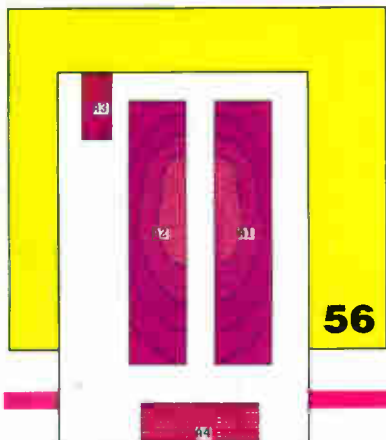


# SOUND & COMMUNICATIONS

Volume 39 Number 11

November 29, 1993



## UPTOWN SOUND

When Barneys opened its posh doors on the ultrachic Madison Avenue, the media mar-

ked to cast doubts on the tension of the downtown department store. Noticed the sound system? Barneys did. **36**

0299 3E023 9211UATA11EC  
00167007 BE  
MARK GAMBER/PRES  
BEAR BOUND & COMMUNICATION  
21000 W WINFIELD RD  
TOPANGA CA 90290

## THE 95TH AES CONVENTION

The Sound & Communications staff presents its various views of the recent convention — with agreement and disagreement. What were the high points? What was the buzz? Who was there?

Our roving reporters tell all — in four parts, all in this issue. **12**

### IN THIS ISSUE

#### • AUTOMATIC MIC MIXERS, PART THREE

We continue our series on automatic microphone mixers, emphasizing who can use them, when they use them and why they use them. And when is a person better than auto-pilot? **46**

#### • UNDER THE BOARDWALK

The sound on the beach was feedback dominated and had to be fixed. Wireless mics, an elevated speaker system and distributed sound went toward making the music better — and culminated in a Labor Day concert attended by 16,000 people. Beach conditions made working hard. Armed with sunglasses and sunscreen the installers finished the job. **52**

#### • DR. WOKKA'S QUESTIONS

Dr. Wokka has outdone himself. He has designed a scientific questionnaire to test your natural aptitude as an acoustical consultant or sound installer (or publisher — but here we don't agree and part ways with the doctor). Dr. Wokka responds to a query on the subject, from France. **65**



## FOOTBALL DEADLINE

The panic of reality set in when the contractor had only two months to design and install a sound system for a football stadium. The university itself was skeptical — because new equipment was specified. A wind-proof structure was built on the roof to house the speakers. And all went well and opened on time. **42**





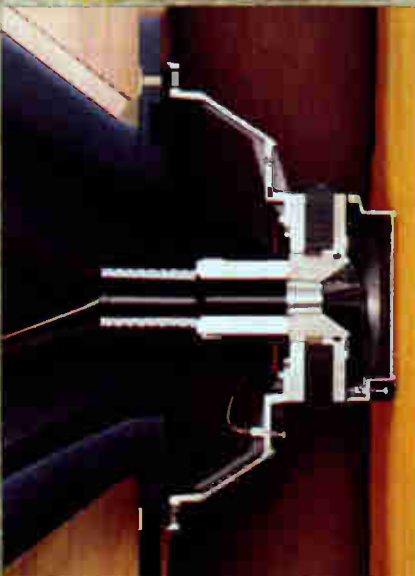
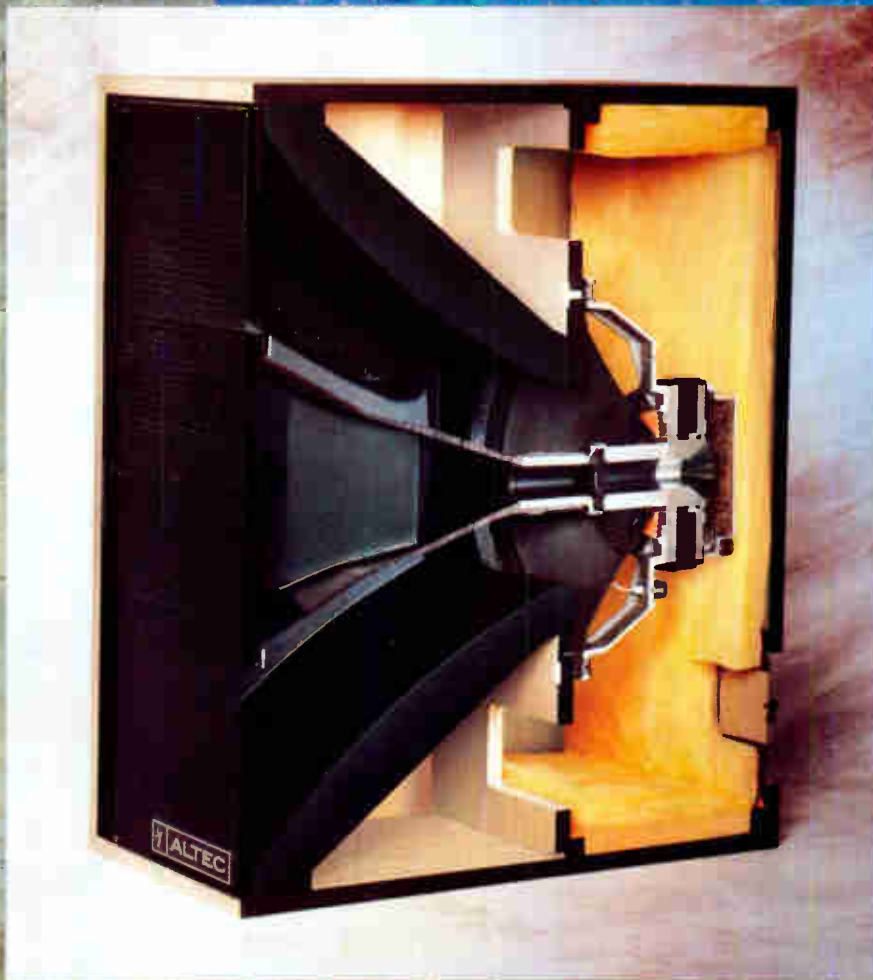
# ALTEC 9864-8A

## THE ACOUSTIC ENGINE WITH A SPLIT PERSONALITY

**A**ltec Lansing has literally redefined the approach of full-range loudspeaker design with the introduction of the revolutionary 9864-8A vented bass duplex horn system. The 9864-8A is the first and only full-range, point source, constant directivity, loudspeaker system in a single enclosure.

The heart of this innovative system is its "engine": a true coaxial or Duplex<sup>®</sup> design. The low-frequency and high-frequency components feature a single integrated driver which is capable of handling 550 watts of continuous power while providing 130db SPL from 50Hz to 18kHz with directivity control down to 200Hz. The unique cabinet not only acts as a housing for the "engine" but also as an acoustic propagation guide for the lower frequencies.

- ❖ Compact Enclosure
- ❖ Single Point Source
- ❖ High-Output
- ❖ Excellent Directivity Control
- ❖ Cabinet Allows Refinishing
- ❖ Cost Effective
- ❖ Ease Of Installation



### Primary Specifications

<b>System Type:</b>	Vented bass horn type, full range loudspeaker
<b>Pressure Sensitivity:</b>	HF: 109 dB SPL (1 w, 1 m) LF: 104 dB SPL (1 w, 1 m)
<b>Frequency Response:</b>	50 Hz - 18 kHz (equalized)
<b>Power Handling:</b>	HF: 75 w, AFS: 150 w, continuous program: 300 w, peak power LF: 200 w, AFS: 400 w, continuous program: 800 w, peak power
<b>Maximum System Output:</b>	127 dB SPL, AFS method: 130 dB SPL, continuous power; 133 dB SPL, peak power
<b>Dimensions:</b>	31.5 in. (80.0 cm) high, 25.3 in. (64.3 cm) wide, 25.5 in. (64.8 cm) deep
<b>Net Weight:</b>	124.0 lbs. (56.2 kg)



Altec Lansing Corporation  
P.O. Box 26105  
Oklahoma City, OK 73126-0105  
Phone: 405/324-5311 • FAX: 405/324-8981

© 1993 Altec Lansing Corporation - A Mark IV Company

Circle 214 on Reader Response Card





top: 431 Series II 31-band single rack unit EQ \$249.95

bottom: 830 Series II stereo 15-band EQ, \$249.95

# Fill your rack without emptying your pockets.

We build more equalizers than anyone else in America, and we sell them all over the world.

And now we're introducing the new Series II, with 5 EQ's and 5 signal processors. More than just a new look and feel, DOD Series II EQ's are engineered and built "smart", using the latest Computer Aided Design techniques, and the highest manufacturing standards.

We've even lowered the price to give you more value, and made them the best performing units in their class.

**RTA Series II**  
Real Time Analyzer  
**\$359.95**



Quick, easy and accurate setup of your system to almost any environment. Includes calibrated microphone and pink noise generator.

These new models offer 12dB of boost & cut on ISO standard center frequencies, and FET switches for the low-cut and bypass functions to eliminate annoying 'thumps'.

With a signal-to-noise ratio greater than -90dB, and harmonic distortion less than .006% @ 1kHz, they're ideal

for PA, club, or lounge installations, or for your studio recording projects.

Come and listen to all the new Series II products at your favorite dealer today... or call or write us for more information.

Fill your rack with DOD and you can keep the change in your pocket.

## DOD

8760 South Sandy Parkway • Sandy, Utah 84070  
(801) 566-8800 • Fax (801) 262-4966  
Int'l Fax (603) 672-4246

**H** A Harman International Company

# CONTENTS

Volume 39 Number 11

November 29, 1993



12



42



52

## FEATURES

### 12 AES CONVERSATIONS

*By Judith Morrison, Mike Klasco,  
Neil A. Shaw and Rob Baum*

Four different reporters, four different opinions of the recent Audio Engineering Society shindig. We get the buzz and the feedback.

### 36 BARNEYS ON MADISON AVE

*By Mark Miller*

A classic sound system for a classy, ultra-chic, uptown department store in New York was the aural style. But the speakers had to be as invisible as the Madison Avenue location was conspicuous.

### 42 THE HORNED FROGS' HORNS

*By Chris Jordan*

Texas Christian University's 46,000-seat Amon G. Carter Stadium was in need of a new sound system . . . in two months! But Electro Acoustics was able to get the job done. And now the TCU Horned Frogs have their new horns.

### 46 AUTOMATIC MIC MIXERS, PART THREE

*By Rob Baum*

A discussion about the hows and whens of using these devices; along with proper methods and a buyers guide. Can you use automatic microphone mixers for music and how about virtual mixing?

## DEPARTMENTS

### 6 LETTER FROM THE EDITOR

### 9 NEWSLETTER

### 4 *Sound & Communications*

### 52 FIRST PERSON: THE FESTIVAL OF THE ATLANTIC "OUTDOOR SOUND SYSTEM"

*By Stephen Minozzi and Robert Pelepako*

### 56 INSTALLATION PROFILE: MAKING THE PASTOR INTELLIGIBLE AND MAKING THE DESIGN AND EQUIPMENT WORK TOGETHER

*By Richard Harbour*

### 65 DR. WOKKA: A PERSONAL PROFILE FOR YOUR PART IN THE SOUND INDUSTRY

*By Dr. Wilhelm Wokka III*

### 67 NEWS FROM AROUND THE INDUSTRY

### 70 PRODUCTS


### 74 LITERATURE

### 74 PEOPLE

### 76 AD INDEX

### 76 MARKETPLACE

### 78 PRODUCT CHECK: WORSHIP CENTERS



You can look high  
and low and never find a better  
performing line.

For years, sound contractors have looked to Shure for standard-setting solutions to every microphone need. And our Microflex line is no exception. It features a fixed-installation mic for every application, from conference rooms to church sanctuaries. Low-profile, high-performance microphones that suspend from the ceiling, attach to the podium or mount on the floor.

And each one delivers the legendary performance, reliability and outstanding value that have made Shure the world leader in microphone sales, selection and design.

For a closer look at the line that sound contractors are looking up to, call 1-800-25-SHURE for information on Shure Microflex miniature condenser microphones.

**SHURE**<sup>®</sup>  
microflex™





# Disagreement in the Trenches

There was a disagreement in our office last week. My side won (that's why Mike Klasco calls me the Editor 'n' Queen). Actually Mike and I were on the same side in the argument which took in several editorial and advertising people. The issue was the importance of a particular sound product. I won't divulge all the nasty details, but I want to point out that we have disagreements, just as you do within your organizations. And I, despite being the fascist editor (this is decidedly not a democracy), am fortunate enough to have people throughout the organization who I can trust and who sometimes prove me wrong (yes, moi).

Outside of our organization, there are plenty of you to help prove me wrong. You call and let me know. And I want you to know that I — and we — appreciate that. A magazine doesn't exist unless it fulfills the needs of its readers. And any trade magazine worth anything needs a dialogue with its readers, and feedback from its readers.

Most of you look at the masthead and call me, or Steve Jacobs, or Mike Klasco, or even Vinny Testa. Sometimes some misdirected people call the advertising director, which is fine, since he's a nice guy. But we in the editorial department take responsibility — both credit and blame — for everything in this magazine (except for advertising).

Which brings me back to our original disagreement — on coverage. The editor decides. How happy for me. But you'd better help. Our next issue will feature an annual report on the state of manufacturing. We'll be talking to you soon.

As for this issue of Sound & Communications, I solved any disagreements that might arise with no effort at all. I just assigned AES wrap up stories to whomever wanted to write one.


During the AES convention, it was hard to gain perspective, since once



again we were all busy wearing many hats. As most of you know, Testa Communications, the publisher of Sound & Communications, also produces television news shows at conventions such as NAB, CES, NAMM, NSCA — and, of course, AES. AES-TV News was on the air each day of the convention, with a new show each day, delivering the news of AES to convention hotel rooms and to the exhibit floor.

This is a personal thank you to all the exhibitors who made our lives easier by letting us know in advance at least a hint of what they were showing — so that we could schedule camera crews and write the scripts in a timely manner. We do know how to keep secrets. Thanks.

Best regards,

  
Judith Morrison  
Editor in Chief

## SOUND COMMUNICATIONS

Publisher/Editorial Director  
Vincent P. Testa

Editor-in-Chief  
Judith Morrison

Technical Editor  
Mike Klasco

Associate Editor  
Steve Jacobs

Research Assistant  
Sacha Landreneau

Contributors

Rob Baum, Richard Harbour,  
Clifford Henriksen, Chris Jordan,  
Mark Miller, Steven Minozzi,  
Robert Pelepako, Neil Shaw

Technical Council  
Dr. Mort Altschuler

Professor Audiology, Hahnemann  
University, Chief of Audiology,  
V.A. Hospital, Phila, PA

C. Leroy James  
Rees Associates, Inc.

Richard N. Jamieson  
Jamieson and Associates, Inc.

Russell Johnson  
Artec Consultants, Inc.

Joel Lewitz  
Lewitz and Associates

Daniel Queen  
Daniel Queen Associates

Jon Sank  
Cross Country Consultants

Neil A. Shaw  
Menlo Scientific Acoustics, Inc.

William R. Thornton  
Phd, PE

Art Manager  
Alicia Celli

Artists  
Janice Kallberg, Janice Pupelis,  
Wendy Ser, Lori Villardl

Production Manager  
Steven Thorakos

Traffic Manager  
Ron Perone

Electronic Composition  
Kerri Ann Ball

Diane Catanzaro  
Kim Marchica

Circulation Director  
Debbie Vanderneut

Advertising Manager  
John Carr

Classified Ad Manager  
Patricia Torrisi

Associate Publisher  
Nancy Davis

Editorial and Sales Office  
Sound & Communications  
25 Willowdale Avenue  
Port Washington, New York 11050  
(516) 767-2500  
FAX: (516) 767-9335



Sound & Communications • DJ Times  
Post • Producer  
Sound & Communications Blue Book  
The Music & Sound Retailer • The Retailer Red Book  
The Music & Sound Buyer's Guide  
CES-TV News • NAB-TV News • NAMM-TV News  
NSCA-TV News • AES-TV News

# LMS

# Loudspeaker Measurement System

*Solution!*  
New!  
Version 3.5

At last, there is a complete and affordable analyzer system that provides quality data suitable for real electro-acoustic engineering purposes. The LMS system provides a vast array of powerful computer based features which are specifically focused on the unique requirements of loudspeaker development and QC production testing.

Whether your application is professional audio, consumer stereo, car stereo, or direct contract installation, LMS is the perfect tool for development and testing of loudspeaker systems.

No other measurement package today provides as many outstanding features and capabilities at such an affordable price!



### System Utilities and Features

The system software provides a host of powerful utilities and processing features which enable the user to perform many complex and tedious tasks easier than ever before. Unlike most other analyzer software which is oriented towards single curve use, LMS handles multiple curve display and operations with a versatile 20 entry library database.

- ✓ Curve library system for multi-curve operations
- ✓ Macro programming of operation for QC testing
- ✓ Standard and user selectable Frequency Ranges
- ✓ Relative and Absolute PASS/FAIL Compare
- ✓ Import and Export Data to ASCII files
- ✓ Speaker Parameter Generation
- ✓ SPL/Z Combo Conversion
- ✓ Nyquist Plot Conversion
- ✓ Polar Plot Conversion
- ✓ Tail Slope Correction
- ✓ Multi Curve Averages
- ✓ RLC Meter

### Analyzer System Specifications

- ✓ Full Length IBM PC Slot Card, 8 Bit PC Slot
- ✓ Oscillator: Continuous or Gated Swept Sine Wave
- ✓ Osc Maximum Output: +16dBm (5Vrms)
- ✓ THD: 0.015%, 20Hz-20kHz
- ✓ Frequency Resolution: 200 steps/decade, Log
- ✓ Filters can track Osc frequency by any ratio
- ✓ SPL Measurement Range: 35-125 dB-SPL
- ✓ Video graphics support: VGA, EGA, CGA, HGA
- ✓ Calibrated 8mm Electret Mic with Preamp
- ✓ Frequency Range: 10Hz-100kHz
- ✓ Osc Attenuator Range: 60dB In 0.25 dB Steps
- ✓ Frequency Range: 10Hz-100kHz
- ✓ Dual State-Variable Filters LP/HP/BP/BR
- ✓ System Signal to Noise Ratio: 90dB
- ✓ XLR Interface: Osc out, Bal Input, Mic Input
- ✓ 354 Page Manual with Application Notes

### Printer/Output Formats

LMS supports a large number of printer standards, and even supports numerous desktop publishing graphic formats in both B&W and color! Portrait and Landscape orientations in any custom size and aspect ratio are also possible.

- ✓ IBM/Epson 8 Pin Dot Matrix
- ✓ NEC, Epson, Toshiba 24 Pin
- ✓ HP LaserJet, DeskJet Series Printers
- ✓ HPGL Compatible Plotters
- ✓ PostScript Printers- B&W,Color
- ✓ PostScript EPS/TIF B&W,Color
- ✓ DXF AutoCAD Vector Plots
- ✓ AI Adobe Illustrator B&W,Color
- ✓ TIFF, BMP, PCX Bit Image Plots

**Call Today for a free Demo Disk! Tel: (503) 620-3044**

**International Dealers:** Argentina:Interface SRL (54-17782-13/Australia:ME Technologies 61(0)955-2200/Austria:Audiomax 43(0)71-31-162225/Belgium:Belram 32(0)2-736 50 00/Brazil:SDS Equipamentos 55(0)11-887-7597/Canada:Germaudio 416 696-2779/China:Rhyming Industrial 86(7620)562-0111/Denmark:Finland:A&T Ljudproduktion 46(0)8 623-08-70/France:Belram 32 012 736 50 00/Germany:Audiomax 49-71-31-162225/Indonesia:Kenw Audio 62(0)21-380 2118/Italy:Outline snc 39-30-3581341/Korea:Sammi Sound 82(0)2-463 03 94/Luxembourg:Belram 32(0)12-736 50 00/Malaysia:ADVI 65-283-2544/New Zealand:ME Technologies 61-65-50 2254/Norway:A&T Ljudproduktion 46(0)8-623-08-70/Poland:Inter Americom 48(22)43 23-34/Singapore: ADVI 65 283 2544/Spain:Audio Equipment Services 34(94)681-81-20/Sweden:A&T Ljudproduktion 46(0)8 623-08-70/Switzerland:Audiomax 49-71-31-162225/Taiwan:Gestor 886-2-562-3883/Thailand:ADVI 65-283-2544/The Netherlands:Duran Audio 31-41-80-15983/Turkey:Silver Productions 44(0)722-336221, UK(England):Munro Assoc 44(0)71 379-7600.



LinearX Systems Inc/7556 SW Bridgeport Rd/Portland, OR 97224 USA/TEL: (503)620-3044/FAX: (503)598-9258  
Circle 201 on Reader Response Card



# Platform™



## FAR MORE PERFORMANCE IN A LOT LESS SPACE.

*Products with greater capability, flexibility and function are the very foundation of Platform. This extraordinary collection of modular components gives you the ability to create, without compromise, your own custom tailored signal processing system, to precise, even unusual, specifications. With its unique modular architecture, Platform gives you the building blocks necessary to construct a virtually perfect system in less space than ever before.*

*To achieve the same signal processing capability with currently available products, you'd need individual comp/limiters, expanders, gates, de-essers, mic/line inputs and outputs, noise reduction plus a fair amount of EQ. And at least 8 to 10 RU of precious space, maybe more. Only Platform lets you pack a fully integrated system, with optional remote control via RS-232, MIDI and switch closures, into a rugged 3RU rack mount chassis complete with a universal switching power supply (100-240 V range).*

*Perhaps the best news of all. Platform handles tight budgets with the same ease it fits the tightest space constraints. Platform is also sufficiently open-ended enough to adapt to future needs without functional or economic limitations. So, before you specify another signal processing system, give our FlashFax™ number a call at (818) 895-8190, reference #837, and get your copy of our Platform technical summary via fax.*



UREI • 8500 Balboa Boulevard, Northridge CA 91329 • Phone: (818) 893-8411

**H** A Harman International Company



# NEWSLETTER

## **CCTV ENCOURAGED**

The Closed Circuit Television Manufacturers group of the Electronic Industries Association is making an effort to encourage CCTV people to display at and attend the NSCA convention. In addition, the CCTV people are considering a dedicated CCTV show in 1994.

## **CES WORKSHOP PROGRAM PLANNED**

The Consumer Electronic Show has redesigned its workshop program into a series of tracks and modules. The new format debuts at the 1994 International Winter Consumer Electronics Show in Las Vegas, January 6 through January 9. Participation cost is included in the badge registration fees. SoHo (small office/home office), desktop video, multimedia, mobile electronics, high end audio and government relations are among the 14 track topics schedules. More than 30 sessions are under development. Each track is planned as a complete three hour, one day event. The modules are Industry Direction and Trends; Technology Roundtables; and Retail and Marketing Sessions.

## **AIPHONE GETS ISO CERTIFICATION**

Aiphone Corporation has announced that it has been notified by its manufacturing parent, Aiphone Company in Nagoya, Japan that Aiphone has been awarded ISO 9001 Certification. Aiphone says it is the only intercom manufacturer in Japan to win the ISO Certification, and that it is the only one selling in North America. (Previously, Aiphone was awarded the Deming Prize for quality control.)

## **IBM HOLDS "ADVANCED SOLUTIONS" FORUM**

Users of the IBM Application System/400 platform described their implementations of client/server solutions in an October 26th forum held at IBM's New York City offices. The customers detailed how they were able to use the AS/400's multimedia, imaging, wireless and telephony capabilities.

Information systems executives from Massachusetts Financial Services, CIBA Vision and Dry Storage Corporation highlighted their experiences with the AS/400 server. Solutions for businesses were featured, including those used by Merv Griffin's Resorts Casino Hotel and Veratex Corporation. In the case of Merv Griffin's Atlantic City showplace, the hotel uses Ultimeia Host Support/400 on the AS/400 to provide customers with a redemption process for awards earned in the casino. Patrons accumulate awards on a plastic card that can be inserted in one of 15 multimedia kiosks and receive entertainment and merchandise certificates.

## **DRAGON SYSTEMS RECEIVES AWARD**

Dragon Systems has announced that it has been awarded a Technology Reinvestment Project by the U.S. government to develop technology to enable people to talk to handheld computers. Analog Devices will develop a series of digital signal processors to run Dragon Systems' speech recognition software.

## **PANASONIC INTERACTIVE MEDIA DIVISION**

Panasonic Company has established an Interactive Media Division dedicated to the development and marketing of a new generation of consumer products. The first product to be marketed is the Panasonic REAL 3DO interactive Multiplayer. Panasonic's player is the first to come to market using 3DO's technology which the company has exhibited at conventions. The price of the player is \$699.95. The player used an enhanced compact disc with fast animation and sound processors.

## **NEW STANDARDS FROM AASA**

The Standards Secretariat of the Acoustical Society of America is releasing three sets of acoustical standards. They focus on sound from portable electric power tools, stationary and fixed electric power tools, and gardening appliances; guidelines for obtaining noise level data from manufacturers of stationary equipment; and the second part of a series concerning the description and measurement of outdoor environmental noise.

# NEWSLETTER

## **CEDIA NAMES CHARM**

CEDIA, the Custom Electronics Design and Installation Association, has named Orrin Charm chairman of its Systems Integration Council. Charm is the director of engineering for Interior Systems Design, Inc. in Los Angeles. He succeeds Michael Avery. The Systems Integration Council was established to collect and disseminate information on the integration or combination of residential electronics systems. Its membership includes manufacturers as well as designer/installers. The council has 21 members including representatives from Ademco, AMX, Intellon, Microsoft, Panasonic Technologies, Parks Associates, Square D, Unity Systems, Voyager Technologies, and X-10.

## **NSCA SEARCH FOR MARKETING MANAGER**

Jack Toerner, president of the National Sound & Communications Association, has announced a search for a Marketing Manager "to develop and coordinate the overall marketing activities of the Association." Toerner said, "Through the years, our value to the members has increased dramatically with important programs, some with high visibility and others more behind the scenes. We now need to provide even greater numbers of more diversified benefits." Background required of the Marketing Manager includes: having worked in the industry, a marketing and/or business degree, public speaking ability, and written communication skills. Interested parties should contact NSCA headquarters at 800-446-NSCA.

## **ZENITH AND BASSETT JOIN FORCES**

Bassett Furniture Industries and Zenith Electronics Corporation have announced plans to develop a line of integrated home theater furniture systems. Bassett is designing home theater furniture pieces, including modular wall systems, to complement Zenith TVs.

## **E-V BEGINS COMPUTER CONTROL FRIENDLY PRODUCTS**

Electro-Voice has announced that "many of its electronic products" will now feature computer control compatibility. All of the company's mixers, amplifiers and signal processing devices for fixed installation and concert touring markets will include a port allowing for retrofit of all current and future computer control devices and interfaces. The Mark IV Audio Group, which includes Electro-Voice, has entered a licensing agreement with Lone Wolf to use its MediaLink communications and control protocol. Mark IV Audio has also given Lone Wolf a contract for development of interfaces and applications layer software for several Mark IV Audio products.

## **CREST CONSOLE DIVISION'S FIRST YEAR**

Crest Consoles has announced that it is "encouraged by the positive response the Century Series has received in its first year, with sales well into the hundreds." The new Century LM Monitor consoles are now in production in mono and stereo versions, including internal passive microphone splitter systems.

## **LONE WOLF GRANTED PATENT**

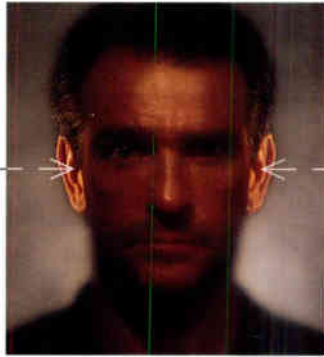
Lone Wolf has announced that it has been granted a U.S. patent for its MediaLink network communications protocol. The patent was issued on September 14, 1993. MediaLink "allows seamless and transparent connection of electronic devices into a fault-tolerant network," and is a "universal communications platform for integrating different media formats.

## **RSI INTRODUCES PRODUCTS**

Residential Systems, Inc. has introduced a line of audio products for the interior design industry at the ISID Trade Fair '93. More than 500 designers attended the Fair, sponsored by the International Society of Interior Designers. Some of the new products introduced included Shades of Sound, combining lamps with hidden speakers, and Jamo Atmosphere, a light sconce speaker. Also demonstrated were PET speakers by Pioneer Electronic Technology, and the Audio Vision picture frame speaker.



# THE PM4000 WILL PLEASE TWO OF YOUR BIGGEST CRITICS.



When it comes to getting the right mix, your toughest critics aren't the promoter, the audience or even the guy on stage with the full-body tattoo.

It's you, the person behind the console.

Which is reason enough to check out Yamaha's PM4000 pro mixing console and our companion monitor mixer, the PM4000M.

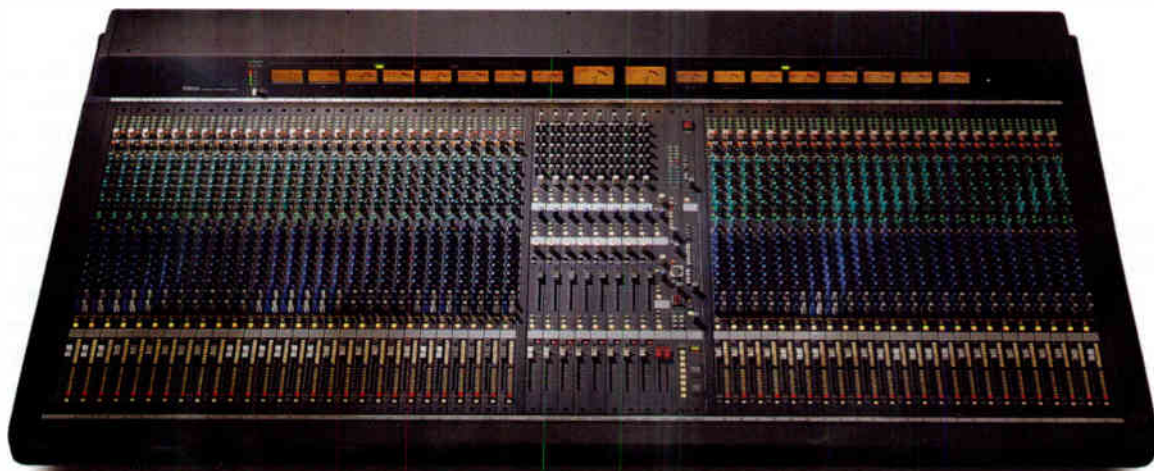
Both include the same features which made the PM3000 the best-selling pro audio mixer in

the world. Plus a few extras that may sound familiar, because we

listened to your feedback while designing our latest console. The result is sound so clean it's like getting a new pair of ears.

