has no association with any contractor or equipment supplier. In addition to studio design services and acoustical consultation, the company provides extensive acoustics testing capabilities. Mr. Augspurger is a member of the Audio Engineering Society, Acoustical Society of America, U.S. Institute for Theatre Technology, American Theatre Association and National Council of Acoustical Consultants.

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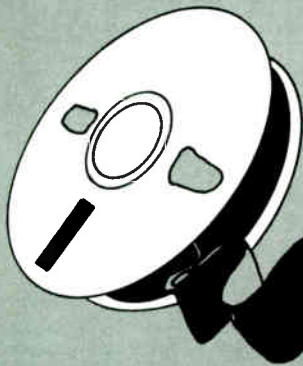
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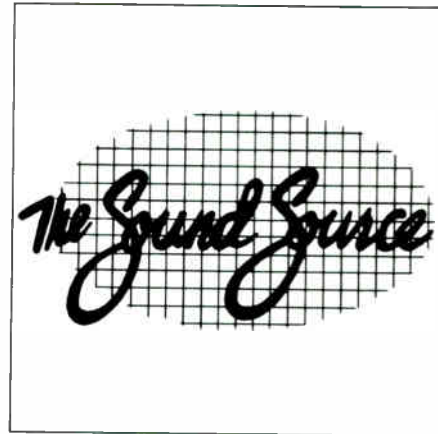
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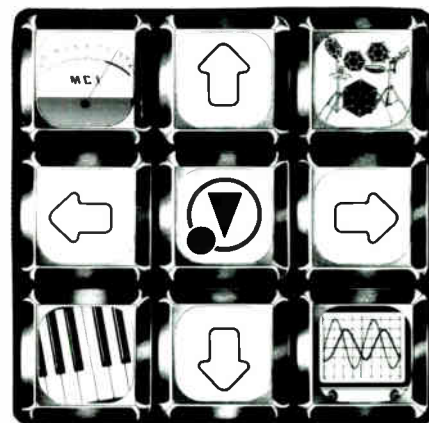
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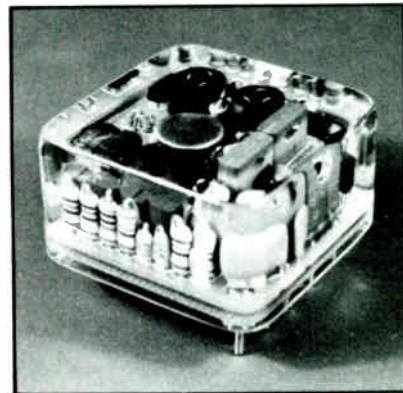
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—FROM PAGE 8, SESSIONS

*cording/Channel One Productions* has started work on a compilation LP featuring Metroplex area underground pop and rock talent. The album, to be titled *Town Without Basements*, will showcase upbeat original songs, according to *Drew Townson*, the record's producer...

## NORTHWEST

Fresh off the recent Chicago tour, multi-talented Bill Champlin settled in *Starlight Studio* in Richmond, CA to contribute vocals to former Sons bandmate *Terry Haggerty's* solo album. The guitarist and producer Norman Kerner are shooting for a late summer release to coincide with the live debut of Terry's new acid-funk quintet...*Russian Hill Recording* in San Francisco contributed to the soundtracks of three feature films that were screened at this year's Cannes Film Festival: *Dim Sum*, Wayne Wang's new independent film scored by Oscar winner (Amadeus) *Todd Boekelheide* at Russian Hill, *Mishima* (Lucasfilm) which did their Foley work at RHR with sound designer *Leslie Shatz* and *Latino*, directed by *Haskell Wexler*, which did their dialogue work at RHR in association with Sprocket Systems of Lucasfilm... At *Mushroom Studios* in Vancouver, *Dave Ogilvie* engineered and produced an album for *54/40*, a band the subject of US major and independent label interest... At *Prairie Sun Recording* in Cotati, CA, East Bay heavy metallers, *Possessed*, were in working on their debut LP on Combat Records with *Randy Burns* producing and engineering, and *Steve Buck* assisting... At *Montage Recording Studio*, Newark, CA, recent sessions include a new ballad for *Dean Keith's* forthcoming EP engineered by *Randy Spendlove* with *Louise Singleton* assisting... Post-production work at *Studio C* in San Francisco included *David & Janaki Rathod*, fresh from Bombay with the first-ever MTV filmed in India for *Translator* and 415 Records... At *Triad Studios* in Redmond, WA, *Queensryche* was in for a demo project with *Tom Hall* on the board... Recent sessions at *Heavenly Recording* in Sacramento included San Francisco's *Monkey Rhythm*, with *John Baccigaluppi* producing and engineering, and *The Convertables*, with *Brent Bourgeois*, *Craig Liviach*, and *John Baccigaluppi* engineering and producing...

