

SOUND & COMMUNICATIONS

Volume 39 Number 7

July 26, 1993

UPTOWN BARNES & NOBLE

The upper west side of Manhattan was rocked recently as only Manhattan can be — a new book store came to town. But not just a book store — a Barnes & Noble superstore, a category killer. Whatever the merchandising concerns, aficionados of books and of new uses for sound and communications should take an interest in the new store, as we do. **32**



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• ARTIST IN RETAIL

New artistry proceeds from sound and communications — with new problems in reproducing this new art. Christopher Janney, environmental artist/jazz percussionist and designer of interactive installations, talked with Sound & Communications of his plans and of his entrance into retail sound. **14**

• DR. WOKKA MEETS SPEC

If you, the robust contractor, need to meet spec for a whiny contractor, Dr. Wokka gives lessons in “vocal techniques for correction of realtime analysis data.” **38**

• AUTOMATIC MIC MIXERS

Even though they’ve been around for 15 years, enquiring minds want to know what they are and how they work. Rob Baum tells us, in part one of this series, some of the methods used by various products. **50**

CIRQUE DU SOLEIL

World renowned for its inventiveness, the Cirque du Soleil created a sound system of its own design for its fixed tent at the Mirage in Las Vegas. The design emphasized the ears, with no pink noise. **60**



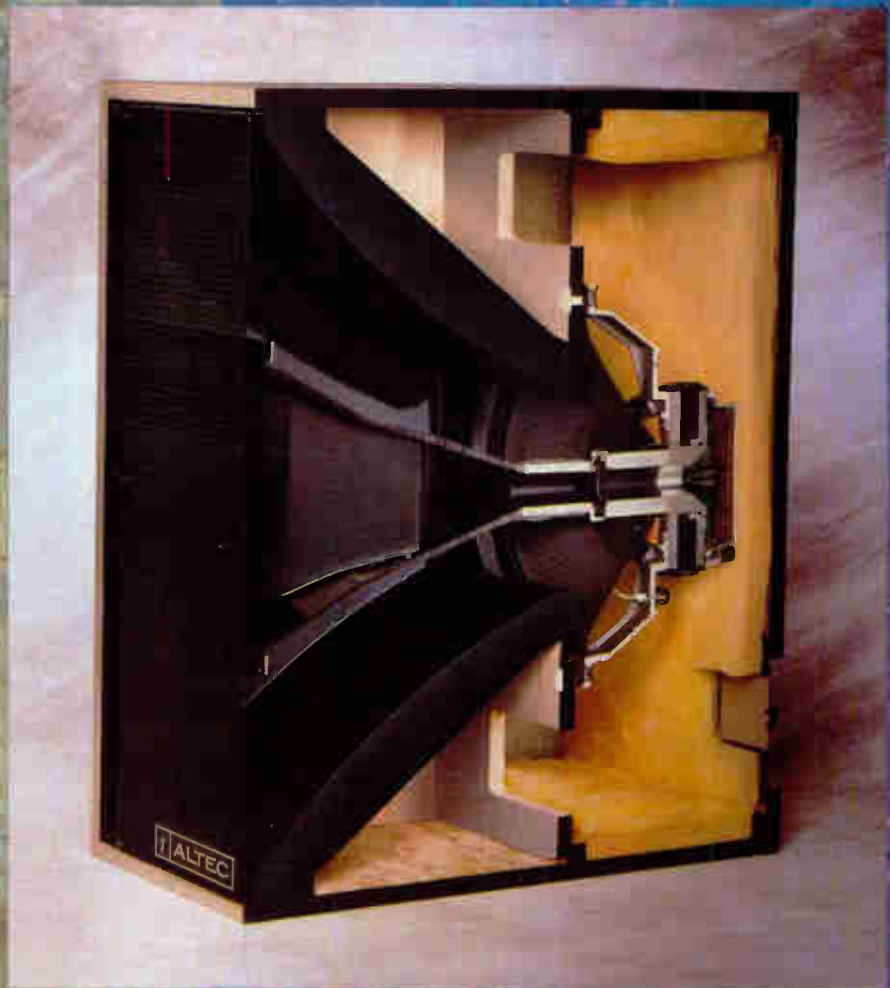
ALTEC 9864-8A

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- ❖ Cost Effective
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Primary Specifications

System Type:	Vented bass horn type, full range loudspeaker
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Frequency Response:	50 Hz - 18 kHz (equalized)
Power Handling:	HF: 75 w, AES: 150 w, continuous program: 300 w, peak power LF: 200 w, AES: 400 w, continuous program: 800 w, peak power
Maximum System Output:	127 dB SPL, AES method; 130 dB SPL, continuous power; 133 dB SPL, peak power
Dimensions:	3.5 in. (89.0 cm) high, 25.3 in. (64.3 cm) wide, 25.5 in. (64.8 cm) deep
Net Weight:	124.0 lbs. (56.2 kg)