For more information, call Yamaha at 1-800-937-7171, Ext. 110. You'll find out just what the PM4000 is really capable of.

Which will please your critics for a while, anyway. **YAMAHA®**



© 1993 Yamaha Corporation of America, Pro Audio Products, P.O. Box 6600, Buena Park, CA 90622-6600, (714) 522-9011.



Circle 203 on Reader Response Card

# Conversations on the AES Convention

## *Sharing Our Thoughts*

BY JUDITH MORRISON, MIKE KLASCO, NEIL A. SHAW AND ROB BAUM

*For this AES Convention, we decided to pool our raw thoughts and run them by our readers. We have independently written up the main impact to each of us of this AES convention. Some of the items receiving our notice overlap. Sometimes we agree on what we've seen. Then again, sometimes we disagree. Here for your edification (we hope) are some of the highlights of what some of us at Sound & Communications saw at the AES show in New York. —Editor*

## Networks and Networking

### *The AES Show Had It All*

BY JUDITH MORRISON

**A**fter the hugs and the hand shakes, the hustle and the hype, what have we learned from the ninety-fifth convention of the Audio Engineering Society? For one thing, we've learned that New York AES-types are quite capable of dealing with the convenience of a convention center rather than the slim byways and small elevators of a hotel. It's not true that New Yorkers are more comfortable with the uncomfortable.

And for another thing, we learned about . . . Control. Control of sound

---

*Judith Morrison is the Editor-in-Chief of Sound & Communications. Mike Klasco is the Technical Editor of Sound & Communications magazine. Neil Shaw is a partner at Menlo Scientific Acoustics in El Segundo, California. Rob Baum works for Menlo Scientific and consults for the audio industry.*

design and of the system itself. Controversy seemed to die down and everyone was officially cozy as Lone Wolf's MediaLink seemed to become the de facto standard for computer control. Of course no one was talking about the elusive chip that will make it all easier. And meanwhile, Crown IQ and IED systems are presumably rolling merrily off the loading dock. But QSC is in fact shipping its MediaLink based QsControl. Vega is preparing a MediaLink based wireless microphone. In what amounts to a statement of mission, Mark IV Audio announced that it is "aggressively pursuing development of a full line of network compatible products." (Mark IV acquired the Intelix Mind System hardware and software products in 1990 and developed Altec's Announce Management

System introduced in 1993.) And Lone Wolf's list of licensees grew to include just about all the major players.

Peavey, not always thought of as a major AES player, scored some heavy publicity and good words from a number of observers, as the company demonstrated the new MediaMation project — a program and chip combination that effectively does away with a slew of sound shaping boxes. MediaMation uses a DSP card mounted within a PC. Each DSP card uses five Motorola 56000 processors. There was no price or delivery date for the product. And the buzz on the floor was reminiscent of the first introductions of ADAT by Alesis (at NAMM and at AES), where the talk in the elevators was on the new affordable technology, but the users — and dealers — had to



wait for price and for delivery.

And speaking of ADAT, Alesis was at the AES show, as was Fostex with its new ADAT. The Fostex SVHS RD-8 (quietly shown at the last NAMM) ADAT compatible 8-track recorder has a tape format that is interchangeable with the Alesis ADAT, and has a built-in SMPTE timecode reader and generator. The price is \$4,795.

Tascam showed its 8 millimeter "affordable digital multitrack."

As a matter of fact, for standing room only cachet, Peavey, Lone Wolf, and Avid took the prize according to this observer's eyes.

Avid was a first-time exhibitor, although many of us have seen them at other shows such as NAB, and now Infocomm. Avid's Open Media Framework format, announced several NAB's ago, was a working format with Avid and Studer Editech able to exchange files from their respective digital audio workstations. The demo consisted of the transfer of digital audio media data and sequences between Avid's AudioVision and Studer Editech's Dyaxis II, through the use of the OMF file format on optical disks. (A prototype version of the interchange was demonstrated at NAB.) In addition, Avid Technology held a technology demonstration of AvidNet/FDDI, the company's "digital media networking solution" connecting several Avid AudioVision DAW's. The AvidNet/FDDI uses Fiber Distributed Data Interface network interface boards and application software over fiberoptic cabling.

Avid introduced its AudioStation, a new model, with prices starting at under \$30,000 for a complete system.

And for first-day show buzz, and overall show wannabe witticisms, Harman International took the prize. With its very recent acquisition of a controlling interest in AKG and its less recent acquisition of Lexicon, ADA, DOD, UREI, Soundcraft, Allen & Heath, etc. (not to mention the consumer division's acquisition of Audio

# THE RUGGEDNESS OF OUR CD PLAYERS ISN'T A RETROFIT.

From the get-go, we designed our Industrial Strength CD players to stand up to the kind of heavy-duty use that typical consumer CD players can't handle.

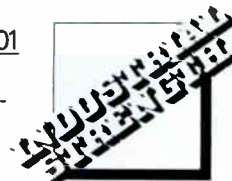
That's why every TASCAM CD player is rack-mountable. And why both the CD-301 and CD-401 feature balanced XLR and unbalanced RCA outputs for added flexibility.

The economy-minded CD-301 (\$549,\* including hardwired remote) offers the high reliability required for heavy-use applications, plus precision playback capability. The CD-301 also features a single-play function to automatically stop playback at the end of a song, allowing DJs to concentrate on voice-overs or to make a clean start for the next track. And a link function to permit hookup of multiple CD-301s for automatic back-and-forth sequential play.

The high-performance CD-401 (\$849\*) incorporates TASCAM's award-winning ZD circuit to eliminate low level distortion and ensure sound quality that meets the most demanding standards.

The CD-401's fader-start feature allows play to start automatically on fade-in and stop at the completion of a fade-out. The CD-401 is available with optional hardwired or wireless remote.

For more information, call or write TASCAM, the company whose Industrial Strength product line also includes cassette decks and mixers.



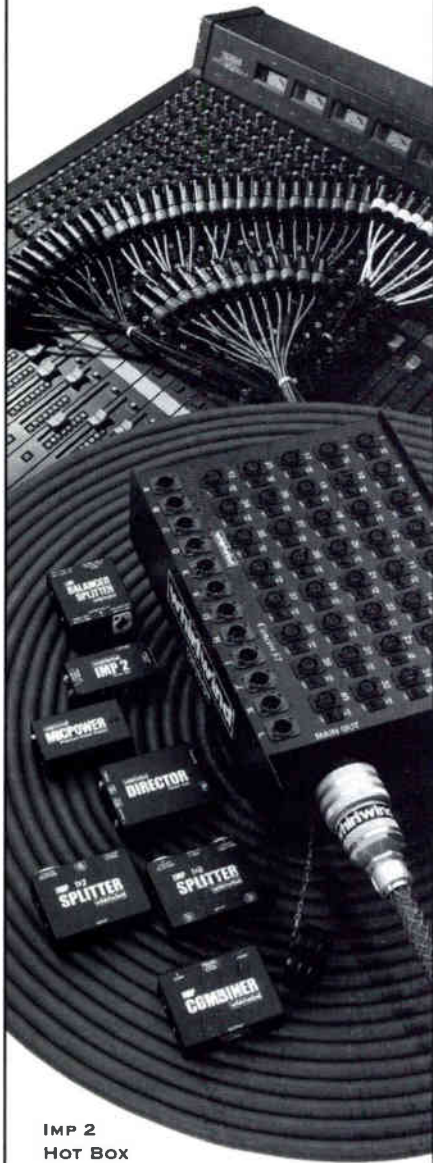
## TASCAM



© 1992 TEAC America, Inc., 7733 Telegraph Road, Montebello, CA 90640. 213/726-0303. \*Suggested retail price.

Circle 226 Reader Response Card

# TOOLS FOR THE SOUND MAN



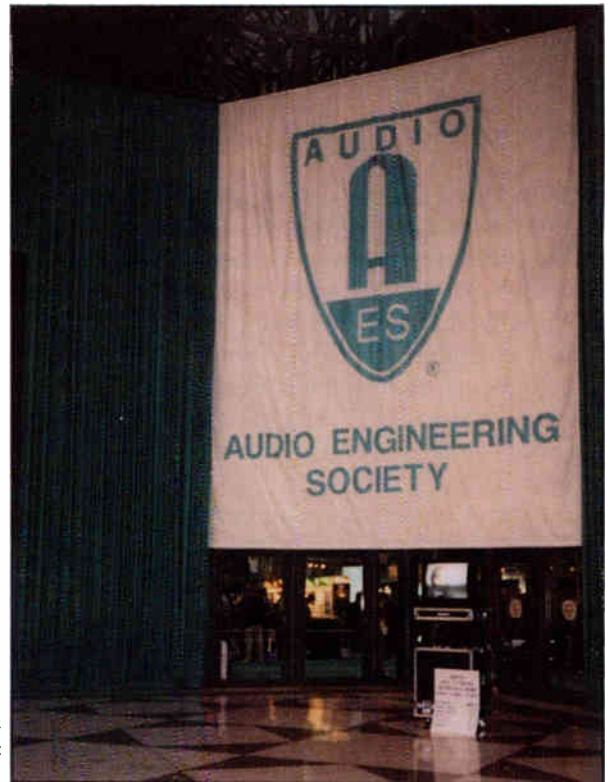
IMP 2  
HOT BOX  
DIRECTOR  
MIC POWER  
IMP SPLITTER  
LINE BALANCER  
PHASE REVERSE  
LIFTER • IMP PADS  
MEDUSA SERIES  
MK-4 MIC CABLES  
CONCERT SERIES 32, 42, 52  
MASS CONNECTORS

THE BEST PERFORMANCES  
ARE BETTER WITH

## whirlwind

100 Boxart Street • Rochester, NY 14612  
716-663-8820 • FAX: 716-865-8930

Circle 272 Reader Response Card



*The 95th  
AES Convention  
in New York City.*

Access and now Madrigal), any AES attendee could easily get lost in Harman-land (clearly identified by a huge Harman logo flying high above the company's components). As a starter to what the expanded conglomerate may mean, formal announcement was made during the show that JBL will be taking over the distribution of the Lexicon L.A.R.E.S. system, previously distributed . . . and shown at past AES conventions . . . by Lexicon. All of the Harman components were showing new products. For its part, AKG USA reported business as usual and an immediate benefit "from having a parent company based in the United States."

"Audio in a Multimedia Age" was the theme of this year's AES show, and its suitability was evident in the papers, the products, and the audience — which ranged from Disney creators to the consultant community. Len Feldman was the conference chairman and he and Irv Joel, his co-chairman, put together a pretty well-run affair.

Papers ranged from DSP theory to Multimedia Sound in Russia, with the papers chosen by the capable Bob Finger of Matsushita and Ken Pohlmann of the University of Miami. Robert True of Jensen presented a paper on

an Automated System for Measuring Spider Compliance.

Workshop Chairman was Edward Foster, who has written in these pages and who put together a package that ran the gamut from Computer Control to Auralization (a workshop hosted by Neil Shaw, supplementing the paper session by Akira Mochimaru of Altec Lansing) to "Live From New York."

The venue was new, but the Javits Center, with all its problems (no taxis, no neighborhood), reaffirmed the principal established in California — large convention centers can work for the Audio Engineering Society. The AES Convention is always the site of meetings, many of which are held because all the attendees are in town for the AES. The SC-10-3 committee agreed to publish its agreements (probably in the December issue of the AES Journal), bringing computer control concepts closer to universality.

And the Infocomm show held a meeting of a sound advisory board that has formed to encourage the usefulness of Infocomm and the increasing exhibiting of audio companies at the show, which runs this year in June.

The World Studio Group, which



formed last year, convened during the AES convention, and announced six new members. The goal of the association is to have 50 studios as members in 1994. The Group serves as an international networking association, providing studio facilities internationally.

Other meetings taking place included SPARS (the Society of Professional Audio Recording Services), which elected new officers as of AES: Howard Schwartz of Howard Schwartz Recording, president; Steve Lawson (Bad Animals), vice president/treasurer; Paul Christiansen (Omega Productions), secretary; and Dwight Cook (Soundworks), chairman of the board.

New companies were on display at AES. Tactile Technologies (showing modular mixers) featured personnel from the old Fostex . . . Mark Damon Cohen and Fred Hwang. Products pre-



*The exhibition floor just under the Harman International logo.*

sumably from former New England Digital personnel who were hired by Fostex were shown. Fostex demonstrated the Foundation 2000, the first product at the company's new research facility in New Hampshire. Foundation 2000 is a digital audio production platform housed in a six space

rack enclosure featuring proprietary software and hardware architecture for audio recording, mixing and editing. The standard Foundation configuration including the 540 MB hard drive has a suggested retail price of \$25,000. The computing engine is a card with four Motorola 56002 processors which provide random access DSP for digital mixing functions. The cards are software-configurable.

The Tektronix television division appeared in its first showing at an AES convention, with a dedicated testing product, the AM700 with analog and digital generators, analog and digital acquisition units and other features. It's the start of a new line which will include hand held portables.

Philips took a major booth to tout the DCC format along with duplication possibilities and OEM modules. Ap-

## 'PEOPLE HAVE SAID IT HAS IMPROVED THE SOUND 100%'

Recounting the incredible history of the Virgen De San Juan: Del Valle Shrine in San Juan, TX helps to understand this new contemporary church. When the original Shrine was dedicated in 1954, the ornamentation it contained was described as "lavish". Special bells by La Savoy of Paris, a massive crucifix carved in wood and murals followed the tradition of European Cathedrals by Bartolome Monge of Spain.

In October of 1970, all of this splendid architecture and art was destroyed when a low flying airplane exploded into flames on the roof of the Shrine. In a matter of minutes the fire was out of control and the Shrine was a total loss except for the tower.

In 1980, an estimated 50,000 people from the U.S. and Northern Mexico converged upon the small community to witness the dedication and opening of the new edifice. This church, which holds 3,000 for mass, has a simple interior design to augment the beautiful 40ft mosaic on the back wall of the Shrine with Jesus presenting His Mother. It is the focal

point of the contemporary interior. It is estimated that 15,000 people visit the Shrine every week.

After many years of using two different approaches to the loudspeaker utilization, the pastor was unhappy with the lack of intelligibility. It was equally frustrating to worshippers. Herman Goren of Circle Industries, Inc. offered a three week demonstration of three Soundsphere Q-12 Speakers. The results warranted the installation of permanent fixtures achieving clear voice announcements for the congregation. The Pastor, Fr. Peter Cortez, states, "People have said it has improved the sound 100%. I am very pleased with this system."

*Write or call direct for further information.*

**SOUNDSPHERE** A PRODUCT OF  
**SONIC SYSTEMS, INC.**

737 Canal St • Bldg 23B • Stamford, CT 06902 • USA • (203) 356-1136



*Circle 258 Reader Response Card*

# AES in New York: A Javits Center Jamboree



The Fostex RD-8 digital multitrack recorder.

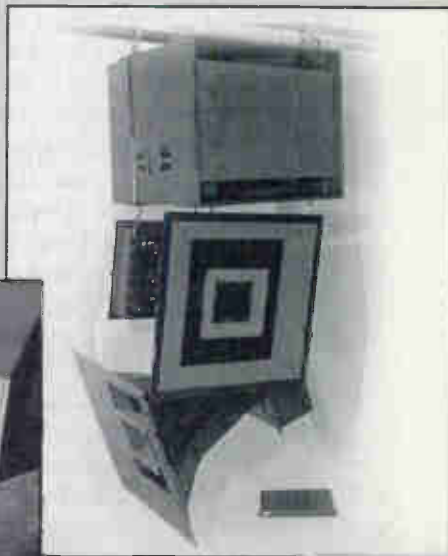


Tactile Technology's M4000 modular automated mixing system.



360 Systems' DigiCart/II digital hard disk recorder with RC-210 and RC220 remotes.

Frazier's  
VSE  
system.



Ramsa's WZ-DM30 digital multiprocessor.

## EZ AUDIO TEST SYSTEM

Measurement system in a lightweight convenient carrycase



**GOLDLINE**  
MANUFACTURED IN U.S.A. SINCE 1961

**Includes:**  
RTA, SPL Meter,  
dBm and Impedance  
meters, Frequency  
counter, Sine Wave  
Generator, Gated  
Pink Noise Source  
with timed pulses.

**Software Options  
to Expand  
The System:**

- 30 Non Volatile  
Memories
- Printer Port
- RS232 Port
- Distortion Analyzer
- RT60
- Loudspeaker  
Timing

**Contractors prices  
available.**

Box 500 • West Redding, CT 06896 • Phone: (203) 938-2588 • Fax: (203) 938-8740

Circle 274 Reader Response Card



The single chip  
implementation of  
Dolby's AC-3  
digital audio  
technology in a  
DSP IC from  
Zoran  
Corporation.



The AKG  
Vintage TL.



*AmpeX 499  
Grand Master  
Gold mastering  
tape.*



*AGM Digital  
MR 1-Mk 1  
microphone  
assembly.*



*TDK's write-once recordable compact discs.*



*Sony's PCM-E7700  
DAT Editor.*



*The AT&T DISQ digital mixer core.*

**F**ROM SPEAKER TO **S**PEAKER



**A**s simple as... the stand alone IED 4400/4800 Series Automatic Mixers and the 6000 Series highly efficient power amplifier -

Or as versatile as... the computer - controlled IED 500ACS Announcement Control System and the multi-functional digital domain processing of IED's UDAPS™ -

IED, Innovative Electronic Designs, Inc., is the process and product for total communication.

From speaker to speaker - it's IED.

Contact Tom Roseberry or Mark Lewellyn (502) 267-7436 for the IED product or system to fit your needs.



Innovative Electronic Designs Inc  
9701 Taylorsville Rd.  
Louisville, Ky. 40299 U.S.A.  
(502) 267-7436

Circle 249 Reader Response Card

pointments had been set up with the "majors" according to the company, and a DCC Multicassette Duplication Unit was being talked up. Philips was promoting the MPEG compression standard, along with its "partners." And the company was showing pro products such as a Sound Enhancer, a Mini Sample Rate Converter, and Digital Speakers.

For the first time since the changing of the baton, Roland exhibited under its new president, Denis Houlihan. (Tom Beckmen has become a consultant to the company.) Roland products, as usual, fit in with the show's theme of multimedia.

Frazier announced a new general purpose full range monitor for "small to medium studios, home theaters and

other auditorium sized venues." The CAT 43 is an 85 watt system available in assorted colors. It features a built-in 30 degree angle when wall mounted or used on the floor.

The Frazier VSE Vector Synthesis Ensemble has active processing and coincident aligned transducers. The new series is designed for "high performance permanent installation sound systems."

360 Systems introduced two new remote controls for its DigiCarts digital audio hard disk recorders. The RC-220 allows for playback, record, edit, setup and utility functions.

Tannoy's PBM Mark II Series is using injection-molded cone materials. The polyolefin low-frequency cones are mica-impregnated. The speaker elements are suspended with a single roll of nitril rubber.

Dolby Labs, having entered into a technology alliance with Zoran Technology, announced a new DSP coming out of the effort, which will reportedly migrate Dolby's multi-channel digital film sound technology to home entertainment formats and consumer products. At AES Dolby emphasized its "advanced multichannel digital audio coding format at the core of the Dolby Stereo Digital film sound, with a screening of *The Fugitive* available to AES delegates.

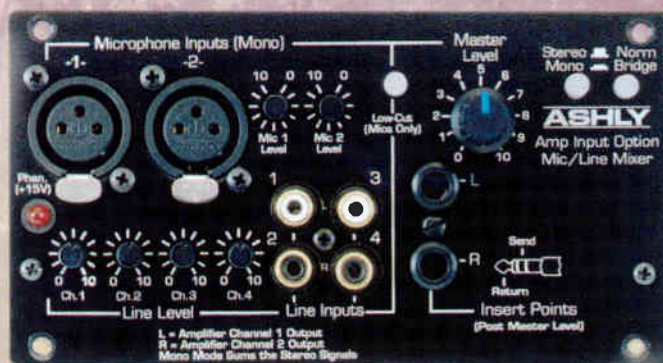
Sabine showed new workstations. For instance the ADF-2400 is a dual mono/stereo version of a complete set of fully adaptive digital filters and can be programmable for automatic feedback control, digital parametric filtering, digital shelving filters and digital delay.

Ramsa's WZ-DE40 digital multiprocessor was shown at AES. The unit can function as an all parameter variable, stereo or two-channel compressor limiter, graphic equalizer, parametric equalizer and spectrum analyzer. It has an auto notch filter, a MIDI connection, and a dynamic range of 107 dB. The suggested retail price is \$3,950.

# Power Mixer

Large mixing consoles can come in mighty handy when the situation calls for lots of microphones and several different mixes. But what about those applications when the needs are much more basic? Introducing the MM-6 PowerCard from ASHLY. Just plug this input option into any of ASHLY's new amplifiers and you've got all the power the job requires without the extra complication and cost of a separate mixer.

The MM-6 has separate controls for each line level channel, allowing for the connection of two stereo sources or four monaural ones. Phantom power is provided for condenser microphones, and there are even patch points on each channel for the connection of an equalizer or any other signal processing device. Combine all this flexibility with any of ASHLY's latest amplifier models, and you have a *truly powerful* powered mixer! Sometimes the best solutions come in small packages.





BASF premiered its rewritable magneto optical disc master which is delivered pre-formatted, and is available in a 3.5 inch version with 128 MB and in a 5.25 inch version with either 594 MB or 652 MB of memory. High speed timelapse tests have reportedly proven a minimum life expectancy of 15 years for recorded data. The company also introduced new tape for digital recording, in half-inch and one-inch widths.

AES business was conducted, as Floyd Toole of Harman International

**AES business was conducted, as Floyd Toole of Harman International ended his year as president of the association. Richard Cabot of Audio Precision takes over as president this year.**

ended his year as president of the association. Richard Cabot of Audio Precision takes over as president this year.

AES-TV News was again on the air, transmitted to convention hotel rooms and on the exhibit floor. The television program, produced by Testa Communications, and written by our staff, ran all the news that was fit to run, and was, as always, informative to the attendees.

A plus for Sony was the announcement by Sonic Solutions of an agreement to incorporate Sony's Super Bit Mapping technology into Sonic Solutions products. The agreement marks the beginning of an effort to jointly develop SBM algorithm circuitry for use in compact disc premastering.

EAW introduced a new series of speakers, and also announced the formation of a strategic alliance with Siemens Austria to address the sound

contracting market in Central Europe.

BGW had its first press conference in recent memory, introducing a self powered subwoofer.

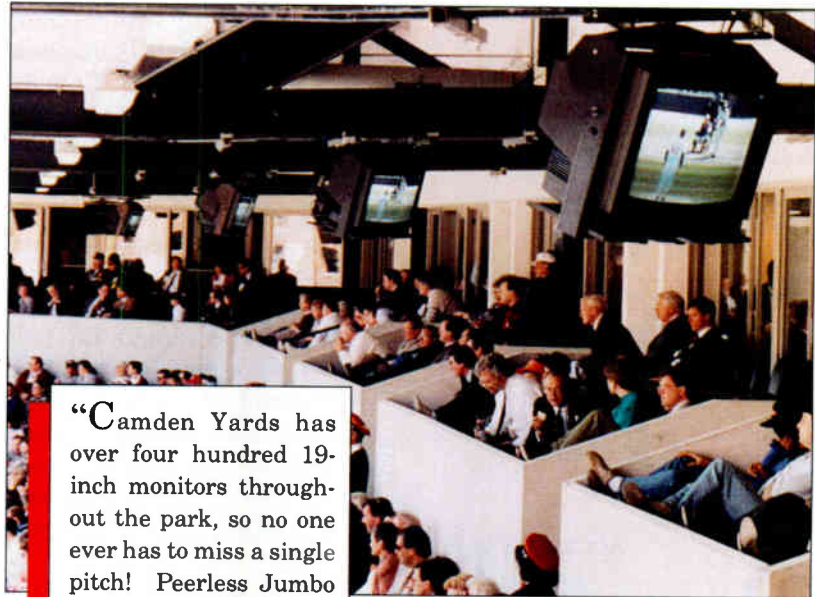
Crest introduced a new 3-rack-space amplifier with over 3000 watts per channel with a 2 ohm rating.

Microphones were everywhere. AKG introduced its Vintage TL condenser mic with the capsule recreat-

ed from its original design in the 1950s.

And news of AES actually hit the New York Times, as Ednet held a press conference with Phil Ramone transmitting musical information over the ISDN for recording. Several companies at AES were exhibiting this "virtual studio" with varying methods used, but all ready for the next step in

Monitor installation by DEI



"Camden Yards has over four hundred 19-inch monitors throughout the park, so no one ever has to miss a single pitch! Peerless Jumbo mounts gave us the versatility and the strength to install them under varying conditions."

- Janet Marie Smith  
V.P. Stadium Planning  
and Development,  
Baltimore Orioles

The Jumbo Mount is UL listed

**Peerless Mounts make a day at the ball park even more fun!**

Find out how Peerless can provide solid support for your video, or CCTV installation. We manufacture the world's most complete line-up of video and audio installation accessories.

For our free Product Guide 1-800-729-0307  
in Illinois 708-865-8870



Solid Support

Peerless Industries, Inc. - 1980 Hawthorne Ave - Melrose Park IL 60160

**Pivotelli**

## The Strong Silent Type

Pivotelli Swivel Supports may be designed to look sleek and stylish. But there's a lot of muscle behind them. For openers, their solid steel construction and durable nylon finish combine to make them virtually indestructible in normal use. Their powerful rubber-lined clamping arms securely hold cabinets up to 47" wide and weighing as much as 176 pounds. And they're backed by a five-year parts and labor guarantee. The best in the business.

Little wonder more builders, architects and engineers are specifying Pivotelli Supports for commercial and industrial applications every day.

**Pivotelli**

Division of Grant Products, Inc.

Outstanding Performance in a Supporting Role.

Pivotelli/USA, 25 Commercial St.  
P.O. Box 560, Medford, MA 02155  
1-800-548-5040 (In MA: 617-391-4097)  
Fax: 617-391-7819



Circle 289 Reader Response Card

**Free**

ACCESS TO

**Raxxess**

As if great service, low prices and our wide variety of audio racks and rack accessories weren't enough reasons to call...

Now you can reach us **TOLL FREE**

Raxxess offers rack solutions for audio pros, including rack shelves, drawers, storage products, rack rail & screws, security/vent panels and much more...

And now, access to Raxxess is **Free!**

**CALL FOR A FREE CATALOG.**

**1-800-398-7299**

178 Sixth Ave. Paterson, NJ 07524

Circle 290 Reader Response Card

recording. Other companies subscribing to transmitting digital data to far-away places were IED, RE America, Dolby, Lexicon, Lone Wolf, Rane, APT, Avid, Studer, and so on.

Neutrik AG, having acquired Amber, the manufacturer of audio test equipment, set up its test equipment company under the name of Neutrik Instrumentation Inc., headquartered in Montreal. Neutrik USA under James Cowan now focuses its energies on the connector products of the company.

John Storyk of Walters-Storyk Design Group was busily demonstrating his proprietary CART (Computerized Acoustic Ray Tracing) software system. Cart was developed by Storyk in collaboration with Malcolm Young and Steve Lewis.

Sony made a mega-introduction of products, with new showings including a dual deck DAT editor which will allow digital editing in the field. Also shown were new portable wireless synthesized microphone receivers, an all digital audio mixing console, and the MD cart machine. These showings follow Sony's NAB exhibit, which was the largest showing of Sony new products ever.

Furman introduced a new line of high performance AC power controllers called PowerPorts, intended for unobtrusive installation in the rear of racks. All control and monitor functions may be accessed via an optional computer interface.

The Kurzweil MicroPiano is a half-rack sound module with sampled sounds plus built-in effects at a price of \$499. It contains Kurzweil's Grand Piano sample plus a number of others. Thirty-two presets are offered.

Group One, now distributing KRK monitors internationally, introduced the Model 6000 monitor featuring a six-inch polyglass woofer and a one-inch Kevlar tweeter.

As always, there were varying interests among attendees at the AES Convention. While consultants we spoke to were excited most by Peavey's new

system, studio people picked other things for their most important list. For instance, Chris Stone of the World Studio Group listed for us, among his "most exciting" items: AT&T, TimeLine, AGM, SSL, Ampex, and 3M. To amplify: AT&T's console, discussed at several AES's, is finally moving forward. The Disq Digital Mixer Core brings full digital mixing capability to analog consoles. AGM's MR1-Mk1 offers "no compromise in technical quality" in a 20 bit "microphone recording system." The price is reportedly close to \$50,000. SSL showed new console upgrades and the new OmniMix for its Scenaria line.

Ampex Tape says they've seen their best first-half sales ever in 1993, sustained largely by sales of Ampex 499 Grand Master Gold and Ampex 467 DAT tape products.

Ampex, 3M, BASF and TDK, of the tape companies, showed digital product. TDK announced the expansion of its pro division, offering "a wider range of sales, services, products and consultation."

There were anniversaries: A.R.T. celebrated its tenth. EAW celebrated its fifteenth. And Community celebrated its twenty-fifth!!! So if any of us were still deluding ourselves that this was a young industry, well, everything is relative. But if we ourselves are getting older, it was good to see that the ideas were still young. And this ninety-fifth AES had ideas and inspiration enough for all. The next AES is in Amsterdam this winter; and after that it will be back in San Francisco next autumn.

Obviously, the AES convention, with its hundreds of exhibitors, offered too much information to cover in these quick on-deadline wrap-ups. Sound & Communications will be following up throughout future issues with coverage of new products and developments initiated at the AES New York 1993 convention.

Meanwhile, stay tuned to see what some of our other reporters thought. ■



# New Formats, Systems, Products

BY MIKE KLASCO

**V**isiting New York is always a big event for me, as I grew up in Manhattan. October is a good month for New York, not too cold or hot. The city — and the AES convention — both seem to have turned around their slow decline. In fact, this year's AES is the best show that I can remember.

Testa Communications, the publisher of Sound & Communications, produces AES TV News, a special TV news show that is seen throughout the show floor and at nearby hotels. Of course Sound & Communications and its sister publications; Post, Producer, DJ Times and Music & Sound Retailer are distributed at the show.

