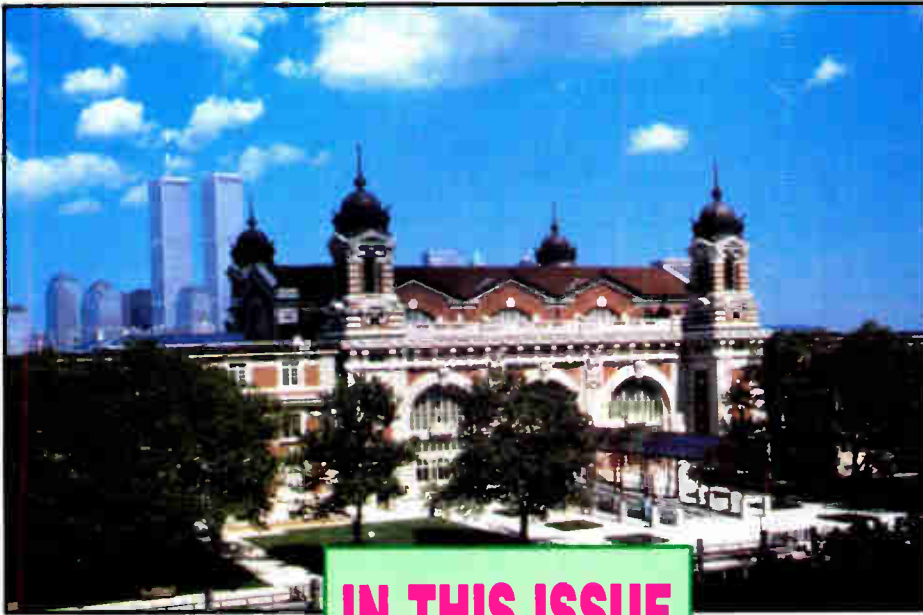


# SOUND & COMMUNICATIONS

Volume 37 Number 2

February 14, 1991



## ELLIS ISLAND

When David Andrews was called upon to do the sound for the Ellis Island fundraising gala he did things he never did before. And the mix was a happy mix of intelligibility and cosmetics. The permanent venue features a videowall with never-before-done flexibility. The wall allows instant programming and quality. Read Mary Gruszka's complete report. **26**

## IN THIS ISSUE

### • BOOK REVIEWS

Two books that may or may not tell you all you need to know about mics. **48**

### • CAD TOPICS

The latest and greatest from the world of hardware and software. **74**

### • MULTIPURPOSE AUDITORIUM

The Albert Einstein College of Medicine has an 800-seat room used for just about everything. **42**

## CEILING SPEAKERS

Ceiling Speakers come in a vast assortment. How to differentiate them? Our first article in a series discusses installed price versus raw price and some innovative roads to easy installation. **34**

## BOARD ROOMS

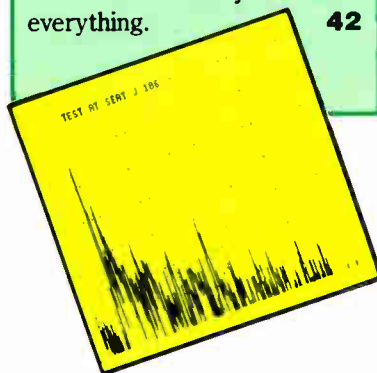
In-house conference facilities have become an important investment for corporations, hospitals, education and for the government. With esthetics and ergonomics a major consideration, these institutions are looking to save money by investing now. **12**



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program with a new twist: it's not being marketed as a tool to sell hardware. Part one of this review is herein. **64**



# Controlled, not processed

## **Spectral balance and controlled protection — a performance combination exclusive to DeltaMax™ electronically controlled speaker systems**

Prior to the introduction of the Electro-Voice DeltaMax speaker line, dedicated processor-based systems have all exhibited a common problem — audible changes in sound quality when protection circuitry is activated.

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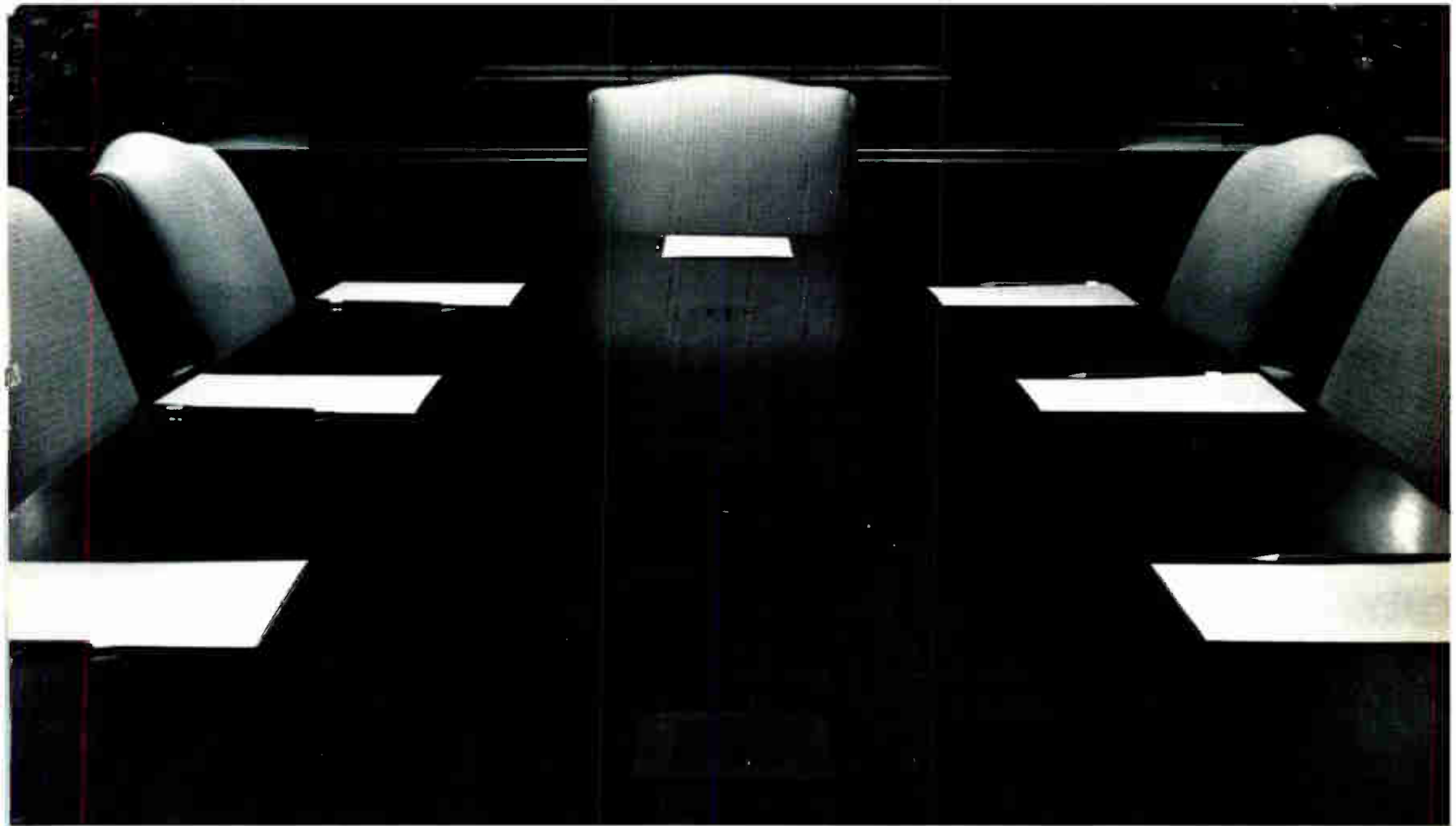
All DeltaMax speaker systems employ dual Neutrik (NL 4MP-R) Speakon™ connectors and are available in three-point flying versions utilizing Aeroquip hardware. No other competitive system can deliver the accuracy, reliability or output-per-pound performance of DeltaMax electronically controlled speaker systems.

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\$5.00, including postage and handling.

For more information, see your Crown dealer, return the coupon or call toll-free: 1-800-535-6289.



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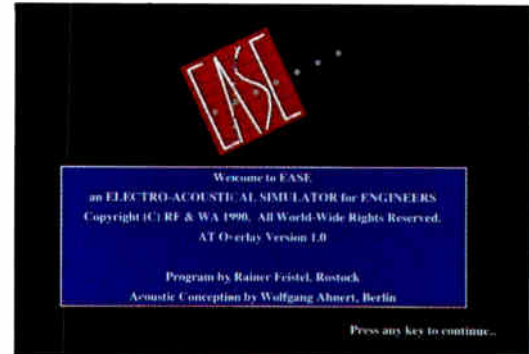
# CONTENTS

Volume 37 Number 2

February 14, 1991



26



64

## FEATURES

- 1 THE BOARD ROOM**  
*By David Jacobs*  
Conference rooms have become a way to save money for many institutions who want to avoid extensive travel expenses. How can you get in on this boom?
- 22 ANTENNAS FOR WIRELESS**  
*By Gary J. Stanfill*  
A look at antenna systems for wireless and the use of cable in these systems.
- 26 ELLIS ISLAND**  
*By Mary C. Gruska*  
When one of the nation's most important landmarks reopened last year numerous and varied installations were necessary, from an inconspicuous sound system to a high tech videowall.
- 34 CEILING SPEAKERS, PART ONE**  
*By Pamela Micahel*  
The first part of a three part series examines raw and installed speakers. What are the benefits of both types?
- 42 UPGRADE CHALLENGE**  
*By Joseph Mezzafonte*  
After an evaluation at the Albert Einstein College of Medicine an upgrade was recommended. What were the problems involved in this multipurpose setting?
- 59 TELECONFERENCING FACILITIES**  
*By Peter D'Antonio*  
Why do some high tech systems sound low tech? The importance of acoustical design in teleconferencing facilities is discussed.
- 64 EASE, PART ONE**  
*By Mike Klasco*  
The only European sound system engineering program available in the United States was developed in what was East Germany.

## DEPARTMENTS

- 7 NEWSLETTER**
- 0 LETTER FROM THE EDITOR**
- 1 GUEST EDITORIAL:  
THE WIRE QUESTION**  
*By Dominique Cheene*
- 20 SALES AND MARKETING:  
By David Lander**
- 40 NEW TECHNOLOGY:  
IN FAVOR OF FIBER OPTICS**  
*By Irwin Math*
- 47 FIRST PERSON:  
THE ORIGINAL PBS**  
*By Edward Scribner*
- 3 BOOK REVIEWS:  
MICROPHONES**  
*By David Josephson*
- 53 SALES & MARKETING:  
CRISIS MANAGEMENT**  
*By John Sanger*
- 68 NEWS FROM AROUND  
THE INDUSTRY**
- 69 CALENDAR**
- 70 PRODUCTS**
- 73 LITERATURE**
- 74 CAD TOPICS:  
DEVELOPMENTS**  
*By Mike Klasco*
- 76 MARKETPLACE**
- 76 AD INDEX**
- 78 PEOPLE**

SOUND  
COMMUNICATIONS

# SOME BREAKTHROUGHS ARE MORE OBVIOUS THAN OTHERS.



Super TD. At the risk of sounding immodest, we think many professional VHF systems will look like this in the years to come. Of course, others will be quick to pick up on Super TD's optional Active FM antennas that do increase effective transmission range by 25%.

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# NEWSLETTER

## **HARMAN BUYS FOSGATE**

Harman International Industries has reached an agreement in principle to acquire Fosgate Inc. Privately held Fosgate is a designer, producer and marketer of surround sound processors. Dr. Sidney Harman, chairman and ceo of Harman International, said that Fosgate's "breakthrough products in the area of surround sound technology . . . are complementary to our plans for the home consumer, automotive and professional equipment markets." At the Consumer Electronics Show in January, Harman Video expanded its range of products to include its new Series II projection TV in conjunction with Fosgate products. Harman Video and Fosgate-Audionics previewed the DSL-Three Home THX processor. The full THX system is expected to ship this spring, offering a single source system.

## **MTX ACQUIRES SOUNDCRAFTSMEN**

MTX/Mitek Corporation has finalized the acquisition of Soundcraftsmen, Inc. Soundcraftsmen was founded in 1968 and manufactures amplifiers, equalizers and electronic components in both the home and pro fields. Loyd Ivey, president/ceo of MTX/Mitek said that Soundcraftsmen will continue to operate and manufacture in Santa Ana, California.

## **TOA SEMINARS**

TOA Electronics is continuing its regional training seminars for its new line of engineered sound products. Twelve seminars will be held in 1991, including Orlando March 6 and 7; Chicago March 20 and 21; Seattle April 10 and 11.

## **NEW DIGITAL AUDIO SYSTEM**

Philips Consumer Electronics has demonstrated its long-awaited compatible digital and analog tape deck system. The technology, called Digital Compact Cassette (DCC), allows the end user to play and record both digitally and via analog. The system uses a stationary solid state head and standard chromium tape, and is coded by "Precision Adaptive Sub-Band Coding" (PASC). Philips says the system is expected to be brought to market (with prerecorded software) in 1992. Reportedly, several Japanese manufacturers including Matsushita are planning DCC involvement.

## **WILLIAMS SOUND MOVES**

Williams Sound Corp. has moved to a new Eden Prairie, Minnesota location. Company president Jim Broz said, "The new facility has been completely remodeled to meet the specific needs of our growing hearing assistance business." The new address is 10399 W. 70 St., Eden Prairie MN 55344.

## **A.R.T. MULTIVERB ALPHA**

A.R.T. has introduced a new model in its Multiverb line. The Multiverb Alpha has a price "that is significantly lower than its predecessors." The new unit offers over 50 reverb, delay, flanging, sampling effects, as well as a new acoustic environment simulator with up to six effects simultaneous.

## **SRS LICENSED**

The 3-D sound enhancement technology developed by Hughes Aircraft Company has gained a new adherent in the consumer electronics business. RCA color TV receivers will include the Sound Retrieval System. Previously, SRS was included in Sony TVs only. Hughes retains the rights to professional audio equipment.

## **BASF—AGFA DEAL FINALIZED**

German antitrust authorities have approved the purchase of the Agfa-Gevaert magnetic tape business by BASF. The acquisition was presumably effective January 1 of this year. According to the company, the BASF acquisition "creates one of the largest sales, marketing and technical service companies serving the magnetic tape needs of consumers and audio/video duplicators in the world." For the time being, BASF will continue to offer products of both companies.

# NEWSLETTER

## **AMX CANADIAN DISTRIBUTION**

AMX Corporation has named Dimtrex Limited its exclusive distributor in Canada. Dimtrex will be responsible for sales and marketing of Axxcess, SX, and MX remote control products.

## **INFOCOMM SOLD OUT**

Infocomm International, being held this month, was sold out by early January. The show includes more than 320 video, audio-video and computer exhibiting firms, with first-time participation from IBM, Commodore and Dataton Multi Media products. At press time, more than 10,000 people were expected to attend.

## **PIRELLI APPOINTMENT**

Bryan K. Jacobson, an expert in underwater cable installation, has been promoted to president of Pirelli Jacobson, Inc. Pirelli Cable acquired the company, Jacobson Brothers, Inc. in 1986.

## **SEMINAR ON 'TRANSLATABILITY'**

Berlitz International has developed a new seminar on preparing technical copy for translations. The two and one-half day seminar is about "translatability," the relative ease with which the English-language source text can be effectively adapted to one or more target languages. The company claims that they "put forth practical tools that lead to more cost-efficient translations."

## **BANDWIDTH ON DEMAND**

Ascend Communications has announced a class of product that provides high-speed bandwidth on demand through the public switched digital network (PSDN). Multiband can turn switched digital channels into "rubberbandwidth" that expands and contracts to meet the dynamic usage requirements of an application.

## **SAMSUNG SWITCH**

A monolithic CMOS 4 x 4 cross-point switch featuring 16 internal control latches is available from Samsung Semiconductor for use in telecommunications applications. According to Samsung, the device integrates several functions not previously available in a single chip.

## **NEW NEWSLETTER**

The Vinyl Institute Electrical Materials Council has begun publishing a newsletter to communicate information about the use of vinyl, or PVC, in electrical applications. The newsletter, titled "Electrical Connection," is being offered without charge to engineers, contractors and others involved in the specification of electrical materials. The Vinyl Institute is at 114 Mayfield Ave., P.O. Box 3053, Edison, New Jersey 08818-3053.

## **CERTIFICATION FOR REPS**

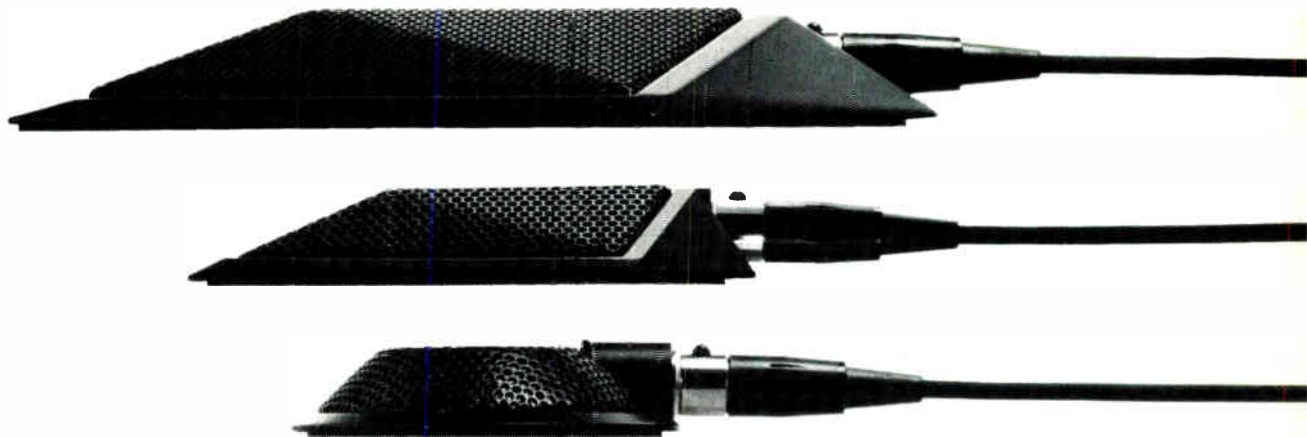
A certification program for manufacturers' representatives has been introduced by the Manufacturers' Representatives Educational Research Foundation. The professional designation of CPMR (Certified Professional Manufacturers Representative) will be available upon completion of the required educational and career experience. The program is offered through the Institute for Professional Advancement of Arlington TX, with the academic component supplied at Indiana University.

## **DESKTOP VIDEO**

Digital F/X has announced volume shipment of the Video F/X desktop video production system. The system integrates video, audio and graphics editing, and uses an Apple Macintosh II as a user front-end.



# UniPlate<sup>®</sup> and OmniPlate<sup>™</sup>



## The Flat-out finest!

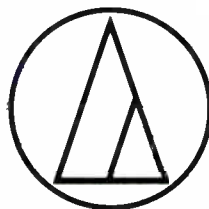
Now there are three A-T boundary microphones: the new AT871R hemicardioid boundary condenser microphone, its smaller cousin the AT851a, and the new OmniPlate<sup>™</sup> AT841a. Each offers superior performance despite the unobtrusive design.

Each captures the full range of sound for natural reproduction and better intelligibility than the peaked-response boundary microphones of the past. Plus a high-pass filter that puts you in control of acoustic room noise. And with

three models you can now choose the polar pattern that matches your specific use.

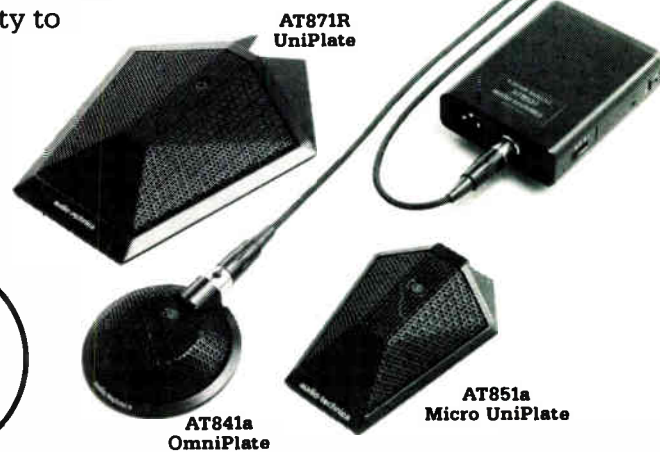
We've also moved the electronics of the AT871R inside the case to simplify installation and reduce noise. The robust case and rubber base also reduce sensitivity to mechanical noise so often encountered in these applications.

When you need a microphone that extends the limits of boundary-layer microphone performance, look no further than Audio-Technica. A comparison test will prove our point.



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# This Is The Season

This is the trade show season. One can travel the byways of the nation attending conventions and product demonstrations to the complete destruction of one's own business, if one chooses. Or one can pick and choose carefully the trade shows that can help. The thing is, everyone has their own mixture of conventions that can help one's business.

The National Sound & Communications Association Expo is awhile away — May 20 to be exact. But between that time and this we've had the Consumer Electronics Show, the NAMM show, and the NAB or broadcasters' show. And going back a few months we had the AES Convention.

The Consumer Electronics Show is hardly the prime show for this sound and communications business. However, there are always products, seminars, and people who cross over into this end. At the January CES in Las Vegas much was made over the Home Theater section of the show. And in truth there was a lot to talk about. Surround sound processors, THX systems, multi-room controls and projection televisions all stood out in their home in the Mirage hotel. One can still question, however, how far that segment of the business will go and where it will go. As you may have noticed, Sound & Communications magazine is sponsoring a survey of all interested parties in the commercial and residential ends of the business to ascertain what their interests are and where their goals are. What exactly does the home theater have to do with any of us? We'll let you know when the results are in. I hope you've all filled out the survey that was in our last issue. If you haven't, let us know and we'll provide you with another one.

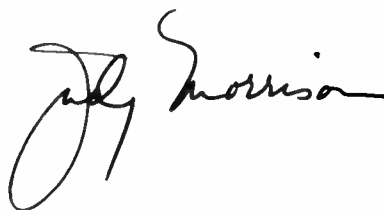
As for the rest of CES, for those of you who don't trek to Las Vegas to see the phones and faxes mixed in with the audio products, the convention drew over 70,000 people and 1500 exhibitors. Kenwood showed a prototype recordable CD player

for the home that was similar to the professional model they introduced at the AES convention. Philips showed its compatible technology for digital and analog audio. Sony showed its DAT Walkman and a four-head home DAT deck.

As for the past, in the last issue gremlins made off with some of the figures in Carolyn Davis's article. Carolyn was disappointed — as were we — in not being able to present the full story of what can be accomplished through accurate measurements. She will be writing more on that topic, and you'll see for yourself.

As one works in an industry, some people — very few — become special both for personal and professional reasons. Bob Davis at Yamaha was one of these special people. Bob died as this magazine was going to press, and one wishes we had more time and more space to tell you all how devastated our office is and how great he was. Bob was always there with any information we needed, was forthcoming, honest and knowledgeable; and never lost his friendly and forthright demeanor. We'll all miss him. The Davis family has established a scholarship fund, and contributions should be sent to Central Kentucky Youth Orchestra, Robert Davis Scholarship Fund, 161 N. Mill Street, Lexington, Kentucky 40507; attention Patricia Cordy. Our sympathies are with the Davis family and all Bob's colleagues at Yamaha. We'll miss Bob's generosity — and his good stories.

Best regards,



Judith Morrison  
Editor in Chief

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## GUEST EDITORIAL

# THE WIRE QUESTION ANSWERED

By Dominique J. Chéne

**It is not my style to get in the middle of heated discussions, especially when there is no argument which will change the minds of the participants, but in this case I will make an exception.**

I am referring of course to the big debate about wiring and the use of esoteric cable. I am reading Mr. Dieckaus's response to Mr. Rosner [Sound & Communications, July 18, 1990] and I can't help thinking that they are both extremists in their positions. Mr. Rosner's cold and factual approach to the problem offends Mr. Dieckaus's sensitivity. What can I do about it? Well, I am going to attempt to solve this problem once and for all. The three basic points of discussion are:

- Esoteric wire is expensive (or at least more expensive than regular wire).
- Tests might (or might not) show that the wire actually improves the sound quality.
- People might (or might not) feel good about having esoteric wire in their system.

That's it. No more, no less. Let's construct a decision matrix to analyze all the options and formulate the proper course of action.

As you can see, the above table offers all of the answers to the esoteric wire dilemma. I guess the key is, "How much do you value feeling good?" Most mechanical Swiss watches are not as accurate as quartz timepieces and usually cost much more. Why do people buy Swiss watches? Because they have other reasons to justify their purchase and these reasons cannot be quantized in terms of seconds per year.

As an engineer I am ticked off by unsupported scientific claims. I wish that some of the manufacturers of esoteric cables would quit re-inventing Maxwell's

CAN YOU AFFORD IT?	DOES IT IMPROVE THE SOUND IN A MEASUREABLE WAY	DOES IT MAKE YOU FEEL GOOD?	COURSE OF ACTION TO BE TAKEN
NO	NO	NO	What do you care? Go fly a kite.
NO	NO	YES	Life is tough. Go for it anyway.
NO	YES	NO	Don't do it. You will regret it.
NO	YES	YES	Beg! Borrow! Steal! Buy it now!!
YES	NO	NO	Save your money.
YES	NO	YES	Of course buy it! It's just money.
YES	YES	NO	Do it. You'll learn to love it.
YES	YES	YES	Go for it. Better yet, the bigger one.

Equations to serve their own purposes, and stop raising theories which cannot as of today be warranted by verifiable laboratory experiments.

As a Beaujolais Nouveau Philosopher, I also believe that humans need to justify their actions at any cost in order to feel

good about what they just did. That's just human nature and it works with buying sports cars and esoteric wire.

Some of Sound & Communications' readers might wonder if I use esoteric wire and cables on my audio system: The answer is "not yet." ■

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# The Board Room

## *Saving Money by Expanding in Hard Times*

BY DAVID JACOBS

**A**midst a climate of economic uncertainty wherein even the President has begun to use the “R” word, it appears that at least one sector of the audio/visual industry is maintaining strength and even experiencing growth.

Large and mid-sized corporations, government bodies, medical and educational institutions are increasing their investment in superior in-house communications — particularly in conference room facilities. This isn’t because money is loose. Most observers tell us that end users are seeing ultimate savings in the construction of presentation rooms that will keep employees and clients on site.

Esthetics and ergonomics have become a major concern to the corporate consumer — sometimes to the dismay of the audio/video provider because if he or she enters the planning process any later than the initial stages, the engineers may find themselves dealing with marble/glass/stainless steel environments.

Dixon Media in Detroit is a design firm that creates facilities for some of the major corporations in the U.S. “We’ve just completed a facility for Kellogg,” says company president Fred Dixon. “It’s one-of-a-kind. It features an overhead projector in the wall right beside the rear projection screen and uses three mirrors behind the screen and pulls out of the wall. It’s all very flush against the wall so it looks like it’s part of the wall. It has a remote focus lens on it so that they can keep the resolution in

overhead but still have the rear screen advantage. Plus they use slide projectors and video projectors on rear screen too.”

Dixon’s other recent clients include Dow Chemical, Whirlpool and Upjohn.

The new Dow facility is an auditorium that seats over 300. It’s designed for employee training and information. And the CEO uses it for quarterly report meetings. Dixon says that it is tied into a full television production studio and control room. “It’s front projection with everything in the projection booth except that some of equipment such as VCRs are contained in a rack just behind the front wall so you don’t have to have an operator in the projection booth to do everything. The speaker can do his own set-up.”

### **Esthetics and ergonomics have become a major concern to the corporate consumer.**

The Dow facility also features a flying spot scanner for slides. It’s a unit with added high resolution modifications, enabling slide projection onto a video screen. It also goes to the lectern and back so presenters can write on the slides.