## NORTHEAST

Activities at *Rawlston Recording* in Brooklyn, NY included the *Fat Boys* album, produced by *Kurtis Blow*, for *Autra Records*. *Kurtis* also did overdubs for his fifth album for Mercury/Polydor Records, *Akili Walker* engineering, *Bob Brockman* assisting... Recording at *Planet Zero Studios* were *Irma Estel La Guerre*, co-star with *Yul Brynner* in the

*King and I*; engineer for the sessions was *James Cannings* assisted by *Steve Rosenthal* and *Fitz*... Mixing their second LP at *Pyramid Sound Studios* in Ithaca, NY were *Crazed Management* recording artists *Anthrax*. *Alex Perialas* engineered with *Peter Bombar* assisting and *Carl Canedy* producing... *Edwin Birdsong* was in *Power Play Studios* producing his new single "Get it Right." *Marly Marl* mixed the record and *Stevie Wonder* played some keys on it. *Patrick Adams* engineered... *Isley, Jasper Isley* (formerly of the *Isley Brothers*) were in at *Eastern Artists Recording Studio* in East Orange, NJ recording their next album for CBS Records. *Dave Dachinger* engineered... Singer *Mara Friedman* was in NYC's *Quadrasonic Sound Studios* doing tracks for the re-make of "Ball of Confusion," originally done by the *Temptations*. It was produced by *Kenny Beck* and engineered by *Tom Gonzalez*... At *Classic Sound*, NYC, *Ben Rubin* produced the *Ray Brown All-Stars*. *Jim Anderson* engineered, assisted by *M. Denise McGrath*... *Tim Moore* was in *Tiki Studios* (Glen Cove, NY) mixing for his new LP for Elektra Records. *Rob Freeman* (Go-Go's) produced with *Danny Caccavo* engineering. *Robbie Dupree* ("Steal Away") was in doing some background vocals for the project... *Walter Duda*, pianist and vocalist, completed a demo recording at *A&R Recording* in New York City for George Butler of CBS Records. He also recorded additional original compositions at *Carriage House Recording Studios* in Stamford, Connecticut. *Larry Franke* engineered the session at A&R, and at the Carriage House he was helped by *Jeff Jones*... At *Golden Apple Media* of Mamaroneck, NY, *Tim Scott* has been laying tracks with his new band, *Wild Mojave* in preparation for their debut album on Warner Bros. *Peter Denenberg* was at the board... Jazz guitarist *Kevin Eubanks* recorded a new album for GRP records with engineer *Paul Wickliffe* and assistant *Mario Rodriguez*; and *Dizzy Gillespie* cut tracks for a new album on GRP produced by *Larry Rosen*. *Joe Jorgenson* was at the console, with *Scott Ansell* assisting... The *Diamond 2 Crew* cut their fresh 12-inch "We're Getting Too Old" for A.S.D. Records with producers *Hernandez & Allecca* at *Reel Platinum Studios* in Lodi, NJ... The *Works* finished recording their debut single at *Pyramid Sound Studios*, Ithaca, NY. *Alex Perialas* and *Peter Bombar* engineered and co-produced the project... At *39th Street Music* in NYC, *Ashford & Simpson* were in doing several demos for an upcoming movie starring *Mikhail Baryshnikov* and *Gregory Hines*. *Tim Cox* engineered... Recent happenings at *Shakedown Sound* included *Brass Construction* in the studio laying down tracks and mixing for their forthcoming album on EMI. Producing was *Randy Muller*, with *Andy Wallace* engineering... *Secret Sound Studio* in NYC had *Grandmaster Flash* recording a single for Elektra Records with *Tom Gartland* engineering and *Bob Brockman* assisting... At *Boogie Hotel* in Port Jefferson, NY, *John Waite* recorded his forthcoming album for EMI Records. The proj-