Digital formats, as confusing as ever, were very much evident. Sony was showing pro versions of its MD Mini Disc format. One model is a cart player, the PMD-C1P, and another version is a recorder/player, the PMD-C1. MD is a particularly attractive format for clubs, for instance, because the discs are even more compact than CDs, and the MD format consumer recorders are about \$1,000 compared to CD recorders ("CD-R") which are more than \$3,000. MD has quick start and shock memory (electronic skip protection). But MD has not yet taken off because there is very limited music on disc and blank (recordable) discs cost over \$12. Sony is starting to

ship their pro units soon, with future competition coming from Otari with its MDR-10 pro MD unit starting next June. I was not able to get exact prices, but all of the Sony and Otari units are more expensive than any of the popular club CD players. Sony introduced a CD format post production player, while Pioneer and Denon showed CD juke boxes. One thing is for sure, any sort of non-contact disc medium (MD, CD, CD-ROM, etc.) is inherently easier for the machine to handle and will have faster access time than tape formats.

Philips was showing a pro DCC format tape player with fast start and somewhat better access time. No price



## CAL SWITCH

CALIFORNIA SWITCH AND SIGNAL, INC.

**YOUR #1 SOURCE  
FOR:**

# Switchcraft®

Audio Connectors, Adapters, Jack Panels,  
Patch Cords, Plugs, Switches

**Off the Shelf Delivery  
Competitive Pricing  
Just in Time Delivery  
Value Added Services**

Assembly, Engraving, Modification

[310] 538-9830  
[213] 770-2330  
[818] 761-5226  
[714] 525-6606  
[619] 231-6740  
[415] 621-7386  
[408] 279-8848  
[510] 452-1009  
[916] 448-6370  
[209] 441-1752

## [800] CAL-SWCH

Circle 261 Reader Response Card

has been set yet, but if a basic DCC deck is about a grand, expect to pay double for a pro version.

If you are specing tape decks, then you would have been interested in the new, less expensive pro DAT format digital tape recorders at the show. Pro machines are now priced at \$2,000 or less. Tascam and Fostex had variable speed machines with instant start. The new Fostex LD-10 DAT recorder uses digital RAM memory for instant start, cues to the music, and has a jog wheel for scanning and cueing.

#### EFFECTS DEVICES

Behringer introduced the Duaflex II sound enhancer, a processor that is similar to the Aphex and BBE devices. Another European based firm, S.P.L., introduced its Vitalizer sound en-

hancer which is distributed here by Sascom Marketing. Aphex, the original developer of the Aural Exciter processor, introduced a combination of

**If you are specing tape decks, then you would have been interested in the new, less expensive pro DAT format digital tape recorders at the show.**

this device along with the Compeller Dynamic Processor (limiter).

Wireless mics were hot, with Shure

debuting the EC series at AES. These mics feature digitally controlled frequency synthesized circuitry for reduced dropouts. Vega introduced wireless mics that would work with computer controlled sound systems (see discussion later in this article).

#### SPEAKERS

Pioneer's TAD group is known for outrageously expensive (but superbly crafted) studio monitor and concert sound speakers. The Pioneer Pro Series was introduced, with many of the features of the TAD products, but at prices more in the range of clubs and karaoke bars. The TCM series includes both subs and full range speakers. At the AES, the TCM speakers, along with power amplifiers, CD autochangers and projection club systems were on display.

JBL introduced its latest series of club speakers, the SR series II. This is an evolutionary development of the original Cabaret Series, later the SR4700 series. Main enhancement is cleaner sound from revised horn throat geometry, but this has been gained without losing their high output capability.

Truly awesome was Community's Leviathan II, a full-range horn system whose front was 6 foot by 6 foot and 7 feet deep! I installed my first Leviathan about 20 years ago, and it was loud — but this new system is louder (and having heard it at NSCA, it sounds real good)! I cannot help the thought that it looks like a giant Motorola piezo "super horn" tweeter from hell!


BGW displayed a sub with four 15-inch woofers and built-in power amplifier and electronic crossover. BGW is expanding, and showed their line of rack hardware and industrial grade rack computer gear. With the rapid growth of computer control of audio equipment, BGW looks to have a winner here.

Renkus-Heinz added the C-3 Sub, a dual 15-inch subwoofer, to its product


# Equal but not Equal

**ROLLS** has brought truly professional equalizers to everyone. Rolls stereo 15 band REQ215 and 31 band REQ131 equalizers have all the features professionals demand. The adjustable shelving filters and three different I/O connectors on each channel are great for starters, but the incredibly smooth sound, ease of use and convenient size make these U.S. made EQ's something special. And with 15 years experience in the equalizer business you can also expect, exceptional

**Dual EQ/REQ215**




**Graphic EQ/REQ131**



value. Audition the ROLLS EQ's now at your ROLLS dealer. If they don't have them, complain.

For more information on Rolls products contact:  
**ROLLS CORPORATION**  
 4711 Holladay Blvd., Salt Lake City, UT 84117  
 Phone 801-272-9711 Fax 801-272-9534



MADE IN U.S.A.

Circle 269 Reader Response Card



# ARCHITECTURAL ACOUSTICS SOUND SOLUTION

PROJECT: **SPORTS BAR /  
RESTAURANT**



PZS 80



PR 605T

ALM 166  
MICROPHONES



PR 605T X 19  
ENCLOSURES

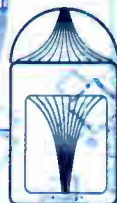


PZS 80  
ZONE MIXER/AMP

TAPE PLAYER



TAPE PLAYER



JUKE BOX

## CLIENT'S REQUIREMENTS:

- ✓ DIFFERENT MUSIC STYLES TO DINING ROOM, BAR AND ARCADE
- ✓ TO BE ABLE TO PAGE INTO DIFFERENT AREAS

## SOLUTION:

- ✓ PZS 80 ZONE MIXER/AMPLIFIER
- ✓ (19) PR 605T TWO-WAY, HI-FIDELITY ENCLOSURES WITH ON BOARD TRANSFORMER
- ✓ (2) PEAVEY ALM 166 GOOSENECK MICS

## VERSATILITY

Need **versatility** in your permanent sound installation project? Consider the PZS™ 80 multi-zone mixer and PR™ 605T speakers. The PZS 80 is a 5-channel mixing system with assignment capability to 4 independent zones. Each channel offers low and high EQ, level control, and zone-assignment switching. Channels 1 and 2 include low-Z mic inputs and paging capability, while channels 3-5 may be used for various music sources. The PZS 80 eliminates zoning balance problems by providing master output level controls for each zone. LEDs appear on each of the 4 zone master controls to indicate activity and clipping, enabling you to keep each zone within its output limits. Connect PR 605T speakers in strategic spots, and you can fill virtually any acoustic space with sonic pleasures.



MADE IN THE U.S.A.

# PEAVEY

ARCHITECTURAL  
ACOUSTICS

A Division of Peavey Electronics Corporation  
711 A Street • Post Office Box 2898  
Meridian, Mississippi • 39302-2898  
Telephone: 601/483-5376 • FAX: 486-1278

To receive a catalog featuring the complete line of Architectural Acoustics products, call or write Peavey Electronics.

Circle 209 on Reader Response Card

**Affordable Solutions  
to Hearing  
Accessibility**



Choose the Easy Listener FM or StarSound Infrared System to meet ADA requirements easily and inexpensively.

Call for free catalog  
800/227-0735 U.S.  
800/387-3158 Canada

)))))) **Phonic Ear**

Circle 292 Reader Response Card



**INTRODUCING OUR NEW  
PARTS & ACCESSORIES  
DEPARTMENT**

**FOR THE DISCRIMINATING  
ENGINEER & STUDIO**

CABLES, PATCHBAYS, CONNECTORS,  
TOOLS, TAPE, RACKS, ETC.

PICK-UP COUNTER  
RUSH DELIVERIES • MAIL ORDER

BRANDS INCLUDE:  
ADC; AMPEX; AMPHENOL; CANARE; 3M;  
MIDDLE-ATLANTIC; GEPCO; NEUTRIK;  
PANDUIT; SWITCHCRAFT; MANY MORE.

**SAM ASH  
PROFESSIONAL  
PARTS & ACCESSORIES**

723 7th Avenue (at 48th Street)  
9th Floor, New York City

**(212) 302-5114  
Fax: (212) 302-5744**

Managers: Jim Gillespie & Myron Dubb,  
formerly of Martin Audio

Circle 293 Reader Response Card

# AES in New York: Javits Center Intros

*Sony's PMD-C1/PMD-C1P MD Cart.*



*Aurasound's  
1800 series of  
woofers.*



*JBL's SR Series II loudspeaker systems.*



*Lone Wolf's FiberHub.*



line. For deeper extreme bass in a compact enclosure, Renkus-Heinz uses what they call a Tandem Drive arrangement. This is the same as the isobaric configuration, popular in fancy autosound installations. One woofer is mounted directly behind the other, and wired in parallel. What is unique is that one woofer fires into a horn-loaded front chamber, while the second drives a rear vented chamber. On the engineering software front, EASE 2.0 and EARS were formally introduced at the show.

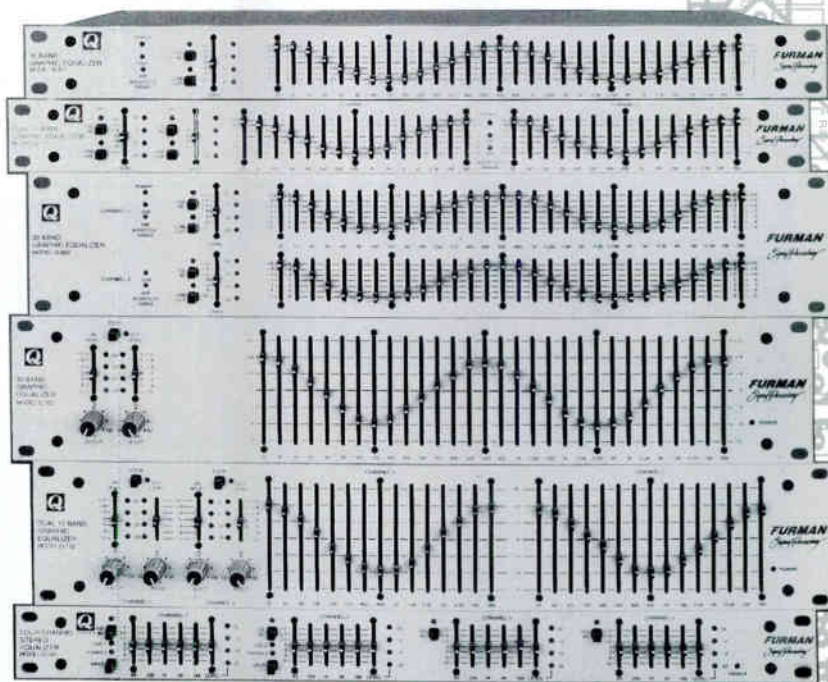
Bag End's ELF system includes a subwoofer and signal processor. The subwoofer is an acoustic suspension enclosure, and the signal processor provides bass boost starting where the sub would begin the natural rolloff. Actually, the processing is more than just EQ. Since woofers do not have unlimited excursion, the signal processor also provides protection/limiting circuitry so the woofer can provide maximum output without overload. The goal of this approach is to provide good bass in a relatively compact sized enclosure.

Aura Systems had two unique products. One was a super 18-inch sub driver with a special high energy Neodymium magnetic system with enormous excursion. The other attraction was Aurasonics, a bass device that could be built into seats and floors to shake the dancers to the music.

### COMPUTER CONTROLLED SOUND SYSTEMS

This was the hottest topic at the show. Applications include not just when to toot the lunch whistle and pre-programmed announcements at airports, stadiums, and theme parks. Soon even clubs will use these systems to switch over from live cabaret configuration of speakers, amplifiers, and equalizers into playback settings and DJ operation. Stage monitor speakers will be turned off, and speakers on the rear of the dance floor activated, EQ settings toggled between

# Graphic Details



It's attention to details that sets the new **Furman Q-Series Graphic Equalizers** apart from the competition. Details like constant-Q equalization for minimum interaction between adjacent bands and maximum graphic accuracy. State-of-the-art low noise op amps. "Straight wire" bypass function. Four segment meters that make it easy to find optimum signal levels. Beefy power supplies that assure long-term reliability. All six of our new EQ's feature silky-smooth sliders, and our long-throw sliders are 15 mm longer than those on most other premium graphics. And there's a dramatic new look, with pale gray front panels and tasteful deep blue and black legends.

Contact Furman for the full graphic details.

Furman Sound, Inc.  
30 Rich Street  
Greenbrae, California 94904  
Phone (415) 927-1225  
Fax (415) 927-4548

**FURMAN**

Circle 225 Reader Response Card

preprogrammed contours, and so on. Home entertainment will also be impacted by computer control.

MediaLink has had good acceptance as a command communications standard, and the AES SC-10 committee issued a standard at the show. Alternative standards such as Echelon are further along and more established in other industries and markets — but are *not*

promising to carry the audio channels.

So the fat lady has not sung yet. MediaLink has recently received funding, but they have yet to make the transition from their start-up mode. MediaLink also has to live down a history of vaporware and broken promises on what they have and when they will deliver it.

Perhaps the most visionary effort at

the AES was the MediaMation system demonstrated by Peavey. This system uses a computer monitor screen and a mouse to “configure” the sound system. The operator can “build” the sound system by arranging the equalizers, delay lines, electronic cross-overs, and other signal processing gear in a block diagram on the TV monitor. When the sound system of your dreams is in front of you, you hit the return button and the computer “compiles” the software and commands digital signal processing cards within the computer to create your

**This system uses a computer monitor screen and a mouse to “configure” the sound system.**

configuration. Is this a baloney story that is all flash and no reality? Nope. Actually the first systems are being completed as you read this, starting with the communication system of the U.S. Senate! Price is not so expensive (Peavey has never been the high-priced spread) and this system might even be practical for medium as well as large sized venues. While the Peavey MediaMation system does provide mixing capability, this would really just be used for routing inputs and outputs (such as switching over from a live mixing board to a club DJ board in a multipurpose facility, rather than doing the actual mic or phono mixing). These systems still would need the usual complement of amplifiers and speakers, of course, but would eliminate all the rack wiring and most of the separate components that usually are found in sound systems.

In upcoming issues we are going to take a look at Peavey’s MediaMation, the many new MediaLink compatible products, as well as Echelon and other systems. Next AES jumps back to the west coast and is in my home town, San Francisco — see you there. ■

**FEEDBACK FIGHTER**

**S**CORE a TECHNICAL KNOCKOUT against AUDIO FEEDBACK in any PUBLIC ADDRESS SYSTEM. Take advantage of the power you paid for.

Introducing the model 745 FEEDBACK REDUCTION UNIT from POLYFUSION ELECTRONICS. This professional, highly effective, and economical instrument will defeat even the most SERIOUS CONTENDERS. The 745 remains the UNDEFEATED CHAMPION, the choice of the PROFESSIONALS.

Model **745** Feedback Reduction Unit

- ATTACKS THE FUNDAMENTAL CAUSE OF AUDIO FEEDBACK
- NOT A FILTER (no sound coloration)
- DOUBLE, TRIPLE, EVEN QUADRUPLE USEABLE PA POWER
- PROVEN, PATENTED, AND GUARANTEED

FOR MORE INFORMATION CONTACT:  
POLYFUSION ELECTRONICS INC.  
30 WARD ROAD LANCASTER, NY 14086  
Ph.(716)681-3040 FAX.(716)681-2763

**polyfusion**  
ELECTRONICS INC.



# Reach The Entire Audience

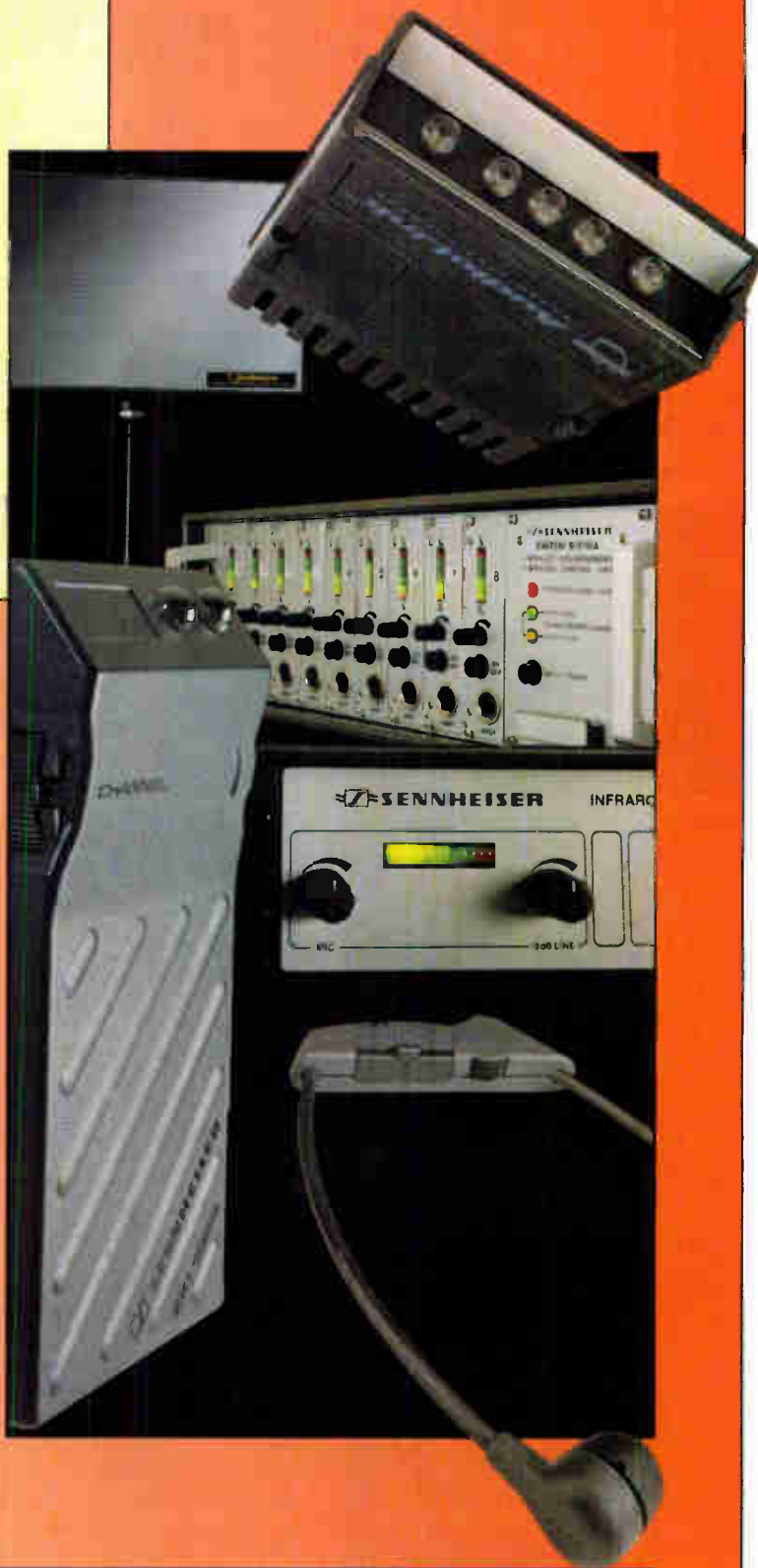
Your sound system may not be addressing the 10% of Americans who are hearing impaired. Sennheiser infrared systems solve this problem by providing interference-free coverage in any venue. And have you comply with the ADA as well.

Sennheiser offers the widest range of infrared equipment and accessories, including unique multi-channel systems for dual-language and simultaneous translation applications.

Comfortable, lightweight receivers with the most intelligible sonic quality combined with reliable and powerful transmission equipment provide cost effective solutions and years of trouble-free operation.

And Sennheiser manufactures the Audiolink™ Personal Listening Systems for the National Captioning Institute, universal standard in infrared compatibility for both public facilities and home users.

Reach your audience...with Sennheiser infrared.



 **SENNHEISER**

6 VISTA DRIVE, P.O. BOX 987, OLD LYME, CT 06371 · TEL: 203.434.9190 FAX: 203.434.1759  
IN CANADA: 221 LABROSSE AVE., PTE-CLAIRE, PQ H9R 1A3 · TEL: 514.426.3013 FAX: 514.426.2979

Circle 206 on Reader Response Card

# Blurring the Lines Between Touring and Fixed Install

BY NEIL A. SHAW

**T**he 95th Convention of the Audio Engineering Society was held at the Jacob K. Javits Convention Center in New York City from October 7 — 10, 1993. The theme of the convention was "Audio in the Age of Multimedia."

Although this review begins as all my reviews of this type have, this review is different. Instead of reviewing what was at the show, I'll talk about the show itself and how what was shown says something about the industry. The 95th Convention was the

best AES show this reviewer has attended, and the choice of venue reflects the maturation of the AES. Finally, after tentative steps in securing a competent venue for the AES conventions for those held on the West Coast, the AES has taken the plunge and has moved the New York convention to a facility that allows both the convention program and the manufacturer exhibits to be presented in a manner befitting a major technical society convention.

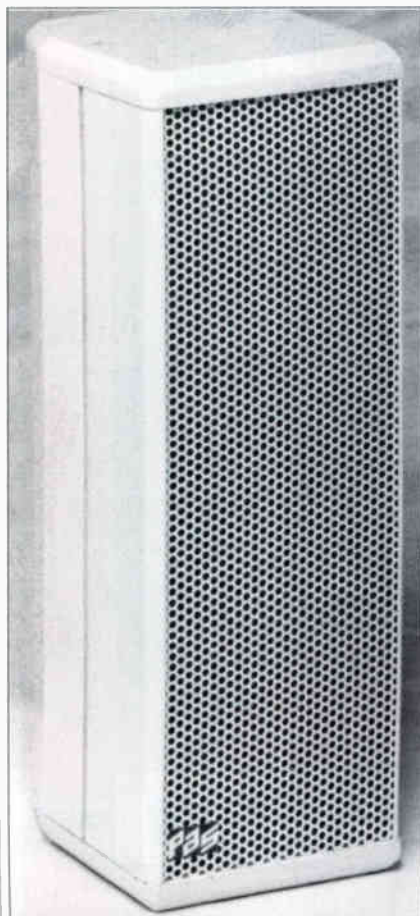
For almost 20 years, this reviewer has attended AES conventions that were held at hotels in New York City and Los Angeles. In the beginning, the exhibits and convention sessions were concerned with recording engineering and broadcasting. The fixed installa-

**The interaction between the electroacoustic system and the acoustic environment was acknowledged and embraced by both the technical sessions and the exhibitors.**

tion and touring sound segments of the industry were just making their way into the convention — both in the exhibits and in the paper sessions.

In the 1980s, the exhibits and sessions showed a great increase in the number of exhibit booths and papers devoted to, and about, fixed installations and tour sound. There was also an increase in the interest in computers. More importantly, the interaction between the electroacoustic system and the acoustic environment was ac-

# MAN



## AGAINST THE ELEMENTS.

Clients been asking for great sounding speakers that stand up to the great outdoors? Recommend the new PermTec P-100s, a great way to get superb sound quality in surprisingly compact and durable weathersealed enclosures.

Designed to make life easy for installers, PermTec speakers feature moisture-resistant components and extruded aluminum enclosures constructed with integral flying and mounting points. An optional self-powered model available for turnkey installations.

PermTec. Sound for the great outdoors.



## PERMTEC SERIES

Professional Audio Systems  
660 N. Twin Oaks Valley Rd., Suite #101, San Marcos, CA 92069  
TEL: 619-591-0360 FAX: 619-591-3602



knowledge and embraced by both the technical sessions and the exhibitors. In the sessions, the simulation and analysis of both the acoustic and electroacoustic parts of the equation were given much coverage and attention. In the exhibits, i.e., equipment portion of the convention, the range of products — hardware, software and services — that depended on computers grew tremendously. Along with this was the realization of digital implementations of the analog world. Suddenly, the promise of great possibilities dawned upon us.

Now, in the 1990s, the possibilities are being realized. The convergence of technologies evident at this year's AES convention was awesome in its scope. It is obvious to the most casual observer that sound, video and con-

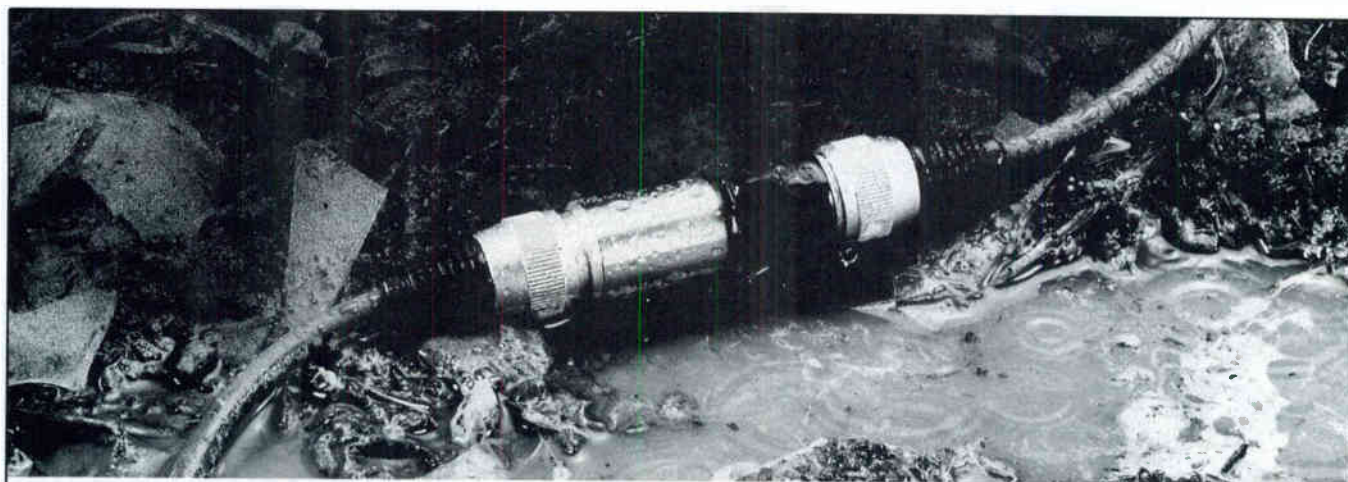
trol can all be represented as data, and that this data can be encoded and manipulated in the digital realm. The

**It is obvious to the most casual observer that sound, video and control can all be represented as data, and that this data can be encoded and manipulated in the digital realm.**

95th Convention had paper sessions and workshops about Digital Music; Test, Measurement and Specifications;

DSP Theory and Applications; Computer Control of Sound Systems; Auralization; Multichannel and HDTV Sound; Audio in the Age of Multimedia; Perceptual Coding; Digital and Analog Electronics; and, Grounding, Shielding and Interconnections in Analog and Digital Systems. Each of these sessions was directly dependent on digital representations of the signal, digital computer control of and processing of the signal, and analysis and synthesis of the system in the digital realm.

The exhibits represented the explosive growth of digital implementations available to the audio engineering world. Software packages, hardware systems, integrated chip manufacturers, digital services providers, digital interconnections, DSP programming



## PERFECT CONNECTIONS FOR AN IMPERFECT WORLD

When the going gets tough, the tough get Neutrik. Just look at the flawless design and Swiss-made precision of Neutrik MX-HD and FX-HD connectors as an example. They are weather, dust and corrosion proof. When mated together, the contacts are completely protected against anything the elements might throw their way—from sun and water to mud, snow and ice.

Neutrik X connectors are also very quick and easy to assemble. With *only 4 parts, no screws and no tools needed as required by all competitors' products*, Neutrik X connectors can be assembled in 50% less time than

any XLR found worldwide. Less time means greater productivity that lowers your connector assembly costs. The price? Very often less expensive than other brands that have far less to offer.

Make the perfect connection...choose Neutrik.



**NEUTRIK**

CONNECTING THE WORLD

NEUTRIK AG  
Liechtenstein  
Tel 075 / 232 9666  
Fax 075 / 232 5393

NEUTRIK USA INC.,  
USA  
Tel 908 / 901 9488  
Fax 908 / 901 9608

NEUTRIK Marketing Ltd.  
United Kingdom  
Tel 071 / 792 8188  
Fax 071 / 792 8187

NEUTRIK Zürich AG  
Switzerland  
Tel 01 / 734 0400  
Fax 01 / 734 3891

CONNECTORS • TRANSFORMERS • PLUGS • JACKS • ADAPTORS • GOOSENECKS • TEST SYSTEMS



File

Edit

Access

Views

Objects

Diag

Operation M

EX Series < 2 >

Ch 2

Clip

Output

+10  
0  
-10  
-20  
-30  
-40  
-50  
-60  
-70

-76

0% 100%

Thermal

Mute

Solo

Polarity

Pwr Prot Ch 1

On Mute Clip

Input Output

+10  
0  
-10  
-20  
-30  
-40  
-50  
-60  
-70

-60 -69

0% 100%

Thermal

Mute

Solo

Polarity

Select

Aux

In

Out

Control

Gang

Fader

Mute

Solo

QSC

Pwr Prot Ch 2

On Mute Clip

Input Output

+10  
0  
-10  
-20  
-30  
-40  
-50  
-60  
-70

-31 -54

0% 100%

Thermal

Mute

Solo

Polarity

Atten -36

THRSH

SOLO

BYPASS

0  
-5  
-10  
-15  
-20  
-25  
-30  
-35  
-40  
∞

QSCControl™ gives you full graphic computer control of any device in a MediaLink Network using LoneWolf's breakthrough Visual Network Operating System (VNOS™). Displayed on this screen are QSC EX Series Amplifiers, the JBL/UREI Platform Signal Processor, the Carver PDR-10 CD Recorder, and the Rane Neq 228 Equalizer.

Neq 28/56 < 1

AN 1 FADERS CUR MEMORY NA

50 63 80 100 125 150 160 200 250 315 400 500 630 800 1k 1.25k 1.6k

1  
2  
3  
4  
5  
6  
7  
8

PD

Mute Record

Track A B

Inc



# QSCControl™

## The New Tool Of The Trade.

On October 1, 1992 at AES/San Francisco, QSC invited the industry to "Hear the light."

It was time to unveil a breakthrough that QSC was convinced could become the long-awaited standard for pro-sound computer control and network integration — Lone Wolf's MediaLink™ and the Visual Network Operating System (VNOStm).

MediaLink offers complete, non-proprietary, open system interconnection with any audio device via a common networking language (VNOStm) and simple hardware interface.



*The QBridge™ is the hardware interface for various communication formats in a MediaLink network and the QHub™ connects up to eight full-duplex fiber optic devices.*

QSC was the first power amp manufacturer to recognize MediaLink's potential and develop QSCControl™ (pronounced "Q's Control").

QSCControl connects QSC EX Series Amplifiers to the MediaLink network. It gives you total computer control and monitoring of all amplifiers and any other MediaLink device in your system. (Even

non-MediaLink devices may be bridged to the network.)