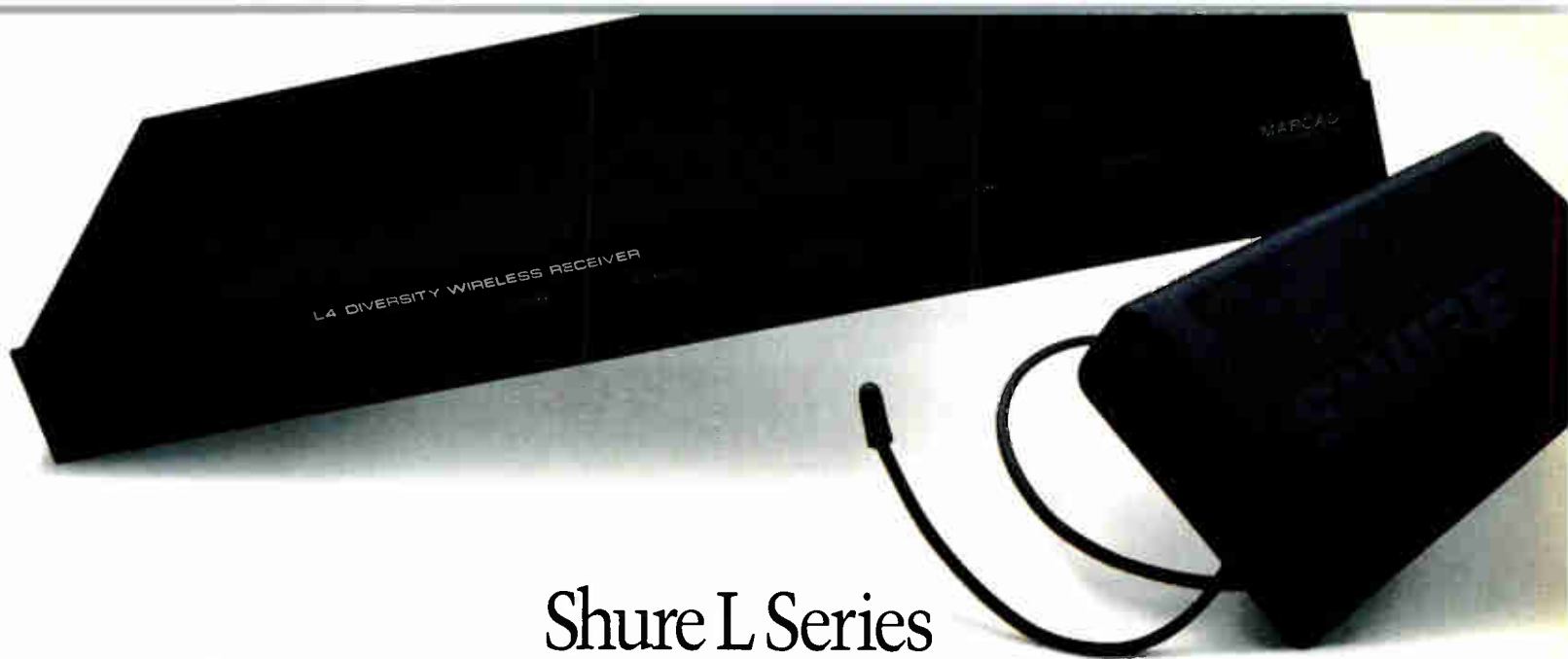
Dixon says his company recommends different equipment manufacturers and different systems, depending on the applica-

tions, but, “We’re not a dealer, so we’re not obligated to recommend any particular brands. I’m hesitant to recommend any one product. It depends on what [the clients] have already, what they’re familiar with and what is available and serviceable in their area, because we travel all over the United States.

On esthetics Dixon says, “We feel the media systems should be ghosts in the room. You should not see them when you first walk in. And the systems should work for the user — not the other way around.”

Wireless is one approach being used to help with esthetics. Sennheiser manufactures a wireless transmitter that can be placed under a planter. “Most of these gentlemen demand the very best,” says pro products manager Al Zang of typical board members. “You can place a wireless system on them enabling every word to be heard clearly. Many of these company chairmen aren’t interested in microphones. Maybe they haven’t ever even worked around a microphone, and a lavalier mic that can transmit to the back of the room and on to tape is very advantageous because the guy can move his head around and about freely.

According to Zang, wireless technology is becoming more and more common in the meeting room. “They can take the audio out of live microphones and they can then transmit it into the room environment without feedback because people have these under-the-chin receivers. It’s similar



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SM58, SM96, and Beta 58 capsules, offer durability, compact size, light weight, and provide the same distinctive sound as their wired counterparts.

---

#### Performance meets economy.

Even though L Series components are economically priced, they incorporate sophisticated RF technology. The L4 Diversity Receiver utilizes "intelligent" MARCAD™ circuitry to monitor signals from its two independent RF sections, blending them in the optimum proportion—not merely switching them. The result is reliable, uninterrupted audio with no clicks, no pops. And all L Series systems feature Shure "Mirror Image" companding, plus high-gain, low-noise MOSFETs, a high-fidelity quadrature detector, and a 3-pole Chebyshev audio low-pass filter. It all adds up to outstanding audio quality with exceptional freedom from noise and distortion.

---

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**L SERIES**

Circle 207 on Reader Response Card

to the United Nations. In board rooms, if they have open speakers, they have to worry about feedback, so they can't have open microphones all around on the table. One solution to this is the infrared listening devices. Additionally, people can adjust the gain at their own level.

"I'm working with a guy up in Maine who's putting together a boardroom that's all glass and pillars and things of that nature so the emitters have to be hidden. I remember a project that was actually a Superior Court in Minneapolis where they had an elaborate presidium for the courtroom and they didn't want to have the emitter panel facing them. So we had a slotted wall in which we angled the wood off center a little bit so you couldn't see in, but the light could be emitted out. At the Connecticut State Legislature, the emitters were actually installed in the slots of the wood — every so many inches there was a slot."

Boundary mics are the fastest growing segment of the microphone market according to Ken Reichel, Vice President of Marketing at Audio Technica. And wireless is increasingly recognized as appropriate for the boardroom, when a system can run for 10 hours on one battery, and the receiver can be kept in another room — leading to space and esthetic solutions. Reichel sees up to seven wireless mics in one room, and he finds that security is not a major concern in most cases.

Shure manufactures wireless systems, but director of mixer products Michael Pedersen cautions that while infrared is basically secure, the use of conventional RF systems is not. He says that "Everyone wants wireless. The non-technical people see it on television and they want it in these boardrooms, but as soon as you tell them that anyone with a Radio Shack scanner can zero in on what they're saying, they shy away from it. They come to the realization that 'Oh my God, we've been using this wireless system all along' while they've been talking about selling out the company. In government high security rooms they have what are called 'tempest specs' which are measurements of just how much electro-magnetic energy may leave that room. The real high-tech



*Video Images recently installed a boardroom for Journal Communications, publisher of the Milwaukee Journal Sentinel.*

areas even have specs on the wired systems."

Some larger facilities need multi-channel capabilities. Zang at Sennheiser says that six-channel systems are most common in the United States and that two-or three-channel systems are also quite common. "McDonnell University has six of our audio channels so that they can have visitors from other parts of the country. We have a project coming up that we're not really at liberty to discuss in detail. It's a project for a union in New York City and it's a multi-channel system. They will be having people coming over and speaking in different languages. There will be an interpreter system set up.

"One thing that the companies can also take advantage of is a hearing-impaired system. Those are generally pretty small systems. If a company has television where they're using satellite, they'll often use our small ES-460 system as a transmitter on top of the television and the individuals can wear the headsets and adjust the volume for their needs." Zang hopes that as time goes on this will become a more popular system. He feels that the diminution of need for elaborate speaker systems and amplifiers is a factor that will make infrared wireless transmission more commonplace. Additionally, unlike radio-based wireless systems, infrared systems are virtually secure from outsider tapping.

Video Images in Milwaukee sells and installs video/audio computer interfacing and

graphics systems. The company has been involved in professional video and audio broadcast for 16 years. Two years ago company president John Fuchs saw the presentation arena expanding and decided to institute a new division: Presentation Systems. The company specializes in computer interfacing, graphics systems, database systems, slides and computer animation. "We have product group specialists and the product line is split up among those people. We can call in our resource people to aid account executives in helping clients with specific product area. We have systems integration people and installation and service departments. When I go out to handle an account I can send questions regarding this or that to specific people and the systems person will get involved so that when we go back to a customer with a proposal we have all our i's dotted and our t's crossed."

One of the company's major recent projects is a boardroom for Journal Communications, publisher of the Milwaukee Journal Sentinel. Says Video Images' salesperson Diane Boech, "We got involved early on in the project with the architect. I find architects typically have no concept or knowledge of the kinds of equipment we work with. Architects don't usually understand aspect ratios of screens and they're more into the esthetics."

The room is located on the sixth floor where Journal Communications has all of its executive offices. Impressive in its architecture, it has walls constructed of



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World Radio History

cherry wood. "It is quite an impressive room and it has turned out very nicely," says Boech.

The approximately 50-foot long room is divisible into two rooms when necessary. The rooms are usually used separately, but the open room is used for monthly teleconferencing as well as board meetings.

The system features a Symetrix Hybrid 111, four Shure M-267 mixers, four Crown PCC 200 table mics, Crown CM-190 on the podium and Panasonic EG-1250 VHS for playback. A Sony VPH 1031Q multi scan projector is also included. The company uses a lot of Macintoshes with SuperMac graphics cards and SuperMac monitors which scan at about 48 kHz. A

Hudson Photographic rear projection screen helps to round out the system.

GMS Sound in Orange County, California does a significant amount of boardroom installations. While the company does architectural work as well as audio/visual consulting, its recent large projects have been done in conjunction with architectural consultants.

The company is currently installing a system for the city of Covena. "We're doing quite a bit of audio/visual work on that," says company president Dennis Befune. It will include: a JBL automatic mixing system; Mitsubishi video projector;

### **While infrared is basically secure, the use of conventional RF systems is not.**

multi-scan RGB capability, 35mm slide capabilities courtesy of an Elmo Omni-graphic Zenon projector, custom console that has both VCR and ACR playback capabilities, character generator and three video monitors for preview. Additionally, a Sigma switcher and color-black generator and GMS's own wireless system are included.

One recent project is a boardroom for the Orange County Sanitation District. According to GMS systems engineer David Crawford, it is a large facility with approximately 30 to 40 mic positions. "It's a Shure AMS system and in conjunction with that we have rear screen video projection, Sony video projector and Kodak slide projector. It's a fairly simple system but it's set up in such a way that the room can be reconfigured. The ceiling mounted speakers are Bose 102 series.

Another recently completed project is the California State University Board of Regents in Long Beach which features 68 microphones with automated mixing. "That facility is where the presidents of all the colleges and the regents for the California State university and colleges meet along with the governor four times a year," says Befune.

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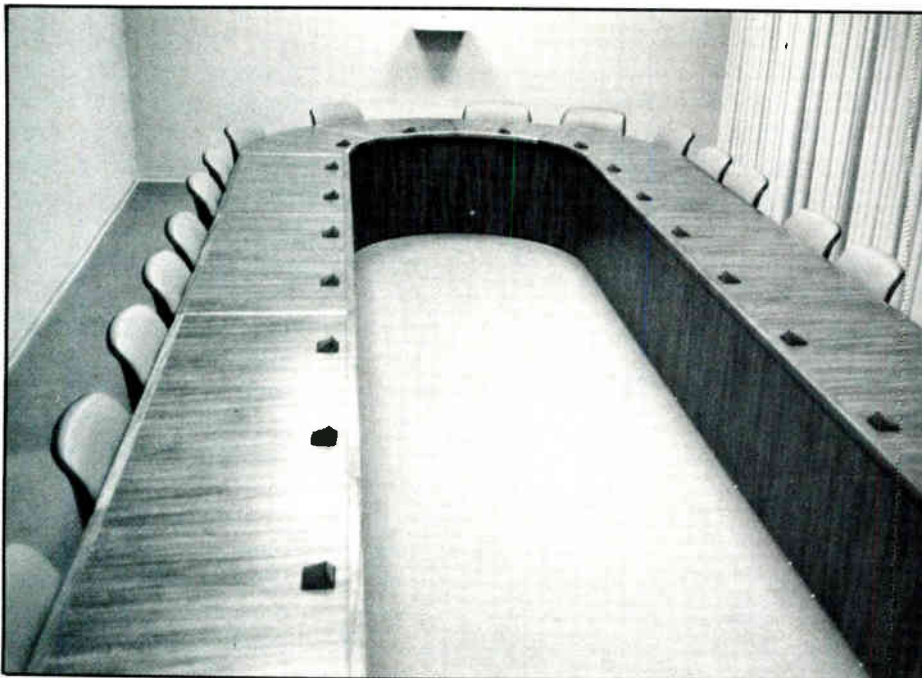
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World Radio History



*The East West Center, International Business Symposium, Honolulu (above and below) uses a Shure AMS System.*



“For the West Covena Council Chambers we were forced to use a fair portion of their existing system, but we installed all new microphones and switches,” says Crawford. They’re going into extensive video capabilities with Barco video projector, JVC cameras with remote pan and tilt in two locations, three 25-inch monitors around the perimeter, a Sennheiser infrared system for the hard-of-hearing and a complete Sony U-Matic editing system.”

Befune says of today’s client; “Cosmetics are real important. No longer is a stainless steel cover plate acceptable. The clients want the blending of architectural styles. They want to see their wall plates and floor plates designed to match the room. We spend a lot of time just on finishing work. A lot of our plates are custom anodized. So it’s real good to have a custom metal worker and a custom finisher and engraver in your hip pocket. The clients are concerned with two things;

‘How does it sound and how does it look.’ It can be the best-installed system in the world as far as the rack is concerned, but if your finish work isn’t satisfactory it isn’t very good.”

“A lot of people will spend a great deal of money on the esthetics of a room without spending much money at all on what goes into that room,” adds Boech.

Shure’s Pedersen says, “The biggest problem I see is when you run into a vice president who knows nothing about electro-acoustics and who is dictating the design. I work with a lot of consultants around the world. A lot of times esthetics dictates what the system is going to be. When you go in to talk to these non-technical people, there’s no common ground. They don’t understand how people hear or how acoustics of a room affect

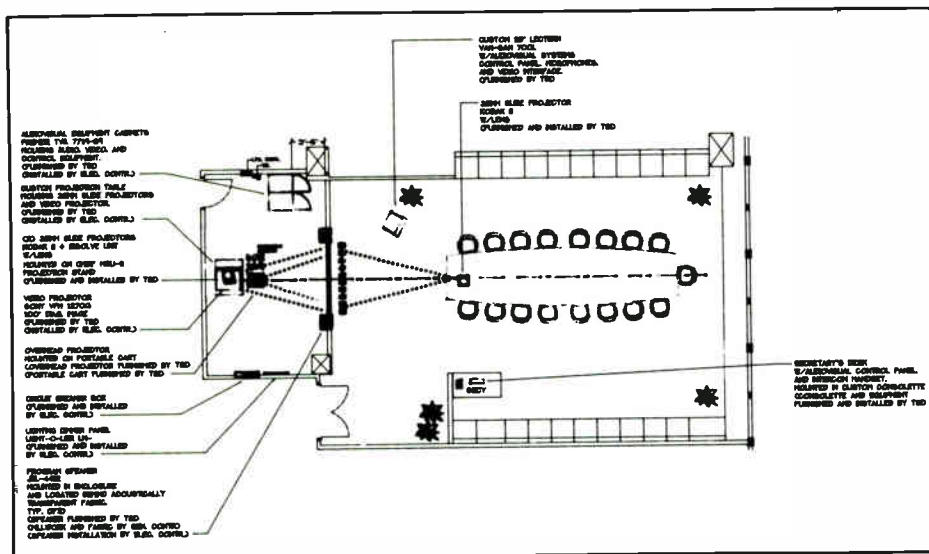
**“I find architects typically have no concept or knowledge of the kinds of equipment we work with.”**

a system. We were involved in a facility in Canada that had glass walls around, marble floors and a marble table. And they couldn’t understand why we couldn’t tell them what kind of electronics could solve their problems.

“There are better looking microphones, there are better ways to hide speakers. But the biggest problem is that boardrooms are almost never thought of as systems. They’re thought of as rooms for the big shots to sit in. Then later they realize that the guys on the board are 75 or 80 years old and don’t hear too well and the chairman who is sitting 35 feet away can’t hear the guy who is just barely speaking above a whisper.

“And it’s the interior designer who calls the shots saying, ‘Oh, well you can’t put the microphone there.’ The best facilities I have seen have the table built around the sound system from the beginning.”





Borden audiovisual facilities plan.

A facility for the Joint Commission on the Accreditation of Hospitals in Chicago was designed with the input of Pedersen at the initial architectural stages. "By doing that we could insure that everybody's needs were met. The table seats about 40 and everybody had a working position of about 18-20 inches in front of them. The table was like a big square, open in the middle, so you could hop in and serve everybody drinks if you wanted to," Pedersen laughs. "We covered over the wiring trough and the microphones with a very attractive grille so that while you're sitting there you don't see any of this equipment.

In mid-town Manhattan, a large conference facility for Borden is about to open at press time.

Designed with the help of TSI in Mineola, New York, the facility features rear video projection via the Sony 1270 video projector. Speech reinforcement, rear slide projection, rear overhead projection, and portable (removable) front projection are also included. The room is designed to accommodate 18 to 20 attendees.

The project was coordinated with architect Ralph Ferrigno of Designers Coalition, Inc. The control is simple, with most functions controllable from the lectern." In addition to the lectern controls are two full panels — one on a secretary's desk in the rear of the room, and one in the control booth. An electronic roll down screen by Dalite is also included.

Manufacturers are beginning to devote product design specifically for presentation applications. Electro-Voice manufactures

automatic mixers. "The PI-100 speakers are used quite a bit for these applications," says E-V spokesperson Keith Clark.

Steve Savenuy, product manager at Dukane, says his company manufactures a line of general purpose sound products as well as more specialized systems which are marketed by over 230 distributors.

Crown, of course, manufactures the PZM line of mics, which it says are ideally suited for conferencing because of their phase-cancelling ability.

## We were forced to use a fair portion of their existing system, but we installed all new microphones and switches.

Is there really increasing business for the presentation facility professional?

Sennheiser's Zang says that from where he sits he sees corporations expanding their boardrooms to accommodate media including satellite dishes, television and increased telephone communications capabilities.

Dixon reiterates this feeling; "Due to the cost of travel, due to the cost of employee downtime and due to the right-to-know legislation, it has become more attractive for corporations to put in large training and meeting facilities where they can train large numbers and get them back on the road so they're not out of the field too long." He says there has been an up-

trend in larger and more sophisticated facilities "due to the large amount of information available through satellites and what you can get off your own computer systems. If there's one trend it's in computers and video projection."

Befune says that in his company's area he hasn't seen any slowdown. "We're still real busy with bid work and we have a lot of negotiated work that never goes out to bid that we get through consultant recommendations. Of course we'd like to see more but while we've seen a decline on the smaller jobs, that's not a market that we're really involved with any more."

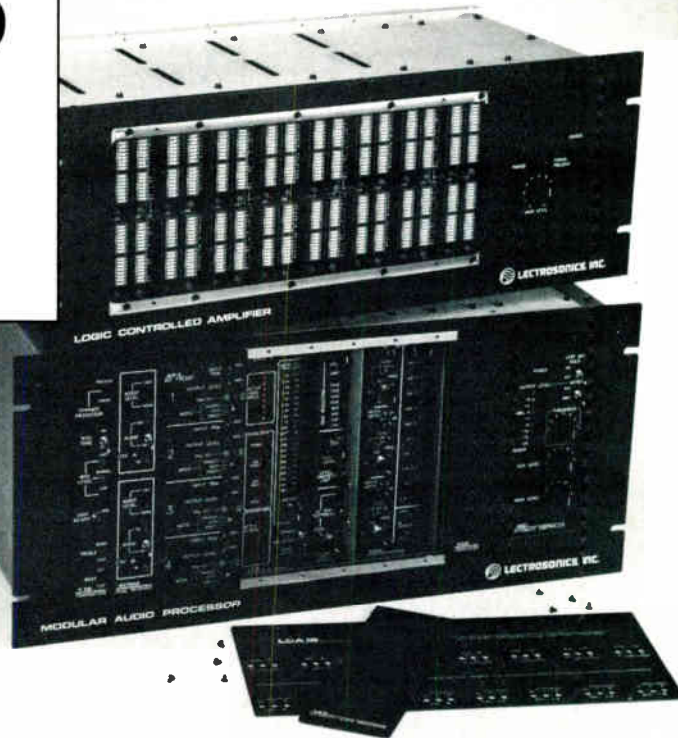
Shure's products Michael Pedersen says, "There are definitely more systems going in every year. It does vary with the economy. A majority of the products that we put in boardrooms are our automatic mic (AMS) systems and our Shure Teleconferencing (STR) systems. Our sales have not been affected so far even during this so-called recession — which I think is mainly driven by the media. Being a manufacturer, though, we can't tell where our products are going to. Sales just seem to be really consistent. The corporate users may slow down, saying 'Well the bottom line hasn't been so good this quarter. Do we really want to spend \$50,000 or \$100,000 to renovate the boardroom.'"

Boech adds, "Five years ago the idea of bringing a computer into a boardroom or even of the wide screen format just didn't exist. Two years ago a lot of people weren't aware of what could be done. As people are becoming aware of what can be done, they're upgrading their boardroom facilities to include all this technology." She adds that there has been a great rebirth in the use of slides.

In the Northeast, there may be a different trend. As one source says, there has been a downturn in new construction, but an upturn in service needs. At any rate, boardroom and conference room providers are hardly crying the blues. It may be up to these providers to point out to the end-user the cash savings that these rooms can relay to a company. ■

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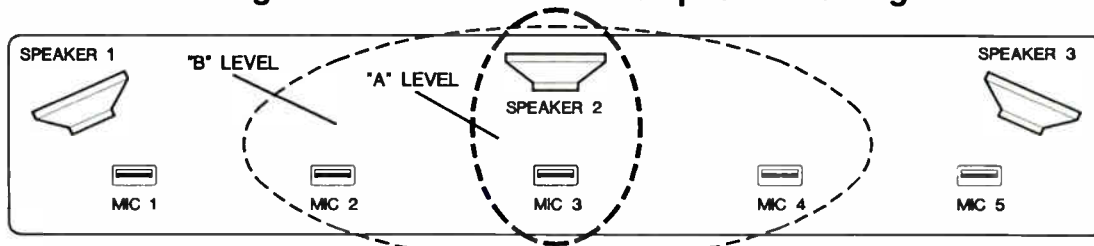


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# HOW DO YOU DEFINE ADVERTISING?

By David Lander

**In a given week, the average American is exposed to enough advertising to make his brain spin.**

The advertisements we see range widely in quality, from expertly and expensively produced TV spots to newspaper ads that resemble diner menus and do little more than list items and prices.

While some of these advertisements are duds, others in the never-ending barrage cause powerful sales explosions.

How does one tell which advertisements pay for themselves and which are ineffective? Without research, doing so is impossible. Still, it's safe to say that, if one could identify the ads that work best and subject them to close analysis, most would mirror a few advertising fundamentals.

Is advertising effectiveness really governed by rules? Consider this expert opinion: "The time has come when advertising has in some hands reached the status of a science. It is based on fixed principals. . . The correct methods of procedure have been proved and established. We know what is most effective, and we act on basic laws."

These words were written in 1923 by Claude Hopkins, one of advertising's greatest and most successful copywriters (whose annual earnings from writing ads, even prior to the First World War, were in the six figures). At the time, Hopkins was employed by Lord & Thomas, one of the era's top ad shops.

Hopkins' boss, Albert D. Lasker, joined Lord & Thomas in 1898, while still in his teens. He had been a newspaper reporter and expected his wealthy German immigrant father to buy him a small-town

paper of his own. At that time, advertising agencies were primarily brokers of advertising space, so Lord & Thomas seemed a logical place for young Lasker to learn the newspaper business from another perspective. (Within a few years of his arrival, he was given 25 percent interest in Lord & Thomas, where he worked in advertising for more than four decades, amassing an enormous fortune in the process.)

Soon after arriving at the Chicago-based agency, Lasker, with a reporter's inquisitiveness, began to ask colleagues what, in fact, advertising was. He got "a different but meaningless definition from each one."

Studying ads done by a competing shop, Lasker "saw they were publishing the news about their clients' products" and that "they would tell the story of someone who had gotten some wonderful result, but they would tell it in a newsy way."

### HOW DOES ONE TELL WHICH ADVERTISEMENTS PAY FOR THEMSELVES AND WHICH ARE INEFFECTIVE?

"Advertising," Lasker concluded from this, "is news."

One day a few years later, a note was delivered to the Lord & Thomas offices. The writer stated that he was downstairs in the saloon, that he knew the definition of advertising and that he would be happy to reveal it. All Lasker had to do was send the messenger back with a one-word answer — yes.

The simplicity of the response mechanism in itself displayed unusual selling ability on the part of the writer, a former Canadian mounted policeman named John E. Kennedy. Lasker summoned him upstairs and encountered "one of the handsomest men I ever saw in my life. He stood six feet full in his stocking feet, every inch of him muscle, with an eye as keen as could be in a man's head, and a forehead that showed the student."

"We sat there until midnight, and when I left that room I knew what advertising was," Lasker stated in a 1925 address to his Chicago and New York employees. "It is exactly what he told me . . . and the whole complexion of advertising for all America was changed from that day on."

Kennedy's definition of advertising consisted of only three words, "salesmanship in print."

Lasker went on to hire Kennedy, who gave him "a series of lessons" about the craft of creating ads. After lesson one, "advertising is salesmanship in print," came a way to apply that definition. An advertisement, Kennedy maintained, must provide "the reason why people should want the goods."

Advertising that provides "reason why" copy can be contrasted with what Lasker disdainfully referred to as "sloganizing," using an ineffectual phrase that does no more than keep an advertiser's name before the public. To illustrate sloganizing, the advertising tycoon singled out a campaign run for Armour ham soon after he got into the business.

One week, noted Lasker, a black man would appear in an ad and say Armour was "the ham what am." This would be followed by an Italian calling it "the ham what ees" and, later, a German, who told



potential customers that Armour was "the ham vat iss."

Foolish? Certainly. Yet we needn't look far to discover that many of today's ad campaigns do little more than translate such sloganizing into a contemporary idiom.

The seed of John E. Kennedy's definition of advertising, "salesmanship," has continued to bear fruit for generations of marketers and merchandisers. About 30 years ago, however, another of advertising's all-time great theoreticians, Rosser Reeves, decided it wasn't good enough.

"Too many advertising writers, who have never sold anything, have their own definitions of salesmanship," wrote Reeves in a highly important book called *Reality in Advertising*. Reeves further asserted that "advertising is the art of getting a uni-

que selling proposition into the heads of the most people at the lowest possible cost."

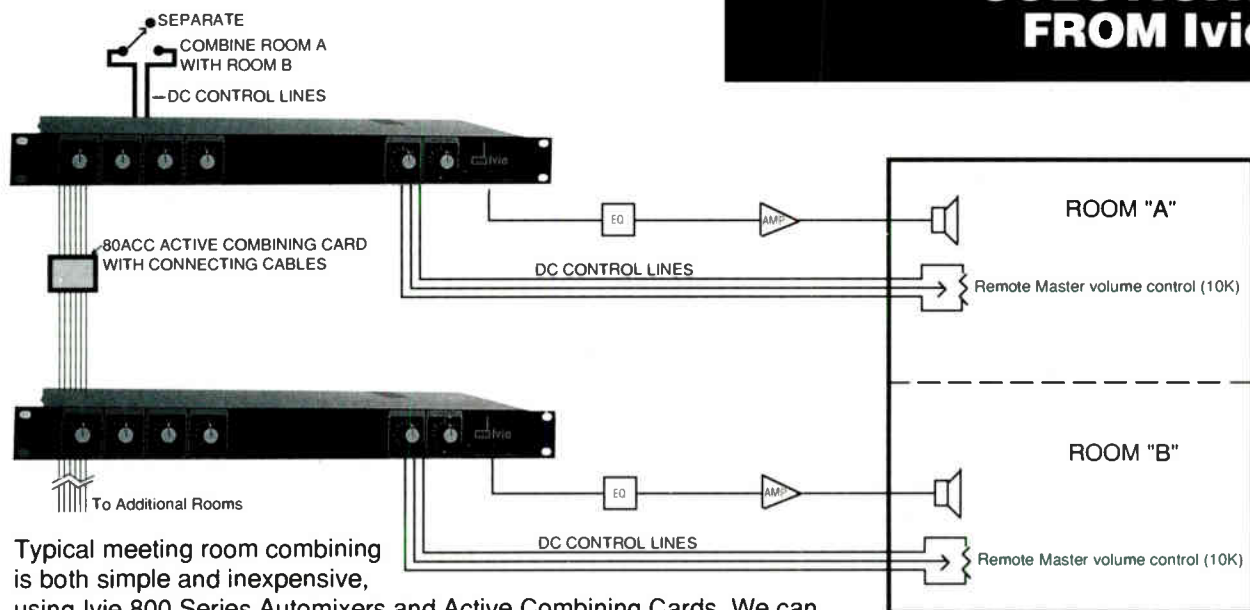
Reeves, the man who is credited with propelling the Ted Bates agency into the ranks of the world's top five shops, went on to split his unique selling proposition (often abbreviated as U.S.P.) into three key components.

- "Each advertisement must make a proposition to the consumer [and] must say to each reader: Buy this product, and you will get this specific benefit."
- "The proposition must be one that the competition either cannot, or does not, offer."
- "The proposition must be so strong that it can . . . pull over new customers to your product."
- The principles established by Albert

Lasker, John Kennedy and Rosser Reeves are key chapter headings in today's advertising rule book. The fact that these tenets are effective has been proven time and again, both through research and in the cauldron of direct mail merchandising, a segment of sales where a given ad's pulling power quickly becomes evident.

It would be a mistake to think these guidelines apply only to expensive print and broadcast advertising. Every sound and communications professional can — and should — employ them in letters, fliers, product sheets, brochures and any other form of written communication prepared for potential customers. And they're just as important to verbal presentations, whether done in person or via telephone.

