July 1989

Recording ENGINEER/PRODUCER

The Applications Magazine for Audio Professionals

AN INTERTEC PUBLICATION

$4.00

Studio Design

Focusrite: What Went Wrong?
Ad of the Year Contest

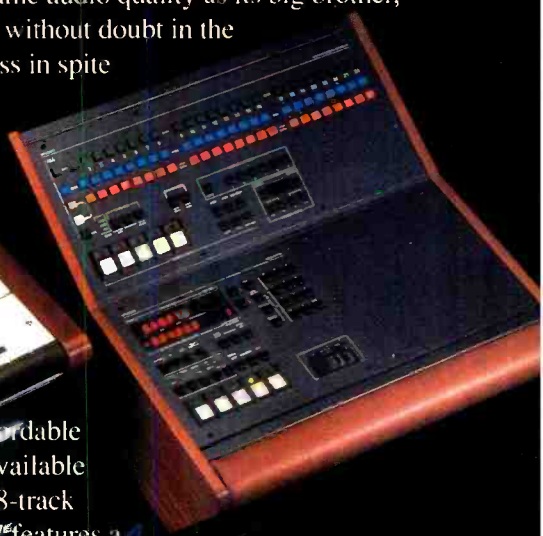
www.americanradiohistory.com

Attention Otari and Sony/MCI Customers:

'Now you can afford Studer quality and performance'

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

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



Featured for post production. For TV/Video/Film post production work, the A827 offers the fastest transport in the business—0 to 600 ips in 4 seconds—and with 14" reel capacity. The optional chase lock synchronizer guarantees nobody'll be waiting on *this* machine. Post features like Reverse Play/Record and parallel/serial RS232/422 control ports make for easy integration into post production facilities.

There's never been a better time to part ways with those "other" machines...and move up to the famous Studer sound and quality. Call us. Experience the new A827-24 with the best price/performance ratio available.

STUDER REVOX

Studer Revox America, Inc.
1425 Elm Hill Pike • Nashville, TN 37210 • (615) 254-5651
Los Angeles (818) 780-4234 • New York (212) 255-4462
Studer Revox Canada Ltd. (416) 423-2831

Circle (1) on Rapid Facts Card

www.americanradiohistory.com

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

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

More important, though, listen to the way it sounds. This 32 bus console offers very low noise, minimal crosstalk and a degree of sonic transparency that sets new standards.

Combine these attributes with a sensitive yet effective equaliser section to create one of the sweetest sounds to be found anywhere, perfect for high quality track laying.

And while our crystal clear layout is free of gimmickry, we've included a number of unique features and sophisticated circuit designs which, together with Soundtracs Tracmix fader automation, provides versatility to set your creativity free.

Little things in themselves. But in the Soundtracs IL, add up to a rather special production console.

SOUNDTRACS PLC, 91 EWELL ROAD, SURBITON, SURREY KT6 6AH ENGLAND. TELEPHONE: (01) 399 3392/8101. FAX: (01) 399 6821. TELEX: 8951073 STRACS G

SPECIFICATIONS:

- 48 OR 36 CHANNELS
- 104 OR 80 INPUTS ON REMIX
- INTERCHANNEL CROSSTALK BETTER THAN −88dB @ 1kHz
- MIX NOISE 32 INPUT ROUTED BETTER THAN −82dB.

EXCLUSIVE US DISTRIBUTOR:

SAMSON®
Technologies Corp.

SAMSON TECHNOLOGIES CORPORATION, 485-19 SOUTH BROADWAY, HICKSVILLE, NY 11801. USA. TELEPHONE: (516) 932 3810. FAX: (516) 932 3815.

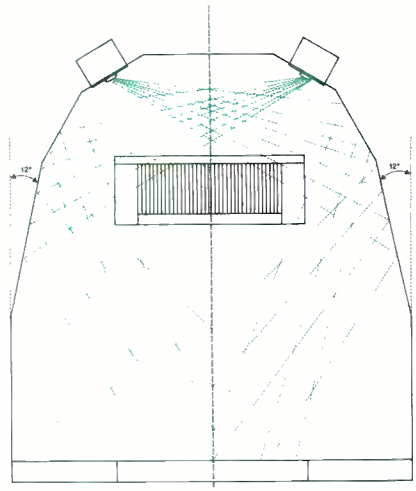
Circle (4) on Rapid Facts Card

www.americanradiohistory.com

CONTENTS

Studio Design

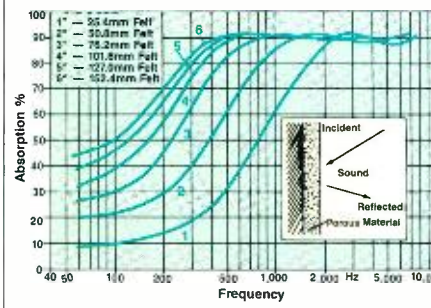
Control Room Design
Beyond voodoo, a lot can be done to design good sound into a control room.
By Vin Gizzy . . . . . **18** ▼



Facility Profile: Abbey Road Studio 3
Abbey Road's new Studio 3 has been designed to meet the needs of an increasingly demanding and competitive industry.
By David Allison . . . . . **28** ▼

Other Features

Designing for Audio/Video Post
Combining the effective audio *and* video monitoring is just one of the challenges that face the designer of an A/V post facility.
By Carl Yancher . . . . . **36** ▼

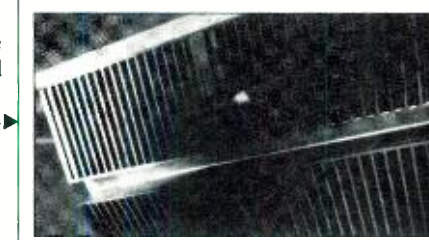


Acoustic Room Treatments
Controlling room reflections involves the interaction of absorption, reflective and diffusive surfaces.
By Dr. Peter D'Antonio . . . . . **44** ▶

Focusrite: A Special Report
Does Rupert Neve's design genius mitigate his responsiblity for losses suffered by his former console customers?
By Michael Fay **50**

Departments

Editorial 4
Letters 6
News 8
Managing MIDI 12
SPARS On-Line 14
Understanding Computers 16
Engineer/Producer Index 54
Tracks 58
Studio Update 61
The Cutting Edge 64
New Products 65
Classified 69
Advertisers' Index 72
Engineer/Producer Index Reply Form 73
Tracks Reply Form 75
Rapid Facts Cards 77
New Subscriber and Address Change Cards 79



◂On the Cover

Abbey Road Studio 3. Photo by John Price, courtesy of Abbey Road, London.

Volume 20, No. 7

RECORDING ENGINEER/PRODUCER (ISSN 0034-1673) is published monthly for $26 to qualified readers, $30 to non-qualified readers per year by Intertec Publishing Corporation, 9221 Quivira Road, Overland Park, KS 66215. Second-class postage paid at Shawnee Mission, KS and additional mailing offices. POSTMASTER: Send address changes to Recording Engineer/Producer, P.O. Box 12960, Overland Park, KS 66212.

www.americanradiohistory.com

In an age of disk and digital, why buy analog?

We know there are some applications where our 32-channel digital machine, the DTR-900, is the only answer. But if your business is such that you can do anything you want to do in the analog domain, and at the same time do less damage to your budget, then our brand new analog 24-channel MTR-100A may be the perfect machine for you.

When you consider that the MTR-100 will literally *change forever* the way engineers interface with audio machines, and

The MTR-100's auto-alignment saves you hours of time by eliminating constant tweaking and re-tweaking between sessions.

that this new way will save you hours spent in non-productive time, the analog choice begins to make even more sense. You see, the MTR-100 features full Auto-Alignment that allows total re-calibration of the record and reproduce electronics. This means you can compensate for different tapes in a *fraction* of the time that it previously took, and your studio is not bogged down with constant tweaking and re-tweaking between sessions.

And if you think digital machines have a corner on high performance transports, think again! The MTR-100's new transport incorporates reel motors that approach one horsepower—you'll get fast wind speeds of up to 474 inches per second! Of course, the transport is pinchrollerless to give you the legendary tape handling ballistics of our MTR-90.

What's more, with its optional EC-103 chase sychronizer, the MTR-100 maintains frame-lock in forward and reverse from 0.2X to 2.5X play speed, and will typically park with zero frame error.

Reel motors that approach one horsepower are driven by pulse width modulation amplifiers to tape speeds up to 474 ips.

Then, there's the sound. New cylindrical-contour heads built by Otari especially for the MTR-100 result in remarkably low crosstalk and outstanding low-frequency performance. Pre-amps are located directly beneath the heads to further improve frequency response, and HX-Pro* is built-in for enhanced high frequency headroom. (An optional internal noise reduction package houses Dolby* SR/A.) Add all these features to gapless, seamless, punch-in, punch-out, which is also built-in, and your MTR-100's sonic performance will rival, or beat any digital machine in the world.

So there you have it. With these powerful benefits available in analog, does it make sense to go digital? Sure, for some applications. But analyze your needs carefully before you buy. For many applications, a hot analog tape machine like the MTR-100 is the right choice.

And because we can see both sides of the question, put us to work. We have information that can help you make the right decision. Call Otari at (415) 341-5900 for the *"Technology You Can Trust"*.

OTARI®

Trademark Dolby Laboratories Licensing Corporation

Circle (5) on Rapid Facts Card

www.americanradiohistory.com

EDITORIAL

Shakeout in Utopia

By all appearances, the pro audio industry is an exciting and profitable business for high-tech manufacturing. But in reality, ours is a cottage industry, suffering from an overload of redundant product development and a limited, if not shrinking, customer base.

In the past few months, we've seen Yamaha cancel production plans for an already announced synthesizer (the V80FD); Fairlight, Focusrite and Harrison either go out of business or undergo major financial restructuring; Carillion (owner of dbx) pull out of pro audio; and AKG and Orban, and Mitsubishi and Neve seek the protection of mergers or distribution alliances. And this is just the beginning.

Our industry is experiencing a shakeout similar to the one the computer industry experienced a few years ago. It is a time for weeding out impostors, charlatans, frauds, hustlers and wannabees. It is a time of transition, of maturation, evolution and revolution that is long overdue. Manufacturers that lack focus will find, no matter what their size, that their once-naive customers are no longer in a position to be their cash cows.

Based on *RE/P*'s research, there are roughly 20,000 qualified users of the professional products made for this industry, and most of them share equipment: one fully equipped studio serving the hardware needs of several engineers. Manufacturers cannot continue to churn out new and/or non-relevant products in attempt to capture some small share of what is already an infinitesimal market. The numbers just don't add up.

At present, studio owners and engineers are being charged for the right to be guinea pigs. They are being used as beta testers for products that manufacturers are releasing long before they have been fully developed and debugged. After the initial hoopla, such products are often spurned by knowledgeable users who quickly discover not only technical deficiencies but operational flaws. The manufacturer is then forced to return to the R&D stage in hopes of satisfying the select group willing to stick around for version 2.0. Of course, version 2.0 rarely solves all the problems of version 1.0, and version 2.5 soon follows.

In reality, if manufacturers were to be honest with themselves, they would have to admit that very few of them have the operational background and the necessary resources to successfully research, develop and market products with diverse applications.

Don't think the rest of us can escape all of the blame. At a time when studios are paying astronomical sums to have "the best that money can buy," they accept delivery on $100,000 devices that have unproven hardware and/or software. We get infatuated with new products without carefully evaluating whether the technology is economically and functionally practical for our specific applications. And don't pass off the blame on unsophisticated production clients who shop studios by brand names. Few studio managers shy away from pointing at hardware to sell themselves. The shakeout is happening now. Facilities that can't make intelligent hardware decisions are being attacked by private-use studios. Engineers who think they need digital audio and total recall to make a record or hard disk to edit sound effects will be looking for work in another field.

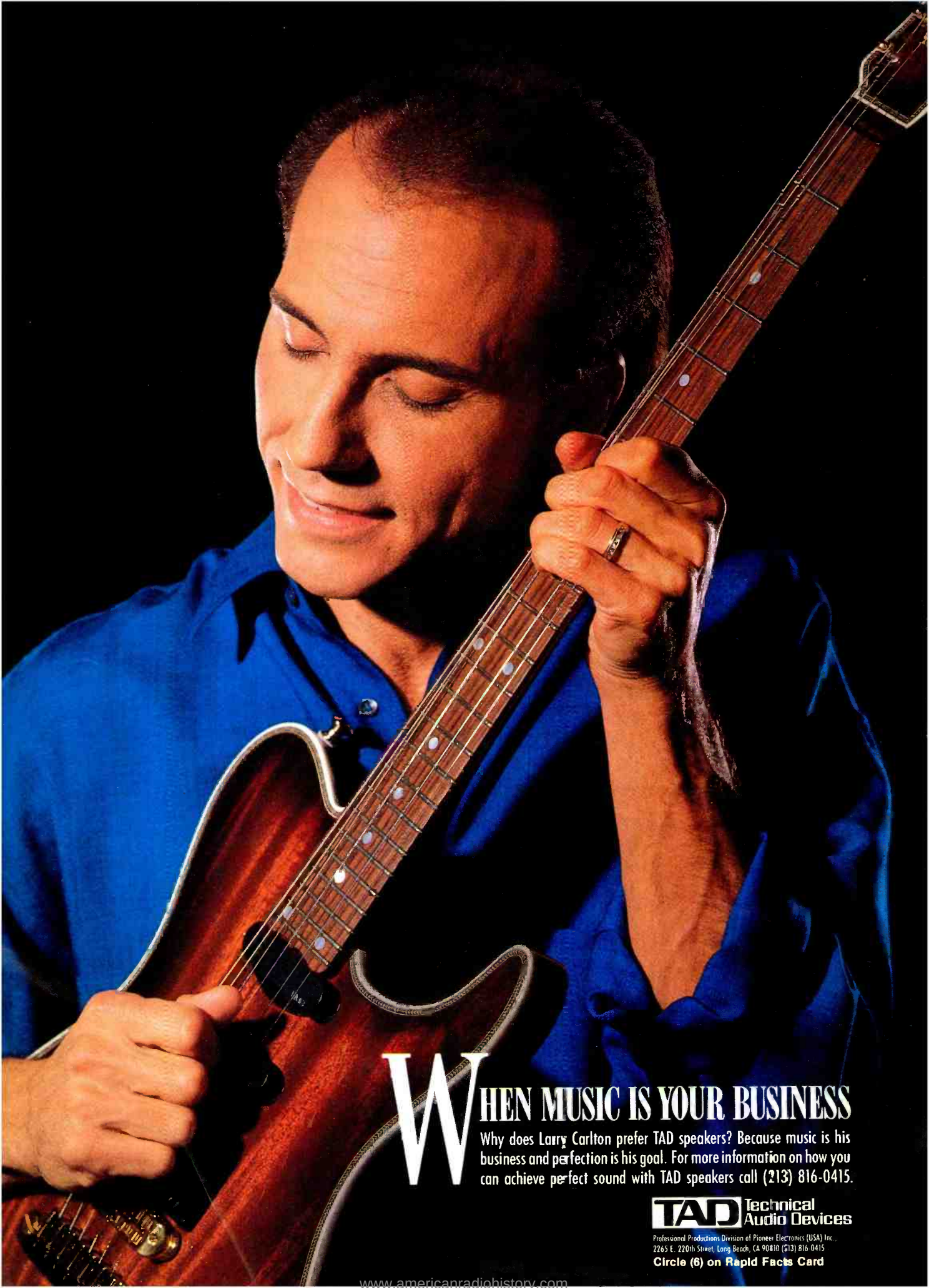
Studio owners and engineers, I suggest you control your hardware habits long enough to re-establish a real relationship between supply and demand. Don't let constant marketing pressure to upgrade turn you into junkies.

As for manufacturers, I suggest a moratorium on all new product introductions or updates between the 1989 and 1990 fall AES conventions. Instead of new products, marketing campaigns ought to emphasize the *productivity of proven technology.*

Alert product managers are beginning to realize that with all the available choices, there is no prosperity in marketing new gear (or software) that isn't operating at 100% of its publicized capability. They understand that it is an indication of stature when a company makes a useful product and sticks with it over a period of time that, *from the user's perspective*, reflects a meaningful technological, functional and economic lifespan.

Mike Fay
Editor

www.americanradiohistory.com



www.americanradiohistory.com

LETTERS

Broadcast audio

From: Mick Stern, audio engineer, WFXT TV, Needham Heights, MA.

As a student of music production and engineering at the Berklee College of Music, I was told by my professors that "the only time TV engineers notice the audio is when they lose it." Having worked in a top-notch SSL facility since then and having become a devotee of "audiophilia," my transplant to the broadcast world was met with trepidation.

Happily, attitudes are changing in the broadcast industry. Perhaps the change is not as rapid as we "audio-heads" would like, but awareness is a start; the advent of stereo television has not been proven to be an almighty ratings booster, yet it has made significant inroads. Indeed, the consumer has become more aware than ever of quality audio, as compact disc digital sound is no longer an item of curiosity. Therefore, the state of audio cannot help but improve in all fields.

As an audio engineer in the broadcast industry, you will find two kinds of production. The "fast food" variety is quite a challenge. This is where you will be called upon to live with compromise, whether it be inadequate budget or difficult miking, such as is required in ENG or EFP situations. And there won't be such a thing as a punch-in or a re-take!

The "gourmet" variety assumes ideal conditions where optimum quality is required, and utilizes technology and time to its fullest potential. Obviously, this creates different types of challenges. Note that each of these situations can be equally rewarding, and equal in pitfalls. As an audio "artist," the broadcast profession demands a mixed bag. You must learn to be happy knowing that you have made something as good as the situation permitted, and not always as good as it could have been.

Finally, a major difference in the audio industry and the audio-for-broadcast industry is this: In the latter, audio is part of the picture. In the former, it is the end. This implies that your financial investment into the "end" is easier to justify to the bean counters than might be the case of the "part of the picture" situation. This in no way justifies bad audio, but is designed to show that there is attention, and presumably forward progress!

History lesson

From: Paula Maute, MIT Architecture Department, Cambridge, MA.

The famous quote, "The only thing we have to fear is fear itself," was misattributed twice in your fine magazine. Once in January, when Jeff Burger in "Understanding Computers" attributed the quote to JFK, and a second time, attributed to FDR, when it appeared as a correction in the April "Letters." Indeed, FDR did say it in trying to sway Americans into the war effort, but the original source of this quote is not FDR.

In 1851, Henry David Thoreau said, "Nothing is so much to be feared as fear." Before that, in 1623, Sir Francis Bacon said, "No thing is terrible but fear itself." And, even before that, Michel de Montaigne, the famous philosopher, noticed that fear was a scary thing when he said in 1580, "The thing I fear most is fear."

But giving credit where it seems to be due, the Bible states in Proverbs, "Be not afraid of sudden fear."

Fear not *these* quotes are mis-attributed; I referred to Barlett's Familiar Quotes.

William Abrams, RE/P's editorial assistant (and resident history expert), replies:

Ms. Maute's letter was very informative, and everyone at *RE/P* appreciates her having taken the time to research the origins of the quote. But I'd like to point out that President Roosevelt did not say "the only thing we have to fear is fear itself" in trying to sway Americans into the war effort, but rather to assuage fears of the Great Depression. If I'm not mistaken, the year was 1933; the occasion, his first inaugural address. RE/P

Send letters to RE/P, Suite C, 8330 Allison Ave., La Mesa, CA 92041. Letters may be edited for length and clarity.

www.americanradiohistory.com

THE LATEST TECHNOLOGY IN 24 TRACK PRODUCTION MAY COST YOU SOME OF YOUR FAVORITE PRECONCEPTIONS.

You may think you know which 24 track gives you the most advanced technology and design. But you're probably in for a surprise.

It's the ATR-80.

The ATR-80 is a production dream come true. It's got features that make audio-for-video editing faster and easier than it's ever been before in a 2-inch, 24 track format.

Look at the speed. Unique samarium-cobalt motors in the ATR-80 start the capstans quicker and then shuttle at a lightning-fast 380 ips. Lockup time is limited only by your other equipment.

Tascam's proprietary head technology allows you even more production speed, with head quality so uniform that EQing decisions can be made right in sync without rewinding to repro. Special circuitry provides transparent punch-ins for completely gapless and seamless edits.

But there's only so much of the ATR-80 that can be described in features. For the rest you must sit down in front of it and lay your hands on the controls. That's when you'll sense the craftsmanship and quality of it's design. The power, the speed, the smooth response of the transport.

See your Tascam ATR-80 dealer. After you use it, you won't miss those preconceptions one bit.

TASCAM

© 1988 TEAC Corporation of America, 7733 Telegraph Road, Montebello, CA 90640. 213/726-0303.

Circle (7) on Rapid Facts Card

www.americanradiohistory.com

NEWS

RE/P debuts ad contest

What was the best pro audio advertisement in the past year? *RE/P* readers have the chance to determine this in the first Ad of the Year Contest.

This issue contains a ballot, which asks readers to name which advertisement had the most impact and if the advertised product was purchased. Only ads that have appeared in the October 1988 through July 1989 issues should be considered.

Everyone sending in ballots will be eligible to win an ART signal processor in a prize drawing. All ballots must be returned by Aug. 31. The prize drawing will be held in September, and the Ad of the Year winner will be announced a the AES Convention in New York.

Electric Sound and Picture founded

The founders of Fairlight Instruments recently formed Electric Sound and Picture. The organization has purchased all Fairlight assets and will provide global customer support, production, ongoing development and servicing of Fairlight audio and video products.

Fairlight's distribution network in nearly 20 countries remains in place, but has been taken over by Electric Sound and Picture. The U.S. subsidiary is no longer operational.

Electric Sound and Picture can be contacted at 30 Bay St., Broadway, Sydney, NSW Australia 2007; 61-2-212-6111; fax 61-2-281-5503.

3M Lyra Awards presented

3M has presented its eighth annual Lyra awards to five audio teams nominated for Academy Awards in the "Achievements in Sound" category.

Receiving the awards were:

For "Bird": Willie Burton, production sound mixer; Les H. Fresholtz, supervisor re-recording mixer, dialogue; Dick Alexander, re-recording mixer, SFX; and Vern Poore, re-recording mixer, music.

For "Die Hard": Al Overton Jr., production sound mixer; Don Bassman, supervisor re-recording mixer, dialogue; Richard J. Overton, re-recording mixer, SFX; and Kevin F. Cleary, re-recording mixer, music.

For "Gorillas in the Mist": Peter Handford, production sound mixer; Andy Nelson, re-recording mixer, dialogue and music; and Brian Saunders, re-recording mixer, SFX.

For "Mississippi Burning": Danny Michael, production sound mixer; Robert Litt, supervisor re-recording mixer, dialogue; Elliot Tyson, re-recording mixer, SFX; and Richard C. Kline, re-recording mixer, music.

For "Who Framed Roger Rabbit": Tony Dawe, production sound mixer; Robert Knudson, supervisor re-recording mixer, dialogue; John S. Boyd, re-recording mixer, SFX; and Don Digirolamo, re-recording mixer, music.

Original scoring mixers who received Lyra awards were Joel Moss, "Gorillas in the Mist"; Bobby Fernandez, "Bird"; Armin Steiner, "Die Hard"; Trevor Jones, "Mississippi Burning"; and Dennis Sands, "Who Framed Roger Rabbit."

SPARS hosts meeting

The Society of Professional Audio Recording Services is hosting an informal meeting August 4 at Paisley Park Studios, Chanhassen, MN. The meeting will be cosponsored by SPARS members Paisley Park, 3M and Hutchinson Technical College, and is open to both SPARS members and non-members. For more information, contact David Igl, Hutchinson Technical College, 612-587-3636, or Shirley Kaye, SPARS executive director, 407-641-6648.

Carillon sells dbx companies

Carillon Technology has accepted a letter of intent to purchase from AKG Acoustics to purchase the dbx Professional Products Division. The agreement is expected to be

EDITORIAL

Michael Fay, *Editor*
Dan Torchia, *Staff Editor*
Pamela S. Fleener, *Associate Editor*
William Abrams, *Editorial Assistant*
Andrew Naugher, *Editorial Assistant*
Melissa Bulgren, *Editorial Assistant*
Tom Cook, *Senior Managing Editor*
Pat Blanton, *Directory Issues Editor*

ART

Alecia Wright, *Graphic Designer*

BUSINESS

Cameron Bishop, *Group Vice President*
Dennis Milan, *Publisher*
Evelyn Hornaday, *Promotions Manager*
Cynthia Baker, *Marketing Coordinator*
Laurel Cash, *Executive Consultant*
Dee Unger, *Advertising Business Manager*
Tami Bartocci, *Advertising Coordinator*

Sales offices: See Advertisers' Index.

ADMINISTRATION

R.J. Hancock, *President*
Chuck Rash, *Corporate Circulation Director*
Sandra Stewart, *Circulation Director*
Doug Wilding, *Circulation Manager*
Customer Service. 913-541-6628
Kevin Callahan, *Creative Director*

CONSULTING EDITORS

Jeff Burger, *Computers*
Paul D. Lehrman, *Electronic Music*
John Monforte, *Technical Consultant*
David Scheirman, *Live Performance*

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

CORRESPONDENCE

Advertising and Subscription:
9221 Quivira
Overland Park, KS 66215
913-888-4664
Telex: 42:4156 Intertec OLPK
Fax: 913-541-6697

Editorial:
Suite C
8330 Allison Ave.
La Mesa, CA 92041
619-464-5577
Fax: 619-464-2643

SUBSCRIPTIONS

Qualified:
United States (Domestic Only) **$26.00**
Foreign **$50.00**
Non-qualified:
United States (Domestic Only) **$30.00**
Foreign **$60.00**

Optional airmail for non-qualified readers is also available for an additional $55.00 per year. Foreign subscriptions are payable in U.S. funds only by bank check or money order. Adjustments necessitated by subscription termination at single copy rate.

Recording Engineer/Producer is not responsible for any claim by any person based on the publication by **Recording Engineer/Producer** of material submitted for publication.

Photocopy rights: Permission to photocopy for internal or personal use is granted by Intertec Publishing Corporation for libraries and others registered with Copyright Clearance Center (CCC), provided the base fee of $2.00 per copy of article is paid directly to CCC, 21 Congress St., Salem, MA 01970. Special requests should be addressed to Cameron Bishop, group vice president.

ISSN 0034-1673 $4.00 + $0.00. BPA

Member, Business Publications Audit of Circulation
Sustaining member of Acoustical Society of America
Member, International Communications Industries Association
Associate member of Society of Professional Audio Recording Services

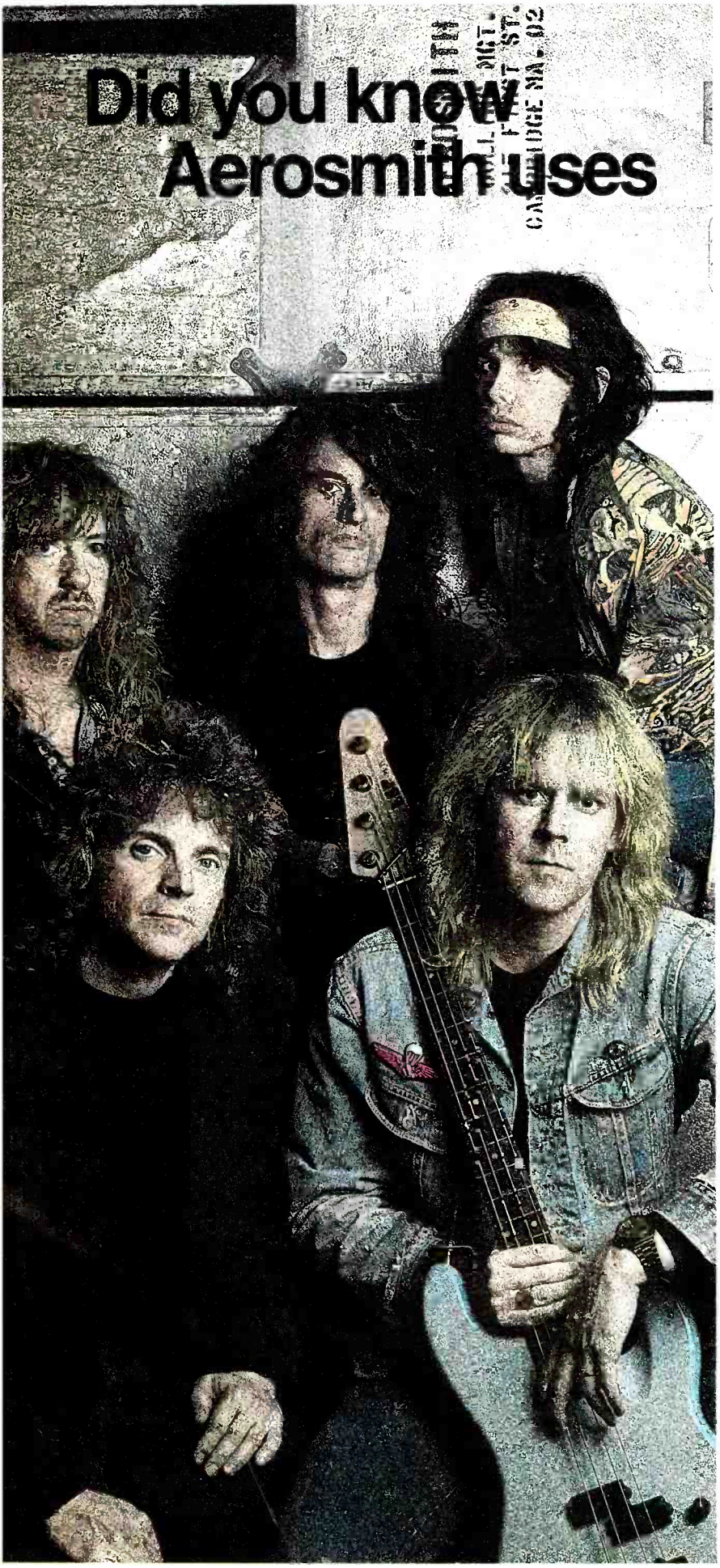
©1989 by Intertec Publishing. All rights reserved.

INTERTEC PUBLISHING

www.americanradiohistory.com

WE CARE

AGFA



Aerosmith—the band that taught a generation to "Walk This Way."

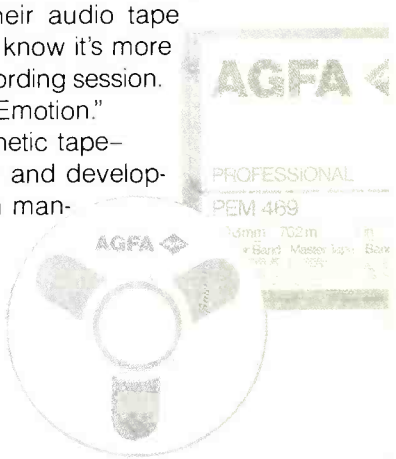
They've been turning hard rock into gold and platinum for almost twenty years.

Today, Aerosmith is using a new hit-making formula: bias-compatible AGFA PEM 469. "Only AGFA captures the intensity of our music—the life of it," says lead singer Steven Tyler. "We need a tape as dynamic as our music...a tape that delivers all our energy and emotion."

In the studio, these music masters are master craftsmen. They care about their audio tape because they know it's more than just a recording session.

It's "Sweet Emotion."

AGFA magnetic tape—from research and development, through manufacturing, to delivery and service—we care!



Agfa Corp., 100 Challenger Road,
Ridgefield Park, NJ 07660 Telephone (201) 440-2500

Circle (8) on Rapid Facts Card

AGFA Agfa

www.americanradiohistory.com

NEWS

completed by mid-July. Carillon has also sold dbx OEM Products to THAT Corporation, Natick, MA, a newly formed company of former dbx employees.

Both sales complete Carillon's goal of concentrating on consumer electronics.

News notes

Ampex has incorporated its magnetic tape division as a wholly-owned subsidiary. The new corporation, Ampex Recording Media, is based at Ampex's worldwide headquarters in Redwood City, CA. Max O. Mitchell, president and CEO of Ampex, has been named chairman of the board.

Julian Systems and Seehorn Technologies have signed an OEM agreement incorporating Seehorn's videotape/disc editing and production management system into Julian's Edit Worx system.

Promusic has acquired rights to the majority of recordings in the Emil Ascher Library; any use should be cleared through Promusic's Fort Lauderdale office. The company is offering 65 CDs in a wide range of styles; more than 150 classical masterpieces are available on R-DAT, ¼-inch or cassette tape.

Neve has appointed Audiotechniques, New York, and Audio Intervisual Design (AID), Los Angeles, as representatives for its Prism Series modules.

Manny's Music, New York, recently received **Beyer Dynamic's** Sales Excellence Achievement award.

A federal judge has upheld its ruling that **Yamaha** cannot employ U.S. trademark and tariff laws to enforce a worldwide price discrimination scheme. In December 1986, Yamaha sued ABC International Traders, claiming that ABC's importation of audio components and electronic musical instruments violated U.S. and California trademark laws, as well as U.S. tariff laws.

Edge Distribution has relocated to RR2, Box 144C, Millbrook, NY 12545; 914-567-1400.

Current Music Technology is now importing the product line of ARSonic, a West German manufacturer of studio outboard effects. For more information, contact CMT at 146 Paoli Pike, Malvern, PA 19355; 215-647-9426.

AudioTechniques recently hosted a clinic on DDA console technologies and applications in its New York City headquarters. DDA personnel was on hand to answer questions and discuss console operations and installations. The clinic featured a full demonstration of the AMR 24 console.

Precision Devices is a new company that manufactures loudspeaker components. The company was first formed to manufacture loudspeakers for Turbosound and is a member of the EdgeTech group. The company's address is Quintec Court, Barbot Hall Industrial Estate, Rotherham SG1 4RM, England; 709 360200.

GLW Enterprises has acquired the assests of Harrison Systems. The console line is now being manufactured at GLW's facility in Nashville. The company's address is 437 Atlas Drive, Nashville, TN 37211; 615-331-8800; fax 615-331-8883.

WaveFrame has appointed Technology Consultants, Nashville, as its AudioFrame rep in the Southeast.

People

Mary Cooper has been appointed equipment sales and marketing representative for Hudson Audio Video Enterprises.

Dan Lavry has joined Apogee Electronics to head up the the design of A/D and D/A conversion systems.

Mark Johnson has been named director of technical marketing for Meyer Sound Laboratories. **Cindy Ramos** has been named national sales manager. **George Douglas** has been named director of international sales and marketing, and director of SIM operations.

Len Tweten has been elected to Carver's board of directors.

Jim Stern has been named national sales manager of AMS/Calrec.

Eunice Davis has been promoted to pro audio general sales manager for HM Electronics. Randy Opela has been named marketing product manager.

Al Zang has joined Sennheiser as manager for professional products.

James E. Thornton has been elected to Wadia Digital's board of directors.

Katie Seaman has been appointed marketing assistant at Soundtracs.

John Lawrence has been appointed West Coast sales representative for Adams-Smith.

Audio Animation has expanded its engineering staff and made the following appointments: **Steven Kurant** and **Neil Martin**, senior development engineers; **Mark Schmid**, software engineer; **Richard Guay**, hardware engineer; **Jeff Berry**, laboratory manager; and **Melissa Stallings**, technical support.

As part of a reorganization of its sales and marketing staff, Telex has announced three appointments. **Dan Dantzler** has been promoted to vice president of sales for professional audio, aviation, RF communications and OEM sales. **Don Mereen** has been appointed executive director of marketing. **Ted Nemzek** has been named senior director of audio-visual products.

The Joiner-Rose Group has announced several staff additions. In the Dallas office, **Barbara O'Toole** has been named theater systems designer, and **Richard Zwiebel** and **Sam Berkow** have been named architectural acoustics designers. In the New York office, **Michael Leiboff** has been named A/V systems programmer/designer; **Lyn Canfield** has been named A/V systems programmer; **Chuck McGregor** has been appointed sound system designer; and **Robin Alleyne** and **Guy LaFontant** have been named A/V systems designers.

New England Digital has appointed **Steven Strassberg** Eastern division manager. The company has also made several staff appointments in its London office. **David Whittaker** has been named European technical sales manager. **Paul Beckett** has been named customer service representative. **Chrystin Lyons** has been appointed office manager. **Doug Daniel** has joined Harman Audio, the U.K. NED distributor, as sales manager.

RE/P

www.americanradiohistory.com

APPRECIABILITY

GML CLIENTS SPEAK FOR THEMSELVES

RESPONSIVE

"It just works. The system is virtually transparent to the user. No complicated displays...No time consuming keystrokes."

TOM McCORMACK, THE BURBANK STUDIOS, CA

DEPENDABLE

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

TETSU TAKAHASHI, SEDIC STUDIOS, TOKYO

PRECISION

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

BRUCE SWEDIEN, MIXER, CA

COMPATIBILITY

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

STEVEN BRAMBERG, ATLANTIC STUDIOS, NYC

ENGINEER ENGINEERED

"For the mixer, the operation is effortless and intuitive. When complex problems do need to be addressed, the Editor provides an easy to use off-line function for any eventuality."

MICK GUZAUSKI, MIXER, CA

PALETTE-ABILITY

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

CHICK COREA, ARTIST, PRODUCER, CA

ORTHOGENETIC

"GML's system architecture assures that our investment will remain on the cutting edge of technology for years to come."

STEPHEN FLOOD, MASTERROCK STUDIOS, LONDON

GML

GEORGE MASSENBURG LABS

THE AUTOMATION STANDARD

7821 BURNET AVENUE, VAN NUYS, CALIFORNIA 91405, FAX 818·781·3828, TELEPHONE 818·781·1022

Circle Reader Card

MANAGING MIDI

By Paul D. Lehrman

Time, Distance, Relativity, and Other Myths

Everyone complains about MIDI, but nobody does anything about it"—Mark Twain, posthumously.

We all know lots of things about MIDI. We all know it's not fast enough, you can't get rid of the cables and you can't chain more than a couple of MIDI devices together before you get horrible delays.

Like many things we all know (the President is always right, my race and/or gender is superior to yours, everything will be OK in the end), these things are not necessarily true. There is a new generation of thinkers and hackers who realize this and are taking advantage of it to come up with some very interesting new ideas.

First of all, many people would argue that MIDI *is* fast enough for what it was designed for, and that it can be made faster in a number of ways. The most common solution is to split the MIDI data over multiple cables.

But that's not to say there isn't room for improvement. Unfortunately, you can't just increase the clock rate of the data stream—that would negate the whole idea of MIDI as a standard and would instantly render billions of dollars of equipment obsolete.

But there are other ways of speeding up the data rate without disturbing the clock. There are two lines of experimentation going on that I'm aware of. One is to take more advantage of Running Status. Running Status is a feature of the MIDI spec that allows repeated command ("status") bytes to be left out of a data stream, and just the note-number or controller-value ("data") bytes that follow to be sent.

For example, if you want to play a scale instead of sending a note-on command followed by the note number and velocity for *each* note of the scale, you merely send a *single* note-on and then all of the note numbers and velocities for the scale, uninterrupted. This represents an efficiency increase of nearly 33%.

Now, if somehow you can get *everything* on a MIDI line to be in running status mode, you can speed MIDI up by a significant factor. You can accomplish this, within reason, by converting all of the data on a MIDI line—notes, controllers, program changes—to one type of data: for example, notes.