You can customize control panels, view and change network configurations (LanScapes™), and design an endless variety of venue applications with Virtual Venue™. All graphically. All with mouse-driven, drag-and-drop simplicity and efficiency. And, you can instantly switch between views in multiple open windows.

In other words, QSCControl takes complete advantage of the full-function power and ease-of-use of the two most popular GUI's. Versions are available for both Macintosh® and Windows®. *In fact, with MediaLink your network can include both of these platforms at the same time.*

One of the most revolutionary features of a MediaLink/QSCControl network is its use of Fiber Optic Cable for connection between devices. Fiber Optic Cable is immune to interference and it prevents ground loops. It offers a very high bandwidth. And, this Fiber Optic Network will allow you to upgrade to digital audio or whatever else the



*The plug-in QLink card is the EX amplifier interface, via fiber optic cable, to the MediaLink network. It allows for several optional I/O modules, including MMDI, PA-242, RS-485, and other glass or plastic fiber optics.*

future may bring.

Speaking of the future, what about MediaLink's potential to become the industry's widely accepted standard?

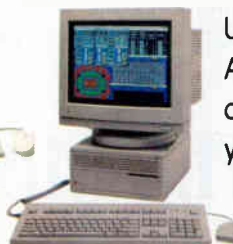
It may still be too early to tell, but the list of leading manufacturers who have "heard the light" is growing rapidly. At the time this ad was produced the list

included JBL, Soundcraft, UREI, Rane, TOA, Carver, Altec Lansing, Vega and Klark-Teknik. But, if you want to keep up to speed, you'd better contact us. It's likely the list will keep getting longer.

If you're considering computer control, don't get locked in to a closed network. *Join the MediaLink revolution.* And call QSC Audio Products at (714) 754-6175 to learn more about QSCControl and EX Series Amplifiers.



*The QSCControl software is available in Macintosh and Windows versions.*



*With QSCControl and MediaLink, your network may include both "Mac" and PC systems.*

## Hear the light.

QSC®  
A U D I O

MediaLink, VNOStm, Virtual Venue and LanScapes are trademarks of LoneWolf, Inc. Macintosh is a registered trademark of Apple Computer, Inc. Windows is a registered trademark of Microsoft Corporation. QSC is a registered trademark and QSCControl, QBridge, QHub and QLink are trademarks of QSC Audio Products, Inc. 1675 MacArthur Blvd., Costa Mesa, CA 92626-1468 (714) 754-6175 Fax (714) 754-6174

**Circle 208 on Reader Response Card**  
World Radio History

services, DSP hardware and DSP systems, to name a few computer based options available, were readily evident in the exhibit area. (More about the Auralization workshop chaired by the author in a future article).

So, after moving from emphasis on recording and broadcast engineering to focusing on fixed installs and touring sound, we see that the convergence of technologies is blurring the line between audio and other fields. Visual, auditory and haptic senses are used together. Command, control, sound, video, accounting, security, et. al., are be combined into software and hardware packages that not only do it faster than before, they also do it better.

For example, a cursory look at the options available to a fixed installation designer shows new and exciting tools, such as Lone Wolf's VNOS (which uses discrete real components), IED's UDAPS (which uses DSP implementations of conventional equipment via custom programming), and Peavey's MediaMation and the Klotz VADIS system (which are de-

finied on-screen and "compiled"), which are available to the designer for implementation of systems. Now, instead of having to design a system

**So, after moving from emphasis on recording and broadcast engineering to focusing on fixed installs and touring sound, we see that the convergence of technologies is blurring the line between audio and other fields.**

using discrete mixers, processing equipment and the interconnection thereof, as well as finding the physical space for the equipment and being dependent on the installation practices of varied installers, soon a designer

can literally, in some cases, paint the system on the computer VDT, compile the system, and then turn it on and go do it! The DSP implementation is ready to go as soon as you are done defining the system. Any changes are implemented in software. The increase in capability, control and configurability now available to designers, contractors and, perhaps most importantly, to owners, is unfathomable.

The best part is that the above is also available now to the designer and users of recording systems, broadcast systems and touring systems. The lines between a tour-sound piece of equipment and a fixed-install piece of equipment are fading.

To close, the quickening of the convergence of functions and functionality evident at the 95th AES Convention provides the clearest indication of the beginning of how the audio engineering world can focus more on solving the problems at hand with less and less concern for the inherent limitations of the tools used to solve the problems. ■

# The Media Convergence

BY ROB BAUM

**T**he 95th AES convention was held in the Javits Convention Center in charming New York City. The theme, "Audio in the Age of Multimedia," was reflected in the increasing convergence of audio with video, and computers, often using telecommunications to tie all the pieces together. Hmmmm. Does this really mean anything to the pro sound community? Despite the hype, the future holds the promise of major changes in the way we all make our livings.

On display were hardware/software combinations used in personal computers to provide contractors as well as studios increasingly sophisticated

control over playback systems, music synthesis, processing, editing and distribution. There were a large number of hard-disk drive ("tapeless") recording systems, or "Digital Audio Workstations," which naturally could synchronize to video.

## YOU SAY YOU WANT A REVOLUTION

The most revolutionary changes were not products, but two ideas that have been kicking around for years. These concepts have been driven to fruition by the unprecedented drop in the price of computer processing power and telecommunications.

Well, what are they? Drumroll, please . . . Computerized control and signal processing.

First; using computers for control and monitoring of equipment, as well as to pass along audio, timecode, and even video signals. Computer controlled systems from Lone Wolf (MediaLink) and others exist and actually work. Chip sets to make these systems are easy to implement and are coming.

EDnet already delivers high quality audio to a network of studios over fiberoptic lines. Several different data compression schemes are available to help cram all this data down telephone



company ("telco") copper or fiber optic lines. They include Dolby's AC-2, CCS's Musicam (MPEG-2 audio), and APT's apt-X.

Second, using computers to process audio signals. Your favorite signal processing boxes — like equalizers, mixers, and delays — may soon be replaced with digital signal processing (DSP) chips controlled by software. The days of all those fancy, *i.e.*, expensive, boxes clogging up rack spaces between a source, like a microphone or a CD, and the power amplifiers and speakers, are probably numbered. Peavey showed, under controlled conditions, their MediaMation system. This revolutionary system is described elsewhere in this issue.

Wow! This is potentially great news for users and not so great news for

suppliers. If and when this product, and others like it, matures, signal processor companies could find them-

**Your favorite signal processing boxes — like equalizers, mixers, and delays — may soon be replaced with digital signal processing (DSP) chips controlled by software.**

selves transformed from hardware companies into software companies. Many may not be able to make the

transition, while companies new to the audio business may jump into the fray.

### MAKING WAVES

Yamaha showed their modestly priced "WaveForce" series of PA speakers. These products, along with Ramsa's and Genelec's, are among an increasing number using waveguides to control the spherical dispersion of sound, rather than traditional rectangular horns. At the other end of the signal chain, Josephson Engineering showed a new series of German manufactured measurement mics, promising BMW precision at Acura prices.

In summary, an interesting show that may be looked back on as a watershed: when it became clear that audio would be swallowed by multimedia. ■

## DISCOVERY TOYS INSTALLS SOUNDSPHERE SPEAKERS TO IMPROVE PAGING...

The marketing concept of Discovery Toys Inc. is to have home demonstrations of the developmental toys, books, and games. Approximately 135 items are carried at any one time by the 25,000 independent contractors who are called, "Educational Consultants." They do home demonstrations of Discovery Toys quality products.

The Discovery Toys Distribution Center in Livermore, CA has a need for clear voice announcements to improve efficiency. Because there is also some final toy assembly, the floor areas have the production ambient noise in addition to the usual noise of lift trucks and other packaging machinery. Eleven SoundSphere #110A Speakers were installed to distribute voice paging and background music.

This quality installation was coordinated by Ted Connell and Don Chaffee of MUZAK, San Francisco.

Write or call direct for further information.

**SOUNDSPHERE** A PRODUCT OF  
**SONIC SYSTEMS, INC.**

737 Canal St • Bldg 23B • Stamford, CT 06902 • USA • (203) 356-1136

Circle 257 Reader Response Card



# Barneys on Madison Avenue

*Uptown Sound with The Movers and Shakers*

BY MARK MILLER

**F**or the opening of Barneys, New York City's most talked about department store in over half a century, Audio Sound Productions of Farmingdale, New York, pieced together a classic sound system. The notoriously posh clothing and accessories store opened its uptown doors in New York City in September with an aural emphasis on simplicity, discretion and high-technology.

One of the requirements made by architect Peter Marino was that the speakers not be seen. "Peter wanted that very clean look to the store," says Dave Rosen, the system designer who oversaw the installation by Adco Electrical Corp. of Staten Island. In the ceiling, Audio Sound Productions mostly used the B.E.S.T. speaker CT 62. Adco spackled and concealed the speakers into the ceilings with paint. JBL Control 1s were used in other areas, including installation in coves and behind grilles. "When installing in an alcove," says Rosen, "we had to break the speakers into three sections and reconstruct it in the 'cove. It's a lot of work to be clean." Because two types of speakers were used, two different amps and equalizers were fitted and balanced.

The fitting rooms, hallways, and rest

---

*Mark Miller is a freelance writer living in New York City.*



*Barneys New York on Madison Avenue.*

rooms all contain Audio Sound Productions' own Art Deco Speakers, each with its own level control for the area. The fire alarm system is interfaced to the audio system to mute the music in case of fire alarm alert. The muting is a function of the ASP Digital Switcher and was designed by Michael Rosen, of MPS, Houston, Texas.

"Simplicity is also a thought behind the complex multi-zone audio system," says Rosen. The system must be simple enough for the store's sales personnel to be able to run it. Each one of the nine floors has two depart-

ments. Each department can have its own source of music, either CD, tape, or the house music from the first floor.

The equipment racks are located between the two departments on each floor so that either department has programming access. The racks consist of two ASP Digital Switches (also designed by Michael Rosen), two Grommes-Precision amplifiers, two Sony CDPC910 10-stack CD players, a Sony Dual Reverse Automatic Cassette Player, an AB International 1/3 Octave Equalizer and the Equipment Rack by Middle Atlantic. The components are



# SmartMixer®

## Uncomplicated, Automated



AT-MX341 Automatic Microphone Mixer

If you thought that automatic mixers required an advanced EE degree to install and years of experience to run, we've got great news for you. Introducing the Audio-Technica AT-MX341 four-channel SmartMixer® with unique digital microprocessor control.

### Cleaner Sound...Automatically

At last a mixer anyone can set up in minutes, providing three modes of operation for exactly the control you want, automatically. The SmartMixer reduces background noises and other distractions by keeping the number of open channels to a minimum. And switching between channels is instant and completely transparent.

### Easy System Setup

Mixer setup is a snap: 1. Adjust channel one gain... 2. Adjust "threshold level" to exclude ambient sound... 3. Adjust other mike gains... 4. Select which mikes you wish to control (all, some, or none). That's it! The last-mike-on stays on so that ambient sound is always heard through the system, eliminating "dead air." Channel LEDs indicate which mikes are active. Mixer output level is indicated by 6 LEDs.

### Flexible Priority Control

Each channel has a switch to connect it to the digital control system.

If all channels are under digital control the system opens just one microphone at a time, switching only after the controlling channel falls quiet. The operation is so fast and silent that it is the recommended mode. A channel switched to priority will override all others any time the threshold level is exceeded, useful for moderators and chairpersons. Thus you can choose to have just one microphone open at a time, all microphones active, or any combination desired.



### Digital Switching plus TTL Output

All switching is controlled by a digital microprocessor with proprietary algorithms for instant, seamless operation, far superior to older analog designs. By using digital control the AT-MX341 SmartMixer also offers TTL logic output control signals that can be used to turn speakers on or off, control cameras, light tally lights, or whatever else is needed. And it can easily interface with the Audio-Technica DT100 Teleconferencing System as well. Because the logic is in a socketed EPROM, a new IC from A-T can quickly revise or update the programming at any time.

### Designed for Expansion

Using the provided link cable you can cascade as many SmartMixers as needed to create a system for large seminars or legislative bodies. The priority control system extends throughout the entire chain of SmartMixers. The SmartMixer mounts in a single 1/2-wide rack space and is powered by either 117V AC or 15V DC. It also provides 12V DC phantom power for condenser microphones. Security covers are included to limit access to controls if desired.

### Great Sound...Everywhere

The SmartMixer is perfect for teleconferencing, meetings, seminars, and for use in broadcast and A/V studios. Its simplicity and unique abilities make the AT-MX341 ideal as the hands-free heart and soul of many sound or recording systems, from boardrooms to churches.

Get all the details on the AT-MX341 SmartMixer. Write, call, or fax today. Available in the U.S. and Canada from **Audio-Technica U.S., Inc.**, 1221 Commerce Drive, Stow, OH 44224. Phone (216) 686-2600. Fax (216) 686-0719.



**audio-technica**

INNOVATION □ PRECISION □ INTEGRITY

Circle 212 on Reader Response Card



The second floor woman's Chelsea Passage contains B.E.S.T. and JBL speakers in the coves and ceiling.



The Window Display: ASP speakers above the window display, and JBLs behind the grills.

panel mounted along with storage drawers and a monitor speaker. For simplicity, Audio Sound Produc-

tions modified the amplifiers and equalizers so that one control could adjust the volume of sound on the en-

tire floor in relation to the two different types of speakers. "Different speakers get different sounds," says Rosen, "so we manipulated the system to get them as close as possible and controllable from one source. This allows for the sound to just flow from one area to the next rather than being brash in one spot and soft in another." It is also easy to select the program material by using the ASP Digital Selector Switch to select music.

Barneys' original superstore downtown, once a discount house, has long been famous for its window designs. Barneys' uptown window design team

**"We manipulated the system to get them as close as possible and controllable from one source."**

took the concept one step further by adding sound.

The uptown store's large windows, 11 in all, look onto Madison Avenue and 61st Street. Four of these look directly into the store. Seven work as display windows and are equipped to feature live bands, dancers, and come-

## All New Infrared System

- ★ More Coverage
- ★ More Features
- ★ Easier Installation
- ★ Lower Cost

The TX300 Infrared System features a separate Modulator and Transmitter for maximum flexibility. The MOD 1 Modulator offers multiple inputs from mic-level to 70V speaker level.

Audio quality is improved with a new audio processor. Each TX3 Transmitter covers over 5000 sq. ft. and features automatic shut off circuitry.

Three Receiver styles are available to suit customer preferences. The TX300 is made in the USA and is backed by a 3 Year Warranty.

We also offer a complete line of high quality FM Systems.



WIR TX300 Transmitter and Modulator

For complete specifications, call Toll-Free:  
1-800-843-3544

**Williams Sound**<sup>®</sup>  
Helping People Hear

Circle 273 Reader Response Card



# And now a few words to all of you who already own a dual CD player...

## We're sorry.

**Introducing the Gemini CD-9000—  
it does everything you demand from a dual CD player  
...for a lot less money!**

If you were one of those people who couldn't wait; who simply had to be the first on your block with a dual CD player, *don't read this ad.*

On the other hand, if you're one of those smart individuals who knows that being first doesn't always mean being best, we'd like to introduce you to your new dual CD player—the CD-9000 by Gemini.

This baby has everything you've ever wanted in a dual rack-mountable CD player—and then some. Aside from the 2 rock solid, self-locking CD transports, there's variable pitch



control (+/- 8%), pitch bend, an effect sampling button and stutter—all for the "on (or over the edge)" effects you need to keep your gig going.

There's also digital instant start, multi-function FL-Tube display (track elapsed, remain, overall CD remain and more) with indexing and more.

And because the CD-9000 is by Gemini, you know it's affordable and built to last—all of which serves as a reminder of that age old saying... "Good things come to those who wait."

Corporate Offices: 1100 Millik Street, Carteret, NJ 07008 • 908-969-9000 • Fax 908-969-9090  
Florida Branch: 2848 J Stirling Rd., Hollywood, FL 33020 • 305-920-1400 • Fax 305-920-4105

**gemini**  
SOUND PRODUCTS WITH SOUND IDEAS



JBL Control 1s are behind the black grilles in the coves.



The staff that put it together. David Rosen, Ray Benza and Rich Ludlum (left to right).

the best just got better.

**EASE** **EASE JR.**  
**Acoustical Design and Analysis Tools for Contractors, Engineers and Consultants Versions 2.0**

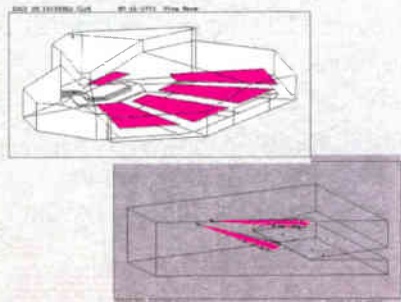
**Easier to use** Windows-like menus speed up use and reduce "cockpit" errors

**Improved room modeling techniques** - Prototype rooms, graphic editing simplify and speed modeling

**DXF file exchange** allows data exchange with virtually all architectural CAD programs, including AutoCAD

**Improved graphics and presentation capabilities** enhance effectiveness as a marketing tool

Plus all the features and the accuracy that have made EASE and EASE JR famous around the world



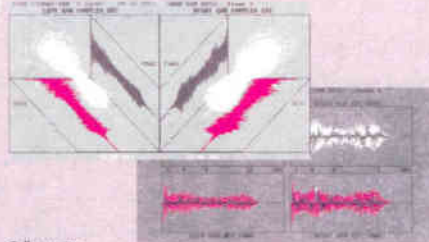
EASE Software - © Copyright ADA (Acoustical Design Ahnert), Germany

**PLUS EARS**  
**EARS - the advanced binaural auralization program that allows hearing how a room will sound before it is built.**

**Realistic**  
 Unique Binaural auralization technique and CD fidelity add unprecedented detail and accuracy to the simulations

**Economical**  
 EARS requires only a low cost 16 bit multimedia card

DSP cards can be added to speed up calculations



Call or write for more details

**rh RENKUS-HEINZ**  
 MANUFACTURERS OF PROFESSIONAL SOUND PRODUCTS  
 17191 Armstrong Avenue, Irvine, California 92714  
 Tel 714/ 250-0866 Fax 714/ 290-1035

dians and can broadcast to both interior and exterior speakers. Each window contains several mic jacks patched in to a central rack system. "The windows let the Barneys personnel interact with the community," says Rosen. "Different things can be going on at the same time."

Some of the scenes designed by Barneys' display design staff feature pre-recorded music. The window display rack has seven dual and two reverse tape decks that feed into a DISTRAMIX Matrix Mixer. The source can be routed into any combination of windows. The tape decks have also been modified and fully automated to be programmed to go on or off at a given time. In addition, the customized decks are able to play continuously.

Rosen used JBL all weather Control 1 speakers for the exterior of the store, and mounted them behind the grille over the windows. ASP Art Deco Speakers function as monitors to the interior with individual volume controls. The AB Series 200 amp powers the speakers that are used for the window system.

The store also features a restaurant in the cellar with its own rack of equipment and speakers surrounding the room. JBL Control 1's are spackled into the walls and JBL 8306s are flush mounted. Barneys plans to open a gym, spa, and beauty parlor at the location which Rosen has designed.

"The place is like Disneyland," says Rosen. "There is something new everywhere, and when you enter a new territory, you hear new, interesting things, but at the same time, the whole thing just flows." ■

Circle 260 Reader Response Card



# Why does Crest Century SP/TC give you more for your money?

*Because our customers put in their 2¢.*



## ***This is exactly what the job calls for.***

That's what contractors are saying again and again about Crest Century SP and TC consoles.

### **IT'S NO SURPRISE**

Before designing the Century series, we spent over a year talking to leading contractors and end users about what they needed in a console. They gave us an earful about which design elements and features are really important, and which frills add to the cost, but don't add value. We listened and learned. And then we got busy.

### **IT'S GOT WHAT YOU WANT**

Start with flexibility. Century SP and TC consoles are available in six different frame sizes, from 16 to 52 inputs. The SP's 4 band fixed EQ is ideal for non-technical operators, while the TC adds sweepable mids. Choose from four or eight subgroups, plus optional stereo input and matrix output modules. A mono assignment system, ideal for hearing impaired or center channel systems, is standard. So is electronic balancing on all primary inputs and outputs. Or

you can choose optional balancing transformers.

### **YOU CAN COUNT ON CENTURY**

Crest reliability is legendary — ask any Crest amplifier or Crest Gamble console user. The Century consoles are built to the same high standards. We've used the latest technology and only top quality components in the Century series — you'll find no TL072 or 5532 chips and no electrolytic capacitors in the signal path. The console is fully modular. And the power people at Crest have given Century SP and TC a power supply that's practically indestructible...think of the service calls that could save!

### **THE NEW STANDARD FOR VALUE**

Made in America, Crest Century consoles are quickly gaining a worldwide reputation as the contractor's choice for features, performance reliability and above all, value. For the full story on the entire Crest Century series, which includes the full-featured GT and live monitor LM console models as well as the SP and TC, call Crest Consoles at 201-909-8700.

 **CREST**  
CONSOLES  
THE POWER OF INTELLIGENCE

CREST AUDIO INC. 100 Eisenhower Dr., Paramus, New Jersey 07652 USA · TEL 201.909.8700 · FAX 201.909.8744  
CREST AUDIO EUROPE 5a Wilbury Grove, Hove, East Sussex BN3 3JQ, England · TEL 44+(0).273.325840 · FAX 44+(0).273.775462  
CREST AUDIO ASIA 6001 Beach Road #17-03, Golden Mile Tower, Singapore 0719 · TEL 65.295.2328 · FAX 65.295.4707  
In Canada: Contact Dist. Ltd. 38 Thornmount Drive, Unit #1, Scarborough, Ontario M1B5P2 · TEL 416.287.1144 · FAX 416.287.1204

Circle 216 on Reader Response Card  
World Radio History

# TCU'S Amon G. Carter Stadium

*The Horned Frogs Get New Horns!*

BY CHRIS JORDAN

**T**exas Christian University (TCU) in Fort Worth features a rather unique nickname for their athletic teams: The Fighting Horned Frogs! But now the frogs have new horns (of the audio variety), after the installation of a modern sound system at the university's Amon G. Carter football stadium.

Originally built in 1930, the stadium

*An enclosed structure had to be built in order to mount the six E-V MH6040Cs on the roof of the coliseum.*



*Amon G. Carter Stadium at TCU.*

was remodeled and expanded in the 1950s to its current capacity of 46,000 seats. It has two-tier seating on the west side, with a single tier on the east side. The Daniel Meyer Coliseum, used for basketball and other indoor events, is located immediately past the

south end zone.

Our firm, Electro Acoustics, Inc., also located in Fort Worth, has completed several projects for TCU, enjoying a good working relationship with them. We had been aware for several years that the existing stadium sound

system needed to be replaced, but funds simply were not available.

## HOW QUICKLY THINGS CHANGE

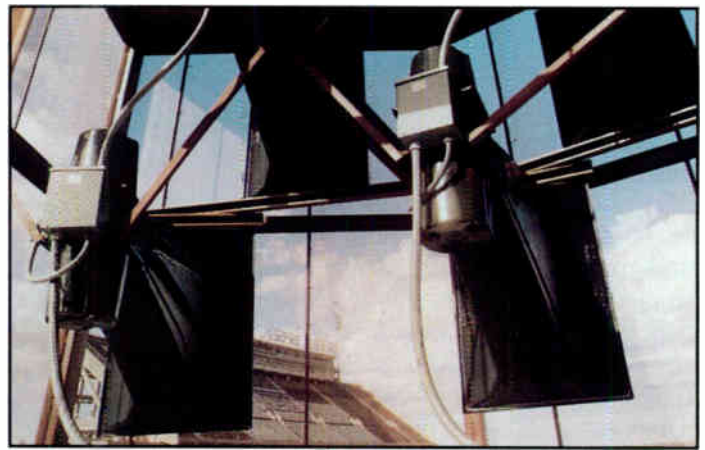
In mid-July of last year, Electro Acoustics and one other firm were contacted by the university and asked if a complete sound system could be designed, bid, and installed by September 7 — in time for the first game.

Our elation was quickly replaced by the panic of reality: we had less than two months to accomplish the entire project. The contracting firm would handle complete system design and specification — an acoustic consultant would not be retained. The university felt the contractor held the most re-





The stadium is located in Fort Worth, Texas.



Rear view of the cluster.

sponsibility in seeing the job completed by deadline.

Due to the tight deadline and the size of the project, we sought the input and expertise of Erich Friend, Crawford Friend Corp., Ft. Worth. As Erich and I reviewed numerous design possibilities for the main loudspeaker system, it became obvious that both the east seating area and end zones lacked suitable places for mounting distributed clusters.

We instead opted for an end zone speaker cluster, to be mounted atop the coliseum. This location, providing clear line of sight to all seats except those under the west seating tier, presented only one notable concern: The far end zone seats would be more than 640 feet from the cluster!

### MANUFACTURED SOLUTIONS

Prior to the TCU project, I had participated in an Electro-Voice Contractor Council meeting, where the company presented several new products in development. One of those products was the MH6040, a horn-and-driver system designed especially for large sports venues.

This system is the most recent application of E-V's Manifold Technology, which combines multiple drivers for increased power handling without an increase in loudspeaker size. The result is a higher output level without the typical cancellations that occur when combining drivers.

This particular device was designed to cover the voice range in a very effi-

cient, water-resistant package for outdoor use. Two ten-inch cone drivers, mounted on a six-foot-long fiberglass horn, are employed to cover the 100—4,000 Hz frequency range.

The MH6040 provides coverage all the way to 20,000 Hz with the addition of two high-frequency drivers (we selected E-V DH1As) manifolded on to an E-V HP640 medium-format 60 x 40 constant-directivity horn. This version, known as the MH6040C, features the

### The university was a bit skeptical of this approach because it involved new technology.

HP640 mounted coaxially in the mouth of the large horn and aligned using a digital delay.

The university was a bit skeptical of this approach because it involved new technology. However, E-V quickly sent us an MH system, along with a dual 18-inch subwoofer and amplifiers for purposes of a live demonstration. Even with only one MH system placed at the proposed installation point, it performed impressively, even at 640 feet. In fact, the sound quality was so good for voice that the university elected not to include the subwoofer option.

Using AcoustaCADD, Mark IV Audio's computer-assisted design program, we determined that six MH6040C's were required to produce

the desired levels. Each seat would be covered by at least four drivers, meaning that half of the system could fail and still provide acceptable coverage.

The seating area tucked under the west deck received additional coverage from six E-V PI-100 weatherproof full-range speakers. Each speaker is on a separate digital signal delayed output and powered with a 200-watt amplifier.

Based on our complete design and the successful demonstration, we won the bid — with exactly one month for installation until the season-opening kickoff!

### TIME FOR ACTION

We contracted a structural engineer and steel fabricator to design and install an enclosed structure for mounting the six MH6040Cs on the roof of the coliseum. The structure, which was in place within three weeks, is capable of withstanding 90-mph winds, and provides added protection from the elements even though the MH systems are weatherproof. It also includes provisions for the possible future addition of subwoofers.

The amplifiers for the main cluster are rack-mounted and are housed in a room at the coliseum, about 150 feet from the cluster. These racks also house limiters and protection capacitors for each MH system to prevent over-excursion of the driver diaphragms. Minimal equalization was needed, with only a slight bump in the 1,000 Hz region needing correction.

A small amount of remodeling was done on the room containing the amplifier racks housing the amplifiers for the west tier support speakers. Isolated-ground electrical circuits were installed, with power switching accomplished by lighting contactors which provided a reliable and cost-effective utility. In addition, a new power transformer was installed at the coliseum to accommodate the main system.

After installation, the west deck support speakers were equalized to closely match the level and curve of the main system. We didn't have a TEF analyzer available for alignment, but instead used a very effective method that was discovered by accident.

Located at the amplifier rack location, I noticed that it was much easier to align the impulse clicks being fed



*A custom panel in the announcer's booth that allows system operation.*

into the system via the walkie-talkie than by the ears of our staff members on the field. With the field walkie-talkie kept constantly transmitting, I was then able to quickly align each speaker from my position at the racks. The results of this alignment proved to be very accurate and satisfactory.

At the press level, we installed 10

that it puts as much sound on the field as it does in the stands, causing feedback and echo problems when the referee is using his wireless microphone.

A way to delay the referee's announcements was devised. When the referee keys the microphone, a McKenzie digital repeater receives the signal, stores it until the microphone is keyed off, and then distributes it to the system.

A separate feed is taken directly from the wireless system to provide the proper lip-sync for television broadcast. Even after using this setup for a while, most people were not aware of its existence but did notice how the referee's calls were loud, clear, and without feedback or recurring echo.

Erich also recommended the use of a Lyntec Automatic Crowd Level Computer. This device uses calibrated microphones to sense crowd levels and adjust the sound system volume accordingly. Our goal was to keep the system volume at a pleasant and comfortable level, which has been accomplished.

The system remains clearly intelligible regardless of crowd level and does not become offensively loud when the stadium is quiet. This is especially beneficial for community relations, because the stadium is located in the middle of a residential area.

The main system is controlled from the PA announcer's booth, activated by a single switch that's very simple to operate. The announcer's microphone

## **I noticed that it was much easier to align the impulse clicks being fed into the system via the walkie-talkie than by the ears of our staff members**

E-V S-40T 70-volt compact loudspeakers. These speakers are tied into a special foot switch and lighted on/off indicator used by a "spotter." Wearing a head-worn microphone, the spotter provides game information and updates to the press. Broadcast feeds are provided by a buffered distribution amplifier that handles output from both the referee's wireless microphone system and mics picking up crowd noise.

### **SPECIAL ENHANCEMENTS**

Erich Friend presented us with some great ideas to enhance the new system's performance. A drawback of any end-zone loudspeaker system is

**Tek-CALL**



Apartment House Intercom Systems offer communication between entrance areas and individual apartment intercoms. Accessories available to comply with ADA requirements

**Call or Write To:**  
**TekTone Sound & Signal Mfg.**  
 1331 S. Killian Drive  
 Lake Park, Florida 33403 \*  
 Phone (407) 844-2383 FAX (407) 845-1587  
 Order Toll Free: (800) 327-8466

TekTone © North Carolina  
 27 Industrial Park Drive  
 Franklin, N.C. 28734  
 \* Phone: (704) 524-9967 Fax: (704) 524-9968  
 Order toll free: (800) 448-1811

TekTone © Canada  
 4190 Fairview St., Unit B-8  
 Burlington, Ontario, Canada L7L-4Y8 \*  
 Phone: (416) 333-0051 Fax: (416) 333-0599

Circle 291 Reader Response Card



runs at 6-12 dB compression to provide consistent levels.