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SWEEPS



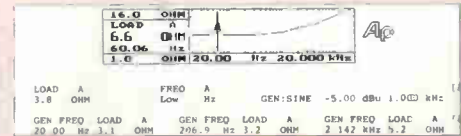
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 Tel: 34 91 431 1101 Sweden: Tel & Test Elektronik AB Tel: 46 8 71 80 20 Switzerland: Dr. H.A. Gammeter AG Tel: 41 1 31 2 41 44
 Taiwan: AOE Electronic Co. Ltd Tel: 886 2 276 2294 United Kingdom: S&S Technology Ltd Tel: 44 21 267 1122

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World Radio History

SVHS Hi-Fi



1-2

CH-2

Hi-Fi



MONITOR OUT
METER
Hi-Fi



CH-1
MIX
CH-2



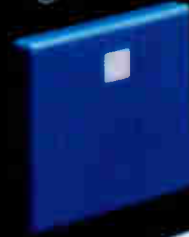
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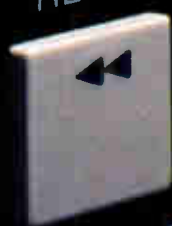
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TRACKING CH-2 METER
FIXED AUDIO



HEADPHONES
CH-2



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INNOVATION AT WORK.

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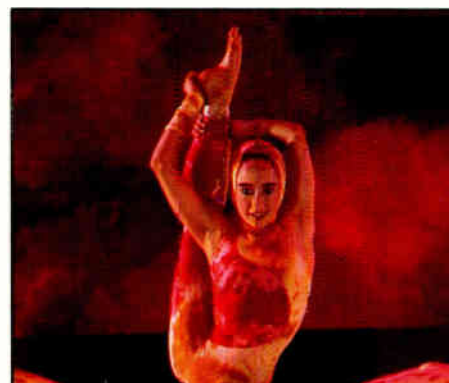
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By Judith Morrison

The tallies are in and once again you have spoken on the important issues affecting your business. The results of our annual survey are within.

50 AUTOMATIC MIC MIXERS, PART ONE

By Rob Baum

Automatic mic mixers have been around for about 15 years, yet many sound contractors never specify them. Are there jobs that you should be using automatic mic mixers for that you're unaware? Do you avoid specifying these devices because you are not familiar with the functions and features?

60 CIRQUE DU SOLEIL

By Jesse Walsh

The circus' Nouvelle Experience troupe is presently in a 1,330-seat tent next to the Mirage Hotel and casino in Las Vegas. The sound system had to be small, yet be capable of providing high intelligible sound pressure levels with a limited number of enclosures, while reinforcing a small orchestra.

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NEWSLETTER

SANDERS JOINS SALTER

Charles M. Salter Associates, Inc. has announced that Philip N. Sanders has joined the firm, the consultants in acoustics and audio/visual system design. Sanders received a B.A. and M.A. in linguistics from Stanford University. His academic studies emphasized the acoustics of speech and speech intelligibility. He is assisting on the Walt Disney Concert Hall, the San Jose Repertory Theater, and a World Savings facility in San Antonio, Texas.

ROLAND US ACQUIRED BY ROLAND JAPAN

Roland US has been acquired by Roland Corporation Japan headed by Ikutaro Kakehashi, chairman of Roland Corporation. Since Roland US was established over 20 years ago, Roland Japan has held 50 percent ownership in Roland Corp US. A new president will be appointed in the near future. Tom Beckmen, president of Roland Corp US, has been retained as a corporate consultant.

AMX PURCHASES AXCESS TECHNOLOGY

AMX Corporation has announced that it has purchased Axxcess Technology Ltd. of York, England from its parent company, Sarner International Ltd. of London. Axxcess Technology will operate independently as a wholly owned subsidiary of Dallas based AMX. According to Scott Miller, AMX president, "Axxcess Technology will conduct its business in the same manner as our independent distributors, They will operate independently, and represent other manufacturers' product lines as well as AMX."

QSCONTROL TOURS WITH BUFFET

Sound Image is implementing QSControl, QSC's MediaLink based computer control system, during the course of the Jimmy Buffett tour which began June 3rd. Sound Image is one of QSC's largest purchasers with a count of over 700 QSC amplifiers. The Buffett tour is using Sound Image's own Phase-Loc system combined with sixty new EX series amps (35 4000s and 25 1600s) to coincide with QSControl. Randy Curlee, marketing director for QSC Audio Products, commented, "We are very pleased to be associated with Sound Image. Because of the tour's length and demanding venues, QSControl will prove its worth on this very high profile tour."

NEW SERVICES FROM NYNEX

New York Telephone has introduced Nynex Enterprise Services which allows additional services via mouse. Bandwidth on demand temporarily gives customers the ability to handle infrequent loads, among other services.

BOSTON ACOUSTICS NAMES THREE VICE PRESIDENTS

Boston Acoustics has promoted three executives to vice presidents. They are Paul Reed, who becomes vice president, administrative services, Debra Ricker-Rosato, now vice president, finance, and Bob Spaner, who moves up to vice president, sales.

ITCA SPONSORS VIDEOCONFERENCING DEMONSTRATION

The International Teleconferencing Association and Network Management Magazine sponsored the first-ever public demonstration of BONDING-compliant, network interface (known as inverse multiplex or I-mux) compatibility in a videoconference involving multiple locations, at the ITCA '93 trade show June 15-17. Elliot Gold, project manager for the demonstration said "Audio teleconferencing is now basically as easy as picking up your phone. Network interface interoperability — the breaking down and reassembling of signals so that more than one can be carried at a time — is the next big step in making videoconferencing as easy as audio teleconferencing."