ect was co-produced by *Stephan Galfas* and *Waite*, and *Stephan* shared engineering duties with *Chris Isca*... At *Inner Ear Recording* in Queens, NY, singer/bassist *Bob Guida* and pianist/singer *Michael Greene* recorded and edited their new album on *Global Village Records*. *Steve Vavagiakis* engineered... Recent mastering projects at *The Cutting Edge* in Ferndale, NY included a 45 for *Louis Dicks & The World's Greatest Gospel Singers* and an LP for *Roach-Egg Invasion*... At *All Star Sound Studio*, Bloomfield, NJ, *Southside Johnny & the Jukes* cut tracks for an upcoming LP with *Jay Vicari* engineering, *Southside Johnny* producing, *Brian Bannon* assisting... Elektra Recording artist and former leader of the band *Suicide* *Allen Vega* finished his newest album at *Broccoli Rabe Studios* in Fairfield, NJ. The album was engineered by *Kennon Keating* (who also played guitar) and assisted by *Marc Lennard*... *Rob Freeman* was in NYC's *D&D Recording* working on *Tim Moore's* upcoming release on Elektra Records, with *Danny Caccavo* engineering... *Joey Lynn Turner*, former lead singer of *Rainbow* recorded his debut album for Elektra Records at *Bearsville Studios*. Veteran producer *Roy Thomas Baker* handled production chores, and the project was engineered by *Ian Taylor* with assistant engineer, *Ken Lonas*... At *Celestial Sounds* in NYC, *Allan George* and *Fred McFarland* produced tracks for *Evelyn King's* upcoming LP for RCA. *Hugo Dwyer* was at the board with *Larry Decarmine* assisting... *Allan St. Jons* (Billy Squier Band) and *Scarlet Rivera* (Bob Dylan) completed work on a feature-length movie soundtrack, *Las Vegas Weekend* which they co-wrote and produced at *Michael Levine's Studio* in NYC. Engineering were *Michael Levine* and *Barnaby Bristol*... Ongoing projects at *Normandy Sound* in Warren, RI included singer *John Cafferty* doing an interview with *Joe Interrante* for RKO Radio with engineer *Bob Winsor* and producer *Maurice Starr* working on new material with engineer *Phil Greene*... *Jeff Rust* of *Jasir Recording* (Boston, MA) recently produced demos for *Tom Whaley*, a Berklee College of Music trombonist, which helped Tom to win an "Outstanding Performance Award" in the Jazz Instrumentalist Soloists category of *downbeat* magazine's 1985, Eighth Annual Student Music Awards... Actor *Jackie Gleason* recently produced his own Dixieland compositions for the CBS-TV movie *Izzy and Moe*, in which he stars with former *Honeymooners* sidekick *Art Carney*, in *Media-Sound's Studio A*; *Michael Golub* engineered, seconded by *Tim Hatfield*...

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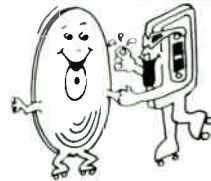
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If you've been reading **Mix Magazine** in 1985, you've almost certainly heard about the TEC Awards. Established by the publishers of **Mix**, this first-of-its-kind awards program will honor outstanding achievement in the professional recording and sound production industries. Encompassing three general categories (Technical, Creative, and Institutional Achievement) the TEC Awards will give audio and music professionals the opportunity to recognize the accomplishments of their peers.

On May 31st, balloting closed for the First Annual TEC Awards. Several thousand **Mix** readers took part in the voting, assuring that the awards will represent a true cross-section of our many-faceted industry. The sealed ballots have been turned over to a firm of certified public accountants, to be tabulated just prior to the TEC Awards celebration on October 14th.

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On Monday night, October 14th, during the AES Convention, a gala celebration will be held at New York City's Puck Building. Beginning at 7:00 p.m., the TEC nominees and other members of the industry will gather to enjoy an evening of dining, entertainment, and—most importantly—the presentation of the TEC Awards. A specially printed TEC Program Guide, including profiles and photographs of all 130 nominees, will be handed out to each guest. If you or members of your company would like to attend the TEC Awards celebration, or you would like to reserve advertising space in the Program Guide, call or write today to: **TEC Awards, 2608 Ninth Street, Berkeley, CA 94710, (415) 843-7901.**

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*All proceeds of ticket sales for the 1985 TEC Awards celebration will be divided among: The Deafness Research Foundation (for research into the causes and cure of hearing impairment); the Audio Engineering Society (for creation of an educational scholarship); and the winner of the Recording School of the Year Award (to fund a scholarship for a deserving student).*

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## —FROM PAGE 47, MODIFICATION

engineer would now have enormous control over the acoustical parameters of the room. At the present time, a recording session may need to take place in several different studio locations, merely to meet the acoustical requirements. The recording of such traditional instruments as strings and woodwinds is not suited to a rock and roll studio. With these systems in place, however, one studio and one room could conceivably cover each acoustical requirement.

Another factor to be considered is musician comfort. Acoustical instruments need a room's resonance and reflections to sound correct to the musician. And, playing an acoustical instrument without these aural cues can be frustrating, and cause poor musicianship. Therefore, a proper room tuning not only benefits the recording

medium, but enhances the musician's ability to perform in the studio.

The systems could also be useful in film and video studios to recreate the environment being portrayed. This would save on postproduction costs, where external processing is used to simulate the medium, and would perhaps create a more realistic atmosphere.

The studio would also have in place a very interesting special effects tool. The studio itself could be used as a processing chamber for reverb and delay effects in mixdown. And since there is no limitation in the sends to the ERES system, myriad unconceived effects would be available. This could include the use of specialized binaural effects which are difficult to create with conventional studio equipment.

There are some disadvantages to these systems, however. The studio would have to be of medium size, with

fairly high ceilings as previously discussed. Implementation in a small studio would be difficult, as feedback in the resonant loops and proximity to the ERES loudspeakers would increase. Thus, this system is not a cure-all. Yet, in the right applications, these systems would be powerful tools for multi-dimensional studios.

Since this system has never been used in a studio, the first application will be costly. And of course, with anything new, there will be some unexpected problems. The science, however, is ready. In time, if many studios were to successfully implement this system, the cost and problems would diminish, and the possibilities would multiply. Someone, somewhere, must now take the risk of the initial installation. It should be to their advantage, in the long run, over previous acoustical remedies. ■



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