Source devices available include a cart machine, CD player, and cassette deck for taped announcements, commercial spots, or music playback. A custom panel allows adjustment of volume and the ability to cut programs before they go out over the system.

Vega UHF wireless microphone systems, which are extremely reliable and offer enough range to cover the entire stadium, are used for both the referee and for field announcements, ceremonies, etc. Wireless system antennas are mounted at the press box in clear line-of-sight with the field.

#### CONCLUSION

The university has expressed their complete satisfaction with the new



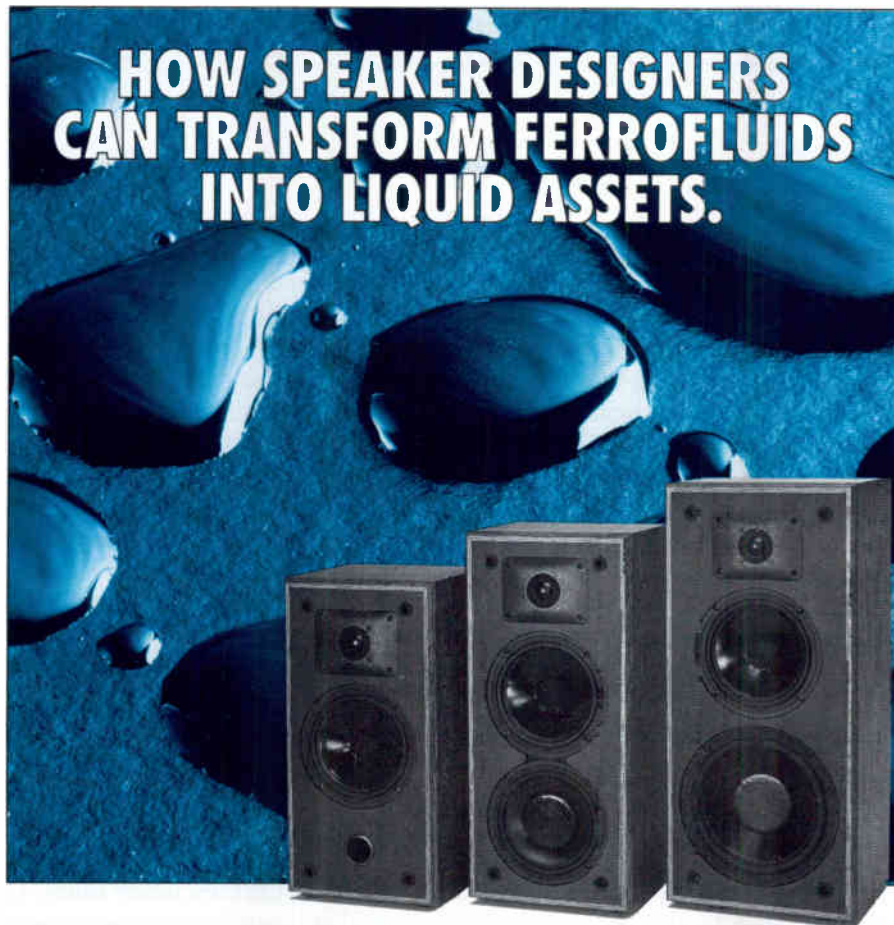
Author Chris Jordan of Electro Acoustics, Inc. who served as the project manager.

system. The only complaint was that it was too loud at the beginning of the season, a problem easily fixed by dialing down the gain by about six dB.

The sound quality is best described as extremely direct and accurate. It's almost eerie to be more than 600 feet from a speaker and still have it sound as though it were right in front of you. The quality of speech and even coverage of this stadium would not have been possible in this budget range only a short time ago! ■

*(Chris Jordan, author of this article, would like to thank Jon Lanmon, George Nicholson, Ben Lanmon and Rodney Harvey, all of Electro Acoustics, for their considerable contributions to the TCU project. Special thanks also goes to Buck Fielding, director of facilities at the university, for his support.)*

## HOW SPEAKER DESIGNERS CAN TRANSFORM FERROFLUIDS INTO LIQUID ASSETS.



### Introducing the FerroSound Technical Assistance and Customer Support Program.

The company that first set the standards in ferrofluid technology over 20 years ago now raises them even higher with the most comprehensive value-added support program in the industry.

FerroSound is Ferrofluidics' commitment to you that starts with access to the latest expertise (and our state-of-the-art audio test lab) dedicated to maximizing loudspeaker design and performance. Then we'll continue to back you by providing ongoing technical support for your current engineering applications.

Finally, by telling consumers of the many advantages of speakers utilizing FerroSound technology, we'll be right by your side at point-of-purchase as well.

For more information about how the FerroSound Program can be a real asset to your company, call 603-883-9800 or fax 603-883-2308.



Ferrofluidics Corporation, 40 Simon Street,  
Nashua, NH 03061

© 1992. FerroSound is a trademark of Ferrofluidics Corporation

Circle 251 on Reader Response Card

# Automatic Microphone Mixers, Part Three

## *When To Use Them*

BY ROB BAUM

In the first part of this series, we discussed the reason that automatic mic mixers exist as a product category: to automatically minimize the extra noise, reverb, and comb-filter effects that severely degrade the clarity of sound systems with more than one mic on at a time. In Part Two, we examined the way that automatic microphone mixers decide to switch microphone channels between the "on" and attenuated states. Methods reviewed included fixed and adaptive level based thresholds, direction sensitive gating, and gain sharing.

This month, more systems are discussed, along with a few hints about how and when to use automatic mic mixers. And finally, to help you in spec'ing the most appropriate device, a basic buying guide that will lay out the features and prices of some popular units.

### ADAPTIVE PROPORTIONAL GAIN

Mike Sims designed the Biamp Advantage series auto mic mixer, and went on to develop a whole line of au-

---

*Rob Baum is a Mechanical Engineer whose professional experience includes CBS Records and Apogee Sound. Rob works for Menlo Scientific and consults for the audio industry.*



*Biamp's Advantage One Mic Mixer.*

tomatic products for Lectrosonics. The Lectrosonics DC-1B is an enhanced adaptive gain sharing pre-processor that goes in the mic lines ahead of the mixer. Four mics plug into the DC-1B, and the DC-1B plugs into four mic inputs of the console. It offers an adaptive threshold, with 2:1 expander gates. That means that for every 1 dB that the mic signal exceeds the threshold, channel gain increases an additional 1 dB (for a total of 2 dB gain). The expander insures smooth action without chopping the signal off abruptly in marginal situations. Its basic gain-sharing functioning is similar to the Altec and Dugan "speech system" products.

A new Number of Open Microphones (NOM) attenuation function, 1.5 x NOM, increases the standard 10 log NOM attenuation curve when more than four mics are in use.

Lectrosonics feels the more aggressive gain reduction compensates for some microphones not being in the reverberant field.

The DC-1B's functions are controlled by a microprocessor, with an analog audio signal path. The controller varies the signal contributions of the active microphone, sensing both the pre and post attenuator channel levels. This scheme effectively weights the signal contribution of the dominant channel more heavily, and the other channels less, even if the actual signal level difference is small. Lectrosonics, in its patent application, predicts this will improve the mixer's immunity to "bleed-over" from a talker's mic to closely spaced adjacent microphones.

Inputs can be set to priority mode, which suppresses other mics. There are also three memory presets which can set combinations of channels to



direct, auto and priority modes from remote contact closures. A last hold function can be used to maintain constant ambience noise level and prevent breathing and modulation side effects. The Lectrosonics DC-1B may be linked for more inputs and hardware bypass relays insure fail-safe operation if power is lost to the mixer. In setup mode, the actual input levels of the mics are displayed in real time so that differences in mic sensitivity may be determined.

### READY OR NOT: "VIRTUAL MIXERS"

Auto mic mixers basically come in four varieties. They include standalone units, pre-processors for larger conventional mixing boards, mainframes (a rack of small cards housed in a box



Crown's SMX-6 mic mixer for the IQ system.

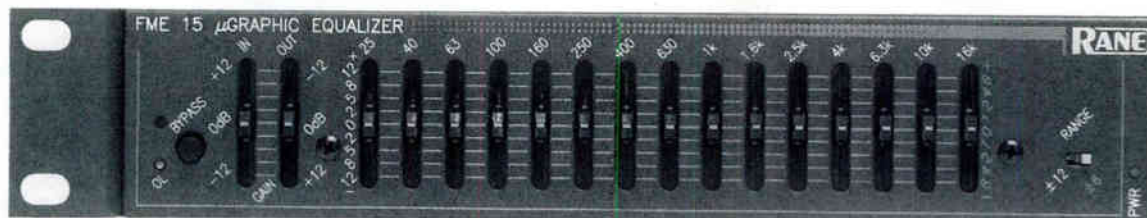
supplying power and signal routing), and, for lack of a better word, "virtual" mixers which exist only in software, often as part of a larger virtual audio system.

This new category of virtual mixers are programmed in software, typically will use a Windows-based or Mac menu-driven computer screen. The software tells a digital signal processor what to do with audio signals that have been converted from analog to digital. The software-based Media-Mation system from Peavey, described elsewhere in this issue, consists of all kinds of virtual signal processing

boxes — equalizers, delays, input/output routers — everything but an auto mic mixer. But that function can be added in software, later. Naturally, the resulting performance and capabilities of the output signal depends on the instructions (algorithms) in the software and firmware code.

Some products have an interface to the outside world through software (often embedded in replaceable ROM, Read-Only Memory chips and called "firmware"). As its parameters are manipulated on a computer keyboard, the software makes the mixer act like a virtual mixer. A pioneering example

# EXPERIENCED EQ SEEKS WORK



High-performance  $\frac{1}{3}$ -octave graphic equalizer available to start work immediately. Honorably discharged from highly-respected manufacturer. Works well with any other equipment. Recording/broadcast qualifications. Interpolates well. Proven track record. Small but very capable. Will work standing up or laying down. Call (206) 355-6000 for references. Ask for the FME 15 Constant-Q  $\frac{1}{3}$ -Octave micro-Graphic Equalizer.

RANE CORPORATION 10802 - 47th Ave. W., Mukilteo, WA 98275. (206) 355-6000



Circle 253 Reader Response Card



Lectrosonics' AS100 powered automatic mixer.

of this is the Crown SMX-6 auto mic mixer, part of its IQ 2000 System of networkable components. The SMX-6 has six channels in, two out. Software controls compression ratio, threshold, release time, and automatic gain control. User can assign priority to input channels and duck lower priority inputs when higher priority inputs are activated.

## Auto Microphone Mixer Buyers Guide

All prices are manufacturers suggested list and reflect configurations for eight channels unless otherwise noted. Prices are approximate and will vary.

Vendor	Model	Patent	Decision Method	Switch Method	NOM Method	List Price	Notes	Phone
Altec Lansing	1684A	Dugan Speech System	level pattern	expander	implicit	\$3,500	Standard 4 channel unit plus 4 1681A input channels (\$300 each)	405-324-5311
Audio-Technica	AT-MX431		VOX	gate	none	\$800	Microprocessor controlled 4 channel, small box.	216-686-2600
Biamp	Advantage Advantage Advantage	1 EX AG II	adaptive threshold	gate	VCA master attenuator	\$1500	Adv. 1 and EX (extra channels) require AG-II for auto mixing. Part of a system, add-ons available for EQ, zones. Price is for Adv 1 + Adv AGII.	800-826-1457
Crown	IQ-SMX-6			gate		\$1,795	Part of computer-controlled IQ system. Six channels in, two out.	800-535-6289
Dugan Sound Design	Model D	Dugan Speech, Music, Gain Limiting	level pattern or adaptive threshold	expander	implicit or variable threshold	\$5,450	Line-level processor for std mixer. In-channel VCAs to adj. mic gain. Music system uses ambience mic last hold function when gating.	415-821-9776
Eddor							New product mid 1994	800-854-0259
Electro-Voice	2508/9, 2504/5		adaptive threshold	gate	VCA master	\$2,316/2,500 \$3,440/3,614	Eight channels Four channels 2505/2509 = wired remote last hold function	800-234-6831
IED	4000 4800/4400	Ponto & Martin	adaptive threshold	gate at zero crossing	digital master attenuator	\$2,400+ \$3,000+\$1,875+	Prices depend on configuration 4000 Series is mainframe-style 4400 has four channels, EQ, computer control, monitor test system, power amps among option slide-in cards.	502-267-7436
IRP	DE-4013 DE-4018  System 41 DE-4024E	Peters	hi-to-low scanning	gate on for 200 millisecc	stepped master attenuator	\$3,314  \$2,916 \$1,342	Most units mainframe style. Prices reflect configuration. Many modules available. Options incl. EQ, master ALC (DE-20 \$442) and four more inputs (two D 202 input modules, \$472 ea.) Mainframe, as above Four channels only. Stand-alone Wired remote option (DE-209, \$180)	800-255-6993
Ivie	808 808R 804 804R		adaptive threshold	gate	VCA master attenuator	\$2,620 \$2,750 \$1,750 \$1,892	last hold function, R suffix = wired remote 804 has four channels	801-224-1800
JBL/UREI	7510B  Platform + Gate 1 module	Ponto & Martin	adaptive threshold	gate at zero crossing	digital master attenuator	\$2,195  \$3,000+	Platform mainframe + modules. Price depends on configuration.	818-893-8411
Lectrosonics	DC-1B  AM6  AC1 + EP4/AP4	modified Dugan System	level pattern  adaptive threshold	expander  expander	implicit	\$2,395  \$1,645  \$2,500- \$3000+	Line-level processor for std mixer  Six channels, tone controls, 1/5 octave notch filter (500-5kHz) Depends on configuration of AC1 mainframe and EP4/AP4 modules plus options	800-821-1121
Shure	AMS-8000 AMS-4000  FP-410	Anderson, Bevan, et al  Julstrom	direction sensing  adaptive threshold	gate	mix bus loading	\$2,850 \$1,850 \$1,760 \$2,040 \$1,595	AMS-4000 is four channel Requires special mics (below) Eight dual-element, direction sensing mics. Dual Element Microphones: AMS-22, 24, 26, 28 Portable: AC or battery power uses any microphone	800-25-SHURE
TOA	AX-1000A	US patent 5,148,491	adaptive threshold	gate	variable ratio, in channel VGAs	\$2,740	NOM attenuation adjustable from 0 dB (standard manual mixer) to 20 log NOM (-6dB per open mic)	415-588-2538



# CELESTION

## *CR Series*

The CR Series™ are professional sound reinforcement enclosures. Portable, versatile, and reliable; the CR Series™ enclosures are designed to fit any application. From nightclub to stage monitoring, or from DJ playback system to general reinforcement, there is a model that will fit your requirements exactly.



# CELESTION

89 DOUG BROWN WAY - HOLLISTON, MA 01746 • VOICE 508-429-6706 • FAX 508-429-2426

Circle 210 on Reader Response Card  
World Radio History

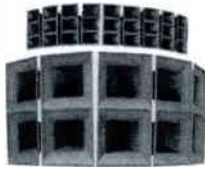
Crown describes the SMX-6 as an intelligent multiplexer as it can completely reconfigure itself under computer controlled input switching and routing capabilities. The SMX-6 has what Crown calls "Distributed Intelligence," and can function independently from IQ System components. Operation can be performed realtime or scheduled through the IQ 2000 sys-

tem. Multiple SMX-6 units may be combined to create a 24 x 2 out system or by paralleling inputs, a 6 x 8 mixing and distribution system. Intended applications range from small church jobs to large conference centers.


#### MUSIC AND AUTO MIXERS

Generally, it is not a good idea to use automatic mic mixers for music, since


most are designed specifically for speech processing. A possible exception is for miking drums, whose very loud transients readily gates on most automatic mic mixers. While *Sound & Communications* is read more by the technical people who spec the jobs, rather than the actual operators, it should be pointed out that many sound engineers find themselves sitting in



**Meet The Only Team  
Powerful Enough To Play  
Yankee Stadium, The Astrodome  
The Georgia Dome, The Orange Bowl  
& Sheffield Arena.**



**Power That Will Blow You Away.**



PROFESSIONAL SOUND SYSTEMS

1 - 8 0 0 - 2 9 2 - 1 1 6 5

(FAX 215 - 874 - 0190)

**Generally, it is not a good idea to use automatic mic mixers for music, since most are designed specifically for speech processing.**

front of a mixer like a Yamaha PM-3000, which may be configured for up to 40 channels. Mixing 40 channels would be easier if an automatic mic mixer could be placed on some of these channels. (Specifically, Dan Dugan's piggyback automixer subsystem, which has specific settings for music mixing — and uses an ambience mic — might be the most appropriate choice for this mission.) However, this is a rigorous and demanding application, and extreme caution is advised, particularly for auto mic mixers without a sensing microphone.

#### MIXER OPERATORS: TO BE, OR NOT TO BE?

Are mic mixer operators going to go the way of dinosaurs and hula-hoops? Not really. Effective as some automatic microphone mixers are, there are many instances where it is a good idea to have a human operator around. Human operators are essential at certain times for turning mics completely off (not just attenuating them). For example, in the slapstick comedy "Naked Gun 2½," the bumbling star  
*(Continued on page 64)*



# Planning For The New Year?

## Plan on Using

# TELEVISION

<p><b>CES-TV NEWS</b> at the Consumer Electronics Show</p>	<p><b>NAMM-TV NEWS</b> at the National Assn. of Music Merchants</p>	<p><b>NAB-TV NEWS</b> at the National Assn. of Broadcasters</p>
<p><b>INFO-TV NEWS</b> at INFOCOMM</p>	<p><b>NSCA-TV NEWS</b> at the National Sound and Communications Assn.</p>	<p><b>AES-TV NEWS</b> at the Audio Engineering Society</p>

Convention **TELEVISION** is the **MOST EFFECTIVE** way to reach your target audience.

Magnify your presence to the key customers who attend **CES**, **INFOCOMM**, **NAMM**, **NSCA**, **NAB** and **AES**. Make a high impact audio and video impression with television advertising in "heavy rotation"... geared toward the right audience, during the right convention, at the right time.

Contact Al Poxon at  
Testa Video Communications:  
CALL (516) 767-2500  
FAX (516) 767-9335.



# THE FESTIVAL OF THE ATLANTIC “OUTDOOR SOUND SYSTEM”

By Stephen Minozzi and Robert Pelepako

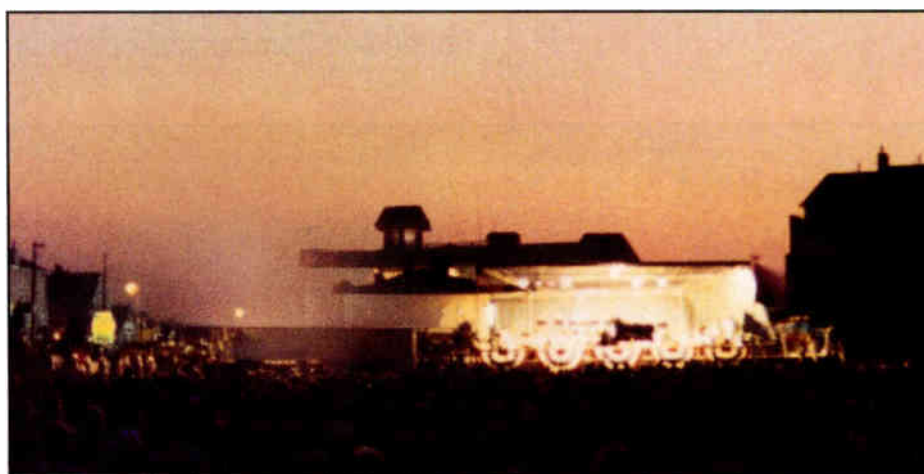
**When Mike Cipolletti contacted us, on behalf of Fr. Alphonse Stephenson, to request sound reinforcement for a 42-piece symphony orchestra with featured instrumental and vocal soloists, we didn't see a problem.**

However, when Mike further explained that this concert was on an ocean beach the size of two football fields and attended by approximately eight thousand people, we began to visualize numerous problems, along with an interesting challenge.

Festival of the Atlantic was founded by Fr. Alphonse Stephenson, the former music director and conductor of the Broadway musical “A Chorus Line,” and features outdoor concerts by professional musicians on Jenkinson's beach in Point Pleasant, New Jersey.

The orchestra performs every Wednesday evening during the summer season, from a canvas band shell on the boardwalk, and the audience sits in a sand area approximately three hundred feet long by six hundred feet wide.

During an afternoon meeting on the beach, Fr. Alphonse and Mike Cipolletti described their dissatisfac-



*The orchestra performs from a canvas bandshell on the boardwalk, and the audience sits in a sand area approximately 300 feet long by 600 feet wide.*

tion with the current sound system as a combination of chronic complaints from the audience, and routine interruptions from acoustic feedback during performances.

They were also unhappy with the abundance of hard wired microphones on stands that were integrated throughout the orchestra, which they understood to be a “necessary evil.”

This rental sound system was staffed with an engineer, and utilized a full range speaker cluster with crossovers, on each side of the orchestra.

A third speaker cluster with a delay system was also placed in the sand about one hundred feet in front of the orchestra.

Audience complaints ranged from “too loud” to “too soft,” depending on the location of the listener, and the tone was often described as “tinny.”

We explained that “feedback” was

probably a result of the close proximity of the main speaker clusters to the stage microphones, and the “tinny” sound was probably a result of the directional differences between the mid-range horns and the low frequency drivers.

Horns are more directional than low frequency speakers, and as the distance increased between the listener on the beach and the full range speaker cluster, the mid range and high frequency horns would travel further than the low frequency speakers, therefore producing an imbalance of low and high frequencies that could produce a thinner, less robust sound.

We suggested the possibility of a distributed sound system utilizing low “Q” speakers with multiple drivers but without horns or crossovers, in order to reduce this directional imbalance between low and high frequencies.

---

*Stephen Minozzi and Robert Pelepako are directors of Monte Bros. Inc in Dobbs Ferry, New York.*





*Utilizing overhead microphones with a variety of cardioid polar patterns was essential in improving separation between the various groups of instruments, and also reduced the effect of wind noise in the sound system. (Far left)*

*Rev. Alphonse Stephenson is the Music Director of the Festival of the Atlantic in Point Pleasant Beach, New Jersey. (Left)*

Both Fr. Alphonse and Mike Cipolletti agreed with the concept, because they wanted the orchestra's performance evenly distributed over the beach area with the "intimacy" that they had experienced while performing in various churches that featured our distributed sound systems.

The challenge of installing a distributed sound system on this beach was an irresistible temptation; even after anticipating numerous obstacles.

Since there was no precedence to this project in our repertoire, we suggested a "trial installation" of a distributed sound system for the next concert,

which would provide the opportunity for a first hand evaluation of our efforts.

If the initial attempt demonstrated an improvement, Fr. Alphonse would endorse its further development over the remainder of the summer concerts.

The following Wednesday afternoon, we invaded Point Pleasant beach with a combination of speakers, microphones, and electronics.

Our most formidable obstacles proved to be the installation of the distributed speaker system, and the se-

lection and placement of the overhead microphones.

The sand and wind conditions were a significant impediment to our mobility, as we tried to install and stabilize the 12 Delta DT-8 speaker cabinets on their five foot stands.

The wind also complicated the installation, and proper placement of the 12 Audio-Technica AT-853 overhead microphones in the band shell area.

The battle lines were drawn and the beach was winning! Our precision in-

# MASTER CONTROL

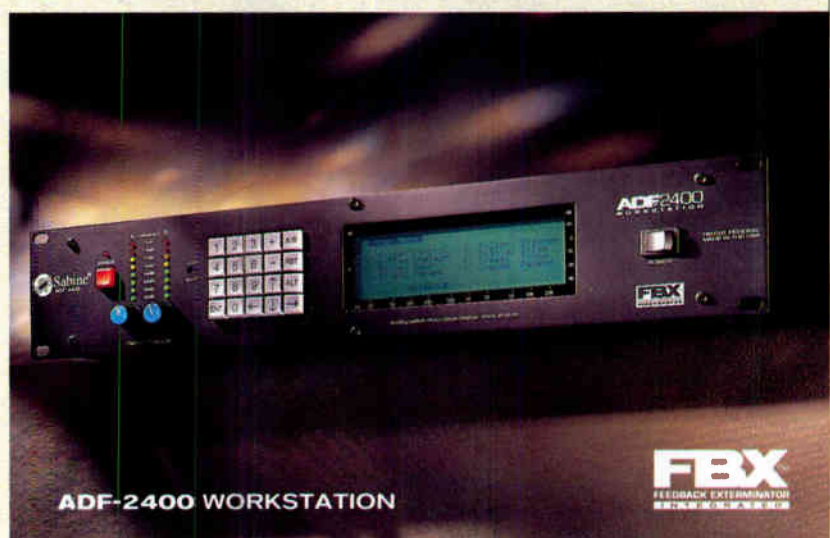
THE FIRST COMPLETE SET OF FULLY ADAPTIVE DIGITAL FILTERS FOR SOUND ENGINEERS

Now you have the power to completely control the shape of your sound. Highly accurate Adaptive Digital Filters make the ADF-1200 and 2400 WorkStations the intelligent choice for an amazing array of functions— all for the price of a good Real-Time Analyzer.

- All Functions Fully Programmable
- 12 or 24-Band Parametric Filtering
- Narrow-Band Noise Removal
- Automatic Feedback Elimination
- Shelving Filters
- Digital Delay
- Noise Gate
- Real-Time Analysis
- Mono or Dual Mono/Stereo

Call, write, or fax for detailed information:

**Sabine**<sup>®</sup>  
 Enabling Technology For The 21st Century  
 4637 N.W. 6th Street Telephone: 904/371-3829  
 Gainesville, FL 32609 USA Fax: 904/371-7441



ADF-2400 WORKSTATION

- Password Protection
- Multiple configurations stored in memory
- 12 or 24 independent, automatically or manually controlled digital filters; from 20 Hz to 20 kHz
- Programmable filter depth, from +12dB to -80 dB
- Programmable filter width, from 1 octave to 1/100 octave
- Time required to find & eliminate feedback: user controllable, typically .4 seconds
- THD: <.02% @ 23 dBV at 1 kHz
- SNR: >100 dB (with Noise Gate)

FBX/Feedback Eliminator (Patent Pending) is a registered trademark of Sabine Musical Manufacturing Co., Inc. for their brands of automatic feedback control. All rights reserved. **MADE IN USA**

ADF1224-081893

Circle 246 Reader Response Card

stallation schedule was reduced to a ludicrous version of "beat the clock."

Working in the sand, the wind, and the heat of direct sunlight, doubled our projected installation schedule, and left us with little time to experiment, or fine tune the sound system.

As the concert progressed, we became aware of a multitude of problems that could not be immediately corrected.

The Delta DT-8 speakers on their five foot stands were not high enough to project across the beach without unacceptable volume levels in their immediate vicinity.

The wind noise from the Audio-Technica AT-853 microphones reduced intelligibility, and created interference that forced us to cut the low frequencies and to temporarily lower

the volume of the front microphones during the performance.

As a grand finale, the failure of an electrical multiple outlet box caused the sound system to temporarily shut down just before the last selection to be performed by the orchestra.

Needless to say, we were not comfortable with the results of our initial effort, but Fr. Alphonse considered it an improvement, and asked us to continue developing the application of this distributed sound system for the remainder of the concerts.

We arrived much earlier to set up for the next concert, and brought plenty of sunglasses, baseball caps and sun screen.

We successfully elevated the Delta DT-8 speakers to a height of approximately 12 feet, by inserting a ten foot

length of one-half inch tubing into each of the four legs of the speaker stands.

Each leg was then buried approximately 12 inches into the sand, and a vertical cable was secured from the apex of the stand to a fence below, for stabilization against the wind.

We utilized a greater variety of overhead microphones, applying their polar pattern characteristics to the logistics of the band shell.

Since there was less wind, and therefore less microphone movement, in the rear of the band shell, Audio-Technica AT-933/ML Engineered series overhead microphones were installed slightly ahead of the brass section, at a forty-five degree angle.

The acute "lobar" pattern of these microphones provided greater rejection of the adjacent woodwind and string sections, and improved "separation" through the sound system.

Audio-Technica AT-933/H Engineered series hyper-cardioid microphones for the second violins and the woodwinds provided more generous polar patterns that could accommodate greater microphone movement in the wind.

Audio-Technica AT-853 microphones with "large windscreens" covered the first violins, violas and cellos, because their generous polar patterns reduced "off axis rejection" in the intense wind at the front of the band shell.

Utilizing overhead microphones with a variety of cardioid polar patterns was essential in improving separation between the various groups of instruments, and also reduced the effect of wind noise in the sound system.

Since the brass section was elevated on risers in the rear of the band shell, the hyper-cardioid pattern of the Audio-Technica AT-933/H microphones that were positioned directly above the second violins and woodwinds rejected the brass section.

AT-933/ML overhead microphones with tighter "lobar" patterns were pointed toward the elevated brass section, therefore rejecting the adjacent

## Don't Voice Page - Know Where Your Key People Are!

Position automatically updates.  
No controls, no buttons.  
Infrared tags, easy installation.

Voice Response: "Dr. Zack is at Extension 103"

Phone Map		Phone List
City Diagnostic Clinic - Gotham, New York		Nearest Extension
Nurse Jones	Receptionist	Dr. Zack 103
Dr. Fong	Nurse Cooper	Nurse Woo 104
Reception	Nurse Fisher	Radiology 104
Dr. Gray	Dr. Zack	Dr. Peck 102
Nurse Fox	Dr. Jones	Nurse Fox 118
Dr. Jones	Dr. Fong	Dr. Jones 122
Dr. Fong	Dr. Peck	Nurse Fish 130
Dr. Peck	Dr. Jones	Dr. Demus 128
Dr. Jones	Dr. Fong	Dr. Fong 126
Dr. Fong	Dr. Peck	Dr. Old 123
Dr. Peck	Dr. Jones	Nurse Bob 119
Dr. Jones	Dr. Fong	Dr. Fong 100

Busy offices, hospitals, support centers - anyplace where people want their calls and area paging may be disruptive.

Know location via voice response or see location on PC screen.

Costs about the same as paging.



(210) 493-3335  
Call for free demo diskette.

Circle 271 Reader Response Card

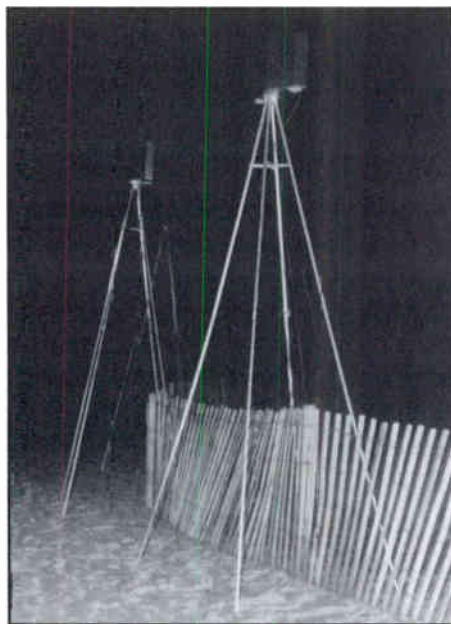


sections of the orchestra.