ISC EAST EXPANDS

The International Security Conference & Exposition East announced its conference program for the Jacob K. Javits Convention Center in New York City, August 31-September 2. The program consists of 49 seminars and seven half-day workshops. Six category tracks focus on CCTV, Access Control, False Alarms, General Business and End-Users.

NEWSLETTER

RP SALES HOSTS CUSTOMER-ORIENTED AUDIO FAIR

RP Sales, Inc., an audio manufacturers sales representative firm based in Detroit, Michigan, recently organized and hosted a highly successful "mini trade show" for its customers. "The RP Sales Audio Fair," held May 4-5, featured equipment displays and demonstrations by representatives from each of the nine primary manufacturers that the group represents. More than 180 RP Sales customers from 45 audio retail and contractor companies attended the event.

SELECTROCOM FOUNDER DIES

Walter R. Murray, founder and former president of The Selectrocom Corporation of Greensboro, North Carolina, passed away on May 11. Murray founded Selectrocom in 1961 to work in language laboratory development and manufacturing. He remained president until his retirement in 1985.

SHARED TECHNOLOGIES INC. TO ACQUIRE SPECTRADATA, INC.

Shared Technologies Inc. (STI) announced that it has signed an agreement in principle to acquire SpectraData, Inc., a Connecticut-based provider of data communications products and services. Under the terms of the agreement, STI would purchase 100 percent of SpectraData's stock and SpectraData would become a wholly-owned subsidiary of STI. SpectraData's services include facilities management, fiberoptic system implementation, local and wide area network systems design, multi-vendor maintenance contract services and communication systems expansions and upgrades. Services offered by STI include local and long distance telephone service, voice messaging, 800 services, cellular telephone services, wiring and computer services.

ASSOCIATION OF AMERICAN RAILROADS INSTALLS VIDEOCONFERENCING NETWORK

The Association of American Railroads (AAR) contracted Videoconferencing Systems, Inc. of Norcross, Georgia to install a videoconferencing network. Initial installations will be at AAR headquarters in Washington D.C., AAR's R&D facility in Chicago and the AAR Test Center in Pueblo, Colorado. The systems include NEC video codecs operating at 384 kbps and NEC MCU 5000 multipoint control units permitting cascade connectivity for simultaneous participation of up to 20 separate sites.

74-MINUTE MINIDISC MADE AVAILABLE

The MDW-74, the first 74-minute recordable MiniDisc, from Sony's Recording Media Products Group, is now available at major electronics and music retailers. Stephen Nikkel of Tower Records said that MiniDisc "represents digital recording in an appealing format for customers.

NHCA GIVES AWARDS

The National Hearing Conservation Association (NHCA) awarded its first annual media award at the 18th annual NHCA Conference in May. The winners were Dorie Watkins with the Center for Hearing Health in Pleasanton, California and Bill Clark with the Central Institute for the Deaf in St. Louis, Missouri. Watkins was featured by an NBC affiliate in Sacramento Valley, California, in a segment that highlighted the OSHA form 200 issue and changes in threshold shift recordability. Clark was featured in a broadcast produced by Washington University in St. Louis that stressed the risks of recreational noise exposure to the young, with an emphasis on firearms and personal stereos.

AIPHONE "PUTS ON THE BRAKES"

An April 2nd letter from Aiphone Vice President, Operations Harry Quanz to customers stated that the company was experiencing difficulty in supplying special order products and would review the entire line and streamline their production facility. The letter stated, "The end result was that the variety of systems offered, and the volume of orders received, became so great that we could no longer adhere to our normal delivery schedule or continue producing some of the systems offered in the past." The company will honor any prior orders that were specified by their technical sales personnel, and currently plans to bring back, by the end of the second quarter, special order products that are considered the backbone of the department. These items, according to the letter, represent 70 percent of the company's current special order product sales.



Array Series. Designed To Impress Everyone Who Has Heard It All Before.



The competition to produce the "ultimate" sound reinforcement system is fierce. Each new system design brings claims of having *achieved perfection* or touts *this is the one*. Yet, in time, you can expect the very same manufacturers to introduce new models claiming to have further *perfected perfection* or that their *unorthodox* technology has rewritten the laws of physics. Sound familiar? So how do you impress everyone who has heard it all before? Simple.

JBL engineers have drawn upon proven advancements in loudspeaker design and state-of-the-art digital electronics to create Array Series: a comprehensive sound reinforcement system concept with performance second to none. Developed as dedicated array elements, Array Series systems can be easily configured to fill any venue with seamless coverage from a deceptively small package.

Such performance could only be achieved by designing the exact transducers required for the job. The Array Series is the first professional loudspeaker system to use neodymium magnets. The LF transducer's unique motor structure topology also includes proven Vented Gap Cooling (VGC™) and a deep copper-sleeved gap to significantly reduce distortion and power compression.

The 38 mm (1 1/2 in) exit HF compression driver also uses a neodymium magnet structure, a Coherent Wave™ phasing plug and damped titanium diaphragm. The result is effortless and reliable high frequency output with outstanding accuracy. A 45° Optimized Aperture Flat-Front Bi-Radial® horn assures proper matching and summing of multiple Array Series systems.