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# Antennas for Wireless

## *The Do's and Don'ts of Antenna Location*

BY GARY J. STANFILL

*This article is an excerpt from "Wireless Microphone Application Techniques" by Gary J. Stanfill, President of Vega, published by Vega, a Mark IV company. In a previous excerpt, published in the December 21, 1990 issue of Sound & Communications, installation of wireless systems was discussed. This excerpt deals with antenna systems, their proper placement and the use of cable.*

**F**requently, antennas must be located some distance from the desired location of the receiver. In this case, coaxial cables unavoidably reduce the available signal and cut system operating range. In general terms, cables should be used only when the receiver cannot be moved to a position near the antenna or where mounting considerations require that the antenna be distant from the receiver. In most instances, better results are obtained by running a longer audio cable and using a shorter antenna cable. RF cables, particularly longer ones, should be used primarily when the advantages of a better antenna mounting location outweigh the disadvantages of cable loss.

One common error is the use of long RF cables to move the antenna closer to the location of the transmitter. This is usually done in an effort to improve performance. Unfortunately, the loss of the cable is quite often higher than the additional transmission loss to an antenna at the receiver.

This is especially likely if a low cost cable such as RG-58 is used; only about 82 feet of this type of cable will reduce the range of wireless systems by one-half. Although the concept is a bit tricky, the rule of thumb is this: if the distance between the receiving antenna and the transmitter can be reduced by one-half or more by a cable with less than 6 dB of loss, performance will be improved. On the other hand, if the cable loss required to position the antenna

### **The type of cable used, and the corresponding loss factor, will also affect the equation.**

to one-half of the original range is more than 6 dB, performance will suffer. An example or two may make this more clear. If the original range is 200 feet (60m), using 100 feet (30m) of RG-58 (having 7.3 dB of loss) to lower the range to 100 feet (30m) will result in a loss of performance. Conversely, using 50 feet (15m) of RG-58 (with 3.7 dB of loss) to reduce range from 100 ft 30m) to 50 feet (15m) will slightly improve performance. Obviously, the type of cable used, and the corresponding loss

factor, will also affect the equation. Better solutions are to use a directional antenna with gain (such as a yagi) to extend the range or to locate the receiver nearer the transmitter and use an audio cable.

However, in some situations, the use of cables is difficult or even impossible to avoid. In these cases, the length of the cable should be kept to a minimum and the type of cable used selected to maintain performance. Different sizes and types of RF cable vary widely in the amount of loss introduced and, thus, the effect upon wireless systems operating range. There are several ways to approach the process of selecting a cable for a wireless installation. One of the best ways is to first decide how much performance degradation can be accepted for the wireless system. Then the required cable length should be measured, not estimated, as errors can cause significant variations in performance. Needless to say, the actual routing that the cable will follow should be used, not the point to point distance. With this information the type of cable can be selected.

It may be noted that some of the above cables are 75 ohm types and some are 50 ohm types. Although almost all wireless microphone equipment is designed for a 50 ohm impedance, the use of 75 ohm cable is quite acceptable. While there is a small impedance matching loss when going from 75 ohms to 50 ohms, 75 ohm

cables usually have slightly lower losses. This offsets the matching losses for lengths greater than a few feet. In addition, several common types of antennas have impedances closer to 75 ohms than 50 ohms, so the actual effective matching loss using 75 ohms may be negligible. Because 75 ohm cable is widely used for CATV, MATV and cable TV systems it may be more readily available and less expensive than 50 ohm cables. For the same reason, low loss foam type 75 ohm cable is usually considerably easier to obtain than the equivalent 50 ohms cables and often less expensive due to higher demand.

### **The use of very long cables may be unavoidable.**

Although entries for cable lengths which will reduce the operating range of the wireless to one-half (50%) of its normal range are possible, an installation of this type cannot be recommended. A range reduction of about 30% should be the design maximum for any permanent installation. As can be seen from the above chart, this limits the permissible cable length to 130 to 140 feet (40-42m) or so, even for a higher quality cable. Of course, larger and better cables do exist, but their cost is usually prohibitive. Where distances beyond about 140 feet (42m) must be covered, relocation of the wireless receiver to a point closer to the desired antenna location is strongly recommended.

Sometimes, however, the use of very long cables may be unavoidable. In these situations it may be necessary to use a RF line amplifier (RF preamplifier) to offset cable losses. However, line amplifiers are wide-band devices and do not have the ability of receivers to reject spurious signals. Therefore, there is an unavoidably increased possibility of encountering interference when using line amplifiers. Because these devices normally cover a wide frequency range (such as 165 to 220 MHz

or 150 to 200 MHz), they will often receive many powerful signals in addition to the signal from the wireless system or systems. In particular, most areas have one or more TV stations on channels between 7 through 13. These transmitters are usually quite powerful and can sometimes cause overload problems. It is not unusual to encounter an intermodulation problem if an amplified system which does not exist if the same wireless receivers are used with whips.

Because of potential overload problems, it is necessary to ensure that the wireless transmitters cannot get too close to the receiving antenna in the amplified systems. Normally, it is desirable to place the receiving antenna relatively close to the location where the transmitter will be used. However, operating a transmitter closer than about 20 feet (6m) to an antenna with an attached amplifier invites problems. This is a particularly important consideration in installations where multiple transmitters will be used. In spite of the potential overload and intermodulation prob-

### **One common error is the use of long RF cables to move the antenna closer to the location of the transmitter.**

lems, the RF line amplifier must always be located at the antenna, not the receiver. This is because once the signal has been attenuated by the cable, amplification is more or less useless. In fact, adding an amplifier at the wrong end of the cable can often actually decrease range, especially when a high quality receiver is being used.

Because of the necessity of remotely locating the line amplifiers, supplying the necessary operating power and protecting them from the environment, system reliability may suffer. For example, it is not all that unusual for power to accidentally become disconnected from an amplifier, resulting in performance far poorer than

would be the case without the amplifier. However, since there is often no recognizable major failure, the problem may go unnoticed for some time while other equipment is blamed for any difficulties. For all the reasons, it is virtually always better to install a lower loss cable, move the receiver closer to the antenna or select a higher performance antenna if the use of the line amplifier can be avoided.

Oftentimes, it is desirable to have one antenna feed two or more receivers. In this case, a multicoupler (amplified signal splitter) may be used. These devices

### **Use of more than two active devices in series is strongly discouraged.**

typically have four outputs, allowing one antenna to drive up to four receivers. However, multicouplers are wideband active devices much like line amplifiers and have most of the same limitations in respect to overload, intermodulation and interference rejection. Splitters are RF signal dividers with no amplification. These devices provide a good RF impedance match to minimize signal loss, unlike simple "tee" connectors, which are often extremely lossy. Splitters can be used to divide the signal from one antenna to drive two receivers. However, it is important to realize that each two-way split will reduce the range of the wireless by about 32%.

### **Leaving unused outputs unterminated may reduce the isolation of the multicoupler.**

This may be acceptable in situations where the antenna is short and the operating range is not too long. Splitting more than two ways will reduce the operating range

*(continued on page 75)*



# Ellis Island

## *The Celebration, The Installation, The Venue*

BY MARY C. GRUSZKA

### The Reopening

**T**he Place: Ellis Island, the Registry Room also known as the Great Hall in the Main Building. The Time: Saturday, September 8, 1990. The Event: The fundraising gala to help underwrite the actual reopening celebration that was held the next day. The Program: Speeches and music by such noted personalities as Art Buchwald, Leslie Uggams, Hume Cronyn and his daughter, Tandy Cronyn. The Acoustics: Reverb time of 10 seconds at 2 kHz. The Sound System Requirement: Be heard but not seen.

Andrews Audio Consultants was chosen to provide the sound system for this important event and David Andrews, owner, was up to the challenge. (Andrews also provided the sound system for the actual reopening celebration held on September 9, 1990 outdoors in front of the Ellis Island buildings.) "I do all of the East Coast productions for a West Coast production company, Don Mischer Productions, who were hired to produce the shows for the Statue of Liberty-Ellis Island Foundation, Inc.," Andrews said. The producers "were very concerned about the audio quality."

"The primary concern of the people running the event was that they didn't want to see any loudspeakers," Andrews said. The production was orchestrated so that the guests would first enter the baggage room where the early immigrants checked their various trunks, bags, and suitcases. They would then proceed up the grand staircase where they entered the Great Hall.

"The first impression that the guests were to have as they entered the Great

Hall was that they were walking into it over 70 years ago, not today," Andrews commented. "They were to see just the renovated room as they walked up the grand staircase."

#### THE GREAT HALL

The Great Hall is a rectangular shaped room about 180 feet long, 104 feet wide and two large "old-fashioned" stories high or about 58 feet, according to Pat Zitko, of the Ellis Island Public Relations department. Columns down the two long sides support a second floor balcony that wraps all around the room. In addition to tile, "the surfaces were all concrete, marble and plaster," Andrews remarked. "In addition, the ceiling was domed and there was focusing in some areas." The room had a reverb time of 10 to 11 seconds at 2 kHz.

The stage was constructed at one of the narrow ends of the hall and was large enough to accommodate about 300 to 400 people. The audience seating area on the main floor consisted of about 80 dinner tables that seated about 10 people each, according to Andrews. There were no audience seating areas in the balcony where the mixer's position was located.

When Andrews saw that room, he felt that he could provide a marginally acceptable system considering that he couldn't put the speakers where he wanted them. "I would have preferred to hang a speaker from the balcony over the center of the staging area," Andrews said. "But we couldn't put speakers on the balcony behind the stage so we worked off the side

balconies."

As things turned out, the large distributed system worked better than expected, according to Andrews. "The intelligibility was spectacular," Andrews said. "We expected about 15-20% articulation loss, but we achieved about 7-8%." This was achieved by careful planning, good system design, and on-site adjustments made manageable with the Meyers SIMTM system.

#### PLANNING THE SOUND SYSTEM

Given this less than ideal situation, Andrews did "two things I never do" in designing the sound system. First, he brought equipment out to the venue beforehand. "I put different sound components into the room and listened to them," Andrews commented. Some components that would have worked acoustically proved too large. "We looked for smaller components," Andrews said.

Smaller loudspeaker systems also had another advantage for this particular situation — they put out less low frequency energy, according to Andrews. "In a large reverberant space, we would have had to get rid of low frequency energy anyway, as it masks the voice frequencies," Andrews said. Excessive low frequency energy would also have adversely excited the room.

The system design was a "pencil and paper" one, according to Andrews. Unfortunately there was not enough time to do a more complete analysis. Although Andrews was contacted about the event about a year ago, specific information



Designed in the French Renaissance-style, the red-brick Main Building opened on December 17, 1890.



Meyer UPM-1As on columns; Meyer UM-1As hung from balcony. Note cables are hidden.

about the program arrived at the last minute. "We had to deal with a lot of unknowns, like how many people were attending," Andrews said. "We had to add another delay zone after the system was installed as they kept adding more seats," said Andrews.

The success of the system was also due to the proper choice of microphone for this particular situation. "The program material of interest was speech," Andrews said. "We used a single mic for the many different talkers." Andrews wanted to use the Crown CM100 omni mic for the podium. The problem was that the client was accustomed to certain cardioid mics. "I had to let the client decide for themselves that the omni was the mic of choice," Andrews said.

And this is where the second of Andrews's "never do's" comes in. "I did something else that I never do," Andrews said. "I let the client listen to the raw system before we were done. They had to tell me to use the omni mic."

Andrews set up a listening test with a couple of the cardioids that the client normally used and the Crown CM100 omni mic. In each case, a talker spoke into the mics and the client was invited to hear how each sounded through the system. "Without exception, everyone chose the omni mic," Andrews said. The system was so carefully designed that even with the raw system, the sound was good, according to An-

draws. "I told them that if they thought it was good now, wait, it will get better."

"By changing to the omni mic you pick up x% of articulation instantly," Andrews

commented. "The omni mic doesn't need to be heavily equalized and has no proximity effect — no low end build-up when the talker gets closer and closer to the



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View from the balcony looking into the great hall towards the stage.

mic. This means that you don't need to compensate for that and it has the advantage of sounding the same no matter how far the talker is from the mic."

This also has the benefit of avoiding excessive reverb in the low end because you are not feeding the room with the bass build-up. Other advantages include smoother frequency, phase, and polar responses.

### THE SOUND SYSTEM

Andrews chose a distributed system for the Great Hall. "Everyone had to be within critical distance of a loudspeaker," Andrews explained. "Beyond critical distance, there was no chance of understanding anything." The "far-throw" listeners were about 40 feet from a loudspeaker, while the "near-throw" audience was only about 15 to 20 feet away.

"We were able to accomplish getting an audience of 800 people within critical distance with 38 loudspeakers distributed around the room," Andrews said. "That came out to about 20 people per loudspeaker on average."

The long throw loudspeakers were four pairs of Meyer Ultra Monitor UM-1A's hung from the side balconies. Each pair consisted of one left and one right loudspeaker in one of the four delay zones and were aimed towards the center of the seating area.

Coverage for the nearer seats was provided by Meyer UPM-1 loudspeakers, two loudspeakers mounted on each of the 12 columns. These speakers were aimed at the areas under and near the balcony. One speaker covered the under balcony seating areas, while the second pointed out to the floor area near the column. Six delay zones were used for these.

To keep the loudspeaker mounting on

the columns as unobtrusive as possible, Andrews and his crew used audio engineer Michael Morley's "invisible rigging" system which is a ratchet strap that was covered with white gaffer's tape. Spanset, a polyester sling, was used to hang the balcony speakers. While the loudspeakers were visible from the columns, they didn't stand out, according to Andrews. "When you walked in the room it was subtle. Your eye was first drawn to the room itself, especially with the way it was decorated with lights," Andrews said. "If you looked up you could see the speakers, but they were very unobtrusive."

Additional UPM-1's had to be installed when more seats were added, bringing the total up to 30. Four UPM-1's were also used as front fills to cover the audience seats nearer the stage. These speakers were located in front of the stage on the first step of the staircase, according to Andrews.

(For those not familiar with the Meyer loudspeakers, the UM-1A monitor is a two-way, bi-amplified system that contains a 12-inch low-frequency driver in a vented enclosure and a symmetrical 60-degree high-frequency horn driver. It is used with the M-1A control electronics unit which, among other functions, provides the crossover and driver protection circuitry. The UPM-1 is a relatively compact passive system that contains two 5-inch low-frequency speakers in a vented enclosure and a high-frequency piezo-electric driver mounted in a 2' x 5' horn. This speaker is used with the P-1A control electronics unit.)

For the main system, Andrews used 24 Crown MA1200 power amplifiers and three Klark-Teknik DN716Bs and one Audio Digital PAD18 delay units, and a Yamaha PM3000. Twelve different delay zones

were used.

Andrews attributes much of the success of the system to the Meyers SIM (Source Independent Measurement) processing. "We couldn't have balanced and eq'd the system without SIM," Andrews commented. "The system would have been acceptable, but marginal."

"SIM uses the performance itself as a test signal," said Bob McCarthy, SIM engineer at Meyer Sound and the SIM engineer for the Ellis Island sound system. "It's a two channel measurement. We look at what is sent out of the mixing console and compare it with what we receive from the hall."

Eight measuring microphones were used for this event. Since the SIM system measures phase, it can calculate the travel time from source to each microphone and give a readout of how much delay is needed. The system also gives a graphic representation of the frequency response which aids in setting the equalizers, and can store the readings in memory. Different averaging times can be used to take the measurements.

The goal is to "make the sound the same in the different parts of the hall. We look at one system spilling over into another system's area, and set levels," McCarthy explained. "Each zone is adjusted separately, and each overlap area is then adjusted separately," Andrews added.

McCarthy described the three-step process that was used to setup and align all of the different sub-systems of the Great Hall's distributed sound system. "We set the frequency response of each of the sub-systems and the delay times. We set the relative levels [of the subsystems] and blended them together in an unobtrusive fashion."

This was especially important in a multi-zone system such as this. "If the system is not well aligned, you create new echoes," McCarthy explained. "If the system is too loud, it spills over to another zone. David knew that he had the technology to carefully perform an alignment to avoid exciting the ceiling and to ensure that the systems didn't fight each other."



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Racks of equipment located on rear of balcony.

### MIXING POSITION

A separate "13th zone" was created for the sound mixer who was located in the balcony, out of range of any of the house loudspeakers. A monitor speaker was placed in front of the mixer, and levels were set to match those of the house speakers. For practical reasons, the mixer's speaker was closer to the mixer than the 20 feet or so that the audience was from a speaker. But McCarthy feels that since the levels, frequency response, and delays were properly set, the mixer experienced the same sound as the audience.

### MUSIC

While speech was reinforced, most of the musical numbers, such as the New Amsterdam Singers, the Dalton School Choir, and the Manhattan Brass Ensemble were done acoustically (without sound reinforcement). However, the Merryvale Quartet was mic'd with a Bruel and Kjaer 4007 microphone positioned in the middle of the ensemble. "This increased its presence and the direct to reverb ratio," Andrews said. "We got more direct sound for the people in the rear of the listening area."

Andrews also brought some monitor speakers along, just in case, and he eventually had to use them on the stage.

### THE RESULTS

The system worked out better than anyone, including Andrews, expected. Andrews summed up the results: "Ideally everyone should localize with the talker, but it was difficult with nothing hung in the center. The image was nebulous, but no matter where you went, you understood what was said even if the talker was one to two feet from the microphone. We had an overlap area right down the center line, since for purposes of visuals and acoustics, everything was symmetric. The center line had a row of tables, but we received no complaints on this event at all. It couldn't have worked out better if I had planned it that way. The people were ecstatic." ■

## *The Ellis Island Learning Center Nynex Interactive Videowall*



The Nynex Interactive Videowall at the Ellis Island Learning Center.

**E**llis Island in New York Harbor was America's chief, and probably most renowned, gateway for millions of immigrants between 1892 and 1924. In September 1990, the newly restored Main Building was reopened to

the public. As part of the restoration, the Ellis Island Immigration Museum was created to tell the history of Ellis Island and the story of immigration, and to be a monument to America's immigrant heritage.

### THE LEARNING CENTER

One of the rooms in the Immigration Museum is the Learning Center, located on the first floor off the Baggage Room and funded by Nynex. "Nynex gave a grant in 1986 and 1987 of \$300,000 to help with the restoration," said Janine Mudge, Staff Director, Media Relations, Nynex. "Nynex gave an additional gift of technology in the restoration of this room."

The idea was to present something high-tech and educational at the same time. "After discussion with the National Park Service and the Ellis Island Foundation, Nynex determined that an interactive video presentation system would assist the Rangers in their interpretive mission," said Linda Saxon, Manager-Marketing, Nynex Computer Services. Nynex chose a computer-controlled interactive wall and a presentation that tells the story of immigration.

The Learning Center "was designed to be run by a person to teach school groups and community groups," said Mudge. Normally, the Park Service ranger runs the program. While the room is not directly accessible to the public, groups wishing



to use it can make reservations with the Park Service. Called the "classroom of the future," the room has 30 seats and 4 positions for wheelchairs.

### VIDEO WALL SYSTEM

The development of the videowall system and its program material was a cooperative process.

"Nynex Computer Systems acted as the prime contractor for the hardware and for the construction of the room, and did the software development," Saxon explained. Nynex designed and constructed the room, developed and installed the audience polling keypads, and developed the software platform, the Nynex Interactive Videowall Manager, to run the wall.

### The development of the videowall system and its program material was a cooperative process.

Corporate Communication Group of New York worked in partnership with Nynex and created the program content, developed the script and designed the way the program looks on the videowall, according to Steve Rothman, President of CCG. Multivision Video and Film of Miami FL, supplied the Electrosonic video wall and worked with Nynex and CCG on programming the videowall effects.

The Electrosonic videowall is made up of 16 27" diagonal Pro System monitors in a four over four configuration, according to Bob Berkowitz, President of Multivision. Each of the 16 monitors is fed an RGB signal by a Pic-Bloc still-frame card. Sixteen still-frame cards, mounted in rack frame, are used for this system. The system also includes a multi-source input switcher which is fed from three video laserdisks and one computer, and the Electrosonic ES-5003 laserdisk controller. The Electrosonic "C-Through" software allows the control of the laserdisks and the videowall to produce the special effects, wipes, still frames, and full videowall pictures that make up the presentation.

## Nynex Videowall Project: The Key People

### Nynex Computer Services

Thomas Leonard — Manager, Video Information Services; Technical Project Manager  
 Melissa O'Meara — Lead Software Engineer  
 Rafael Guerra — Senior Software Engineer  
 Robert Furphy — Senior Technical Analyst  
 Thomas English — Construction Manager  
 John Ferretti — Software Engineer  
 Robert Urban — Hardware Technician  
 Angela Chan-Meiner — Manager, Creative Services, Creative Project Manager  
 Carol Schotz — Senior Graphic Artist  
 Francis Reilly — Graphic Artist  
 Peter Reilly — Graphic Artist  
 Diana Pedretti — Graphic Artist

### In association with:

George Valdivia — Chief Videowall Programmer (Multivision)  
 Ron Almstead — Architect (Design Disciplines)  
 Ted Ratchliffe — (Adeum Electronics)  
 Steve Laifer — (Electric Image Center)  
 Eric Hirsch — (Electric Image Center)  
 Paul Sterzel — (Magno Sound & Video)  
 Bob Berkowitz — (Multivision)  
 Jerilyn Giwner — (Multivision)  
 Corporate Communication Group  
 Tim O'Donnell — Chairman CCG, and overall creative director of the videowall project.  
 Steve Rothman — President CCG, writer  
 Ted Schulman — Executive Producer  
 Trent Oliver — Research

One of the challenges Nynex had "was to find a high quality videowall that could be controlled remotely and that could handle multiple sources," said Melissa O'Meara, Lead Software Engineer, Nynex Computer Services. The Electrosonic videowall has a 'high level of interactivity and speed,' said Berkowitz. It also met the multiple source requirement.

### INTERACTIVITY

The videowall is interactive in two ways, according to Rothman. The first involves the touchscreen controller that lets the ranger select the video segments that will be presented to the audience on the videowall.

### The Electrosonic videowall is made up of 16 27-inch diagonal Pro System monitors in a four over four configuration.

The video segments amount to about 40 minutes total of programming that is broken down into five themes: Leaving the Homeland, The Journey: Passage to America, Ellis Island—Port of Entry, New Americans, and Ethnic America Then and Now. The length of each theme varies from about 5 to 11 minutes. Within each theme are the component segments of about a minute to 2½ minutes each that discuss one aspect of the theme. The full-motion video segments and still pictures, much of which is archival footage, are stored on video laserdisk and played back

in a way that gets the audience's attention, said Rothman. The narration was provided by Gregory Peck who donated his talents.

With the Ranger Control Unit — a touch-screen controller — the ranger can configure the program in any order depend-

### Andrew provided the sound system for the indoor fundraising gala held in the great hall.

ding upon the audience. "This offers flexibility to the ranger," said Rothman. "The ranger leads the group and controls the technology."

The second type of interactivity is the audience polling that tallies the audience's responses to questions presented on the videowall during the program. Part of the program can include graphics that pose questions to the audience. An audience member can then participate by using a 4-key keypad mounted on the railing in front of the seats to select A, B, C, or D in answer to the question. The results are tabulated by computer and displayed on the screen with clever graphics. There are about 20 questions that can be interspersed throughout the program.

### COMPUTER CONTROL SYSTEM

The computer control system was developed by Nynex Computer Services and includes a proprietary software platform developed by NCS. "The Nynex Interactive Videowall Manager software permits a presenter to compose his or her own videowall presentation from a library



of prepared material by simply making selections on a touchscreen," Saxon explained. "Presentations can be prepared in advance or on the fly. The system provides the full production capability of a mini-television studio, allowing the user to access video, full-motion or still frames, graphics, and/or audio from an array of inputs, and sequence the material interspersed with interactive polling questions, or other 'game' type effects. The software provides real time display of the audience responses on the wall."

### **The American Immigrant Wall of Honor will be completed in time for Ellis Island's Centennial in 1992.**

"This was the first time that Nynex did an interactive videowall that operates in this fashion," said O'Meara. "We do a lot of interactive kiosks that have many single monitors, but this was the first interactive videowall."

Three Zenith 386, 25 MHz MS-DOS computers are used in this system. The first is used with the Ranger Control Unit (RCU) which is an Accutouch integrated monitor with internal touchscreen from Radiation Electronics that the ranger uses to select which program elements will be used for the wall presentation.

The second computer is used as the Polling Input Controller (PIC). This computer receives the inputs from the 34 audience keypads, collects the data, and passes it through. The 34 custom keypads each have four membrane keys and are made by Adeum Electronics.

The third computer is the Videowall Controller (VWC) that also acts as a graphical source for the wall. With the proprietary software, it controls the three laserdisk sources plus the graphics. "At this time the Nynex Interactive Videowall Manager is the only videowall program that can handle up to four different input sources," Saxon commented.

A fourth computer, a Zenith 286, 12 MHz, MS-DOS unit, is used for running the Electrosonic "C-Through" videowall software and is also used for programming the wall creatively. That's when the decisions are made as to what will be shown on the wall and how the sequence of video images will be laid out on the wall.

The videowall controller (VWC) is the only computer that talks to this "fourth" computer and along with the fourth computer controls what is being displayed on the wall, according to Tom Leonard, Manager of Video Information Services for Nynex. For full-motion video, the "C-Through" software is commanded to run by the Nynex software, but for displays like the polling results, the output from the VWC becomes a source and the Nynex software switches the graphics on the wall.

The communications between the computers and the devices that they control is via RS232 ports.

#### **VIDEO SOURCES**

As mentioned previously, four sources are used to supply the video images for the wall — three Sony laserdisk players plus the computer which provides the bit-mapped polling result graphics. A Targa 16 Graphics Board from Truevision was used to display the graphics. "We chose Targa for speed to display the images within the few seconds that we wanted," Leonard said.

The graphics board that was used to capture the images initially was the broadcast quality Vista board from Truevision. "We wanted to grab the image using the best technology available to get the most lines of resolution and the best look," Leonard explained. CCG did the graphics used with the full-motion images and Nynex produced the graphics for the questions and the captured still images, according to Saxon.

### **One of the challenges Nynex had "was to find a high quality videowall that could be controlled remotely and that could handle multiple sources."**

An additional laserdisk player is used with the RCU to let the ranger see the stills as he/she prepares the presentation.

"It was a challenge to build the software platform and to get all of the components talking to each other," O'Meara said.

"Until this proprietary software was developed, there was no easy-to-use videowall program that let the presenter select, arrange and run a custom program tailored to the audience, with the ability to interrupt, change or add new material on the fly," said Saxon. "The Nynex Interactive Videowall is totally user friendly and requires no computer programming capability to manage a presentation once the library of material and the touchscreen menus have been developed. Other easy-to-use videowalls have preprogrammed 'effects' or display patterns but are not able to support the complexity of applications like the Ellis Island Learning Center."

## *A Brief History of Ellis Island*

The first Immigration Station that was constructed on Ellis Island opened on January 1, 1892 and processed 450,000 immigrants in its first year of operations. When that facility was destroyed by fire in 1897, a new facility, the one that we know

today, was built. Designed in the French Renaissance-style, the red-brick Main Building and its famous second floor Registry Room (or the Great Hall) opened on December 17, 1890. This was the place where, for 24 years, immigrants waited in

lines for examinations, inspections and interviews before being allowed to proceed to their ultimate destination in the U.S. — New York and points beyond.

When the Immigration Act of 1924 effectively ended mass immigrations, the

Ellis Island facilities were then used, at various times, as a detention center and a Coast Guard station. Its hospitals were used for wounded World War II soldiers. But, finally it was closed in 1954 and its facilities fell into disrepair.

In 1965, President Johnson added Ellis Island to the Statue of Liberty National Monument, and in 1982 President Reagan asked Lee Iacocca to begin a public-sector fundraising effort to restore the Statue of Liberty and Ellis Island. The Statue of Liberty-Ellis Island Foundation, Inc. was established to raise funds and oversee the restoration of both of these national monuments.

The Ellis Island restoration project included the creation of the Ellis Island Immigration Museum in the Main Building, designed to tell the history of Ellis Island and the story of immigration and to be a monument to America's immigrant heritage. One of the rooms of the Museum is the Learning Center, donated by Nynex.

**After six years of planning, fund-raising, design, and construction, Ellis Island was reopened on September 9, 1990.**

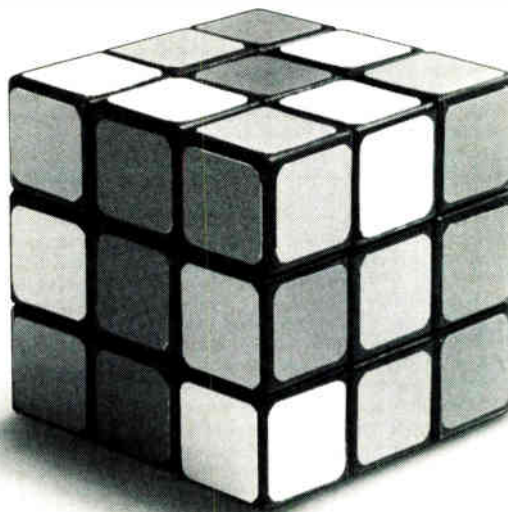
With its programmable, interactive videowall, the Learning Center serves as a "classroom of the future" that aids the Park Service rangers in their interpretive mission.

After six years of planning, fund-raising, design, and construction, Ellis Island was reopened on September 9, 1990 with Vice-President Quayle participating and with present-day immigrants sworn in as new U.S. citizens. Andrews Audio Consultants did the sound reinforcement for this event, held outside of the Main Building. Andrews also provided the sound system for the indoor fundraising gala, held the night before in the Great Hall. He was able to achieve good speech intelligibility in a

room with a reverb time of about 10 seconds at 2 kHz.