With intelligent processing on both ends of the MIDI line, you could declare that certain notes (such as ones at the top and bottom of the range) are not notes at all, but are pre-defined controller commands, program changes or "pseudo" status bytes, which are then modified by the notes and velocities that immediately follow. It can get complicated, and it might be hairy to get it to work with multiple MIDI channels, but in certain situations this scheme could be of significant help.

Another approach is to analyze the MIDI stream on the fly and try to thin out unnecessary data. This requires even more intelligence, but it only has to be single-ended—it needs no decoding. Such a system could decide, for example, that it is not really necessary to have a whole string of pitch bend commands after a note has been released, and can reduce it to one or two bytes. The aftertouch that occurs right after a note has been hit may well be masked by the note's attack envelope. It can possibly be eliminated.

A mod wheel movement at the same time, however, is probably important, so it should be left in. But later, when the wheel is being pulled back, maybe it doesn't require that fine a resolution on it. Two-thirds of the commands can be left out safely.

Wireless MIDI is impossible, as we all know. Many have tried, and many have failed, foiled by the loss of a single byte. Unlike audio signals, MIDI has no tolerance for errors. Drop a status byte, and anything can happen. A note can be stuck on forever, a crucial program change can be missed, a pitch wheel can reset itself a half-step out of tune. And that's the good news. The bad news is that everything after the dropped byte could end up as total gibberish.

There's no error correction possible because, unlike audio, MIDI can't deal in probabilities or rely on similarities in the data from moment to moment—it's all or nothing. Standard wireless techniques like diversity switching won't work—by the time a diversity system decides it's time to switch, it's probably too late.

But now it seems someone has actually overcome the problem of data loss in a wireless system. It's done, apparently, by broadcasting a reference signal along with the data signal. By constantly comparing the two, the problems caused by multipath are eliminated. I haven't used the system yet, but I've seen some very impressive demonstrations of it. Right now, it's fiendishly expensive, but with any luck, that will change soon.

And then there's the dreaded "Thru Delays." In a properly designed MIDI device, the Thru jack should be connected directly to the In jack, with only a couple of opto-isolators in between. These opto-isolators typically have a rise time of a few microseconds, so even if you chained 50 of them together, you shouldn't get any appreciable delays in the MIDI signal, whose resolution to start with is only about a millisecond.

And yet, the myth of Thru Delays persists. I recently heard an interesting explanation of why this might be so. Like a square wave recorded on audio tape (SMPTE time code, for example), if MIDI goes through too many generations, it can start to deteriorate. Opto-isolators are not instantaneous devices, and can impose a bit of a slope on a rising or falling digital signal. (The leading edge usually gets hit worse.)

Adding to the problem might be the cable connecting two MIDI devices, or even the circuitry inside a device connecting the In and Thru jacks. If it has any significant capacitance, this can slow the digital wavefront as well. If the wavefront is slowed too much, the width of the digital pulse gets shortened. The receiving device derives its sampling clock speed from the MIDI stream itself, and if the pulse width is wrong, the device can lose its lock on the data stream, and start looking for the digital pulses in the wrong place. Needless to say, this can introduce serious errors.

So it's not that you get delays when you chain more than three or four devices together—it's that you get garbage.

Again, I have no empirical data to back any of this up, but it seems to make sense. Anyone with evidence pro or con should let me know. (Special thanks to Nigel Redmon for this idea.) RE/P

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

www.americanradiohistory.com

ready • sit • go

The modern recording environment requires a diverse array of equipment to accomplish a wide-range of challenging tasks--from commercial record production to video post-production. With a complete line of highest-quality professional recording gear, Peavey's Audio Media Research division is uniquely qualified to meet your needs as a recording engineer/producer/enthusiast. We've got the tools of your trade... We're *ready.* Just *sit* and *go...*

Circle (10) on Rapid Facts Card

PEAVEY®

AUDIO MEDIA RESEARCH™

A DIVISION OF PEAVEY ELECTRONICS
711 A Street / Meridian, MS 39302-2898
(601) 483-5372 / Telex: 504115 / Fax: (601) 484-4278

www.americanradiohistory.com

SPARS ON-LINE

By Francis Daniel

Designing Economy

Let's talk about new and less-expensive techniques for recording studio construction. Nice idea, but unfortunately, the laws of physics haven't changed, nor have the building trades recently produced any economic breakthroughs.

What we can do is offer a few suggestions on how to keep your project under control, which ultimately will help keep both your budget and your temper under control.

Planning is crucial if you want to build a studio while keeping your pocketbook and sanity intact. To plan effectively, you need a basic understanding of how the design process works and some checkpoints to keep tabs along the way.

As an acoustic consultant, I prefer to work closely with a licensed architect of the client's choosing (sometimes one I have suggested, but often not). Each of us represents a portion of the owner's interests in developing a design and seeing that it is built properly.

The architect is the lynchpin of the operation. In addition to his creative role, he is the central organizer, scheduler and controller. The architect will mediate between the client (you) and the contractor, seeing that bids are fair and that the work is done well and on schedule. If you think you don't need an architect, you are mistaken—unless your project is very small, you are a licensed architect, you're bored with the studio business anyway and wouldn't mind going into chapter 11, or you are very rich and don't mind having to rebuild the whole thing two or three times. If none of these conditions apply, read on.

Complementing the architect's work, it is the acoustician's role to inspect the endless details essential to a successful project. The independence of each element in the process assures you the best chance of getting what is really needed. Arguments can be made for the turnkey approach, but I suggest that if you take the time to assemble your own team, you will be better served. You will have to decide, based on your own beliefs and what is available in your locale.

Let's assume that you've decided on an approach with good, independent professionals who are qualified in their respective fields. I have a degree in architecture, but I know better than to think I can achieve the best functional *and* aesthetic design for my client. For example, even though he understands the general rules of the process, the architect will bring in a mechanical engineer to design the HVAC system, again aided by the acoustic consultant.

Your next task is to find good *local* professionals, if you possibly can. You can't fax a brainstorming session or an on-site inspection. Meetings, visits to the site and repeated inspections are all critical items on the agenda, and if you have to fly in team members, your budget will also fly—straight through the roof.

When choosing these professionals, the usual rules apply: personal recommendations, known projects with good results, a rational plan that can be explained without confusing jargon, and no unreasonably optimistic promises. You must also have a good rapport with your chosen consultants, because you will be doing a lot of talking. You should know and communicate what your goals are, what your market is, what your competition amounts to and where you want to be positioned in five years.

Planning is crucial if you want to build a studio while keeping your pocketbook and sanity intact.

Start planning early, because you can be sure there will be plenty of changes under even the best circumstances. The design process is, necessarily, a series of successive approximations. As in many creative ventures, it is 1% inspiration and 99% perspiration. A good designer, architectural or acoustical, should draw out of the client both what is needed and what is wanted in a good-looking, good-sounding, functional design.

You may feel that a lot of the initial planning is time spent aimlessly. Chances are it isn't. The truth is rarely easy to uncover and you should be suspicious of anyone trying to sell you on a vision that is not your own. Another thing to look for is reasonable prices for services rendered—too inexpensive should be as alarming as too expensive.

The design process is 1% inspiration and 99% perspiration.

Take your time in the early stages. Look at lots of sketches, sleep on it and then look again. No matter how tedious the process may get on occasion, the time you spend planning will pay-off later—it is a lot less expensive to tear up paper than walls.

Don't design in better specs than you need. Everyone on the technical end of your project will be pushing to make the job just a little bit better. Be cautious of that constant prodding to go for an extra couple of decibels. The extras may sometimes be necessary, but remember: This is your business, not a designer's showcase.

Take the time to carefully pick professionals, then give them time to work with you to develop a thorough plan—you will be living with the results for a long time. We would all like quick and easy answers to the tough problems—and designing that very complex space called a recording studio is as tough as it gets. RE/P

Francis Daniel is a senior associate with the New York acoustical consulting firm of Shen, Milson and Wilke, and an active member of SPARS.

www.americanradiohistory.com

QUIET CONFIDENCE.

The design of sound studios shouldn't be left to chance. Intuition alone will only get you so far. It's not enough for a studio to "feel good," it must also "feel right." But how do you arrive at a facility that feels right? Tele-Image, Inc. in Dallas recently was confronted with this dilemma. The construction of their new studios in Las Colinas was the realization of a ten-year dream. They were seeking the perfect balance of audio and video quality to offer to their wide range of clients. Though they were willing to try some new ideas to expand the state of the art, they were also seeking the predictability which is so necessary in the recording industry. It was their goal to enjoin the current evolution of multi-track sound studios with one of the most advanced video facilities in the country.

There was one obvious concern. When you are investing the kind of money it takes to develop a studio of this caliber, there is no room for error. You need the confidence that the design and construction is done right the first time. The Joiner-Rose Group, Inc., consultants in acoustics, blended sound scientific principles with a keen sense of practical application to render a design which was totally compatible with Tele-Image's unique philosophy. Their 25 years of experience in environmental noise control, architectural acoustics, video systems, electro-acoustics, vibration isolation, and facilitization provided Tele-Image with the quiet confidence which they were seeking.

You can have this same level of confidence on your next project. Simply call 1-214-392-7800 and ask for Russ Berger.

The Joiner-Rose Group, Inc.

Silent Partners in Sound
4125 Centurion Way
Dallas, Texas 75244

Circle (11) on Rapid Facts Card

www.americanradiohistory.com

UNDERSTANDING COMPUTERS

By Jeff Burger

Monitors and Graphics

All the microprocessors, memory and software in the world don't do us much good without a way of displaying them. Because even plain old text comes under the heading of computer graphics, this month we'll take a look at monitors and how computers talk to them.

There are two basic types of displays—vector and raster. Both employ a cathode ray tube (CRT) similar to the one in your television set. A beam of electrons excites the phosphors on the inside of the screen. This phosphorescence typically exhibits extremely short persistence, requiring the image to be constantly refreshed or redrawn.

Vector graphics, the older of the two techniques, derives its name from the ability to draw a vector between any two points on the screen. A common example is the radar screen. Today, however, vector graphics are used less frequently, raster graphics having become the norm.

The term raster comes from the raster lines found in TV monitors. The display consists of a series of horizontal lines made up of individual dots energized by an electron gun. Beyond that, however, not all raster displays follow the same rules. The NTSC (National Television System Committee) standard is set at 525 interlaced lines. Interlaced means that only the odd lines are drawn on the first pass. The electron beam shuts off while it goes back to the top of the screen and the even lines are drawn on the second pass. The scheme was devised to eliminate flicker—as the phosphorescence of one set of lines begins to fade, the other holds its internsity until the first can be redrawn.

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

The typical computer display is not interlaced, which is partly why you can't plug most computers directly into TV sets. And even when adapters are used to provide a composite interlaced video signal, the display is typically blurred.

Most raster displays for computers are further subdivided into monochrome and RGB. Monochrome, of course, consists of just a foreground color and a background color. RGB, used for color, takes its name from the red, green and blue phosphor elements used in the process. A triad cluster consisting of one red, one green and one blue phosphor makes up each dot on the screen. At the same time, the process uses three electron guns, one for each of the three colors.

The colored elements are close enough together that the human eye perceives them as a single color element (which is dependent on the intensity of each beam). These three signals are fed to the monitor directly from the computer, providing higher video bandwidth and sharper images.

Each dot on the screen is called a *pixel*, short for picture element. The resolution of a computer display is measured in two ways, the first being the number of pixels. Specs such as 320 × 200 indicate 320 pixels per line by 200 lines. The other resolution spec is the number of displayable colors. Some computers offer different modes, which allow you to sacrifice the number of available colors to increase the physical resolution.

The refresh rate and the number of lines on the screen varies between computers and display adapters. Until recently, special monitors were required for each option. Multisync monitors are now popular because they can adapt to these varying display formats.

There are two basic types of displays—vector and raster.

RGB monitors are further subdivided into digital and analog varieties. Digital monitors display a limited number of colors, typically eight or 16. Analog monitors, on the other hand, control color intensities over a much wider range and display an extended- or full-color spectrum.

Just as memory is a limiting factor in many other aspects of computing, so it is with graphics. Consider that a monochrome graphic display of 320 × 200 consists of 64,000 bits or 8K. Each bit corresponds to a pixel. If the value of a bit is zero, the pixel is the background color. If the value is one, the pixel is the foreground color.

Just as memory is a limiting factor in many other aspects of computing, so it is with graphics.

To create color, the computer employs multiple *bit planes*, which can be thought of as layers that are similar to the color separations used for printing. Eight bit planes yield two to the eighth power, or 256 colors. As you can see, quite a bit (pun intended) of memory would be required to create the millions of colors our eyes can distinguish. A popular solution to this problem is color mapping or color look-up. Let's say we have 256 digital "paint pots." These pots can be filled from a palette of thousands or millions of colors.

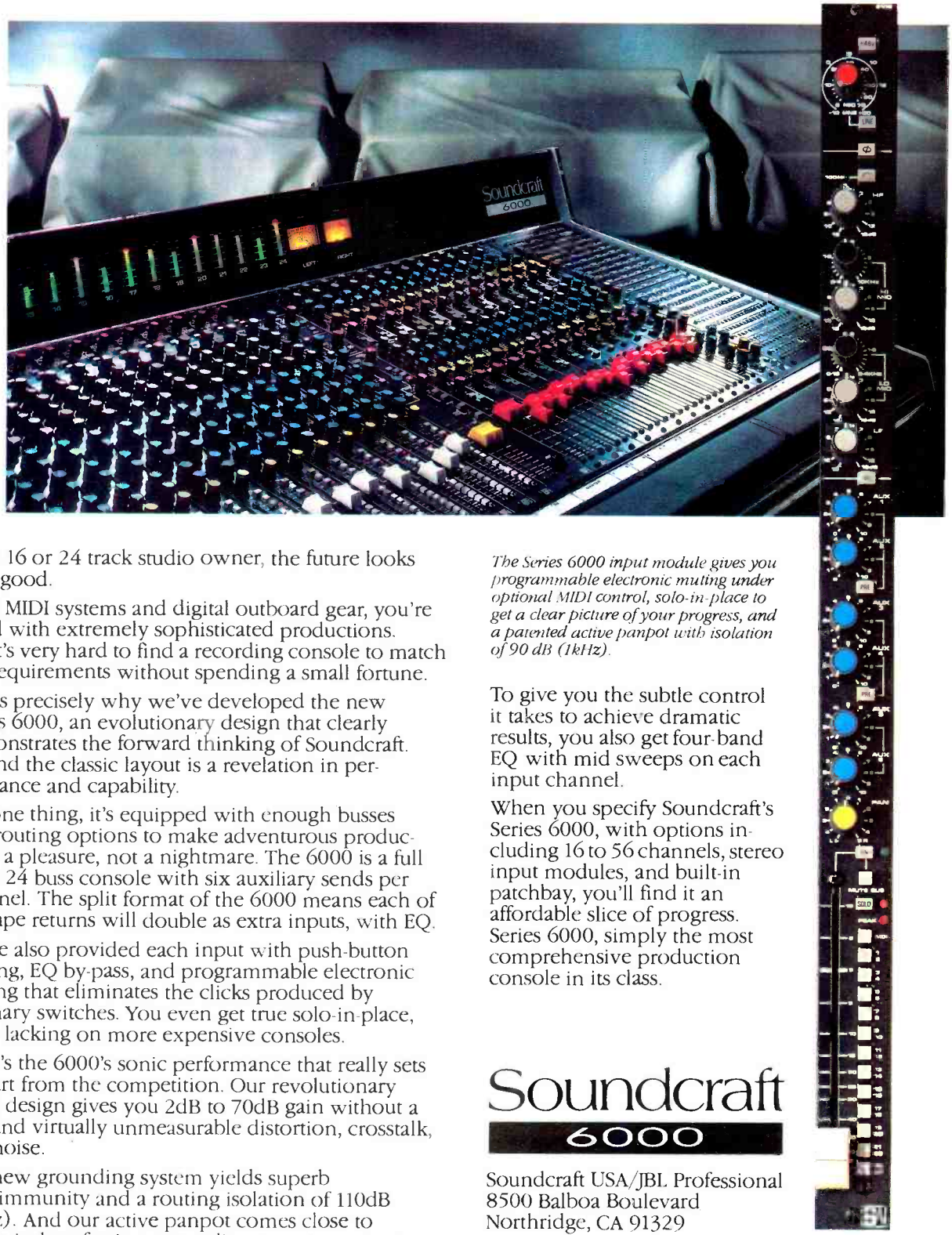
The bit values, representing each pixel from each plane, are added together to create a composite color number. These numbers, generated by adding together the pixel bit values, direct the computer to display the correct color from the total available range. Thus a small number of bit planes can address a predetermined subset of a large number of colors.

Graphic displays are handled differently by different computers. We'll take a closer look at display options as we begin comparing the various computer systems.

RE/P

www.americanradiohistory.com

If Only More Expensive Consoles Performed As Well.



For a 16 or 24 track studio owner, the future looks very good.

With MIDI systems and digital outboard gear, you're faced with extremely sophisticated productions. But it's very hard to find a recording console to match the requirements without spending a small fortune.

That's precisely why we've developed the new Series 6000, an evolutionary design that clearly demonstrates the forward thinking of Soundcraft. Behind the classic layout is a revelation in performance and capability.

For one thing, it's equipped with enough busses and routing options to make adventurous productions a pleasure, not a nightmare. The 6000 is a full 16 or 24 buss console with six auxiliary sends per channel. The split format of the 6000 means each of the tape returns will double as extra inputs, with EQ.

We've also provided each input with push-button routing, EQ by-pass, and programmable electronic muting that eliminates the clicks produced by ordinary switches. You even get true solo-in-place, sadly lacking on more expensive consoles.

But it's the 6000's sonic performance that really sets it apart from the competition. Our revolutionary input design gives you 2dB to 70dB gain without a pad and virtually unmeasurable distortion, crosstalk, and noise.

Our new grounding system yields superb hum immunity and a routing isolation of 110dB (1kHz). And our active panpot comes close to theoretical perfection, exceeding our competitor's performance by a full 25dB.

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

To give you the subtle control it takes to achieve dramatic results, you also get four-band EQ with mid sweeps on each input channel.

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

Soundcraft
6000

Soundcraft USA/JBL Professional
8500 Balboa Boulevard
Northridge, CA 91329

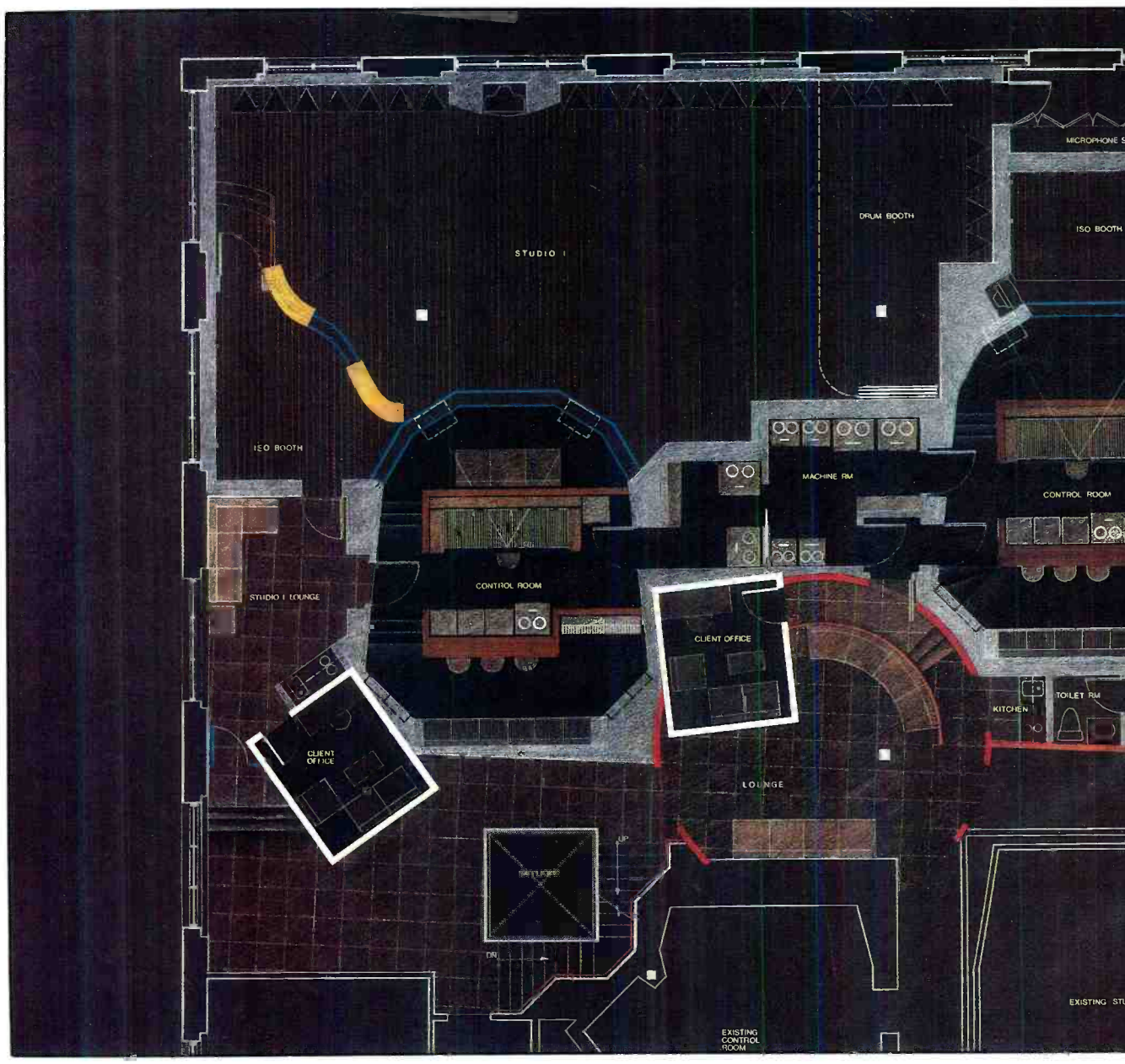
© 1988 – JBL Incorporated, A Harman International Company

www.americanradiohistory.com

Control Room Design

By Vin Gizzy

Beyond voodoo, a lot can be done to design good sound into a control room.



Streeterville Studios, Chicago.

www.americanradiohistory.com

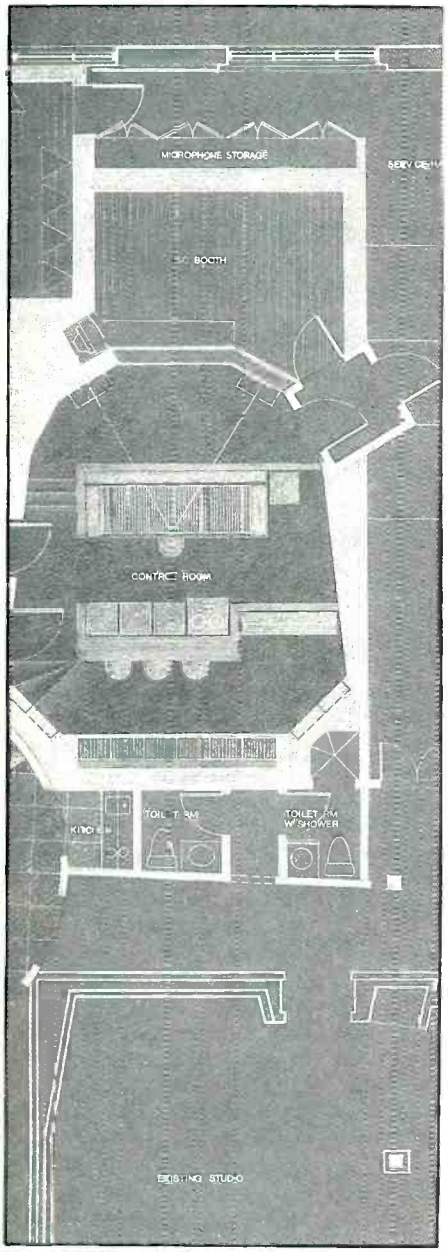
Few subjects in the audio business are more likely to provoke debate, argument and anxiety attacks than the merits of one control room's sound over another's. When the topic is control room acoustics—especially someone else's—everybody is both an expert and a critic.

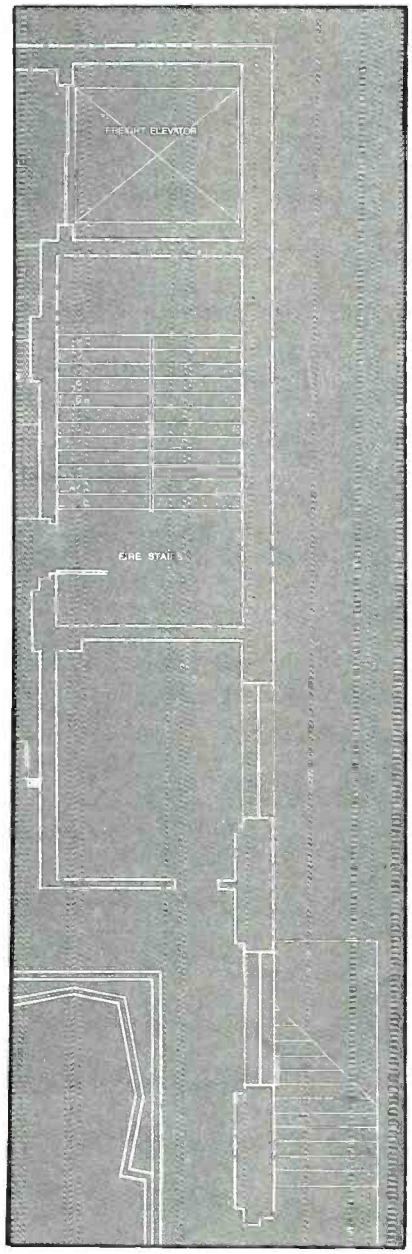
Well, fair enough. Voodoo acoustics have been practiced often enough in this business to make the design process seem about as scientific as picking lottery numbers. But the truth is, we do know a great deal about why rooms sound the way they do.

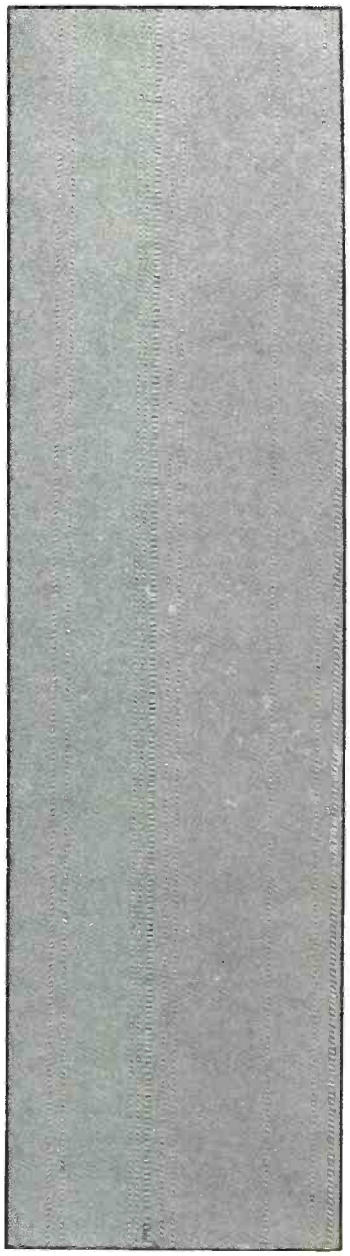
Vin Gizzy is a partner in Benchmark/Downtown Design, a New York firm specializing in the design of control rooms and studios.

As a starting point, let's consider what role a control room should play in the psychoacoustic drama of control room monitoring. Unlike a living room, where acoustical anomalies may, for some listeners, enhance reproduced sound, a control room should be a neutral environment. It should deliver the sound from the monitor speakers to the listener's ears in unaltered form, so that engineers and other critical listeners can make sonic judgments without having to compensate for room artifacts. Unfortunately, however, the elimination of all room effects from the monitoring process can only be achieved with headphones or in an anechoic chamber, neither of which is a satisfactory solution.

Let's side-step a discussion of the merits or validity of headphone monitoring and simply rule out the option as impractical in a professional studio situation. As for the anechoic chamber, there have been control room designs that attempted to achieve near-anechoic conditions, particularly at lower frequencies, but all have been difficult to work in. The anechoic environment is unnatural and uncomfortable for most listeners; also, it provides only a very small area in which spectral balance







www.americanradiohistory.com

and stereo imaging are accurate.

The phrase "sweet spot" is often used to describe that tiny portion of ground in a very dead control room where things sound good. This condition is particularly problematic when signals are recorded in mono and then panned left or right to set their stereo location, a technique used on 95% of all modern recording. A phenomenon called the "proximity" or "Haas effect" begins to play havoc with the auditory localization system—the brain's method of localizing a sound by comparing its arrival time at each ear, largely ignoring relative amplitude. What this means is that a listener sitting closer to the right speaker will judge a mono signal as originating from the right, even if it is panned three-quarters or more to the left. When an engineer moves as little as a foot to the right or left of center, his perception of signal placement changes dramatically. The effect is greatly reduced with *true* stereo recordings—which contain more complex ambience information that the brain can use as directional cues—but even so, the anechoic chamber is far from the ideal place to monitor.

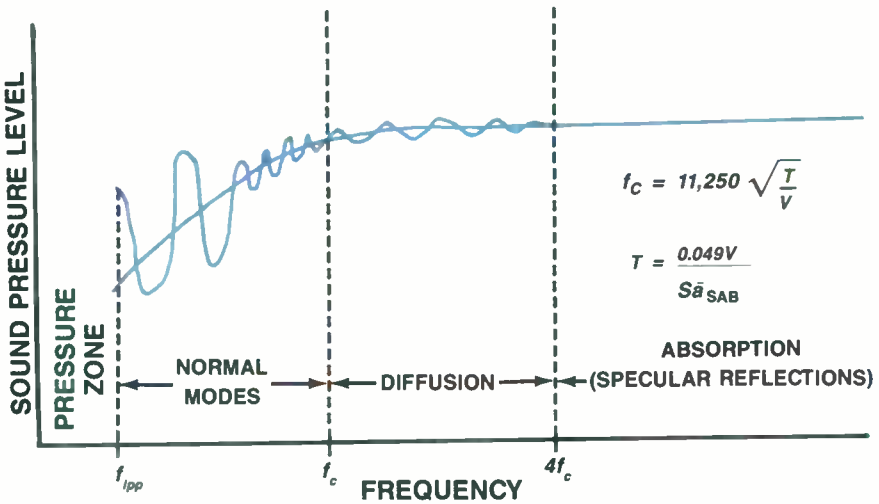


Figure 1. Acoustic response regions.

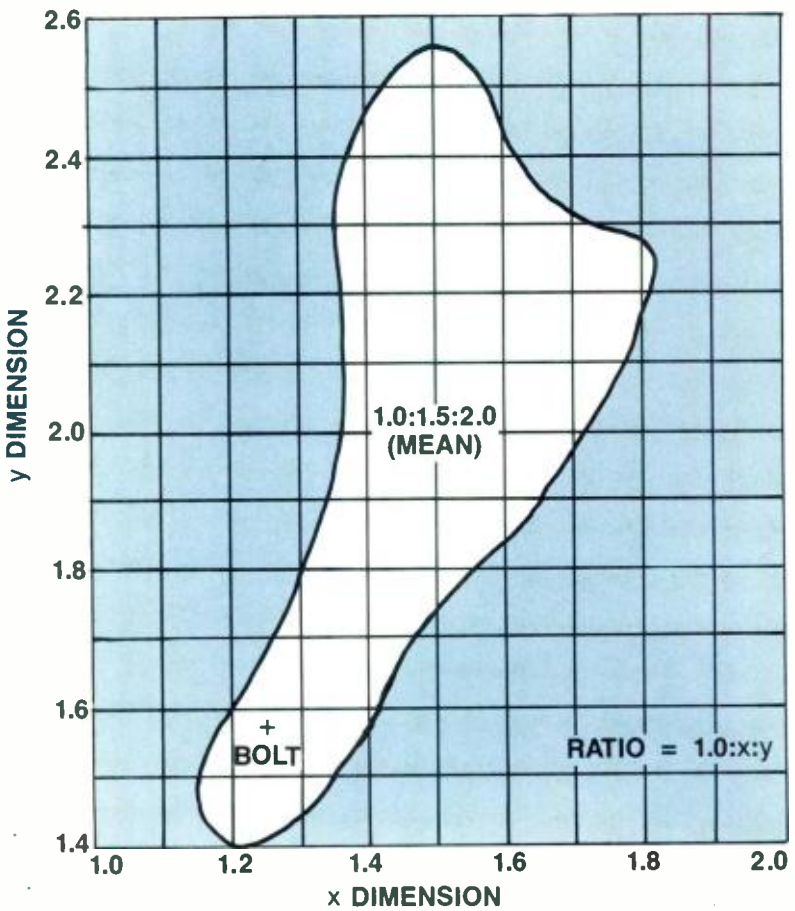


Figure 2. Acceptable room ratios, as per Bolt, Beranek and Newman.

Three regions of room response

According to one of the classic equations used in acoustic design (developed by Bolt, Beranek and Newman), there are three broad regions of steady-state room response: the modal region, the diffusive region and the absorptive region. (See Figure 1.) They are determined by the equation:

$$f_c = 11{,}250\sqrt{\frac{T}{V}}$$

where

T = RT_{60}
V = volume in cubic feet
f_c = the upper limit of the modal region of the room

Although the equation was not originally intended for use in designing control rooms—which are quite small in acoustical terms and therefore have no true reverberant field—it does identify three distinct acoustical regions in a room.

The term "modal region" might be a little confusing, because in fact, modes exist throughout the frequency spectrum. But it is only in the low-frequency range that modes are potentially problematic. A bunching or severe lack of modes around any one frequency causes spectral coloration, and in the low-frequency region of a room's response, modes are both sparse and can be unevenly spaced. In the diffusive and absorptive regions, room modes are dense and uniform enough not to create hotspots at discrete frequencies.

Modes are calculated using the equation:

$$\text{Frequency} = \frac{c}{2}\sqrt{\frac{N_x^2}{L_x^2}\times\frac{N_y^2}{L_y^2}\times\frac{N_z^2}{L_z^2}}$$

where

c = the speed of sound in feet per minute
L_x, L_y, L_z are the room proportions (length, width, height)
N_x, N_y, N_z are random integers.

For the sake of illustration, let's plug into the formula values typical of a music control room: 0.3 for T and 21′ ×14′ ×11′ for the room's dimensions, giving a volume of 3,234 cubic feet. (All dimensions for this hypothetical control room refer to the rigid interior surfaces and not

www.americanradiohistory.com

Sony Communications Products Company, 1600 Queen Anne Road, Teaneck, NJ 07666. © 1988 Sony Corporation of America. Sony is a registered trademark of Sony.

NTRODUCING SONY'S ALL NEW APR-24 MULTITRACK RECORDER.

Analog recording has a new tate of the art. Sony's APR-24, Aultitrack Recorder.

As you'd expect, the APR-24 elivers extraordinary sonic quality. Because it's Sony-engineered from op to bottom. But it also offers ome things you might not expect.

Like a built-in, multi-featured synchronization system which accepts video reference, LTC and VITC signals. Which makes it perfectly suited for post production.

There's also a newly designed, remarkably fast transport built on a rock solid 4-inch casting. Long life amorphous heads. And microprocessor-assisted alignment. All standard on every machine.

So if you're getting ready to upgrade your facility, upgrade with the APR-24. Contact your Sony Professional Audio representative, or call Sony at 800-635-SONY.

SONY®

PROFESSIONAL AUDIO

www.americanradiohistory.com

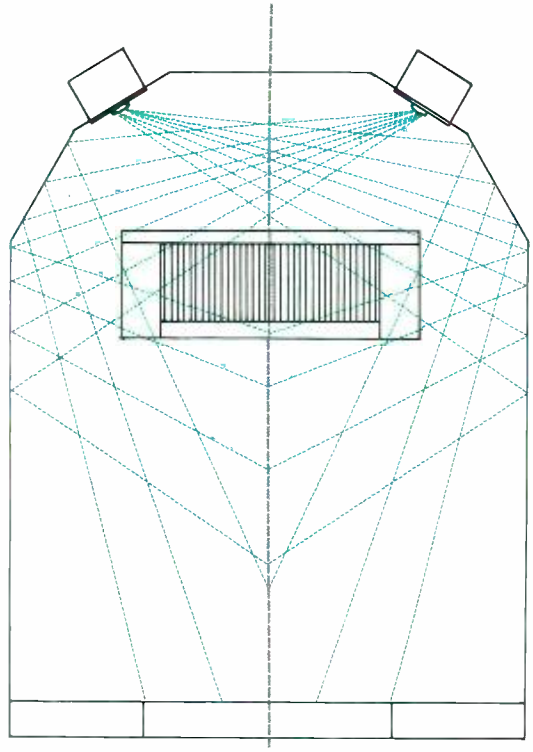


Figure 3a. *Reflection pattern with sidewalls parallel to the center line of a room.*

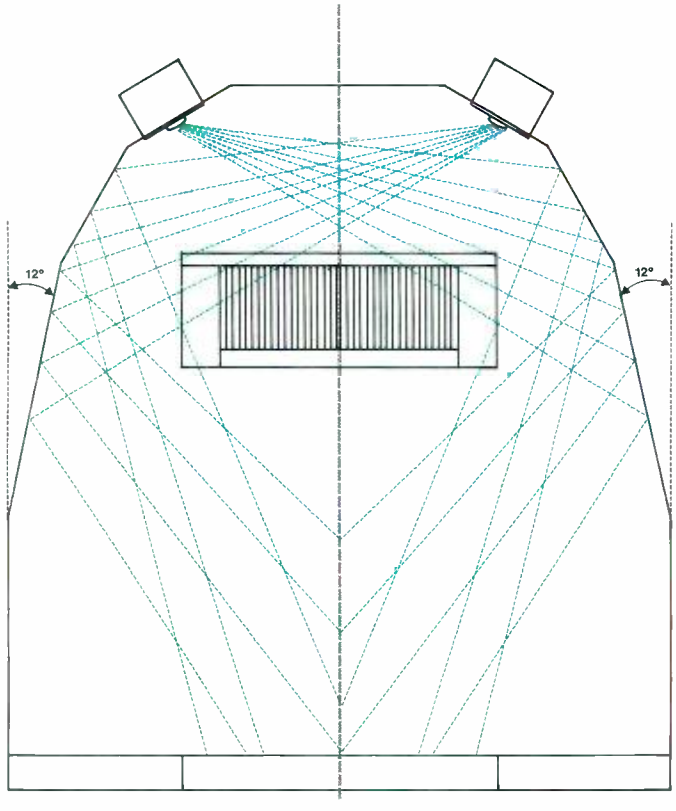


Figure 3b. *Reflection pattern with sidewalls splayed 12° from the center line of a room.*

to decorative finish materials.) The result is an f_c of 108.3Hz.

Calculating all permutations of N_x, N_y and N_z (for integers up to 5, the practical limit for a room this size) reveals that between 25Hz and 109Hz, roughly a 2-octave spread, there are only 25 modes, while in the next ⅓-octave, centered at 125Hz, there are more than 20.