We took advantage of the more generous cardioid polar patterns of Audio-Technica AT-853 overhead microphones with larger windscreens, for the first violins and cellos in the front section of the band shell to reduce the effects of microphone movement in the wind.

Enabling the overhead microphones to "move with the wind" seemed to diminish wind noise by reducing wind resistance across the microphone capsules, while the more generous polar patterns of these microphones continued "off-axis" rejection of the instruments.

Four Audio-Technica AT-859b microphones on Lectrosonics H-185 wireless transmitters were used for announcements by Mike Cipolletti and Fr.



*The Delta DT-8 speakers were elevated to a height of approximately 12 feet by inserting a ten foot length of tubing into each of the four legs of the speaker stands.*

Alphonse, and to accommodate a variety of vocal and instrumental soloists.

Vocal soloists included an assortment of baritones, tenors and sopranos, sometimes in a multiplicity of up to six soloists performing simultaneously.

Featured instrumental soloists

ranged from harmonicas and banjos to a concert grand piano.

Each consecutive concert demonstrated gradual improvements in the performance of the sound system, including the final Labor Day concert that was attended by an audience of almost 16,000 people.

While these summer concerts proved to be a learning experience in the logistics of outside sound reinforcement, they were also a valuable insight to customer satisfaction.

Sometimes we find ourselves trying to tell people "what they are supposed to hear," and embellish our description with technical verification, rather than trying to understand exactly what the listener has in mind. "When people hear the sound that they want to hear, they will recognize it!" ■

# CONQUEST U.S.A.



## NOBODY SELLS

# — Switchcraft® —

## FOR LESS!!!

### PLUGS - CONNECTORS - JACKS - ADAPTERS

- PLUS -

**WE MANUFACTURE OVER 20,000  
AUDIO WIRING PRODUCTS FROM  
CABLES TO SNAKES TO PANELS  
AND CUSTOM DESIGNS.**

- FAST DELIVERY
- CUSTOM DESIGN SERVICES
- LIFETIME WARRANTY
- SERVING THE AUDIO INDUSTRY SINCE 1975
- CALL FOR A FREE CATALOG

26113 S. RIDGELAND MONEE, IL USA 60449

**- 800-323-7671 -**

Circle 262 Reader Response Card

# MAKING THE PASTOR INTELLIGIBLE AND MAKING THE SOUND DESIGN AND EQUIPMENT WORK TOGETHER

By Richard Harbour

Last year, Pastor Gary Blumanthal of St. Stephen's Lutheran Church in Gladstone, Oregon, knew he had a problem with his sound system. As he tells it, "Congregation members, especially seniors, were commenting that they couldn't hear everything I was saying during the services."

Quite a dilemma, when trying to articulate the subtle messages in a Sunday Sermon. In addition, Pastor Blumanthal was developing a "more contemporary worship service" that included amplified, live music and vocals, along with the sermon. He re-



*St. Stephen's Lutheran Church in Gladstone, Oregon.*

*Richard Harbour is an independent writer and the director of Show Development, an entertainment consulting company, specializing in theme parks and performance facility shows and installations. Formerly the Entertainment Technical Director for Knott's Berry Farm, Buena Park, California, he directed all entertainment facility installations and operations, for sound, staging and lighting, at Knott's Berry Farm and Mall of America's Camp Snoopy theme parks. He has produced shows for many nationally known companies and popular artists.*

alized he could no longer rely on his existing sound equipment to meet the church's present and future demands. It was time to get a new sound system.

Pastor Blumanthal had only four requirements of the new system. First, the system must provide clean, transparent vocal qualities with superior voice articulation. He wanted every congregation member to be able to

understand every word of every sermon. Secondly, the system had to provide adequate sound reinforcement for the musicians and choir. That meant more input channels, better amplifiers, a higher-quality speaker system, etc. Third, the system must maintain the aesthetic qualities of the church. Specifically, he was concerned about sight lines to a large, floor-to-ceiling cross, mounted to the wall just behind the



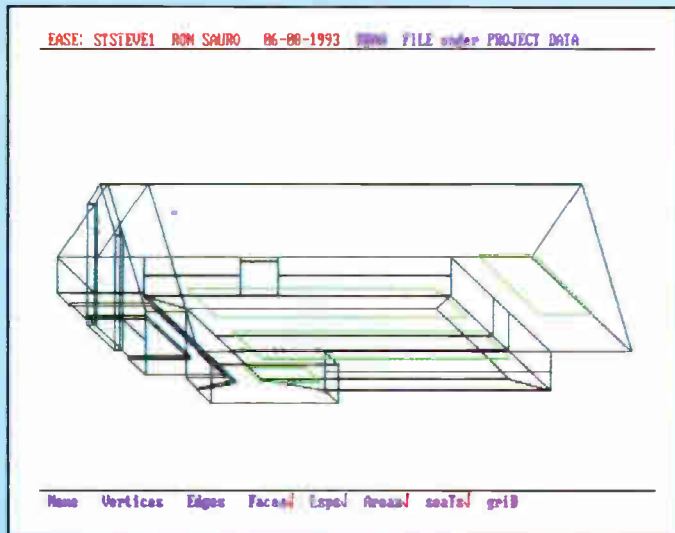


Figure 1.

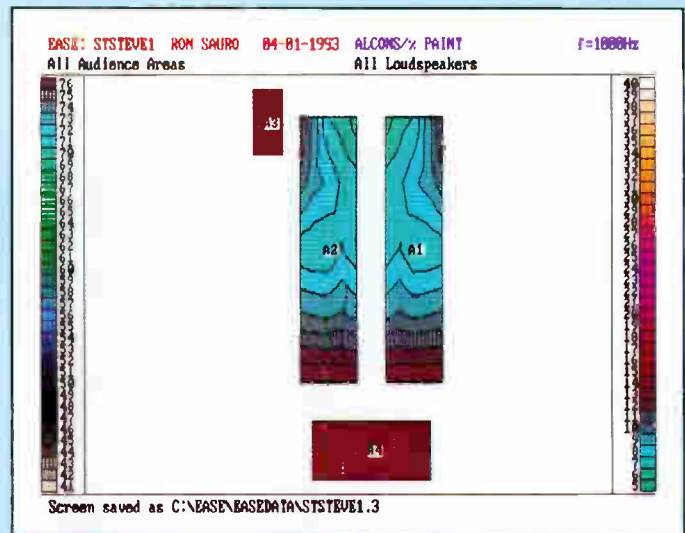


Figure 2.



Figure 3.

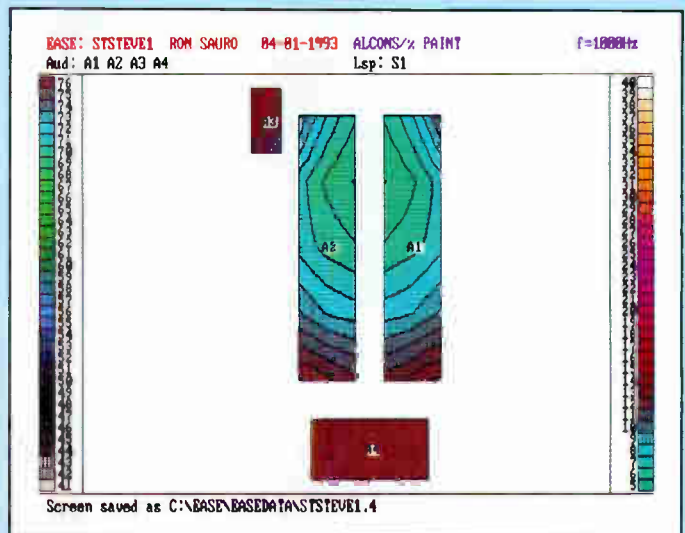


Figure 4.



Figure 5.

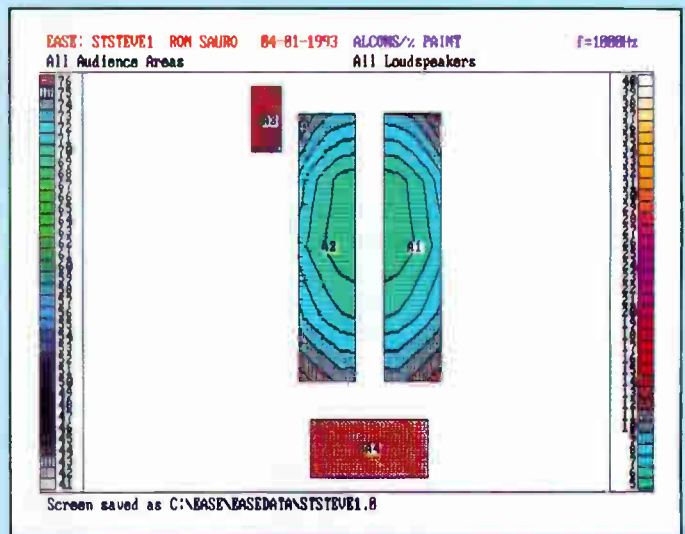


Figure 6.

## THE HOW AND WHY OF THE SPEAKER CHOICE

The CE-3 is part of Renkus-Heinz's new line of Co-Entrant Waveguide Technology loudspeaker systems. According to Jimmy K, Sales Manager of Entertainment Products at Renkus-Heinz, the CE-3 and CE-3 M/H "represent a breakthrough in speaker technology . . . this is the only loudspeaker on the market today that offers true point source performance."

Renkus-Heinz boasts that CoEntrant Waveguide Technology (U.S. and International Patents Pending), with its compound throat design that couples the outputs of multiple mid and high frequency drivers and feeds the combined output into a single (shared) horn, offers perfect signal alignment and seamless transition from the mid- to high-frequencies. This technol-

ogy produces a speaker that performs as a true point source from below 500 Hz to 20 kHz with flat power response, and provides wide band dispersion control with constant Q and directivity (a tight 60° x 40°) all the way down to 500 Hz even through crossover. The end result is exceptional clarity and greatly improved intelligibility.

The CE-3 is loaded with dual 6.5-inch carbon fiber midrange speakers, dual one-inch extended-range high frequency drivers and a heavy duty 12-inch woofer. A Renkus-Heinz X310-TSC controller provides crossover, equalization, loudness compensation and overload protection for the CE-3.

With the CE-3, intelligibility in St.

Stephens was improved over a greater percentage of the main room and balcony area. (Figure 6 shows the intelligibility projections with the room empty.)

Direct sound pressure levels were 106 dB on the main floor, dropping to only 99 dB in the balcony. Total SPL was an amazing 112 dB ±1 dB throughout the entire room, balcony included . . . plenty of sound energy for a live band. (See Figure 7)

Figure 8 shows the projected %ALcons intelligibility data with the church full of people. The majority of the room shows 4-5 percent, with the worst case being 10 percent in the balcony. "I can live with that kind of performance, any day," Sauro concluded.

—R.H.

pulpit. Finally, the system had to fit within the church's limited budget. Pass the Bible!

The St. Stephen's Church was designed and built in 1953. The rectangular building, with its high A-frame roof, is constructed of wood and glass, with partially carpeted, wooden floors. The main sanctuary is long and narrow (40 feet wide by 94 feet deep) with a 33-foot peak. The seating areas are on the main floor and upper balcony at the rear of the building. The existing sound system was a 12-year-old six-channel, powered mixer, with one home stereo type speaker attempting to cover both the main floor and the balcony. It had three microphone lines, supporting three high impedance microphones and a Telex wireless microphone.

Ron Sauro, owner of Ron's Keyboard and Electronic Services, in Tacoma, Washington, had a lot of experience with churches like St. Stephens. "It was a classic church design, with the classic, dated sound system, with all the classic reverberation problems," Sauro commented, "so, when I was

contracted to design and install their new sound system, I knew I had my work cut out for me."

First, using Renkus-Heinz's EASE "Electro-Acoustic Simulator for Engineers" acoustic design and analysis software program, Sauro went about the task of determining the most appropriate speaker system for the church. Sauro uses EASE extensively. "It dramatically saves R&D and installation time," he remarked, "and when the installation is complete, I know what to expect . . . there aren't any surprises."

Sauro has used EASE to design speaker systems for some 40 churches and performance facilities and feels very comfortable with it. "EASE allows me to try out speakers from almost every speaker manufacturer, and see how they react with the space, anywhere in the space. It gives me everything I need to make the best choice." "Everything" includes frequency response, reverberation times, coverage, intelligibility, etc., from any point in the room. "I can simulate what the person in the back row, fifth seat, or anywhere else, will be hearing . . . at

any given time," Sauro added.

Sauro was able to construct a detailed model of the St. Stephen's Church in less than three hours. (See Figure 1.)

Initial EASE modeling showed the reverberation time in the room varied from 2.0 seconds to 3.0 seconds, depending on the signal frequency. This had a significant, negative impact on intelligibility. Sauro started investigating the performance of a number of speakers he had used in other projects and that he thought might provide the coverage and high intelligibility needed.

Sauro first tried a center cluster of three passive, 60' x 40' two-way speaker cabinets. The results showed poor intelligibility (Figure 2 shows %ALcons intelligibility projections), and poor, uneven, audience coverage, with direct sound pressure levels ranging from 97 dB in the front of the house to 87 dB in the balcony (See Figure 3). The simulations indicated that if these speakers were used, a 7-speaker distributed system with two delay clusters would be needed to supply adequate coverage for the back rows and



balcony, possibly adding to intelligibility problems and certainly adding to the cost. Sauro's main objective, now, was to find a front cluster configuration that would give adequate, intelligible coverage, without a rear delay.

Next, Sauro selected another speaker he had used extensively, a 15-inch coaxial speaker with a 90° x 90° coverage pattern, trying to improve intelligibility and coverage with single point technology. The results (See Figures 4 and 5.) showed slightly improved intelligibility, but the coverage, 100 dB SPL at the front of the house, dropping 8 to 9 dB at the balcony, was still not quite good enough. Further investigation revealed that with this speaker, a 5-speaker distributed system, would be needed to provide barely acceptable performance.

Finally, Sauro tried the Renkus-

Heinz CE-3 and hit pay dirt. "I was amazed," said Sauro. "One CE-3 speaker took care of every problem I was trying to work around. I wouldn't normally consider a processor controlled, biamped or triamped speaker for a low budget installation, but it took care of the intelligibility problems in the church and gave me excellent, uniform, audience coverage. It also reduced my installation costs as I only had to hang one speaker, instead of five or seven."

With the speaker system specified, Sauro went on to the rest of the system. The old mixer was replaced with a rackmounted, Mackie 1604 mixer, giving the church 10 additional input channels to support the musicians' inputs. The Mackie was chosen because of its low cost and low noise characteristics. A custom, shielded Rapco

patch bay was installed, to help alleviate RF problems from a 50 kW AM transmitter a few blocks from the church. A 24-pair snake, with four, six-pair stage boxes, was distributed around the church's stage area. Equalization, for the house system, was accomplished through a Biamp EQ301, 1/3-octave equalizer. Power amps were of the Crown variety . . . two MA1201s, two channels driving the dual HF/MF drivers in the CE-3, the other two channels driving the low frequency and the stage monitors. Two Countryman Iso-max microphones were hung from the ceiling, for the church's choir. One Countryman Hypercardioid Pulpit microphone was installed on Pastor Blumenthal's pulpit.

The total installation time was 12 hours. Sauro attributes much of this time savings to the EASE program. "I

---

# MENLO SCIENTIFIC ACOUSTICS, INC.

CONSULTANTS IN ACOUSTICS AND COMMUNICATION TECHNOLOGIES

*CONSULTING* ◦ *DESIGN* ◦ *TESTING* ◦ *INSTRUMENTATION*

**SPECIALIZING IN:**

- ◇ SOLVING ACOUSTICAL PROBLEMS
- ◇ ARCHITECTURAL ACOUSTIC DESIGN
- ◇ SOUND SYSTEMS - DESIGN AND TRAINING
- ◇ AUDIO/VISUAL SYSTEMS
- ◇ NOISE AND VIBRATION CONTROL
- ◇ ACOUSTICAL MEASUREMENTS
- ◇ EQUIPMENT PERFORMANCE EVALUATION
- ◇ PRODUCT DEVELOPMENT AND TESTING

**SERVING:**

- ◇ CONTRACTORS
- ◇ ARCHITECTS
- ◇ MANUFACTURERS

CONTACT: MICHAEL A. KLASCO OR NEIL A. SHAW  
531 MAIN STREET, SUITE 428, EL SEGUNDO, CALIFORNIA 90245-3060  
TELEPHONE: 310-322-3086 FACSIMILE: 310-322-3016

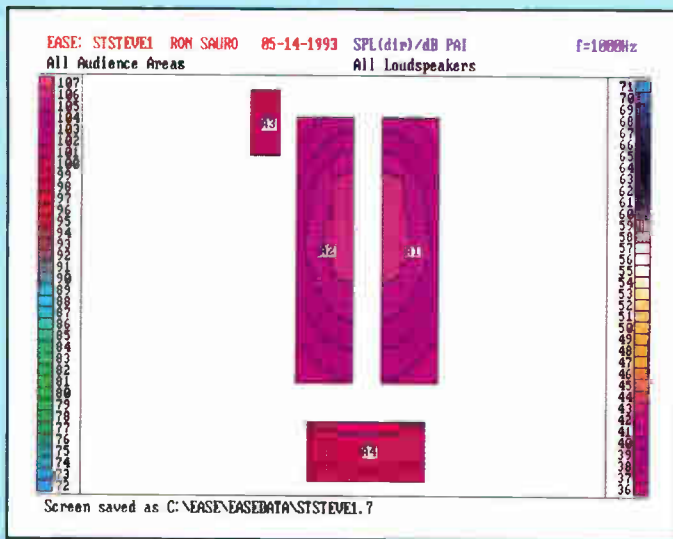


Figure 7.

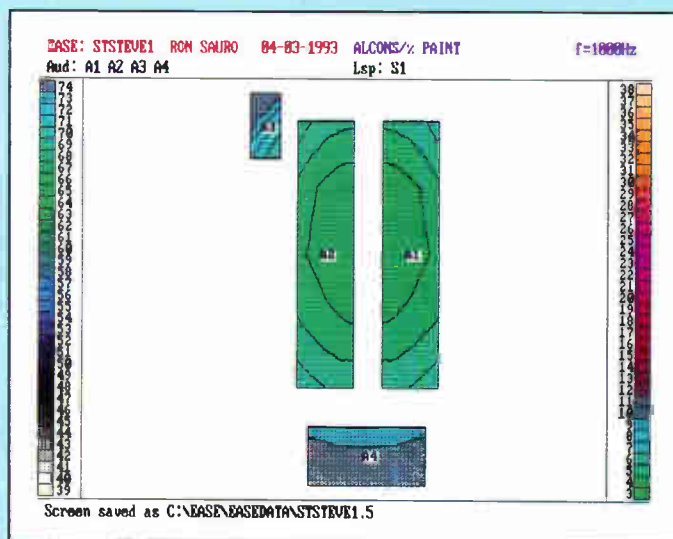


Figure 8.

don't waste time on site, anymore, going through trial and error testing and measurements with the speaker system. I've already done it all on the computer with EASE . . . I know exactly what to do once I get on site."

Pastor Blumenthal was impressed at

the speed in which the system went in and said, "I was amazed how small it (the Renkus CE-3) was, when they finished . . . you don't even know it's up there, but almost immediately, everyone was telling me that he could, finally, hear every word I was saying,

not just every third word. The sound volume and clarity are 100 times better than the old system, especially in the balcony. The whole system is much more versatile and does exactly what we were hoping for. We are very pleased." ■

# Klipsch®

## PROFESSIONAL

P.O. BOX 688 • HOPE, ARKANSAS USA 71801-0688  
 (501) 777-6751 • FAX (501) 777-0593

Circle 248 on Reader Response Card

World Radio History



# Ordinarily Evolution Crawls...

# Occasionally It Flies

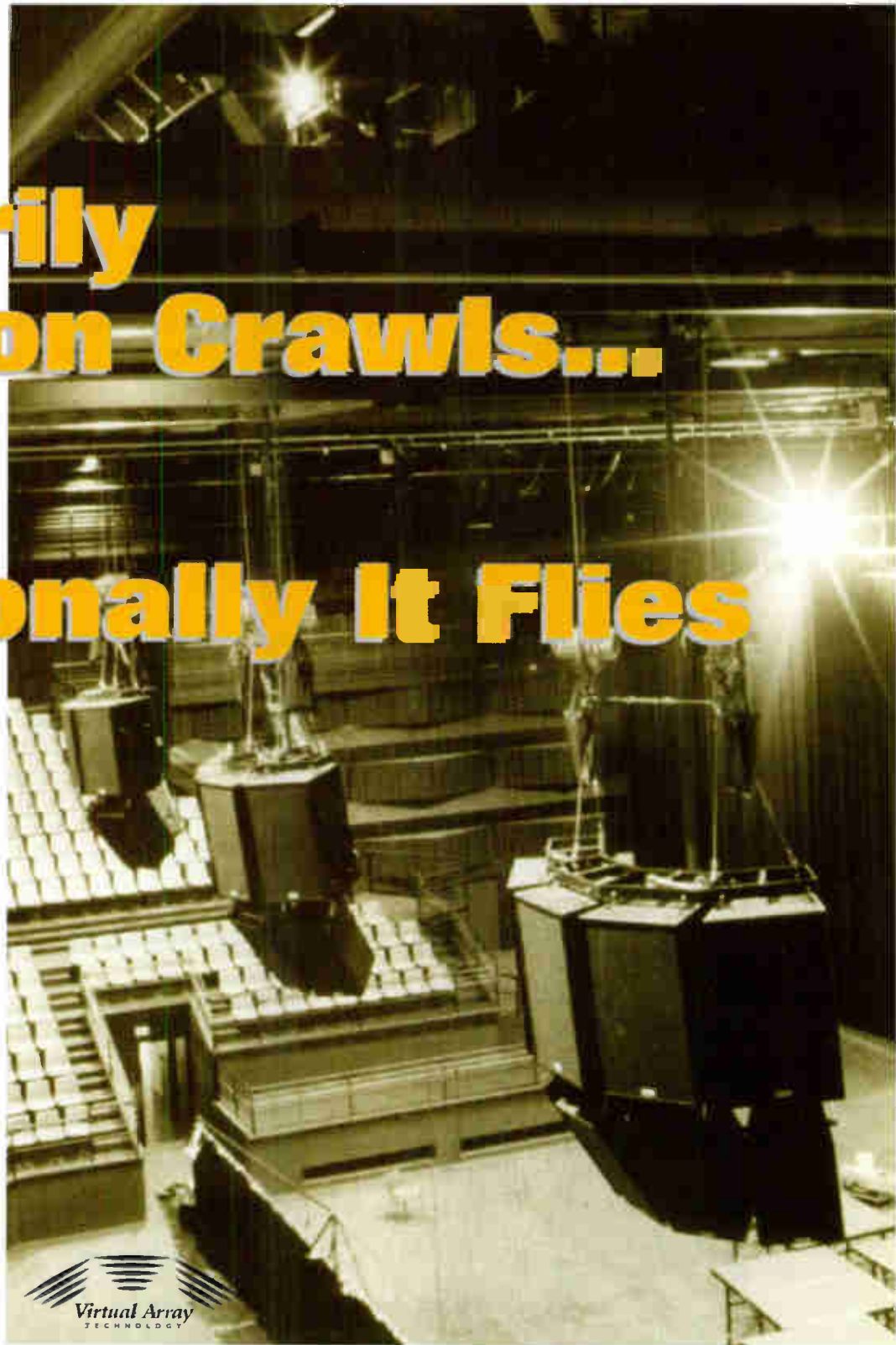
## To Succeed, Evolve

Progress emerges in many forms: one of them is a cultural center in the south of France. The Zénith de Pau actually adapts its internal architecture to the presentation. Inside dual acoustically isolated space frames, the stage, seating, ceiling and rear wall can be reconfigured for classical music, pop, theater or meetings. Integrated acoustic treatment and digital electronics maximize flexibility.

The acoustical consultant demanded an equally evolved loudspeaker system: light-weight to hang without massive support, compact to leave sightlines open, accurate and natural for acoustic music and speech, powerful to deliver the energy of rock performances. Conventional thinking had no answers. So Jean-Pierre Mas turned to EAW's Virtual Array™ Technology for practical solutions.

## To Evolve, Adapt

With a range of enclosure sizes, dispersion angles and output capacities, VA™ Technology adapts to almost any application. The new KF650i used in the Zénith de Pau, like all VA™ systems, is a true three-way design: The entire vocal range is covered by a 10" cone loaded with Kenton G. Forsythe's midbass horn and displacement plug. This astonishingly compact system is capable of 133 dB SPL and  $\pm 2.5$  dB response from 70 Hz to 20 kHz.



## To Adapt, Listen

For a decade and a half, we've been listening critically and carefully to loudspeaker components and systems. To rooms of all sizes and shapes, to music of all kinds. To the voices of our customers, audiences and end users. If you're interested in what we've learned—and how it can help your next project evolve beyond the ordinary—contact us today for more information and a demonstration of Virtual Array™ Technology.

*The KF650i evolved in demanding environments like the Zénith "Salle de Spectacle," Pau, France. Christian Malcurt, APIA, acoustician. Jean Pierre Mas, Mas Conseil, designer. Tech Audio, installer.*

**EAW**  
EASTERN ACOUSTIC WORKS

One Main St., Whitinsville, MA 01588  
Tel 508 234-6158 • Fax 508 234-8251

Circle 217 on Reader Response Card

## MIC MIXERS

(Continued from page 50)

(Leslie Nielsen) takes his live wireless mic offstage to the rest room with him. Need I say more? In a similar vein, if someone with a live mic starts moving around or scratching himself, the high pass filters on many auto mic mixers may not be enough to reduce the accompanying low frequency noise.

Obviously, a live operator has the common sense to manually turn down that channel's input. In general, if it is important to keep extraneous noise out of the system, such as in network broadcasts to large and/or critical audiences, the added protection of a live operator may be deemed worth the extra expense. Perhaps in the future "fuzzy logic," artificial intelligence or

expert signal processing systems will be able to effectively emulate a talented mixing engineer — but don't hold your breath.

### SELLING AUTOMATIC MIC MIXERS TO CLIENTS

A contractor may feel that automatic mic mixers are the best thing to happen since power tools. However, the contractor must help the client convince himself to buy. How? Properly set up automatic mic mixers, within certain limitations described elsewhere in this series, have many benefits. They often eliminate the need for an operator. They are cost efficient. Once properly set up, they are simple to use. They improve sound quality and intelligibility. Gated mixers can control useful accessories, such as

video cameras, which will become increasingly important as teleconferencing increases in popularity. They may help you get the job, since many sound contractors hesitate to offer them. They increase the system price, which improves profits.

The guidelines we used for researching this series of articles is to provide more tutorial, practical and

**In a similar vein, if someone with a live mic starts moving around or scratching himself, the high pass filters on many auto mic mixers may not be enough to reduce the accompanying low frequency noise.**

comparative information than the sound contractor could get from the product literature, advertising, or even the product instruction manuals. In this series on auto mic mixers we have discussed the reasons automatic mic mixers exist as a product category and the ways automatic microphone mixers decide to switch microphone channels between the on and attenuated states. Almost all of the commercially available systems have been touched upon, along with a few hints about how and when to use automatic mic mixers.

Included this month is a basic buying guide which lays out the features and approximate prices of some popular units. If you have not installed an automatic mic mixer in the field yet, perhaps it is time to call the local rep and try it out on a loan basis for a local job. I hope you have learned as much about automatic mic mixers while reading this series as I have in writing it. ■



**Security Communications.**

The P9600 is the latest addition to Stentofon's line of high quality intercoms. It's specifically engineered for the demanding heavy-duty needs of correctional facilities and security applications.

Rugged construction, tamper resistant substations and high quality components make the P9600 the system of choice for jails and prisons. Add clear voice reproduction, compact control masters, audio monitoring, sound detection, paging capabilities and you've got the ideal intercom for security applications.

Prisons. Security. Either way, you'll be putting Stentofon value to work for you. Call today to find out why Stentofon products should be part of your total communications package.

**STENTOFON** Communications, Inc. 6119 Connecticut Ave.  
Kansas City, MO 64120 (816) 231-7200 FAX (816) 231-7203

Circle 270 Reader Response Card



# A PERSONAL PROFILE FOR YOUR PART IN THE SOUND INDUSTRY

*Dear Dr. Wokka,*

I read your impassioned plea re: becoming an acoustical consultant; and I would like to become one myself. How do I know where to turn? Should I get tested somewhere? And, pour quoi, how come the Germans get all the work here? Why won't the English hire consultants from France? These questions and more are in my mind. Lastly, isn't there a sure way to find out if you are qualified to become a consultant, or to find out exactly what you should be doing?

**Pierre Pollywoix**  
Paris, France

*Mercy, Perry [sic]*

Yes, you can. Funny you should inquire. I have prepared a database-generated questionnaire to do just this. Answer the following questions honestly (many in this industry cannot do this), and you will be given the keys to your future. Choose the answer that is closest to how you feel, or how you have always thought you felt but never could put in words. In a way, this will be an inspirational and guiding experience for some of you. I have "mixed them up" among professional artistic and personal categories according to the best psychoilllogical methods we have here at the Academy. We distilled literally thousands of industry profiles and have found that there is a distinct correlation between the "personal bent" and your role in the indus-

---

*Dr. Wilhelm Wokka III heads up the Philadelphia Medical College of Musical Knowledge, 106 Penn's Landing, Philadelphia, PA 19001. Dr. Wokka is a pseudonym.*

try. Also, thank you for addressing me properly. Americans never get this right; being arrogant and angry by nature, they have no sense of decency and respect for the learned and wise, like me. Lastly, stick to your own country if you know what I mean. Let the Germans and the English fight among themselves. I don't expect you to fully understand this, being too close to it for too long. Just do it. Now, without further adieu, here it then is, pour quoi que quoi? [sic]

## **A. WHAT IS A "DB"?**

1. Dun and Bradstreet rating.
2. Decibel.
3. Douche-bag.
4. Dumb blonde.

## **B. WHAT IS A "SABINE"?**

1. An esoteric sports car from Israel.
2. A measure of acoustical absorption.
3. An electric guitar tuner.
4. My ex-wife #2.