The Statue of Liberty-Ellis Island Foundation is still seeking donations to fund an endowment for the Statue of Liberty National Monument. For a donation of \$100, a name can be placed on the Centennial Edition of the American Immigrant Wall of Honor, which will be completed in time for

Ellis Island's Centennial in 1992. This will be a new section of the Wall of Honor which overlooks New York Harbor and lists the names of thousands of American immigrants. For more information about the Wall of Honor, write: The Statue of Liberty-Ellis Island Foundation, Inc. P.O. Box Ellis New York, N.Y. 10063 212-883-1986. ■



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# Ceiling Speakers

## *Installed Price Versus Raw Price*

BY PAMELA MICHAEL

“One person’s floor is another person’s ceiling,” the old adage goes. For sound contractors, the similarity ends when it comes to choosing a loudspeaker. The unique challenges inherent in overhead speaker installation demand a specialized, extensive assortment of speaker options and configurations.

Happily, the sheer number of ceiling speakers required for commercial and institutional bid requirements insures a healthy array of competitive manufacturers. The wide variety of ceiling materials and construction methods presented by both new and retrofit buildings necessitate an overwhelming diversity of hardware and components.

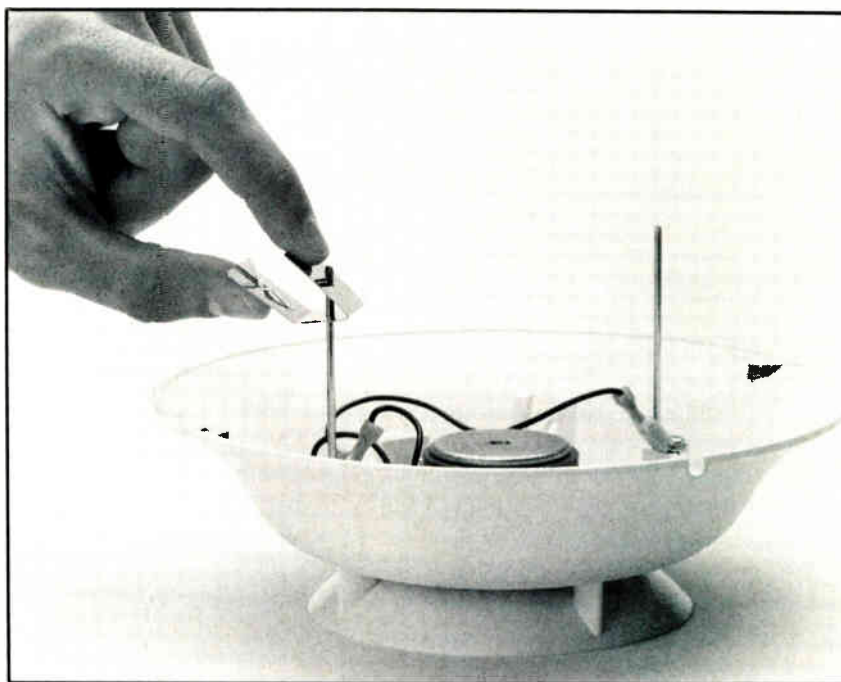
And as ceilings change, so do ceiling speakers. The proliferation of drop tile ceilings decades ago, for example, prompted manufacturers to come up with new speaker designs and installation techniques.

To many sound contractors, the first criterion that comes to mind when buying in quantity is price. Because of the number of speakers involved in many ceiling installations, the tendency of contractors for many years has been to look only at unit price. When you are buying speakers in the hundreds or even thousands—not unusual for an airport, hospital, hotel, or convention center installation—and when individual speakers are not being called upon to handle much, then minimum performance/low price speakers can seem adequate and cost effective. After all, in many situations, a

limited bandwidth and restricted dynamic range is all that is needed for background music or paging. Increasingly, however, savvy contractors are paying attention to *installed* price versus raw speaker price. The cost of assembling speakers on site and the cost of preparing the ceiling for installation—cutting, wiring, fitting—eats up time and profits, especially if union labor is involved. The trend toward using preassembled speakers (transformer/speaker/baffle) and easy-to-install speakers reflects this growing awareness of the true costs of installation. An added benefit is that you often end up with higher quality sound by spending more per speaker, and yet still realize big savings in labor costs.

Higher quality sound is assuming greater importance in the marketplace as the “audio sophistication” of the average listener rises. Due to massive consumer exposure to CDs—at home, in cars—and to the greatly improved fidelity of movie theaters and television sets, our ears have become accustomed to cleaner sound. As a result, background music is moving to the foreground. The trend toward higher quality sound sources means that sooner or later many facilities may shift to CD background music and will expect it to sound good.

Another method of reducing installation costs that is finding increasing favor among contractors is the use of speakers that offer a wider dispersion pattern, allowing the



The Gemco QM-300 series speaker assemblies “Quick Mount.”

*Pamela Michael is a free-lance writer who resides in Berkeley, California.*





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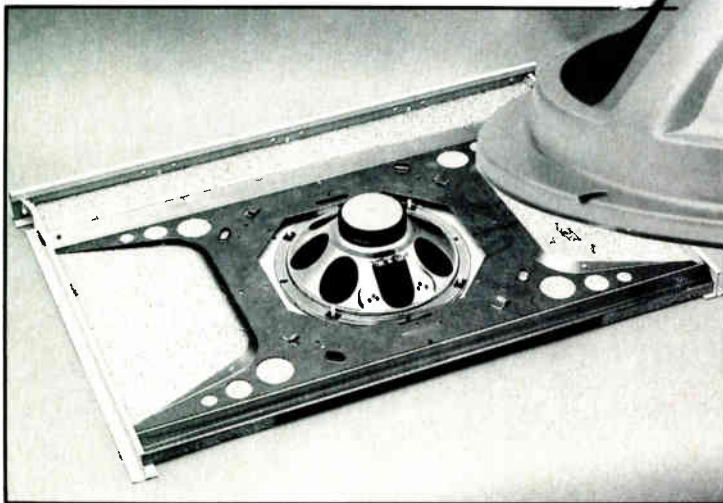
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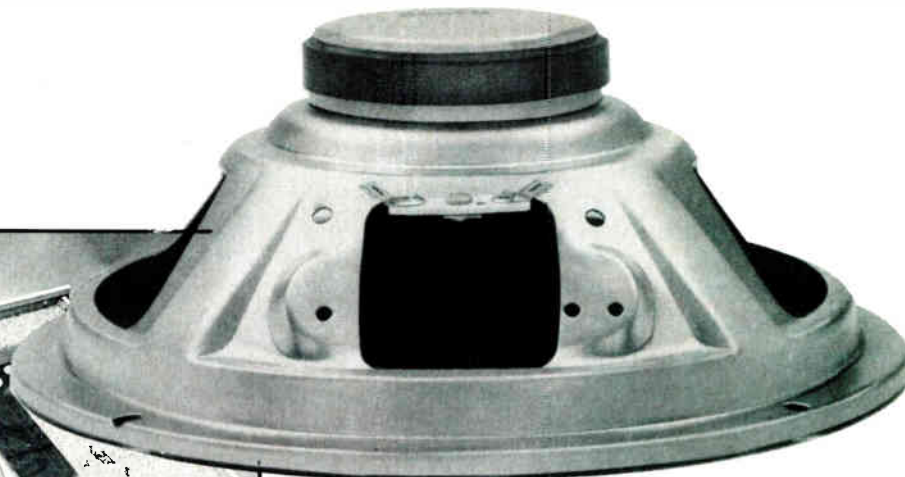
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*Fourjay's model PB8 bridge.*



*Bogen's model S86 loudspeaker.*

use of fewer speakers to cover an area uniformly. The wider the dispersion, the smaller the speaker (unless a two-way driver is used), so you lose a little at the bass end usually; but in many low ceiling situations, using 4-inch wide-dispersion speakers can allow you to space them further apart.

Manufacturers, too, are finding ways to reduce costs and improve quality at the same time. Stackable units, cropping up in many product lines, represent savings in storage and shipping costs for the seller as well as the buyer. Other savings are being realized in assembly methods. Some manufacturers, like Soundolier in Texas, have switched to robotic assembly lines for some of their products. Western Region Sales Manager Jim Edwards says the new process allows the company to do extensive QC while keeping the price down.

Price and quality, as always, are the primary factors in deciding on a given ceiling speaker. The downturn in the building industry is already translating into higher proportions of retrofit jobs for many contractors. Weakening national and world economies can be predicted to have a negative effect on sound contractors' businesses along with most others. Maintaining a healthy profit margin and a client-pleasing level of quality may well depend on creative use of the many products, accessories and techniques designed to facilitate installation and improve performance.

The industry direction toward easier in-

stallation is reflected in Aiphone's SP-5N flush mount ceiling speaker. The 8-inch SP-5N has a 70V transformer built in to the white steel baffle speaker package and installs easily using the SSB-2 mounting frame.

JW Davis offers the CSS-50, a pre-assembled closed system that flush mounts into a 2-foot x 2-foot ceiling grid. The rather shallow 5 3/8-inch depth permits installation where clearance is limited. This speaker is foreground powered (50W continuous input power) and has a frequency range from 45 Hz to 20 kHz. The lower powered 10W Model JD8P-ST is a transformer/baffle assembly that can be customized to fit any configuration requested. Mounting hardware is included in the package; enclosures and mounting rings must be ordered separately. Davis' Model SLC8-1010, an 8-inch self-locking ceiling assembly, on the other hand, requires no hardware at all. Torsion spring mounting brackets are pushed into a 9-inch hole in the ceiling and the pre-assembled unit, with your choice of 25 or 70V transformer, is then pressed into place.

Fourjay also features quite a few pre-fab, easy to install combination units—baffles with speakers and transformers. A pioneer in the mounting ring market, the company offers a configuration that differs from other manufacturers. Their new "point of connection" accessory, soon to be on the market, simplifies return air ceiling installations, a headache for most contractors. The new item, an enclosure t-bar

bridge assembly, offers an optional seal ring to be used if the specs call for the ceiling hole to be airtight prior to the baffle being installed, restoring the fire barrier. Fourjay president Jay Fulkerson says air return ceiling codes are "the most neglected area in codes." Most large cities such as Los Angeles, Chicago and New York now require backboxes when going into air return ceilings, but the lack of uniform codes has long been a problem for sound contractors.

The most unique and efficient approach to quick installation ceiling speakers is Gemco's Push-N-Lok QM-300 series. A plastic baffle with a 3 1/2-inch diameter speaker pierces the dropped ceiling tile with two spikes. Each spike is connected to a speaker terminal. The QM-300 series is available with or without 70V transformer. The limitations of this approach are that you must have a dropped ceiling and, at least at present, the frequency response is adequate only for voice paging.

In response to a lot of discussion in the industry about the issue, NSCA has been working with Underwriter's Laboratories to establish a set of guidelines. Products that are UL-listed are showing up more and more in catalogs, part of a continuing effort to upgrade and standardize.

Bose's Model 102-F72 flushmount speaker is UL-listed and so robust it can withstand fire. This unique system serves two functions: fire evacuation and hi-fi. This is a good general installation speaker for situations where you don't need high volumes. The 102 snap-on grille accessory employs a ratchet mechanism which allows installation of the 102 without hardware or tools. The galvanized steel WB-16 Channel Support Bracket is available when additional support is required for drop ceiling installations. The 102 uses a 4-inch extended range speaker, whose wide disper-



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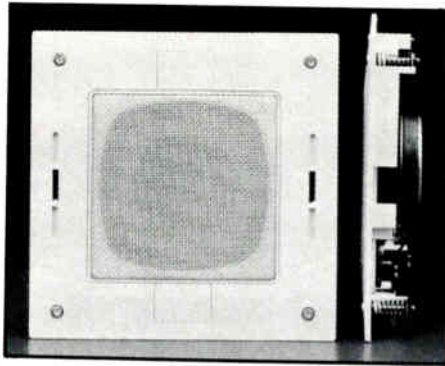
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sion allows fewer speakers while maintaining even coverage.

Altec Lansing's 405 4-inch speaker has long been popular with contractors looking for a small, high quality, ceiling speaker. OWI also offers the 2300 and 2301 Thindy 4-inch ceiling speakers. The 2300 is weatherized, and uses an unconventional flat diaphragm speaker with a ribbon tweeter, while the 2301 uses a more conventional speaker, and is intended only for indoor applications. University's CS410 is another 4-inch speaker intended for distributed sound systems including ceiling mounting.

Quam-Nichols' new BR8-10WS offers one of the simplest installation set-ups in the industry. The unit attaches to two rails with wingnuts. A textured grille is designed to match ceiling tile patterns. The BR8-10WS has a baffle with one-third less surface space than previous models and has no visible hardware. Their Support



OWI Thindy II model 2301 4-inch speaker.

Bridge SSB-2 is an accessory that allows the contractor to cut a square hole without having to poke bolts through the ceiling. It will mount either torsion spring, square or round units and will accept any backbox, square or round. Quam has a number of stackable backboxes and components that are attractive from a shipping and storage point of view.

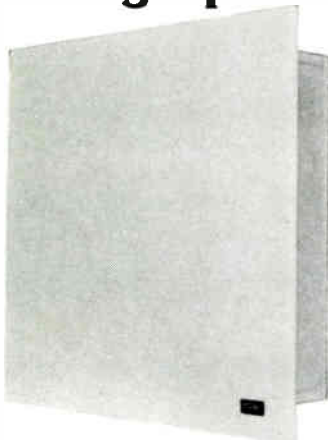
B.E.S.T. was one of the first to market upscale ceiling speakers, and their design approach is unique. The speaker uses a plastic foam diaphragm, driven by a conventional magnetic system. B.E.S.T.'s philosophy is that fewer speakers of wider dispersion, higher output, and easier installation are more cost effective than lower cost generic ceiling speakers with

higher installed cost. B.E.S.T. has a 24-inch x 24-inch pre-fab speaker assembly, the CT-76D, for use in t-bar grid ceilings when added power handling capability is needed, as in sports bars or in foreground music. Their CT-72 Series is silk-screened to match most two-dimensional ceiling tile patterns. Another new model is the LA2000, which has even higher power handling and output, and is 28 inches x 51-inches.

LA East has pyramid configured ceiling tile baffle with four speakers, slightly sloping, for sound in all directions. SD Series (patent applied for) contains four 8-inch diameter loudspeakers featuring a wide band response projected evenly in an omnidirectional dispersion pattern.

Texas-built Atlas/Soundolier has a patented loudspeaker assembly, the EZ Mount, that features unique adjustable sliding bars that straddle the back of the ceiling tile. The speaker assembly tightens

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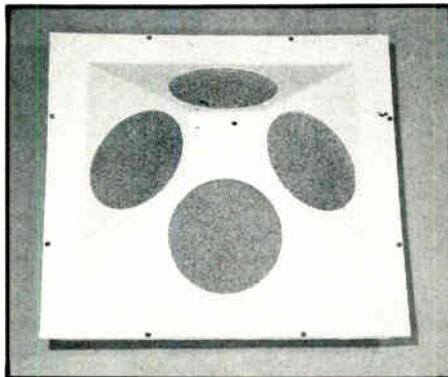
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down with just two thumbscrews. They are designed for use in standard 2 x 4 lay-in ceiling installations where backboxes are not required. Soundolier also offers a transformer/baffle package, their B Series, with a 4-inch speaker and speakers styled as track lighting. You may also have seen track lighting-styled ceiling speakers from Bose, but as yet, these are only available for distribution for residential installations.

Another odd sized speaker package is manufactured by TOA, a 6 1/2-inch assembly that pops in to place with no visible hardware, a very attractive package. Bogen Communications' S86 and S810 8-inch speakers are available in factory assembled versions incorporating their Model T725 transformer. Contractors can also order the speakers fully assembled in a ceiling grille for recessed installation. S86 assemblies offer an optional volume control.

Dukane's 8-inch speaker assemblies



LA East SD48 super dispersion series.

**Contractors can also order the speakers fully assembled in a ceiling grille for recessed installation.**

have a frequency response of 90-15,000 Hz and are available in 25V or 70V packages. Model 6A630 has a high impact styrene baffle. The 6A631's baffle is brushed aluminum.

The Music Supply Company in Dallas has a catalog that features quite a few accessories and installation aids of interest to sound contractors: wire and cable threading rods, wire reel holders, trusses, enclosures, and extender rails. An established source for back boxes is Q-Liner, which include various models, some plastic and fire retardant.

The above products are just a sampling of the truly impressive roster of ceiling speaker products that offer ease of installation. Next month, we'll explore high performance ceiling speakers and unusual models and applications. Upcoming articles will feature wall speakers and outdoor speakers.

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February 1991 39



# IN FAVOR OF FIBER OPTICS

By Irwin Math

**Problems with interference pickup on high impedance millivolt signals lines, hum, ground loops and even shielded wire considerations will all become a thing of the past due to the unique nature of fiberoptic transmission systems.**

As designers, engineers, and end-users become more familiar with the benefits of fiber optics, the employment of this technology will become more and more common in the audio industry. Gone will be the careful consideration given to the routing of audio cables, and the designers of such systems will be free to spend their time with system features rather than the basic details of the physical installation.

To fully appreciate the benefits of a fiberoptic transmission system, it is necessary to remember two basic facts: The optical fiber is made of glass or plastic and the signal it carries is light. There is no electrical path or metallic connection between the two ends of the system.

The basic fiberoptic transmission system consists of a signal-to-light converter or optical transmitter, a length of fiberoptic cable, and a light-to-signal converter or optical receiver. The fiberoptic system has a number of significant advantages over copper wire. These include:

- **No Interference:** Since light is the carrier of signal information at a frequency thousands of times higher than normal electrical signals, fiberoptic cable is simply not affected by conventional electrical

interference. It can be run inside a conduit with a high voltage power feeder without concern, and even lightning will not affect it.

- **Wide Bandwidth:** The attenuation of fiberoptic cable is uniform as a function of distance, not frequency selective as is the case with coaxial cable. As a result, wide-band or high frequency signals can be conveyed over long distances without repeaters or special equalizing equipment. Signal fidelity is perfect even over thousands of meters.

- **Total Isolation:** As there is absolutely no electrical connection between the two ends of the fiberoptic transmission system, there is no possibility of ground loops or signals other than those specifically desired. Hum and crosstalk through adjacent fibers is a thing of the past.

- **Safety:** Since glass is unaffected by most chemicals or solvents, the fiberoptic cable can be used in chemical plants, hospitals, public institutions of all kinds as well as in oil and gas refineries. A broken fiber will not cause a spark leading to an explosion, nor will it create a hazardous condition to personnel. In addition, since there is no electrical current, the effects of water are also non-existent. Short circuits simply do not exist.

A typical fiberoptic audio transmission system can be easily implemented with standard, off the shelf hardware. (See Figure 2.)

If the system is chosen correctly, it will appear "transparent" to the audio signal (within the parameters of the system) and will operate the same as its copper wire counterpart — but with the previously mentioned benefits of fiber optics. Such a system could be used, for example, to connect the output of a mixing console with a power amplifier or recorder; a radio station's studio with a transmitter located at the antenna site; or even to configure a simple intercom system. If stereo is

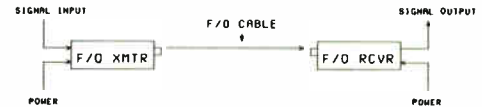


Figure 1. Basic fiberoptic transmission system.

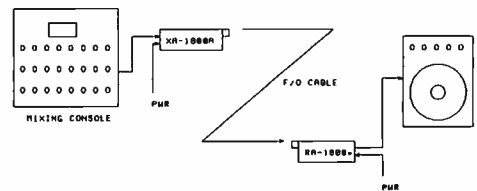


Figure 2. Typical fiberoptic audio transmission system.



Figure 3. Commercial fiberoptic audio transmitter and receiver.

needed, simply use two such systems, one for each channel.

Because systems such as these are directly compatible with 1 volt rms 600 ohm lines, installation usually consists of simply connecting wires from one terminal block to another or installing XLR connectors, a procedure almost anyone can handle. Since the fiberoptic cable is usually supplied with optical connectors already attached, the job is finished. In the event that the installer wishes to attach his own connectors, a short 30 minutes of instruction will enable the average technician to perform this task in about 10 minutes per connector.

*Irwin Math is Technical Director of Math Associates, Inc.*





Figure 4. Microprocessor based fiberoptic intercom.

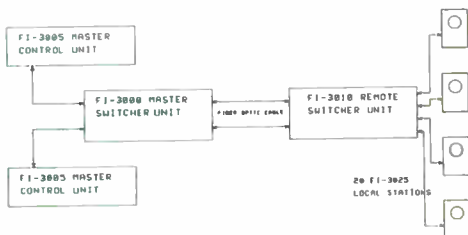


Figure 5. Block diagram of fiberoptic intercom.

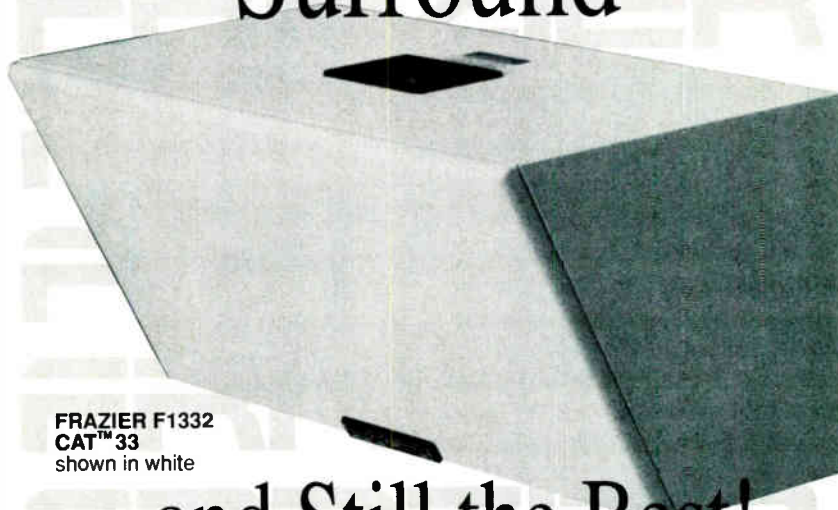
When the link has been finally installed, the noise free, interference free result will easily overshadow the small additional cost of the fiberoptic hardware.

A commercial fiberoptic audio transmitter and receiver can be used as a stand-alone system or 19" rack mounted if desired and can be used in all of the examples mentioned. The units are about the size of a cigarette package and operating power can be batteries or low voltage ac, obtained from a plug-in calculator-type ac adaptor.

The audio bandwidth of the system described above is from 20 Hz to 20 kHz as one might expect, but the available bandwidth of fiberoptic cable is hundreds of times greater. This allows a number of signals to be multiplexed onto a single fiber, with the result that more complex transmission systems can be implemented. A microprocessor based fiberoptic intercom allows two way audio and two way control signals to be multiplexed onto two optical fibers. This system, will allow one of two control units to communicate with anywhere from one to 576 individual local stations — all via fiber optics. (See Figures 4 and 5.)

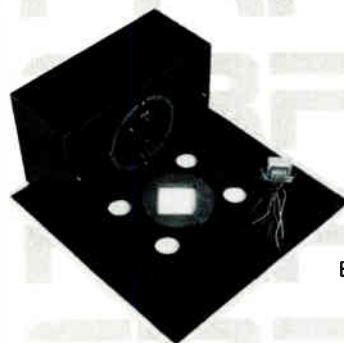
In short, the fiberoptic system's ability to carry interference-free signals several miles through all sorts of hostile environments without amplification or regeneration makes it the ideal transmission medium for millivolt or line level audio signals of all kinds in all types of installations. ■

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# The Challenge in an Upgrade

## A Multi-Function College Auditorium

BY JOSEPH MEZZAFONTE

In the spring of 1989 we at Applied Sound & Communications were requested to evaluate the condition of the sound system at the Robbins Auditorium at Albert Einstein College of Medicine in the Bronx, New York and prepare a report with our recommendations for an upgrade or replacement.

The Robbins auditorium is an 800 seat multifunction room used primarily for class lectures and video presentation and also for small theatrical groups, musical concerts, movie projections and civic affairs.

Our first meeting revealed what was going to be a challenging project.

The system consisted of a single amplifier, an octave band equalizer, and two 4 x 1 microphone mixers. The speaker system was made up of two sound columns mounted on either side of the stage wall. A listening test of the system indicated several obvious problems: placement of speakers; lack of uniform coverage including the front center seating section, and no speakers in the rear seating area; lack of signal processing and insufficient frequency response of the overall system.

At this point we realized that rather than our spending time and effort on the existing sound system, we should recommend a totally new one using modern equipment and technologies.

*Joseph Mezzafonte is the Vice President of Applied Sound & Communications Inc. in Floral Park, New York.*

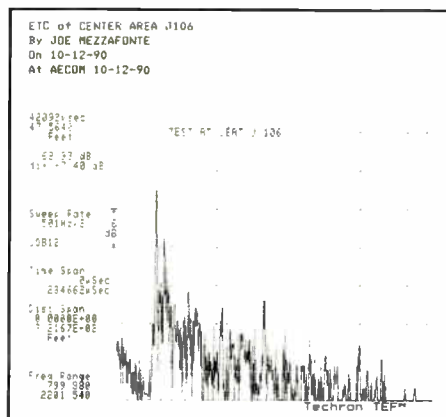


Figure 1: Energy Time Curve of system showing direct sound and all reflections.

Even though the acoustical properties of the room appeared to be adequate, we decided to perform a series of tests to find where reflections existed, and to measure reverberation time, percentage of Alcons, and determine if acoustical treatment was necessary.

This required a second trip on a day when the auditorium would not be used. Our test equipment consisted of a Techtron TEF 12 system analyzer, 16 square feet of 2 inch and 4 inch Sonex material (needed to pinpoint reflections), an omnidirectional test speaker, a Crown D-75 test amplifier and a 25 foot measuring tape. To facilitate our work, the engineering department supplied us with elevation and floor plan drawings as well as mechanical, electrical and HVAC and seating arrangement drawings. Most of the day was spent mak-

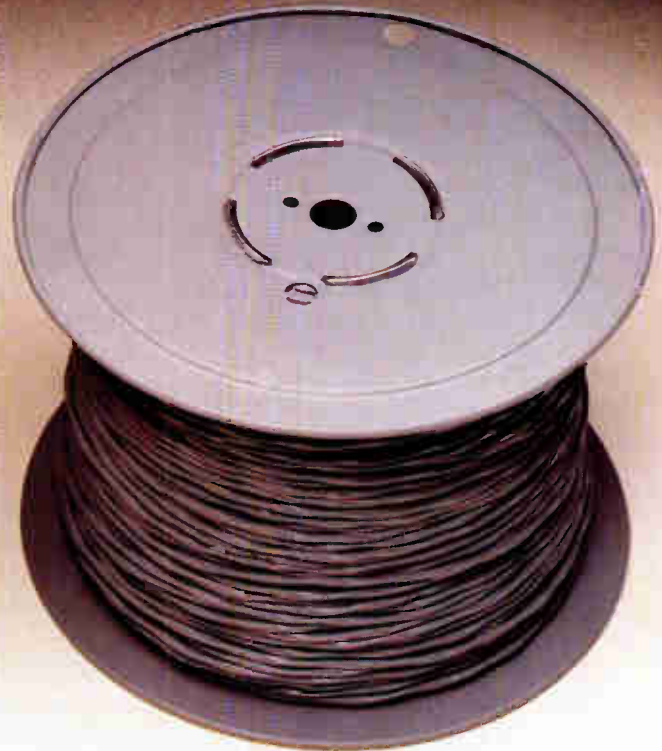
ing several ETC, FTC, EFC measurements at various frequencies and locations, recording each test number and comments on our blueprints for later evaluation. From this data we agreed that acoustically the room behaved very nicely. The only major reflections were along the perimeter seats due to the construction on the side walls, and in an area under a curvature of the ceiling that housed the various spot lights.

The room is made of plaster on wire lathe sloping ceilings, painted nine inch cinder block wall, rear wall covered with decorative vertical wood strip, carpeted floors and rising upholstered seats. The stage walls are covered with oak paneling and the floor is wood on a solid concrete platform.

Each test was evaluated for reflections, reverberation time and Alcons. When a sufficiently strong reflection was present, its location would be determined and this condition indicated on our working drawings for future examination and recommendation.

The room reverberation time was found to be acceptable for sound reinforcement. The reverb time was measured at 0.96 seconds (excellent for speech reinforcement) the ALCONS at 4.09%, RASTI of 0.688 and a signal to noise ratio of 7.14 dB. These measurements were obtained on the TEF System 12 analyzer using TEF 2.0 software. Figure 1 shows a typical

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energy-time curve for the space.

Now that we had a good picture of the room, we could proceed with a design for the new sound system. Several meetings were held on this subject, and budget cost prepared for each design. Finally a concept was agreed on meeting both the clients objectives: system performance and cost requirements. This design would be a single multipurpose sound system rather than separate speech and music system. Our objectives were:

- Uniform coverage throughout the seating area.
- Variation in spl not to exceed plus or minus 1 dB.