Low-frequency performance

Despite advertising literature for products that claim to remove standing waves, the presence of modes in a room is not necessarily a problem. They are only a problem when unevenly distributed in frequency, location or both. Furthermore, they are unavoidable except in anechoic environments. Splayed side walls and sloped ceilings don't eliminate them, they simply move them around.

Room proportions are critical to low-frequency response because they determine the frequency of each mode. The goal is to have the number of modes increase smoothly with frequency. A bunching of several modes of the same frequency followed by a large jump is undesirable. As an illustration, let's look at the normal modes plotted for two rooms, one with well-chosen proportions, one without.

Table 1a shows the values of the 40 modes with the lowest frequencies in our hypothetical control room. Below 100Hz, as mentioned earlier, modes are few and widely spaced. But, from 100Hz to 125Hz, the number of modes begins to increase significantly. The spacing between them averages only a few Hertz, and above 130Hz, the modes have become quite dense.

Contrast this with another hypothetical control room of the same volume, but having the slightly different dimensions of 22′ ×13′ 6″×11′. (See Table 1b.) Here the modes exhibit a pattern of bunching, with wide gaps between the bunches, a problem caused largely by the fact that one room dimension (11 feet) is a multiple of another (22 feet).

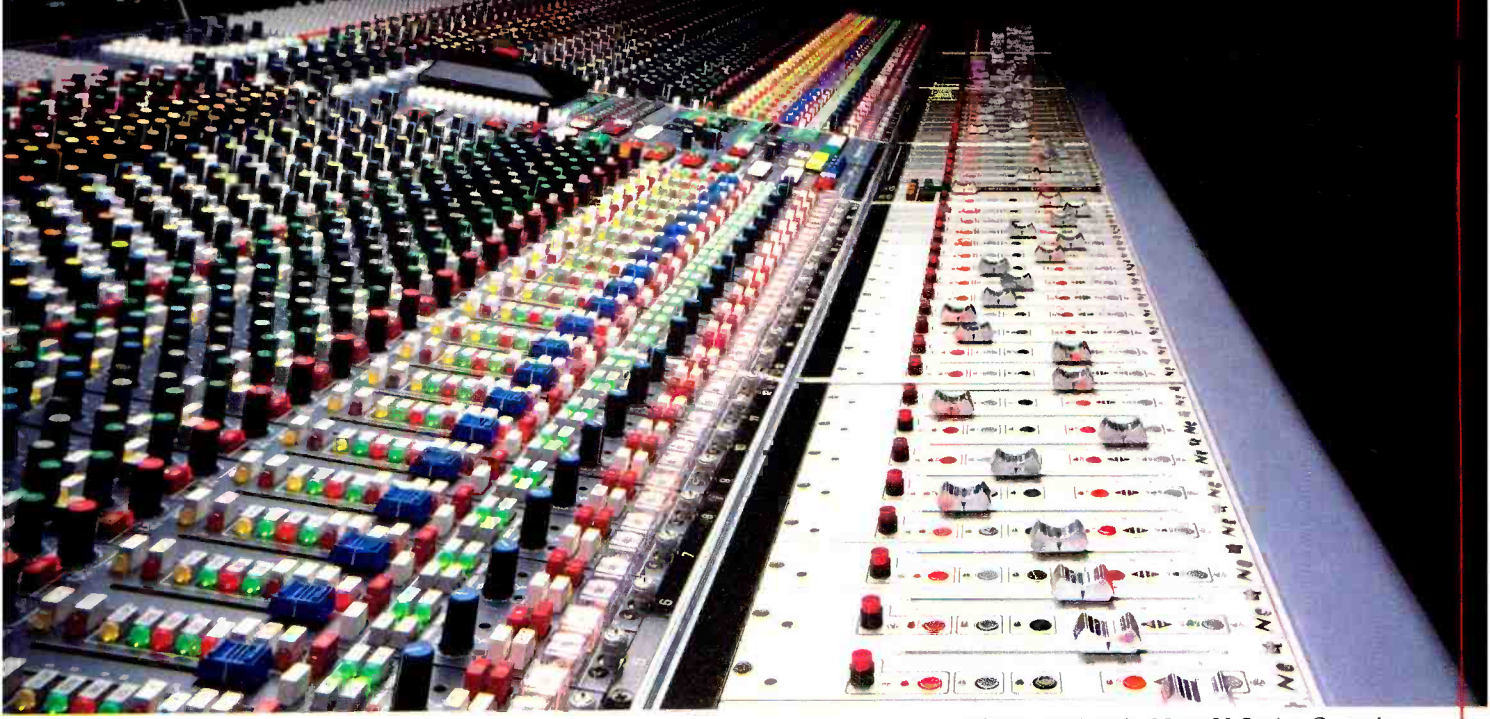
A second test that can be applied to a set of room dimensions was proposed by Oscar Bonello (*Journal of the Audio Engineering Society*, September 1981). Bonello suggests that the number of modes, grouped by ⅓-octave bands, must always increase with frequency. Table 2a shows the modes for the control room grouped by ⅓-octave bands. Note that each succeeding group is larger than its predecessor and, also, that the rate of increase is rising fairly smoothly. Contrast this with Table 2b, which shows the same grouping for Control Room B. Note that there is no increase at the 63Hz band.

A third test is to compare a room's proportions with existing recommendations.

www.americanradiohistory.com

The Automation System

FLYING FADERS™



Flying Faders in Neve V Series Console

Neve's Fourth Generation Moving Fader Automation System

Unique Features:

- *Unparalleled accuracy with 4,096 digital steps*
- *Total Mix Memory keeps all moves, not just the last pass*
- *Harddisk and 3.5" floppy for permanent mix storage*
- *Global and local fader and mute mode controls*
- *MATCH buttons for automatic nulling*
- *Both Master-Slave and Necam™-style grouping*
- *Stereo fader for 2T bus master*
- *Color VDU with pull-downs and pop-ups, and built-in HELP!*
- *TRIM for one or all faders, in 1/10 dB steps*
- *Interface to A-S 2600 for locates, cycling, punch-ins, etc.*
- *Retrofits to other consoles*

Flying Faders
Designed in cooperation with ARTINSOUND TECHNOLOGIES

Neve
A Siemens Company

RUPERT NEVE INC., BERKSHIRE INDUSTRIAL PARK, BETHEL, CONNECTICUT 06801, U.S.A. • TELEPHONE: (203) 744-6230. TELEX: 96 9638. FACSIMILE: (203) 792-7863

NEVE ELECTRONICS INTERNATIONAL LIMITED, MELBOURN, ROYSTON, HERTS SG8 6AU, ENGLAND • TELEPHONE: ROYSTON (0763) 60776. TELEX: 81381. CABLES: NEVE CAMBRIDGE. FACSIMILE: (0763) 61886.

SIEMENS AG, POSTFACH 326 A-1031, WEIN, VIENNA, AUSTRIA • TELEPHONE: 43-222-72930. TELEX: 100-847-1372-35. FACSIMILE: 431-72935040.

RUPERT NEVE INC., 260 WEST 52ND STREET, SUITE 25E, NEW YORK, NY 10019, U.S.A. • TELEPHONE: (212) 956-6464. FACSIMILE: (212) 262-0848

RUPERT NEVE INC., 6353 WEST SUNSET BLVD., SUITE 402, HOLLYWOOD, CALIFORNIA 90028, U.S.A. • TELEPHONE: (213) 874-8124. FACSIMILE: (213) 874-1406

RUPERT NEVE INC., 1221 16TH AVENUE SOUTH, NASHVILLE, TENNESSEE 37212, U.S.A. • TELEPHONE: (615) 329-9584. FACSIMILE: (615) 329-1473

Designed by DRC Graphic Advertising, USA © 1988

Circle (12) on Rapid Facts Card

www.americanradiohistory.com

Table 1a. *Value in Hertz of the 40 lowest-frequency modes in a hypothetical control room having dimensions of 21'x14'x11'. Note the fairly smooth rate of increase, few frequencies being duplicated.*

26.9
40.4
48.5
51.4
53.8
58.0
65.3
67.3
70.6
74.4
80.7
80.7
84.6
85.1
90.2
95.7
95.7
97.0
99.4
102.7
103.8
106.2
107.6
109.8
110.4
113.6
114.1
114.9
116.0
119.2
121.1
122.8
124.0
125.2
125.9
130.6
130.6
131.5
132.5
133.4

Table 1b. *Value in Hertz of the 40 lowest-frequency modes in a hypothetical control room having dimensions of 22' ×13' 6" ×11'. Note the bunching and gaps at certain frequencies.*

25.7
41.9
49.1
51.4
51.4
57.4
71.1
72.6
77.0
83.7
83.8
87.6
87.7
92.6
98.2
98.2
101.5
101.6
102.7
102.7
105.9
110.8
110.9
110.9
113.8
113.9
114.9
114.9
122.2
122.2
124.8
125.6
128.2
128.4
128.4
132.5
132.5
135.0

Bolt, Beranek and Newman proposed a range of acceptable proportions that have been a standard for many years. (See Figure 2.) Also, in 1971, M.M. Louden performed a lengthy series of calculations that resulted in a ranking of various proportions. (See Table 3.) Caution should be exercised, as the authors, in general, acknowledge that the various proportions work better at certain room volumes than others.

(It must be noted that these tests apply to rectangular rooms. When room shape deviates substantially from rectangularity, it is nearly impossible to mathematically predict the frequency and location of normal modes. Experience shows that using one or more of the recommended lists in combination with a plot of all modes and an analysis of Bonello's criterion produces a reasonable correlation for good sound.)

While music control rooms with complex shapes have been common for many years, the proliferation of personal-use studios, MIDI rooms and A/V production facilities has, by necessity, focused more attention on the humble rectangle as a listening environment.

Other elements that influence performance

Within the modal region, there are two other design elements that influence the performance of rooms like the ones in our example. The first is listener location. At the geometric center of a room, the fewest modes have a peak. In fact, two of the lowest frequencies that a room will support are at nulls at the center of a room. Therefore, the mixing position, or ideal listening position, should be located away from the center, along at least two axes.

Table 2a. *Modes in a 21' ×14' ×11' control room, grouped by ⅓-octave bands.*

⅓-OCTAVE BANDS									
31.5	40	50	63	80	100	125	160	200	250
NUMBER OF MODES									
0	1	3	3	7	11	20	34	48	56

Table 2b. *Modes in a 22' ×13' 6" ×11' control room, grouped by ⅓-octave bands.*

⅓-OCTAVE BANDS									
31.5	40	50	63	80	100	125	160	200	250
NUMBER OF MODES									
0	1	3	4	5	11	21	35	49	55

www.americanradiohistory.com

In a critical-listening room, left/right symmetry is needed for stereo imaging. This leaves only height and depth as potential variables. Try to avoid an 8-foot ceiling, as this generally places a seated listener's ears midway between the floor and ceiling. Similarly, the room should be laid out so that the mixing or listening position is not centered front to back. This is often difficult because of space limitations, but ideally the offset from the center point should be at least a quarter-wavelength of the frequency at which low-end monitor response begins to roll off.

The other important component in low-frequency performance is the placement of the monitor system's low-frequency drivers. The maximum number of modes will be excited when the drivers are located in trihedral (3-way) corners. At all other locations, some modes will be at null points and, therefore, energized only minimally by a sound source. Room-boundary interference patterns also can produce irregularity in the low-frequency response of monitors that are not located in trihedral corners.

Because most of the popular monitor systems combine all drivers in one cabinet, locating them at the most obvious trihedral corner—the floor and two walls—is often not practical, because of the mixing console and other such large objects blocking the path from speaker to ear. (Incidentally, in a living room, often it is possible to locate speakers on the floor in the corners, which is why so many home systems have surprisingly strong and smooth low-end response.)

In a properly designed control room, if the monitor system does not include a separate subwoofer, the monitors can be mounted directly below a low ceiling, or the front wall above the monitors can be sharply angled to the ceiling, thereby creating another boundary.

The reflection-free zone

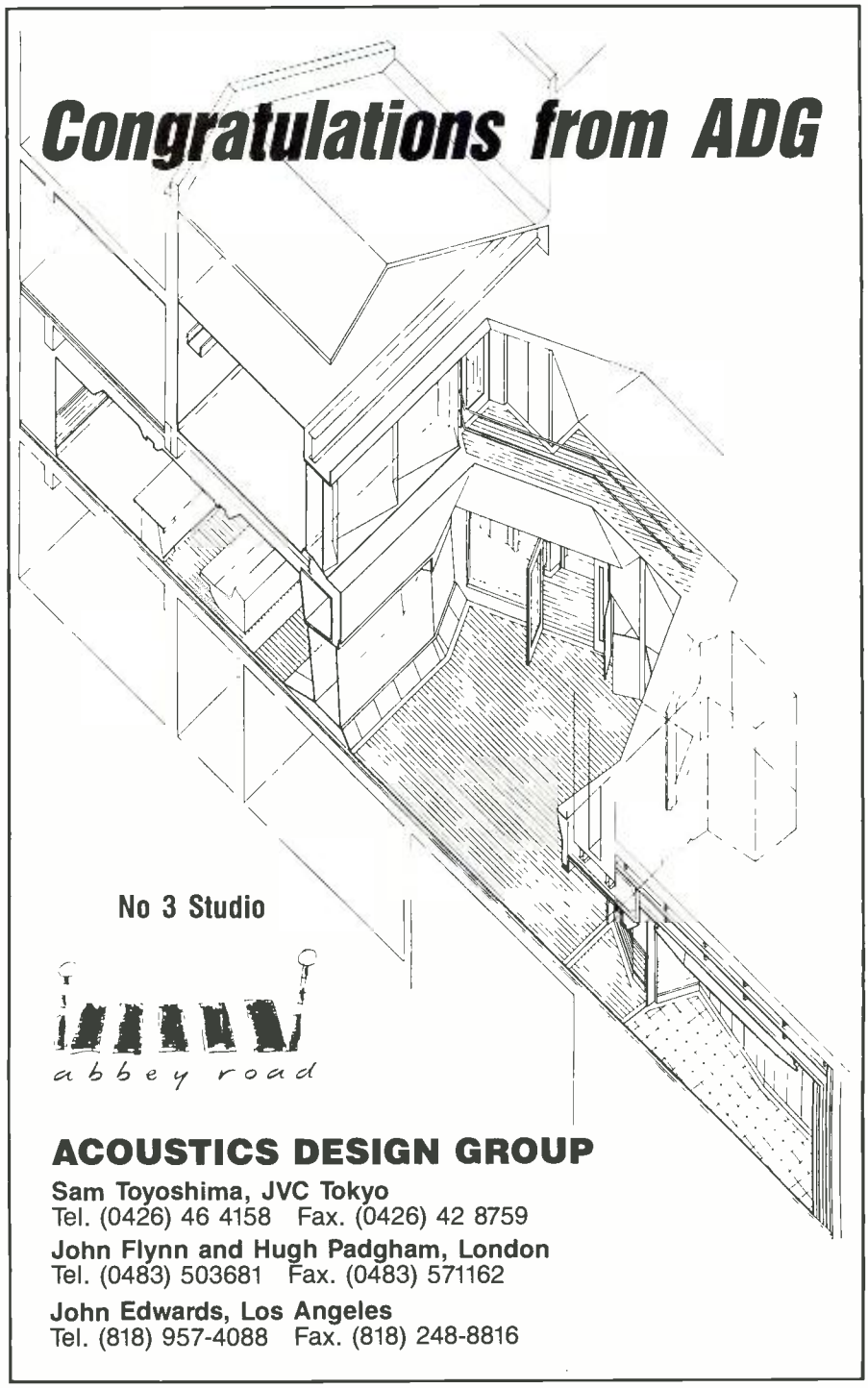
The sonic activity in a room—rectangular or otherwise—can be controlled by one or more of three methods: absorption, controlled reflection and diffusion.

In a control room, absorption and controlled-reflection techniques can be combined to create what is called a reflection-free zone. The idea behind the zone is that *early reflections* degrade the signal from the monitor speakers. Early reflections are defined as any reflection of an acoustic signal (by a room surface or other object) that arrives at a listener's ear within 15ms of the direct signal.

Early reflections play an important role in concert halls and performance spaces, where they are essential for both performance ensemble and also for the projection of sound to the audience. They are, in fact, one of the most important elements in determining the sonic character of a room. But it is for just this reason that they are undesirable at the listening position in a control room—a room that should impart little sonic character of its own.

By establishing the correct angles for the front walls and ceiling of the control room, all reflections from the monitors can be directed away from the primary listening position—typically an area eight to 10 feet wide, three to four feet deep and three to six feet in height, located at the mixing position. Ideally, all reflections are directed into sound diffusers, thereby producing as much diffusion as possible.

Figures 3a and 3b are the plans of two hypothetical control rooms, showing the side-wall reflections of the monitor signal. Together they illustrate the difference in reflection patterns between a side wall that is parallel to the center line of the room (3a) and one that is splayed by 12° (3b). Virtually no reflections enter the



Circle (13) on Rapid Facts Card

www.americanradiohistory.com

Table 3. M.M. Louden's ranking of room ratios.

Rank	Room Ratios
1	1.0: 1.9: 1.4
2	1.0: 1.9: 1.3
3	1.0: 1.5: 2.1
4	1.0: 1.5: 2.2
5	1.0: 1.2: 1.5
6	1.0: 1.4: 2.1
7	1.0: 1.1: 1.4
8	1.0: 1.8: 1.4
9	1.0: 1.6: 2.1
10	1.0: 1.2: 1.4
11	1.0: 1.6: 1.2
12	1.0: 1.6: 2.3
13	1.0: 1.6: 2.2
14	1.0: 1.8: 1.3
15	1.0: 1.1: 1.5
16	1.0: 1.6: 2.4
17	1.0: 1.6: 1.3
18	1.0: 1.9: 1.5
19	1.0: 1.1: 1.6
20	1.0: 1.3: 1.7
21	1.0: 1.8: 2.3
22	1.0: 1.9: 2.4
23	1.0: 1.4: 2.2
24	1.0: 1.7: 2.3
25	1.0: 1.7: 2.2
26	1.0: 1.9: 2.6
27	1.0: 1.4: 2.0
28	1.0: 1.3: 2.1
29	1.0: 1.5: 2.4
30	1.0: 1.9: 2.3
31	1.0: 1.9: 2.5
32	1.0: 1.9: 2.7
33	1.0: 1.8: 2.5
34	1.0: 1.5: 2.3
35	1.0: 1.8: 2.4
36	1.0: 1.8: 1.5
37	1.0: 1.7: 1.4
38	1.0: 1.7: 2.4
39	1.0: 1.2: 1.9
40	1.0: 1.5: 2.0
41	1.0: 1.7: 2.5
42	1.0: 1.8: 2.2
43	1.0: 1.9: 2.8
44	1.0: 1.6: 1.8
45	1.0: 1.6: 2.0
46	1.0: 1.8: 2.6
47	1.0: 1.1: 1.3
48	1.0: 1.7: 1.2
49	1.0: 1.2: 1.3
50	1.0: 1.8: 2.8
51	1.0: 1.6: 2.5
52	1.0: 1.4: 1.3
53	1.0: 1.8: 2.7
54	1.0: 1.1: 1.2
55	1.0: 1.2: 1.8
56	1.0: 1.9: 1.6
57	1.0: 1.7: 2.1
58	1.0: 1.3: 2.0
59	1.0: 1.4: 2.3
60	1.0: 1.5: 1.6
61	1.0: 1.7: 2.7
62	1.0: 1.7: 2.6
63	1.0: 1.3: 2.2

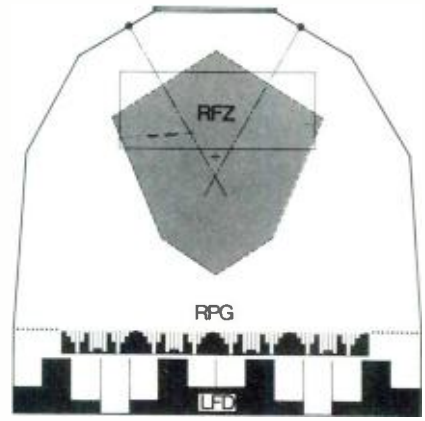


Figure 4. *Plan of a theoretical control room. Note the large reflective free zone.*

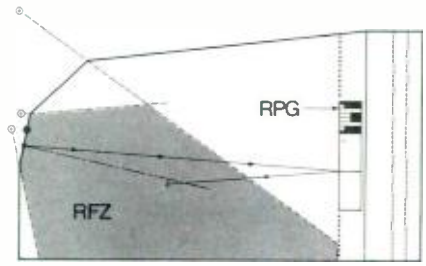


Figure 5. *Elevation of the control room in Figure 4. Note the sharply angled front wall above the speakers.*

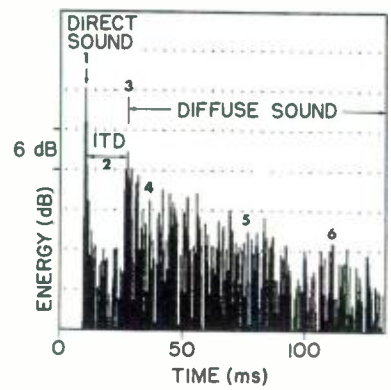


Figure 6. *The desired energy time curve for the control room in Figure 4.*

prime listening area from the splayed wall, contrasting sharply with the many reflections from the parallel wall. Note that most of the reflections from the splayed wall are directed to diffusers on the rear wall, increasing the amount of diffuse energy returned to the listeners.

In most real-world situations, not all of a control room's front end can be manipulated in an ideal fashion to control early reflections. Some absorption must be applied at critical locations. (In addition, a certain amount of absorption is required to achieve an appropriate reverberation or decay time, and to damp normal modes.) It might seem that covering the entire front end of the room with absorptive material is a good solution and a lot easier than building complex angles at every corner. After all, if our goal is to eliminate early reflections, why does it matter how we do it?

One reason it matters is that no absorber is completely effective over the full audible spectrum. Some energy, mostly at lower frequencies, will be reflected. Even a 6-inch panel of compressed fiberglass insulation—an excellent sound absorber—is only about 40% as effective at 125Hz as it is at 1,000Hz. Achieving true broadband absorption would require a combination of a resonant (membrane) absorber and a passive (fiberglass) absorber; such a system would be expensive to build and generally too large to be practical.

Diffusion

A truly diffuse and dense sound field is desirable for the sense of envelopment it imparts to the listener. Therefore, another reason that a totally absorptive room front is undesirable is that it doesn't redirect sound for eventual diffusion. This is an important point, because space limitations often restrict the amount of diffusive material that can be installed. In such cases, every extra decibel that can be fed to diffusers will help to make up for limited surface area.

Figures 4 and 5 show a well-planned control room that combines a reflection-free zone with a diffusive rear wall. A plot of the desired energy/time curve for such a room is shown in Figure 6. The first significant reflection from any room surface arrives after a suitable initial time-delay gap of about 20ms—followed by a dense, diffuse sound field that decays smoothly. (For more information on diffusion see "Acoustic Room Treatments," page 44.)

In the end, the shape, treatment and construction of a control room depends as much on available space and budget as on strict design principles. Acoustic ideals are often abandoned in the struggle with practical realities. But implementation of the principles outlined here can help ensure the success of a project of any scope. The complexities of control room design may seem daunting, but effort extended in achieving outstanding acoustics is well worth it. For many audio professionals, the opportunity to hear great music in a great environment is the ultimate reward.

RE/P

Streeterville photo courtesy of Benchmark Associates with Downtown Design. Figures 1 and 2 courtesy of Bolt, Beranek and Newman. Figures 4, 5 and courtesy of RPG Diffusor Systems. Table 3 courtesy of M.M. Louden. Acoustica, vol. 24, 1971.

www.americanradiohistory.com

AVAILABLE NOW

AKAI MAKES DIGITAL MULTI-TRACK AFFORDABLE

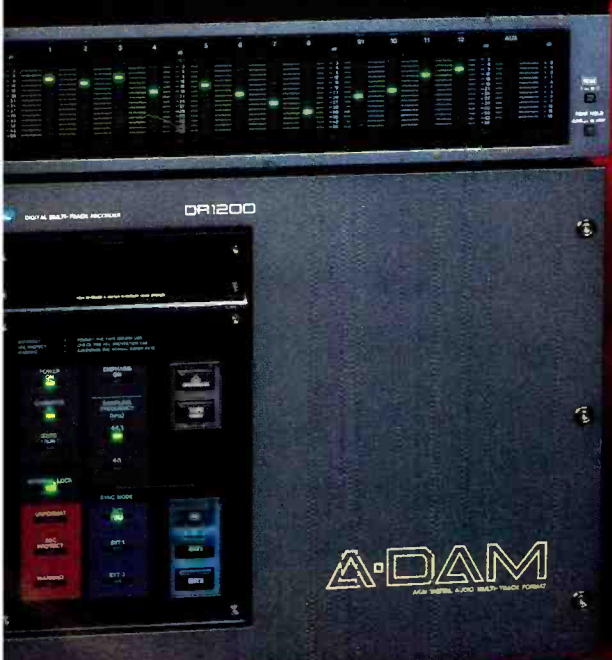
Akai Digital is now delivering the A•DAM System: the first professional, expandable digital recording system in a compact package. A•DAM utilizes the advanced tape technology of the 8mm video tape, which is easily available at stores everywhere. A•DAM offers 12 to 36 digital audio tracks in a modular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

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

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

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

A•DAM



AKAI DIGITAL

WRITE FOR A FREE BROCHURE

P.O. Box 2344 Fort Worth,
Texas 76113-2344 U.S.A.
Phone: 817-336-5114
FAX 817-870-1271
Telex: 163203 IMCTX UT

Circle (14) on Rapid Facts Card

www.americanradiohistory.com

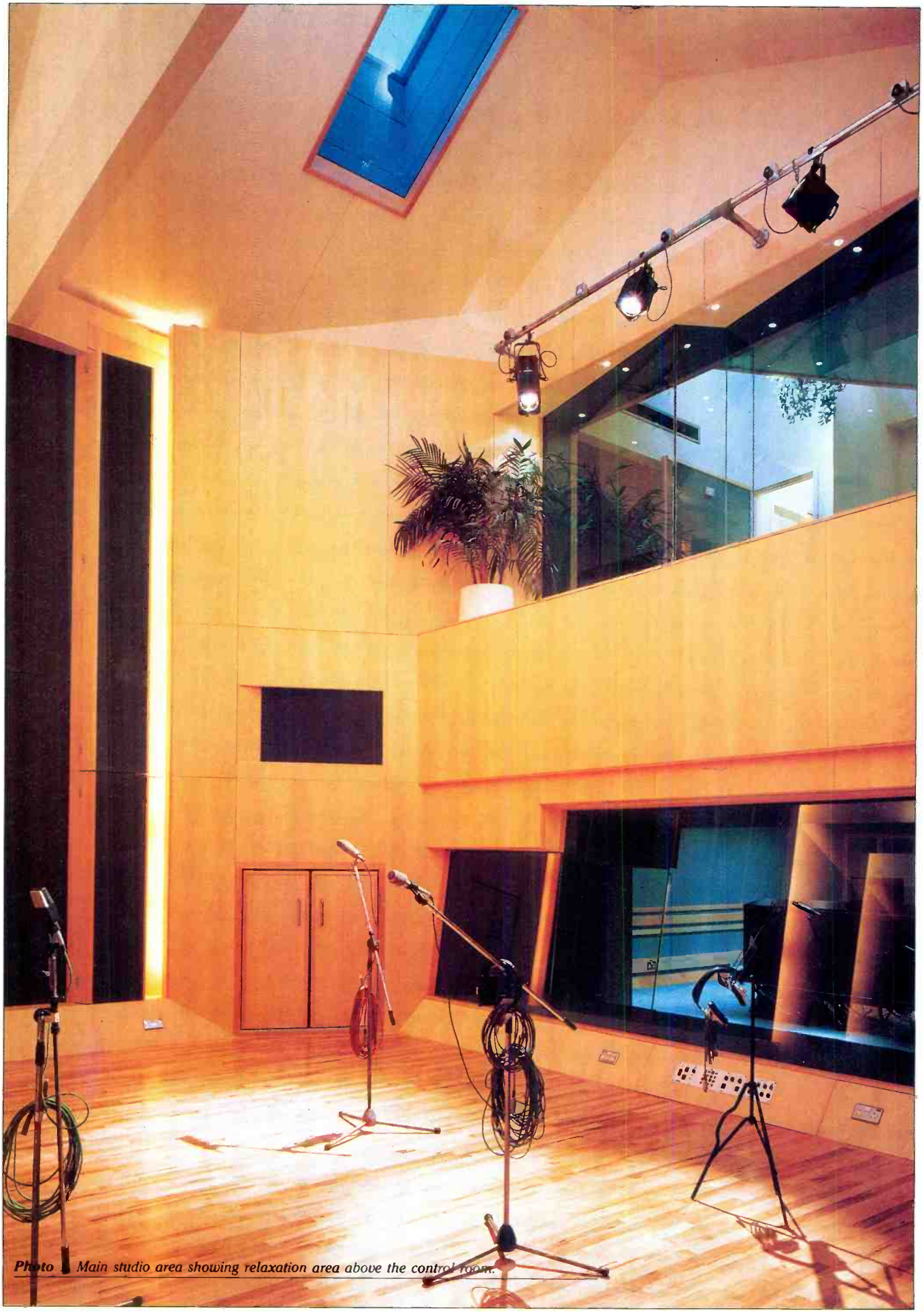


Photo 1 Main studio area showing relaxation area above the control room.

www.americanradiohistory.com

Facility Profile: Abbey Road Studio 3

By David Allison

Abbey Road's new Studio 3 has been designed to meet the needs of an increasingly demanding and competitive industry.

Abbey Road's Studio 3, once described by Paul McCartney as looking "like a record shop" because of the album covers that decorated its ceiling, is not unaccustomed to change. It was during its last major upgrading, in 1975, that the monopoly held by custom-built EMI boards was broken by the installation of a Neve console. By 1986, the studio again needed modernization, and once again served as a point of departure.

The redesign was conceived by senior engineer/producer Mike Jarratt, back in the summer of 1986.

"I had a dream to build a studio that would make use of the latest technology and acoustic design concepts, and have a very live feel," he says. "I also thought that for a long time Abbey Road had lacked a private studio, away from all the hustle and bustle that goes with a recording complex of this size. I wanted Studio 3 to be a totally self-contained facility, but one that would still benefit from the atmosphere generated by a large complex."

Armed with these ideas, Jarratt began talks with general manager Ken Townsend, senior technical engineer Colin Johnson and the five other house engineers. Sam Toyoshima and John Flynn of Acoustic Design Group were chosen for the project because, as Jarratt recalls, "Everyone liked the studios designed by Toyoshima and felt that his rooms sounded the best."

Live but flexible

The original brief was to create—both acoustically and visually—a spacious, daylit room with a live feel. At the same time, the room had to offer a variety of acoustic possibilities, so that musicians were not limited to a particular kind of sound. This "live but flexible" concept partly reflected the preference of Jarratt and the other engineers, but also was a response to a refreshing development that heralded the return of live-sounding records played with real instruments.

The final design used the space previously occupied by the old control room for a live isolation booth. A new control room was constructed at the opposite end of the studio, housed largely within the former video room—that until then had separated Studio 3 from Studio 1—but also projecting partly into former studio space. A relaxation area, complete with a kitchen and bathroom, was built overlooking the studio, above the new control room.

David Allison is a publicist at Sound Public Relations in London and a freelance writer.

www.americanradiohistory.com

Photo 2. *Main studio area with control room below right and movable acoustic panels on the left.*

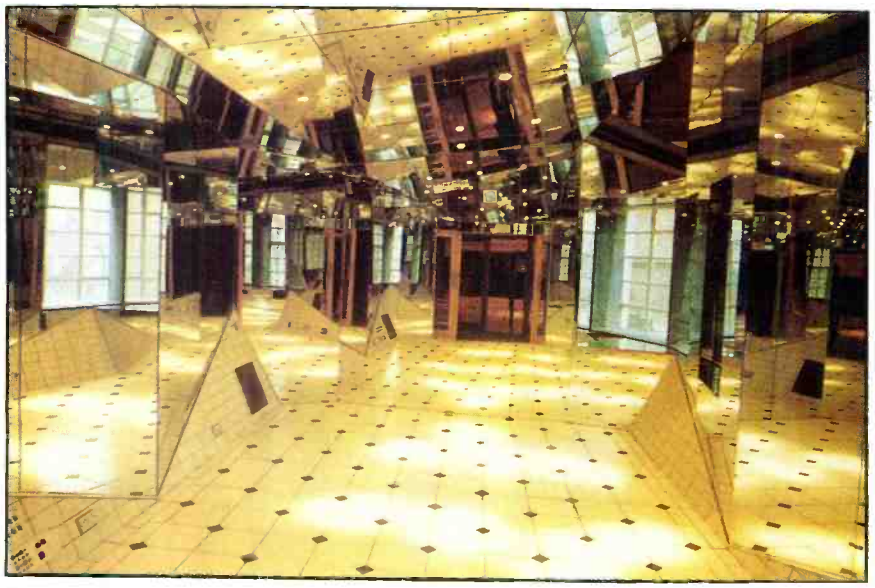


Photo 3. *Live area drum room.*

The design entailed some major structural alterations, and, so as not to disturb the reception area, a temporary hole was cut through the side of the building. Building materials, including 30-foot steel girders, were delivered through the hole into the hollowed-out shell. "The worst thing," Jarratt says, "apart from the noise, was the dust and the dirt. It literally went everywhere."

The situation was complicated further by two problems. First, during the early period of construction, the builders could only work for two hours in the morning. They came in at 8 a.m. and had to stop around 10 a.m. when sessions began in the adjacent room, Studio 1. Secondly, they couldn't come back at night, because Abbey Road is situated in the residential area of St. John's Wood in West London. Luckily, the major construction work only lasted for a short period, and the builders were soon able to resume normal hours.

The next task was to float the floors, walls and ceilings to form a "building within a building." This proved to be no easy task, as Flynn explains.

"Number 3's new control room now directly adjoins Studio 1, which does not have a floated shell. Also, during initial demolition work, several small holes were discovered in the wall between the two rooms. Once these were plugged, simple listening tests revealed that a piano playing in Studio 1 was still audible in the area to be occupied by the new control room. The panels in Studio 1 are fixed directly to this separating wall, and we discovered that they were transmitting their respective resonant frequencies into the structure."

One solution would have been to change the way the wall panels were fixed, but this would have changed the acoustics of Studio 1. Instead, a dampening layer of plasterboard and rockwool quilt was suspended against the surface of the structural wall. This was in addition to the triple-floated isolation layer already planned for the rear of the new control room. As Flynn points out, "Where there was the likelihood of monitoring rock music to levels of around 120dB on one side, simultaneous with quiet classical solos on the other, we were not going to take any chances."

Impact tests were carried out during the construction to ensure that satisfactory decoupling was achieved. But even so, because of the difficulty in excluding airborne noise originating from the impact generator, the accelerometer readings were not wholly conclusive. Toyoshima's solution was rather simple. After listening to the structure with a stethoscope, he pronounced the new works satisfactory and offered the quiet assurance, "It will be OK."

Jarratt also wanted to build special amp

www.americanradiohistory.com

booths at the side of the studio. Using these "traps," guitar amps can be isolated from the musicians in the studio. Mic lines are simply fed from the booths to the control room. In addition, there was space above the sound lock and amplifier booths for a gallery, which is accessed via the relaxation area. A new sound lock was formed between the studio and the corridor outside, providing access to the studio, the control room, and the staircase to the relaxation area at mezzanine level. (See Photo 1.)

Light maple wood was used in the main material for walls and floors. This, together with the skylights built into the roof of the studio, gives the room a very light, spacious feel. Three tapered baffles made from solid maple and maple-veneered plywood were built into the right-hand wall of the studio. Each baffle is made up of two hinged sections and can be turned to present a surface of either maple wood or rockwool faced with fabric. Various combinations are possible, allowing the room's acoustics to be adjusted. (See Photo 2.)

Drum room

Perhaps the studio's most original feature is the live drum room (6m × 3.5m) to the rear of the playing area. The floor is laid with black and white ceramic tiles, and the walls and ceiling are covered entirely with angled mirrors. "We wanted a very live, bright room," Jarratt says. "Our original idea was to use a lot of stone. Then we decided to go all out for something really special, and John came up with the idea of using mirrors." The visual effect is quite startling. Standing in the middle of the room allows you to see yourself from many perspectives. "It's got nothing to do with the vanity of rock drummers," asserts Jarratt with a smile.

Perhaps the studio's most original feature is the mirrored drum room.

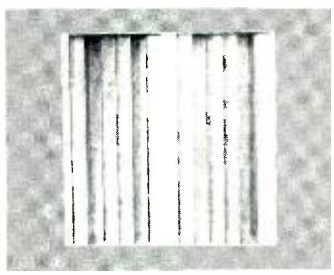
The emphasis on *live* is apparent throughout the studio. Prelude 16/30 theater spotlights were hung from the ceiling above the gallery to help create the atmosphere of a concert performance. Still, the control room is large enough to handle large keyboard racks and other electronics that can be connected to various SMPTE/EBU/MIDI processors. Mic panels with D.I., MIDI and SMPTE interfaces have been installed throughout the studio area, making recording options even more flexible. David Hawkins's Acoustical Construction Services handled the carpentry, fixtures and fittings. (See Photo 3.)

Jarratt and Townsend spent a great deal of time visiting studios and manufacturers, making sure all console alternatives were considered. After much deliberation, the staff decided on a Calrec/AMS UA8000 with 64 inputs, 32 group outputs and TASC automation. "We already have two SSLs and a Neve," Jarratt says. "We felt that we had to go for something a little different. We tested a lot of modules, but in the end we decided that the Calrec was right for this particular room. (See Photo 4.)

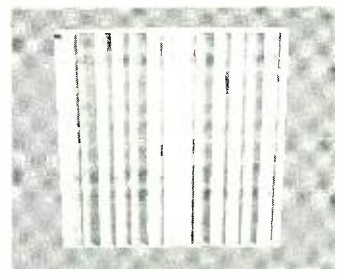
"Naturally, the ergonomics aren't the same as the SSL; it took a while to get used to the design—like having the EQ at the top of the module. But I'm convinced we made the right choice. I also like the TASC automation system. It's quick, powerful and easy to operate."

At the moment, there are relatively few Calrec consoles in operation—four in Scandinavia, three in the United Kingdom, three in Japan and one at Mastermix in Nashville. But Jarratt sees the fact that

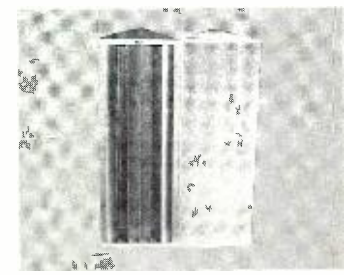
Announcing The Complete Acoustical Treatment System For Music, Speech And Noise Control — The RPG Diffusor System™



QRD® DIFFUSOR — broad-bandwidth diffusion



ABFFUSOR® — broad-bandwidth absorption



TRIFFUSOR® — variable acoustics

NEW ACOUSTICAL SYSTEM

In 1983, RPG Diffusor Systems introduced the first reflection phase-grating sound diffusor and revolutionized architectural acoustics. Today they continue that innovative tradition and announce the first complete modular acoustical treatment system containing an expanded line of **QRD® DIFFUSORS™**; a unique broad-bandwidth absorber — the **ABFFUSOR®**; and a rotatable triangular variable acoustics module — the **TRIFFUSOR®**. Sound contractor and dealer pricing now available.