The 13 ply hardwood enclosure has 45° sidewalls to match the horn coverage in arrays, and is reinforced with integral steel attachment hardware, designed to interface with S.A.F.E.™ flying hardware for quick and secure cluster assembly.

System functions, such as crossover filter points, transducer acoustic center alignment, system equalization and protective limiting are achieved totally in the digital domain by the ES52000 Digital Controller. The ES52000 employs Finite Impulse Response (FIR) filters for zero phase shift and requires no amplifier output sensing cables, so you can expand your system by adding Array Series loudspeakers without having to add additional controllers.

The sum of these parts is Array Series: a complete system providing extremely high power handling, very high sound pressure levels with full dynamic range, low distortion and unmatched fidelity. Truly a system capable of impressing *anyone who has heard it all before*.

Call or write for detailed specifications. Or, for more *immediate* response, you can get current product information on Array Series, the ES52000 Digital Controller and all JBL Professional products, *VIA FAX* by calling (818) 895-8190.

Pictured above, Array Series installation at the Grand Palace, Branson, Missouri.



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“Lobbying” for Quality and Skill

This is the month of our annual survey of the people who actually work in this business. We asked in our survey what it is that our readers would like to see in a trade association. The answer in effect was “lobbying.” Our readers are concerned about what they see as encroachment on their turf, or as one respondent succinctly wrote, “Get rid of unqualified, unskilled, lying and cheating contractors.” Similarly, in the annual survey conducted by the National Sound and Communications Association, many of the respondents requested training and certification by the association. We have no doubt that NSCA sees fit to do that. And in fact the current name of the NSCA — National Sound and Communications Association says it all. Whether a contractor is dealing with systems, with parts of the technical spectrum far from sound, such as CD-ROM — that word *communications* says it all. In this month’s Sound & Communications, communications becomes the message itself in three of our articles. Janney designs actual art works around communications. Barnes & Noble has opened superstores which rely very heavily on making the consumer feel comfortable — and communications with him and her. And Cirque du Soleil has split itself in two — with one show touring the country, and another operating as a fixed installation.

As a magazine, we often wonder what our readers are thinking, what they’d like to see in these pages, and how, in effect, we can help them. Our annual Survey of Contractors is an attempt at that help. There is a sore lack of hard data in this industry. And all our surveys are unique in that we make the results available to the entire industry — not just our advertis-



ers. And our results are tabulated by an independent contractor so that we have no opportunity even if we were so inclined (and we are not) to monkey with the results. So read all about it — our eighth annual survey of contractors is printed in this issue of Sound & Communications. If you look closely at the figures printed in contrast with figures of the last few years, you will see some changes in mood and in actions. For instance, some of the glamour has gone out of residential systems, as that classification returns to something nearer the gross sales percentage of previous years.

You can read about yourselves and other positive feeling folks in the eight pages within this magazine dedicated to the annual survey of contractors. Which makes me want to say thank you to all of our readers who took the time to fill in the survey and send it back to us. We go to a lot of work and expense to present this. And you who have participated make us think it’s all worth it. In the nineties, when everything is mean and lean and no one is the benefactor of extra laborers, we appreciate the extra labor you have taken. Now you can read the results.

Best regards,

Judith Morrison, Editor in Chief

SOUND & COMMUNICATIONS

Publisher/Editorial Director
Vincent P. Testa

Editor-in-Chief
Judith Morrison

Technical Editor
Mike Klasco

Associate Editor
Steve Jacobs

Research Assistant
Mark Miller

Contributors

Rob Baum, Wendy J. Duch,
Clifford A. Henriksen,
Jesse Walsh

Technical Council
Dr. Mort Altshuler
Professor Audiology, Hahnemann
University, Chief of Audiology,
V.A. Hospital, Phila, PA

C. Leroy James
Rees Associates, Inc.
Richard N. Jamieson
Jamieson and Associates, Inc.
Russell Johnson
Artec Consultants, Inc.

Joel Lewitz
Lewitz and Associates
Daniel Queen
Daniel Queen Associates
Jon Sank
Cross Country Consultants
Neil A. Shaw
Menlo Scientific Acoustics, Inc.
William R. Thornton
Phd, PE

Art Manager
Alicia Celli

Artists

Janice Kallberg, Janice Pupellis,
Wendy Ser, Lori Vllardi,
Colleen Warenik

Production Manager
Ron Perone

Electronic Composition
Diane Catanzaro
Kim Marchica
Kerri Reilly

Circulation Director
Debbie Vanderneut

Advertising Manager
John Carr

Classified Ad Manager
Patricia Torrisi

Associate Publisher
Nancy Davis

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



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Post • Producer
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EMERGENCY BACK-UP IN A CRISIS

On Friday, February 26th, 1993 terrorists blew up the subterranean parking garage of the World Trade Center. The explosion blew out the building's control center, power supply and back-up generator. With no power or back-up systems available thousands of people within the building were stranded in smokey offices and in still and darkened elevators. There was loss of life and many injuries. This story made international news due to the building's size, landmark standing, and the magnitude of the explosion.