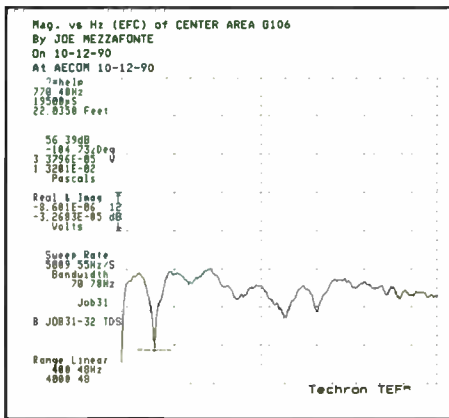


Figure 2: Frequency response curve of sound system. Notch is at 800 Hz (crossover point of low frequency radiator and high frequency devices).

- Maintaining a high degree of speech intelligibility.
- Sufficient low frequency response for music reproduction.
- Giving the sound operator full control of the system while assuring a low degree of tampering.
- Selection of products having excellent performance specifications and high degree of reliability. Several speaker designs were tested (single cluster, multiple cluster, distributed system).

We used our PHD Cluster design program which is run on a Compaq 386 computer to design our speaker system. The final configuration was that of a central cluster and a rear distributed system. The cluster chosen consist of two stacked



The Robbins auditorium is an 800 seat multifunction room used primarily for class lectures and video presentations.

Community Light and Sound 60 x 40 PC 464 constant directive horns, a single 90 x 40 PC 294 constant directivity horn, a low frequency radiator, Community LFR-215, cut at 800 Hz and two-inch Electro-Voice DH-1A drivers.

The distributed system required 15 Soundolier C803-T47's and for music reproduction and movies two Intersonic Servo- Contra Bass cut at 100 Hz were installed under the stage floor.

The sound console consists of an E-V 16 input sound reinforcement mixing board, a Nakamichi MR-2 audio cassette player-recorder, a half-inch pro quality Panasonic VHS video player-recorder, and a three-quarter-inch U-matic video player.

The head end is made of: three Crown CT200 dual channel 200 watt power amplifiers; one Crown MA1200 dual channel 1200 watt power amplifier; one Crown FFX-2 crossover; one Crown PIP-FXT plug in crossover module; two White Instruments 4500 one-third octave equalizers; three Industrial Research precision digital delays; one Industrial Research millisecond digital delay.

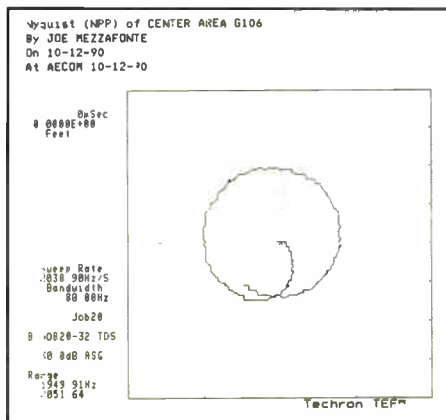


Figure 3: Nyquist of speaker system.

All precautions and good installation practices were strictly performed during installation of the system to avoid any possible ground problems or electromagnetic induction. All cables used in the system were shielded cables and

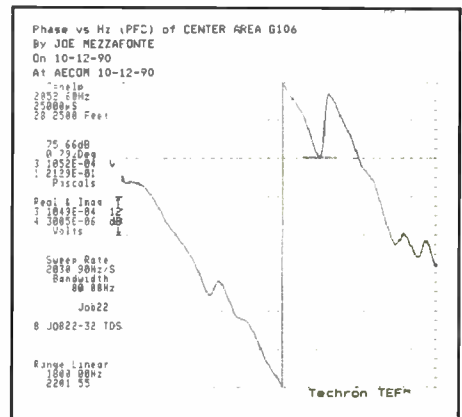


Figure 4: Phase vs. frequency curve of speaker system.

speaker and microphone cables installed in separate conduit. In order to minimize line losses at high power, 12 gauge cable was chosen for all the speakers in the cluster and 10 gauge for the subwoofers. The microphone wires are 2 conductor 18 gauge shielded. To further ensure a good system we requested that the power source be a separate dedicated and ground isolated circuit.

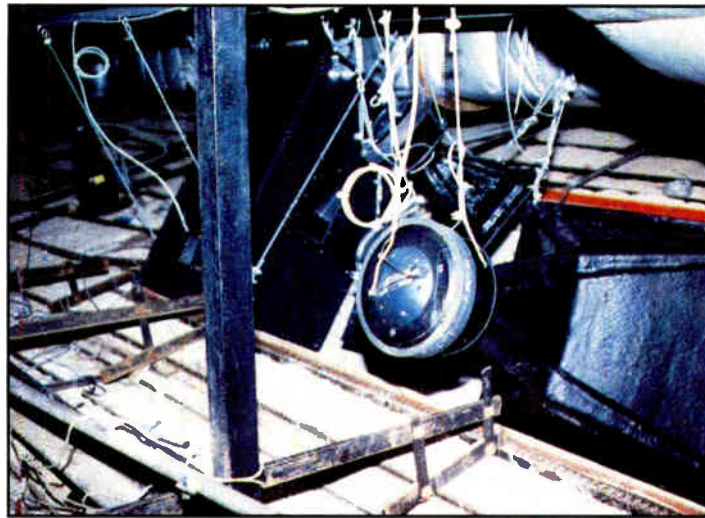
Before installation each speaker was tested for proper phasing to ensure the least amount of electrical problems once the system was installed.

Extreme care was also taken for the installation of the speakers within the cluster. Each device had been precisely positioned based on the information obtained from our cluster design program. After each speaker would be suspended

and pointed with compass and an inclinometer, the house lights would be dimmed, and with the use of a laser pointer its aiming point projected at the floor for comparison with the predicted location of the axis line and spl.

After the installation of the system was completed, pink noise was injected to the system and each device was tested for proper overlap and uniform coverage; the impedance of each line was recorded and another set of TEF measurements was made.

These tests now were to record the performance of each speaker and consisted of a frequency response curve, a phase curve, an impedance curve. These measurements were taken for each single device on axis and at the 6 dB point. After the time alignment of the entire cluster was completed, the procedure was repeated paying special attention at the over-



Central cluster viewed from crawl space.

lap zones.

With pink noise still in the system a very detailed spl measurement was taken throughout the auditorium to ensure uniformity and the predicted variation in sound level ( $\pm 2$  dB).

Once we were satisfied with the results, several other TEF measurements were taken of the whole speaker system and room acoustics as well as ambient noise readings prior to and while the space was being used. These readings helped us establish the proper dial setting for each

component at the sound rack.

Lastly, the room was equalized and a standard house curve set. The system was tested for possible feedback using various microphones at several locations. This test revealed that some reflections caused by the structure around the cluster were of concern and that if such microphones as PZM would be used some gain limitation would be realized. This problem was corrected by the addition of two inch thick Sonex material around the cluster opening. ■

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# THE ORIGINAL PBS

By Edward Scribner

**While going through the October issue of *Sound & Communications*, my eye was caught by the article by Daniel Leckie entitled "Audio for Military Colors." Being a former Air Force serviceman stationed at the Army Air Force Technical Training Command at Sioux Falls, S.D., I was the NCO Chief Engineer of Broadcasting of the "POST BROADCASTING SYSTEM," commonly called in those days (1942-45) "P-B-S."**

I do not want to belittle the article in any way. I thought it was fine and it brought back memories to me. To write the details of what P-B-S was like and what it did, an article was written and appeared in the May 1944 issue of *Radio News*, which had a world-wide circulation. This system was unquestionably the first of its size and kind in any military installation in the country. A couple weeks prior to the surrender of Germany, I was told to get ready to go out and visit several other Air Force bases, make a survey and prepare a program for similar installations. When the surrender

in Europe came about, my plans were cancelled. I was naturally disappointed in not being able to make these trips, but I was happy for all of my brother servicemen that that phase of the war was over.

To broadcast the taps, we had a microphone "planted" in the ground near the flag pole at headquarters. Each day a different group from the several thousand students "stood retreat." At ten minutes to five PM, we would discontinue all programs on the field. By monitoring the buried mic we were "cued" by the officer in charge at the retreat ceremonies. We turned the mic on the main system, which had more than 100 speakers on the field.



*From "Audio for Military Colors," *Sound & Communications*, October 17, 1990 issue.*

As the cannon boomed and the trumpeter sounded taps, it was heard all over the field. At the conclusion we would continue with our entertainment program or special announcements etc. to whatever section we wished. Each squadron, each day room, each mess hall, etc. was individually controlled. We opened at 4 AM when the first meal of the day was served. It might have been dinner or supper, all depending

upon the shift, as the school operated 24 hours a day, 363 days of the year. The only days closed were Christmas and Easter. We continued until midnight, although the squadron speakers (outdoors) were not on for those areas that were sleeping, and all were off at 9 PM.

After the article in *Radio News* was written, we installed a "satellite system" in the base hospital. Speakers were in each ward and each again was individually controlled. They were able to originate their own programs or could take them from the main control room, even though the main station was using some other programs. It was a very versatile system.

This was one instance in the military service that a person who had been in the electronic field found a spot in which his past experience was used to the fullest. I had been in the sound business since

**WE WOULD HAVE ONE BASIC OPERATION WITH A TRAINED GROUP THAT WOULD BE DOING THIS WORK "AROUND THE CLOCK."**

1926, having made the first sound installation in two nearby county fairs in 1927. I was informed even before I went into service that I would be assigned to the Communication Division of the Air Forces.

At my arrival in Sioux Falls I was assigned to salvage work trying to get parts for the radio mechanics classes to use for study purposes, as even in 1942, parts were scarce. I was then transferred to a department where we started feeding the code classes (six a day) with music and

*Edward Scribner is a distributor of electronic sound system supplies in Schoharie, New York.*



news. A short time in there and I was approached by our Executive Officer, then Major Charles Walters, to install an intercom system at headquarters. After that, he wanted me to design a separate PA system for each of the eight squadrons. While working on this I came upon the idea of combining all these squadrons into one location and tie it in with our news and

**EACH SQUADRON, EACH DAY ROOM, EACH MESS HALL, ETC. WAS INDIVIDUALLY CONTROLLED.**

music to the classrooms. This met with great approval. I said that then we would have one basic operation with a trained group that would be doing this work

“around the clock.” Thus was born the “Post Broadcasting System.”

This installation being so unique and unusual attracted visiting officers from other bases and hundreds of returning GIs. Outside our building was a large scoreboard on which we displayed the results of the baseball games.

Of the personnel involved: Corporal Wolfe later went to NBC and was one of the directors of the Macy parade. Jesse Faulkner went back to his electronic business and later was with NASA. Max Pierce is back in Sioux Falls where he is an engineer at one of the TV stations. I have lost contact with the others mentioned.

Additionally to the items mentioned in Radio News, we had remote lines to the two theaters, the chapels, the sports arena and to the Coliseum in the city of Sioux Falls. The console was enlarged, more

amplifiers installed, etc.

Another item of Mr. Leckie's story caught my eye, and that is the use of the Grommes-Precision amplifiers. That is the line I have been using for the past 25 years or so. Mostly retired now, I do a little sound work, don't go out after any but try to take care of my customers. Just passed my 65th anniversary in business.

**TO BROADCAST THE TAPS, WE HAD A MICROPHONE “PLANTED” IN THE GROUND NEAR THE FLAG POLE AT HEADQUARTERS.**

Hope you have not been too bored with this lengthy letter, but there was a lot to say that was not covered in Cpl. Minoff's original story. ■

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# NOT EVERYTHING YOU EVER WANTED TO KNOW ABOUT MICROPHONES

By David Josephson

**Two books on microphones appeared in my mailbox this month, one new and one old, both from the U.K., and both with some promise for adding to practitioners' knowledge of the principles and practice of microphony. Each lives up to that promise in one way or another, but probably not in the way the authors would have liked.**

If you can accept and benefit from the information contained in *The Use of Microphones* by Alec Nisbett, and *Microphones, Technology and Technique* by John Borwick as you would, perhaps, from an enlightening weekend with an opinionated and slightly out-of-the-mainstream expert in the field, then you'll be ahead, because these two are certainly both expert and opinionated.

Anyone active in the field and of an inquiring mind would find each of them interesting and useful. But if you're looking for a one-book source for all you need to know about mics, these ain't it (not that there is such a book, mind you, but I'm still hopeful). Useful information is interspersed with an odd assortment of ir-

relevancies and inaccuracies that leaves the reader wondering whether either book was carefully edited. Both are published by Focal Press, a British organization known mostly for its excellent works in cinematography but also responsible for some essential works in the audio worker's library, for instance *The Art of Digital Audio* by John Watkinson, which remains the best in its field.

Neither book will make you an expert, and neither is directed particularly toward sound reinforcement mic applications (both authors hail from the BBC, and studio pickups are more their cup of tea). But the

## THESE TWO ARE CERTAINLY BOTH EXPERT AND OPINIONATED.

Borwick book, and to a lesser extent the Nisbett book, gives you insights that are unavailable as a collection anywhere else. The idea is to get you thinking about how mics hear, and each of these two books goes a long way toward conveying this information.

The newer book is John Borwick's *Microphones, Technology and Technique*, a comprehensive soup-to-nuts attempt that begins with an ambitious (66 pages, nearly one third of the book) primer on acoustics and electronics. Unfortunately, the reader who needs this information most is likely to be confused by the manner Borwick uses to present it, specifically by the finality he attaches to various opinions that aren't the whole story.

All sounds don't necessarily begin "with oscillatory movement of the source" and intensity, loudness and sound pressure

aren't different measures of the same thing at all. Sound pressure is just that, and is analogous to voltage; loudness is an electrical approximation of a psychoacoustic phenomenon (as Borwick goes on to explain) and takes into consideration the frequency distribution of the sound. Intensity is a measure of the acoustic *power*, or amount of work done by the sound, and can only be evaluated by knowing pressure and particle velocity. It's not proportional to the square of pressure as the book claims, unless the sound field is spherical. The discussions of resonance and some of the more complex problems in room acoustics are handled well, and in general the introduction to acoustics works if the reader has a more complete reference at hand, like the Davis's *Sound System Engineering* or the new or old *Audio Cyclopedias*.

Most annoying about the Borwick introduction to electronics is the gratuitous use of acronyms never before seen. We have enough names for electromotive force (voltage, E, potential, etc.) without adding another "analogous quantity to water pressure, the pd, measured in volts." Comparing charge in a capacitor to "a bar magnet which stores magnetic energy between its North and South poles" has to be puzzling for anyone who has studied either capacitors or magnets (magnets don't store energy). The section on active devices (transistors and tubes) is about as useful as could be expected from three and a half pages — just be sure you have another source when some of the more confusing lines throw you off.

*Micophones, Technology and Technique* fares better when it reaches the topic at

---

David Josephson heads up Josephson Engineering.



hand, but is still not without a slant that the reader needs to keep in mind. Unfortunately, "Power output ratings are also found in some microphone manufacturers' literature" is an insufficient treatment of the issue. As the Institute of Audio Research's Al Grundy reminded me at my AES display booth a few years ago, if you're going to do a sound system power gain calculation, open circuit voltage output is not enough — you need the output level in power terms (typically dBm) because very few mic makers specify actual output impedance.

There are a few other areas where Borwick's attempts to simplify run aground, for example in the discussion of operating principles of condenser mics. It may seem trivial, but just because the output of a condenser mic is more or less linear with diaphragm displacement doesn't mean that it's linear with

### ALL SOUNDS DON'T NECESSARILY BEGIN "WITH OSCILLATORY MOVEMENT OF THE SOURCE" AND INTENSITY.

pressure, because the amount of displacement varies according to diaphragm tension — which changes with the amount the diaphragm is already displaced. The output of an actual mic capsule doesn't even obey the linear relationship discussed, because stray capacitance of the capsule makes the relationship between displacement and output nonlinear.

These are important sources of distortion in condenser mics. The book omits all discussion of mics' transient response, and many of the other contributors to the perceived "sound" that aren't revealed by frequency response and polar graphs. There are a few factual errors too; maximum 48V phantom powering current since 1981 has been 10 mA (DIN 45 596, IEC 268-15A), not 2 mA as noted, and 12V phantom be up to 15 mA.

With those gripes out of the way, Borwick's book does present a reasonable picture of the state of the art, in an ab-

breivated mic catalog and summary of stereo pickup techniques. Too bad that the discussion accompanying the picture of a Decca "tree" stereo pickup doesn't mention that the mics are Neumann M50s, which aren't true omnis at all, but rather directional at the high end to get away from the very problems with spaced omni techniques that Borwick mentions. But this is more than made up for by a good short summary of Michael Williams' work on coincident and near-coincident technique.

The second part of *Microphones, Technology and Technique* is dedicated to mic choice and placement ideas for various sound pickup applications, mainly in broadcast and recording. "Pop vocalists rely very much on the properties of particular microphones and the way they use them (or, in a few cases, misuse them)" shows the usual engineer's bias, which extends to not saying much about choosing mics for a given pickup based on experience and subjective impressions rather than specs. Mic makers simply don't provide enough information (some would say it can't be provided) to narrow a choice down to frequency response and directivity as suggested. The discussion of vocal mic technique is otherwise good and comprehensive, and the reader should have little difficulty sorting out the biased parts. The discussion of instrumental pickup is based on a short discussion of the physics of each instrument, and this helps to understand why the recommendations are made as they are. A few hiccups here too; no one who's recorded a harp, solo or in an ensemble, would agree that "microphone position is uncritical."

Alec Nisbett's *The Use of Microphones* isn't quite as ambitious as Borwick's book, so with one man's view of the world as the knowledge source, it can come a little closer to its stated goal. The book is now in its third edition, and is essentially an amplified excerpt from his classic *The Technique of the Sound Studio*. Like Borwick, Nisbett is a BBC veteran and his main focus is sound pickup for recording and broadcast, but the techniques are all applicable to sound reinforcement mic use. Also like Borwick, Nisbett tends (probably

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unintentionally) to regard his own experience as being representative of the world at large. Speaking of cardioid mics, "the most commonly used method today employs a condenser with two diaphragms" was never true except in Germany until about 1955. And the implication that omni mics are the only types suitable for hand-held use just isn't so.

*The Use of Microphones* employs a simple format — short discussion of a topic on the left-hand page, and illustrations on the right. This makes it possible to look up, for instance, "Other Strings" and get a short earful about balance between soundbox tone and mechanical noise, and some of the peculiarities of instruments like mandolins and zithers.

Nisbett's writing is more conversational and easier to follow than Borwick's, and the book has lots of interesting bits that

might come in useful some day. Where else can you read that "lavalier" is a reference to one of Louis XIV's mistresses, a Mme. de la Valliere, who was fond of pendant jewelry clearly visible in her décolletage? The discussion of how noise-cancelling mics work, while based (in both books) on the ST&C 4104 ribbon type which is essentially unknown in the U. S., is simple and to the point in Nisbett, and quite a bit more convoluted in Borwick.

Which to buy? Nisbett is better if you want to get a running start on the question of what mic to put where, without a lot of thought about why. If you're interested in a more detailed technical approach, at the expense of some clarity, get the Borwick book. The British usage (mostly in Nisbett) like "cottage-loaf" for hypercardioid and "tip-up" for boost, doesn't get in the way of the books' utility

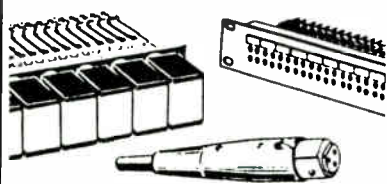
for us colonists.

A good reference that everyone serious about mic use should have is the collection of *Audio Engineering Society* articles on microphones published by them as a compendium volume, which contains the essential works from the pioneers at RCA, Neumann, Shure, Altec and E-V. More theory, concisely presented, can be found in *Acoustics and Electroacoustics* by Mario Rossi. Also excellent, but sadly out of print, are Lou Burroughs' *Microphones* and the microphones section of the original *Audio Encyclopedia* by Howard Tremain.


And try to remember a point that isn't ever made clearly enough: train yourself to hear the subtle differences whenever you listen to a mic pickup, and figure out what makes these differences later. Knowing all about it doesn't help a bit if you don't hear it. ■

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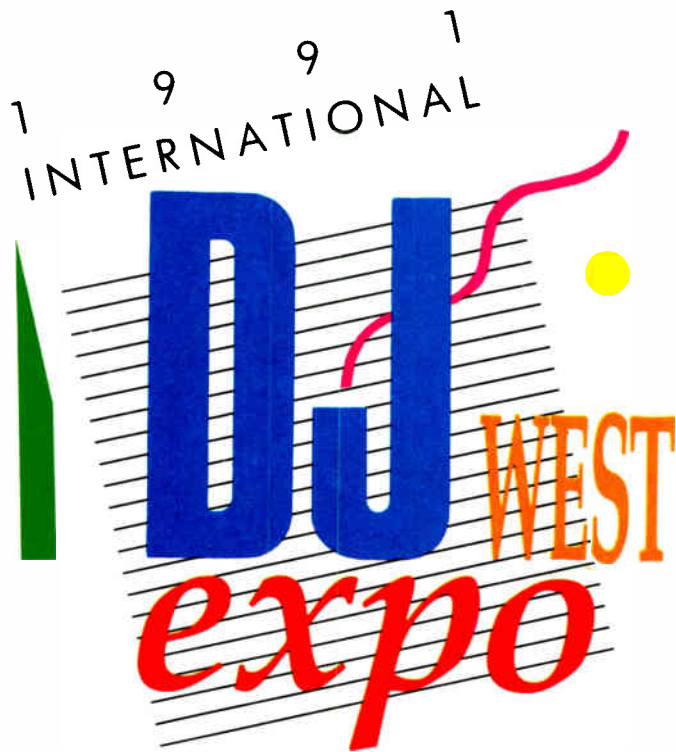
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# PUTTING A SPIN ON A CRISIS

By John Sanger

**“Product Tampering  
Results in . . .”**

**“Striking Employees  
Disrupt . . .”**

**“Company Execs  
Charged with . . .”**

**“Chemical Spill  
Threatens . . .”**

**“Building Collapse  
Injures . . .”**

It's not unusual to read headlines like these in your daily newspaper or hear them on the evening news. You probably read or listen to the stories with interest—subconsciously thankful that the press isn't talking about your company.

Crises come in all kinds. They're like snowflakes. No two are alike. They can be natural disasters or man-made blunders. Some have global or national impact. Most stay within local boundaries. Some are blatantly obvious from the time they start developing. A few are difficult to spot until it's too late. Almost all have a common element: if left untended, they grow to epic proportions.

### EQUAL OPPORTUNITY PROBLEMS

You'll recognize the names of companies mentioned in this article. They're big companies. Don't be misled, however. Crises don't always happen to big companies. And they don't always happen to the “other guy.” You might find the press on your company's doorstep one day, asking questions — and you'd better have some good answers.

A small company may be more at risk than a large one, however, according to Robert L. Dilenschneider, president and chief executive officer of Hill and Knowlton, Inc., New York, and author of



*Motorola, Inc. is located in Schaumburg, Illinois.*

the newly published book, “Power and Influence.” He contends that community issues can affect small companies because these firms rely entirely on local markets for their business. A bad local reputation, whether deserved or not, can hurt you.

Sound and communications contractors who also sell and install security and fire alarm systems place themselves in a unique position. A sound or telephone system that fails is serious and may create some liability, but not like the liability created if a security or rigging a fire alarm system fails — especially if a loss occurs.

### ASKING “WHAT IF”

“Public relations people try to think ahead and project ‘what if,’ ” said Laura Podlesny, manager of public relations for Midway Airlines Inc., in Chicago. “I ask myself if I'm ready for a crisis. I look at what's happened to other companies and try to determine how I would handle similar situations.”

Calculating the number of possible crises that could develop for a company would be a statistician's nightmare. Planning for all eventualities would be impossible. The trick, if there is one, is to have a flexible master plan that can be implemented quickly and tailored to meet the specific needs of a particular crisis.

For example, the crisis management plan of Motorola Inc., Schaumburg, Illinois, establishes general policies for the person acting as company spokesperson so a single voice will be heard from the company. It also outlines operating procedures and specifies how to prioritize crises.

Your company might not face the same type of crisis that an airline or large electronics firm might. The crisis might not be on the same scale. It can be just as devastating, however.

What if your company becomes involved in a union labor dispute that escalates to violence? What if one of your installers miswires a system, resulting in a fire that

destroys a building? What if you purchase a piece of property not knowing that its owner has ties to organized crime or is a supporter of apartheid in South Africa?

### INNOCENT BYSTANDER

You don't have to be at fault to get dragged into a crisis situation. You don't have to be an active participant in the events leading to it. Nonetheless, you could find yourself reading about your company in the morning paper.

"You want to know if an incident is a crisis, creeping crisis or day-to-day press event," said Margot Brown, manager of media relations at Motorola, referring to the document's more formal classifications for Priority I, II, and III Crises.

Instead of providing a formula for handling specific crises, Motorola's plan helps the public relations department's staff and key company personnel determine the best communications channels to use and aids them in developing the kind of information the media most likely will request.

There are some specifics, however. It contains "the do's and don'ts of crisis communication, such as the types of information you either can or should never give out. For example, you shouldn't speculate on how many people might be dead or give the press somebody's name before his family is notified. It's a short list of common-sense items," she said.

#### TIPS TO SURVIVE A CRISIS

- Tell the truth and tell it fast
- Use a single company voice
- Understand how the media works
- Anticipate what information the press will want and prepare it quickly
- Target the most influential people to receive your company's message
- Keep your employees — from the top to the bottom of the organizational ladder — informed
- Ask for outside help
- Develop a crisis plan and test it in advance

### AN OUNCE WORKS WONDERS

The best approach is prevention. If you keep a potential problem from growing into a crisis, then you don't have to deal with it.

"We just announced a drug-testing policy for all our employees in the U.S. during the next three years. It had the potential to be received in a rather negative way. As it turned out, it wasn't," Brown said.

Information detailing the policy, and the reasons for its adoption, was prepared for Motorola's employees and the media. "I was the primary spokesperson for the new policy but I had a person who was directly involved with the program standing by in case an in-depth interview was needed," she said.

You often can't head off a crisis successfully. It's rare when you can beat the press with the first telephone call after a crisis occurs.

### BREAKING SPEED RECORDS

"The first rule of crisis management is to tell it all and tell it fast. You must get as much information as possible together as fast as possible — literally within minutes and hours," said Dilenschneider.

Dilenschneider, and other members of Hill and Knowlton's team, who serve as public relations counsel to 40 percent of the Fortune 500 companies, have had their baptisms by fire. They were called in to help control damage as fear spread following the incident at Three Mile Island and after the walkways collapsed at the Hyatt Regency Hotel in Kansas City.

The damage being controlled didn't directly involve tangible assets. Dilenschneider's task was to minimize damage to his clients' images. "Public perception exacerbates a crisis. It can create problems for you in the stock market, with shareholders, with other plants you operate and with employee groups, for example," he said.

Dilenschneider recommends that a top manager take charge during a crisis. He also suggests that you get as many key outside people as possible involved to help solve the crisis as quickly as possible. Depending on the nature of the crisis, you



*Margot Brown, manager of media relations at Motorola.*

might want representatives from your local police and fire departments present. Don't overlook politicians, government regulators and representatives from special interest groups either.

"Get them together and admit that a terrible mistake has been made. It's a very positive thing to do. If you don't admit it then, you'll have to admit it later on. It is very difficult for people to remain hostile towards your company if you make them part of the solution," he said.

Motorola's Brown agrees, saying that if a crisis has an impact on the community, one of your objectives is to get to the community quickly and give them factual information.

### SOLIDIFYING OPINIONS

"A statistic bandied about several years ago said that in a crisis, most people form their opinions of whether you are right or wrong in 12 hours. So if you don't get your message out in the first day, it's going to be an uphill battle. Stonewalling the press doesn't make sense because the news media are your primary means of reaching the public," Brown said.

Playboy Enterprises Inc., in Chicago, began gearing up to prevent a crisis when company executives first heard rumors that the Meese Commission planned to release a potentially damaging report. Within hours after the report was re-



leased, Playboy's public relations staff was placing telephone calls and sending out letters to tell its side of the story.

"We went after all the influential people, ranging from financial analysts to our retailers; we needed to reach with our message," said Terri Tomcisin, Playboy's manager of corporate communications.

#### HAVE A NICE DAY

The Meese Commission letter prompted Southland Corp. to pull Playboy magazine from the shelves of its company-owned 7-Eleven stores. While countering the commission's report with zeal, Playboy showed that you can't lose your sense of humor even in a crisis — and published a pictorial called "The Girls of 7-Eleven."

Unlike most companies, Playboy Enterprises had a ready-made vehicle to reach more than three million people with its

message: the "Forum" section of Playboy magazine. But that didn't meet all the company's objectives for countering the commission's charges and controlling the crisis. Christi Hefner, then president of the company, took the Playboy message on the road, meeting with various groups, such as the National Press Club, all over the country.

#### IF LEFT UNTENDED, A CRISIS GROWS TO EPIC PROPORTIONS.

"She made herself available to the media and was very open to interviews and speaking engagements, including appearing on 'Meet the Press' and the MacNeil/Lehrer NewsHour," Tomcisin said.

Chances are that a crisis affecting your

company won't require you to deal with the media on a national level. Your primary concern will be the newspapers, magazines, and radio and television stations in your market area. Therefore, you should know all the key media people in your area. You don't have to be on a first-name basis with them, but you should know who they are and what they do. You also should know how to get in touch with them quickly if a crisis occurs.