PARTIAL CLIENT LIST

Ardent, Memphis
CBS, Los Angeles & London
Digital Music Products, Stamford
Digital Recorders, Nashville
Eurythmic's Church Studio, London
Full Sail, Orlando, FL
HBO, NY
John Mellencamp, Nashville, IN
NBC, NY, Burbank, Chicago
Peter Gabriel, Box Mill, UK
Rhinoceros/INXS Studios, Sydney
Telarc International, Cleveland
Whitney Houston, Mendham, NJ

APPLICATIONS

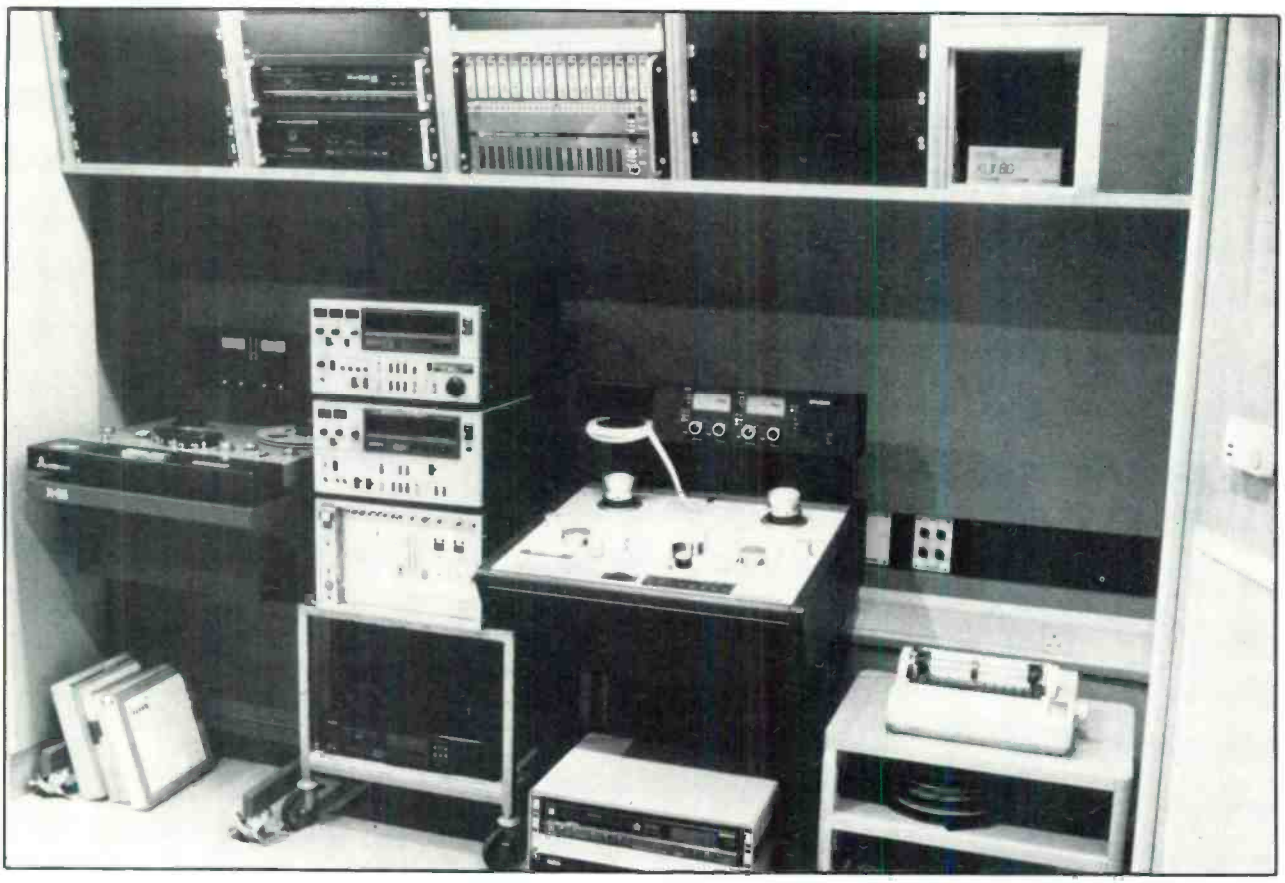
Recording/Broadcast/Post Facilities
Audio/Video & Teleconference Rooms
Worship Spaces • Acoustical Shells
Music Rehearsal Rooms • Auditoriums
Audiophile Home Listening Rooms
Performing Arts Facilities • Schools

RPG® Patented
Diffuse It or Lose It

RPG Diffusor Systems, Inc. 12003 Wimbleton St., Largo, MD 20772 Phone 301-249-5647 Fax 301-249-3912
RPG Europe Northfield Industrial Estates, Unit 15, Beresford Ave., Wembley, Middx, HA0 1YB Phone 01-900-0355 Fax 01-900-2793

Circle (15) on Rapid Facts Card

www.americanradiohistory.com



Studio 3 Equipment:

Calrec/AMS UA8000 64×32 mixing console
TASC Automation
Mitsubishi X-880 multitrack (2)
Audio Kinetics 1.11 synchronizer
Event SMPTE/EBU/MIDI processor
Quested Q412 monitors
Lexicon 480L, 224XL, 200 reverbs
Quantec Room Simulator
Alesis Midiverb multieffects processor
Eventide Ultra, H949 and 910 Harmonizers
AMS 1580S stereo delay (2)
Yamaha SPX90 multieffects processor
Roland GP8 multieffects processor
Drawmer DS201 gates
Drawmer M500 multieffects processor
Panscan autopanner
Valley 415 Dynamic Sibilance Processor
Urei 1176 limiter (2)
Fairchild 160 tube compressor (2)
dbx 160 comp/limiter(2)
Akai S1000 sampler
Pultec EQP.1A3 equalizer (2)

many engineers and producers may be unfamiliar with the console as an advantage rather than a problem. "Calrec has a good reputation for quality and innovation," he says. "I think more and more engineers and producers are seeking an alternative. Besides, every engineer likes to try a new board."

The console also incorporates some customized modifications—the handiwork of technical engineer Colin Johnson. A separate control panel on the right side allows the engineer to change the lighting anywhere in the studio at the turn of a dimmer switch. "I've often wanted to alter the mood of a session by changing the lighting," Jarratt says. "But I haven't been able to without going into the playing area and possibly upsetting the musician's concentration. In Studio 3, all you have to do is reach over to the lighting control panel and you have the effect you're looking for.

64 tracks of digital

Two Mitsubishi X-880s are housed in the tape machine booth on the left side of the control room. The X-880s were chosen, says Jarratt "because we liked their sound and their technical specifications are excellent. The great advantage of having two machines is that if you want to build up a big block of harmony vocals on a chorus, for example, you can work on a number of tracks on one machine and then, using offsets, spin the completed chorus onto the other machine where needed."

An Audio Kinetics' ES 1.11 ESbus system is used to synchronize the two X-880s and, when required, an additional analog multitrack and video machine. However, the system's capabilities extend to far more complex machine-control tasks. According to Johnson, "Now that we've had a couple of months experience with the ES 1.11, I can see the ESbus systems becoming standard at Abbey Road, allowing us to set up a machine-control network throughout all the studios."

As for hard disk, Jarratt would like to see a system in Studio 3. "In the digital domain, editing on tape is not so easy. I've been looking at a new system by Sonic Solutions, but I think we'll have to wait until the price goes down before we add a hard disk system as a permanent feature."

Monitors

The studio is equipped with a Quested monitoring system—three Q412s, positioned right, center and left, along with two H405s at the rear of the control room for surround-sound film mixing. About two years ago, Jarratt worked on a project at another London studio, Lillie Yard, and was very impressed with the quality of their monitors. Subsequent listening tests with Questeds only confirmed his initial view. The speakers "give a very true

www.americanradiohistory.com

Incredible stereo. Great imaging. No trade-offs.

Until now, there have been only two choices for stereo microphones.

Mid side and X-Y mics gave good mono compatibility but produced wishy-washy imaging and sacrificed ambience. The second choice, near-coincident pairs, produced sharper imaging at the expense of poor mono compatibility and required awkward stands and field assembled parts.

Either way, low end has been weak and off-axis coloration lurked in the background.

All that has changed with the introduction of Crown's Stereo Ambient Sampling System™: SASS™. Now, two new choices are available, each with no sacrifice in performance.

SASS-P with switchable battery or phantom power and Crown's best studio grade PZM capsules; or SASS-B to utilize the world standard Bruel & Kjaer 4003 and 4006 studio mics.

Full ambience without coloration, excellent sum to mono and an extraordinarily broad frequency response, SASS offers fantastic imaging with pinpoint localization for both music and non-music sources.

It's all done within a single, lightweight, Crown-patented frame that is easily adaptable to all common stands and mounts. A cushioned grip is provided for hand-held applications.

On one hand, portability and impressive high end; on the other, ultraquiet response to the lowest audible frequency. Both SASS models have it all.

See your Crown representative. You'll find the new SASS family stands alone as THE choice for stereo. No trade-offs.

crown® INTERNATIONAL, INC.
1718 W. MISHAWAKA ROAD, ELKHART, IN 46517

Circle (16) on Rapid Facts Card

www.americanradiohistory.com

Photo 4. *The control room at Abbey Road Studio 3.*

Photos courtesy of John Price, London.

sound with exceptional clarity," Jarratt says.

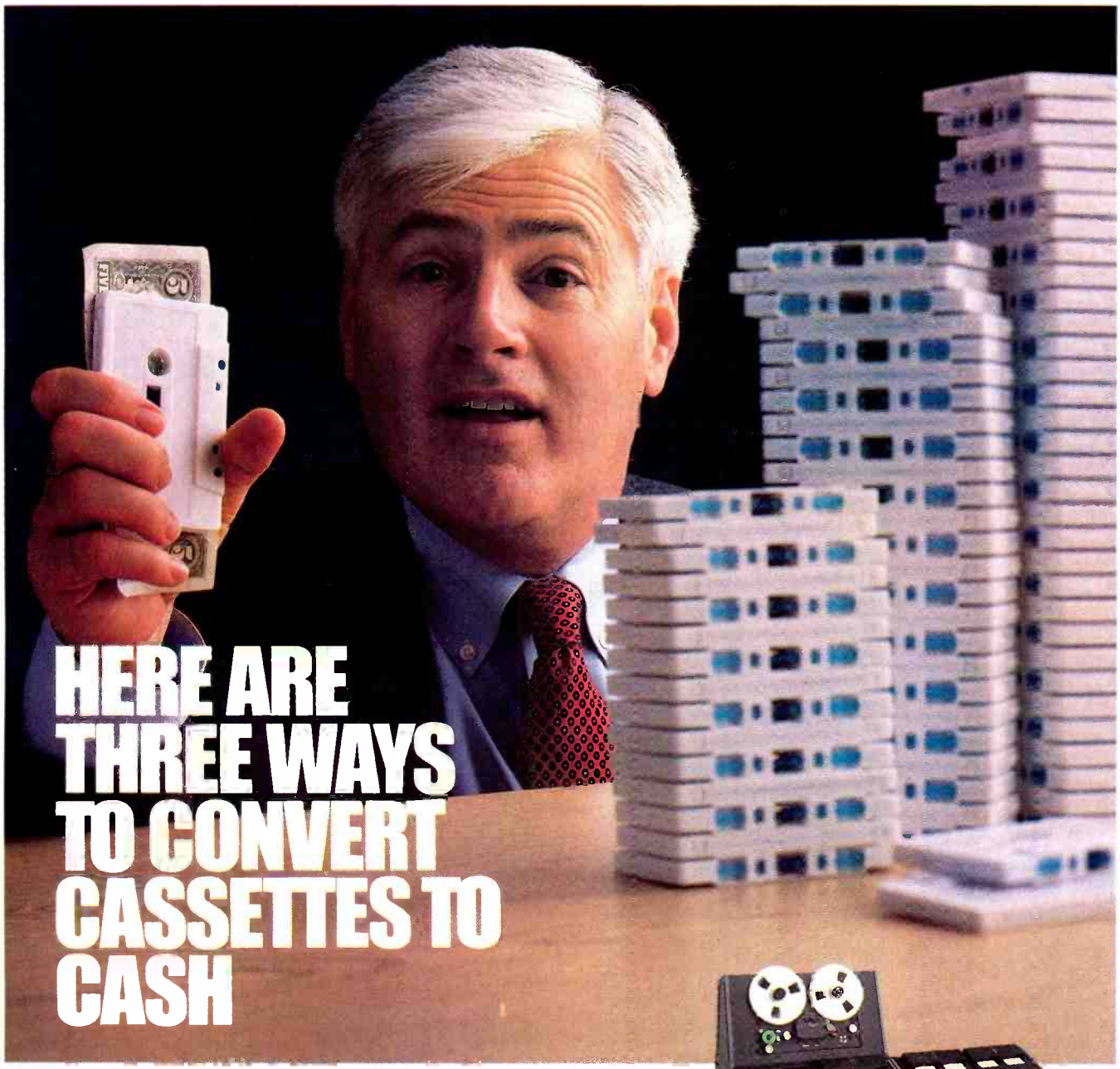
Studio 3's list of outboard equipment is extensive (see spec list). The large stock of microphones ranges from old tube mics to Bruel & Kjaer omnis. Of particular note is the Nemesis Foldback System, which provides individual mixers for musicians. Each mixer has eight stereo inputs, enabling the engineer to provide several submixes to the studio area, so that musicians can adjust their own headphone balances.

The facility has been costly to build and equip. With a daily rate of about $2,600, it requires a heavy financial commitment from its users. So far, business has been steady, with Pink Floyd, Sigue Sigue Sputnik and Climie Fisher using the studio.

Jarratt sees this as a promising start and is confident that Studio 3 will continue to grow in popularity, although he thinks that "the U.K. market is slightly deflated at the moment, with too many studios competing for too little work." But even though any artist is welcome to record at the studios, Studio 3 is aimed largely at high-end users. Jarratt feels that this makes marketing the studio easier because they "have a fair idea of the kind of artists who'll want to use the studio. RE/P

Circle (17) on Rapid Facts Card

www.americanradiohistory.com



- **Add new profit opportunities** by starting your own high speed tape duplication department.
- **Increase production** of your current tape duplication department by adding modules as you grow.
- **Save the money** you're spending on cassettes now. Produce them yourself for only the cost of the tapes.

Telex is the leader in high speed audio tape duplication equipment with products ranging from the compact, economical Copyette® series to the professional 6120XLP shown here.

The Telex 6120 series provides outstanding audio quality, unlimited expandability and profitable production capabilities. It's available in high production 16X speed or 8X speed for highly critical audio needs.

Hearing is believing
For full details including specifications and a free demo tape, call or write today.

3120 High Speed Duplicator

Call toll free: 800-828-6107

Telex Communications, Inc.
9600 Aldrich Av. So.
Minneapolis, MN 55420

Name
Company
Address
City State Zip
Telephone

©1989 Telex Communications, Inc.

TELEX®

Circle (18) on Rapid Facts Card

www.americanradiohistory.com

Designing for Audio/Video Post

By Carl Yancher

Combining effective audio *and* video monitoring is just one of the challenges that face the designer of an A/V post facility.

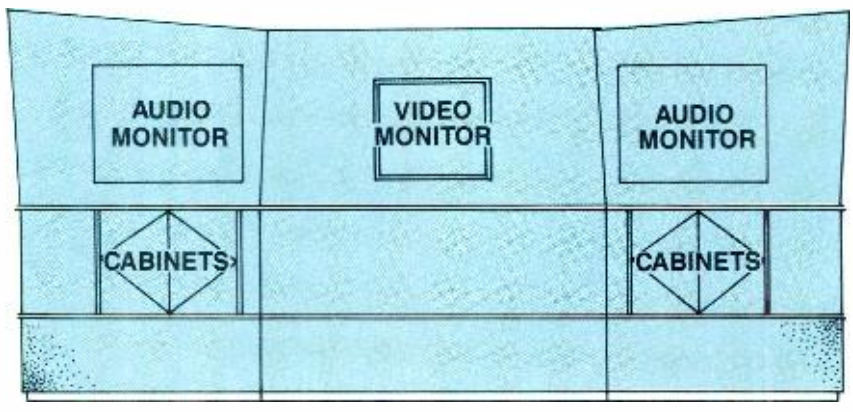


Figure 1. *The optimum location for the video monitor is centered, at or just slightly below seated eye level.*

Post-production audio encompasses the recording and mixing of music, sound effects and dialogue. The requirements for a good post room are basically the same as those for a good music control room, the primary difference being the post room has to relate audio to video.

There is no denying video monitors have become commonplace in music control room for entertainment, as part of a console automation system or even as part of an attempt to diversify into the post-production field, but in the dedicated post room, video is the focal point. A 25-inch monitor is typical, though larger rear- or front-screen projection systems are often employed.

Carl Yancher is president of Lakeside Associates, an acoustical design and consulting firm in Santa Ana, CA.

www.americanradiohistory.com

★ LEGAL DAT TODAY ★

Are You Ready To Enter The True Digital Domain?

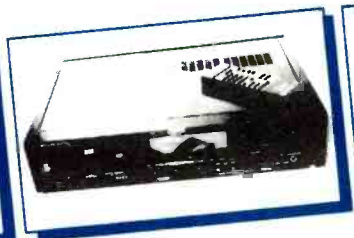
DAT
DIGITAL AUDIO TAPE
THE FUTURE OF RECORDING . . . TODAY!

A DAT Recorder Is Like Having Your Own Home/Portable Recording Studio.

Master Quality Sound Production With No Distortion! No Tape Hiss!

- English Operating Manuals
- All Connecting Cables
- AC Converters

SONY
PCM-2500
Professional two piece studio standard
- Wireless remote control
- Fully programmable
- Switchable sampling freq. 32/44.1/48 khz



SONY
DTC-500ES
Sony's second generation bestseller
- Direct digital-to-digital
- Transmission capability
- Switchable sampling freq. 32/44.1/48 khz

SONY
TCD-D10
Sony's #1 consumer portable
- High-speed (near-instant) index search
- Built-in clock/calendar
- Stereo microphone and windscreen

TECHNICS
SV-D1100
18 Bit high resolution DAT
- Full function remote
- 6-speed CRV digital servo system
- Reduce conversion error by 75%

PANASONIC
SV-250
A masterpiece of miniaturization
- 9 - 1 3/4 - 5 1/2, under 4 lbs.
- MASH A/D converter w. 64X O. Samp.
- Digital-to-digital editing

CLARION CAR STEREO
DAC-2000
- Full-logic transport
- High-speed music search
- Intro tape scan

KENWOOD CAR STEREO
KDT-99R (not pictured)
- Din-size. Dual-chassis
- Wireless remote control
- Direct track access

Did You Know:

DAT recorders offer you better sound quality than CD players, plus all the benefits of a cassette recorder.

DAT cassettes are half the size of standard analog cassettes, and are a higher quality tape.

DAT recorders are fully programmable, with high speed (up to 300 times playback speed) indexing and music search.

FLEXIBLE LEASING PROGRAMS
START AT
$69 per month
- NO MONEY DOWN
- QUICK APPROVAL
- COMMERCIAL ACCTS WELCOME

CHOOSE FROM THE FOLLOWING
Sony • Panasonic • Technics • Tascam
• Kenwood • Pioneer • Akai • Sharp • Alpine
• Nakamichi • Denon • Yamaha

- USA Written Warranty
- Nationwide Service Centers
- Pro User Extended Warranties

Knowledgeable, Friendly Customer Service.

American International Audio Video

127 ROUTE 206 TRENTON, NJ 08610

DAT HOTLINE
609-888-4414

609-888-2930
FAX ORDERS

Circle (19) on Rapid Facts Card

DIL Digital

www.americanradiohistory.com

Table 1
Video Monitor Viewing Distance

Screen Size (Diagonal)	Minimum Viewing Distance	Maximum Viewing Distance
9″	3′9″	7′6″
12″	4′0″	10′0″
15″	5′0″	12′6″
19″	6′3″	15′9″
23″	7′9″	19′3″
25″	8′3″	20′9″
31″	10′3″	25′9″
35″	11′9″	29′3″
45″	15′0″	37′5″

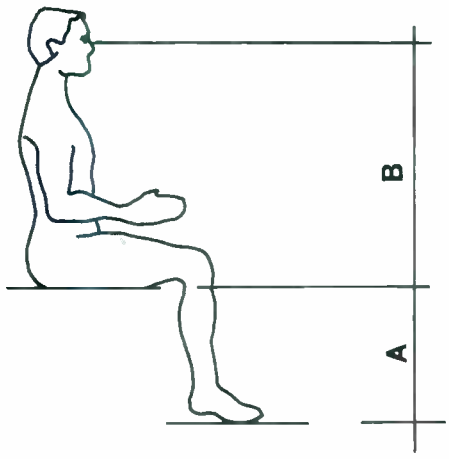


Table 2

	Percentile 5th	50th	95th
Seat Height A			
Adult Male	15.5″	17.3″	19.3″
Adult Female	14.0″	15.7″	17.5″
Seated Eye Height B			
Adult Male	28.7″	31.3″	33.5″
Adult Female	27.4″	29.3″	31.0″

When dialogue or sound effects are being mixed with the picture, the phantom center image of the audio track should coincide with the center of the picture. In order to be perfectly accurate, the characteristics of the audio monitors should be investigated prior to design and construction, and provisions that allow some adjustment after installation are wise. Also, certain audio monitors do not have vertically symmetric off-axis response, which should be taken into account. In most situations, monitors with non-symetric, vertical, off-axis response patterns should be mounted upside down.

A particular difficulty arises when a window into an adjacent studio or a center audio monitor is brought into play. The traditional location for such windows is between the audio monitors, basically centered at eye level and sized for optimal sight lines. The preferred location for the audio monitors is at or just slightly above seated ear level, spaced eight to 12 feet apart, as dictated by room size and geometry. To minimize neckache, the optimum location for the video monitor is centered, at or just slightly below seated eye level. (See Figure 1 and Tables 1 and 2.)

The console—typically three and one-half to four feet high, plus whatever semi-permanent equipment is stacked on its meter bridge—serves as a lower limit to sight and "hearing" lines in the horizontal plane. The upper limit is the ceiling height.

For Foley, NC curves are not always a good standard to follow.

Monitor placement

Starting with the simplest case—a video monitor with left and right audio monitors—the video monitor should be placed so that the bottom of the screen just clears any obstruction presented by the console. (See Figure 2.)

The second case, that of a video monitor and a center audio monitor, presents a serious conflict. Unless you are using front-screen projection with a properly perforated screen, a compromise must be made. For better combined imaging, most engineers surveyed prefer to have the audio monitor below the video monitor.

Case three—a video monitor(s) and window—is again a matter of tradeoffs. For an optimum view into the studio, the height of the window should be at least six feet. This would place the bottom of the video screen at a height approaching seven feet, good only for chiropractors' pocketbooks. This might, however, be an acceptable arrangement for large scoring sessions, where the relationship to picture is less crucial. (See Figure 3.)

The final case, that of a video monitor with center-channel audio monitor and window, does not allow any reasonable compromise. (See Figure 4.) The only possible solution is to position the video monitor to the right or left of the center audio monitor. This, of course, destroys the alignment relationship of the aural and visual images.

There is at least one alternative. The

www.americanradiohistory.com

window, and consequently the associated studio, can be moved to one side of the control room. This frees the front wall for the video and audio monitors to vie for position, while removing a large reflective surface from the front of the room. An added benefit is that this configuration is faster and less expensive to construct. (See Figure 5.)

(On the subject of monitoring, as yet, little interest has been taken in permanently installing surround speakers. Part of the reason probably lies in the still-fading memories of quad. As the market for surround-sound video develops and standards become defined, the integration of surround speakers may become more important.)

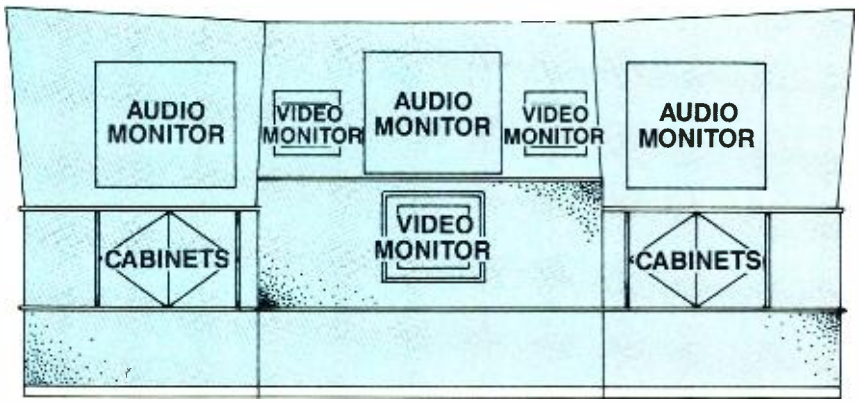


Figure 2. *A common configuration using two audio monitors and a central video monitor, without a window.*

Noise floor criteria

In addition to music, post-production can involve many hours of dialogue replacement (ADR), sound effects recording and Foley. Recording whispers and the rustle of leaves requires an environment that is exceptionally quiet, free from extraneous rattles, resonances and reflections.

The first order of business in the design of an ADR or Foley studio, as with any studio, is to isolate the room from the outside world. The conventional method for specifying the noise level in a room is the NC (Noise Criteria) curve. Many articles and books deal with the subject in great depth, so I won't go into it here. (See "Acoustic Design: Noise Control," August 1988.) However, one important point must be made.

Introduced in 1957 by Leo Beranek, the NC curves are based on survey data concerned with the effects of environmental noise on office workers' ability to perform work and communicate speech. At NC 20 and below, the typical goal in such situations, the acceptable noise level at 63Hz can be as high as 50dB SPL. For voice recording, this may not always present a problem if, for example, the use of a high-pass filter is tolerable. But for Foley, when the sounds being recorded fall into this frequency range and are at or below the background level, a filter won't help. If several channels are summed, the situation is even worse.

The human ear is less sensitive to low-frequency sound. Most microphones are not designed to be as selective. In passing through the electronic chain, any rumble picked up can increase distortion or even cause amplifier clipping.

At low-frequencies, transmission loss through walls, floors and ceilings becomes much more complex to predict. The transmission loss is no longer governed simply by the mass of boundary, but also by such factors as damping, stiffness and panel dimensions. Very little test data exists for frequencies below 125Hz, because most testing is targeted for the residential and office construction markets.

The video monitor should be placed so that the bottom of the screen just clears any obstruction presented by the console.

Materials such as concrete and concrete block perform well in the low-frequency range by virtue of their mass and stiffness. At 70 to 140 pounds per cubic foot, however, a 6-inch thick, 12-foot high wall weighs in at 430 to 860 pounds per linear foot. This is fine for a single-story building on grade, but in a high-rise office building, it may present some structural challenges. The wisest and often the most economical means of ensuring good isolation is to locate noise-sensitive areas away from noise-producing areas.

This common sense approach applies in particular to HVAC equipment. The mechanical portion of the system—compressors, chillers and fans—must be installed in a manner that does not introduce either airborne or structure-borne noise and vibration. Also, the air must be brought into the room without any of the noise or vibration generated by the equipment. Usually this is accomplished with some form of duct work.

Independent duct systems for each room are a must. Whether sheet metal, rigid fiberglass or flexible ductwork, it should be routed and isolated so that it doesn't pick up any noise along its path or carry sound from one room to another. And the ductwork should not produce any noise of its own.

Sheet metal duct, though having a higher transmission loss than rigid fiberglass or flexible duct, can generate popping noises when it is either pressurized or depressurized. It is also more susceptible to transmitting aerodynamically generated noise. Round or flat-oval sheet metal duct minimizes both of these problems in situations where sheet metal duct must be used.

Flexible duct has very low transmission loss, can generate crackling noises as it expands and contracts and, if not installed properly, can add airflow noise. On the other hand, it is very economical and does not transmit vibration as easily as the other types.

To introduce air into a room without adding noise requires a low outlet velocity of approximately 250 feet per minute. A ton of refrigeration (a carryover from the days when ice was used to cool) is equivalent to 12,000Btu per hour. or about 400 feet cubed per minute. Consequently, a low velocity requires a large outlet area, because Cubic Feet per Minute (CFM) = Area × Velocity. Dampers should be avoided, as they reduce the net area and therefore can only increase noise.

Air distribution should use the techniques employed for clean rooms or surgical suites. In such rooms, the air is distributed over the entire ceiling. Air-diffusers, if they must be used for aesthetic reasons, must not restrict air flow. A good rule of thumb is that one square foot of

www.americanradiohistory.com

grille or diffuser has approximately 65% open area.

Internal noise control

Once externally generated noise is under control, attention should be given to internal sources. Any device with a fan is a prime candidate for exile to a machine room. Devices that must be kept in the room should be treated on an individual basis to minimize their noise contribution. Light fixtures, air grilles and registers, and console and rack panels will vibrate or rattle when excited by particular frequencies. Offenders can be easily identified with a sweep oscillator, and then damped with neoprene or foam.

In the studio, script stands and tables should also be investigated for resonance, and covered with an absorbent material such as heavy felt or carpet. Chairs should be selected for quietness as well as comfort. Foley prop storage cabinets should be built so as not to rattle or resonate, and also to prevent any items being stored from doing so as well. Once again, the best solution is to remove potential problem items from the room if they are not essential.

Studio considerations

Room "character" is usually desirable in music recording studios. For ADR and Foley, the room should be as transparent as possible. This usually translates into "dead." Unlike many film-use Foley stages, Foley studios for video are very small, often doubling as ADR studios. Because of their small volumes, traditional reverberation time calculations are not meaningful. However, any reflected energy should be diffuse and of essentially uniform frequency content. (For more information, see "Acoustic Room Treatments," page 44.)

Air distribution should use the techniques employed for clean rooms or surgical suites.

Again, it is the low-frequencies that cause difficulty. Below 500Hz, such materials as Sonex, 703 or 705 insulation and carpet become, to some degree, less effective. (See Figure 6.) Resonant absorbers such as panel absorbers or Helmholtz resonators are effective at low-frequencies, but they also reradiate a portion of the energy that is not absorbed. The effectiveness of porous absorbers is dependent upon their thickness and placement, relative to a rigid wall. (See Figure 7.) Space permitting, they are the better choice.

Lighting and seating considerations

Although we have placed an emphasis on the acoustic aspects of facility design, other areas deserve careful attention as well. Good lighting depends on two factors: layout that minimizes shadow, and fixture and lamps selection that minimizes glare.

The light source should not be behind the observer (engineer, producer or talent), but should be located slightly to the left or right so that the light comes over the shoulder. To prevent glare, the light source should not be visible. The lamp should be screened by some type of baffle. The lamp itself should be selected for good beam control. In addition to being energy-efficient, the Phillips MR 16 lamp is particularly useful in this regard.

Low-voltage fixtures with integral transformers and the standard autotransformer dimmers commonly found in studios must be used with caution. Power transformers radiate a certain amount of hum. They all should be kept away from low-level signals, especially the audio signal transformers found in microphone pre-amps and tape machines.

Autotransformer dimmers are a common fixture in most studio applications, because they present a low potential for the radio-frequency interference inherent in electronic dimming systems. Unfortunately, they can generate audible noise, both from the vibration of the coil and the subsequent resonance of their enclosure or adjacent wall, and must be banished from ADR and Foley studios. One solution is to remote them with motorized controls, assuming the motor noise can be sufficiently isolated from the studio. The simple solution of placing them in an adjacent room is not always permissible, depending on building codes.

One of the most often used pieces of equipment—seating—is seldom given

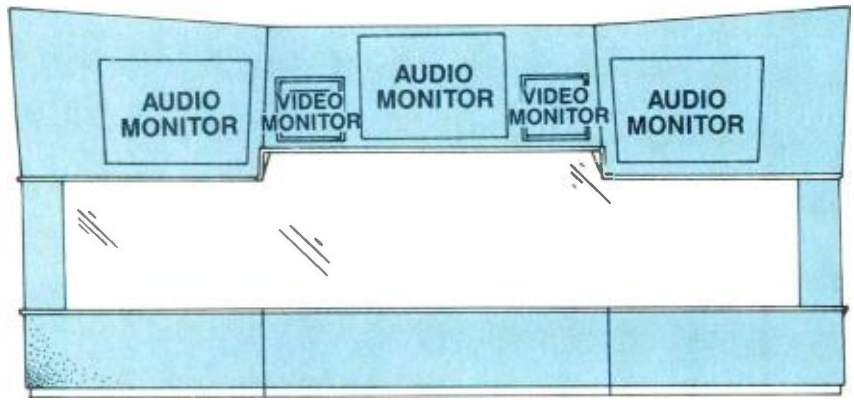


Figure 3. Here there is no center position available for the video monitor. For an optimum view into the studio, the height of the window should be at least six feet. This would place the bottom of the video screen at a height approaching seven feet.

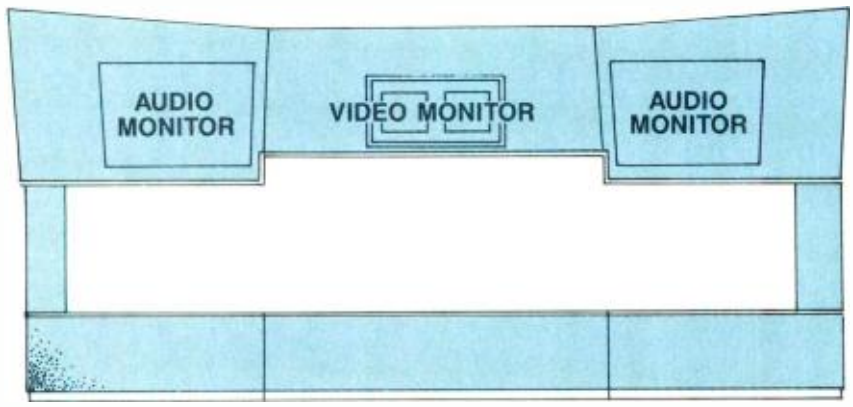


Figure 4. Typical left/right audio monitor and central video monitor(s) configuration, with a window below.

www.americanradiohistory.com

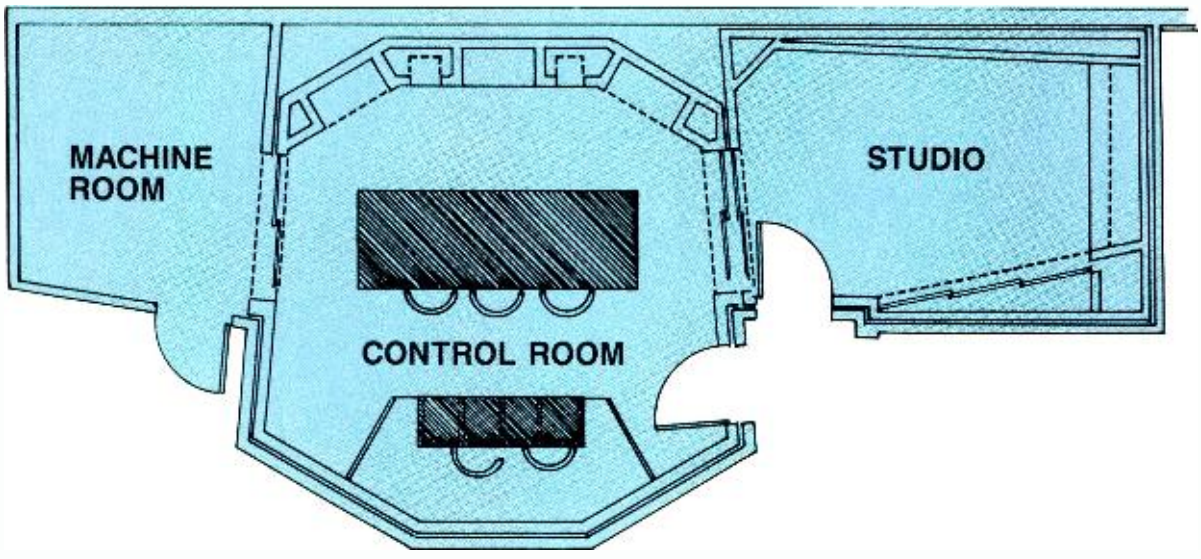


Figure 5. *One alternative is moving the studio to one side or the other, thereby eliminating the front window.*

careful consideration in selection, other than perhaps color coordination. Much research has been done over the past several years into what constitutes good seating design. It has been found that seat tilt and cushion density are even more important than the design of the back cushion for providing long-term comfort.

Ventilation

. We have already discussed the importance of quiet air conditioning, and the need for proper temperature control is obvious. However, the V in HVAC is not always given proper emphasis.

The precautions necessary to ensure a quiet environment also preclude the introduction of natural ventilation from open windows, for example. Soundtight means airtight as well. Any ventilation must be supplied mechanically, most often in conjunction with the cooling system.

In the control room, by removing the electronic equipment with noise-generating fans, we have also eliminated a primary source of heat. And the energy efficient low-voltage lighting suggested to reduced glare has reduced that source of heat, too, by as much as 50%. Each watt of equipment and lighting removed from the room reduces the cooling load by 3.412Btus. In the studio, one or two actors generate little heat, about 420Btus each.

A byproduct of the reduction in supply air required is usually the reduction in ventilation. Variable air volume (VAV) systems are particularly at fault since they regulate the amount of cooling by reducing the

Sources of Indoor Air Pollution

Asbestos. This particulate can be found in about half of the office buildings constructed between 1958 and 1970. More than 3,000 products contain asbestos fibers. Over the years, asbestos fibers can come loose and circulate in ventilation systems. If its fibers are inhaled, asbestos can cause a debilitating and ultimately fatal lung disease called asbestosis. It can also cause various forms of cancer.

Carbon monoxide. This gas, combined with hemoglobin in blood, inhibits its oxygen-carrying capabilities. Long-term, low-dose exposure to carbon monoxide can result in headaches, dizziness, decreased hearing, visual disturbances and personality changes. The biggest source of carbon monoxide is outside ventilation air introduced through improperly placed intake vents.

Fiberglass. Fiberglass can produce hives, scratchy throat and severe rashes. When inhaled, it becomes permanently lodged in the lungs.

Formaldehyde. This pungent gas is used in as many as 3,000 different building materials such as fabrics, furniture, carpets, plywood, particle board, urea-formaldehyde foam insulation, caulkings and glues. Ailments attributable to formaldehyde include burning eyes, coughing, breathing difficulties, nausea and dizziness.

Ozone. A colorless gas with an odor, ozone is produced by photocopiers. It is a severe irritant to the lungs, nose and throat.

Tobacco smoke. Tobacco smoke contains nearly 3,000 compounds including ammonia, benzene, formaldehyde, propane, hydrogen sulfide and methane, as well as carbon monoxide. A room in which tobacco smoke is moderately heavy will have a particle concentration of about 30,000,000 particles/foot3.