What you may not realize is almost everyday a terror hits a smaller less renowned office building, also knocking out elevators and communication systems. These attacks rarely make major headlines, because these terrorists aren't fanatic religious fundamentalists. These terrorists are accidental fires, broken water and steam lines, overloaded circuits, and blackouts. The actual numbers of people involved in these crises may be less, but the potential for loss of life and injuries are equally as great. And nothing adds more crisis to a catastrophe than a lack of communication. Emergency personnel and victims alike need to know what is happening and must be kept informed.

Internal communications and security systems are crucial to the management of any facility's emergency situation. Unfortunately, all too many facilities lack the proper equipment and systems to adequately address a crisis in their facility. Other buildings and industrial complexes have good systems, but they may be poorly laid out or have equipment not applicable to the types of disasters they might face. In today's volatile work environment, facility managers, building operators, and contractors are looking for more high tech and reliable systems to assist in the saving of lives and property.

Experts in the field of emergency communication and security strongly suggest that every facility invest in a comprehensive communications system designed to operate through a catastrophe. One of the major players out in the marketplace today is Ring Communications, in Ronkonkoma, New York. Ring Communications offers innovative and reliable internal communication and security systems. The sophistication, ease of operation, flexibility, and expandability of Ring's product lines explains their diverse range of clients. Ring's systems can be found throughout North America in international airports, towering high rise buildings, major financial institution, prisons, health care facilities, nuclear power plants, universities, and military bases just to name a few.

Ring Communications features "smart" systems like the Digital Annunciator Display system, part of Ring's Crisis Alert System. This incredible microprocessor controlled system is expandable to over 7,000 stations. It can handle simultaneous call and provides priority call queuing in a variety of call in levels. With continually supervised lines, this system instantly detects faults on the line, tampering, blown fuses, and power failures. If the power is cut off the Crisis Alert System also offers emergency battery back-up. The unit's modular plug in design also permits fast diagnostics and eliminates costly on site maintenance. This system is ideal for normal internal communication purposes with remote control interfaces, but is essential for just about any facility with a potential for disaster.

Ring Communications also offers high tech, discreet personal duress alarm systems and the recently introduced Electronic Audio Receptor - E.A.R., from Ring Communications, which provides a level of security and surveillance in places never before thought possible.

Self monitoring, emergency power independent, explosion resistant, and well thought out designs and installations of internal communication and security systems are the solution to today's crisis potential. Ring Communications asks every facility to carefully review their emergency and back-up systems, and take advantage of the latest internal communications and security technology. After all, it's just about the only thing you have control over in an emergency.

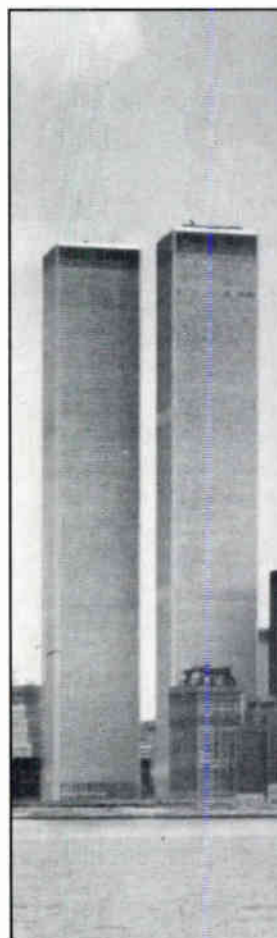


If a tree falls
and no one is there,
does it make
a noise?

The revolutionary Electronic Audio Receptor, the E.A.R., from Ring Communications is the only noise triggered security device that can discern fluctuating background noise from gunshots, screams, breaking glass and explosions without anybody having to hear them. The E.A.R. is perfect for parking garages, deserted hallways, darkened areas, behind obstacles and anywhere sound travels - all without manned surveillance.

Subway tested, the E.A.R. is part of Ring's Crisis Alert System. To find out more information call your security contractor or RING at (516) 585-RING.

RING
COMMUNICATIONS, INC. 



Nothing adds more crisis
to a catastrophe
than a lack of
communication.

Ring Communications' Crisis Alert System was designed with catastrophes in mind. Expandable from two-7,000 stations, the Crisis Alert System can handle simultaneous and priority calls in a variety of levels. The system monitors itself 80 times a second to assure reliability and can interface with a control room's computer system. Ideal for large facilities and elevator buildings.

More than ever, facility managers and building operators need a communication system that can operate through any emergency. To find out more ask your security or communication contractor or call RING at (516) 585-RING.

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AS HE LIE DREAMING: PHENOMENARTS' CHRISTOPHER JANNEY

By Wendy J. Duch

When the free-flow forms of jazz meet the artistry of architecture, the results shape entirely new concepts in sensual imagery.

The interactive installations of environmental artist/jazz percussionist Christopher Janney combine elements of architectural design, sculpture, and cutting edge technologies to transcend the *static limitations* of physical mass. His collective works entertain a unique class of structural surrounds within transient realms of sound and vision-play. *Play*, in fact, is central to Janney's eclectic assortment of highly innovative, invitingly interactive creations.