## **C. WHAT IS YOUR YEARLY INCOME?**

1. Substantial, filthy rich. The exact amount is inconsequential.
2. \$23,000.00-\$47,000.00.
3. Cannot discuss my contract; depends heavily on overtime.
4. Not enough, preparing my resume.

## **D. WHAT IS THE MOST IMPORTANT PART OF ANY SOUND SYSTEM DESIGN?**

1. Sonic purity and fine patina of soundstage.

2. Properly crimped and soldered connections.
3. Dunkin' donuts.
4. Shipping product, the numbers.

## **E. WHAT IS THE MOST IMPORTANT DATA AVAILABLE FOR LOUD-SPEAKER DESIGN?**

1. Computer database of 3-D radiation behavior in anechoic environment. Also the same for the room.
2. Frequency response and just plain old "how does it sound"?
3. How many watts?
4. Whatever data sells the product. Old "thumb on the scale" if needed.

## **F. WHAT ROLE WOULD YOU LIKE TO HAVE IN THE INSTALLATION OF A LARGE SOUND SYSTEM DESIGN?**

1. Orchestrating the design and installation into a masterful panorama of acoustical grandeur.
2. Making the new owner happy by giving him a great sound system.
3. Getting overtime.
4. Overshipping in as much product as possible.

## **G. WHAT IS YOUR FAMILY LINEAGE?**

1. Nobility, old money.
2. Average American middle class.
3. Mob.
4. Pirates, car salesmen.

#### **H. WHAT IS YOUR WORST NIGHTMARE?**

1. White house wine.
2. Captain Hook.
3. Donny Osmond.
4. A revolving door.

#### **I. WHAT KIND OF A SOUND SYSTEM DO YOU HAVE AT HOME?**

1. Electrostatics, Class A tube amps, special room, the best.
2. AR3s, 100w/ch Sony, etc.
3. Sunn Coliseum PA.
4. Fully-loaded 4-channel Dolby/THX stereo home theater, on memo loan.

#### **J. WHAT KIND OF MUSIC DO YOU PREFER?**

1. No preference, just the best recordings, only no annoying rock music.
2. Barbara Streisand, Mitch Miller, Burl Ives, the works.
3. Anthrax, Dead Kennedys, the works.
4. I hate music. Videos and Sega Genesis is all I do. Videos and games on memo loan.

#### **K. WHAT KIND OF CAR DO YOU DRIVE?**

1. High-performance GT coupe.
2. Chrysler Caravan, Plymouth Voyager.
3. Chopper.
4. Whatever, company car.

#### **L. DESCRIBE YOUR IMMEDIATE FAMILY**

1. No immediate family: audio monk.
2. Wife, Carol, 2 children.
3. Live-in biker bitch.
4. Divorced 4 times, looking for young adventuresome DWF.

#### **M. WHAT IS YOUR FAVORITE PASTIME ACTIVITY?**

1. No free time: audio monk.
2. Soccer coach, collecting stamps.
3. Go to metal concerts, shoot up.
4. Eat, watch NFL, Go to disco, tie one on, score babes.

#### **N. FAVORITE EXPRESSION GUIDING YOUR LIFE IN THE AUDIO INDUSTRY**

1. I hear, therefore I am.
2. If it sounds good, it is good.
3. You can never be too loud, you can never have too much bass.
4. Get their confidence, get their trust, get their money.

#### **O. WHERE DO YOU SHOP FOR CLOTHING?**

1. Specialty shops that know my tastes.
2. Land's End, Penny's.
3. T-shirt concessions at metal concerts.
4. At conventions: free logo golf shirts and swag.

#### **P. WHO IS THE MOST INFLUENTIAL FAMOUS PERSON(S) IN YOUR LIFE?**

1. Freud, Stockhausen, all at the Bauhaus, Harry Olsen.
2. Norman Rockwell, Jay Leno.
3. Ozzy, Bruce.
4. Eddy Antar.

#### **Q. WHO IS THE MOST IMPORTANT PERSON NOW IN YOUR LIFE?**

1. My analyst.
2. My mother.
3. Ozzy, Bruce.
4. My attorney.

#### **R. WHAT WAS THE MOST IMPORTANT EVENT IN YOUR LIFE?**

1. Discovering sushi, Nathan Pritikin.

2. Discovering Epcot Center.
3. Meeting Ozzy, Bruce.
4. My first visit to 47th Street Photo in New York.

#### **S. WHAT IS YOUR FAVORITE BOOK?**

1. Catcher in the Rye, or Acoustical Engineering by Olson.
2. Johnathan Livingston Seagull.
3. Can't read.
4. Victoria's Secret Catalog.

#### **T. WHAT IS YOUR MOST VALUED POSSESSION?**

1. My computer.
2. My VISA card.
3. My hair.
4. No possessions. My ex-wives have it all. Everything in my possession is on memo loan.

#### **U. FAVORITE EXPRESSION**

1. Fabulous.
2. Gee whiz.
3. Fuck you.
4. Trust me.

If you answered "1" on every question, you qualify to be an acoustical consultant. You may very well be one at the moment. If you answered "2" on every question, you are probably not in the audio business and actually have no business being in it. If you answered "3" on every question, you are a sound system installer. If you answered "4" on every question, you are either working for some sound manufacturer as a sales representative or in the marketing department, or you are a writer or publisher in the audio business. [Editor's note: We don't know what Dr. Wokka is talking about.] Again, these questions are carefully crafted from four distinct industry profiles found in a survey of thousands of persons. Don't like the results? Go figure. ■



## NEWS FROM AROUND THE INDUSTRY

### Yakima County Stadium; Gourmet Coffee

#### Ramsa Goes to Bat

Yakima County Stadium now boasts a new sound system that features Ramsa A-500's. The A-500's measure 15.5-inches x 22-inches x 10.75-inches and a weight of 38 pounds. Eight of the nine units face the 3,200-seat ballpark on several large poles located in the dugout area and the third- and first-base sides of home plate. The poles are divided among four areas of available amplification, with independent level control on each. In addition, three microphone jacks are located at field level, with another microphone located in the announcer's booth. To mix the various sources, a Ramsa RW-M10A rack mounted mixer was selected, allowing engineers to mix four mics, a CD player and a dual cassette deck.



#### Panasonic's Caffeine Rush

Gloria Jean's Gourmet Coffee, which has 170 retail units nationwide, is using Panasonic S-VHS 7000 Series and WV-F70 2-CCD Camera to produce videotapes for employee training and promotional purposes. The WV-F70-2CCD is docked to an AG-7450 S-VHS Hi-Fi VCR. The camera delivers 500-line horizontal resolution, and features a variable electronic shutter, a -6dB switch for fine gain adjustment, two-setting white balance memory, and a 1.5-inch electronic viewfinder.

Panasonic has also introduced the AG-1280 VHS VCR, which has a large multi-function display that includes indications for the time, recording, or playback mode, remaining tape time. A Rapid-Tun-

ing feature permits switching back and forth between any two channels by pushing a button on the remote control. The VCR also offers S-VHS Quasi-Playback, facilitating playback of S-VHS tapes at standard VHS resolution.



technology facilities in Mexico City and elsewhere.

The DN60 combines two .33-octave channels over a full 30 ISO center frequencies from 25 Hz to 20 kHz. The DN716 digital delay line is a single input/three output

#### Televisa Studios Upgrade

From Mark IV Pro Audio Group comes the following news: a total of 34 Klark Teknik DN360 graphic equalizers, nine K-T DN60 real-time analyzers and eight K-T DN716 digital delays are part of an \$80 million upgrade of Televisa S.A. de C.V. of Mexico. A wide variety of video and audio equipment is currently being installed throughout Televisa's central production and

delay line primarily used for the synchronization of sound paths in multiple signal distribution systems.

Klark-Teknik has also installed seven DN360 graphic equalizers, four DN504 quad compressor/limiters and four DN514 dual compressor/limiter/expanders at Chicago's Petrillo Band Shell. The facility hosts a variety of summer concert events, including the Chicago Jazz Festival, the Chicago Blues Festival, and per-

**The mike designed for those of us tired of going nowhere.**



#### Introducing Gemini's VH-180 Wireless Microphone—designed to give you the freedom you need.

If you're ready to really cut loose on your next gig, start with our VH-180 wireless mike. It gives you up to 150 cable-free feet of wireless mobility, features our exclusive no-pop "silent" on/off switch and includes a vinyl carry-case and screw-on antenna. And thanks to our exclusive RF-signal enhancement system, your signal will kick through loud and clear in situations that would make other wireless mikes snap, crackle and pop. If you're ready to start going places, start with the Gemini VH-180.

**gemini**  
SOUND PRODUCTS WITH SOUND IDEAS

Corporate Offices: 1100 Milik St., Carteret, NJ 07008 908-969-9000 Fax 908-969-9090  
Florida Branch: 2848 J Stirling Rd., Hollywood, FL 33020 305-920-1400 Fax 305-920-4105

Circle 280 on Reader Response Card

formances by the Grant Symphony Orchestra.

### EV at Smith

Electro-Voice DeltaMax DML-1152A electronically controlled speaker systems were installed at the Elsie Irwin Sweeney concert Hall on the Smith College campus in Northampton, MA. Two DML-1152A's are mounted horizontally, via custom hardware, to modified projection lifts, allowing them to be raised or lowered as needed. The DMC-1152A controllers are rack-mounted in the control room with the system's amplifiers. Several EV PRO-12B speakers in the rear portion of the hall to provide further reinforcement to the balcony and rear seating areas.

In addition, producer and guitarist Pete Anderson has chosen E-V M-12G guitar monitors for the "This Time" tour with Dwight Yoakum. Anderson has worked with Yoakum, Steve Forbert, Michelle Shocked, and Tommy Conwell. Other users of the monitors include Eddie Martinez, touring guitarist for Robert Palmer, and country guitar virtuoso Ricky Skaggs.

### Altec Lansing In Spartan Surroundings

Twelve Altec Lansing Vari Intense speaker systems and six 617-8A ceiling loudspeakers were recently installed at the Spartan Bowl in Connersville, IN. The 5000 seat arena serves as the gymnasium and field house for the high school in Connersville and is used primarily to host basketball.

Eight Veri Intense trapezoidal and four rectangular horns are coupled to 12 Altec 299-8A drivers suspended around the perimeter of the seating area to provide sound reinforcement for the audience during games and programs such as commencement. The 617-8A's are mounted in overhead boxes and baffles shooting directly down to the floor.

Altec has also installed 132 920-

8B ceiling speakers and three 8558 programmable EQ's to Boeing's 777 production facility in Everett, WA. The EQ's are located in the control booth situated between two meeting rooms while the 920-8B's are mounted in ceiling enclosures throughout the facility.

### LCD Adaptor From Ampro

The Mini-LCD Adaptor from Ampro Computers, Inc., allows embedded system designers to integrate color liquid crystal display screens into their systems. The unit was designed to drive the Sharp LQ6-series 6-inch color LCD screens, and includes an interface for a touch input screen.

The 4.4 x 3.8-inch card attaches directly to the back of the display,



and is driven directly by an Ampro MiniModule/SuperVGA or MiniModule/CGA display controller module. Using either hardware or software control, the Mini-LCD switches between computer-generated and externally-sourced NTSC video signals. The adaptor includes a DC-to-DC converter to generate the -8V DC power required by the LCD screen.

### Atlas/Soundolier Hits Home

The ThundraPro CXA subwoofer amplifier/active crossover system, from Atlas/Soundolier, has been introduced into the company's Integrated Home Electronics line. The 100-watt RMS system has a built-in subwoofer electronic crossover which allows



it to serve as a single-channel amplifier or as a dedicated subwoofer amplifier.

The front panel includes an LED-displayed power switch and bass intensity meter, crossover switching for the subwoofer and main speakers, and bass-level control to match the subwoofer level to that of the main speakers. The unit also turns on automatically when it senses an audio signal. The rear panel is complete with

mated routing matrix, with input and output levels controlled by Out Board's unique moving faders.

The SS2 has a custom interface for a digital optical recorder playback system produced by French manufacturer Audio Follow, allowing sound effects to be remotely triggered by the SS2 from either one of two playlists loaded into the Audio Follow Machine. The SS2 can store up to 1000 static or dynamic sound effect cues, allowing precise and repeatable manipulation of spatial sound effects from a variety of sources. The system also features MIDI and RS232 communications protocol for wide interface flexibility.

### Shure Rids WSU of Echo

Shure Brothers has provided the following case history: Washington State University recently expanded its video classrooms to include more locations. The changes necessitated changing from an analog microwave to digital microwave and video compression. After the installation of the new system, it was discovered that the video equipment performed with a highly noticeable echo that was deemed unacceptable by the school.

To combat the problem, the Shure ST6300 Type 2 echo canceller was installed. In addition to eliminating the echo, the system was more compatible with the automatic microphone mixers the University already had. The ST6300 Type 2 is an audio system designed especially for video-conferencing and other four-wire applications.

AC outlets, five-way wire binding posts, a mode switch, a subsonic filter to attenuate signals that lie below the subwoofer's range, and input signal connectors to receive signals from the preamp, equalizer, receiver, or other signal processors.

The unit is finished in black and can be shelf or rack mounted. It measures 3.5-inches high x 17-inches wide x 14-inches deep.

### Out Board Goes to Paris

The Comedy Francaise Theatre, situated at the Palais Royal in central Paris, has recently taken delivery of an Out Board Electronics SS2 automation system.

The unit, supplied in a stand-alone format, has 8 inputs which route to 16 outputs via an auto-





### Pioneer's New Policies/ Pricing

Pioneer has announced significant changes in its pricing, policies, and services offered to videodisc replication customers.

Digital audio, increasingly used in premier programs and previously priced at \$150 per side, is now available at no extra charge. There is also no charge for an unlimited number of picture stops, which was previously \$250 for each stop in excess of 150 stops. In addition, the disc I.D. charge has been eliminated entirely. Also, the "works in progress" window has been extended from 90 days to 6 months after the proof or check disc has been shipped. Finally, Pioneer is introducing free storage of the release master tape for one year. The release master, which is the final program from which the laser disc is created, will be stored in a controlled environment ready to be used for future replication orders.

### Graham-Patten's Success

According to Graham-Patten, its D/ESAM Digital Edit Suite Audio Mixers are now in use at a growing number of broadcast and video post facilities throughout the world. Recent orders include D/ESAM systems for The Mill (London), Wharf Cable (Hong Kong), and AAV (Melbourne).

The D/ESAM's modular input architecture and digital signal processing allow all audio mixing functions to be controlled in a manner similar to conventional video switchers, enabling full integration of digital/analog ATR's and VTR's in a single editing suite. All level settings, channel/machine assignments, delay, EQ and crossfades can be stored and recalled as snapshots.

### Panduit Uses Bar Coding

Use of bar coding on all product packaging and shipping containers by Panduit Corp. aids customers in receiving, inventory control, sales, and financial management, and reduces their transaction costs. Bar coding supports multi-check bar code validation and assures accuracy of package and shipment contents.

Panduit has used bar coding since 1984. Three types of codes which meet NEMA/NAED standards are used by the company. Interleaved 2 of 5 is used for all standard product packaging, with UPC Version A used for items with a package quantity of one. The code includes the package level indicator, Panduit's UPC supplier code, and the UPC part code. USS 128 Version B is used for non-standard products where the customer has not designated the bar code in his specification.

### Blue Line Red Hot

Jacobs Audio, a Boulder, CO based sound reinforcement and sound contracting company, has replaced its entire range of condenser microphones with the AKG C391B condenser microphone from the AKG Blue Line Series.

The microphones were used recently for National Public Radio's "E-Town", a live music broadcast addressing environmental issues. The microphone was used for a wide range of artists, including James Taylor, Julian Lennon, Roseanne Cash, and T-Bone Burnett.

The microphones are also used at the Botanic Gardens, a 5000-seat amphitheatre in Denver. Jacobs mixes a multitude of classical and chamber orchestras — over 20 concerts each summer — at the location.

## CALENDAR

### Upcoming Events

#### DECEMBER

**Video Expo/Image World:** Orlando, Florida. Contact: 9812) 995-8212. November 1-3.

#### JANUARY 1994

**ShowBiz Expo East and East Coast Theatre Conference:** New York, New York. Contact: (213) 668-1811. January 6-8.

**Consumer Electronics Show:** Las Vegas, Nevada. Contact: (202) 457-4900. January 6-9.

**NSCA Owners and Managers Conference:** Amelia Island Plantation, Florida. Contact: (800) 446-NSCA. January 20-23.

**National Association of Music Merchants:** Anaheim, California. Contact: (800) 767-6266. January 21-24.

**The New Product Showcase (ICIA):** Atlanta, Georgia. Contact: (703) 273-7200. January 21-22.

#### FEBRUARY

**International Security Conference:** Las Vegas, Nevada. Contact: (708) 299-

9311. February 1-3.

**Association for Research in Otolaryngology:** St. Petersburg Beach, Florida. Contact: (515) 243-1558. February 6-10.

**National Hearing Conservation Association:** Atlanta, Georgia. Contact: (515) 243-1558. February 17-19.

#### MARCH

**intermedia:** San Jose, California. Contact: (203) 352-8240. March 1-3.

**National Association of Broadcasters (NAB):** Las Vegas, Nevada. Contact: (202) 429-5300. March 21-24.

#### APRIL

**National Sound and Communications Association (NSCA):** Las Vegas, Nevada. Contact: (800) 446-NSCA. April 7-9.

**USITT:** Nashville, Tennessee. Contact: (317) 494-8150. April 12-16.

**Electronics Distribution Show (EDS):** Las Vegas, Nevada. Contact: (312) 648-1140. April 26-28.

# Winsted®

## NEW! FREE Catalog

## Security Furniture Systems

Send today for this full-color illustrated catalog, and see the complete line of modular furniture designed especially for professional security systems.

For our FREE full color SECURITY FURNITURE SYSTEMS Catalog call Toll Free:

- Security/Surveillance Consoles
- Monitoring and Reception Centers
- Security Equipment Cabinets
- Modular Stands, Racks, Tables

## 800-447-2257

Preferred by Professionals Worldwide

THE WINSTED CORPORATION

10901 Hampshire Ave. So. • Minneapolis, MN 55438  
612-944-8556

FAX: 612-944-1546

Circle 281 on Reader Response Card

# PRODUCTS

## Speakers and Drones

### EAW's VA System

Eastern Acoustic Works' KF852 Mid/High Virtual Array System features EAW's new CD5002 HF compression driver and two mid/bass horns with 10" cones and displacement plugs. The BH852, the matching low frequency system, includes two 15" woofers on foam-reinforced wood veneer horns. This arrangement allows approximately an extra 3 dB per array module. The new systems are designed to complement the full range KF850 and SB850 subwoofer in Stadium Array Systems that are easily scalable from medium-size halls to large arenas and outdoor events. The production prototypes have already been used by Hank Williams Jr. on his most recent tour.

Circle 1 on Reader Response Card



### Crown Drones

The Drone, from Crown, provides various high-speed interface functions when inserted into a Crown EQ System computer control bus. The unit can be used in lieu of an IQ interface, and also allows interfacing between the IQ System and third party control systems or devices. In addition, the Drone provides interface of external stimulus devices, such as

switches and pots, within the IQ System control bus.

The Drone includes two high-speed onboard microprocessors, operating independently but multitasking, on a plug-in module that inserts into the IQ Card Cage. Each unit also includes four microphone inputs and four channels of audio processing. The Drone is programmed with a special version of Crown's IQ Turbo software that provides it with its own individual control block, as well as special container objects.

Circle 2 on Reader Response Card

### Hot House High Output

Hot House Professional Audio is entering the large format high SPL studio monitor arena with the introduction of its High Output Series line. Making proprietary use of Tannoy's new Super-Dual technology, the SD 312 full-range High Output Series monitor is designed to provide flat bandwidth response at levels approaching 140 dB with negligible second and third harmonic distortion.

The three long-throw 12" woofers will handle 3800 watts, while the 10" Super-Dual's mid section will take 1400 watts with its 2" throat concentric HF driver handling 1200 watts. Power is provided by five of the new Hot House M500 HV mono block amplifiers run in two bridged pairs for the LF and MF sections with a single unit on the HF driver.

Circle 3 on Reader Response Card



### Bi-Direction Deck from Denon

Denon's DN-770R is a dual-well bi-directional cassette deck that offers separate outputs from each of the two decks. These twin outputs allow the user to play back two different cassettes at the same time, feed two different areas, or provide music while previewing another tape. The user can also play back on Deck A while recording on Deck B, to mix in vocals or instrumentals.

Independent Pitch Controls allows adjustment over a  $\pm 12\%$  range. The Pitch Controls are automatically defeated during recording. The Auto Standby feature has optical sensors that instantly reverse either deck when tape leader is detected. Finally, the unit employs Denon's Amorphous Head technology. These heads have a life expectancy approximately five times greater than Permalloy heads.

Circle 4 on Reader Response Card



### IRP's Mixer

IRP Professional Sound Products has introduced the DE-4024E Voice-Matic Microphone Mixer. The unit is a four channel Voice-Matic automatic mixer with remote control capability for input channel sensitivity, auxiliary input level, master output level, plus mode selection between automatic and

standard mixer operation. Features include simple DIP switches for phantom power, 14 dB input pad, "LAST MIC HOLD" capability, and low-cut filter bypass for each automatic input channel.

Circle 5 on Reader Response Card

### Chip Set from BEC

BEC Technologies will introduce its complete proprietary chip set used in the creation of its communications devices, the C3A. This will enable all other manufacturers to implement complex arrays of multiplexing schemes into existing products at lower costs with no R&D expenditure. BEC has tested the circuit designs with lab and field tests and in its existing line of Pro-Series products for the past two years.

The basic chips will include an A/D multiplexer, D/A multiplexer, Byte-to-light conversion, Light-to-byte conversion and a complete encode/decode for LED indications and systems monitoring. C3A stands for Command Control and Communications in the industrial and telecommunications industries.

Circle 6 on Reader Response Card

### Jamming With Lexicon

Lexicon's JamMan is a rack-mounting digital delay/sampler

which offers echoes, looping, and sampling effects. The unit is the latest addition to Lexicon's new series of processors which was launched this past summer with the introduction of "Alex."

JamMan offers musicians and recording engineers three primary operational modes: Echo, Sampling, and Loop. In the Echo



# ADD FULL-FADER & MUTING MIDI AUTOMATION TO OUR CR-1604 MIXER FOR JUST \$799.

TOTAL RECORDABLE CONTROL OF YOUR MIX VIA OTTO-1604!

Finally, you can have real-time, free-flowing control of mixer levels, stereo AUX sends and mutes. Create mixes far more complex than you ever could by hand — and then store, recall and tweak them at any time and as many times as you want.

OTTO-1604 responds instantly to commands without adding noise or in any way degrading the CR-1604's superb specifications. It controls —

- All 16 input faders
- Master faders
- AUX return 1, 2, 3 & 4 levels
- ALT 3/4 Bus levels (a feature not possible on non-automated CR-1604s)
- Muting of individual input channels, AUX returns, ALT 3/4 & main outputs
- Pre-programmed fades & cross-fades up to 30 seconds long in 1/10 of a second increments.

## FREE MACINTOSH SOFTWARE!

OTTO works with any sequencer that includes graphic faders. But if you work on the Mac, you get an added bonus: OTTOmix™ dedicated mixer automation software that runs along side your current sequencer using MIDI Manager or OMS.

## ONLY THE CR-1604 CAN BE UPGRADED.

We designed the CR-1604 to re-define compact 16-channel mixers by packing it with features and endowing it with "big-board" sound quality. Today it's the small mixer of choice for top TV and feature film soundtrack composers, session keyboard and electronic percussion musicians and thousands of home project studio enthusiasts. CR-1604s are loved by members of the Arsenio Hall & Tonight Show bands, and have logged millions of miles on superstar tours.\*

Not surprisingly, this level of acceptance has inspired a number of "imitation CR-1604s. When comparing them to the original, remember that only the CR-1604 lets you add full-fader MIDI automation at any time. Hear the OTTO-1604 and CR-1604 at your Mackie Dealer today.

\* See the full list of Mackie end-users in our color brochure. All company and product names are trademarks or registered trademarks of their respective manufacturers.



The OTTO-1604 retrofit kit consists of an INTERNAL GAIN CELL BOARD which easily installs inside the CR-1604 mixer's chassis below its main circuit board and an external, rack-mountable MIDI CONNECTION BOX. Computer-style ADB connection cable is included.

FADER UPDATE MODE lets you control OTTO from external fader packs that generate MIDI continuous controllers.

ARCHIVE SECTION can automatically save your work to a different file name after each mix.

OTTO ASSIGN switches the screen between up to 3 OTTO-ed CR-1604s.

TOOL BOX for global editing.

BAR and BEAT counters.

MARK for cue points.

### TIME CODE INDICATOR

Assign unlimited fader and mute SUB-GROUPS.

### SOLO buttons

FADER & MUTE activity indicators.

FADERS with real time control.

Assign unlimited scaled or un-scaled Subgroups across up to three OTTO-ed CR-1604s for 48-ch automation!

OTTO-1604 can be controlled with ANY MIDI sequencer that offers on-screen

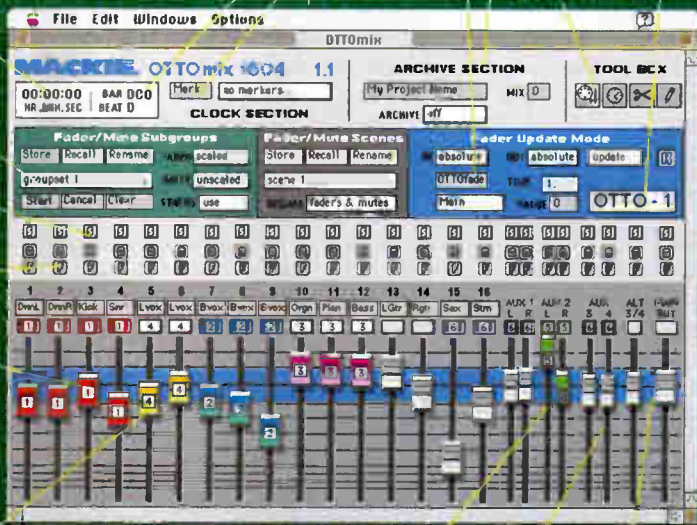
virtual faders & continuous controller messages.

Whether you have a Macintosh, PC, Atari or Amiga you can make full use of the OTTO-1604's power. Mac sequencers

offering on screen virtual faders include: Steinberg's Cubase, Mark of the Unicorn's Performer & Digital Performer, Opcode's Vision & Dr. T's Beyond. PC Windows software that include or will include OTTO-1604 support are Big Noise Software's Max Pak, 12 Tone Systems' Cakewalk, & Master Tracks Pro by Passport Designs.

Shown above: Graphic faders in Supase for Atari

offering on screen virtual faders include: Steinberg's Cubase, Mark of the Unicorn's Performer & Digital Performer, Opcode's Vision & Dr. T's Beyond. PC Windows software that include or will include OTTO-1604 support are Big Noise Software's Max Pak, 12 Tone Systems' Cakewalk, & Master Tracks Pro by Passport Designs.



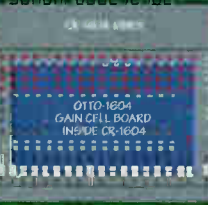
AUX 1 thru 4 LEVELS. ALT 3/4 LEVEL. MAIN L/R OUT LEVEL.

OTTO-1604 connects to MIDI sequencers via an outdoor MIDI connection box that includes IN, OUT and THRU jacks.

Front panel buttons control LEARN, SNAP-SHOT MUTE and BYPASS functions. You can also add an external fader pack for hands-on control... and daisy-chain up to three OTTO-ed CR-1604s (via MixerMixer) for 32 or 48-channel automation!



OTTO MIDI BOX



OTTO-1604 GAIN CELL BOARD INSIDE CR-1604

EXTERNAL FADER PACK (OPTIONAL)

# MACKIE

20205 144th AVE NE • WOODINVILLE • WA • 98072 • USA  
PHONE TOLL-FREE 1-800-258-6883 • FAX 206/487-4337  
OUTSIDE THE U.S. PHONE 206/487-4333 • COMPUSERVE: GO MACKIE OR  
ID# 75300,3505 • ALSO ON MIDILINK. CALL FOR BBS NEAR YOU

Circle 202 on Reader Response Card  
World Radio History

WINNER OF THE 1989 JENSEN AWARD FOR BEST MIXER

CR-1604 Exclusive: Fully adjustable mechanical configuration knobs and switches in minutes.

CR-1604 Exclusive: Secret mic preamps with 129 dB gain E.I.N. and 48V phantom power.

CR-1604 Exclusive: Spectral visualization as useful points: 12.5K instead of 10K, 2.5K rather than 1K, 80Hz vs. 100Hz.

Exclusive: Constant power pan pots.

Exclusive: Stereo in-place solo.

Exclusive: Hi-output headphone amplifier.

Exclusive: Unity Plus gain structure achieves high headroom & low noise at the same time. Extra 20dB gain above Unity eliminates need for constant re-trimming during sessions.

CR-1604 Exclusive: Built-in power supply instead of noisy, fire-hazard, outlet-eating line lumps or wall warts.







mode, JamMan allows the user to set up a tempo by tapping on a front panel button. The delay time of the echo response can be cut in musical quarter notes, eighths, and sixteenths. In Sampling mode, a user can trigger the JamMan's sampling recorder or playback functions via either the front panel button, a foot switch, or with a normal audio input trigger signal. In Loop mode, up to 8 repeating loops can be set up and synchronized with MIDI for controlling drum machines, sequencers, or other JamMan processors. JamMan also features MIDI control for all front panel functions, ships with 8 seconds of memory, and includes a dual foot switch for "hands-off" control of the TAP feature, Reset, and Bypass.

Circle 7 on Reader Response Card

the EV/Dynacord DLS 223, a digital rotor cabinet simulator that provides "rotating speaker" sound. The unit's ARS-10 24-bit digital processor is designed to recreate every detail of the rotary speaker sound. Rotational direction and speed, acceleration and slow-down rates, crossover frequency, and EQ parameters can all be edited. The DLS 223 will also store three cabinet/room simulations for easy recall from either the unit's front panel or through MIDI. The front panel features push buttons that provide access to the most used parameters, while a rotary encoder allows program customization. Complete status monitoring is provided by LED's and a numeric display.