Vinyl chloride. This synthetic compound is found in pipes, lighting fixtures, weather stripping, upholstery, wall coverings, electric wiring, laminates and synthetic carpeting. Vinyl chloride is a carcinogen that, as it deteriorates, emits vapors that have been linked to chronic bronchitis, ulcers, allergic dermatitis and bone disorders.

www.americanradiohistory.com

volume of air entering the room. The American Society of Heat, Refrigeration and Air Conditioning Engineers (ASHRAE) publishes standards based upon acceptable levels of carbon dioxide and odor. Carbon dioxide levels, rather than oxygen levels, determine human respiration rates.

The currently applied standard requires a minimum of 5CFM per person of outside air for general office environment where smoking is not permitted, although 10CFM per person is a commonly used design rule. The standard is currently undergoing revision, and the minimum is expected to be raised to the rate of 12 to 15CFM per person. In buildings where equipment or tobacco smoke generates additional indoor pollution, the minimum ranges from 20 to 35CFM per person.

A dilemma lies in the fact that outside air is usually at the wrong temperature and brings along with it numerous, small pollutants. The ASHRAE *Fundamentals Handbook* indicates that 99% of the particles in a typical atmospheric sample are less than one micron in size. And, of course, outside air usually brings with it outside noise.

All these factors force us to rely on the recirculation of existing indoor air to maintain proper air exchange rates—about seven to 10 times per hour. Unfortunately, indoor air is also potentially laden with pollutants. (See sidebar.) Although some pollutants, such as asbestos, require specific control measures, many can be removed with a properly designed, installed and maintained filtration system.

Because of the particle size involved, electronic air cleaners or high-performance dry filters are required, often in conjunction with conventional fibrous-media filters. Electronic air cleaners should be used with the precaution that they can generate random clicking noises. Regular cleaning or replacement of the filter media is essential.

The goals for the design of a good post-production facility are not unique. Good isolation, interior acoustic control, good HVAC, lighting, seating and video monitor placement can apply in some degree to any environment. However, these are some of the areas that deserve special attention and continued research.

RE/P

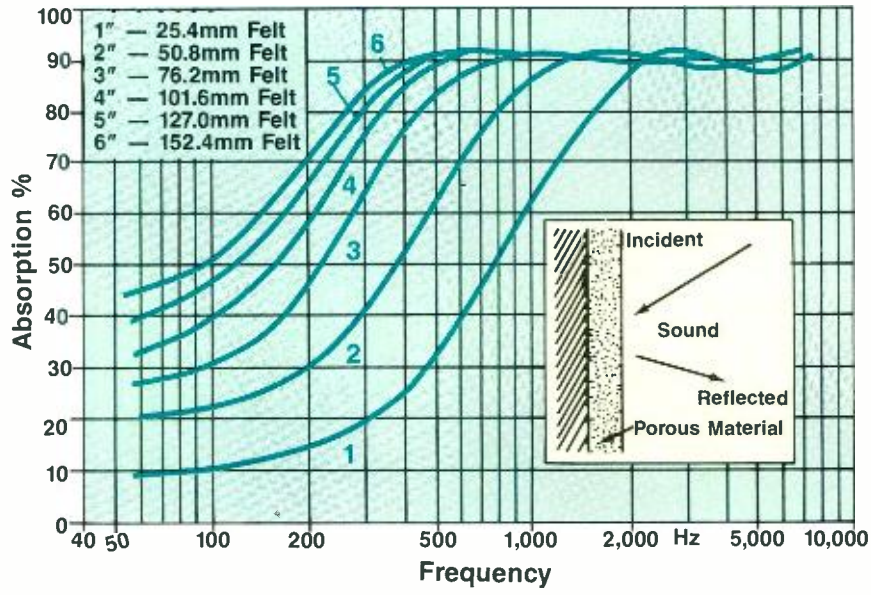


Figure 6. Dependence of the absorption of a porous material on the thickness of the material.

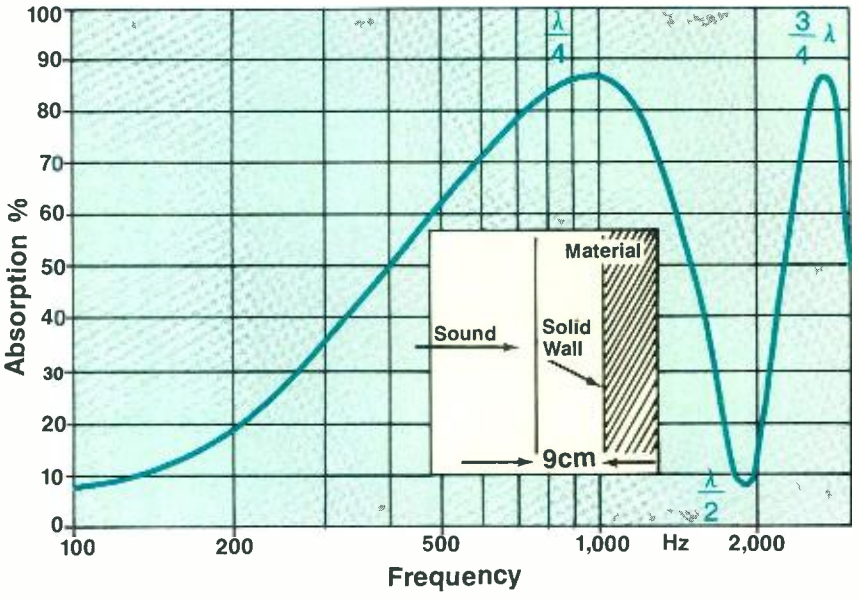


Figure 7. Absorption characteristics of an absorptive material mounted 9cm from a solid wall.

References

[1] Blenkinsopp, Jeff, "HVAC for Audio Facilities," Recording Engineer/Producer, August, 1988.

[2] Gilford, C. L. S. , "The Acoustic Design of Talk Studios and Listening Rooms," Journal of the Audio Engineering Society, 27: ½ (Jan./Feb. 1979).

[3] Gizzy, Vin, "Acoustic Design: Noise Control," Recording Engineer/Producer, August, 1988.

[4] Schindler, Thomas A. "Acoustical Design for the Technical Building at Skywalker Ranch: Part 2—Mechanical and Electrical Noise Control," SMPTE Preprint No. 129-82.

[5] Schwind, David R., "Acoustical Design for the Technical Building at Skywalker Ranch: Part 1—Sound Isolation and Room Acoustics," SMPTE Preprint No. 129-81.

[6] Wadsworth, Raymond H. Basics of Audio and Visual Systems Design, Howard W. Sams & Co., Inc., Indianapolis, 1983.

[7] Woodson, Wesley E., Human Factors Design Handbook, McGraw-Hill, New York, 1981.

[8] Yaniv, Simeone L. and Flynn, Daniel R., "Noise Criteria for Buildings: A Critical Review," NBS special publication 499, U. S. Departtment of Commerce, National Bureau of Standards, Washington, DC, Jan. 1978.

www.americanradiohistory.com

It's Not Just A Phase We're Going Through.

The tremendous success of the Tannoy PBM series of reference monitors is by no means coincidental. Since the introduction of the world renowned NFM-8 nearfield monitor, much time and effort has been spent on discerning the needs of the mixing engineer and the applied requirements of "playback monitors". The PBM Line exemplifies this commitment to excellence in reference studio monitoring. These compact loudspeakers sport robust poly cone mid-bass transducers utilizing efficient long-throw, high power voice coils. The low frequencies are carefully controlled by optimumly tuned ports located on the rear of the loudspeakers. Hi frequencies are provided by Hi Power ferro fluid cooled polyamide dome tweeters which extend H.F. bandwidth beyond 20KHZ. The driver accompaniment is knitted together by means of a precision hardwired crossover unit, utilizing robust low loss components, and heavy-duty input terminals which will accept standard 3/4" spaced banana plugs and the majority of high quality, specialist audio cables. Transducers and crossover assemblies are neatly housed in a stylish, high density, partical wrap cabinet, specially designed to minimize unwanted cabinet resonance, and high frequency reflection. In summarizing, we have left the best feature of all for last "price versus performance."

TANNOY®
Professional Products

Tannoy North America, Inc.
300 Gage Ave., Unit 1
Kitchener, Ont.,
Canada, N2M 2C8
(519) 745-1158
Telex 069-55328
Fax (519) 745-2364

1988 TEC
TECHNICAL EXCELLENCE & CREATIVITY
AWARD WINNER
TRANSDUCER TECHNOLOGY

Circle (20) on Rapid Facts Card

TANNOY®

www.americanradiohistory.com

Acoustic Room Treatments

By Dr. Peter D'Antonio

Controlling room reflections involves the interaction of absorptive, reflective and diffusive surfaces.

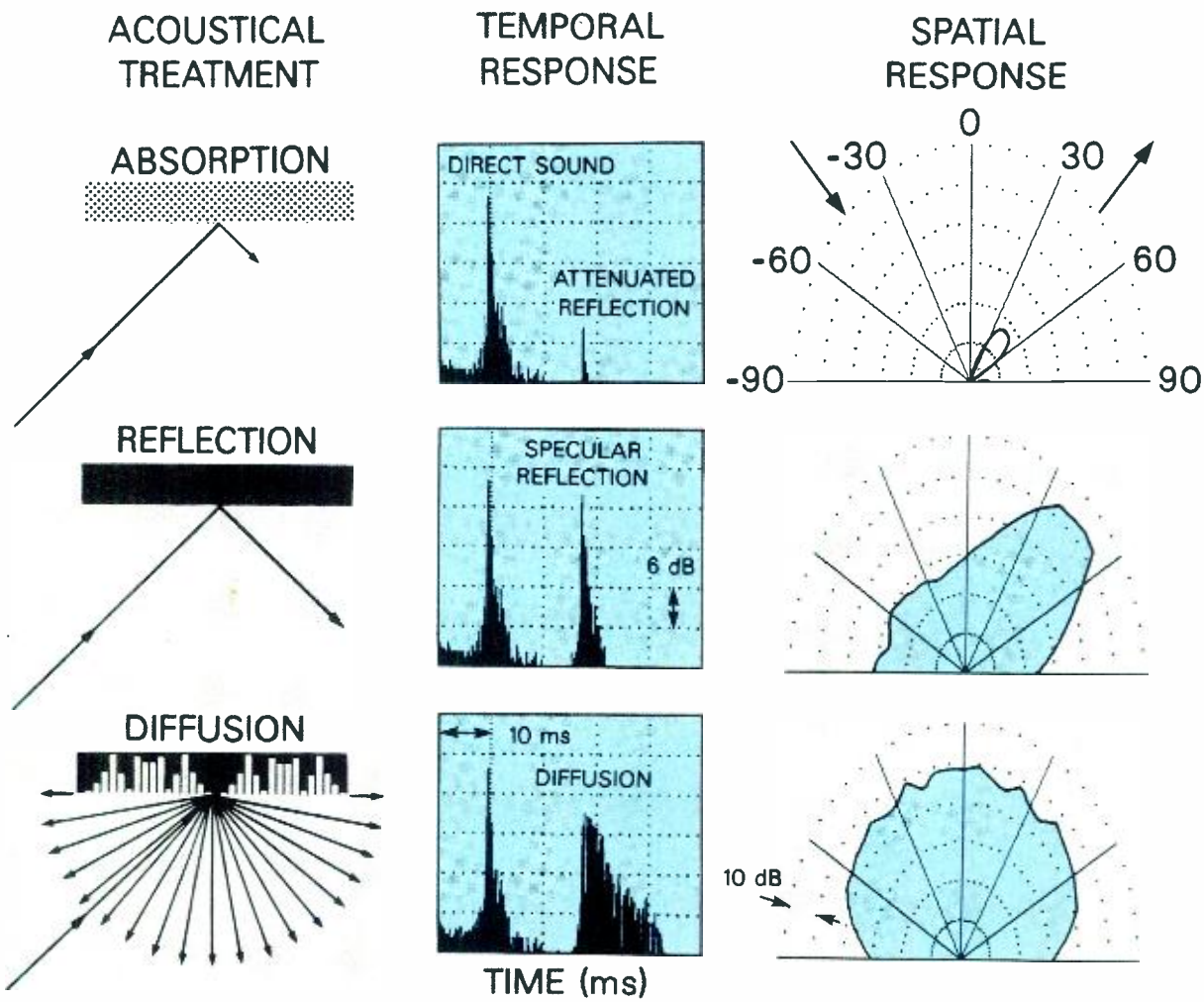


Figure 1. Comparison of the spatio-temporal properties of acoustical treatments.

www.americanradiohistory.com

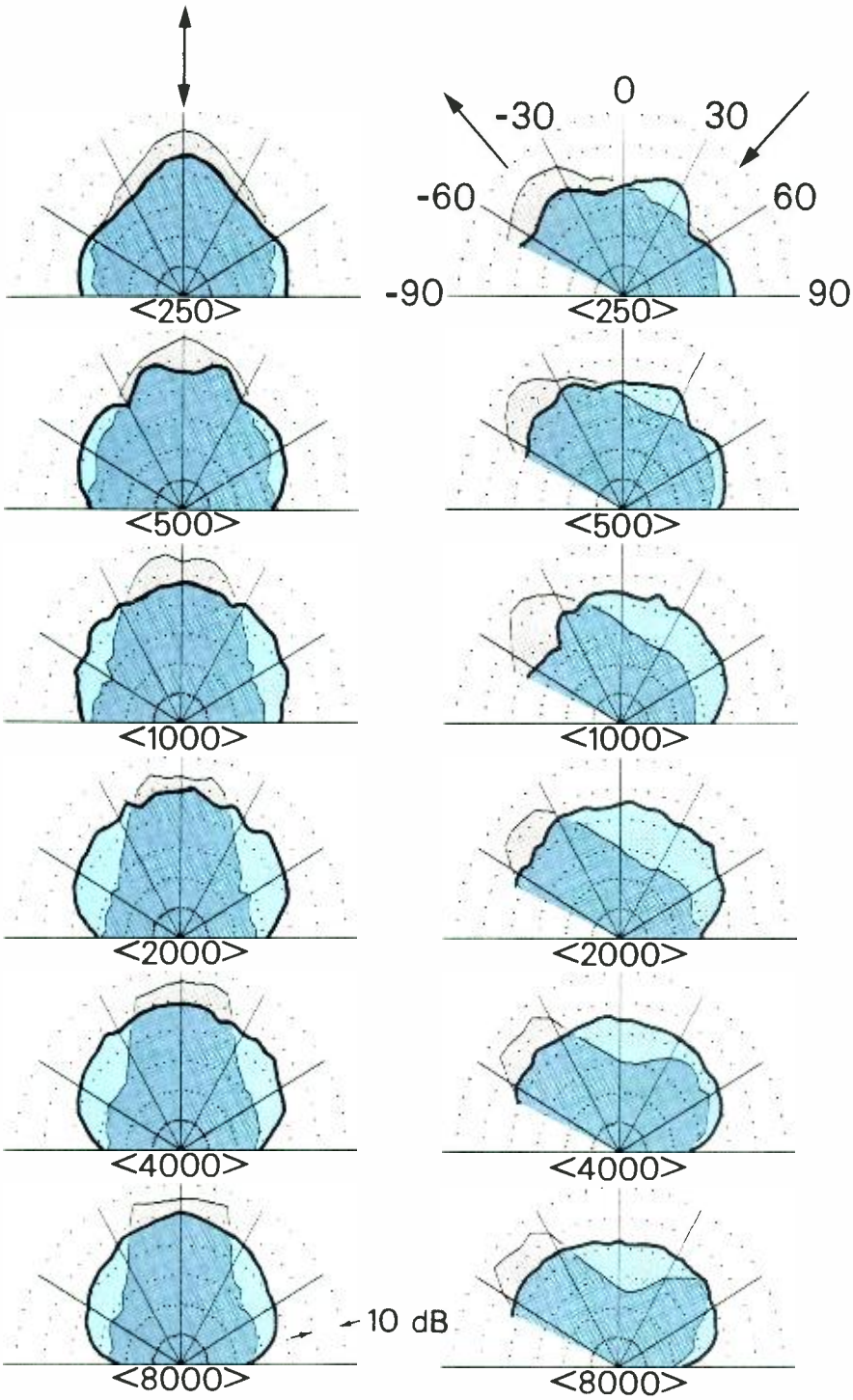


Figure 2. *Comparison of the octave-averaged spatial response for a flat specular panel (thin line) and a QRD diffuser (thick line), for angles of incidence of 0° and 45°. Arrows indicate angles of incidence and the directions of specular reflection. For example, 250 refers to the octave band centered at 250Hz.*

The sound that we hear in a room is a combination of the direct sound emitted by a source and the reflections of that sound from the room boundaries. The reflections arrive at discrete times related to their travel paths. Because the intensity, initial arrival time, temporal distribution and directionality of these reflections determine how we perceive the actual sound source, control of room reflections is a central consideration in acoustic design.

Room reflections can be controlled by surface treatments that absorb, reflect or diffuse incident sound. Simply stated, sound is attenuated by absorption, redirected by reflection and uniformly distributed by diffusion. Figure 1 illustrates how sound is modified in both the space and time domains by these three acoustical surface treatments.

Absorption

Absorption is the most familiar and most commonly specified sound-modifying acoustical material. In fact, the term "acoustical material" has become almost synonymous with such absorptive substances as ceiling tile, fabric covered fiberglass or rockwool, foam and bonded wood fibers. Although absorption is an important ingredient, it is not the only acoustical treatment and for many applications, it may be the wrong one.

The efficiency of an absorbing surface is rated by its absorption coefficient, which indicates the percentage of randomly incident sound it will absorb. An ideal absorbing surface, determined according to ANSI/ASTM standards, has an absorption coefficient of 1.0 for all frequencies in the audible spectrum.

While these random incidence absorption coefficients are very useful for reverberation time calculations, a frequency-dependent directional coefficient—one that indicates the percentage of sound absorbed as a function of the angle of incidence—is needed for reflection calculations. And while there exists an extensive library of *random* incidence absorption coefficients, few *directional* absorption coefficients have been published.

To be effective, absorbing surfaces must

Dr. Peter D'Antonio is president of RPG Diffusor Systems in Largo, MD.

www.americanradiohistory.com

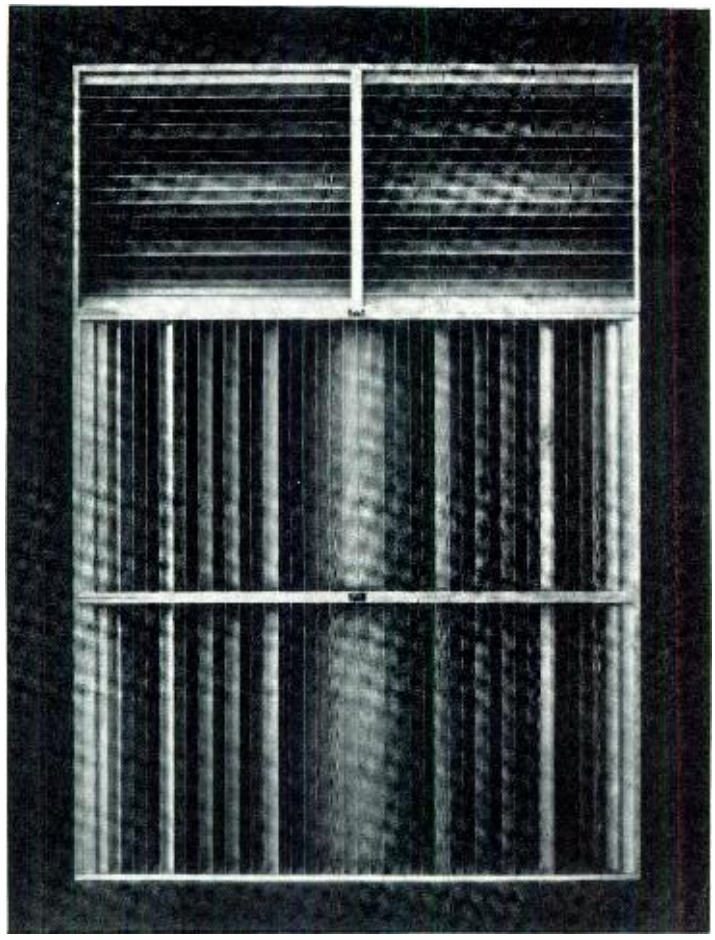


***Figure 3**. A cluster composed of two 4' ×8' QRD-4311 diffusers (lower units) and one QRD-1911 (upper unit). The vertical wells in the lower units provide diffusion in the horizontal plane, while the horizontal wells in the upper unit provide diffusion in the vertical plane.*

RPG Diffusor Systems

RPG Diffusor Systems was founded in 1983 to develop materials that enhance the acoustics of listening and performance spaces. The company's first product was a sound diffuser based on the quadratic-residue sequence called a Reflection Phase Grating, or RPG. This Quadratic-Residue Diffusor (QRD) was developed to improve control room acoustics and to implement an LEDE design approach.

Central to RPG design concept are the reflection-free zone (RFZ)—a wide area surrounding the mix position that is free of early reflections from the side walls—and the creation of a diffuse sound field.

The RFZ is achieved with broadband absorption on speaker boundaries (when room geometry is fixed), or by splaying massive speaker-boundary surfaces that have distributed absorption. The RFZ also contributes to an initial time-delay (ITD), before the onset of reflected energy. The creation of an initial time-delay with the RFZ allows the early-reflection pattern to be sequenced for any arrival time desired, as limited by the distance to the rear wall. (For more information see "Control Room Design" on page 18.) A diffuse sound field is created using QRDs on the rear wall.

The development of the QRD was followed by two complementary products. The Abffusor is a panel that provides both absorption and diffusion. The Triffusor is a rotating prism with absorptive, reflective and diffusive sides to provide variable acoustics.

More recently, a low-frequency diffuser (LFD) was introduced to extend the diffusion bandwidth. It has led to the development of a full-spectrum diffuser called The Wall, combining low-, mid- and high-frequency diffusing elements in one hybrid structure.

operate over a wide range of frequencies and for all angles of incidence. For random incidence, practically all commercially available, porous, absorptive treatments are effective above 500Hz, but to assure low-frequency performance, it is important to verify that the absorption coefficient is approximately 0.8 or higher for frequencies between 125Hz and 500Hz.

It is also important to remember that low-frequency efficiency increases as the depth of the air space behind the porous absorber is increased. If additional low-frequency absorption is required to augment porous absorbers, damped diaphragmatic membrane absorbers, Helmholtz and slot resonators can be used.

Reflection

Flat or curved surfaces that are stiff and massive enough to prevent diaphragmatic absorption and transmission, and that are also many times larger than the wavelength of incident sound, redirect and reflect sound like light from a mirror. (Note in Figure 1 the longer reflected arrow than in the absorptive case.) This mirror-like reflection—where the angle of incidence equals the angle of reflection—is usually referred to as *specular* reflection.

The reason for this directionality is that the interference effects between incoming and outgoing waves are destructive in every direction but the specular one. This is illustrated in the middle row of Figure 1 by a "specular reflection" that is comparable in level to the direct sound, and a spatial response that reveals that reflected sound is oriented in the specular direction (45°).

If the reflecting surface is large and concave, the sound can actually be intensified or focused at certain positions. In general, such surfaces should be avoided when designing a control room. Convex surfaces, on the other hand, are beneficial because they tend to distribute or disperse incident sound throughout a room. To provide broadband reflection, reflecting surfaces need to be both large and non-diaphragmatic.

Diffusion

Diffusion provides for the *uniform* spatial distribution of continuous sound, increases uniformity in the build-up and decay of transient sound, and improves the "liveness" or ratio of reflected to direct sound.

A diffuse sound field exists when sound energy is uniform at all points in a room and there is a high concentration of sound waves propagating in all directions. Diffusion can be increased both by objects within a room that scatter sound waves and by treating room boundaries with

www.americanradiohistory.com

sound diffusing surfaces. Ideally, sound diffusing surfaces do not absorb nor simply reflect sound in a specular direction, but rather scatter it in many directions.

The range of frequencies over which a surface produces diffusion, and the temporal distribution of the sound waves it returns to the room, are also critical. When the distribution is uniform and independent of the direction of incident sound, the sound is considered totally diffuse.

Diffusion occurs when the size of the surface variations are comparable to the wavelength of the incident sound. A diffusive surface does to sound what a frosted lens does to a strong light source. It reduces glare by distributing the light into many directions, minimizing its intensity in any one direction. (Note that room acoustics are generally concerned with reflection rather than transmission, so that the idea of a frosted mirror is really more precise than a frosted lens.)

Limited-bandwidth diffusion

The intricate interiors of cathedrals and "old world" concert halls are generally appointed with statuary, parapets, balustrades, coffered ceilings, loges, balconies, fluted columns, chandeliers, pilasters and other forms of relief ornamentation. Taken together, these elements provide excellent limited-bandwidth diffusion.

Ideally, sound-diffusing surfaces do not absorb nor simply reflect sound in a specular direction, but rather scatter it in many directions.

Limited bandwidth diffusion can be achieved in rooms that do not have surface irregularities, by the non-uniform distribution of sound absorbing surfaces and, at low frequencies, by creating non-uniform impedance through the use of diaphragmatic or resonating panels.

Sound diffusing surfaces should be evaluated for several properties; the uniformity of their spatial response; the bandwidth or range of frequencies over which the spatial response is uniform; the randomness and density of the irregularly spaced frequency domain notches that compose their frequency response; and the density and breadth of their temporal response.

Statuary, for example, scatters primarily high frequencies over a limited angular range—with a limited temporal distribution. Thus, it presents a very beautiful, but costly and limited, diffusing surface.

The frequency response of partially diffusive surfaces is characterized by regularly spaced comb filter notches, as opposed to the dense distribution of the irregularly spaced frequency notches characteristic of totally diffuse reflections. Despite the usefulness of various forms of partially diffuse ornamentation, experimental measurements reveal limitations in the uniformity of the spatial response, the degree of independence to the angle of incidence, the diffusion bandwidth and the temporal density.[1]

Number theory and acoustics

Using number theory (as linked to acoustics by Dr. Manfred R. Schroeder) and modular arithmetic, it is possible to design diffusive surfaces that produce predictable and calculable results.

Such a diffuser consists of the periodic

Our Commitment to Quality

At RADIAN, we believe that professional Compression Drivers must meet high standards:

- **Uncomprised Performance**
  accurate reproduction, low distortion, and high efficiency.
- **High Reliability**
  dependable under the most demanding conditions.

- **Excellent Value for Your Investment**
  Professional performance and reliability are not accidents. They are *deliberately engineered* into every RADIAN product. Innovative designs using superior bonding technology and advanced metallurgical techniques are *standard* in all RADIAN products.

We invite you to examine, compare and prove RADIAN's performance to yourself.

RADIAN
AUDIO ENGINEERING, INC.

162 E. Orangethorpe • Placentia, CA 92670 • 714-961-1213 • FAX: 714-961-0869

Circle (21) on Rapid Facts Card

www.americanradiohistory.com

grouping of an array of wells with equal width, but different depths. The well depths are based on various mathematical sequences. One such sequence is the quadratic-residue sequence discovered by Karl Friederich Gauss in the 18th century, a sequence based on the odd prime numbers, such as 3, 5, 7, 11 and 13. The actual well depths relate sequence values to the longest wavelength for which the diffuser is designed to work efficiently.

The minimum frequency of the diffusive bandwidth is directly proportional to the maximum well depth, while the upper frequency is directly proportional to the number of wells per period and inversely proportional to the well-depth. Thus, an effective broadband, wide-angle diffuser requires a large period, with a large number of deep and narrow wells.

Figure 4. *Custom diffusive rear wall cluster at Whitney Houston's studio. Designed by John Storyk & Associates.*

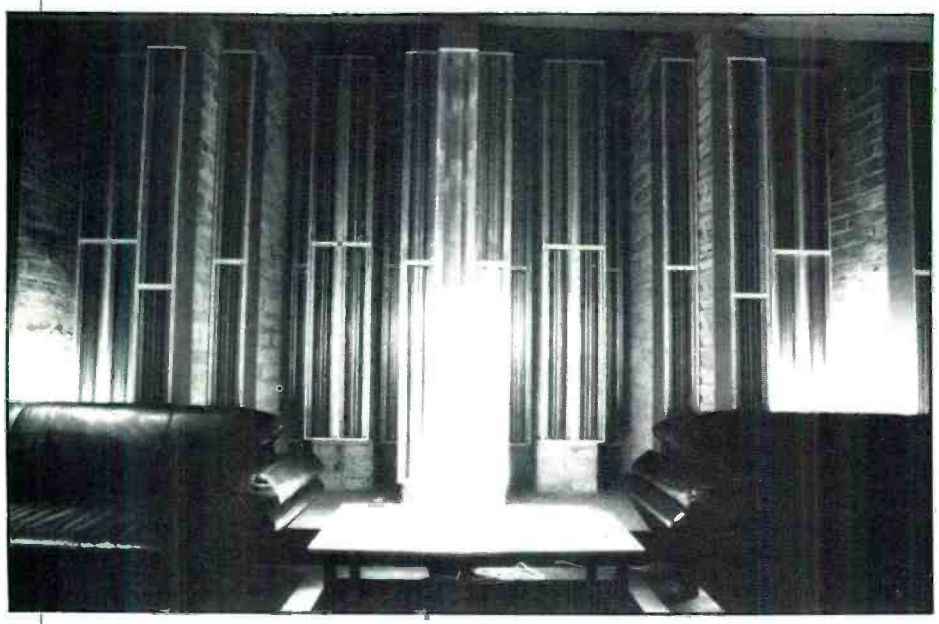


Figure 5. *One of the first installations of the full-spectrum diffuser system, the Wall, at Rhinoceros Studios, Sydney. Designed by Harris-Grant Associates.*

Sound waves, like other waves, can cancel or reinforce each other. The resulting interference is determined by the relative phase of the interfering waves (the relationship between the crest of one wave with respect to another). In acoustics, as with electronics, when two sound waves of equal amplitude and frequency have a 180° difference in phase, cancellation occurs. If the phase difference is a multiple of the full wavelength, there is reinforcement.

In wave interference, it is not the path-length difference that determines the interference pattern, but the *remainder* or residue after the path-length difference is divided by the wave length. In this way, *modular arithmetic* plays a roll in acoustics because it deals with the remainders of quotients, making it a useful tool for accurately determining sound-wave interference patterns.

A surface with well-depths determined by a quadratic-residue sequence provides the appropriate phase shifts to allow constructive interference in all diffraction directions. This is in contrast to the destructive interference that occurs in all but the specular direction when sound is reflected from a flat surface.

The bottom row of Figure 1 illustrates how incoming sound is uniformly backscattered by a diffuser, based on the quadratic-residue sequence. The temporal response illustrates how the depth variations provide dense, diffuse reflections over an appreciable time period compared to the direct sound, and the spatial response illustrates the wide-angle scattering pattern or polar distribution.

Figure 2 shows a comparison of the octave-averaged spatial response between diffusive surface and a flat panel of equal area. At normal (0°) and glancing (45°) angles of incidence, the flat panel behaves specularly, while the diffuser provides a more uniform spatial response over a broad range of frequencies.

Application of the acoustical palette

The objective of a control room/monitoring system is to faithfully reproduce frequency balance and spatial textures or to create, using effects processing, a sonic image with defined spectral distribution and simulated spatial cues. Engineers can't afford to audition material convoluted by the acoustic idiosyncrasies of a room. (For more information, see "Control Room Design" on page 18.)

But in small rooms, such as control

www.americanradiohistory.com

rooms, sound is easily convoluted. The limited number of travel paths prohibit the formation of a diffuse sound field. And because the walls are relatively close, strong primary reflections, comparable in intensity to the direct sound, dominate the early reflection pattern—an effect that is not necessarily desirable. (See "RPG Diffuser Systems" sidebar.) Much progress has been made over the last five years in developing designs that incorporate absorptive, reflective and diffusive surfaces to create the psychoacoustic impression of a large space in a small room.

References:

[1]D'Antonio and Konnert, "The Physical Properties of Sound Diffusing Surfaces," AES preprint 2295, 79th Convention, New York, October 1985.

RE/P

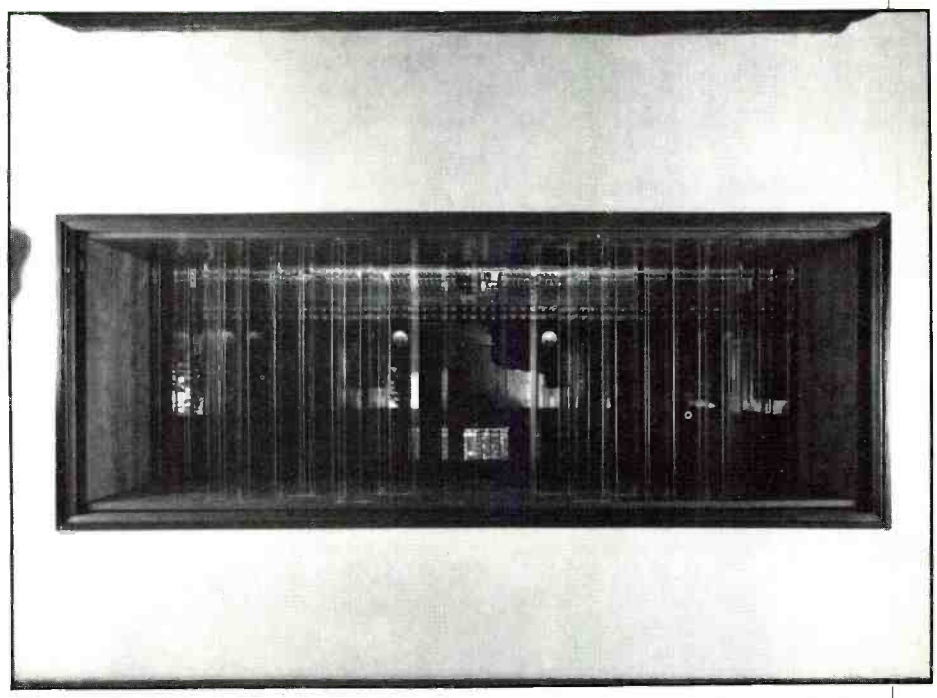
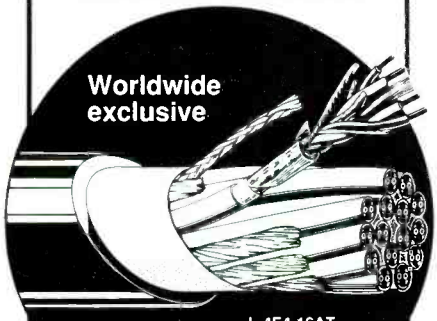


Figure 6. *View through a custom plexiglass diffuser, into the control room at Blue Jay Studios, Carlisle, MA.*

STAR QUAD MULTI-CHANNEL AUDIO CABLE

Worldwide exclusive



L-4E4-16AT

Request full line catalog

- Unique 4 conductor channel design combats RF and EMI noise
- Ideal for studio or stage
- Crosslinked polyethylene and foil shields for Quick and Easy assembly
- >130 dB crosstalk; 2 to 24 channels

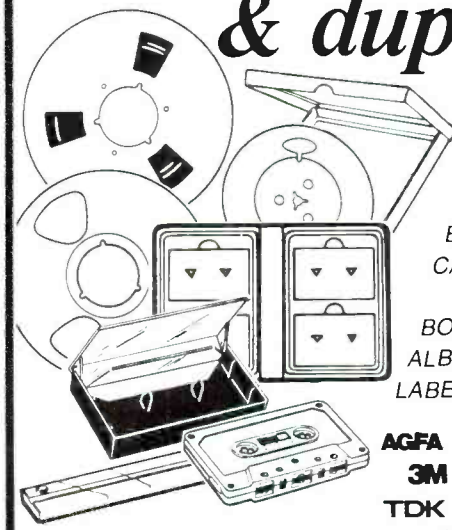
CANARE™

CANARE CABLE, INC.
511 5th. St., Unit G. San Fernando, CA 91340
Phone:(818) 365-2446 FAX:(818) 365-0479

Circle (22) on Rapid Facts Card

Free Catalog of C2

Professional SOUND recording & duplicating SUPPLIES



POLYLINE™ EMPTY REELS & BOXES

BLANKLOADED CASSETTES

BOXES
ALBUMS
LABELS

AGFA AMPEX
3M Scotch
TDK maxell
tapes

now from STOCK in CHICAGO and L.A.

Call Polyline
312/298-5300
8:30 am-5 pm Central Time

Polyline Corp.
1233 Rand Road
Des Plaines, IL 60016

Circle (23) on Rapid Facts Card

www.americanradiohistory.com

Focusrite: A Special Report

By Michael Fay

Does Rupert Neve's design genius mitigate his responsibility for losses suffered by his former console customers?

Rupert Neve has been described as the father of the modern recording console, a design genius. He is also, self-admittedly, "an insufficiently good financial manager."

In October 1987, a press conference at the fall AES convention in New York announced that Neve and his company Focusrite were going to start manufacturing consoles. By the end of January 1989, Focusrite was out of business.

Since that time, *RE/P* has received several inquires regarding the demise of Focusrite, the proposal to resurrect the company under new ownership and management, and the status of deposits for undelivered consoles.

There have been allegations that an element of fraud was involved relative to the handling of the depositors' money. It is wondered how, in good faith, the president of a company could accept a payment in excess of $100,000 less than three months before his company was turned over to a liquidator.

The final deposit, placed by Buddy King, owner of Soundcastle Studios in Los Angeles, was taken during the November 1988 AES show in Los Angeles. At that time, according to King, Neve informed him that the modules for both the Master Rock and Electric Lady consoles were complete, but that shipment was being delayed by the high degree of testing demanded by Focusrite's stringent quality control. It is King's contention that had he not been told the modules were complete, he would not have placed his order.

Michael Fay is editor of *Recording Engineer/Producer*.

www.americanradiohistory.com

In fact, the modules for at least the Electric Lady console were still incomplete the early part of the following year.

The week of May 22, Neve and new Focusrite owner Phil Dudderidge were in New York for the opening of Electric Lady's Studio A. I spoke with them about Focusrite's demise and subsequent rebirth, and also with Electric Lady owner Alan Selby about the steps he took to secure his Focusrite console.

Dudderidge (former owner of Soundcraft) and Neve flatly deny any wrongdoing on the part of the original Focusrite. Neve said that he first realized the company was in financial trouble in December 1988.

"Until that time there were a number of people showing specific interest, and a willing to invest if needed. We didn't have any indication that we wouldn't make it. In fact, right up until the very last day of January, one group had undertaken to put in capital and rescue the company from its then very difficult situation. Only hours later, they changed their minds and abandoned us, which left me with no alternative but to put the company into liquidation."

"There is absolutely no doubt in my mind," Dudderidge said, "that there was no fraud or fraudulent intent in the events leading up to the collapse of the company. I say that without reservation."

In an opening statement, he recounted events as follows: "Focusrite Ltd. was formed by Rupert Neve in 1985. Console development began in 1987, specifically in response to demand from Electric Lady in New York, Master Rock in London and a number of other studio owners who wanted to see the development of another Rupert Neve console.

Rupert Neve has been described as the father of the modern recording console, a design genius.