#### STRONG NOTES IN A SINGLE SONG

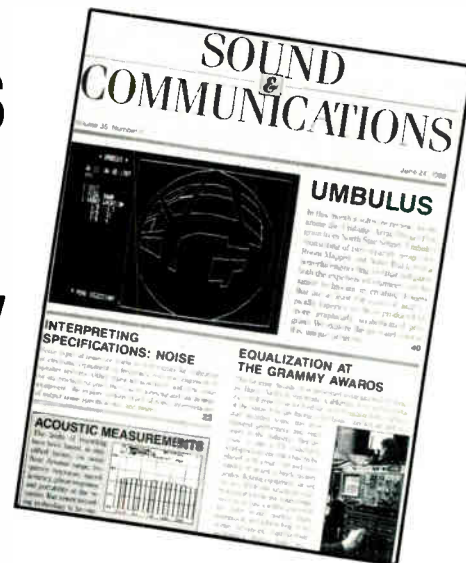
Motorola's crisis management plan stresses the importance of having a single voice for the company.

"If you have a lot of people from your company speaking to the press, they may not have the same set of facts," warned Brown. "One person may have informa-

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tion as of 10 o'clock last night and someone else may have an update. There are all sorts of ways to confuse your message and this is one of them. But if you have one person speaking with the news media, then you can control what's being said to the outside world, ensuring the information is accurate."

## YOU DON'T HAVE TO BE RESPONSIBLE FOR A CRISIS TO BE DRAGGED INTO IT.

Most sound contractors don't have public relations departments. They often don't have any person whose primary responsibility is PR. Fortunately, you don't have to tackle a crisis alone. Help may be available from several quarters if you'll seek it. First, you can call upon the talents of an outside public relations agency — even if you have a PR person or department.

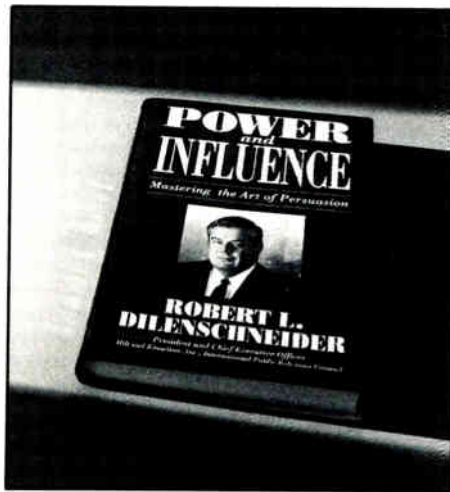
### ONE SHOT FOR SUCCESS

When a crisis occurs, you want experienced people handling it. If you don't handle it right, you won't get a second chance. So when you're looking for outside help, check credentials carefully and look for an agency with a breadth of knowledge and resources.

"We know people who are experts in product tampering and food analysis. We know experts in a variety of fields, ranging from chemicals to wind tunnels to climactic conditions," Dilenschneider said.

The firm you select should have people who understand the political environment as well as people who can deal with the media and those who understand the nature of employee relations during a crisis.

Don't wait until you are in the middle of a crisis to find a public relations agency. You won't have time to find the appropriate agency, and the agency's staff won't have time to mobilize its forces to assist you effectively. Get acquainted now. Find an agency and discuss your needs in advance. Then, if a crisis occurs, the agency will know who you are and how to respond.



*Power and Influence by Robert L. Dilenschneider.*

Dilenschneider also suggests that the public relations agency have a geographic reach into all parts of the country. What starts out as a local crisis may not stay local, he warned.

### FROM HERE TO ETERNITY

A crisis may occur in Atlanta and be picked up from one of the wire services by a newspaper in Denver. The editor may ask a local expert to comment on the crisis and information may become distorted.

## SMALL COMPANIES MAY BE MORE AT RISK THAN LARGE ONES.

Fortunately, a story appearing in a newspaper thousands, or even hundreds, of miles away probably won't affect your company directly. But it could. For example, if your Baltimore-based company plans to open a new branch in Philadelphia, then a story appearing in a Philadelphia newspaper could stall your plans because of adverse publicity.

A second source of outside help is your trade association. Playboy Enterprises enlisted the aid of the American Booksellers Association and the Council for Periodical Distributors. "[The Meese Commission report] was a broader issue than just an attack on Playboy, and our

trade groups were very helpful." Tomcisin said.

At the same time Playboy was being delisted by some of its retailers, other magazines were having similar problems. An issue of Cosmopolitan featuring a story on breast surgery was pulled from store shelves in Texas. Texas Monthly also was having problems with an ad some people thought was objectionable.

### ASKING FOR HELP

If you look beyond your own company's troubles you may find that some of your peers are, or have been, in similar situations. Ask them for help and return the favor when they need it.

Don't overlook the rapport you've built up with local media representatives. Be fair and honest with them and they'll do the same for you.

"Be candid with the press to the extent that you can be. There may be legal, financial or proprietary reasons that you can't tell them everything, of course, but be as accurate as you can be. If you don't know an answer, say so. Then find the answer. But don't speculate. That produces misinformation," Brown said.

"A crisis situation is like any other event in that you have communications objectives — and strategies and tactics to accomplish them," she said. The press has its objectives, too. Help them achieve theirs and they may help you.

Your best bet for surviving a crisis is to take the Boy Scouts' motto to heart: Be Prepared. It can happen to you. ■

#### CRITICAL READING

Communicating When Your Company Is Under Siege: Surviving Public Crisis by Marion K. Pinsdorf (Lexington Books, \$21.95)

Corporate Crisis Management, edited by Stephen J. Androile (Petrocelli Books, \$21.95).

Crisis Management: Planning for the Inevitable by Steven Fink (American Management Association, \$17.95).

Power and Influence: Mastering the Art of Persuasion by Robert L. Dilenschneider (Prentice Hall Press, \$19.95).

When It Hits the Fan: Managing the Nine Crises of Business by Gerald C. Meyers (Houghton Mifflin Co., \$17.95).

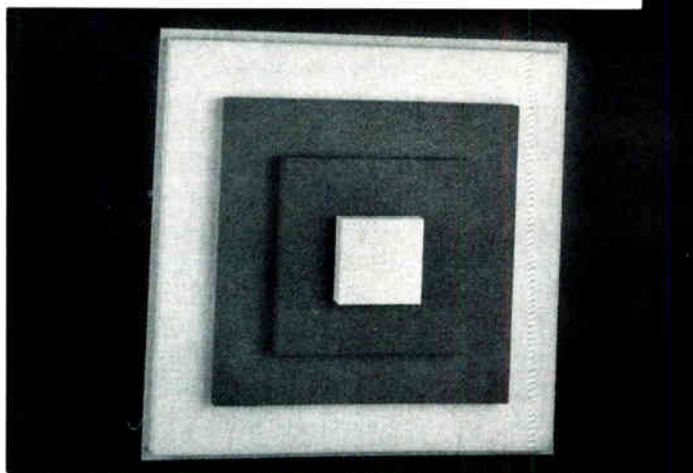
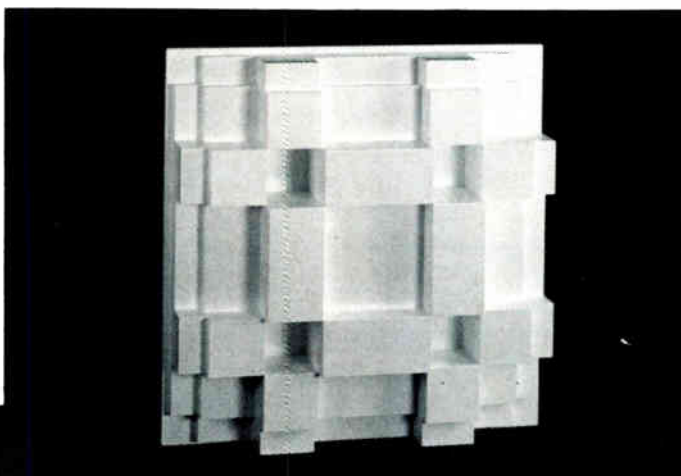
# Teleconferencing Facilities

## *Acoustical Design*

BY PETER D'ANTONIO

**A**udio/video teleconferencing was first introduced at the 1964 New York World's Fair. Corporate planning, however, has resisted this promising yet expensive approach for decades. Recently, rising travel expenses, routine travel delays and inconveniences, loss in productivity while away from the office and advanced lower-priced full-duplex systems have made teleconferencing a technology whose time has come.

*Terrace — a 2D omnidirectional sound diffuser without dividers.*



*Absorber — a fabric upholstered graduated density fiberglass sound absorber.*

The object of teleconferencing is to allow conferees in one office to see and hear conferees in another similarly configured office at some remote location using telecommunications, cameras, video monitors and loudspeakers. Conferees sit around a conference table, which is usually shaped like a trapezoid or half-oval for good sight lines, so that the image in the video monitors gives the impression that the remote conferees are physically seated at the other end of the conference table. With

*Peter D'Antonio is the President of RPG Diffusor Systems, Inc.*

good audio quality and adequate non-glare lighting to provide good depth of field, realistic and natural communication is possible.

While electronic advances have contributed to the popularity and ease of teleconferencing, acoustical advances and design guidelines have not kept pace and in many instances the room just happens! All too soon the importance of good electroacoustic design becomes apparent. When outside interference raises background noise levels sound quality and intelligibility in the receiving rooms is poor, conversation within rooms becomes dif-

icult, and interactions between room reflections, speakers and microphones cause electro-acoustic feedback.

While some electronic techniques may alleviate the situation, acoustic problems should be addressed with acoustic solutions. The first design goal would be good noise isolation to provide a background noise level of "NC 20—30." To accomplish this, floating walls, floors, and ceilings, as well as sound-rated doors may be required. If this is not practical, then sound-rated doors should be used and walls should at least extend from floor to deck to minimize flanking paths over wall partitions. A low velocity HVAC system with wrapped and lined ducts should be used, with air being allowed to fall into the room. High velocity linear diffusers should be avoided in the air exchange registers.

Once control of outside noise intruding into the teleconferencing room has been addressed, attention should be given to the focus of this article; namely, the control and distribution of sound generated within the room from loudspeakers and conversational speech. Since internally

generated sound from loudspeakers and conferees is — one hopes — not noise, sole use of noise control absorptive panels to manipulate interfering reflections is inappropriate. While absorption is an important part of reflection control, exclusive use leads to psychoacoustically “dead” spaces where conversation in the transmitting room is difficult due to poor acoustical support of speech and the sound in the receiving room is perceived as dry and unrealistic. If interfering reflections are not absorbed, how can they be controlled?

Most of us are familiar with absorbing and reflecting surfaces, but there is some confusion about diffusion. Over the years, architectural acoustic design has used many effective ornamental surfaces to

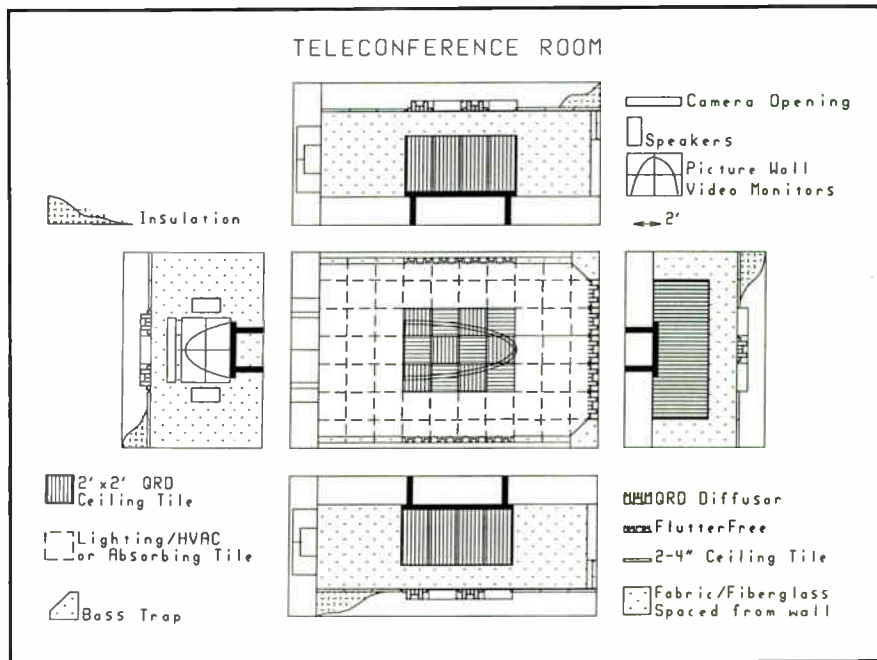


Figure 2: A plan and wall elevation of a teleconferencing room utilizing the RFZ/RPG design philosophy with broad bandwidth absorptive boundaries around flush-mounted speakers, rear wall and ceiling diffusion and hybrid reflective/diffusive/absorptive side walls. The key identifies the acoustical ingredients. A mirror image of the conference table can be seen in the four monitors comprising the front picture wall.

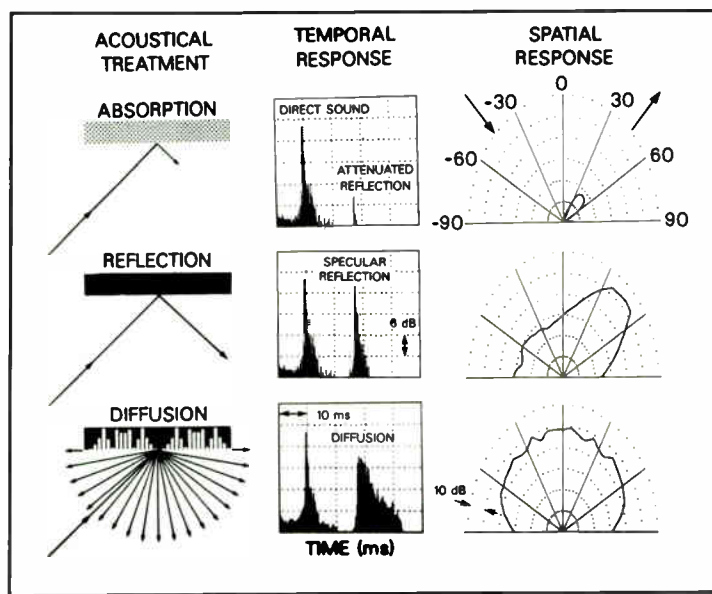


Figure 1: A comparison of the spatio-temporal properties of acoustical treatments, illustrates how sound is attenuated by absorption, re-directed by reflection and uniformly distributed by diffusion, the three ingredients of the acoustical palette.

scatter or diffuse sound, namely: statuary, columns, parapets, coffered ceilings and alcoves. Rising material and construction costs have virtually eliminated much of this surface irregularity and substituted flat reflective surfaces and acoustically absorbing suspended ceiling systems. These factors have led to a general degradation of interior room acoustics. Figure 1 illustrates how sound can be attenuated by absorption, redirected by reflection and uniformly distributed by diffusion.

In 1983, RPG Diffusor Systems introduced an approach to reflection control

using a unique surface called a reflection phase grating or RPG. In contrast to absorbing surfaces, the RPG controls sound by diffusion, in much the same way that frosted glass diffuses light instead of absorbing it. Sound from any direction can now be uniformly distributed into many directions, thereby attenuating the sound in any one particular direction. The RPG consists of a periodic array of wells (1D) or cells (2D) of equal width but different depths, separated by thin dividers.

When the depths are based on mathematical quadratic residue number theory

sequences, as suggested by Manfred R. Schroeder, the RPG is called a QRD. Following the introduction of the QRD, RPG Diffusor Systems developed a complete acoustical palette of acoustical design ingredients called The RPG Diffusor System.

### RECOMMENDED DESIGN

Figure 2 illustrates a teleconference design which can also be used for meetings, conferences and A/V presentations.

#### Room Dimensions

Since teleconference rooms are acoustically small rooms, low frequency problems are often encountered. It is important to use appropriate dimensional ratios of the height, width and length to provide a uniform distribution of low frequency modes which minimizes boominess and provides an even sound decay with frequency. The ratios 1:1.4:1.9 have proven to be effective. If room dimensions are fixed and low frequency problems exist, Helmholtz slat absorbers or diaphragmatic panels with appropriate air cavities should be used. To minimize parallel surfaces and provide flutter echo control, walls and ceiling can be splayed outward about 1 inch per foot.

#### Room Layout

The placement of speakers and video



monitors and the design of speaker boundaries can draw on the RFZ/RPG design. A reflection free zone, RFZ, is created over the conference area within which first order room reflections from the front sides and ceiling are minimized with absorption, and the predominant sound is from the loudspeakers. Reflections from the ceiling above the conference table, side and rear walls are uniformly distributed with QRD diffusor technology, to bathe the conference area with useful diffuse reflections.

The significance of this approach is that high definition stereo audio and high speech intelligibility of reproduced sound are obtained over a wide area, simultaneously with good natural speech intelligibility, acoustic speech support and a heightened sense of ensemble participation within the transmitting/receiving rooms. These design guidelines will extend the lifetime of these rooms, because they will be acoustically ready in the future when high fidelity broad bandwidth audio transmissions are the norm.

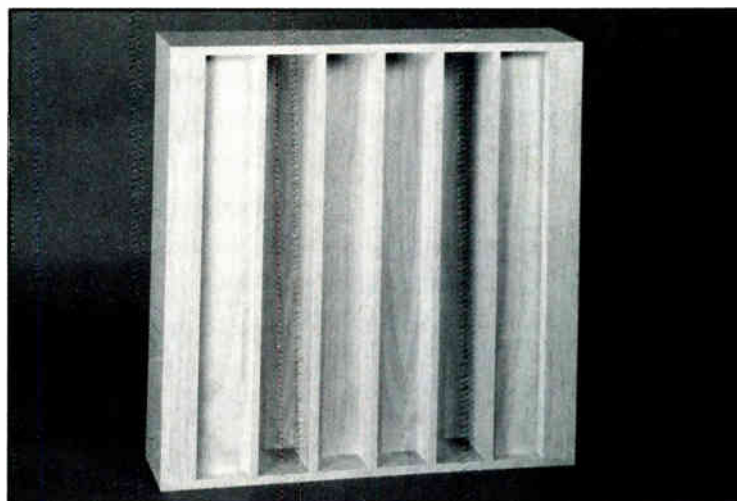
If working with an existing rectangular room, arrange it so the speakers radiate into the longer dimension with windows, doors, and other reflective surfaces away from the speakers in the rear of the room, keeping the surfaces immediately surrounding the speakers absorptive.

#### Front Wall

To minimize speaker-boundary interference, flush mount speakers at the height of the video monitors in the front wall at an equal distance on either side of the room's centerline. The front wall should be completely covered with absorption (i.e. Abffusor, Absorbor, or four inches of fabric wrapped fiberglass spaced from the wall) with openings for the video monitors, speakers and cameras which are located above the video monitors.

#### Side Walls

Side walls are most effectively treated with a lower two-foot reflective area which provides non-interfering reflections and easy maintenance, a mid four-foot high diffusive area consisting of non-absorptive flutter control FlutterFree panels and an upper traditional fabric upholstered fiberglass section extending to the ceiling for



*QRD Diffusor — a broad bandwidth wide-angle sound diffusor.*

## The shape of pure sound...

*Community's design philosophy has always been a little unconventional.*

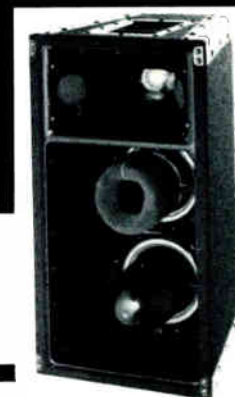
*When everyone else was insisting on metal, we promoted the precise shapes achievable through fiberglass. When others built walls of direct radiators, we built efficiency. When most of professional sound was divided at 800 Hz, we concentrated on midrange.*

*For those prepared to listen, the rewards of good design are clear.*

*In the RS220 Wavefront Coherent™ Loudspeaker system we have created the true culmination of Community design—precise fiberglass curves flowing into matched components—a system designed for effortless performance with maximum efficiency, power and clarity.*

### Community's RS220

*The shape of pure sound...*



**Community**

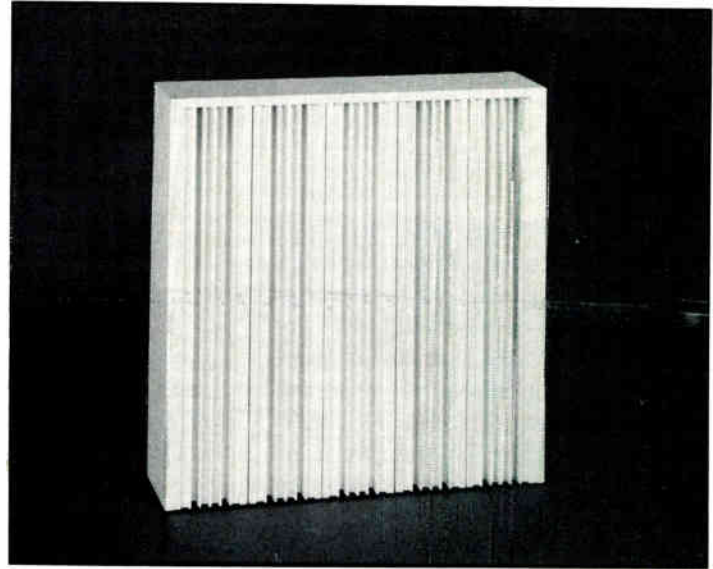
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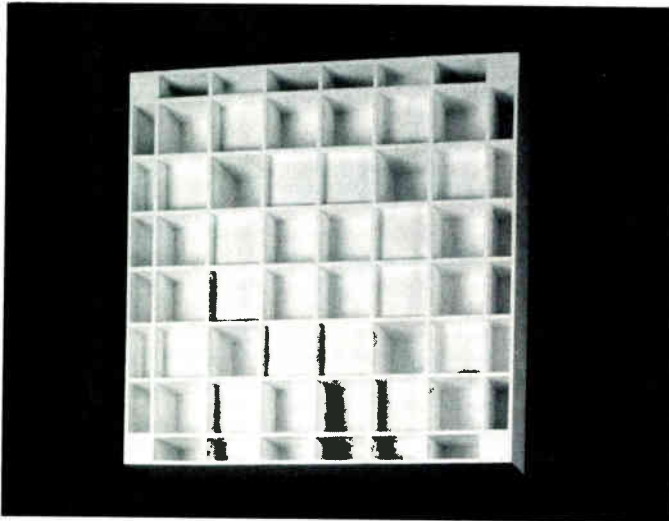
Circle 252 on Reader Response Card

reflection control above ear height.

The side walls between the front speakers and the conference table should be absorptive to minimize reflections from these surfaces over the conference area. The FlutterFree which is mounted along side the conference table minimizes flutter echoes and diffuses sound across the



*Flutterfree — a nonabsorbent flutter control acoustical moulding.*



conference area and into the rear diffusors to create a sense of openness and ambience. While it is common practice to place absorbing panels directly on wall surfaces, this should be avoided to exploit the increased low frequency absorption efficiency obtained as the air gap between wall and absorbing panel is increased.

FlutterFree can also be spaced from the wall surface to simultaneously function as a low frequency Helmholtz slat absorber. FlutterFree panels should be spaced by about  $\frac{1}{16}$ -inch —  $\frac{1}{8}$ -inch apart and two 4-foot semi-rigid fiberglass panels should be placed  $\frac{1}{4}$  inch behind the FlutterFree in the air cavity.

#### *Rear Wall*

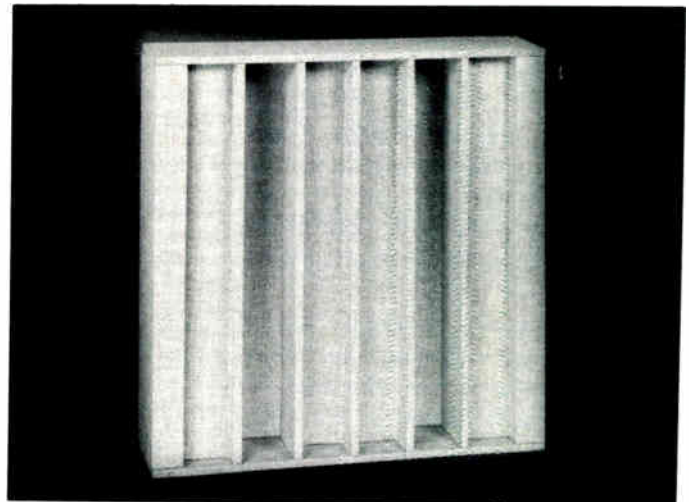
QRD diffusion is the ideal treatment for the rear wall to diffuse reproduced sound from the speakers and internal conversation uniformly throughout the room. A little more depth, i.e. nine inches, can be allocated to these diffusors for control of a broad spectrum of frequencies. If there are windows on the walls or ceiling, translucent or transparent diffusors can be used

*Omnifusor — a 2D omnidirectional sound diffuser.*

to admit natural or artificial light while diffusing sound. The rear corners can be used for dedicated low frequency absorbers to minimize boom in the room. This could consist of Helmholtz slat resonators or damped diaphragmatic panels such as painted or fabric covered  $\frac{1}{8}$ -inch masonite panels with semi-rigid fiberglass mounted  $\frac{1}{4}$  inch behind the surface to broaden the frequency range absorbed.

#### *Ceiling*

One of the most important ingredients in teleconference design is an integrated suspended ceiling system which incorporates absorption between the front wall and conference table, diffusion located directly over the conference table and absorption panels, lighting and HVAC distribution



*Abffusor — a broad bandwidth sound absorber for absorption and diffusion.*

over the remaining area. QRD ceiling treatment improves intelligibility, speech coverage and support. Additional low frequency absorption can be obtained by adding fiberglass blankets in the ceiling space above the suspended grid. (Trademarks: RPG, RFZ, QRD, Diffusor, Abffusor, Diviewisor, FlutterFree, Omnifusor, and Terrace are trademarks of RPG Diffusor Systems, Inc.) ■

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1. P. D'Antonio, RPG Technical Brochure and Application Notes, July 1987.
2. M.R. Schroeder, Number Theory in Science and Communication, Springer-Verlag Berlin, 1984.
3. F. Alton Everest, The Master Handbook of Acoustics, 2nd edition, Tab Books, 1989.

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# Software Review

## *EASE Version 1.0 From Renkus-Heinz, Part I*

BY MIKE KLASCO

**E**ASE, Electro-Acoustic-Simulation for Engineers, is the only European sound system engineering program available in the United States. Even more intriguing is the fact that EASE was developed in Berlin and Rostock, which were previously in the now departed East Germany. Another European development, NexoCAAD, from France, has yet to make it to our shores. (Sound system engineering software originating in Japan has reached us through Mark IV's AcoustaCADD, which started development at Fuji sound, and TOA is also considering bringing their software to this country.)

My first contact with EASE was last June, when I was asked by Bill Gelow of Renkus-Heinz to meet with Dr. Wolfgang Ahnert and discuss the viability of his (and Dr. Feistel's) program for sound contractors and acoustical consultants. The program has continued to undergo intensive development and was formally released at the Los Angeles AES last October by Renkus-Heinz, the distributor of EASE.

Aside from the program's unique heritage, the product positioning of EASE is also a bit different. Unlike other programs from equipment manufacturers, EASE is being marketed as a separate entity, not a tool to sell hardware products. What this translates to is the availability of the program to anyone, regardless of whether or not they are dealers of Renkus-Heinz.

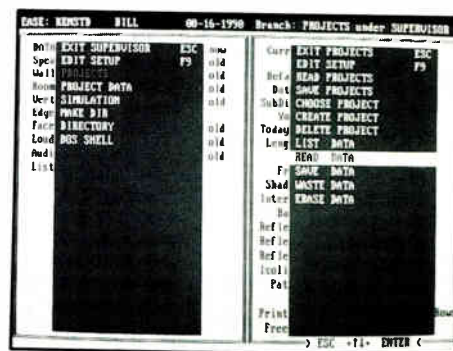
An extension of this policy is an open database that already contains one of the most comprehensive speaker libraries of any sound system design program, and additional components can be added by the user. Actually, this "magnanimous" attitude is formed more out of circumstance, rather than sainthood. First of all, Renkus-

Heinz did not pay up front for the development costs. EASE is an outgrowth of Dr. Ahnert's years of acoustical research, development and practical experience. Dr. Ahnert's organization did the acoustical design work for the Moscow opera and other state-owned facilities. EASE is an outgrowth of Dr. Ahnert's years of acoustical research and development. Their arrangement with Renkus-Heinz calls for the aggressive marketing of the program without being limited to the present Renkus-Heinz dealer network.

Secondly, while Renkus-Heinz is an established company, its relatively small size would eliminate any chance of success, even to its own dealers, of only offering its own products in the speaker library. Nevertheless, I applaud the distribution policies, the open database, comprehensive speaker library approach and lack of copy protection taken by Renkus-Heinz, even if the motivations are one of practicality and necessity. EASE is an outstanding program, and will tend to apply pressure on its competitors to open their databases to other speaker manufacturers and program users. Of course, not all sound system programs are from equipment manufacturers, as exhibited by PHD and Umbulus.