He possesses a child's sense of wonder about the world we live in, yet must face life as a responsible adult. He resolves this duality through an imaginary presence known as Bates, which he has created to signify the source of his artistic vision. Bates is the dreamer within — that part of himself which remains unbounded and limitless. Janney, in turn, is he who turns the imaginary into a focused, nuts-and-bolts reality. He is joined in this pursuit by his wife, publicist Terrell Lamb, their children, Frederick and Lillian, and a host of friends and colleagues.

Wendy J. Duch is a freelance audio writer who has been involved in live sound reinforcement for the past 13 years. Duch currently resides in East Lansing, Michigan.



Christopher Janney

PhenomenArts operates out of a 1.5 acre complex in Lexington, Massachusetts. This space includes a complete prototype/model shop and an acoustically isolated multimedia recording studio. The shop is equipped with facilities for wood, foam, fiberglass, and composite epoxy systems, in addition to a variety of mold-making and casting facilities — including bismuth-tin metal spray gun and RTV rubber systems. In the studio, Macintosh computers with dual-display color monitors provide realtime animation using Graphisoft's ARCHICAD, Stratavision, and Adobe Premier, interfaced with an SGI Iris for rendering via Videobits' FLASHTRACER software. On the audio end of things, Peavey DPM-SP/32 meg and Kurzweil K2000/64 meg sam-

plers run off of Opcode's Studio VISION 1.43 and DigiDesign's Sound Tools and Sample Cell, which are MIDI/SMPTE locked with a fully-automated, multi-track Alesis ADAT recorder.

The musical constructs generated with Janney's interactive creations incorporate all aspects of a given environment. Their aim is to generate spontaneity within the context of a structured event. His many temporary and permanent installations are too numerous for a detailed accounting, yet a few which bear special mention include his thesis-work, *Soundstair*, which employs the motion of foot traffic to turn an ordinary stairway into a wonderland of sampled sounds and giggles. A later work, *Desert Harp*, harnesses the wind itself for interactive input. The most visual of Janney's works-to-date is perhaps his *Rainbow Pass* design, which was unveiled as a permanent installation within Arquitectonica's Miracle Center in Coral Gables, Florida, in early 1989. It's success has engendered yet another Miami project for Janney, which will be opened to the public next March. Entitled *Winds Of Sound/Gates Of Light*, it will serve as a sort of "de-compression chamber" for air travelers as they move between Miami International Airport's new international terminal building and its main terminus. Featuring a sound-score based upon the natural environments of South Florida, this artwork will utilize the bright, natural light of this environment in attempt to reveal the

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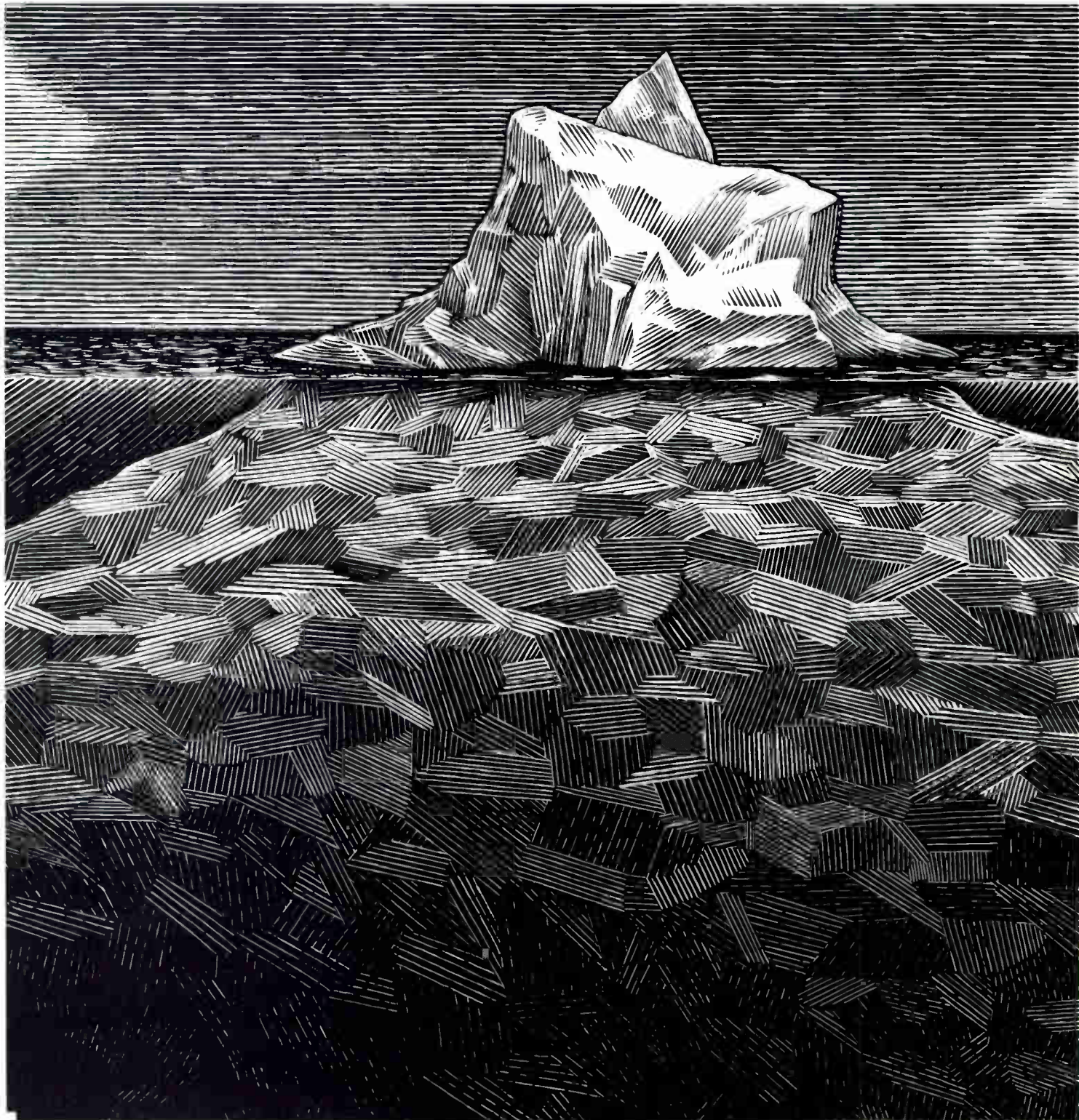