"In the second half of 1988, there were a number of technical problems in the design process, primarily with the logic design of the console. This held up delivery of the consoles beyond the original target dates. Consequently, the company, with its fairly high overhead, ran into serious financial difficulties—almost concurrent with finishing the first two consoles. Not being able to raise new capital to refinance the company, Neve had to call in a liquidator. That was at the end of January 1989."

"I have only myself to blame," Neve said. "The company's module business was doing well, the order book looked good and there was no reason to think they wouldn't make it. But I underestimated the time it would take to get the logic control circuits operating properly.

"The consoles' audio circuits were already proven techniques. The mechanical packaging was all completed by about May of 1988. We delivered into Master Rock a framework complete with its front panels and all the lights on—everything looking like a console, only without the electronics inside.

"During that time, we incurred enormously high costs as we threw more and more money into the project to speed up the design process. We were also buying parts for consoles that were on order, building up inventory that had to be paid for. We had a good, viable design by October. But then we had to get our new staff recruited—operators to build and some very high caliber engineers for testing.

RECORDABLE DAT's
IN STOCK NOW

HOME D.A.T.		PORTABLE D.A.T.	
AIWA XD-999	995	SONY TCD-D10	2250
SONY DTC-M100	1400	Includes all factory accessories	
SONY DTC-300ES	1650		
SONY DTC-500ES	1750	PROFESSIONAL D.A.T.	
SONY DTC-1000ES	1950	PANASONIC SV-3500	CALL
JVC XD-Z700	1750	PANASONIC SV-250	CALL
JVC XD-Z1100	1850	FOSTEX D-20	CALL
JVC XD-Z900	2250	SHARP SX-D100	CALL
AKAI D-9000	1800	SONY PCM-2500	CALL
PIONEER D-900	1800	SONY PCM-2000	CALL

BLANK TAPE – ALWAYS IN STOCK
Maxell, TDK, Fuji, Panasonic
COMPLETE INVENTORY OF ACCESSORIES

FULL WRITTEN WARRANTY PLUS FREE LOANERS
IMMEDIATE DELIVERY
NO DEPOSITS REQUIRED
ENGLISH OWNERS MANUALS
A/C ADAPTORS INCLUDED

9 A.M. – 7 P.M. 7 DAYS
AMEX • VISA • MC SHIP VIA UPS/FED-EX
(213) 828-6487 FAX (213) 470-6176

The DAT Digital Audio Tape STORE
2624 Wilshire Blvd. Santa Monica CA 90403

Circle (24) on Rapid Facts Card

Francis Daniel
ACOUSTICIAN

I'm looking for a few good clients. If you're building or upgrading a studio, you're looking for a very good acoustical consultant. Call me.

201 West 89th Street
New York, NY 10024
212-874-0590

Circle (25) on Rapid Facts Card

www.americanradiohistory.com

Photo 2. *Rupert Neve, Phil Dudderidge and Alan Selby (left to right) at Electric Lady, New York, with the first Focusrite Forte console in the United States.*

The learning curves involved were not conducive to rapid production of the console.

"I was not doing anything different from what I had been doing for years. I didn't really go wrong in the financial sphere, it's just that the development of the logic and control side of the console went out of control. In retrospect, there should have been an operations manager."

Interestingly, Focusrite's then-financial director, Harry Norris, lives in Canada. Neve said, "I suppose that was one of our problems. He was not in England a great deal, so the financial responsibilities fell on my shoulders."

At the same time, the company had no operations director or other such person to relieve Neve of the day-to-day management responsibilities. Dudderidge said, "In my opinion there should have been such a person. There was a management accountant, but I don't feel that he was on top of the situation.

"What clearly happened was that, because of the problems in the final stage of the development project that were not budgeted for and the other overhead involved in building the first console, things started getting out of control. Rupert's attention was divided between resolving the engineering problems and negotiating with proposed investors.

"There was a company that was firmly intending to acquire the business and prevent it from its ultimate fate. After giving Rupert verbal assurances that they were going to buy Focusrite, they then revoked it. That's when Rupert had to call in the liquidator."

The new Focusrite

Dudderidge acquired all Focusrite assets on March 31, 1989, including the name, good will, designs, all tangible assets, all copyrights and intellectual property. The reorganized company will be called Focusrite Audio Engineering Ltd., and Dudderidge plans to continue both the console and module businesses.

"...there were a number of technical problems in the design process, primarily with the logic design of the console."

Neve said that Dudderidge was the only person seeking the company who indicated he would take action to appease those people who had deposits on consoles they hadn't received. Still, the new company assumes none of the debts of the old.

Deposits made on consoles prior to the liquidation will not be honored as such. But Dudderidge said once their costing operation is complete (about two weeks from the time of this interview, according to Dudderidge), they plan "to negotiate with each of the depositors to arrange special concessionary prices that will take into account the magnitude of their losses."

"I have been in contact with those customers for a couple of months now, and we are quite prepared, in order to maintain or restore goodwill, to work on those consoles on a break-even basis."

There has been concern from some quarters regarding the time it is taking for Dudderidge to announce a new pricing structure for the console. In response, he said, "Eight weeks really isn't a lot of time to pick up the pieces and assimilate everything. We've had to acquire new premises and build up a management staff. It's also taking time to get competitive quotes on parts from the vendors.

"We hope to be able to ship two consoles in the last four months of this year. After that, we anticipate being able to produce one console per month. We are budgeting to build a maximum of 12 consoles in 1990. I don't want the company to be under a burden to produce an unrealistic number of consoles."

To reduce labor costs, Dudderidge is looking at ways to assemble the console faster, but he is not planning to change or eliminate any components. "All modules and consoles will continue to be built to Rupert's specs, without compromise. Nothing will be abandoned to save on costs," he said.

Neve will continue with Focusrite on a consulting basis. "I'm giving them every support on the technical aspects of the product and quality control."

"There will be certificates issued with the consoles," Dudderidge said, "indicating that Rupert is satisfied with every aspect of the audio quality of product."

At the same time, a recent press announcement indicated that Neve will be joining Amek. Both Neve and Dudderidge acknowledged that Neve will also be assuming the position of consultant for Amek, but stressed that his work with Amek (potentially a direct competitor), will in no way compete with his work for Focusrite.

"Phil has my total support," Neve said, "for as long as it takes and for as much effort as it takes to produce the consoles for the disappointed customers that I have let down. That is my top priority, and nothing else gets in the way of that.

"I've made that very clear to Amek. They are not making any demands that will conflict with that. What I'm doing with Amek is an entirely separate operation.

www.americanradiohistory.com

We will not be competing directly with Focusrite products. There will be no plagiarism or imitation."

The management team for the new Focusrite consists of Dudderidge, technical and commercial (financial) director John Strudwick and development director Richard Salter.

Focusrite U.S., the company's American distributor, is changing its name to Sonic Image Ltd., though the relationship between the two companies will remain the same. "We expect to recommence shipment of the model 110 modules from England this week," Dudderidge said.

The Electric Lady console

At present, there are two Focusrite consoles in operation, one at Master Rock and one at Electric Lady. Alan Selby first ordered the one for Studio A in October 1987. The original target date for shipment was September 1988, but the console was not completely installed until February of 1989.

"There are a lot of things I would have done differently. I'm in turmoil for the way I've let people down."

"When I heard the company had some problems," Selby said, "my father, who has a background in manufacturing, went over to the factory. With his help and the help of Rupert and people at the factory, they got it out."

When asked how the production delays had affected his studio, Selby said the impact was unknown. "My room has been in the process of being renovated for the past two years, and the room was still being renovated when the console arrived. Right now the console is in, fully commissioned and working properly—including software."

Selby made a point of saying that if he knew then what he knows now, he would do it all over again.

"This product is the Rolls Royce of the industry. Nothing comes near it, and I plan to replace my other consoles with Focusrites."

Whether or not Selby is just putting a good face on things is up for debate. Before automation, the 64-input console ended up costing roughly $450,000. Also, the Electric Lady console doesn't have the reset capability that was part of the design plan.

Selby said, "The console was never planned to have reset." And Dudderidge concurred, saying that resetability was never part of the original design specification.

But in a February 1988 interview with *RE/P*, Neve said about Selby's console, "All the assignment switching on the console (the buss track assignments, aux assignments, the monitor and main path, and the EQ) and the status of the console can be reset. It's a 'smart' reset that follows the mix via SMPTE time code."

Certainly, questions remain, an important one being whether or not an equitable settlement will be reached with those facilities that have outstanding deposits.

At one point during the conversation Neve said, "There are a lot of things I would have done differently. I'm in turmoil for the way I've let people down."

RE/P

—Great!—

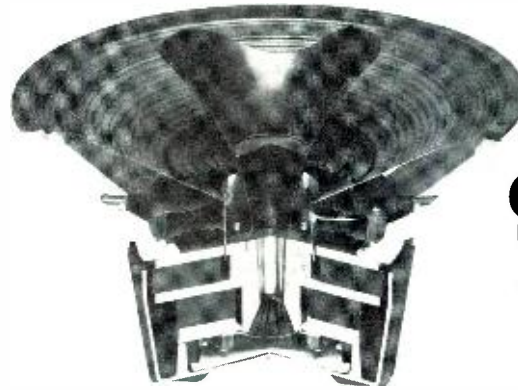
What People Say When They Hear A Gauss Coaxial.

And what they say when they see how a Gauss coaxial loudspeaker is made. What you will say when you hear one coasting along at *200 watts rms.*

They were designed to *perform* at their rated power of 200 wrms... not just survive. Since they were designed to replace the tired old coax used in recording studios, they are extremely clean and distortion free even when played at high levels.

The majority of Gauss coaxials are not only sold for use in studios... they go into installations with even more demand for clean power and reliability... discos (yes they're still around and doing well), convention centers, auditoriums, restaurants, and anywhere true high fidelity sound is needed.

When your application calls for the versatility of a coax, check out the full line of Gauss coaxial loudspeakers. No other coax can compare for power handling, reliability and performance.



gauss

a MARK IV company

9130 Glenoaks Blvd.

Sun Valley, CA 91352

(213) 875-1900

Circle (26) on Rapid Facts Card

www.americanradiohistory.com

ENGINEER/PRODUCER INDEX

A

Gary Arnold (E/P): 295 Madison Ave., New York, NY 10018; 212-683-6854. **Credits:** BBDO/Diet Pepsi (CP-TV), Board Room (Superdupe); The Shrams (MP-A), The Shrams (Superdupe); CBS Sports (CP-TV), Weekly TV Promos (Superdupe); Big Time Productions (CP/MP-R/TV), I Love New York Campaign (Superdupe); MCK (CP-R), English Leather (Superdupe).

Brian Ascenzo (E/P): 13712 Ascot Drive, Sterling Heights, MI 48077; 313-977-7375. **Credits:** The You Band (MP-S), Up (Miller MIDI Productions); Ameer the Merciless (MP-S), A Day Without a Rhyme (Miller MIDI Productions); Toua Lee (MP-A), Toua Lee (Miller MIDI Productions); X-Tra Cut Recording (MP-S), That's the Way/I Take Command (Miller MIDI Productions); Oneida Records (MP-S), Tekno White House (Miller MIDI Productions).

B

Bob Blank (E): 1597 Hope St., Stamford, CT 06907; 203-968-2420. **Credits:** Elias Production/TM Network (MP-SR), TM Network Greatest Hits (Soundtrack); Elias Productions (PP-F), Far From Home soundtrack (Vision Sound); Sunday Productions/Buick BBDO TV 30 (CP-TV), Buick TV International (Blank Productions); Lower Level Records/Dark Side (MP-SR), Gimme the Music II (Blank Productions); Profile Records/Chanelle (MP-S), One Man (Blank Productions).

Tom Blessing IV (E/P): 294 Helen Ave., Xenia, OH 45385; 513-372-9341. **Credits:** PriceWeber Marketing Communications Inc. (CI-TV) (NCR Cambridge location shoot/PriceWeber); PriceWeber Marketing Communications (CI-TV), Awards (NCR Photo Studio/PriceWeber); WKEF-TV Dayton (CP-TV), various projects (WKEF-TV); Dick Clark/KOST Radio (PP/CP-R), Rock, Roll & Remember/Countdown America (KFI-KSOT Radio); Top 30 USA with MG Kelly/KSOT (PP/CP-R), Top 30 USA (KFI-KOST Radio).

Russell Bracher (E): 6328 Radford, North Hollywood, CA 91606; 818-761-6047. **Credits:** Kaho Shimada (MP-A), Kaho Shimada (Kren Studios); Paulo Ramos (MP-A), Paulo Ramos Band (Kren Studios); The Fly II (PP-F), The Fly II (Kren Studios); Paula Abdul (MP/PP-A/MV), Paula Abdul (Kren Studios); Jeffrey Steele (MP-A), Jeffrey Steele (Kren Studios).

Zane Eric Brown (E/P): 455 Massieville Road, Chillicothe, OH 45601; 614-663-2544/800-848-9900. **Credits:** 63 Eyes (MP-A), Gravel (Recording Workshop); Mr. Lucky (MP-A) (Recording Workshop); Roulette (MP-AT) (Recording Workshop); Alex 6 (MP-AT/AR) (Recording Workshop).

Jeff Brugger (E/P): 1157 Briar Cliff Road NE, Atlanta, GA 30306; 404-875-0215. **Credits:** Godfrey Burks (MP-AT), Childlike Faith/They See You (Doppler Studios); Eddie Horst (CP/MP-TV), WAGA, Sun Bank (Soundscape); O'Conner-Burnham (PP-CI), Coca-Cola/AT&T (Soundscape); Jerry McGrath (MP-A) (12 Oaks); Cathie Knight (MP-A), Out of a Grateful Heart (12 Oaks).

C

Jasper A. Cecil (E/P): Box 37329, Overport, Durban, 4067, South Africa; 031 578 2136. **Credits:** Note Well (MP-A), Note Well; Coss (CP-TV), Music vs. Art; Eden Joshua (MP/PP-A/AT/AR), The JFR Project; Melvin Peters (MP-AR); Cartoum Productions (MP-AT), Bombay Duck Take 2.

Chris Columby (E/P): 3017 Santa Monica Blvd., #316, Santa Monica, CA 90404; 818-980-0857. **Credits:** James McNicol (MP-AT), Secret Service Band (AudioWorks/Starworks/Post Logic); G. Dozier/Pop Jam/Glenn & Ilee (MP-AT), Pop Jam/Glenn & Ilee (Audioworks/Starworks); Sly Stone (MP-AT), Touch the Sky/Ace in the Hole (Starworks/Audioworks); Johnny Graham (MP-AT), Johnny Graham Band (Starworks/Audioworks), Chris Columbus (MP-AT), Ship of Fools (Audioworks/Post Logic).

Warren Croyle (E/P): 415 Riverdale, Glendale, CA 91204; 818-241-6921. **Credits:** Hiroshima (MP-A) (Sunset Sound Factory); Trip Trigger (MP-AT) (Take One/SDR); Flame Fortune/Polygram (MP-A), Dreamtime (Take One/SDR); Caroline Records/Uncle Slam (MP-A) (Music Grinder); Dionysus Records/Yard Trauma (MP-A), Face to Face (Beachwood Recorders).

D

Paul deBerjeois (E/P): 173 Greta St., New Braunfels, TX 78130; 512-629-4035. **Credits:** Southern Breeze Band (MP-S), Little or None (Spareroom Productions); TopView (MP-A), Eclipse (Spareroom Productions); Amy Duncan (MP-AT), Beginnings (Spareroom Productions); Detex Corporation (PP-CI), Security Hardware 1988 (Spareroom Productions).

Edward N. Dukstein (E): 309 N. Jefferson Ave., Canonsburg, PA 15317; 412-745-0919. **Credits:** Red Bull Inn (CP-R), Red Bull Inn (Aircraft Recording Studios); Tim Stevens/Leonard Johnson (MP-A), Thinking of Love (Aircraft Recording Studios); David Werner (MP-A), David Werner (Aircraft Recording Studios); The Meadows (CP-R), New Big League Sport in Town (Aircraft Recording Studios); Frank Capelli (MP-A), The PLUS Song (Aircraft Recording Studios).

E

Perry Emge (E/P): 1723 N. Ballas Road, St. Louis, MO 63131; 314-965-9347. **Credits:** Dougg Franks (MP-A), Never Unpack (Icon Studio); Dharma Bombs (MP-A), Rock in the Pagoda (Icon Studio); Wobblies (MP-A), The Wobblies (Icon Studio); Washington University School of Medicine (PP-CI), History/Admissions (Icon Studio); Design Network (PP-CI), The Premier Plan (Technisonic).

Jim Ervin (P): 29836 W. Rainbow Crest Drive, Agoura Hills, CA 91301; 818-715-2268. **Credits:** Baby Dica Inc. (PP-F), Commando Girls (Genetic Music).

G

Larry Gold (E): 20 Broadway, Toledo, OH 43602; 419-255-6606. **Credits:** Blue Suit Records/Honeyboy Edwards (MP-A), White Windows (Larry Gold Studios); Blue Suit Records/Griswold Bros. & Big Jack Reynolds (MP-AR), Two Aces and a Jack (Sub Station 8); Big Jack Reynolds (MP-S), You Better Leave That Woman Alone (Larry Gold Studios).

Scott Gordon (E/P): Box 791, Paramus, NJ 07653-0791; 201-967-9765. **Credits:** Floyd Vivino (CP-R), The Italian-American Serenade (Scott Gordon Enterprises); Colavita Pasta and Olive Oil Co. (CP-R), The Colavita Music Hour (Scott Gordon Enterprises); Pete Melegari (CP-TV), Uncle Floyd Live (Roman Gardens [live mix]); Launch Restaurant (CP-TV), The Uncle Floyd Show—In Person (Harp & Bard Pub [live mix]).

Kathy Gray (E): c/o Crawford Post Production, 535 Plasamour Drive, Atlanta, GA 30324; 404-876-7149. **Credits:** Turner Entertainment (PP-F), The Making of a Legend: Gone With the Wind (Crawford Post Production); Turner Broadcasting (PP-F), Without Borders (Crawford Post Production); Turner Broadcasting (PP-F), Larry King's Night of Soviet Television (Crawford Post Production).

Adam Green (E/P): 425 S. Pine, Richmond, VA 23220; 804-344-8151. **Credits:** Alter-Natives (MP-A), Alter-Natives (Floodzone); Gwar (MP-S/MV), Stupid White Chick (Floodzone); Always August (MP-AR), Geography (Radio-Active Audio); Alter-Natives (MP-A), Group Therapy (Radio-Active Audio); Burma Jam (MP-S), Burma Jam (Living Room II/Floodzone).

H

R. Alan Henry (E): Box 1863, New York, NY 10025; 212-662-1765. **Credits:** Konektor Entertainment/Teresa Davis (MP-A), In a Single Moment (Evergreen Recording/Soundworks); Konektor Entertainment/Slingshot (PP-F), Slingshot (Manhattan recording/Sigma Sound/The Carriage House/Todd AO); Konektor Entertainment/Slingshot (MP-A), Slingshot Soundtrack (Sigma Sound/Carriage House/Manhattan Recording); Upsidedown Theatre

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

Title Codes:
E (Engineer); P (Producer); E/P (Engineer/Producer).

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

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

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

www.americanradiohistory.com

Co./Upside Down (PP-F), Upside Down (Sync Sound); Upside Down Theatre Co./Upside Down (MP-A). Upside Down Soundtrack (Evergreen Recording/Normandy Sound).

David Hewitt (E): Box 334, Lahaska, PA 18931; 215-794-5005. **Credits:** Pink Floyd (MP-A), The Delicate Sound of Thunder (Remote Recording Services); U-2 (MP-A). Rattle & Hum (Remote Recording Services).

Chriss Hoffman (E): 644 Galapago St., Denver, CO 80204. **Credits:** Kawai Music/Rob Mullins (TV). An Evening With Rob Mullins (Live, Denver Interconnect).

Joe Hostletter (E): 1140 Boylston St., Boston, MA 02215; 617-266-1400. **Credits:** Wayne Naus Big Band (MP-A), Big Band Express (Berklee Studio A&B); Mili Bermejo (MP-A). Homecoming (Berklee Studio A); Hal Crook (MP-A). XO (Berklee Studio A).

Keidi Howard (P): Box 40222, Long Beach, CA 90804; 213-433-6195. **Credits:** Keidi (MP-S). I Can Hear It Calling (Pacifique Studios); The Superiors (MP-A), The Superiors (Pacifique); Jumbalaya (MP-S), The Godz Must Be Crazy (Home Front Studio); Ti Marie (MP-S), Who Needs Boys? (Picki Music Studio); Jumbalaya (MP-A), Walking on Sunshine (Home Front Studio).

Jay Hudson (E/P): 1211 W. Eighth St., #115, Austin, TX 78703; 512-477-1002. **Credits:** Evan Johns & H-Bombs (MP-A), Please Mr. Santa (Lone Star Recording/Europa Sound Center/Hudley Hilton Recording Spa); Jeff Anderson (MP-A). El Jefe (Firestation Studios/Austin Recording Studio/Arlyn Studio/Lone Star Recording); Teddy and Talltops (MP-AT). Take Your Time (Lone Star Recording); Gene Ryder (MP-AT), Feels Like a Gun (Studio D); Evan Johns & H-Bombs (MP-AT), Bombs Away (Lone Star Recording/Europa Sound Center).

I

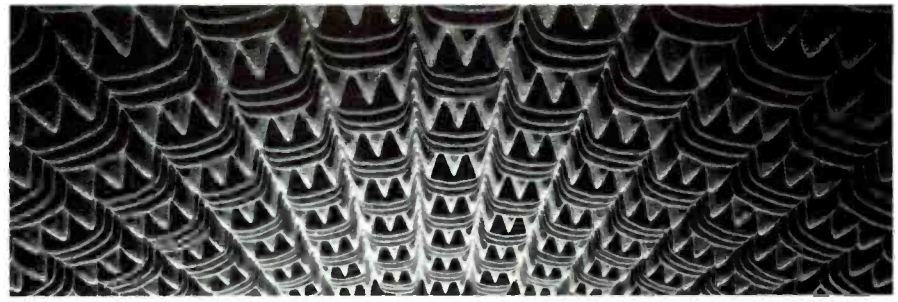
Rande Isabella (E/P): c/o Artasia Music Productions, 73-373 Country Club Drive, Suite 702, Palm Desert, CA 92260; 619-340-4027. **Credits:** Mike Whitehead & Kid Tarri (MP-A), The Rage (A&R Recording); Norwest Mortgage (CP-R), Jingle (A&R Recording); Jon Kodi (MP-A), Tailor Made (A&R Recording); Artasia Music Productions (MP-R), Jingle/TV Theme Demo (Artasia Music Productions); Tyt Fitt (MP-AT). Tyt Fitt (Various).

K

Rick Kennell (E/P): Full Circle Productions, Box 122, Millwood, NY 10546; 914-762-8670. **Credits:** Leah Waybright (MP-AT), Haunted Heart (Powersurge Recording).

Joseph D. Kotyuk (E/P): 6920 W. Lake Road, Fairview, PA 16415; 814-474-1032. **Credits:** Hurtin' Puppies (MP-A), Lazy Weekend (Hatch Recording Studio); Sidewalk Cafe (MP-S), Down n' Drunk (Hatch Recording Studio); Jiggers (MP-S), Same Pain (Hatch Recording Studio).

John Kusiak (E): 25 Huntington Ave., Boston, MA 02146; 617-262-9289. **Credits:** National Geographic

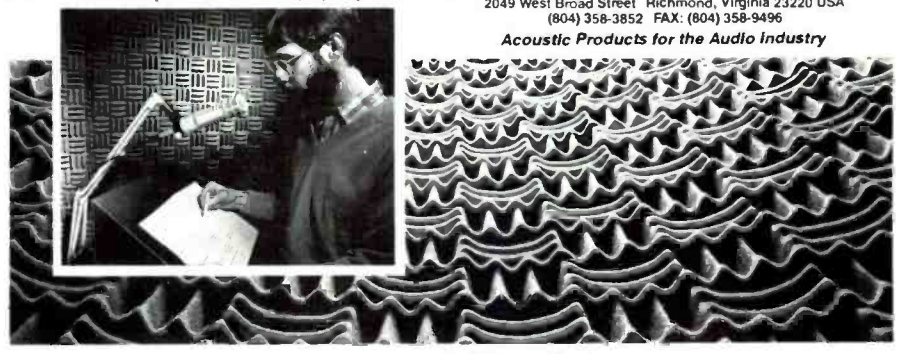


SONEX CONTROLS SOUND.

With its patented anechoic foam wedge, SONEX absorbs and diffuses unwanted sound in your studio. And it can effectively replace traditional acoustic materials at a fraction of the cost. SONEX blends with almost any pro audio decor and looks clean, sharp, professional. Check into this attractive alternative for sound control. Call or write us for all the facts and prices.

SONEX is manufactured by Illbruck and distributed exclusively to the pro sound industry by Alpha Audio.

Alpha Audio. Acoustics
2049 West Broad Street Richmond, Virginia 23220 USA
(804) 358-3852 FAX: (804) 358-9496
Acoustic Products for the Audio Industry



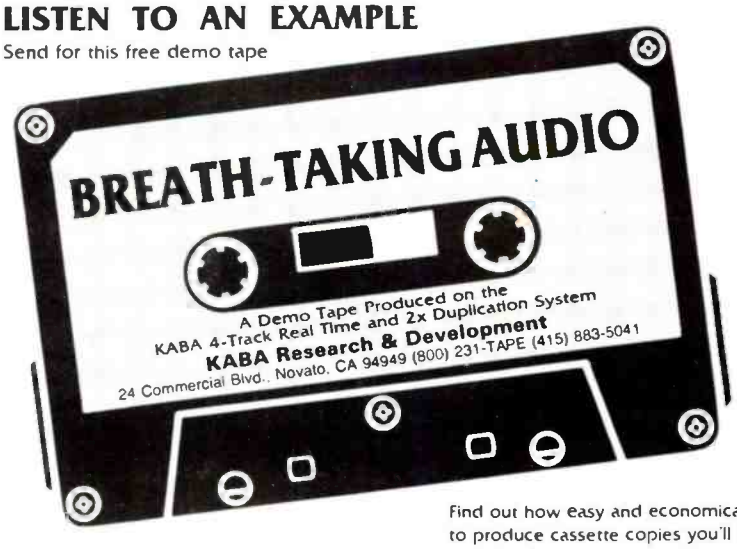
Circle (27) on Rapid Facts Card

KABA AUDIOPHILE DUPLICATION SYSTEM

recreates what was on your final mix down the way you want it heard.

LISTEN TO AN EXAMPLE

Send for this free demo tape



Find out how easy and economical it is to produce cassette copies you'll be proud to have carry your name.

KABA R&D

Toll-Free **800-231-TAPE**

From California **(415) 883-5041**

KABA Research & Development 24 Commercial Blvd., Suite E, Novato, CA 94949

Circle (28) on Rapid Facts Card

www.americanradiohistory.com

ENGINEER/PRODUCER INDEX

Society (MP), Centennial Gala (Silver Linings); Lotus Development (MP), Magellan video (Silver Linings);, Massachussetts Lottery Commission (CP-TV), Aces High jingle (Silver Linings).

L

Bruce P. Leland (E/P): 8088 N. 15th Ave., Phoenix, AZ 85021; 602-870-0351. **Credits:** Dale Lamphear (MP-AT), Waited Too Long, A Little Romance (BPL's Banjo Brass Studio); Dan "Igor" Glen (MP-AT), Igor's Cowboy Jazz Band—Beautiful Life (BPL's Banjo Brass Studio); Jeff Dayton (MP-AT), Carrie (BPL's Banjo Brass Studio); Kevin McCleary (MP-A), Songs of Ireland (BPL's Banjo Brass Studio); Donald Cleary (MP-A), I'd Rather Have Jesus (BPL's Banjo Brass Studio).

Ira Leslie (E): 6348 Longview Ave., Los Angeles, CA 90068; 213-463-3558. **Credits:** Star Search Music (MP-TV) (Interlock Studios); The Arthur Co. (PP-TV), The Munsters Today (Studio Management Services); ABC (PP-TV), Ghostbusters/Pritzi's Honor/View to a Kill/Beverly Hills Cop (Sunwest Studios); Bob Stivers & Associates (PP-TV), 12th Annual Circus of the Stars (Sunwest Studios); Riva Records (MP-A), John Cougar (Cherokee Studios).

S.C. Lewanowicz (P): Box 49464, Atlanta, GA 30359; 404-995-5625. **Credits:** K.C. Steele/SCL Productions (MP/PP-S/MV), K.C. Steele's Videotomy (The Music Machine/New Age Sight & Sound); SCL Productions (PP-F), Weapons of War (The Music Machine); SCL Productions (PP-F), American Mercenaries (The Music Machine).

Frank Lizarraga (P): 3121 29th Ave., Sacramento, CA 95820; 916-456-2289. **Credits:** Juan Alejandro (MP-A), Juan Alejandro/El Agente Doble (Studio C).

M

Dan Mockensturm (E): 652 Kenwick Circle, #205, Casselberry, FL 32707; 407-339-6374. **Credits:** Mark Birtles (MP-S), Demos (Full Sail Synclavier #2); Don Hughes (PP-CI), :30 Spots (Full Sail Synclavier #2); Self-Project (MP-S), Indonesia (Downtown Recorders); Al DiMeola (MP-S), Pre-production (Noonzio's).

Mike Murphy (E/P): 5013 Cartier, New Orleans, LA 70122; 504-282-8811/945-2307. **Credits:** The Murmurs (MP-A), Shhh... (Srumrum Studio); Woodenhead (MP-A), Heartprints (Composers Recording Studio); Percussion Incorporated (MP-A), Windswept (Composers Recording Studio); Jasmine (MP-A), Softly Strong (Composers Recording Studio); Patrice Fisher (MP-A), Singers (Composers Recording Studio).

Anthony S. Murray (E/P): 59 Old Mamaroneck Road, Suite A, White Plains, NY 10601; 914-761-5718. **Credits:** Dennis/Antiqua Productions (MP-A), Just Dennis (Antiqua Sound); Antiqua Records/Timmy Hunter (MP-A), Slammin' (Antiqua Sound); Shenniquia/Antiqua Records (MP-A), Sunset Blue (Chaz 17, Antiqua Sound); Chipmarr Records/Friends (MP-AT), Seek Ye First (Squire Studios, Suite 28); D'Groove/Antiqua Productions (MP-S), Red Light Interlude (IAN London, Squire Studio).

R

Denzil Richards (E): 300 Winthrop Ave., #105, New Haven, CT 06511; 203-777-6437. **Credits:** Aphrodisiac (MP-S).

Anthony L. Roberts (E/P): 163 Amsterdam Ave., #115, New York, NY 10023; 212-459-4802. **Credits:** Victor Wail (MP-A), Suviendo Alto; Lerroy Gittens (MP-A), El Chico de Panama; Orquesta la Nueva Onda (MP-A), La Nueva Onda del Merengue/Falso Fue Tu Amor; Los Diplomaticos del Merengue (MP-S), Es Pescado; Benny Sabel El Casique (MP-S), Sin Despedirme.

Ed Roscetti (P): 6441 Bellaire Ave., N. Hollywood, CA 91606; 818-508-5882. **Credits:** Sheffield Lab Records/Clair Marlo (MP-AT), Let It Go (Schnee Studios).

S

Bill Smith (E): 295 Madison Ave., New York, NY 11791; 212-683-6854. **Credits:** Atlantic Records (CP-TV), KIX TV Spot (Superdupe); DDB/Needham (CP-R), Amtrak Spot (Superdupe); Polygram Records (CP-R), Siren (Superdupe).

Steve Sutphen (E/P): 28720 Canwood St., #203, Agoura Hills, CA 91301; 818-889-1575. **Credits:** Jason Skeleton (MP-S), Scream (Valley of the Sun); BLU (MP-S), Deepest Blu (Valley of the Sun); Dick Sutphen (CP), RX Series (Valley of the Sun); Dick Sutphen (PP-CI), Astral Projection/Auto. Writing (ITV, Video It, Valley of the Sun).

T

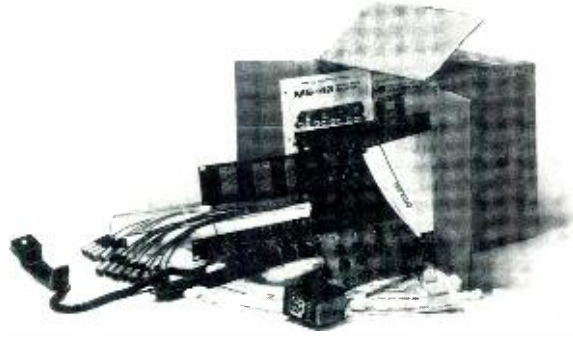
Lucky Tomblin (P): 224 N. Guadalupe St., San Marcos, TX 78666; 512-396-1144. **Credits:** John Legg (MP-A), John Legg (Fire Station Studios); The Nelsons (MP-A), The Nelsons (Fire Station Studios); Doug Sahm (MP-A), Juke Box Music (Fire Station Studios); Six AM (MP0-AT), Introducing Six AM (Fire Station Studios); Lucky and the Others (MP-A), 13th Millenia (Riverside Sound).

Mike Triay (P): 1801 SW 99th Ave., Miami, FL 33165; 305-223-3713. **Credits:** Teaz 2 Pleaz (MP-S), I Want U (Midland); Mask-R-Ade (MP-S), Where Are You Now? (Studio Z/Midiland), Hot 2 Trot (MP-S), Stop Playing (Studio Z/Midiland).

RE/P

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

Installable Audio Interconnect Solutions Right Now



The Pro Co Solution Package

It is always the "unknown" in every project that eats up your time and profits. The solution to the "unknown in audio interconnect is to use the expertise of Pro Co.

Working with you in the early stages of your project, our engineers will help you anticipate and solve your cabling problems. We can help eliminate your worries about the "unknown".

We can meet your time schedules and guarantee your cabling costs with a custom quote on all your audio cabling needs.

We provide documentation drawings that will simplify your task and provide your customer with the history of how it was done.

Solving your cabling problems is our business. Let us show you how the Pro Co package can be a profitable solution for you.

PRO CO

135 E. Kalamazoo Ave., Kalamazoo, MI 49007

1-800-253-7360

Circle (29) on Rapid Facts Card

www.americanradiohistory.com

www.americanradiohistory.com

TRACKS

A

AKR Studio: 4313 Valley Fair, Simi Valley, CA 93063; 805-527-4479; Dan Clements, chief engineer. **Credits:** The 1989 Mrs. World Pageant (CP-TV), The 1989 Mrs. World Pageant (RE/ME: Dan Clements); ASAP Family Treatment (CP-R), The Letter (RE/ME: Dan Clements); Zygon Corporation (PP-CI), UHra Mediation III (RE/ME: Dan Clements).

A Place of Praise: 2500 E. Vancouver, Broken Arrow, OK 74014; 918-355-3020; Bruce Dinehart, owner. **Credits:** CITGO Petroleum Co. (CP-TV), Las Vegas Now (RE/ME: Steve Merkel); Oklahoma Natural Gas (PP-CI), CNG-The Fuel of the Future (RE/ME: Bruce Dinehart); MAPCO Inc. (CP-R/TV), Warm Up Your World (RE: Bruce Dinehart; ME: Kris Carter, Bruce Dinehart).

Audio Arts Recording: 5811 NW 201 Lane, Miami, FL 33015; 305-625-0143; James Knight, owner. **Credits:** Univision Television Network (PP-TV), Calle Ocho—Maria Conchita Alonso (RE/ME: Jorge Pacheco; AE: James Knight).

B

Blank Productions: 1597 Hope St., Stamford, CT 06907; 203-968-2420; Bob Blank, owner. **Credits:** Twinsun Music (PP-CI), Metropolitan Life Show (RE/ME: Bob Blank; AE: Kristin Stone); Sunday Productions (CP-TV), Buick Opel TV Campaign (RE: Bob Blank/Kristin Stone; ME: Bob Blank); Atlantic Records (PP-MV), Now or Never release (RE/ME: Bob Blank; AE: Kristin Stone); American Ballroom Theatre (PP-CI), Joyce Theatre Show (RE/ME: Bob Blank); Coombe Music (CP-TV), TV Theme (RE: Bob Blank; AE: Kristin Stone).

Body Electric Studios Inc.: Box 1491, Bolingbrook, IL 60439; 312-759-9311; Tim Collins, studio manager. **Credits:** AT&T (PP-CI), Metro Digital Transition (RE/ME: Brian Basilico; AE: Bruce Dickert); Scott Thomas Productions (CP-R), St. Margret's Hospital (RE/ME: Brian Basilico; AE: Bruce Dickert); Video Network (CP-TV), Crazy Eddie (RE: Brian Basilico/Tim Collins; ME: Brian Basilico; AE: Tim Collins); Scott Thomas Production (CP-R), Tools Unlimited (RE/ME: Brian Basilico); MPI Home Video (PP-CI), Story of the Tank (RE/ME: Brian Basilico; AE: Tim Collins).

Key

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

Codes

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

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

C

Cedar Crest Studio: Box 28, Highway 5 N., Mountain Home, AR 72653; 501-425-9377; Bob Ketchum, owner. **Credits:** Dime-A-Dozen Music (BMI) (CP-R), Paperkid (RE/ME: Bob Ketchum; AE: Dave Gash); Denise Summy (MP-R), To You (RE/ME: Bob Ketchum; AE: Jeff Miller); Cadillac Wheels (PP-MV), I've Always Been Crazy (RE/ME: Bob Ketchum; AE: Susan Ketchum, Dave Gash); Arkansas State Police (CP-TV), Newton's Law (RE: Bob Ketchum; AE: Susan Ketchum); Baxter Healthcare Corp. (PP-CI), Just In Time (RE: Bob Ketchum; AE: Susan Ketchum, Ben Woody).

Ciani/Musica Studios: 30 E. 23rd St., New York, NY 10010; 212-777-7755; James La Croix, studio manager. **Credits:** Absolute Music (CP-TV), Lysol Spray Eye Dropper (RE/ME: Leslie Mona; AE: James La Croix, Guy Lento); BBD&O Advertising (CP-TV), G.E. Refrigerators, Satisfaction Guaranteed (RE: Leslie Mona, James La Croix; ME: Leslie Mona; AE: James La Croix); Wells, Rich & Greene (CP-R), IBM, Who Knew, Different League, No Turning Back (RE/ME: Leslie Mona; AE: Jamex La Croix); Wells, Rich & Greene (CP-R), IBM, On Hold (RE/ME: Leslie Mona; AE: Mark Dzuiba); Baltimore Gas & Electric (CP-TV), Illiteracy, Drop In (RE/ME: James La Croix; AE: Jeff Shore).

Commercial Sight & Sound: 106 College Ave., LaGrange, GA 30240; 404-884-4400; Paul Patten, owner. **Credits:** Humana Hospital, Newnan (PP-CI), Corporate Challenge '88 (RE/ME: Pat Patten); West Georgia RESA (PP-CI), A Regional Commitment (RE: Pat Patten/Paul Hammock; ME: Pat Patten); Jazmine (PP-MV), Live (RE: Pat Patten/Terry Dumas; ME: Pat Patten/Skip Slaughter), Paul French & Partners (PP-CI), Collins & Aikman (RE: Pat Patten; ME: Terry Dumas; AE: Paul Hammock); West Point Pepperell (PP-CI), Employee Credit Association (RE/ME: Pat Patten).