Besides the politics, EASE has a number of features that establish it as a credible, world class and state-of-the-art player. Highlights of these features include high resolution color graphics for sophisticated room modeling including image modeling (ray-tracing) incorporating shadowing effects, mirroring of symmetrical rooms, RASTI and %ALcons intelligibility predictions, user definable noise floor, intuitive speaker layout aids

enabling the engineer to view the seating coverage from the throat of the horn or view the horn from the seating, graphic depiction of multiple speaker interference effects, as well as a few firsts such as import and export to AutoCAD. Another first would be modeling of diffusion and diffraction into the image model, although this has not yet made it into the released version.



*Project Menu Screen.*

The EASE license fee is \$1,500, or \$1,350 if you buy five copies, or are an alumnus of Syn-Aud-Con (I think Syn-Aud-Con is the cheaper choice). This is about 30 percent higher than similar programs that are directly subsidized by equipment manufacturers, but there are no strings attached and there is no time limit on the license. The EASE license consists of two programs, the EASE program itself, and EASEBASE, where speaker directional files and surface materials are entered, maintained, and edited.

### **HARDWARE REQUIREMENTS**

EASE will run with any IBM XT/AT compatible with 640 K of memory and EGA or VGA color monitor. During start-

up, the software checks for EGA or VGA graphics adaptor and all graphics will be blocked (you will only see text) if neither EGA or VGA are available. Although, in theory, a gray-scale VGA monitor could be used, the program depends on color to aid the clarity of operation, so this is not recommended. I tried a gray-scale VGA, but found that certain menus disappeared. Since there is no way for the user to redefine color assignments (as is possible in various other programs), the current EASE release will not fare well on laptops. Hard disk operation is supported and "required," but you should be able to run the program from a 3.5-inch 1.4 meg. floppy. A coprocessor chip is not required, but it is recommended. Epson compatible printers or the HP Paint Jet (color ink-jet) printer are supported, although users of this program would benefit from a third party printer utility, such as Pizazz.

## DOCUMENTATION

The manual was still in its final stages when I reviewed release 1.0, but it is fairly comprehensive and includes some graphics, numerous appendices and an index. A Quick Guide for EASE is also provided, and it is best to begin your explorations from here. Like other recent sound system engineering introductions (such as Modeler and AcoustaCADD) EASE is based on advanced acoustical algorithms, and to intelligently interpret the results of the simulations requires an intimate working knowledge of recent developments in this field. The manual for EASE needs a bibliography and annotation of reference material, especially for RASTI, image modeling (generally known as ray-tracing, though technically this is not correct), and the like. While qualitative guidelines are provided in the tables for %ALcons and RASTI, more of this information is needed. Reviewing a very early version "1.0" of software is an exercise in chasing a moving target. Many rough edges that you comment on are smoothed out as the article gets to print.

## WHO IS EASE FOR?

Most acoustical consultants will be com-

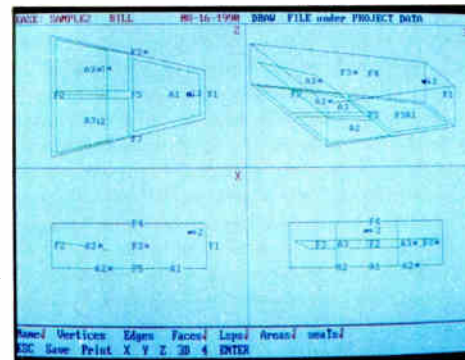
fortable with this program, though it will be a lot to handle for most sound contractors, at least at first. A hotline is provided for users of the program, and seminars are being given on its use and application.

EASE was conceptualized as an engineering tool for acoustical consultants. Dr. Ahnert views with disdain any use of the program as a sales tool, although in spite of his best intentions, the powerful 3-D graphics will surely have a positive influence on potential, customers and clients. To use EASE to its fullest potential, the user would need a strong background in acoustics. Those less accomplished in acoustical engineering can initially limit themselves to coverage simulations and expand from there.

Programs such as EASE, Acousta CADD, Modeler, CADP2, and acoustic test instrumentation akin to TEF, SYSid, MLSSA, and Hyperception bring up the question of the depth to which sound contractors are qualified to be doing acoustical engineering. Powerful tools will generate lots of data, but they must be interpreted. Even correct interpretation will often still require further diagnosis and corrective action. When is the point reached where an acoustical consultant should be called in? How much should the sound system attempt (by high Q speakers located close to the audience) to compensate for poor acoustics, rather than curing the source of the problem? Knowledgeable speaker engineers will admit that the sound quality of high Q horns are inherently inferior to their lower Q siblings. Should sound contractors specify and install acoustical treatments? Luckily, this is a review of EASE, so I can avoid these troublesome questions!

## PROGRAM FLOW AND USER INTERFACE

EASE operates from a hierarchical menu organization. All operation is through the keyboard, and mouse operation is not yet supported. A "beta" mouse version exists, but presently the mouse capability has bloated the memory requirements of the program, so mouse-lovers will have to wait until this version finishes its diet. Con-



Multiple views of room model.

textual HELP is available whenever a menu item is highlighted and when the user hits the F1 special function keys.

The user starts off with the SETUP menu. Here is where you configure the program as to the directory the program is located, tell EASE where to look for the data (design jobs and speaker library), and select the standard of measure (feet or meters). You can switch between meters and feet at any time by going back to the SETUP menu and typing either *m* for meters or *f* for feet.

After the SETUP menu, you advance to the SUPERVISOR menu. This menu deals with the housekeeping of starting or reviewing a design project, SUPERVISOR is also the path to the PROJECTS menu, from which you can originate a new job or list the existing project names.

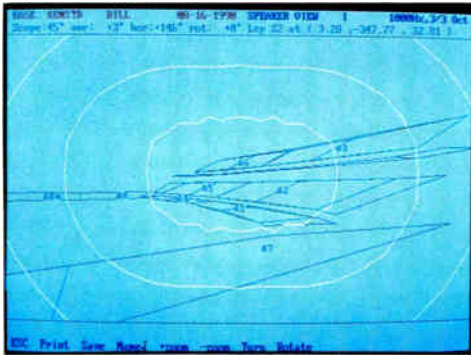
To start a new design simulation, you begin with the CREATE PROJECT menu. A DATAFILE table appears.

Defining the room model begins in PROJECT DATA/edit room menu. Indoor or outdoor space is selected. You might want to specify outdoor space for quick estimating of an indoor job, as a number of specification parameters can be omitted.

After you jump through all these hoops, you return to the "extended Project menu" and will find that while you were creating and preparing files the option of continuing on to the simulations has been added. If you have not properly prepared the program to continue, then the simulation option will not appear.

It is apparent to me that this initial release of EASE requires a little too much "housekeeping." Certainly a few of its latest competitors manage to get through the preliminary stages preceding computer modeling without so many sub-sub-menus and keystrokes. On the other hand, while these extraneous steps tend to stretch out the initial learning curve and tend to put off the uninitiated, experienced users





*A look at the audience seating from a horn throat.*

should be able to jump through the opening steps in a few minutes, and should not find the front end preceding the simulations a serious or noticeable problem. Still, I would prefer a more intuitive and cohesive organization without so many layers, nooks and crannies.

### CREATING THE ROOM MODEL

To start creating the room model, you look over the prints for the space, and determine how you will obtain key dimensions. A drafting board with a drafting machine is one approach, or you can scale and mark off distances on the print itself, or maybe you have just started to use one of those nifty handheld digital plan measures [Sound & Communications, December 1990]. In any case, once the drawings are in front of you, check for symmetry. If the space is symmetrical (the room is the same to either side of the center line) then only half of the coordinate data needs to be entered, as EASE features mirroring. Next the 0,0,0 point is placed on the axis of symmetry. At this point a 3-D sketch will help you visualize the Vertices and Faces (planes). Faces can have up to 10 corners.

EASE does not allow adjacent faces in the same plane, which is a pain when you do want to quickly approximate a room model with a balcony. EASE insists that the underbalcony ceiling and the balcony floor be defined separately. A line without thickness is a no-no. Since the underbalcony ceiling never has as steep a pitch as the seating above, I guess this is legitimate, but I would rather retain my options on short-cuts. [Just as this month's deadline hit, I received an updated manual which (I think) says that you now can have adjacent planes, side by side. More on this next month.] Face labels are defined (F1, F2, etc.).

The user defines the faces in the first phase of creating the room model, and

then later returns and specifies the acoustical characteristic of the faces. My preference is for programs that define the face coordinates and then immediately require you to specify the surface characteristics. This prevents forgetting to specify materials for a plane, and avoids the waste of time of returning to every plane all over again.

Vertices coordinates are determined by scaling the drawing. Entering a complex 3-D room model in EASE is time consuming. The use of a mouse as part of a visual approach to defining location is less tedious than keyboard entry of data and would be a real enhancement to EASE.

Speakers and their location coordinates are defined and entered, again by manual keyboard, but aiming requires the operator to return to this utility later. I have found coarse location and aiming of speakers by mouse, followed by a spreadsheet fine tuning to be more efficient. But...

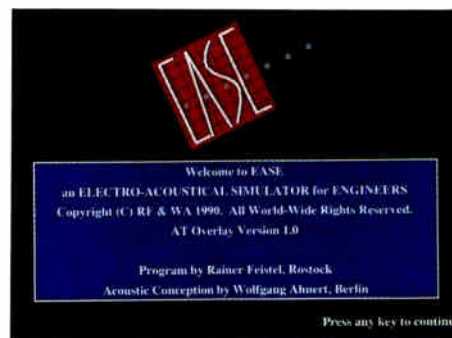
There are two ways to expedite the creation of complex room models. One is to edit an existing room, and the program comes with four example models. The model closest to the job at hand is called up and printed out in 3-D. The data to be modified to the new job are named, and the vertices that are different from the example job are edited, followed by editing of the surface materials and speakers.

### AND AutoCAD FILE INTERCHANGE!!

At the Los Angeles Audio Engineering Society convention, file transfer between AutoCAD release 10 and EASE was demonstrated. Instructions for both import and export are included in the release manual and the necessary utility programs are now included in EASE. The room drawing must be created with AutoCAD release 10, and in 3-D. To import the room envelope and its coordinates, speakers, and audience seats, a number of criteria must be met and procedures followed. Faces (planes) must exist on a layer named FACES, and must have been drawn as 3-D faces. To convert an existing 3-D file not specifically created for use with EASE, you

will need to rename this layer. EASE limits corners to 10 per face. Edges are drawn as "LINE" and must be in a separate layer, which must be named (or renamed) EDGES. Areas and seats must also be in separate layers. Seats are drawn, like speakers, in outline mode. Seats must face the front of the room and EASE defines the acoustic center of the seat as the listener's ears (this makes sense!). A chair drawing is supplied by EASE.

Speakers may be imported into EASE, although it is unlikely that you would received a drawing from an architect that would include speakers. On the other hand, you would probably want to create your cluster drawing within AutoCAD, and perhaps even superimpose it within the room drawing that was prepared by the architect. Following the guidelines provided in the manual, you can also import



*Opening screen shot of EASE.*

the coordinates and surface features of the speakers into EASE from the AutoCAD room/cluster drawings. Loudspeakers are drawn in outline mode with AutoCAD commands (in AutoCAD). The front of the speaker must point away from the front of the room (away from the stage). Included with the EASE program is a utility that adds "acoustical smarts" and asks for the speaker name, coordinates of the acoustic center relative to the enclosed exterior. This utility has great possibilities. I hope to see its capabilities expanded in the future to include automatic collision detection between components, automatic packing for the tightest practical coherent (time

*(continued on page 75)*

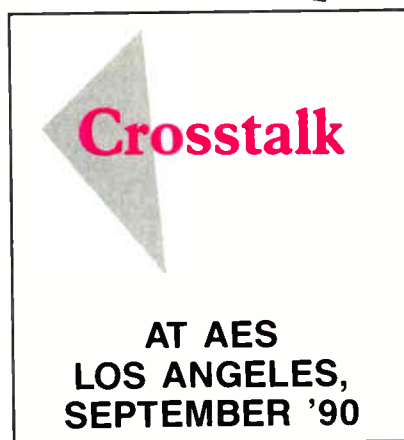


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# NEWS FROM AROUND THE INDUSTRY

## Moves Made; Contests Won; Speakers Installed

### ORFIELD ASSOCIATES MOVES

Orfield Associates, Inc. of Minneapolis has moved into their new offices and laboratories in the former Sound 80 recording studios. In addition to general offices, the facility includes laboratories for testing, research and architectural consulting in acoustics, vibration, lighting, daylighting, audio, video and "human factors." According to Steve Orfield the facility is the only private multidisciplinary lab of its type in North America.

### BURNS AUDIO EXPANDS

Los Angeles based Burns Audio has opened a third facility in the Washington, D.C. area. The east coast facility is being directed by David Hoover, who is responsible for management of the 6,500-square-foot offices, service center and warehouse facility. Bruce Burns, president of the company, said, "Large-scale live television specials are being produced on the east coast. There is need for a specialized sound reinforcement team to meet the sound requirements of today's concerts, TV programs, conventions, film and special events." Equipment includes Apogee speakers, Ramsa consoles and Vega wireless mics.

### MILITARY INSTALLATION

JBL has announced several installations of their professional products. The U.S. Military Academy at West Point, New York has purchased JBL loudspeaker components for a system to be used to supplement and enhance on-field halftime activities for Army football games. The components were installed in custom cabinets designed by AST in New York. Among the products used were two 2241H 18-inch low frequency transducers, two 2226H 15-inch low frequency transducers and MI-291 high frequency power packs.

Charlie Spataro's A.V. Workshop in New York has added JBL SR loudspeaker systems to its stock of rental equipment.

### HOTEL SHOW

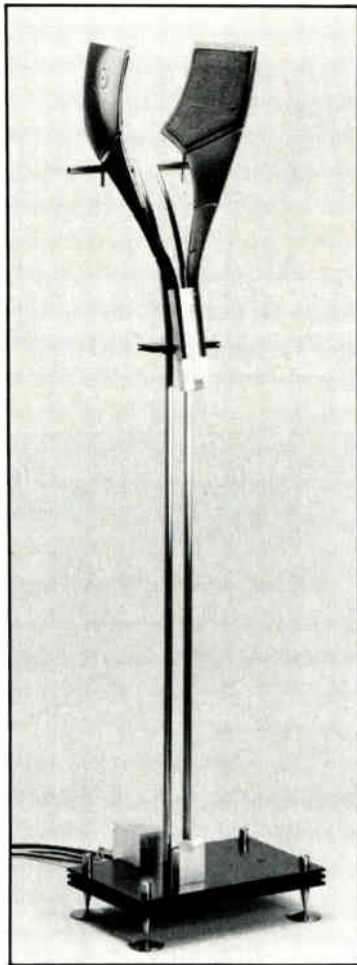
The International Hotel/Motel & Restaurant Show, held this fall, had more than 57,500 attendees and 1520 exhibitors. The association celebrated its 75th anniversary in 1990. Thirty seminars were conducted.

### LIGHTING SHOW SUCCESSFUL

LDI90, the Lighting Dimensions show that took place in November, had a 64 percent increase in attendance and a 40 percent increase in exhibit space, according to show management. Nearly 6,000 people attended.

### CONTEST WINNER

A contest for designing non-traditional headphones was held by Sennheiser Electronic KG in Germany. Winners were Till Kobes for first prize and Jan-Michael von Lewinski for second. The motto of the contest was "How to transmit music to the ear."



Sennheiser Design Contest Winner

### AQUATIC SPEAKERS

University Sound's underwater loudspeakers have been installed in the Rosebowl Aquatics Center. Eight University Sound UW-30 loudspeakers are mounted in the diving pool of the \$4 million aquatics complex in Pasadena. The facility will house four separate swimming pools. The UW-30 is a sealed loudspeaker used in swimming pools for synchronized swimming and PA applications. It can be modified for pressure fitting for utilization at depths greater than 10 feet to 30 feet or more, and can be used in both fresh and salt water environments.

### CONFERENCE PLANNED

PARA, the Professional Audio Retailers Association, plans its eleventh annual conference for March 1 through 5 at the Hilton Palacio Del Rio in San Antonio. It will feature the third annual PARA Management Institute. Eli Harary, PARA Vice President, said the March conference has added two advanced tracks to the four courses given in the past.



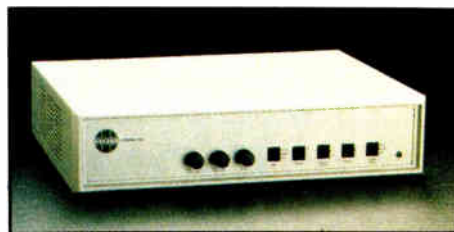
Eli Harary, PARA

### BRYSTON TO OLYMPICS

CBS has purchased 39 Bryston 2B-LP amplifiers for use during the 1992 Winter Olympics. Four have been delivered for use in editing room systems. The remaining 35 are scheduled for delivery in March. Studio Consultants, Inc. in New York handled the sale, Bryston's first to the network.

### SCAN CONVERTER

The RGB/Videolink 1450AX is an auto-sync scan converter that transforms high resolution computer graphics to television format. It automatically synchronizes to any computer signal with a horizontal scan rate from 21.5 to 80 kHz. According to the company, the Model 1450AX is the lowest priced scan converter to automatically accept the full range of computer and workstation signals. RGB Spectrum has a line of video scan converters. The 1450AX provides composite (NTSC or PAL), RGB, S-Video and Betacam/MII outputs.



RGB Spectrum Scan Converter

### FSR ANNOUNCES

FSR Inc. has announced several installations of its ML-112A Ballroom Combining System. Adrian's of Honolulu installed two systems at the Intercontinental Hotel. A four-room system was installed in Jakarta by Catur-Mitra Adhikara. American Amplifier of Virginia installed a four-room system at the Andreas Air Force Base NCO Club. The system combines up to ten rooms. Over 250 systems have been installed worldwide.

### WIRE PLANT

Cat Wire and Cable Corporation has opened a manufacturing plant for production of electronic wire and cable in Miami, Florida. The 15,000 square foot facility includes a quality control and test lab. The company will offer UL and CSA approvals on request, and offers engineering assistance in the design of new cable products for specific customer applications.

## TRAINING SYSTEM

Oval Window has introduced its 3-D induction assistive listening/auditory training system. The system receives an audio signal from a speaker's microphone or other sound source and transmits the signal directly to the listener's hearing aid, Tactaid, induction receiver with headphones or cochlear implant switched to the "T" or "MT" position.

## TENTH ANNIVERSARY

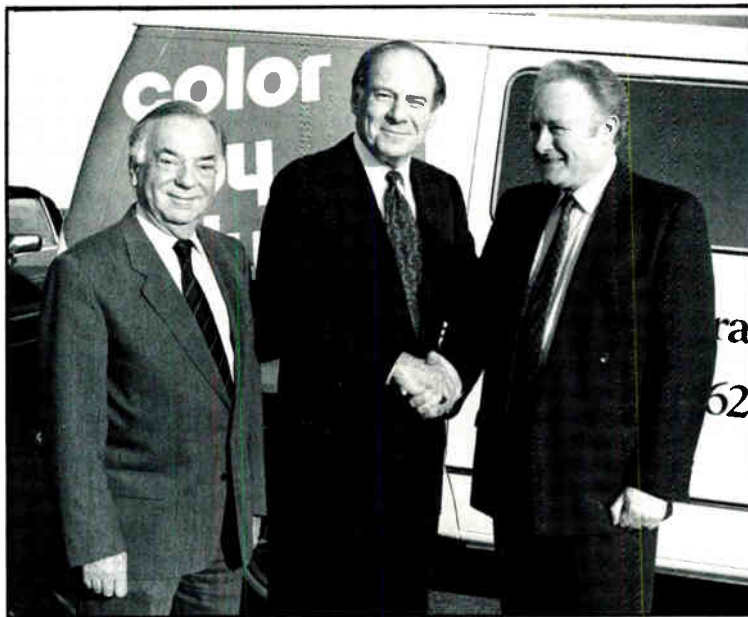
FSR, Inc. is celebrating its tenth anniversary in February. William Fitzsimmons, president of the company, said, "We've grown from a few modules to over 150 products and systems, as well as a fully computerized metal fabrication department." The company is headquartered in a 30,000 square foot facility in West Paterson, New Jersey.

## TEF TRAINING

Full Sail Center for the Recording Arts has become an official training facility for the TEF System 20 Sound Lab from Techron. John Storyk is integrating the TEF System 20 audio analyzer into his Acoustics course at Full Sail. Guest lecturers will include Larry Shank and Jim Bumgardner of Techron.



Left to right: Steve Phelps and Jon Phelps, Full Sail; (behind) Jim Bumgardner, TEF; John Storyk, designer and instructor; Ed Haddock, Full Sail.



Left to right, Jim Downer, Rank Film Lab; Bud Stone, Deluxe; Jim Daly, Rank.

## DELUXE SALE

Deluxe Film Laboratories has been sold to the British entertainment group, The Rank Organisation PLC. The sale includes Deluxe's trademarks, its film laboratory and video mastering facility. Total consideration was \$150 million.

## CALENDAR

### Upcoming Events

#### MARCH

**Musik Messe:** Frankfurt, Germany: Contact: (619) 438-8001. March 2-6.

**ENTELEC (Energy Telecommunications & Electrical Association):** Houston, TX: Contact: (301) 468-3210. March 4-6.

**Video Expo:** San Francisco, CA: Contact: (914) 328-9157. March 4-6.

**CAMP (Computer Aided Graphics, MultiMedia and Presentations):** San Francisco, CA: (914) 328-9157. March 4-6.

**Nepcon Europe:** Birmingham, UK: Contact: (203) 352-8476. March 19-21.

**Interface '91 Plus:** Atlanta, GA: Contact: (617) 449-6600. March 26-28.

**SOUTHCON:** Atlanta, GA. Contact: (213) 772-2965. March 26-28.

**Int'l Mobile Communications Expo:** Anaheim, CA: (303) 220-0600. March 26-28.

## REP NEWS

### Bally Reps

Young & Co. of Glendale CA has been named manufacturer's representative for Bally Engineered Structures, Inc. with responsibility for modular structures sales in southern California. Key members of the company include Bill Chowanec, president; Chuck Grace and Ray Harlow, associates; and Pam Nadelman, inside sales.

### Lewis Joins Loppnow

Will Lewis has joined Loppnow & Associates, the manufacturers's representative for the northwest. Jim Loppnow said of the appointment, "With the addition of Will, we plan to concentrate on being a more service-oriented firm with added support for both the manufacturer and the dealer." Loppnow & Associates, based in Issaquah, Washington, has been representing professional and commercial audio, lighting and security manufacturers in the northwest for nine years.

### Corby Adds Rep

Joel Stokka of MultiTech Representatives has been named sales representative for Corby Industries. Prior to joining Corby, Stokka worked for Honeywell for 11 years, and most recently was owner of Alarmtronics.

### University Appoints Pappas

University Sound has appointed Pappas Consulting of Menlo Park, California, as its sales representative of commercial sound products in northern California and northern Nevada. Mike Pappas is the owner of Pappas Consulting.

## SOUNDCRAFT SALES

Soundcraft has announced several sales of its consoles. Timberline Productions in Phoenix has purchased a 16 channel 200 B/VE console from E.A.R. in Phoenix. Bridges Auditorium at Claremont University Center in California has purchased a 24 channel 200 Delta console from Filament Pro Audio for the facility's sound reinforcement system. Jesse Auditorium at the University of Missouri has installed a 24 channel 200 Delta purchased from Superior Sound. New Covenant Church in Livermore, California has purchased a 16 channel 200 Delta console from Audio Images in San Francisco. Martin Audio in New York has sold a 16 channel 200 Delta console to Lifetime Television.



# PRODUCTS

## Shure Teleconferencing



The Shure ST6300 Type 2 console.

### Teleconference System

Shure Teleconferencing Systems has introduced the ST6300 Type 2 teleconference system. The ST6300 Type 2 is an audio system designed for videoconferencing and 4-wire applications.

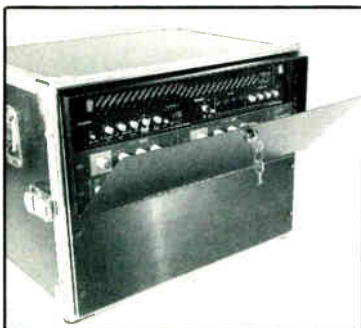
Features of the system include "Full-Duplex Plus" audio with 15 kHz bandwidth capability. Echo reduction circuitry is also included which claims to minimize room noise and reverberation pickup using automatic microphone control that keeps one microphone open for each voice.

Circle 1 on Reader Response Card

### Security Cover

Raxxess Metalsmiths has introduced a locking security cover. The Raxxess cover consists of a steel frame that mounts to the rack rail. A 16 gauge steel door hinged to the bottom of the frame locks over the gear to prevent tampering with mounting screws. The system is available in two and four space configurations.

Circle 2 on Reader Response Card



### CCTV Zoom Lens

Chinon's 2/3-inch C-mount autofocus zoom lens for videoconferencing environments combines active-infrared autofocusing technology with 6X power-zoom capability.

The CL600, designed especially for solid-state CCTV cameras, provides continuous, automatic point-and-shoot capability. In addition, the AF zoom lens can focus continuously on individuals even as the meeting room is being panned.

Circle 3 on Reader Response Card



### Overhead Projector Goes International

The Audio Visual Division of Dukane Corporation has announced the Model 657 Professional Overhead Projector, with an A4 aperture and a 220V/240V power supply that can be adapted to either voltage level. Features include a 250 watt quartz halogen lamp, 2,500 lumen output, triple element projection lens and rack and pinion focus mechanism. According to Dukane, the high efficiency fan permits optimum operation with LCD panels.

Circle 4 on Reader Response Card

### Crimp Kit

A BNC coax crimp connectorization kit for RG-58/59/62 coax is now available from Alpha Wire Corporation. The AT-KIT-1 is an addition to its "Wire Management" program that organizes non-wire products for interconnect needs into six product groups: harnessing, shielding, handling, connecting, identifying and routing.

Circle 5 on Reader Response Card

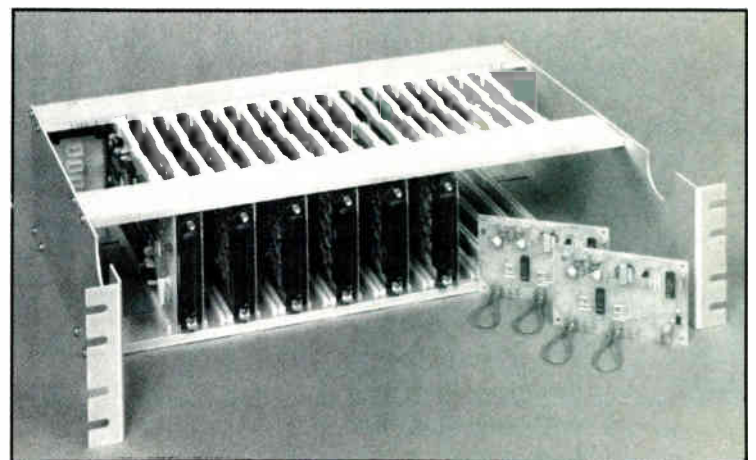


### System Integrity

Keltron has introduced its "Tones Nest" system for transmission of reverse polarity alarm signals over fiber-optic and other voice-grade telephone lines.

Miniature Keltron transmitters at customer premises encode reverse polarity alarm signals from voltage to frequency (tones) for transmission via voice-grade telephone lines to remote central monitoring facilities.

Circle 6 on Reader Response Card



Panasonic's model CT-2790VY color monitor/receiver.

### Business Monitors

Three diagonal color monitors/receivers have been introduced by the Audio Video Systems Group of the Panasonic Communications & Systems Company. Designed for business and educational applications the 27-inch CT-2790VY and 20-inch CT-2090VY include flat, fine-pitch picture tubes and 550 and 450 lines of horizontal resolution. Other features include an S-Video output, variable audio output, a 155-channel PH14 tuning system, a dome speaker system and wireless remote.

The CT-1390V features include a 13-inch diagonal picture tube with 90 degrees deflection and a high-contrast picture tube.

Circle 7 on Reader Response Card

### Production Cart

The Nalpak Production Kart is built on the Magline Convertible that converts from two-wheels to four-wheels via a lever. Shelves and bedplate can be added. Additional accessories include fish pole and umbrella mounts, and an umbrella all-weather production tent.

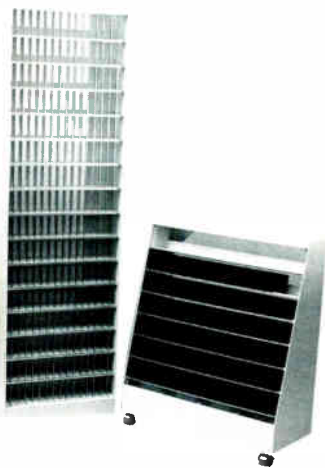
Circle 8 on Reader Response Card



## Video Cabinets

TCS has introduced its Video Tape Systems. These cabinets provide individual dividers for video cassettes. Designed for 1/2-inch Beta, D-2, MII and VHS formats, TCS will analyze space requirements and provide a design for your application. Made of 1/4-inch ABS plastic frame and shelf material, cabinets can be modified to become mobile.