Circle 9 on Reader Response Card



### Bag End Integrating

Bag End Loudspeaker Systems has announced that it will produce a new lower cost version of its Bag ELF-1 extended low frequency integrator. The new ELF-M2 integrator features stereo high pass output with CVR limiters and dual integrated EI F output with Concealment. ELF cutoff frequency and high pass frequency are internally adjusted with plug-in resistors and gain and protection thresholds are front panel adjustable via flush-mount trim pots. An internal switch also allows either stereo two-way operation or mono three-way operation. The ELF-M2 is a one-space rack mount unit. Bag End endorers include Al DiMeola, Jimmy Buffett, and Harry Belafonte.

Circle 8 on Reader Response Card

### Rotor Cabinet Simulation from EV

Electro-Voice has introduced

### New Multi-Room System

Atlas/Soundolier has introduced the MR System wired via the SmartBus Cable Network to its Integrated Home Electronics line. The MR System is a two-zone, multi-room, A/V remote control set up designed to allow the user to distribute music, remote control, and telephone signals to multiple locations throughout a home/office. The system can be customized with the features desired in each room, including infrared control, three built-in wall keypads, and/or two hand-held remotes.

The main component is the MR-3 Smart Room Controller, which accesses two house-wide stereo systems in each room or a local system, such as a separate stereo with a TV monitor or a dedicated home theater system. Each MR-3 receives its signals from the main equipment location, or from optional Soundolier MRZ-1 or MRZ-2 Smart Master



System Controllers. In addition, the SmartBus Cable Network allows the user to connect MR-3 controllers in a daisy chain format.

Circle 10 on Reader Response Card

### Jasper Expands Home Theater Line

Jasper Cabinet Company has expanded its *Encore!* Home Theater Collection to include rear projection cabinetry. Features of the new pieces in this line include solid wood pocket doors, tape/CD storage, optional Panamax surge protection, and enclosures for Pro-Logic front speakers shipped

with both fabric and raised panel wood doors. All direct view cabinets accommodate most 30-35-inch televisions. The rear projection Video Cabinet is designed with the flexibility to accommodate some of the more popular rear projection televisions: the Mitsubishi 50-inch, Sony 46-inch and 53-inch, and the Pioneer 50-inch. Trim kits are available for each model to give the cabinets a custom fitted look. The *Encore!* line is available in 15 standard finishes and 21 pastel varieties.

Circle 11 on Reader Response Card



MR-3 Smart Room Controller  
MRZ-2 Smart Master System Controller/Learner

Micro IR Repeater

Hand-Held Remotes

SmartBus™ Cable Network



## New From Neutrik . . .

The Neutrik A2 is a stand-alone unit capable of proofing and servicing a range of audio equipment used in broadcasting or recording studios. Recurrent measurement sequences for quality control can be automated by linking the A2 to a computer, but all functions — including sweeps, graphics and printouts — can be used without the computer interface.

The A2 combines a two channel analyzer for all relevant audio parameters such as Level (-Ratio), THD+N, Phase, X-talk, IMD, W&F and Noise with a DSP-Generator to provide all necessary test signals. Neutrik also built in a digital storage audio oscilloscope and spectral analyzer designed to further eliminate addi-

tional test/monitoring devices.

**Circle 12 on Reader Response Card**

## ADA's Delta System

ADA's Delta System consists of the Delta-3 Three Zone Pre-amplifier and Delta-650 Six Channel Power Amplifier. As many as eight sources — audio or audio video — can play simultaneously in up to three independent zones. Keypads permit direct access of any of the sources, control of these sources, adjustment of volume, bass and treble, and room off/system off.

The package operates on the ADA Bus, a proprietary bidirectional serial data network which communicates information between system components. Keypads display the source selected,

source transport function conformation, room status, tuner stations, channel numbers, and volume, bass, and treble levels.

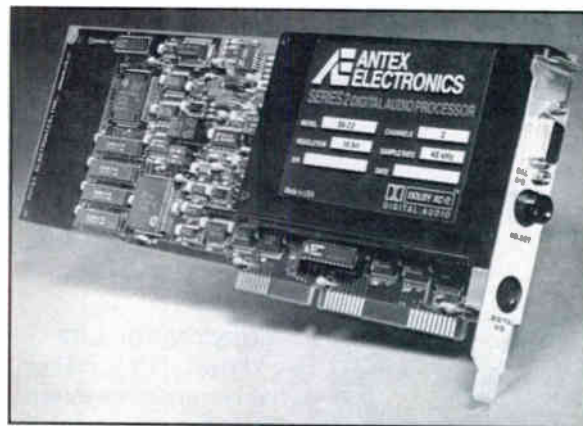
**Circle 13 on Reader Response Card**

## Antex's New Board

Antex Electronics Corporation has introduced a digital audio board with Dolby AC-2 coding, that provides real-time, compressed professional broadcast-quality stereo sound through PC's, PS/2s and compatible computers. The new PC add-on board,

the Series 2 Model SX-22 utilizes the Dolby AC-2 bit-rate reduction technique for high-quality compressed sound in three sample rates — 32, 44.1, and 48 kHz. In addition, Antex includes both balanced analog and AES/EBU or S/PDIF digital input and output in the SX-22. Using the advanced Dolby algorithm the SX-22 provides real-time, direct-to-disk, storing or transmitting or two channels of audio in 256 kbit/sec.

**Circle 14 on Reader Response Card**



# Your Professional Connection

For Quality Response Use the

# MARKETPLACE

**ACOUSTICAL / SOUND AND TELEVISION SYSTEMS ENGINEERS**

Major audio-visual consulting engineering firm is seeking engineer to develop acoustical

**SOUND SYSTEM DESIGN AND SALES**

for expanding independent distributor for Michigan and seeking individual experienced in bidding of commercial and nurse call systems and benefits. Registration Class

**SITUATION WANTED**

Experienced audio professional seeking related business opportunities in VA. Formal training in engineering, sound, pro sound, etc.

Sound & Communications  
25 Willowdale Avenue  
and sign

**MANUFACTURER'S REPS**

Leading manufacturer of Horn/Speaker Assemblies and Baffles seeks

**EQUITY/OWNERSHIP SITUATION WANTED**

Two individuals with strong technical experience in software equity or total contribution

**FOR SALE**

Tef System 12 — upgraded with battery backup, extensive software including many programs Mic stand, printer, cables. Must sell. 416-6600 11050

**WANTED**

ELECTRONIC SERVICE TECH  
Established Clientele Excellent Opportunity  
Contact

Music  
n, MS 39204

Every Month in *Sound & Communications*

**FREE INFORMATION**

Use the Reader Response Cards in this issue to find out more about companies that interest you.

## Measurements and Suppression



### Precision Measurements

Audio Precision has released its 188-page Audio Measurement Handbook. The book is a "practical" publication aimed at working engineers and senior technicians. Figures and tables help to illustrate concepts from very basic frequency response, distortion and noise measurements to DSP-and-FFT-based techniques.

The first major section describes the measurement tool sand techniques used in audio testing. The other major section describes the applications of those techniques to commonly tested audio devices.

Circle 15 on Reader Response Card

### Lighting Guide

Tracoman, Inc. has released a product guide for Martin Professional light products. Included are a number of different lighting units and controllers.

Circle 16 on Reader Response Card



### Suppressor Lite

Tripp Lite, maker of the Isobar surge suppressor, has released a full-color brochure that details economy surge suppressor available from Tripp Lite.

The four-page brochure explains the benefits of diagnostic circuitry that is included in several model described in the brochure, an explanation of AC power problems and detail on Ultimate Lifetime Insurance.

Models featured in the brochure include the SpikeStik, SpikeBlok and Spike Striker, as well as the Spike Bar, Terminator and Super 7.

Circle 17 on Reader Response Card



### Instrumentation Products

National Instruments has introduced its 1994 IEEE488 and VXIbus Control, Data Acquisition, and Analysis catalog detailing the company's products.

There are five sections to the book detailing the company's instrumentation products and how to choose a test and measurement system. The five sections include Instrumentation Software Products, GPIB Interface Products, Data Acquisition Products, VXIbus and MXIbus Products, and Customer Education.

Circle 18 on Reader Response Card

## Ford at Carver; Manager at E-V

### Carver Management

Bill Ford has been appointed National Sales Manager for professional products at Carver Corporation. In this position, Ford is responsible for management of rep and dealer networks, establishing dealer programs and policies, and implementation of long-term marketing strategies. He is also playing a key role in product development.

Ford's 17-year career in music and professional audio includes experience as a studio engineer, record producer, and road manager. He comes to Carver with experience in all aspects of pro audio marketing, both at the dealer and manufacturer levels. Most recently, he has held sales and marketing positions with Otari, Turbosound and TOA.

### Paller at Electro-Voice

Craig Paller has been named market development manager for Electro-Voice. In the position, Paller is responsible for providing technical and marketing support for E-V's music product dealer network.

He is also heavily involved in field training and education.

Paller holds a Bachelor of Science degree in marketing from Millikin University in Decatur, Illinois and has experience in recording, sound reinforcement and as a working musician.

### DeBiase Joins Zenith

Zenith Electronics has tapped a senior executive from the cable industry as its corporate vice president of marketing. Dean A. DeBiase has joined Zenith from Antec Corporation,

where he served as senior vice president.

DeBiase has marketing, sales and management experience in telecommunications. His responsibilities at Antec included vice president of new business development, general manager of Optical Networks International and president of Antec International in the United Kingdom. Previously, he held sales and marketing positions with Federal Express Co.

### Allied Promotes Reggio

Allied Film & Video has promoted Don Reggio to Sales Manager for the Orlando division. He is overseeing Allied's sales and direct marketing activities in seven Southeast states.



Reggio

Reggio's background includes marketing and creative management. He joined Allied as sales Executive when the company acquired Video Corporation of America (VCA) in January.

Reggio is a member of the International Television Association (ITVA) and served on the board of the Atlanta chapter of the American Marketing Association.

### Schneider Promoted

Alan Schneider has been promoted to Vice President of Operations at Video Rentals Inc., a Video Services Corporation company. In his new position Schneider manages the daily operation of VRI's two locations. His responsibilities also include keeping VRI's inventory current.

Prior to joining VRI he was employed by FERCO where he established and managed the video rental department.

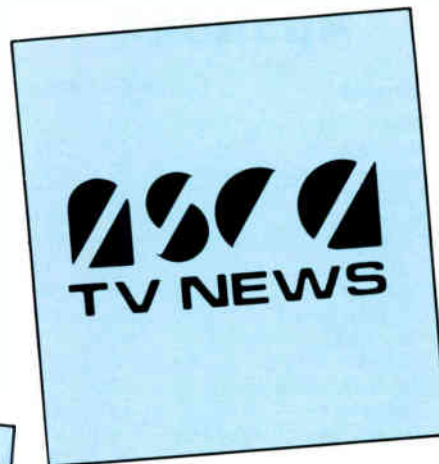


# WE'LL TAKE YOU THERE

**VIDEO CASSETTES NOW AVAILABLE WITH FULL COVERAGE OF ALL THE INDUSTRY TRADE SHOWS IMPORTANT TO YOUR BUSINESS.**

You and your key personnel can travel to the trade show on your VCR. Each video cassette contains 3 full days of on-the-spot show coverage of the people, products, and hottest news in the industry.

**DON'T MISS A THING!  
ORDER YOUR TAPES TODAY.**



Please check the Show(s) you want.

First Tape **\$59.95**; Additional tapes just **\$24.98** each

- NSCA-TV NEWS — Orlando**  
Nat'l. Sound & Communications Assn.  
Contractors Expo '93
- NAB-TV NEWS — Las Vegas**  
Nat'l. Assn. of Broadcasters Show
- NAMM-TV NEWS — Anaheim**  
Nat'l. Assn. of Music Merchants
- AES-TV NEWS — New York**  
Audio Engineering Society Convention
- CES-TV NEWS — Las Vegas**  
Consumer Electronics Show

All shows are independently produced by Testa Video Communications

Please send \_\_\_\_\_ tape(s).

1 Tape, **\$59.95**; 2 for **\$84.93**; 3 for **\$109.91**; 4 for **\$134.89**;  
All Five for **\$159.87**

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Telephone: \_\_\_\_\_

Indicate payment method: (Prepayment required)

Credit Card # \_\_\_\_\_  
 Visa     MC     AmEx     Check Enclosed  
Expiration Date \_\_\_\_\_  
Signature \_\_\_\_\_

Mail to: TV Tapes, 25 Willowdale Avenue, Port Washington, NY 11050

For more information call (516) 767-2500

## AD INDEX

Company	Page	RS #
Allen & Heath	CIII	213
Altec Lansing	CII	214
Applied Technical Systems	77	232
Ashly Audio	18	256
Audio Technica	37	212
Cal Switch	23	261
Celestion	49	210
Community	50	252
Conquest Sound	55	262
Crest Audio	41	216
Digitech (D.O.D.)	3	204
Eastern Acoustic Works	63	217
Electro-Voice	CIV	215
Exchange National Funding	76	230
Ferrofluidics	45	251
Furman Sound	27	225
Gemini Sound	39	205
Gemini Sound	67	280
Gold Line	16	274
Innovative Electronic Designs	17	249
JBL Professional-UREI	8	
Klipsch Professional	60	248
Linearx Systems	7	201
Mackie Designs	71	202
Menlo Scientific Acoustics	59	255
Meridian Communications	77	231
Music Supply Company	77	236
Neutric U.S.A.	31	254
Opamp Labs	77	235
PAS-Professional Audio Systems	30	250
Peavey Architectural Acoustics	25	209
Peerless Sales Company	21	259
Phonevision	54	271
Phonic Ear	26	292
Pivotelli/Grant Products	22	289
Polyfusion Electronics	28	247
QSC Audio	32/33	208
Rane	47	253
Ranxcess Metalsmiths	22	290
Renkus-Heinz	40	260
Roadie Products	77	237
Rolls	24	269
Sabine Musical Manufacturing	53	246
Sam Ash	26	293
Sennheiser	29	206
Shure Brothers	5	211
Sonic Systems/Soundsphere	35	257
Sonic Systems/Soundsphere	15	258
Stentofon	64	270
t.c. electronic (east/west)	77	233
Tascam	13	226
Tektone Sound & Signal	44	291
Whirlwind	14	272
Williams Sound	38	273
Winsted	69	281
Yamaha Pro Audio	11	203

### FREE INFORMATION

Use the Reader Service Card  
opposite page 18. Just circle the RS#  
of products that interest you.  
Detach, and Mail!

"While every care is taken to ensure that these  
listings are accurate and complete,  
Sound & Communications does not accept  
responsibility for omissions or errors."

# MARKETPLACE

## HELP WANTED

### Field Applications Project Manager

Well established Midwest full service low  
voltage contractor seeking experienced  
individual able to read plans, manage  
installation personnel team(s) and solve  
technical problems with regard to A-V, Fire  
Alarm, Security, Nurse Call as well as all  
aspects of sound from small to very complex  
projects. Salary commensurate with abilities.  
Please submit resume and salary history to:  
Madison Telecom, Inc.  
10 North Charter Street, Madison, WI 53715  
FAX: 608 255-5724

## LEASING/ FINANCING

### FINANCING ON ALL

IMMEDIATE

### AUDIO EQUIPMENT

- Easy to qualify
- Fixed-rate, long-term leases
- Any new or used equipment & computers
- 100% financing, no down payment
- No financials required under \$50,000
- Refinancing existing equipment

**EXCHANGE  
NATIONAL  
FUNDING** Call Mark Wilson  
(800) 275-0185

Use Our Experience For Your Business

Circle 230 on Reader Response Card

## COMMUNICATE

## SOUNDLY

Place An Ad  
in the

**SOUND  
COMMUNICATIONS**

MARKETPLACE

And Reach  
Over 19,000  
Qualified  
Readers

For Information  
Contact: Greg Perles  
Tel. (516) 767-2500  
FAX (516) 767-9335

### STATEMENT OF OWNERSHIP, MANAGEMENT AND CIRCULATION

(Required by 39 U.S.C. 3685)

- 1a. Title of publication: Sound & Communications
- 1b. Publication No.: 943-140
2. Date of Filing 9/30/93
3. Frequency of Issue: Monthly, plus a special issue in the fall.
- 3a. No. of Issues Published Annually: 13
- 3b. Annual Subscription Price: \$15.00
4. Complete Mailing Address of Known Office of Publication: 25 Willowdale Avenue, Port Washington, Nassau, New York 11050.
5. Complete Mailing Address of the Headquarters of General Business Offices of the Publisher: 25 Willowdale Avenue, Port Washington, New York 11050.
6. Name and address of the publisher: Vincent P. Testa, 25 Willowdale Avenue, Port Washington, New York 11050; Editor-in-Chief: Judith Morrison, 25 Willowdale Avenue, Port Washington, New York 11050; Associate Editor: Steve Jacobs, 25 Willowdale Avenue, Port Washington, New York 11050.
7. Owner (if owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual must be given. If the publication is published by a nonprofit organization, its name and address must be stated.): Sound & Communications, Inc., 25 Willowdale Avenue, Port Washington, NY 11050; Vincent P. Testa, 25 Willowdale Avenue, Port Washington, NY 11050.
8. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages or Other Securities: None.
9. For Completion by Nonprofit Organizations Authorized To Mail at special rates (DMM Section 424.12 only). The purpose, function, and nonprofit status of this organization and the exempt status for Federal income tax purposes (Check one)
  - Has Not Changed During Preceding 12 Months.
  - Has Changed During Preceding 12 Months.
 (If changed, publisher must submit explanation of change with this statement.)

10. Extent and Nature of Circulation	Average Number Copies Each Issue During Preceding 12 Months	Actual Number Copies of Single Issue Published Nearest to Filing Date
A. Total No. Copies (Net Press Run)	20,058	20,030
B. Paid and/or Requested Circulation		
1. Sales through dealers and carriers, street vendors and counter sales	0	0
2. Mail Subscription (Paid and/or requested)	19,457	19,441
C. Total Paid and/or Requested Circulation (Sum of 10B1 and 10B2)	19,457	19,441
D. Free Distribution by Mail, Carrier or Other Means: Samples, Complimentary, and Other Free Copies	0	0
E. Total Distribution (Sum of C and D)	19,457	19,441
F. Copies Not Distributed		
1. Office use, left over, unaccounted, spoiled after printing	601	589
2. Return from News Agents	0	0
G. TOTAL (Sum of E, F1 and 2—should equal net press run shown in A)	20,058	20,030

11. I certify that the statements made by me above are correct and complete.  
Vincent P. Testa  
Publisher/Editor



# MARKETPLACE

**8x8 MIXING MATRIX**

**DISTRAMIX**

- Room combining, monitor mixing, teleconference mix-minus, console combining, and creative audio distribution
- Linking capability for input and/or output expansion

**MERIDIAN COMMUNICATIONS**  
 PO Box 97, Alameda, CA 94501 USA  
 Ph: 510.769.1515 Fax: 510.523.6296

Circle 231 on Reader Response Card

**TIME SWITCHES AND MASTER CLOCKS**

1, 2, and 8 OUTPUT TIME SWITCHES, CYCLE TIMERS, MASTER CLOCKS, SEQUENCERS AND BELL RINGERS. FEATURES INCLUDE ALPHANUMERIC DISPLAYS, 48 HOUR CAPACITIVE BACKUP SYSTEMS, DAYLIGHT SAVINGS AND LEAP YEAR CORRECTION, RACK MOUNT UNITS AVAILABLE.

**CLOCKS AND LARGE DISPLAY SYSTEMS**

1", 4" OR 12" SUPER BRIGHT LED DISPLAYS. AVAILABLE AS CLOCKS ELAPSED TIME INDICATORS, COUNTERS, AND TOTE BOARDS, OR AS BOARD LEVEL DEVICES FOR OEM

**CUSTOM ELECTRONIC DEVELOPMENT**

PCB ARTWORK, MICROPROCESSOR SOFTWARE AND CIRCUIT DESIGN. CIRCUIT BOARD ASSEMBLIES AND MODULES FOR OBSOLETE EQUIPMENT AND SYSTEMS. PRODUCTION LINE TEST EQUIPMENT.

**ATS APPLIED TECHNICAL SYSTEMS**  
 P.O. BOX 8870  
 SHREVEPORT, LA. 71148  
 FAX: (318) 631-7813

**CALL (800) 444-7161**

Circle 232 on Reader Response Card

Free Catalog & Audio/Video Applications

Routing Switchers (St.A/V) (24,16,12,8,4,2 stations)

Video & Audio Dist. Ampls. RGB-Sync Dist. Ampls.

OPAMP LABS INC (213) 934-3566  
 1033 N Sycamore Av LOS ANGELES CA, 90038

Mic, EQ, Line, Tape, Phone, Cass, Trans., Video, ACN, Pwr. Supp.

Press Boxes 1-in/18-out Video/Audio 2-in/24-out Audio

Circle 235 on Reader Response Card

**WANTED**  
 1940 — 1965

Hi-Fi and Theatre equipment  
 Amplifiers, Speakers, Horns, Microphones, Tube Collections, etc. Especially Western Electric

Please Call Collect — (908) 249-3738

OF DENMARK

**t.c. electronic**

**INTEGRATED SYSTEMS (EAST)**

The award winning TC6032 Moving Fader Eq Remote System available directly from the source  
**(800) 451-6032**

Circle 233 on Reader Response Card

**FACTORY DIRECT CASES**

Our Prices Can't Be Beat

Custom or Stock Sizes

Call for Catalogue or Quote  
 Roadie Products Inc.

800-645-1707  
 In NY 516-563-1181  
 FAX-516-563-1390

Circle 237 on Reader Response Card

**MUSIC SUPPLY CO., INC.**

PUSH-PULL RODS • Push cable in impossible places  
 EASY-KARY® Wire Reel Holders • 5 sizes  
 HANDY-MAN Cable Guide • Makes pulling cable easier.  
 SPEAKER SUPPORTS • Trusses and Enclosures  
 TESTSET • For the Audio Serviceman

FREE 16 PAGE CATALOG OF "STUFF"

ALL 50 STATES & CANADA 1-800-527-1522  
 FAX 50 STATES & CANADA 1-800-345-5657

809 N. MADISON DALLAS, TX 75208

Circle 236 on Reader Response Card

OF DENMARK

**t.c. electronic**

**INTEGRATED SYSTEMS (WEST)**

The award winning TC6032 Moving Fader Eq Remote System available directly from the source  
**(805) 373-1828**

Circle 233 on Reader Response Card

**STOP THEFT!**

order a **BLUE BOOK** for everyone who borrows yours!

Send \$12.00 per copy (Postage & Handling Included)

**CIRCULATION DIRECTOR**  
**The BLUE BOOK**  
 25 Willowdale Avenue  
 Port Washington, NY 11050

**How To Place a Sound & Communications Ad**

Print or type copy indicating capital letters and bold type. All rates are based on column inch. 1X rate for a classified ad \$63. (Includes borders, typesetting and company logo if desired.) 1X rate for a marketplace ad (product) is \$96. Frequency discount available. Call for information.

<b>CLASSIFIEDS</b>		<b>MARKETPLACE</b>
<input type="checkbox"/> Business Opportunities	<input type="checkbox"/> Employment Wanted	<input type="checkbox"/> All product and services
<input type="checkbox"/> Equipment for Sale	<input type="checkbox"/> Facility for Sale	<b>Sound &amp; Communications Ads</b>
<input type="checkbox"/> Help Wanted	<input type="checkbox"/> Miscellaneous	<b>Get Results!</b>

Company Name \_\_\_\_\_ Name \_\_\_\_\_

Address \_\_\_\_\_ Phone \_\_\_\_\_

Method of Payment  Check Enclosed  Visa  American Express  MC

Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_ Signature \_\_\_\_\_

Mail or Fax Copy to:  
 Sound & Communications Marketplace  
 25 Willowdale Avenue, Port Washington, NY 11050  
 Phone: 516-767-2500 FAX: 516-767-9335

# PRODUCT CHECK:

## WORSHIP CENTERS

Products most frequently used in worship center installations...

### ... NOW IN PROGRESS

#### PRODUCTS

	FIRST PLACE	SECOND PLACE	THIRD PLACE
Microphones	SHURE	AUDIO-TECHNICA	CROWN
Speakers	ELECTRO-VOICE	JBL	RENKUS-HEINZ
Mixers	YAMAHA	SOUNDCRAFT	ELECTRO-VOICE
Signal Processors	RANE	DBX	YAMAHA
• CD Players	• TECHNICS	• TEAC	• TASCAM
Tape Players	TECHNICS	TEAC	SONY
VCRs	PANASONIC	SONY	SANYO
Projectors	SONY	SHARP	EIKI
Power Amps	CROWN	PEAVEY, TOA*	CARVER

\* Indicates tie

### ... IN LAST SIX MONTHS

#### PRODUCTS

	FIRST PLACE	SECOND PLACE	THIRD PLACE
Microphones	SHURE	AUDIO-TECHNICA	CROWN
Speakers	ELECTRO-VOICE	JBL	RENKUS-HEINZ
Mixers	YAMAHA	ELECTRO-VOICE	SOUNDCRAFT
Signal Processors	RANE	DBX	FURMAN
• CD Players	• TECHNICS	• TEAC	• TASCAM
Tape Players	TECHNICS	TEAC	SONY
VCRs	PANASONIC	SONY	SANYO
Projectors	SONY	SHARP	EIKI
Power Amps	CROWN	PEAVEY	CARVER, TOA*

\* Indicates tie

## SURVEY METHODOLOGY

1. The sampling pool for the survey consists of sound and communications contractors from Sound & Communications' subscription list. Only contractors within the United States and Canada are called.
2. In a telephone survey, contractors/installers selected at random are asked to identify what brand they used for various products in installations completed in the past six months and those in progress. A different type of installation is highlighted each month.
3. On completion of the survey, results are tabulated and the product brands are ranked on a scale from one to three, with number one having the most votes. Separate rankings are made for installations occurring in the past six months and for those in progress.
4. An asterisk (\*) denotes a tie for that ranking.

Copyright © 1993 SOUND & COMMUNICATIONS PUBLISHING, INC. Reprint of any part of contents without permission forbidden. Titles Registered in the U.S. Patent Office. Sound & Communications (U.S. P.S. 943-140) (ISSN #0038-1845) is published monthly plus a special thirteenth issue in the fall by Sound & Communications Publications, Inc., 25 Willowdale Avenue, Port Washington, N.Y. 11050. 516-767-2500. President, Vincent P. Testa. Subscription rates: U.S. — 1 year \$15.00, 3 years \$37.50. All other countries — 1 year \$25.00, 3 years \$67.50. Subscriptions outside of U.S. must be paid in American currency. Second-class postage paid at Port Washington, NY and at additional mailing office. POSTMASTER: Send address changes to Sound & Communications, 25 Willowdale Avenue, Post Washington, NY 11050.



# The Word Is Out On The GL3...

ALLEN  
&  
HEATH

"Every time someone has rented a GL3 from us, they've liked the console so much that they've wanted to buy it. They're that good."

Mark Herman - Hi-Tech Audio

"The GL3 has great routing, sounds terrific and is an exceptional value."

Scott Thomson - MP Productions

"Flexibility and the auxiliary routing function were the key factors in selecting the GL3."

Frank Kleczewski - Conseps

"We like the GL3 a lot, it's a reasonably priced board with a British EQ and the main to monitor function is extremely handy."

Al Smith - Paragon Productions

The Allen & Heath GL3 is the most flexible live console on the market. Offering a unique auxiliary routing system, the GL3 performs as a front of house console or a full function monitor desk with wedge mix and is suitable for an array of hybrid applications.

The GL3 offers balanced XLR inputs and outputs, four stereo returns and a comprehensive input strip which features individual channel phantom power, phase reverse, PFL with LED, Mute with LED, four band EQ with two sweepable mids, EQ in/out switching and six auxiliary sends on six knobs, all configurable via front panel switching. Available in both 16 and 24 input versions, the GL3 can be expanded to accommodate up to 40 inputs with an optional expansion module that can be installed in a matter of minutes.

The GL3 delivers the flexibility and function you would expect from two dedicated consoles without the associated cost and hassles of set up and tear down.

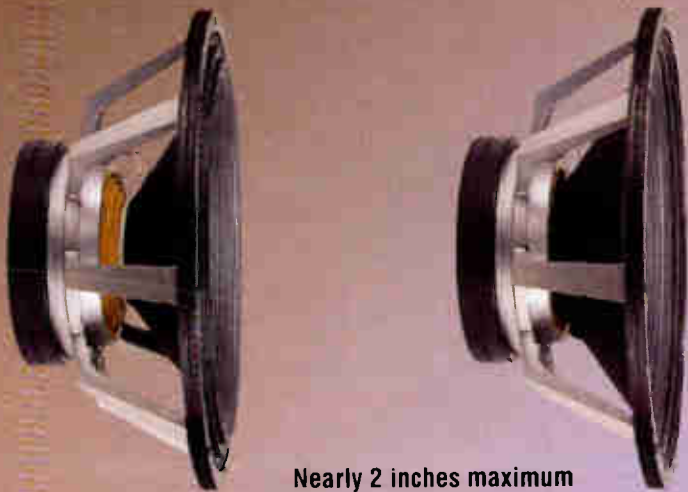
Contact your Allen & Heath dealer and find out why GL3 is rapidly becoming the console of choice for live applications.

ALLEN  
&  
HEATH

A Harman International Company

8760 S. Sandy Parkway  
Sandy, Utah 84070  
Tel. (801) 566-8800,  
Fax (801) 566-7005





Nearly 2 inches maximum excursion without mechanical failure.

An all-new, long-span cloth surround offers high axial stability and freedom from coil rubs.

## What a difference an "A" makes...

A few years ago, designers of professional high-output woofers fought to keep voice coils cool—and in one piece—with high power inputs. Today, there is a new battleground—maintaining mechanical stability over months and even years of actual use. Only Electro-Voice has engaged this battle—and won.

Our 1000-watt EVX woofers were subjected to five years of rigorous field testing and research into failure modes not revealed in normal lab testing. The result: **the new EVX-150A and EVX-180A high-power woofers** are the finest woofers currently available.

A variety of carefully evaluated changes were made to the geometry and materials of all moving parts—spider, surround, cone and voice-coil leads—giving the new EVX woofers **10 times greater resistance to long-term fatigue and as much as 5 dB more output capability than their predecessors.**

Nothing comes close to the performance and reliability of an EVX. Arrange for a demo at your EV dealer and hear for yourself what a difference an "A" makes.

New spider lasts 10 times longer.

Increased clearance eliminates lead breakage and ticking noises at excursion extremes.



Electro-Voice, Inc. a MARK IV company 600 Cecil St. Buchanan, MI 49107  
Phone: 616/695-6831 Toll free: 800/234-6831 In Canada: 613/382-2141

Circle 215 on Reader Response Card

World Radio History