Cotton Hill Studios: 18 Walker Way, Albany, NY 12205; 518-869-1968; Stephen Campito, president. **Credits:** Jay Traynor and The Americans (PP-MV), This Magic Moment (RE: Ray Rettig; ME: Ray Rettig, Ace Parkhurst; AE: Ace Parkhurst); Stony Creek Band (PP-MV), Stony Creek Band (RE: Ray Rettig; ME: Ray Rettig, David Paul Maswick; AE: Ed Carbonie); WHRL 103.1 FM (CP-TV), WHRL ID spots (RE/ME: Ray Rettig); Trick Or Treat (PP-MV), Concert Information (RE/ME: Ray Rettig); Marsh & Donohue Agency (CP-TV), miscellaneous TV spots (RE/ME: Ray Rettig).

D

Barry Diament Audio: 2728 Henry Hudson Parkway, Riverdale, NY 10463; 212-543-2079; Barry Diament, owner. **Credits** (all CD mastering): Geffen Records/Guns n' Roses, G N' R Lies (Barry Diament); Geffen Records/Edie Brickell and the New Bohemians, Shooting Rubber Bands at the Stars (Barry Diament); Mode Records/John Cage, String Quartets (Barry Diament).

Digital Services: 5805 Chimney Rock, Suite E, Houston, TX 77081; 713-664-5258; R. Colbert, traffic. **Credits:** The Production Cos. (CP-TV), Too Far, Too Fast (RE/ME: Gary Moon; AE: Keith Risinger); Joe y La Familia/CBS (PP-MV), You Belong to My Heart (RE/ME: Gary Moon; ME: Les Williams; AE: Keith Risinger); Goodwin, Dannenbaum, et al. (PP-CI) (RE/ME: Gary Moon; AE: Keith Risinger).

F

Fred Weinberg Productions—Worldwide Audio-Video: 16 Dundee Road, Stamford, CT 06903; 203-322-5778; Fred Weinberg, CEO. **Credits:** Hot Latins (TV/R-F), The Hot Latins album (RE: Gregg Scott, Fred Weinberg; ME: Fred Weinberg; AE: Marty Sheller); Latin American Achievement Awards (TV-MV), TV special (RE: Fred Weinberg; ME: Lauren Kim; AE: Gregg Scott); Conill Advertising (CP/PP-R/TV), McDonald's campaign (RE: Fred Weinberg; ME: Larry Hayward; AE: G. Sills); Uniworld Group (CP-TV), Mercury (RE: Fred Weinberg, Marty Sheller; ME: Rodrigo Vallens); Live From China (TV/F), TV network special (RE: Fu Hong, Fred Weinberg; ME: R. Mayer; AE: Gregg Scott).

Future Audio: 7700 Carpenter Freeway, Dallas, TX 75247; 214-630-8889; Randy Adams, manager. **Credits:** Stephen Arnold Productions (CP-CI), Madison Square Garden music (RE/ME: Doug Phelps); Home Sweet Home Productions (PP-TV), Gerbert children's TV show (RE: John Carey; AE: Dana Bayne); Radio Bible Class (CP-R/TV), music selections (RE: Randy Adams; AE: Dana Bayne); JP Productions (CP-R), KOJO ID package (RE: Tom Adler); Stephen Arnold Productions (CP-TV), Channel 39 ID package (RE: Doug Phelps).

G

GBS Video: 44 W. 24th St., New York, NY 10010; 212-463-8863; Steven Garrin, CEO. **Credits:** Milton Samuels Advertising (CP/CI), Brother Overlock Machine (RE: Richard Romaneillo; ME: Stephan Goel; AE: Sam Ash).

GMZ Mobile Recording: 639 Main St., Metuchen, NJ 08840; 201-548-5316; Greg Zaremba, owner. **Credits:** Uncle Funk and the Allstars (PP-MV), Uncle Funk Live (RE/ME: Greg Zaremba; AE: Harry Kopy); Video Artist (CP-TV), Appliance Network (RE/ME: Greg Zaremba; ME: Fred Wasnak).

Group Andre Perry: 1155 21st St. NW, Washington, DC 20036; 202-331-9600; Anthony N. Johnson. **Credits:** National Park Service (PP-F), Black Friday/The Johnstown Flood (RE: Michael David/Tim Kerr; ME: Michael David); MCI Communications (PP-CI), Corporate Logo ID (RE/ME: Michael David); Koppel Communications (PP-TV) News From Earth (RE/ME: Michael David); National Cable TV Association (PP-CI), Thirty Nights (RE/ME: Michael David); Smithsonian Institution (PP-TV), National Zoo (RE/ME: Michael David).

H

Holbrook Media Productions: 2143 W. Main St., Jeanerette, LA 70544; 318-276-6267; Bob Holbrook, owner. **Credits:** Live Oak Gardens (PP-CI), Original music for A/V show (RE: Bob Holbrook/Robbie LeBlanc; ME: Bob Holbrook; AE: Robbie LeBlanc);

www.americanradiohistory.com

Town of Scott (CP-R), custom jingle commercial package (RE: Bob Holbrook; ME: Bob Holbrook/Robbie LeBlanc; AE: Robbie LeBlanc); Abdallas Clothing Stores (CP-TV), fashion commercials (RE: Bob Holbrook; AE: Robbie LeBlanc); Hamilton Medical Hospital (CP-TV), Express Care Services commercials (RE: Bob Holbrook; ME/AE: Robbie LeBlanc); KrossFyre (PP-MV), Promotional Video (RE: Bob Holbrook; AE: Joey Cormier/Karl Fontenot).

Hutt-Biggs Productions: 300 Trillium Drive, #9, Kitchener, Ontario N2E 2K6, Canada; 519-748-1115; Doug Biggs, vice president. **Credits:** CKCO-TV (CP-TV), ID Package (RE: J.R. Hutt; ME: L. Walker; AE: A. Horrocks/D. Walters); CKKW Radio (CP-R), ID Package (RE: J.R. Hutt; ME: L. Walker); Mutual Group (PP-CI), Corporate Presentation (RE: J.R. Hutt; ME: L. Walker).

I

Intimate Sounds, Ltd.: 6315 Metral Drive, Nanaimo, British Columbia, Canada; 604-390-3421; Scott Littlejohn, chief engineer. **Credits:** The Original Seadog (MP-A), Picture a Change (RE/ME: Scott Littlejohn); Jim Zallas (CP-R/TV), Chico's Two in One (RE/ME: Scott Littlejohn); Steve Forenzi (CP-R/TV), Suzuki Leads the Way (RE/ME: Scott Littlejohn); Neo Tribal Vision (MP-A), NTV (RE/ME: Scott Littlejohn; AE: Don MacGregor); The Mix (MP-A), What You Need (RE/ME: Scott Littlejohn).

Interface One Recording Studio: 914 Lake Air, Waco, TX 76710; 817-776-7825; Bob Haley, owner. **Credits:** John Patrick & Associates (CP-R), Poppa Rollo's Pizza (RE/ME: Steve James/Bob Haley; AE: Tim Womack); McLennan Community College (CP-R/TV), Spring Registration (RE/ME: Bob Haley, Bruce Johnson); Parker-Wood Advertising (CP-R/TV), HEB Food Stores (RE/ME: Bob Haley).

J

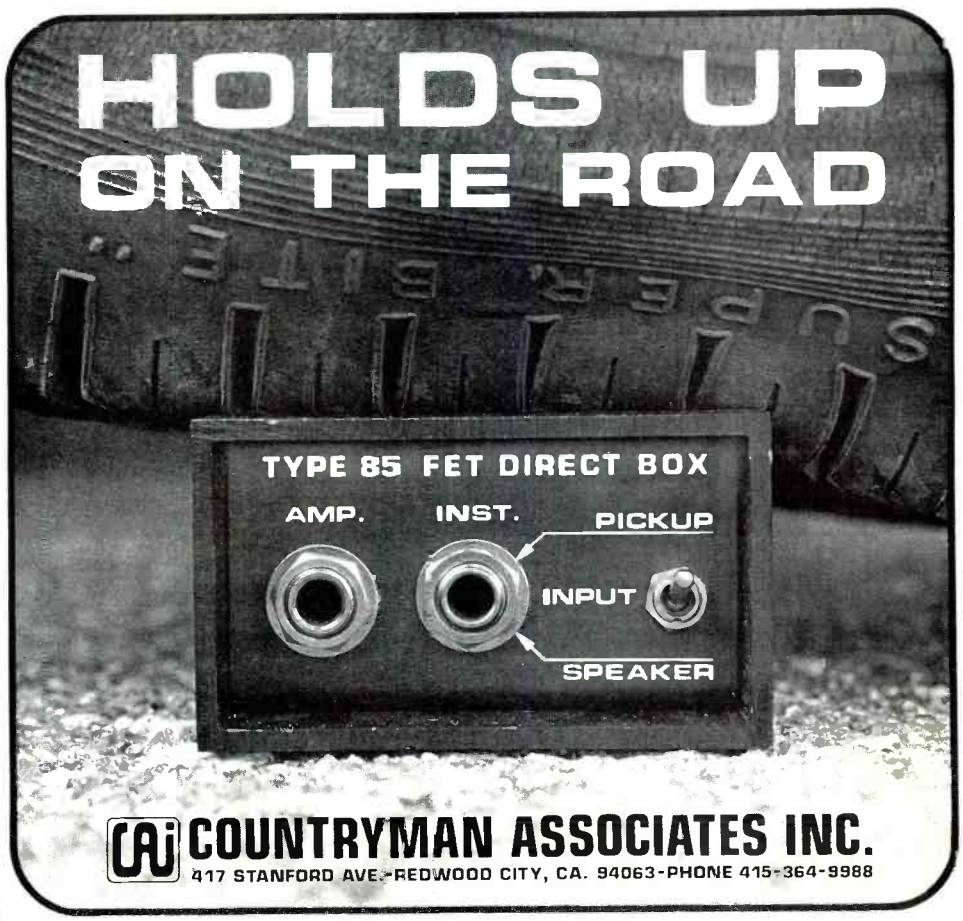
Juniper Studios: 719 Main St., Burbank, CA 91506; 818-841-1244; David Bolger, general manager. **Credits:** MTM Productions (CP-TV), :30/:60 spots, Hill Street Blues (RE/ME: Bruce Chianese); MTM Productions (CP-TV), :30/:60 spots, The Bob Newhart Show (RE/ME: Bruce Chianese); Mid Summer Productions (PP-F), Dreamers (RE/ME: Steve Sharp); The Hand Co. (CP-TV), cable spots for Big Top Pee-Wee (RE/ME: Bruce Chianese); CBS (PP-TV), TV 101 score (RE/ME: Steve Sharp).

M

Master's Workshop: 306 Rexdale Blvd., Unit 7, Rexdale, Ontario Canada M9W 1R6; 416-741-1312; Jim Frank, director of studio operations. **Credits:** Aaron Spelling Productions (PP-F), Day One (RE: James Porteous, Rick Ellis); Universal/Equalizer (PP-F), The Equalizer (22 episodes); Paramount (PP-F), Friday The 13th: The Series (22 episodes)(RE: Tim Archer, Terry Gordica); Grosso/Jacobson (PP-F), Night Heat (22 episodes)(RE: Tim Archer, Terry Gordica); HBO (PP-F), Glory Glory (RE: Rick Ellis, James Porteous).

Media Productions: 125 Miller Ave., Oak Hill, WV 25901; 304-465-5786; W. Doug Gent, owner/engineer. **Credits:** Jingles All The Way (CP-R), Summit Holding

Circle (30) on Rapid Facts Card



Circle (31) on Rapid Facts Card

www.americanradiohistory.com

TRACKS

Co. (RE/ME: W. Doug Gent); Jingles All The Way (CP-R), Grady Whitlock Ford (RE/ME: W. Doug Gent); The Jingle Factory (CP-TV), King Coal Chevrolet (RE/ME: W. Doug Gent); WOAY-TV 4 (CP-TV), WOAY ID Series (RE/ME: W. Doug Gent); The Jingle Factory (CP-R), Super Service Food Stores (RE/ME: W. Doug Gent).

O

Omega Audio & Productions: 8036 Aviation Place, Dallas, TX 75235; 214-350-9066; Philip Barrett, senior engineer. **Credits:** Media Projects (PP-F), Kennedy—Sixth Floor Exhibit (RE/ME: Jim Caldwell); Moroch & Associates (CP-TV) (RE/ME: Philip Barrett); BBD-Detroit (PC-TV), Dodge (RE/ME: Philip Barrett); Tracy Locke (CP-TV), Dillard's (RE/ME: Philip Barrett); First Cut (CP-TV), Pepsi-Cola (RE/ME: David Buell).

On Broadway: 248 N. Broadway, Fresno, CA 93701; 209-485-4898; Jerry Liles/Steve Abbott, owners/partners. **Credits:** Procession (PP-MV), Procession (RE/ME: Lance Kincaid; AE: Rocky Giannetta); Betrayel (CP-R), Metal Mania (RE/ME: Gray Gregson; AE: Bill Sayre); Piel Canela (CP-R), Un Poco de Todo Para Usted (RE/ME: Rocky Giannetta; AE: Jerry Liles/Hector Alvarez); First Priority (CP-R), First Priority (RE/ME: Jerry Liles; AE: Rocky Giannetta); Tales of Young Robert (PP-MV), Tales (RE/ME: Lance Kincaid).

P

PCI Recording: 737 Atlantic Ave., Rochester, NY 14609; 716-288-5620; Tim Backus, studio manager. **Credits:** Mobil Chemical Co. (PP-CI), Degradable Plastics in the Environment (RE/ME: Tom Backus; AE: Jeff Corcoran); Jay Inc. (CP-TV), HBO Boxing Theme (RE: Steve Forney, ME: Mick Guzauski; AE: Jeff Corcoran/Don Fiegel); CompuTravel (PP-CI), CompuTravel Franchise Promo (RE/ME: Tom Backus).

Prima Music Production: 3 Laurel St., Watertown, MA 02172; 617-923-4040; Lance Duncan, partner. **Credits:** USA Today on Television (PP-TV), Music Notes (RE: Lance Duncan, James Anderson; ME: Lance Duncan; AE: Kurt Lachowin); USA Today on Television (PP-TV), Broadcast News (RE: Lance Duncan, James Anderson; ME: James Anderson; AE: Kurt Lachowin).

R

Rex Recording: 1931 S.E. Morrison, Portland, OR 97214; 503-238-4525; Russ Gorsline, general manager. **Credits:** Hewlett-Packard (PP-CI), Desk Jet Plus (RE/ME: Russ Gorsline); Pacific Power (PP-CI), It's People, It's Places (RE/ME: Richard Moore); Franz Bread (CP-TV), F Word (RE/ME: Russ Gorsline).

S

Silver Badge Music, Inc.: 996 Planetarium Stn., Suite C, New York, NY 10024; 212-580-1698; Don Walker, president. **Credits:** The Bang Gang (PP-MV), untitled (RE/ME: Donny Walker, Allan Scott Plotkin; AE: Angela); Mike Ray (Plasmatics) (PP-MV), Fire Storm (RE/ME: Donny Walker; AE: Allan Scott Plotkin); Strike Twice (PP-MV), Strike Twice (RE/ME: Donny Walker); Dean Greiner (PP-MV), Publishing Catalog (RE/ME: Donny Walker, Tom Goldblatt); Jimmy D./ Splash (PP-MV), Breakout (RE/ME: Donny Walker).

Solid Sound, Inc.: 1289 N. Dixboro Road, Ann Arbor, MI 48105; 313-662-0667; Sherry Prindle, office manager. **Credits:** Group 243 Inc. (CP-TV), Silver Screen (RE/ME: Will Spencer); Group 243 Inc. (CP-TV), Sparky (RE/ME: Will Spencer); Production People, Ltd. (PP-CI), Allunet (RE: Will Spencer).

Sound Ideas by Lawler & Associates Inc.: 3637 Park Ave., Suite 312, Memphis, TN 38111; 901-324-7089; Don Lawler, president. **Credits:** Exlax (CP-R), Speaking of Country (RE: Don Lawler); McDonalds (CP-R), Regional Rep with Kelly Cash and Rufus Thomas (RE: Don Lawler); Pepsi (CP-R), Black History Month; 20, the Countdown Magazine (CP-R), weekly countdown for contemporary Christian music (RE: Don Lawler); Federal Express (PP-CI), Leader of the Pack A/V (RE: Don Lawler).

Sound on Sound Recording: 322 W. 45th St., New York, NY 10036; 212-757-5300; Wesley Derbyshire, studio manager. **Credits:** RCA Records (MP-A), Circus of Power, Live in Detroit (RE/ME: Michael McMackin; AE: Kevin Forrester); SBK Songs (MP-S), Luther Vandross (RE/ME: Michael O'Reilley; AE: Bryce Goggin); Sid Woloshin (CP-TV), State Farm Insurance (RE/ME: Alan Silverman; AE: Bryce Goggin); Victor Lesser (MP-A) Victor Lesser (RE/ME: Jeffrey Lesser; AE: Kevin Forrester); DMB & B (CP-TV), A&P (RE/ME: Arty Friedman; AE: Bryce Goggin).

Sound Recording Organization: 1338 Mission St., San Francisco, CA 94103; 415-863-0400; Steven Pinsky, president. **Credits:** Columbia Pictures/American Playhouse (PP-F), Eat A Bowl of Tea (ME: Will Harvey; AE: Lisa Baney); Cornerstone Pictures (PP-F), Dead Pit (RE: Malcom Fife; ME: Phill Sawyer, Will Harvey, Lisa Baney); Molesworth Int. (PP-F), Kamillions (ME: Jim Kallet; AE: Malcom Fife); Shuttlecock Productions (PP-F), Shuttlecock (ME: Will Harvey; AE: Tim Larkin); Farley Films (PP-F), Of Men and Angles (ME: Will Harvey; AE: Lisa Baney).

Studio "B" Inc.: 6525 Sunset Blvd., Hollywood, CA 90028; 213-464-0080; Antonio Castanon, manager and vice-president. **Credits:** Capitol Records (CP), WASP (RE: Mikey Davis, Thomas Nellen; AE: Thomas Nellen); CBS Records International (CP), Joe Strummer (RE: Mark Stebbeds; AE: Thomas Nellen, Frank Garfi).

Sync Sound: 450 W. 56th St., New York, NY 10019; 212-246-5580; Sherri Tantleff, studio manager. **Credits:** D'Arcy Masius Benton & Bowles (CP-TV), Bud Bowl I (RE/ME: Regina Mullen); WNET-Great Performances (PP-TV), Linda Ronstadt, "Canciones de Mi Padre" (ME: Ken Hahn); CBS Music Video Entertainment (PP-MV), Bruce Springsteen Video Anthology 1978-1988 (ME: Ken Hahn/Toby Scott); Little Magic Productions (PP-TV), Ile Aiye (ME: Michael Berry).

Syndicate Sound: 311 Poland Ave., Struthers, OH 44471; 216-755-1331; Jeff Wormley, owner. **Credits:** P.S. Productions (CP-R), Studio Guff radio ad (RE: Jeff Wormley, Steve Turner, Pete Feebinger; ME: Jeff Wormley, Terry Barrett); P.S. Productions (CP-R), Ronnie Lee ad (RE/ME: Jeff Wormley); P.S. Productions (CP-R), Guy Libido spot (RE/ME: Jeff Wormley, Terry Barrett); Dickie Parke (PP-MV), Bowling Adventures (RE/ME: Jeff Wormley, Dickie Parke); Greg Van Such (PP-MV), How to be a Rock Star (RE/ME: Jeff Wormley).

The System: 20 Martha St., Woodcliff Lake, NJ 07675; 201-930-9149; Gene Perla, owner. **Credits:** Kreston/Lahm (PP-MV), Live at Jan Wallman's (RE/ME: Bernard Fox; AE: Gene Perla); ACI Inc. (CP-TV), Pony Farm (RE: Gene Perla); Nation-Wide Reporting and Convention Coverage Inc. (CP-TV), The Deposition (RE: Jeff Ader; ME: Gene Perla; AE: Bernard Fox).

T

Toby's Tunes Inc.: 2325 Girard Ave. S, Minneapolis, MN 55405; 612-377-0690; Harley Toberman, owner. **Credits:** Dayton's (CP-TV), Worry Free (ME: Harley Toberman); 3M (PP-CI), Opticom History (RE/ME: Harley Toberman), King Koil (PP-CI), Bedquarters (RE/ME: Harley Toberman); Berkley (CP-TV), Super Strength Trilene (RE/ME: Harley Toberman); MGM Liquor (CP-R), Holiday Sale (RE/ME: Harley Toberman).

Topanga Skyline Recording: 1402 Old Topanga Cyn Road, Topanga Park, CA 90290; 213-455-2044; John Eden, partner. **Credits:** Chameleon Music/Walking Wounded (CP), (RE/ME: Britt Bacon); Gary Tigerman Music (CP-R/TV), Coors/Superior/Fiesta (RE/ME: Britt Bacon); Harcourt Brace, Jimmy Buffett, Jolly Man (RE/ME: Britt Bacon).

W

Wild Oat Productions: 415 W. Second St., Ashland, WI 54806; 715-682-6464; Mark K. McGinley, owner. **Credits:** Warren Nelson/Nelson/Ferris Concert Co. (CP-R), Whistle Comin' In (RE: Mark K. McGinley; ME: Andy Noyes); Jack Gunderson (CP-R), Jack Gunderson Live at Chautauqua (RE: Mark K. McGinley; ME: Jack Gunderson); Peter and Lou Berryman (CP-R), Your State's Name Here (RE: Mark K. McGinley; ME: Marv Nunn); Warren Nelson (CP-MV), Ashland Historical Society Presentation (RE/ME: Mark. K. McGinley/Andy Noyes; AE: Bruce Bowers).

Woodland Music Productions: 22636 Via Tercero, Mission Viejo, CA 92691; 714-830-4829; Patrick Woodland, owner. **Credits:** Symphony Pictures/Turner Broadcasting (F-TV), Nightbreaker (RE: Patrick Woodland); Bush/Quayle '88 (CP-TV), Positive Economic Growth (RE: Patrick Woodland); Frankenberry/Laughlin, Constable (CP-TV), Chic-Filla Commercial (RE: Patrick Woodland); ITC Productions (TV), Tiko, Pride of the Rockies (RE: Patrick Woodland); TRW Space & Defense (CI-TV), Pride in the Past, Promise of the Future (RE: Patrick Woodland).

RE/P

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

www.americanradiohistory.com

STUDIO UPDATE

Northeast

Sigma Sound Studios (New York) has been acquired by M&M Syndications. Gary Robbins, an M&M producer/director, has been named general manager for Sigma; the facility's chief technical engineer, Don Cuminale, will maintain his position. *1697 Broadway, New York, NY 10019; 212-582-5055.*

Tiki Recording Studios (Glen Cove, NY) has installed an Adams-Smith Zeta-Three synchronizer. *186 Glen Cove Ave., Glen Cove, NY 11542; 516-671-4555.*

Bair Tracks (New York) has installed the following equipment: a JVC 6650 ¾-inch VCR, Adams-Smith Zeta-Three, Sony SSM-2010 video monitor, Sound Ideas effects and sampling libraries, and a Sony CDP-32 CD player. *Box 1162, New York, NY 10009; 212-529-1954.*

The Toy Specialists (New York) has taken delivery of an AMS AudioFile, the first rental company in the U.S. to offer the system on a rental basis. *333 W. 52nd St., New York, NY 10019; 212-333-2206; fax 212-262-4095.*

Premier Recording (Washington, DC) has completed a $100,000 expansion of services, equipment and facilities. A separate MIDI room has been added, and a studio area has been doubled. New equipment includes a Dyaxis workstation, a Sony PCM-2500 DAT recorder, Otari MTR-10-II tape machine, three TimeLine Lynx modules and two Akai/Linn MPC-60 drum sampler/sequencers. *2121 Wisconsin Ave. N.W., #250, Washington, DC 20007; 202-333-5588.*

SoundHound (New York) has added engineer Joe Gauci to its staff. *45 W. 45th St., New York, NY 10036; 212-575-8664.*

Sound Associates (New York) has added a WaveFrame AudioFrame. *424 W. 45th St., New York, NY 10036; 212-757-5679; fax 212-265-1250.*

Northlake Sound Studio (North White Plains, NY) has been acquired by Wood 'N Music Inc. The studio will operate as part of the Rumpelstiltskin Records Group and will continue to accept outside business. *3 Lakeview Drive, North White Plains, NY 10603; 914-682-0842.*

Home Base Sound Studios (New York) has redesigned Studio A's control room and has added a Sony 3036 console with hard disk automation, Studer 24-, 4- and 2-track recorders, a Lexicon 480+2, an AMS 1580 and a Steinway 7-foot grand piano. Studio B, a 24-track MIDI room, has been constructed, featuring 25 synthesizers, three computers, four drum machines and an extensive sound library. *147 W. 24th St., New York, NY 10011; 212-691-7674.*

Southeast

Terminal Studios (Jackson, MS) has purchased a Trident 80 B/C console, a Casio FZ-1 and an E-mu Emax sampler. *4747*

CD-LIKE QUALITY ON CASSETTES!!

Clarity

REAL-TIME CASSETTE DUPLICATION

"THE ULTIMATE RESPONSE"

... Find Out How ...

Post Office Square
Waterville, ME 04901
1-800-458-6405
207-873-3911

Circle (32) on Rapid Facts Card

Sam Ash PROFESSIONAL

We don't sell problems ... we solve them!

Sam Ash Professional is your new source for computer based recording technologies, multitrack, consoles, signal processing and microphones. You know Sam Ash as the musician's favorite store - now we can handle all your needs. Visit our consultants at our fully operating studio. Out of town please call.

DESIGN • SALES • SERVICE • PARTS
• INNOVATIVE FINANCING PLANS • RUSH DELIVERY

Some of our brands:
ATARI • DIGIDESIGN SOUND TOOLS • TASCAM • AKAI • SOUNDTRACS • AMEK • SONY • PANASONIC • MEGAMIX • TRACMIX • NEUMANN • AKG • ELECTRO-VOICE • LEXICON • SYMETRIX • dbx • YAMAHA • EVENTIDE • TC • ART • ALESIS • TANNOY • JBL • UREI • YAMAHA • E-MU • KURZWEIL • OBERHEIM • KAWAI • KORG • ENSONIQ ... and many more!

Sam Ash® Professional

723 Seventh Avenue (at 48th Street) Third Floor
New York City • (212) 719-2640

©1989 Sam Ash Music Corp.

Circle (33) on Rapid Facts Card

www.americanradiohistory.com

STUDIO UPDATE

McWillie Drive, Jackson, MS 39206; 601-932-2627.

Full Sail Center for the Recording Arts (Altamonte Springs, FL) has added Dan Mockensturm as an instructor in the Tapeless Studio course. *658 Douglas Ave., Altamonte Springs, FL 32712; 407-788-2450; fax 407-682-9786.*

New River Studios (Fort Lauderdale, FL) has purchased a Sony BVU 850 ¾-inch SP editing VTR, two Studer tape machines and an Akai S950 sampler. *408 S. Andrews Ave., Fort Lauderdale, FL 33301; 305-524-4000.*

Audio Vision (Nashville) recently won two Diamond Awards and one Merit Award at the Diamond/Addy awards, held by the Nashville Advertising Federation, for audio production produced at the facility. In addition, three people have joined the staff: Leslie Gardner as account executive, Jerry Hernandez as sound engineer and Teresa Robinson as administrative assistant. *1102 17th Ave. S., Suite 200, Nashville, TN 37212; 615-321-3612.*

AVID Inc. (Orlando, FL) recently won six Addy Awards, including one gold and one silver for audio production, at the 1989 competition, sponsored by the Orlando Area Advertising Federation. *130 E. Marks St., Orlando, FL 32803; 407-423-9535.*

New Age Sight & Sound (Atlanta) has acquired a Neve V60 Series MkIII console with Flying Faders automation, a Sony PCM 3324 digital 24-track recorder, an Alpha Audio Boss II system, two Lexicon LXP1 reverb units, a Yamaha SPX1000 processor and an Eventide H3000B Harmonizer. *120 Interstate North Parkway E., Suite 164, Atlanta, GA 30339: 404-956-7956.*

Midwest

Tone Zone Recording (Chicago) has installed an SSL 4032 G Series console. Other new equipment includes a Lexicon 480L digital effects processor, an Eventide H3000 Ultra Harmonizer, an Akai S-900 sampler, a Yamaha TX-802 FM synthesis module and a Roland D-550 L/A synthesis module. *1316 N. Clybourn, Chicago, IL 60610; 312-664-5353.*

Audio Recording Studios (Cleveland) has added an E-mu Emulator III. Michael Mann has been named vice president/executive producer. *601 Rockwell Ave., Cleveland, OH 44144; 216-771-5112.*

Southwest

Cereus Recording (Tempe, AZ) has added remote control to its Adams-Smith 2600 synchronizer. Also new is a Technics SL-P770 CD player, music and sound effects libraries on compact disk and 24 channels of Dolby SR noise reduction. *1733 E. McKellips, #7, Tempe, AZ 85257; 602-990-8163.*

Northern California

Bob Skye, owner of **The Plant Studios** (Sausalito) has become partners with Arne Frager, formerly of Spectrum Studios in Los Angeles. Studio C has been redesigned into a tapeless studio with a New England Digital Synclavier and Direct-to-Disk system, and a DDA 24-track console. The room is said to be the only commercial Synclavier/D-D room in Northern California. *2200 Bridgeway, Sausalito, CA 94965; 415-332-6100; fax 415-332-5738.*

Soma Sync Studios (San Francisco) has installed a Solid State Logic console with G Series Computer and electronics, a Lexicon 480L, an Eventide Ultra Harmonizer and an Otari MTR-12 2-track. *372 Brannan St., San Francisco, CA 94107; 415-546-1374; fax 415-546-1433.*

Music Annex (Menlo Park) has promoted Keith Hatschek to vice president of sales and marketing. *970 O'Brien Drive, Menlo Park, CA 94025; 415-328-8338.*

Pete Scaturro of **Different Fur Recording** (San Francisco) has added a New England Digital Synclavier 3200 into his MIDIFUR production studio.

Southern California

Hit Single Recording Services (San Diego) has added a Sony APR-5002 2-track recorder, a Lexicon 480L digital effects processor, a 3M M79 24-track, Valley Gain Brain IIs and a Neumann TLM-170i mic. *Marketplace at the Grove—Lower Court, #314, San Diego, CA 92115; 619-265-0524.*

South Coast Recording Studio (Santa Ana) has added two Alesis Quadraverbs, four Symetrix noise gates, two Sennheiser MD421 mics and a pair of Tannoy 6.5 close-field monitors. *1818 N. Main St., Santa Ana, CA 92706; 714-541-2397.*

Chase Productions (Hollywood) has installed a second dbx model 700 digital audio processor, a second Sony PCM-1610 digital audio processor, a third Soundmaster Syncro synchronization system, two Orban 674 parametric EQs, two EXR model IV Exciter processors, a fifth Dolby CAT 43 EQ and noise-filtering system, and a Dolby SDU-4 surround-sound decoder. *7080 Hollywood Blvd., Suite 418, Hollywood, CA 90028; 213-466-3946; fax 213-464-1893.*

Sound Design (Santa Barbara) has added a Digital Audio Research Soundstation II. *33 W. Haley St., Santa Barbara, CA 93101; 805-965-3404.*

Post Logic (Hollywood) has opened a new 6-room post facility, totaling 12,000 square feet. The facility has two New England Digital Synclavier rooms, two SSL-equipped rooms and an ADR/prelay room. According to the facility, its SSL G Series SL 6000 console is the world's first. *1800 N. Vine, Hollywood, CA 90028; 213-461-7887; fax 213-461-7790.*

Manufacturer and dealer announcements

Pro audio dealer **AudioLine** has supplied equipment to the following studios: A.D. Productions, Milwaukee; Nexxus Studios, Waukesha, WI; Audio Recording Unlimited, Chicago; Jim DeKoch's Music Composition & Production, Appleton, WI; Filmmusik, Chicago; and Sound Waves, Green Bay, WI.

Soundmaster has installed Integrated Editing Systems at the following facilities: EFX Systems, Burbank, CA; Master Audio Productions, Chatham, NJ; The Banff Center, Banff, Canada; Crossroads Communications, Toronto; STS Productions, Salt Lake City; Finale Post Productions, Vancouver; Comfort Sound, Toronto; Yorkshire Television, London; Films of Bristol, London.

AMS/Calrec has received an order for the first Virtual Console System from Turner Broadcasting/WTBS, Atlanta.

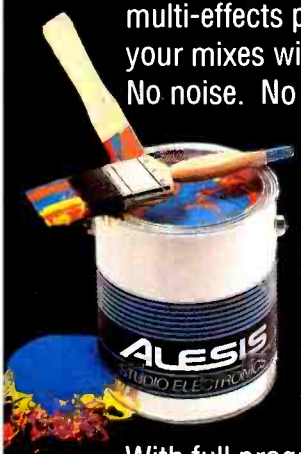
RE/P

www.americanradiohistory.com

If Michelangelo had a QUADRAVERB, he might have mixed music instead of paint.

It's true. Music and painting are very similar. A stroke of red, a touch of chorus. A splash of blue, a wash of reverb. Either way, it's art. And every artform has its masterpieces. And its tools.

Introducing the Alesis QUADRAVERB. An all-new 16 bit digital, simultaneous multi-effects processor and dead-serious musical tool. With QUADRAVERB, your mixes will be mirror images of the sound in your head. No letdowns. No noise. No nonsense. No boundaries between art and creation.



Inside, QUADRAVERB is alive with colors. Chorus, flange, phase shift, pitch detune and delay... all in stereo, to give your music depth and space. For absolute tonal control there are 5 bands of parametric and 11 bands of graphic e.q. And, of course, there's the unmistakable clarity and drama of the award-winning Alesis digital reverb programs.

With full programmability, 100 memory slots, and 90 factory programs created by the best ears in the business, QUADRAVERB gives you total artistic freedom. Plus, in QuadMode™, four of these flawless 20kHz bandwidth effects occur simultaneously. Like crunching thousands of dollars worth of studio gear into one rack space.

With very little cash, and even less effort, you can use QUADRAVERB on your next mix... plug it into your instrument rig... perfect your sound.

See your Alesis dealer today and hear what state of the art really means.

Michelangelo would agree, QUADRAVERB is a masterpiece.

ALESIS
STUDIO ELECTRONICS

LOS ANGELES:
Alesis Corporation • 3630 Holdrege Avenue • Los Angeles, Ca. 90016

LONDON:
Alesis Corporation • 6, Letchworth Business Center • Avenue One, Letchworth, Hertfordshire SG62HR

Circle (37) on Rapid Facts Card

www.americanradiohistory.com

THE CUTTING EDGE

By Laurel Cash

News From NAB

The most noticeable thing about this year's National Association of Broadcasters Convention in Las Vegas was the large number of merger and product announcements.

AKG acquires Orban

S. Richard Ravitch of AKG Acoustics and John Delantoni of Orban Associates announced AKG's acquisition of Orban.

"This is a major step for AKG in the United States," says Ravitch. "Until now we have been primarily an importing and distribution company, but with our Boston-based R&D division expanding into digital-audio product design with such items as the DSE 7000, domestic manufacturing capabilities are a must."

For now, Orban will remain in its present San Francisco facility. Delantoni will continue with the Orban division as general manager, and Bob Orban will continue to head engineering.

Neve to distribute Mitsubishi Pro Audio in North America

In a unique move between two of the leading manufacturers of pro audio equipment, Neve has been named the exclusive North American distributor for Mitsubishi Electric's professional digital audio products.

Under the terms of this agreement, Neve will be the exclusive distributor of the entire line of Mitsubishi Prodigi-format reel-to-reel tape recorders and ancillary equipment.

Neve will consolidate the existing Mitsubishi North American sales and service offices with its own: the Bethel, CT headquarters, and the Los Angeles, New York and Nashville regional offices. Sonotechnique, Neve's sole Canadian distributor, will distribute the Mitsubishi products in Canada.

Studer to enter digital console market

Tore Nordahl, president of Studer Revox America, announced that a pre-production model 48-track digital tape recorder would be on display at the fall AES Convention in New York.

Nordahl also announced Studer's intention to introduce a line of high-end, fully resettable music recording and post-production consoles. No delivery date was set, but Nordahl said a pre-production model would probably be on display at AES.

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

New Products

NED announces optical disk

New England Digital has introduced a new version of its previously available WORM (Write Once Read Many) optical disk system that is designed to work directly with its Direct-To-Disk and PostPro series of digital multitrack recorder/editors. Each disk is 2GB, which is equivalent to over 6 hours of 44.1kHz sampled audio. That's enough for more than 21,000 1-second samples, each fully cross referenced in as many as eight different categories.

For Direct-to-Disk and PostPro users, optical disk files are accessed via the Audio Event Editor screen. Loaded onto Direct-to-Disk tracks as "edit cues," they can be sequenced at specified SMPTE sync points. Conversely, cues of any length can be saved to the optical disk directly from the Audio Event Editor.

A growing number of proprietary libraries are now available in NED's optical disk format, including the Sound Ideas Sound Effects Library and NED's own Timbre Library. Users, however, are not restricted to prerecorded libraries.

NED's other new products include the DESC, remote controller/editor/locator, the MIDInet, a MIDI processor/patchbay, and the MaxTrax, a track expansion option for the Direct-to-Disk and PostPro.

Circle (132) on Rapid Facts Card

Radio Systems RS-1000

The RS-1000 is a product for those who currently use cart machines and want to replace them with newer technology. The machine integrates the Sony DTC-1000 DAT machine and a special controller.

This controller's microprocessor is said to be interwired with the Sony circuitry for complete status feedback and control of all tape functions. The controller allows start and skip IDs to act like the primary and secondary tones on a cart machine, causing the deck to cue to audio and to recue at the end of a cut. From the moment the tape is inserted, the microprocessor assumes control, directing the tape to thread up, search for the first or second ID, and to cue in preparation for playback.

The RS-1000 is said to offer full-broadcast remote control. You can program up to 30 cuts in random order. The controls are large and clearly labeled and the audio ins and outs are balanced.

Circle (130) on Rapid Facts Card

More DAT

Ramsa/Panasonic showed a prototype-only DAT recorder/editor system. This machine is expected to have four heads providing read-after-write capabilities and a time code channel that will follow the proposed format standard that was recently announced by Sony, NHK and Matsushita. This makes the unit incompatible with the existing Fostex DAT machine with time code.

Circle (131) on Rapid Facts Card

RE/P

www.americanradiohistory.com

NEW PRODUCTS

Bose 102P loudspeaker

The 102P passively equalized loudspeaker is designed to retrofit into non-Bose systems or in a small, portable PA system. It is available in flush-mount and surface-mount configurations and uses the same enclosures as the 102 Series Commercial actively equalized loudspeakers. Each enclosure is available in 70V and 4Ω versions.