Circle 9 on Reader Response Card



## Near Field Subwoofer

Tannoy has introduced the PS-88 subwoofer for near field reference applications. Designed for under-the-console placement the unit uses a 100-watt proprietary amplifier to overcome a 12 dB-per-octave roll-off and enable the unit to reproduce the frequencies below enclosure resonance.

Circle 10 on Reader Response Card



## Intercom System

The T-S-K Series 6000 intercom system from T-S-K Electronics is a modular system whose main chassis has a 48 station capacity and can be rack or desk-top mounted. A recurring call-in circuit is designed so that every call is answered.

Circle 11 on Reader Response Card

## DMM Test Lead Kit

Pomona Electronics has introduced the model 5673 test lead kit for use with digital multimeters in plant maintenance and electrical servicing applications. The kit features a "Pop-Jack" banana connector designed for problems of loose test lead-to-probe or clip connections.

The kit contains two red and two black Pop-Jack insulated battery clips, silicon-insulated multimeter test leads with sleeved 90 degree plugs, Pop-Jack probe handles, slide-on tip extenders and Pop-Jack banana couplers.

Circle 12 on Reader Response Card



## CD Addition

The Musikos music library has available a CD release called Musikos 556. It is the first new CD since the introduction of a 12-CD library last year.

According to Musikos CEO Jerry Jones, the new CD offers sounds including pseudo classical, up tempo industrial, futuristic rhythm and movie-type themes.

Circle 13 on Reader Response Card

## Repairable Oscilloscope Probe

Test Probes, Inc. has introduced a 250 MHz Repairable Oscilloscope Probe with X1 and X10 switchable attenuation factors in one probe. Features include compensation for high and low frequency to optimize pulse response, 1.4 nanosecond risetime, compensation range allowing use with any scope with a one-megaohm input resistance.

Circle 14 on Reader Response Card



## White Speakers

Bose has introduced four white models of 102 surface mount speakers. The speakers feature matching white brackets and identical acoustic and electrical characteristics as the black 102.

The 102 also features an injection molded polypropylene enclosure with matching steel grill and threaded insert mounting points on the sides and bottom.

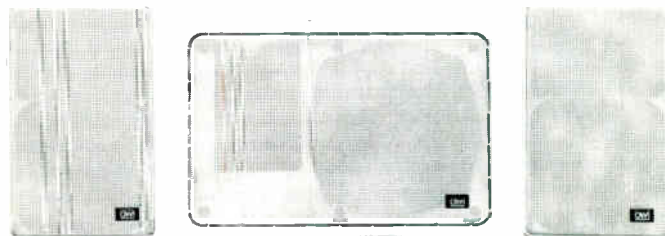
Circle 15 on Reader Response Card



## Video Doorphone

CSI has announced its VDP-2000A, a 2-wire video doorphone system. The unit incorporates a duplex telephone type intercom as well as an auto iris, one-third inch CCD camera with a digital signal which comes with infrared LEDs for night and low light use. Up to three monitors can be hooked up to the outdoor camera for multiple monitoring locations.

Circle 18 on Reader Response Card



## Outdoor/Indoor Speakers

OWI, Inc. has introduced a multi-mini loudspeaker system, the OWI-290, that includes a subwoofer and two two-way satellite speakers, both components are weatherized.

The sub measures 6 3/4 inches high, 10 inches wide and six inches deep. The satellites are seven inches high, 4 1/4 inches wide and four inches deep.

Circle 16 on Reader Response Card

## Sequential Switchers

American Dynamics has introduced two sequential switchers for CCTV systems. Both the AD304L four-position and the AD308L eight-position looping switchers perform switching and camera call-up functions in small CCTV systems.

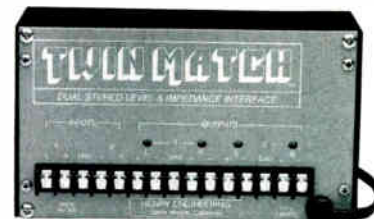
Both of the switchers provide automatic sequential switching of any of the input cameras to a single monitor. Any camera can be skipped in a sequence so that the user can concentrate on priority cameras.

Circle 17 on Reader Response Card

## Converter

TwinMatch is a dual-stereo level and impedance converter from Henry Engineering. It is designed to interface a pair of stereo CD players with a +4 dBm balanced audio system. Each of the four inputs accepts an unbalanced signal at -10dBv and amplifies it to a +4 dBm balanced output.

Circle 19 on Reader Response Card







### Wall-Mount Mixer/Amp

Clarity has announced its line of wall-mount mixer/amplifiers for microphone and telephone access. The unit is available in 15, 25, 60 and 100-watt configurations.

They are designed so that no equipment rack or special mounting is necessary. Telephone, microphone and auxiliary inputs are included, as well as a built-in tone generator and automatic level control.

**Circle 20 on Reader Response Card**

### New Console

Allen and Heath USA has announced the Scepter 2 console. Based on the Scepter rack mixer, the Scepter 2 is designed for entry level users in the sound reinforcement, contracting and home recording fields.

Three frame sizes introduced include eight to sixteen input configurations.

**Circle 21 on Reader Response Card**

### "Price-Fighter" Presented

Burle Industries, Inc. has presented its "Price-Fighter" TC550 Series one-third-inch format solid state CCD camera. The TC550 and TC550X offer a one-third-inch format CCD image sensor providing 510 horizontal by 492 vertical active pixels and 500 by 582 active pixels respectively. Horizontal resolution is 380 TV lines. Minimum illumination is .25 lux. All ac models include phase adjustable line-lock.

**Circle 22 on Reader Response Card**



### Computer Control

Mastervoice, Inc. has introduced the Series II computer. The Series II is a computer that listens to the sound of a voice and controls everything electrical from lighting and entertainment systems to sprinklers. The Series II is designed for the 4,000 square-foot and up home.

**Circle 23 on Reader Response Card**

### Pro Amp

Electro-Voice has introduced its AP3200 two-channel power amplifier. The AP3200 provides 600 watts per channel into four ohms and 400 watts into eight ohms with both channels driven. It is rated at 1,200 watts bridged mode into eight ohms with a 15 amp fuse, and is capable of driving 2-ohm loads on each channel.

**Circle 24 on Reader Response Card**



### Micro CCD

Elmo Manufacturing Corp. has announced the availability of Model MN401, a one-half-inch remote head CCD micro color video camera system. The camera head and control unit can be separated up to 100 feet by cable. The unit features a CCD image sensor with 380 thousand pixels yielding a resolution of 460 lines horizontal. The remote camera head weighs less than one ounce. The unit also features Y/C output, composite video output and nine electronic shutter speeds. A sensor system tracks the white balance.

**Circle 25 on Reader Response Card**



### Multiplexer Modified

Vidplex, Inc. has announced the modification of their video multiplexer, Vidiscan. It now has eight matrix displays with automatic sequencing of any image in any display. One Vidiscan can be installed into an existing system, allowing viewing of up to 16 pictures simultaneously on one TV monitor. The unit can identify each image in each display with up to 928 characters on 16 lines, through the use of its internal character generator. Vidiscan multiplexers are available in monochrome and color.

**Circle 26 on Reader Response Card**

### Digital Audio Delay

TOA Electronics' Engineered Sound Group has introduced the D-1103 one-by-three digital delay, designed to be used in theaters, concert halls, houses of worship, meeting rooms, arenas and stadiums.

Delay times range from 10 microseconds to 655 milliseconds. Ten microsecond increments are maintained throughout the entire delay range. The D-1103 is designed to achieve the delay required by remote speaker/cluster locations while concurrently performing the microsecond delay required for component alignment.

**Circle 27 on Reader Response Card**



### Room Combining Control

The Oxmoor Room Combining Control System provides remote control, multiple-system combining, and zone operation. As a matrixing and level control ensemble, the system is positioned between the line-level outputs of the individual system mixers and the inputs of the power amplifier. The RCM-4 Room Combining Module delivers both zone-combining and source-selection commands to an RMX-44 Mixing Matrix.

**Circle 28 on Reader Response Card**

### Processor-Controlled Amps

Dynacord has introduced the PCA Series processor controlled power amplifiers featuring dynamic signal processing. The amplifiers can be used with compact loudspeaker systems and feature a built-in processor and limiter. A Thermal Brain Circuit adds protection to the loudspeaker being used. The models available of processor-controlled power amplifiers include: the PCA 2250, PCA 2450 and PCA 2544.

**Circle 29 on Reader Response Card**

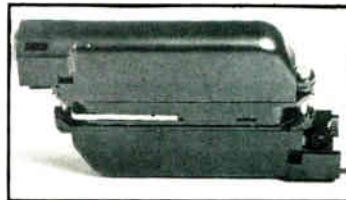


### Telecommunications Connector

The AMP Champ 50-position telecommunications connector is designed for single-connector or major-system field installations.

This cable-to-cable connector features insulation displacement-type contacts for termination of unstripped solid or seven-strand wire with the use of portable butterfly applicators or palm grip tooling.

**Circle 30 on Reader Response Card**



### Color Cameras

Toshiba Video Systems has introduced color cameras targeted for broadcast, electronic imaging, pro video and medical applications. The new units include the IK-M40A micro-miniature camera which features the company's 1/2-inch, 420,000-pixel CCD image sensor chip.

**Circle 31 on Reader Response Card**



### "Silent Server"

FSR, Inc. has introduced the Silent Server, an infrared wireless system that lets the guest or catering manager silently (or audibly) signal the catering staff. The paging system has a suggested list price of "under \$500" and comes complete with transmitter, pickup and selector box.

**Circle 32 on Reader Response Card**



## LITERATURE

### Lexicon Notes; Robot Guide

#### Application Notes

Lexicon is offering eight application notes on tips, tricks and techniques to owners of Lexicon PCM-70 and LXP-5 digital effects systems and the MRC MIDI remote controller.

The notes describe step-by-step procedures for Lexicon users of different backgrounds.

**Circle 33 on Reader Response Card**

#### Tape Bulletin

A new product bulletin from Panduit Corp., Electrical Group, Tinley Park, Illinois describes the company's line of detectable and non-detectable underground hazard tape. Designed to warn excavators of buried utility lines, the tape is available with appropriate preprinted legends in APWA approved colors. Custom legends are available upon request.

**Circle 34 on Reader Response Card**

#### Parts and Components

MCM has announced its catalog of 16,000 parts and components. Among the categories of products offered are audio parts and accessories, semiconductors, television parts, computer equipment, power centers and regulators, speakers and test equipment.

**Circle 35 on Reader Response Card**



#### CCTV Systems

Robot Research Inc. has released the "Coaxcontrol System Design and Application Guide." The guide is a reference book for those who specify, design or install CCTV systems which require camera control. It contains information on applications, system design, control station set up, application drawings, recommendations for system integration, and architect's and engineer's specifications.

**Circle 37 on Reader Response Card**

#### Test Instrumentation

The Instrumentation Products Division of Beckman Industrial Corporation has introduced its 40-page catalog of the company's line of test instrumentation and industrial products. The catalog contains products including digital multimeters, component testers, oscilloscopes, function generators and universal and frequency counters.

**Circle 36 on Reader Response Card**



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# AN INFORMATIONAL UPDATE ON DEVELOPMENTS

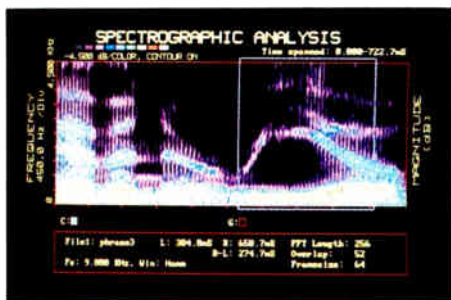
By Mike Klasco

Several new developments in CAD software and related hardware have occurred since our last column. Read ahead for developments.

## HYPERCEPTION DIGITAL AUDIO WORKSTATION

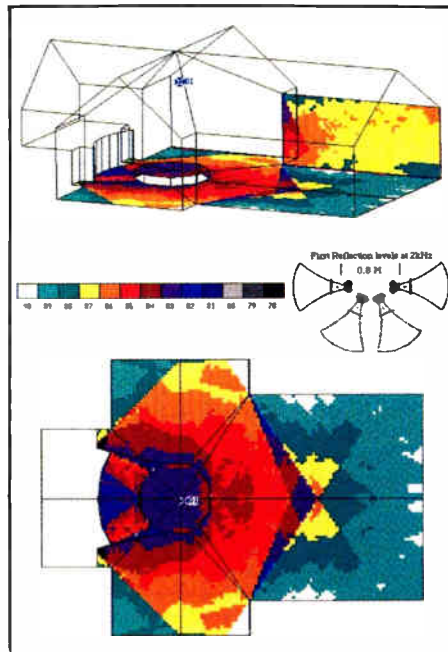
We recently promised you a review of Hyperception's signal analysis system. Hyperception Workstation is a powerful analysis package enabling acoustical consultants, sound contractors, speaker engineers and other inquiring minds to scrutinize acoustical phenomena.

As many of the most interesting features were just being completed as the magazine's deadline neared, it seemed sensible to wait until next month so I could have more time to work with the package before I reviewed it.



*Hyperception Workstation will be reviewed next month. Among its numerous capabilities is the color spectrogram.*

Presently, Hyperception will work with a number of IBM compatible plug-in boards, including Ariel's DSP-16 that is part of the SYSid package. Hyperception complements and extends SYSid operation. For audio people who are considering the Techron TEF, Hyperception has a



*JBL promises lots of goodies in CADP2, including snazzy high resolution color graphics and print capabilities.*

version of their package that will run on the TEF 20 IBM compatible system. I have included a few graphics from Hyperception Workstation to pique your interest until next month.

## TECHRON TEF 20

Techron finally started to ship the TEF 20 (IBM version) in late December. The Mac version will follow early in the first quarter of 1991. Don Davis has been using a pre-production unit and will soon be ready to comment on this test system. A full review is planned for this summer in Sound & Communication.

## AcoustaCADD

A new release of AcoustaCADD is coming, and ought to be out by the time you read this. More next month.

## CADP2

JBL's new program is still undergoing development. JBL is busy completing the program's transition to Microsoft Windows 3.0, the Macintosh-like pull-down menu/windowing environment. We hope to have a hands-on preview of CADP2 in time for our NSCA issue. JBL promises lots of goodies in CADP2, including RASTI (and %ALcons, AI) simulation predications, amplitude, time, phase, signal path, reverb calculations and predictions, 3-D room modeling, AutoCAD DXF file import, faster design and computation time, snazzy high resolution color graphics and print capabilities.



*The TEF System 20 supports both Mac and PC versions of Sound Lab software.*

## EASE

The new sound system design program distributed by Renkus-Heinz has finally been released. Our review of this program starts in this issue.

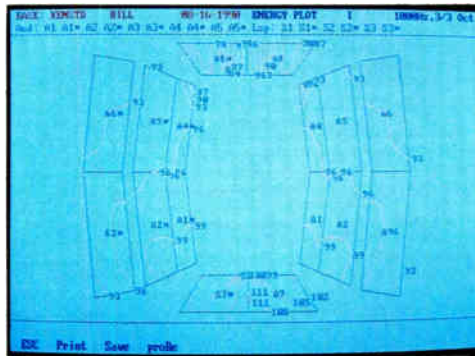
## COMPUTER-AUDIO BULLETIN BOARDS

The next CAD Topics will feature a survey and tour of computer bulletin boards that you can use your modem for to download audio software, from speaker box design to demo programs of the MLSSA, SYSid, Audio Precision test gear and more. ■

## EASE

(continued from page 66)

alignment) cluster, center of gravity data and maybe even generate the hanging links between components. These features can be variously found in Bose SpeakerCAD and Umbulus, but without file interchange with AutoCAD (actually SpeakerCAD can export cluster drawings into AutoCAD as bit-mapped graphics, but this is somewhat limited). A library of pre-drawn speakers, such as can be found in JBL's CADP and Bose SpeakerCAD would be an attractive option, but this can come in time. What is important is that a working file interchange between a sound system design program and AutoCAD has finally been demonstrated and released. A number of other competing programs also have promised file interchange, but EASE is the first to accomplish this feat. For now,



*Audience seating areas are defined as A1, A2, A3, etc. Note spot check of spl at a few locations by use of probe utility.*

EASE gets the prize; enhancements to this capability can come later.

Aside from importing the room model from AutoCAD, EASE will export, allowing loudspeakers to be placed into AutoCAD and viewed using their three dimensional physical data and original room

location. The hidden line option in AutoCAD enhances the visualization. EASE locates speakers by physical centers only, so using AutoCAD is a useful step in checking for collisions between components. Corrections made in AutoCAD can be imported into EASE to investigate the effects on acoustics. Up to six data files (seats, speakers, edges, faces, etc.) can be exported to AutoCAD, each to its own layer/color.

Next month we will take a close look at the full complement of simulations available from EASE. It offers comprehensive capabilities for both acoustical analysis and sound system engineering. Just about every possible variation is included, from spot checking isolated data points using the EASE "probe," to isobar projections, color intensity contours, intelligibility measures, obstruction effects, multiple source interference effects, and more. ■

## WIRELESS

(continued from page 25)

to less than 50% of normal and should never be attempted.

When both a line amplifier and a multicoupler are needed, it is possible to use both at the same time. It is also possible to use more than one coupler in series to drive from 5 to 16 receivers. The practical limit is 16 receivers; multicoupler driving

### **Adding an amplifier at the wrong end of the cable can often actually decrease range.**

four other multicouplers, each of which in turn drives four receivers. Using either a line amplifier and multicoupler combination or one multicoupler driving a second multicoupler will, unfortunately, further increase the possibility of encountering interference or overload. However, satisfactory operation will be obtained in most instances. Use of more than two active devices (two multicouplers or one line amplifier and one multicoupler) in series is strongly discouraged. It is sometimes possible to configure combinations of line amplifiers, splitters and multicouplers in such a way as to avoid some of the inherent limitations. Because these solutions depend upon the characteristics of specific

items of equipment, it is highly advisable to contact the manufacturer for technical assistance before proceeding.

A common question is whether or not it is necessary to terminate unused multicoupler outputs in 50 ohms. While it is always good practice to do this, whether or not it is actually necessary depends upon the characteristics of the particular piece of equipment. Leaving unused outputs unterminated may reduce the isolation of the multicoupler (the attenuation from one output to another output). Poor isolation can sometimes cause one receiver connected to the multicoupler to interfere with another connected receiver. For some units, this may be a problem even with all outputs terminated. This

### **Line amplifiers and multicouplers are usually separately powered.**

problem may appear when using multicouplers with inherently poor isolation or receivers with high leakage out of the antenna connector. In the event of problems with systems using either line amplifiers or multicouplers, it is a good idea to try connecting whip antennas directly to the receiver input to see if this corrects the difficulty. In troubleshooting this type

of system, the obvious shouldn't be overlooked. Line amplifiers and multicouplers are usually separately powered and it is often easy for the power to be turned off and become disconnected.

### **In some situations the use of cables is difficult or even impossible to avoid.**

Sometimes it is desirable to cover an unusually large area, to extend coverage to an isolated secondary area or to satisfy some other special or unusual requirement. In a majority of cases, it will be possible to provide the capabilities desired and to achieve good results. However, a significant amount of hardware may be necessary to properly implement the antenna and RF distribution systems. Purchase and installation of this equipment is likely to be expensive and mistakes may be costly. Because of this and the specialized nature of such systems, it is usually best to obtain expert assistance. Often, the wireless manufacturer can provide valuable assistance. However, because it is frequently necessary to make an on-site survey prior to preparing a design or making recommendations, it may be necessary for the manufacturer to make a referral to a qualified consultant. ■



# AD INDEX

Company	Page	RS #
Altec Lansing (405) 324-5311	37	213
AMX (214) 644-3048	15	209
Ashly Audio (800) 828-6308	45	251
ATI — Audio Technologies (215) 443-0330	47	257
Atlas/Soundolier (314) 443-3110	35	212
Audio Technica (216) 686-2600	9	208
Cal-Switch (800) CAL-SWCH	50	292
Community Light & Sound (215) 876-3400	61	252
Crown (219) 294-8000	3	201
DJ Expo (516) 767-2500	52	—
Electro-Voice (616) 695-6831	CII	210
Frazier (501) 727-5543	41	221
Full Discount Wholesalers (608) 273-5488	49	266
IRP Professional Sound (808) 640-9553	27	267
Ivie Technologies (801) 224-1800	21	256
JBL Professional (818) 893-8411	CIV	205
Karibu Sound (301) 383-2167	38	287
Lectrosonics (800) 821-1121	19	214
Lee Dan Communications (516) 231-1414	38	288
Menlo Scientific (415) 528-1277	75	253
Multiplex Technology (714) 996-4100	16	254
NSCA (708) 598-7070	63	—
Oxmoor (205) 985-7040	33	255
Quam-Nichols (312) 488-5800	4	204
Samson Technologies (516) 932-3810	6	206
Shure Brothers (708) 866-2553	13	207
Sonic Systems/Soundsphere (203) 356-1136	39	250
TAD — Technical Audio Devices (213) 816-0415	CIII	202
TekTone Sound & Signal (407) 844-2383	11	265
TV Tapes (516) 767-2500	67	—
University Sound (818) 362-9516	29	203
West Penn Wire (800) 245-4964	43	211

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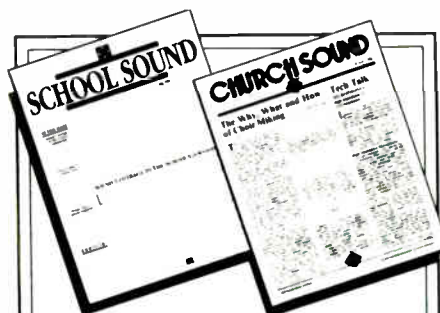
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## Mayworm at Robot; Mark IV VP

### Robot Appoints Director

Russell J. Mayworm has joined Robot Research Inc. as Director of Marketing.

Mayworm was most recently employed as Director of Marketing for VCS, a company specializing in intelligent switching and control communication systems.

Mayworm's position will include specialization in the sales and marketing of controls, switchers and other products.



**Mayworm**

### Gaines Named

Roger Gaines has been named a vice president of Mark IV Audio, Inc. Gaines will be primarily responsible for overseeing management operations for all of the companies in the Mark IV group. Gaines had previously served as vice president of manufacturing for Electro-Voice.



**Gaines**

### Alfiero at E-V

Chris Alfiero has been named marketing specialist at Electro-Voice. Alfiero is responsible for providing technical support for the company's music products dealers.

He previously served as a financial analyst for Mark IV Industries in Amherst, NY.



**Alfiero**

### Alesis Appoints Craig

Alesis Corporation has appointed T.D.

(Tim) Craig as the Canadian Sales Manager. Craig was formerly the Director of Marketing for Tartini Musical Instruments, an Alesis distributor. Craig also worked for Yamaha Canada in sales and

marketing management, and served as President of the Musical Industries of Canada.



**Craig**

### Phonic Ear Manager

Phonic Ear Inc. has appointed Scott Long as Territory Manager for Mississippi, Alabama, Georgia and Florida. Long's responsibilities involve sales for the company's three product divisions and serving customers.



**Long**

### Landfield at Bose

Bose Corporation has announced the appointment of Douglas Landfield as Director of Corporate Marketing. Landfield has spent most of his professional career with Bose. He has also held positions with Leading Edge and Microcom.

### Anixter Names VP

Anixter Bros., Inc. has appointed David Long to the position of vice president energy products. In this position, Long is responsible for product development and market program management for electrical wire and cable in the United States.

Long joined Anixter in 1988 and served as regional sales vice president and area manager in the company's central group.

### Allen is New VP

MultiLink, Inc. has appointed Bruce S. Allen to the position of vice president of engineering. Allen is responsible for product research, development and special engineering.

Allen was most recently vice president of engineering and co-founder of Jupiter Technology, and was previously director of distributed data systems at Gould's Modicon division.

### CFO of NAB

Kenneth D. Almgren has been named senior vice president and chief financial officer of the National Association of Broadcasters.

Almgren most recently was a financial consultant in Washington, D.C. and was previously vice president-finance, treasurer and CFO of the Arinc Companies of Annapolis, Maryland.

### Neal at Burle

Burle Industries, Inc. has appointed Steven C. Neal to the Security Products Division as Technical Application Specialist. Neal is responsible for handling incoming customer application questions and providing technical support for the Burle video products line.

Prior to coming to Burle, Neal was self-employed, contracting various CCVE and data telecommunication assignments.



**Neal**

### Raup Elected

Ron Raup, senior vice president, has been elected to the board of directors of Yamaha Corporation of America. Raup "will have the opportunity as a director to take an even more substantial position on our management team," according to Peter Suzuki, president of Yamaha Corporation of America.

### Leavitt at Gold Ribbon

Kenneth R. Leavitt has been named President and Chief Executive Officer of Gold Ribbon Sound Cinema, Inc. of Iowa City, Iowa. Thomas E. Simon, a co-founder who previously held this position, will now concentrate on his position as Director of Marketing.

Leavitt was formerly President and CEO of the Granitech Corp. in Fairfield, Iowa and previously held the same position with Boston-based CGX Corp.

### AEI Director

Bill Hogan has joined AEI Music Network as Director of Broadcast Services.

Hogan is responsible for directing AEI Music's Broadcast Services operations including a U.S. satellite transmission of five music formats on two satellites.

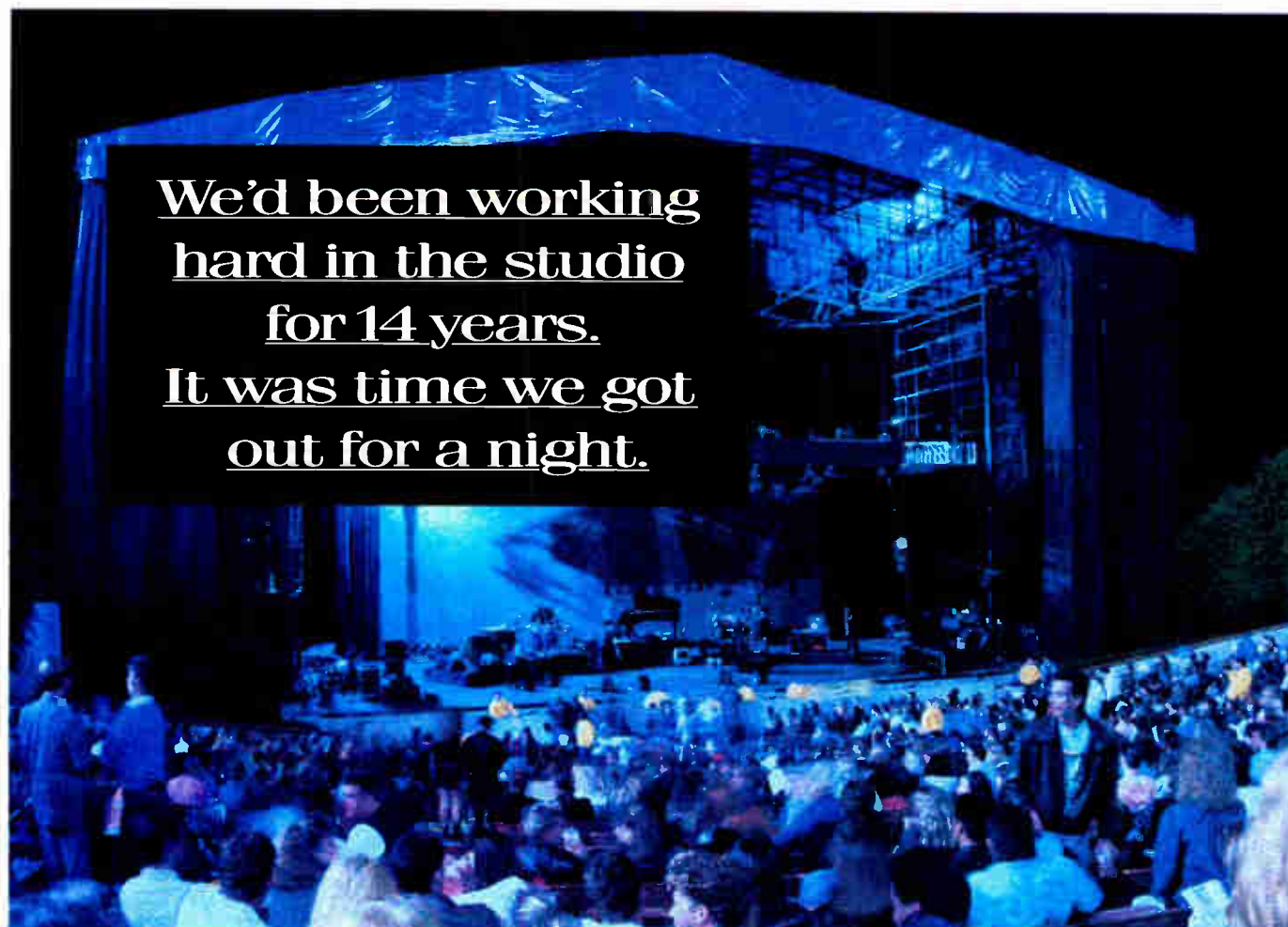
Hogan previously held marketing and product management positions for Scientific Atlanta's Broadcast Network Systems Group.



**Hogan**

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We'd been working  
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out for a night.

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Not that we won't still work our woofers off in studios from L.A. to London all day. But, at night, we'd like to get out and jam more often.

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