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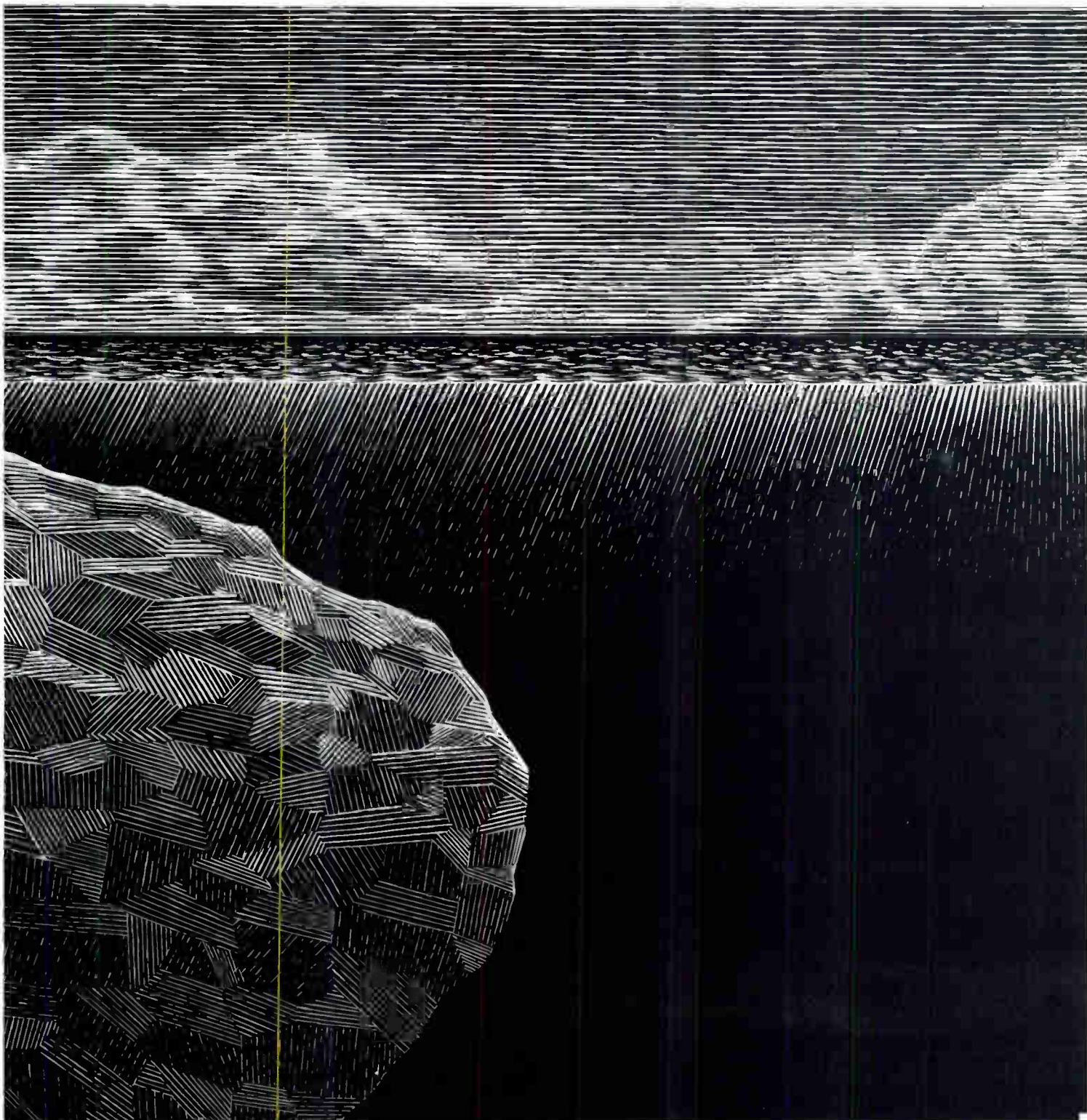
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Soundstair

“essence” of the various ecospheres which it represents.