Circle (134) on Rapid Facts Card

USS DELTEX column

The double-tier DELTEX keyboard stand has been reintroduced by Ultimate Support Systems. The pre-assembled, anodized aluminum stand, now available in all black, features a triangular design and is lightweight and portable. Suggested retail price is $99.99.

Circle (135) on Rapid Facts Card

Roland W-30 workstation

Using the same sampling technology as the S-Series samplers, the W-30 has a full library of sounds, an advanced sequencer, a built-in disk drive, multi-timbral capabilities, individual audio outputs and a SCSI port. A ROM section contains frequently used sounds, and a supplemental RAM section contains memory equal to an S-330. A CD-ROM system is also available for instant access to sounds.

Circle (136) on Rapid Facts Card

Bryant Electric Quadplex receptacle

Quadplex is a color-coded, four-outlet receptacle that requires three terminations, reducing wiring confusion frequently encountered in the studio. It can be used in a portable system, for temporary power applications, or affixed to most commonly used boxes for permanent mounting.

Circle (138) on Rapid Facts Card

Celestion B Series bass/mid drivers

Five different 15- and 18-inch loudspeakers comprise the B Series, all of which are designed to provide pulsating lows and clear mids. The speakers feature cast frames and large magnets for durability and maximum output. Large voice coils (19mm long and 100mm in diameter) are used to produce driving LF sound.

Circle (139) on Rapid Facts Card

Studer A729 CD controller

The A729 can control up to four Studer A727 or A730 CD players, in any operating mode, via the ES interfaces. The unit can recognize up to 100 discs and can store up to three start and end cue points per disc. An automatic program of up to three sequences can be programmed in the central memory of the editing module for each CD player. In the maximum configuration of four CD players, up to 12 preprogrammed sequences with automatic switching is possible.

Circle (145) on Rapid Facts Card

Studiomaster SF812 digital reverb

The digital stereo reverb provides a wide range of algorithms, including rooms, halls and plates, and additional effects such as gates and reverbs. The unit contains true 16-bit architecture with 24-bit processing and achieves 85dB dynamic range.

Circle (144) on Rapid Facts Card

Sunn mixing consoles

Sunn has introduced three sound reinforcement consoles: the 8-channel MX 4208, the 12-channel MX 4212 and the 16-channel MX 4216. All three include cue, 3-band EQ, trim, peak LED, and high and balanced low-impedance inputs for each channel. Also included are phantom power, dual-LED bar graphs and a headphone jack with level control.

Circle (146) on Rapid Facts Card

Renkus-Heinz SR-1A6 system

The Smart Speaker System is a trapezoidal enclosure designed for longer-throw applications. The 60°×40° coverage angle concentrates more energy into a smaller space than the standard SR-A1, which has a 95°×55° horn. When used with the X-22 or X-31 Smart Processors, the unit will deliver up to 130dB. Suggested resale price is $1,870.

Circle (147) on Rapid Facts Card

Audio Kinetics Mastermix II automation

Mastermix II integrates the most important features of the older Mastermix system and the company's Reflex automation. The combination of the Reflex MX844 Mix Computer and color monitor with the AK2 VCA fader units allows engineers to work locally at the desk while the display and computing functions enhance speed and ease of use. Current users of Mastermix and Reflex can uprade to the new system.

Circle (148) on Rapid Facts Card

Bruel & Kjaer type 4012 mic

The 4012 is a prepolarized condenser with a first-order cardioid direction pattern and is powered from the company's 2812 power supply. The power supply provides 130V to the mic's pre-amp, which allows it to handle 168dB before clipping. The line level output allows the signal path to be connected directly to the recording medium, without any signal degradation when long cables are used.

Circle (149) on Rapid Facts Card

APT apt-X audio compression system

Audio Processing Technology's apt-X 100 is a digital audio compression system that compresses digital audio to four bits per sample from the original 16-bit PCM source without any quality loss. The system uses Sub-band Adaptive Differential Pulse Code Modulation techniques, which provide high error immunity, low hardware costs and a low coding delay. The system is designed for satellite and land–

www.americanradiohistory.com

TIMECODE EDITING... LIVING DANGEROUSLY?

Not if you have the new ADx-02 Timecode Analyzer. This is a sophisticated test instrument, as well as a fully functional reader–generator with video Key and L.E.D. displays. It can save you time and money. Finding timecode errors on tape before an edit is attempted, or matching color frames and ScH phase, or tracking on a Betacam is easy. For the engineer, it can be the quickest way to set tape speed, re-align video play-back heads or check an audio synchronizer for *wow*. Each timecode bit is displayed graphically.

The ADx-02 is being used around the world in a variety of environments and applications. But the diagnostics function is not the end of the story, the ADx-02 is a very versatile timecode reader–generator–inserter, with multiple screen displays, selectable fonts, three jam-sync modes, stable code generation, full speed range read and much more. So why buy just a timecode reader–generator?

The ADx-02.
The only timecode unit that can safely save you money.

ADx Systems Inc.
274 Madison Avenue, New York, NY 10016
The World Leader in Timecode.

For more information contact your local dealer or call us at 1-800-444-4-A-D-X.

Circle (34) on Rapid Facts Card

Recording Engineer/Producer presents a
GREAT DEAL!
on classified advertising...

Our New Lower Rates
-- $35 an inch --
are the most cost-effective way
to communicate your message.

An ad in RE/P's PRO AUDIO CLASSIFIED section
reaches the pro audio industry's highest
concentration of product buyers:
Professional audio engineers and producers.

And, our new format
makes your classified ad
easier to find for a greater response.

Recording
ENGINEER/PRODUCER

Call RE/P's Classified Advertising Manager, Renée Hambleton, at 913-888-4664 to reserve your classified space here.
Deadline for space reservations and materials is the first day of the month prior to issue publication date.

NEW PRODUCTS

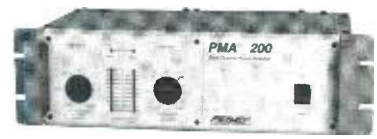
based broadcasting, ISDN and other low-capacity, high-quality transmission and storage applications.

Circle (150) on Rapid Facts Card

AMR PMA 200 dual-channel amp

From Peavey's Audio Media Research division, the PMA 200 is a dual 100W-per-channel amp designed for studio and broadcast applications. The rack-mount unit requires 5 inches of space. Features include a high slew rate, 100kHz power bandwidth, THD of 0.008%, and a damping factor of more than 300 at 1kHz into 8Ω. Suggested retail price is $399.99.

Circle (153) on Rapid Facts Card



Publications

A-R Editions compact disc book

Ken Pohlmann's "The Compact Disc: A Handbook of Theory and Use" is written for people involved in using, preparing or manufacturing CDs. The book covers CD technology in detail and discuss other formats such as CD-ROM and CD-I. Prices are $29.95 for paper and $45.95 for cloth.

Circle (160) on Rapid Facts Card

Aphex promotional video

Aphex Systems has released a 17-minute promotional video that provides a technical overview of the Aural Exciter, the Compellor, the Dominator and the 612 expander/gate. Testimonials from engineers and producers such as Ed Greene, Bernie Grundman and David Holman are included, as is a commentary from company president Marvin Caesar. The video is available for a $5 postage and handling fee.

Circle (161) on Rapid Facts Card

Test discs from DB Systems

DB Systems is offering a catalog of digital test discs, including discs from CBS, the Japan Audio Society, Denon and the Acoustical Society of America. Disc prices range from $12 to $60; the catalog is free.

Circle (162) on Rapid Facts Card

www.americanradiohistory.com

Neve VP console

The first product in Neve's new Post-Production Series, the VP uses a console routing system that eliminates intensive patch routing, multiple push-button switching and complex operator moves. Additional features include 24-track multi-rack operation with the provision for up to two 24-tracks, 4- and 8-track to stereo or mono TV feeds, separate feeds for music and effects, and master machine control. Options include integrated storage and resetting of console settings from memory and Flying Faders automation.

Circle (151) on Rapid Facts Card

Cable Wraps from Video Parts

The ties and wraps use 1-inch Velcro and are attached around the cable near a connector. After coiling a cable, the tie is wrapped around itself around the coil. Prices start at $1.55 each. Available colors are black, white and beige, and the wraps are available in lengths of four, eight, 12 and 16 inches.

Circle (158) on Rapid Facts Card

La Rue TCA-1 time code amp

The TCA-1 is a stand-alone time code unit that is capable of restoring extremely low-level signals while maintaining original transport synchronization information. Features include a low-noise balanced input stage, adjustable input gain of up to 50dB, a selectable time code filter, a built-in comparator and a compensating balanced/unbalanced output. List price is $295.

Circle (154) on Rapid Facts Card

Another LTM Light?

Yes.

11646 Pendleton St.
Sun Valley, California 91352
Phone: (818) 767-1313 • Fax: (818) 767-1442

LOS ANGELES • MIAMI • ORLANDO
NEW YORK • DETROIT • CHICAGO

Circle (35) on Rapid Facts Card

Trackplanner software from Gefen Systems

For use with IBM/compatibles or the Macintosh, Trackplanner is used to track and plan sound effects for the layout and execution of a cue sheet. The program logs the effects used for a given reel of tape or film, either in an off-line or on-line edit mode. Other features include VITC or LTC readers, a sound effects library database, and interfaces for either the Sony CDK-006 auto disc loader or the AudioAccess PX-240 auto disc player.

Circle (171) on Rapid Facts Card

OAP RLH1510 loudspeaker

The unit is a 3-way sound reinforcement loudspeaker system with 15-inch, rear-loaded woofer that increases efficiency and output while reducing distortion. A 10-inch direct radiator operating in its own enclosure covers the midrange. The system can be used in either fixed or portable applications.

Circle (155) on Rapid Facts Card

Juice Goose Micropower strip

Micropower is a 9V power strip for low-voltage ac effects equipment, eliminating external power supplies by supplying one rack-mount unit. A cable attachment connects the effects directly to one of five 1A connectors on the back of the unit. Micropower is compatible with products from Alesis, Valley International and Lexicon. Suggested retail price is $165.

Circle (156) on Rapid Facts Card

Alpha Audio time code module

The module is a retrofit time code reader for ¾-inch video machines such as the JVC CR-850 or Sony BVU-800. It has a wide-band time code reader and connects in-line with the serial data port, which allows the unit to supply the editor with code read from either the address track or an audio channel. Machines do not have to be modified to use the module.

Circle (159) on Rapid Facts Card

Sennheiser HD25 monitoring headphone

The HD 25 uses dynamic drivers in a closed supraural design, which allows them to be worn for extended periods. An adjustable split headband ensures a proper fit for each user, and a single-sided audio cable allows for more freedom of movement. One drive can be rotated off the ear onto the temple for cuing with a single muff.

Circle (152) on Rapid Facts Card

A *Light* Mic Pole.

Carbon fiber for light weight and structural strength. Extends and extends and extends. Available in a variety of lengths. And a shock mount and windscreen for all seasons.

A subsidiary of LTM France
Other offices in London, Paris, Nice, Cologne and Toronto

www.americanradiohistory.com

NEW PRODUCTS

Hardware and software updates

Akai MPC60, ASQ10 upgrade

Akai has released V 2.0 software for the Akai-Linn MPC60 MIDI production center and the ASQ10 MIDI sequencer, which increases the editing power and operating ease of both machines and adds several new features. New features include the support of 64 MIDI output channels, the capability of recording on all 16 MIDI channels at once and a multi-pitch mode. The upgrade consists of changing four chips in each unit and is free to all owners.

Circle (137) on Rapid Facts Card

LCR panning option for Soundcraft Series 8000

Soundcraft is offering a new Left-Center-Right (LCR) panning option for its Series 8000 sound reinforcement consoles, enabling an audio source to be positioned precisely within the left, center and right coverage areas. The new input module incorporates the addition of a center bus and a modified pan pot, which will still operate as a conventional L-R circuit unless the LCR button is pressed.

Circle (140) on Rapid Facts Card

Software and interface for Dyaxis system

A new MacMix V2.0 controller software package and an Abekas digital videodisc interface have been added to Integrated Media Systems' Dyaxis digital recording and random-access editing systems. The MacMix software provides improved digital mixing capabilities, time code slaving and dynamic real-time offset control, scrub editing, custom keyboard macros for dialogue editing and upgrades for radio production. The digital videodisc interface allows Dyaxis to be slaved to an Abekas A60 Series system.

Circle (141) on Rapid Facts Card

Magnetic Music software packages

The company has released three software packages for IBM PCs, PS/2s and compatibles, and the Yamaha C1 computer. The programs are Texture Classic 3.1, Roger Powell's sequencing software with new features and options; Prism, a 16-track sequencer package for less-experienced users; and Texture for Microsoft Windows, which uses Microsoft's multitasking, graphics-based windowing system. Retail prices are $199 for Texture Classic; $99 for Prism; and $299 for Texture for Microsoft Windows.

Circle (143) on Rapid Facts Card

Tascam 238 price reduction

Tascam has reduced the price of its model 238 8-track cassette recorder from $2,295 to $1,799. According to the company, the 8-track cassette format will soon be the standard for a large segment of the market.

Circle (142) on Rapid Facts Card

Software update for Lexicon 480L

Version 3.0 software for the 480L includes new parametric digital EQ programs, offering choices for stereo 2-band and mono 4-band. Additional control to the rate-changing samplers has been added, allowing them to play backward in addition to forward. The software is available for a nominal charge.

Circle (163) on Rapid Facts Card

Module options for Soundcraft SAC200

Soundcraft's new modules for the SAC200 radio console consist of simplified versions of the input modules and a new source select module. The modules allow users to specify the exact range of facilities needed and allow various operational functions to be accessible, although they have been removed from the front panel.

Circle (164) on Rapid Facts Card

Autolocator for Revox C270 recorders

The Revox autolocator is for the entire series of C270 recorders and features 18 storable start and stop addresses, a real-time display and LED tallies on all function keys. A foot switch allows punch in/out operation, and a buffer battery provides memory protection.

Circle (165) on Rapid Facts Card

Gefen Systems M&E update

Version 3.0 of M&E Organizer and M&E Library includes lookup tables for category and sub-category searches, a save window, set search constraints, extensive printing capabilities, the capability to set the screen colors and a new editor that allows users to add, delete and modify new and old libraries. The upgrade is avalable for IBM and Apple users; the upgrade price is $100 without the editor, or $350 with the editor.

Circle (172) on Rapid Facts Card

Cramolin spray update

Caig Laboratories is now making its Cramolin aerosol de-oxidizing solution with ozone-safe propellants. According to the company, the new propellant works as effectively and still retains its non-flammability. The spray is designed for cleaning, preserving and lubricating metal surfaces.

Circle (167) on Rapid Facts Card

NED optical disk

New England Digital has introduced an optical disk to be used with the Direct-to-Disk and PostPro systems. The disk's capacity is 2GB, or more than six hours of sounds recorded at 44.1kHz.

Circle (168) on Rapid Facts Card

New software for E-mu Emulator III

Software 2.2 for the EIII contains a 20-band digital equalizer, a digital compressor, dynamic digital filtering and improved stereo phasing. A user manual addendum is also included. The new version is free, with a $10 shipping and handling fee, to all registered owners.

Circle (169) on Rapid Facts Card

Disk recording module for AudioFrame

WaveFrame's hard-disk recording module, the DRM-4, is available in either 4- or 8-channel plug-ins that occupy one slot in the AudioFrame. Disk recording is switchable to either 16 or 24 bits, and can be expanded to up to 32 channels. The module costs $10,000.

Circle (170) on Rapid Facts Card

PRO-24 software update

Steinberg/Jones has released the third version of the sequencing software program for the Atari ST. Many new features and enhancements have been added and the owner's manual is new. Initially available only to registered users, the update is available to anyone who has not registered, or has moved without notifying the company, for $75.

Circle (189) on Rapid Facts Card

RE/P

www.americanradiohistory.com

CLASSIFIED

FOR SALE

BASF Cr02 in **SHAPE MK-10** shell C-90 — 99¢ 100 LOT

AGFA MAGNETITE-12 in **SHAPE MK-10** shell C-90 — 1.05* 100 LOT

ALSO... A/V supplies/equipment/parts. STUDIOFOAM acoustic foam ($19.99/sheet, 2+ lot), cleaning fluids, HI-DEFINITION speaker cable, DAT, Switchcraft, CD jewel boxes, editing blades, MRP computers, **Hewlett Packard Laserjets/Plotters**, HOSA patch cords & **MORE!** Air personality voice talent available, too

CARTUNES

PO Box 20384, Indianapolis, IN, USA 46220 (317) 257-6776

Serving professionals since 1977

*COD price. Tax/S&H extra. Other lengths/types available at similar savings

---

MAGNETIC RECORDING HEADS—RELAP/REPLACEMENT for Audio, Video, Time Code, Duplication. 29 years of head design experience. **IEM,** 350 N. Eric Dr., Palatine, IL 60067; tel. (312) 358-4622.

DRUM SAMPLE COMPACT DISC.

"Chock-full of the most useable drum sounds we've heard yet, with enough variety to suit many different styles of music."
KEYBOARD REVIEW OCT. '88

AVAILABLE NOW AT $99

PHONE (213) 650-8972

DO YOURSELF A FAVOR

If you're ready to buy any type of recording gear or musical instrument, do yourself a favor and call us before you buy. We have most name brands at some of the lowest prices you'll find anywhere. Call us before you buy, you won't regret it. (318) 989-1000.

BLEVINS AUDIO EXCHANGE INC.

"The South's Largest Pro Audio Broker"

"Your unused equipment is requested for our Nashville, TN showroom."
We have in stock consoles, tape machines, outboard equipment, microphones, etc. Available immediately, the following items:

Sony JH24's EMT 250 Reverb
MCI JH400, JH500 and JH600 consoles
Otari MRT 90's Studer 24's
And lots more.

(615) 391-0429
(615) 391-0456 FAX

EQUIPMENT

Harrison MR3 (36×24), Soundcraft 600 (24×16), Dolby M16/M8 (will accept SRs), Lexicon 224XL, Lexicon model 200, Eventide SP 2016, Ecoplate II, UREI 811s, Otari MX 5050 MK III 4, Macplus/Hyperdrive, Steinway M & **much more!!**
212-362-7840, leave message.

NEW, USED, DEMO EQUIPMENT

Trident consoles, Soundcraft 6000 28x24 w/bay, Amek mixers, Ampex MM1100 16TK, Akai/Roland Samplers, MCI JH110 1" 8TK, Panasonic and Sony RDAT's, Lexicon 200, 480L, Tascam 122MKII, Tascam 8/16 TK Recorders, Eventide H3000, Dolby 363SR.

Equipment Leasing Specialists
Experienced Staff/Unequaled Service

EAR Professional Audio-Video
(602) 267-0600

Brand New 19" ADC tt Patchbay Panels

Balanced/normalled, 144 points each. Cost $300—Sell $175 each, 2 for $300 or 3 for $400.

Call Roger Cordell
(818) 763-8301

AVR **AUDIO VIDEO RESEARCH** **(617) 924-0660**
THE STUDIO STORE

The Only Call You Have To Make For:

AKAI	DIC DAT Tape	MARK OF THE UNICORN	SHURE
AKG	EAW	MOGAMI CABLE	SOUNDCRAFT
ALLEN & HEATH	EVENTIDE	MRL	STUDIOMASTER
AMPEX TAPE	FOSTEX	MILAB	SUMMIT AUDIO
APHEX SYSTEMS	FOUR DESIGN	NADY	TANNOY
ARIES	FURMAN	NUMARK	TC ELECTRONICS
ART	GOLDLINE	OPCODE SYSTEMS	TELEX
ASHLY	HOSA	ORBAN	TWELVE TONE SYSTEMS
ATARI COMPUTERS	HYBRID ARTS	OTARI	US AUDIO
BBE	HYBRID CASES	PANASONIC	WHIRLWIND
BEYER DYNAMIC	INTELLIGENT MUSIC	PROCO	...and Many Others, Plus Used Equipment!!!
BIAMP—LEGEND	JOSEPHSON	RAMSA	
CALZONE CASES	KLARK TEKNIK	SENNHEISSER	
CANARE CABLE	LEXICON		

Exclusivamente para o Brasil, oferecendo instalacao e assistencia tecnica:
dbx JBL/UREI LEXICON
HARRISON KURZWEILL OTARI TRIDENT

AUDIO VIDEO RESEARCH 106 Main St. Watertown, MA 02172

Circle (41) on Rapid Facts Card

"World Class" Tapes & Duplicating

Agfa BASF 3M

- Digital Audio Tape (D.A.T.) In Stock
- Analog Tape, Audio Accessories
- Phone In Order, Ship Same Day
- Great Quality — Great Price
- On-Shell Printing

Call us at

(800) 365-0669

for prices on tapes & duplicating

World Class Tapes

Audio Tape Distributors & Duplicators

670 Airport Blvd., Suite 1
P.O. Box 7611
Ann Arbor, Michigan 48107
(313) 662-0669 (within Michigan)

Circle (40) on Rapid Facts Card

FOSTEX RECORDING EQUIPMENT
MACINTOSH & IBM Computers & compatibles
MUSIC SOFTWARE
Monitors & Printers

DISCOUNT PRICES
DATAWARE INC.

(we ship world wide)
P.O. Box 1122
Hollywood,Ca 90078-1122
(818) 996-1161

STUDIO MONITORS and OTARI TAPE RECORDER

Meyer 833 studio reference monitor system including processor, Tannoy SGM-1000 15" super gold monitors, Tannoy SGM-15B reference monitors, Otari MTR-12-I ½ inch 4 track.
AND **Electro Space** effects processors—"Spanner", "Pressor", "The Gate". **Audio Kinetics** Pacer synchronizer.
Call **TekCom** at 215-426-7354 for details.

www.americanradiohistory.com

STUDIOWORKS

Recording & Broadcast Equipment

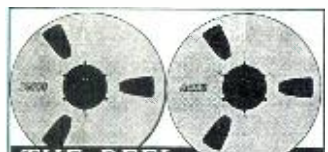
FACTORY DIRECT PRICES ON 3M & AMPEX TAPE

AKG	DBX	LEXICON
ART	DRAWMER	RAMSA
BBE	EV	OTARI
BEYER	JBL	OTHERS

SONY

Professional Audio

(800)438-5921/(704)375-1053



THE REEL DEALS ARE IN D.C.

Sony PCM-601 Digital Processors-$1.2K
Otari MX-70 16-track (used)- $12.5K
Otari-MTR-12CT Recorder- $10.9
Otari MK-III & BQ Series Recorders
TAC Matchless 36 x 24 Patchbay- $25K
TAC Scorpion 40 x 8 w/ 8 Aux- $17K
Soundtracs ERIC w/ Auto- Call
Soundcraft 8000 40 Input PA- $20K
AHB Sigma Series 36 x24- $26K
Quad 8 CoronadoConsole- $22K
Dolby 361SR- $1.4K
R-Dat Sony & Ramsa In-Stock

Washington Professional Systems
11157 Viers Mill Rd. Wheaton, MD 20902

301-942-6800

NEW & USED EQUIPMENT

Speakers

Gauss Co-Ax (used), $900 ea;
Fostex 765 (demo), $300 pr;
Fostex 780 (demo), $400 pr.

Recorders

Otari MTR 90-II, $33,000-$27,000;
Ampex AG-440, $1,500 ea. (3);
Otari MTR-12C (like new), $7,000;
Fostex E-22, ½", 3 head, $3,200;
TEAC 3-head cass. V570, $249.
AKAI 24 DIGITAL, CALL!

Microphones

AKG 414s new & used as low as $500;
E-V PL20s (new), $299;
Shure SM58 (new), $105.

Consoles

Studiomaster V 24x4 (demo), $3,200;
Soundtracs MR 24x4, 6 aux., $4,995.

Call for complete list.

OPUS

RECORDING & EQUIPMENT CO.
4262 Grand Avenue, Gurnee, IL 60031
"The Midwest Recording Center"
(312) 336-6787 FAX (312)336-6895

VELCRO CABLE WRAPS

Quick, safe, neat, never lost
Use them in Studio, Remote & Mtce Shop
Call or write for sample
VIDEO PARTS CO.
POB 1141
PEEKSKILL, NY 10566-8141
212-713-5757

EMPLOYMENT

24-Track Voice-Over Studios with Video Looking for Qualified Maintenance Personnel.
Contact Danny Zellman
212-683-6854

EQUIPMENT WANTED

WANTED: PULTEC EQ's

We will pay $1,000 for almost any Pultec program EQ models. Also wanted: Fairchild 670's and 660's any tube or ribbon microphones and limiting amps. Please call or write to:

Dan Alexander Audio
2944 San Pablo Ave.
Berkeley, CA 94702
(415) 644-2363
FAX: (415) 644-1848

SERVICE/REPAIR

Technical Service Specialists Inc.

Affordable nationwide design and/or construction of audio/video studios and facilities. Full line of electro-acoustical consulting, installations, and CAD/CAM services. Custom racks, cabinetwork, and tuning devices. Just completed turn-key project for Big Guy. For information call (914) 876-3999.

STUDER
REVOX
FACTORY AUTHORIZED
SERVICE CENTER
"SUPERLATIVE SERVICE"

Swiss trained in servicing A77, B77, A700, PR99, A67, B67, A810, A807, B710, A710 &C270. Fast 48-72 hour service w/90 day warranty. Huge parts inventory. VISA/MC. New & used machines available.

STUDIO-SONICS CORP.
2246 N. Palmer Dr. #100
Schaumburg, IL 60173
(312) 843-7400

RCA MICROPHONES—Repair service on all models. Complete sound and cosmetic restoration. 35 yrs. experience with RCA. ENAK Microphone Repair, 420 Carew Avenue, Pitman, NJ 08071. (609) 589-6186.

CASSETTE TEK, INC.

SPECIALISTS IN PROMOTIONAL CASSETTES FOR ARTISTS—PRODUCERS—AGENCIES

- Highest quality custom blanks audio and video VHS cassettes
- Duplication of audio and video
- EMBOSSED on-cassette printing using the PRINT RITE system
- Direct mail services
- Reasonable pricing
- Fast service

1605 THOMASTON AVE.
WATERBURY, CT 06704
TEL. (203) 757-4848

BUSINESS OPPORTUNITIES

Manhattan Studio Available

2 rooms; 24 track & MIDI. Office, shop, lounge & storage. Includes 2 central A/C systems, audio wiring, phone & alarm system. Completely renovated just 1 yr. ago. Great lease. $75K. **212-362-7840,** leave message.

Recording Studio

½ interest in San Diego's top recording studio. Fully equipped 24 track. Big room. Solid client base. Equipment and improvements valued at over one half million. 3 years remaining on lease with 5-year option. $150,000.
Call 1-800-HIT-SONG

MISCELLANEOUS

AUDIO AFFECTS

STUDIO EQUIP. FOR HIRE
Technician on staff 7 a.m. - 1 a.m.
Open 7 days a week
Digital Tape Machines,
Synclavier Systems,
Effects Processors, Reverbs
(213) 871-1104 (818) 980-4006
Ask For Mark

Fix It by FAX.
Faster Free Service!

FAX us your circuit, we'll FAX you our recommended modifications at no charge. Same day transformer shipping from stock.

jensen transformers
INCORPORATED

10735 Burbank Blvd. • North Hollywood, CA 91601
FAX (818) 763-4574 **Phone (213) 876-0059**
TELEX 6502919207 MCI UW
(Mon-Thurs, 9am-5pm Pacific time)

Circle (42) on Rapid Facts Card

www.americanradiohistory.com

MISCELLANEOUS

THE MOST COMPLETE SELECTION OF

AUDIO TEST TAPES

All formats including cassettes

Write or phone for free catalog

STL

STANDARD TAPE LABORATORY, INC.
26120 Eden Landing Road #5, Hayward, CA 94545
(415) 786-3546

Circle (43) on Rapid Facts Card

ACOUSTIC FOAM

GIANT
54"x54"
$19.99
Per Sheet!!

KILL NOISE QUICK! Soundproof studios vans rooms with super-effective, E-Z mount, 2" thick studio gray Markerfoam. Immediate shipping. Add $3.50 sheet shipping. NYS residents add 7% tax. MC Visa Amex COD Check Terms.
3" sheets also available at $29.99.

800-522-2025
(In NY 914-246-3036)

America's most unique catalog for the professional!

MARKERTEK™ VIDEO SUPPLY
145 Ulster Ave. Saugerties
New York 12477 U.S.A.

Circle (44) on Rapid Facts Card

A U D I O

Cassettes

AS EASY AS...

1. REAL TIME DUPLICATION
2. HIGH SPEED DUPLICATION
3. CUSTOM BLANKS

ESP MEANS QUALITY FULL SERVICE PRINTING AND PACKAGING, FRIENDLY PROFESSIONAL SERVICE, COMPETITIVE PRICES, FAST TURN-AROUND AND HIGHEST QUALITY RAW MATERIALS.

ESP EASTERN STANDARD PRODUCTIONS, INC.
26 Baxter St., Buffalo, NY 14207
1-716-876-1454

CALL TOLL FREE:
1-800-527-9225

V I D E O

Circle (45) on Rapid Facts Card

MISCELLANEOUS

DISC MAKERS

MONEY SAVING PACKAGES
COMPLETE MANUFACTURING
CASSETTES CD'S, LP'S & VIDEOS

PROFESSIONAL DESIGN DEPT.
CALL FOR CATALOG
1-800-468-9353

Just the fax...

Now it's easier than ever to run your ad in Recording Engineer/ Producer's Classified Advertising section. All you need to do is fax your ad and we'll take care of the rest.

Easy, right?

Fax #913/541-6697

Attention: Renée Hambleton, Classified Ad Mgr.

MISCELLANEOUS

ENDLESS WORD™

ADVERTISING PROMOTIONS
VOLUME IN STORE P.O.P. and TELEPHONE ON HOLD MESSAGES
IDEAL FOR HI-SPEED or REAL—TIME DUPLICATING

- Made in U.S.A. & Quality tested before shipping.
- Lengths from 20 sec. to 20 min.
- Special non-stretch tape.
- Plays vertical or horizontal.
- Clear case permits visual cuing.
- Ask about our new volume discount pricing & low cost endless cassette promotional players and new F.C.C. approved multi-line telephone adapter for messages on hold tape players.

MANN ENDLESS CASSETTE INDUSTRIES
P.O. Box 1347 • San Francisco, CA 94101
(415) 221-2000 Ext. 2
Fax: (415) 387-2425

Caution DAT Buyers!

Some dealers are offering DAT equipment that is not designed for use in the U.S. and is not covered by a legally binding written warranty. You need to know the facts on DAT - Call the DAT hotline today! 609-888-4414.

RENTAL EQUIPMENT

Rack Attack™

∞ Digital Processing Systems ∞

AMS 1580S
AMS RMX-16
Lexicon 480L
Lexicon PCM-70
Lexicon PCM-42
Quantec QRS
Quantec XL
Eventide SP-2016
Eventide H-3000
Publison Infernal 90
TC Electronics 2290
Yamaha Rev 5

Above system as low as $285/day

other combinations available

A...*unique* Audio Rental Co. specializing in complete 'Rack Systems' of high-end audio processors.
Featuring a savings of 70% or more, over that of single piece rentals. Each modular rack contains various configurations of the finest audio processors.....available for mixing *or* tracking. All racks come with their own remote patchbay and interconnect cabling....thus greatly reducing the set-up and tear-down times.
The *mixing rack*, known as the
"Rack Attack"
(featured to the left) contains 12 pieces of equipment. Tracking racks feature pieces from Neve, Tube-Tech, George Massenburg Labs, API, Teletronics, Drawmer, Aphex, etc...Configurations of any size are now available allowing us to fit every project's needs, no matter how large or small.
* We ship anywhere in the world *

70% Savings

Outboard Rentals **(818) 998-1024** Hollywood, CA **Systems Include Remote Patchbay**

Circle (46) on Rapid Facts Card

www.americanradiohistory.com

ADVERTISER'S INDEX

	Page Number	Rapid Facts Number	Advertiser Hotline
Acoustics Design Group	25	13	
ADX Systems	66	34	212/532-5576
Agfa Corporation	9	8	201/440-2500
Akai/IMC Pro EMI	27	14	817/336-5114
Alesis Corporation	63	37	
Alpha Audio	55	27	804/358-3852
American International Audio Video	37	19	609/888-4414
Audio Technologies, Inc.	34	17	215/443-0330
Canare Cable, Inc.	49	22	818/365-2446
Clarity Cassette Duplications	61	32	800/458-6405
Countryman Associates	59	31	415/364-9988
Crown International	33	16	219/294-8222
The DAT Store	51	24	213/828-6487
Eastern Standard Production	71	45	800/527-9225
Francis Daniel Acoustician	51	25	212/874-0590
Gauss	53	26	213/875-1900
GML	11	9	818/781-1022
JBL Professional	BC	3	
Jensen Transformers, Inc.	70	42	213/876-0059
Joiner-Rose Group	15	11	214/392-7800
Kaba Research & Development	55	28	800/231-TAPE
LTM Corp. of America	67	35	818/767-1313
Markertek Video Supply	71	44	800/522-2025
Neve, Inc.	23	12	203/744-6230
Otari Corp.	3	5	415/341-5900
Peavey Electronics Corp.	13	10	601/483-5372
Polyline Corp.	49	23	312/298-5300
Pro Co	56	29	800/253-7360
Radian Audio Engineering, Inc.	47	21	714/961-1213
RPG Diffusor Systems, Inc.	31	15	301/249-5647
Sam Ash Professional	61	33	516/932-3810
Sony Broadcast Products Co.	21		800/635-SONY
Soundcraft USA	17		818/893-4351
Soundtracs Division/Samson Technologies	1	4	516/932-3810
Sprague Magnetics, Inc.	59	30	800/553-8712
Standard Tape Laboratory, Inc.	11	43	415/786-3546
Studer Revox/America	IFC	1	615/254-5651
Tannoy North America, Inc.	43	20	519/745-1158
Tascam Division/TEAC Corp.	7	7	213/726-0303
Technical Audio Devices	5	6	213/816-0415
Telex Communications, Inc.	35	18	612/887-5531
Yamaha International Corp.	IBC	2	

SALES OFFICES

CLASSIFIEDS
Renée Hambleton
913-888-4664
9221 Quivira Road
Shawnee Mission, KS 66215
Telefax: 913-541-6697

SANTA MONICA, CA
Herbert A. Schiff
213-393-9285
Jason Perlman
213-458-9987
Chris Woodbury Leonard
213-451-8695
501 Santa Monica Blvd.
Santa Monica, CA 90401
Telefax: 213-393-2381

CHICAGO, IL
David Ruttenberg
312-435-2360
55 East Jackson Blvd.
Chicago, IL 60604
Telefax: 312-922-1408

NEW YORK, NY
Stan Kashine
212-702-3401
29th Floor
866 Third Ave.
New York, NY 10022
Telefax: 212-702-7802

OXFORD, ENGLAND
Nicholas McGeachin
Roseleigh House
New Street
Deddington, Oxford
OX5 45P England
Telefax: (0869) 38040
Telephone: (0869) 38794
Telex: 837469 BES G

FREWVILLE, SOUTH AUSTRALIA
John Williamson
Hastwell, Williamson, Rep. Pty. Ltd.
109 Conyngham Street
Frewville 5063
South Australia
Phone: 799-522
Telefax: 08 79 9735
Telex: AA87113 HANDM

TOKYO, JAPAN
Mashy Yoshikawa
Orient Echo, Inc.
1101 Grand Maison
Shimomiyabi-Cho, 2-18
Shinjuku-ku, Tokyo 162, Japan
Telephone: 03-235-5961
Telex: J-33376 MYORIENT

www.americanradiohistory.com

Listen to what engineers in 47% of all recording studios have already heard.* And what they haven't.

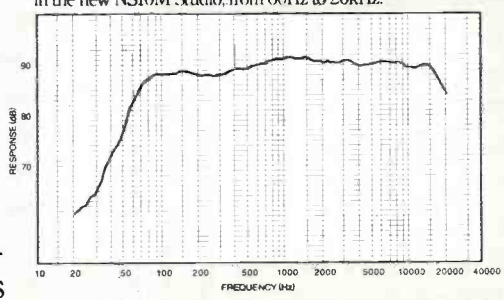
What we're going to tell you about the new NS10M Studio reference monitor may sound familiar, and for good reason.

The NS10M Studio is based on our legendary NS10M which, judging from its popularity in recording studios, delivers the near-field acoustic imaging that most engineers have demanded.

So rather than listen to competitive monitors to improve the NS10M, we listened to professionals like you.

And ended up retaining the best aspects of the NS10M's performance, while enhancing others.

Frequency response remains exceptionally smooth in the new NS10M Studio, from 60Hz to 20kHz.



That means you can expect the same smooth frequency response. The same high-power handling capability. And the same ability to take on the stresses of a longer duty cycle. All while maintaining accurate spatial definition without inducing listener fatigue.

Listening to what engineers needed also meant making refinements designed specifically for the studio environment.

Like connector terminals that accept large-diameter speaker cable for optimum signal quality. A 3.5cm dome tweeter with built-in acoustic damping tailored for near-field monitoring. And a horizontal configuration so the NS10M Studio never gets in your way.

And because it takes a pro to better service a pro, the NS10M Studio is sold exclusively through authorized Yamaha Professional Audio dealers.

The NS10M Studio.

Proof that at Yamaha, we listen to professionals as much as professionals listen to Yamaha.

Yamaha Music Corporation, Professional Audio Division, P.O. Box 6600, Buena Park, CA 90622. In Canada, Yamaha Canada Music Ltd., 135 Milner Avenue, Scarborough, Ontario M1S 3R1.

*1987 MIX Magazine Annual Recording Industry Directory

YAMAHA®
Engineering Imagination™

Circle (2) on Rapid Facts Card

www.americanradiohistory.com

It's Time To Rack Up Another Hit.

It's hard to follow a great act. Expectations run high. The performance must be flawless. When we decided to carry the legacies of our LA-2A, LA-4 and 1176LN into the next generation, we knew exactly what we were getting into.

The 7110 combines the smooth predictable RMS style performance of the LA-4 with the precise automatic peak control of the 1176LN.

Our new 7110 Limiter/Compressor incorporates the characteristics of its predecessors, is the natural addition to a legendary line and has all the potential to become a major hit in its own right. The 7110 combines both peak and average limiting action, producing smooth, predictable RMS style performance like the LA-2A and LA-4 with the precise automatic peak control of the 1176LN.

The 7110, with our exclusive program dependent Smart-Slope,™ gives you adjustable compression curves from 1.5:1 through infinity:1. You set threshold, attack, release time and output level – the 7110 automatically rides the gain with split second response.

To make set-up as simple as possible, we've included an Automatic Preset function. Punch the button on the front panel – the 7110 automatically defaults to program dependent attack and release times, and presets the peak threshold and ratio to consistently used settings. Perhaps the best news of all, the 7110 produces crystal clean sound and is virtually transparent.

Just another limiter/compressor? We don't believe so. After you've heard it for yourself, we think you'll agree. Stop by your local JBL/UREI dealer and give it a listen. And, get ready to rack up another hit.

JBL **UREI ELECTRONIC PRODUCTS**

JBL Professional
8500 Balboa Boulevard, Northridge, CA 91329

© 1988 – JBL Incorporated A Harman International Company

Circle (3) on Rapid Facts Card

www.americanradiohistory.com