Perhaps the most novel of Janney’s creations might never have seen the light of day if his wife had not come across its prototype and asked him to please finish it up. The *Litesign*, as it is called, is a lapel-sized pin which scrolls programmable messages across a tiny screen at variable speeds, like a miniature billboard. Featured late last year in *The New York Times* and on “CBS This Morning,” it was instantly established among the haute couture as *the* sign of the times.

Much of what has come to pass in Janney’s career is the result of what Eastern philosophers refer to as “crystal vision.” At a time in his life when he was searching for expressive individuality, new possibilities were emerging among academia for the

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dreamers among us. His story is unusual. The following interview was made at the suggestion of the former chairman of the New England Section of the Audio Engineering Society, educator Steve Langstaff.

Duch: I was intrigued by the notion of a "Bates".

Janney: It's really more for me than anything else. It's a way for me to separate the dreaming of something and the actual making of things — so things don't get confused.

For me, that's pretty important. There are definite times when you don't want "how" you are making something to interfere with what you hope something might be. You want to be able to be in a place where you can just dream and let your imagination go wild. So I put on these different caps, and try not to let *how* something is



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Rainbow Pass

going to be built necessarily influence the *vision* of what I'm trying to make.

When I was starting out in my twenties, I was a technical director for a number of big artists in New York. I was the person that allowed *them* to dream. My job was to interpret their dreams and help bring them into reality. It's very much of a dual role. So instead of working for Claus Oldenberg or Frank Stella, I'm now working for Christopher Janney — I'm working for Bates.

Duch: How did you get started in your career?

Janney: Well, I always thought that I wanted to be an architect. I mean, I always *was* going to be a musician, but my parents were very much in favor of a liberal arts education.

So, then I got into Princeton. I said, "Well, this is a pretty good opportunity, and you can study architecture as an undergraduate." [But] in the late sixties, architectural schools were very involved in urban sociology, and not so much in design. I was more interested in design.

Duch: So, what did you do?

Janney: In fact, I dropped out of school for a year in 1970. There were

a lot of factors which allowed me to drop out of school and really think about what I wanted to do. This was a time when most major universities shut down, that spring of 1970. It was a tremendous time to reevaluate one's sense of what education is. When I went back to Princeton the next year, I filed for something called an Independent Major — a program they had just started.

So I said, "Well, what have I got to lose here? I don't know what it is I want to study, but I can "feel" it has something to do with these various elements: it's part music, it's part contemporary art, it's part architecture." So I actually put together an independent major with [architect] Michael Graves, [sculptor] James Seawright, and [composer] Milton Babbitt as my advisors.

Duch: What prompted your decision to go into environmental art?

Janney: In the late sixties, it wasn't called environmental art or environmental sculpture. There really *wasn't* any title for it. Sculpture had already, in contemporary, started to deteriorate the boundaries of traditional formats. James Seawright, who was my sculp-

ture teacher, was one of the founding fathers of electronic art — electronic kinetic media. It was a great experience to have him as a teacher and to hang out with him in New York. I [also] worked for his wife's dance company.

But in the end, it was always going to be something to do with making the music more physical on the one side, or being able to "walk through" sculpture. You know. This whole business about being able to "wrap" the music around you like a blanket, and then on the other side making architecture more spontaneous, more alive. More *jazz* — put more *jazz* into architecture.

Duch: That's an interesting concept.

Janney: I actually *was* going to go to MIT Architecture School, but I also knew that there was a place at MIT called The Center For Advanced Visual Studies that was started by Gyorgy Kepes. This really *was* a place for artists who are involved with technology to be able to work in this highly technological environment. The man who was the head of it at that time, a man named Otto Piene, was an artist whose work I knew and admired. Graduate school — in the Arts, anyway — is about finding one person whose work you really like, really admire, really aspire to, and you basically go study with that one person. I really believe that the teaching of art happens on a one-to-one basis. It's something that is passed on from one person to another.

So, I think the environmental art was always there. It was just a question of gravitating toward other artists, older artists who had similar tendencies, in an effort to develop this theory.

When I was in New York, I also studied something called eurhythmics at the Dalcroze School of Music. That was extremely influential.

Duch: How so?

Janney: Out of all the music schools I've been in and out of, *this* school was so influential because everybody studied the same three things: solfège,

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eurhythmics, and improvisation. The whole idea is that music is not about the instrument. It's about tuning the body to understand how to interpret music. From there, you go on and learn the technique of your instrument. But the technique of the instrument does not have to do with evoking the soul in the music.

Duch: Does your ability to connect with the basic rhythms of life as a percussionist enhance your work as an artist?

Janney: The whole aspect of being a drummer — it's a very physical experience. I think that we all have to agree that hitting the drum — and you can hit some drums with your whole body — [is] a tremendously satisfying,

physical experience. The more I got into it over the years, I started to read about drumming, and drumming all over the world — the whole thing about shamen and drumming, and primitive cultures and drumming. I think all musicians get into this sense of entrainment, [when] you're melting right into the music. Drumming is really the oldest musical instrument. There's a lot of that entrainment that comes naturally.

Duch: I was intrigued by the concept of the *Soundstair* [see U.S. Patent #4,504,933].

Janney: All music is made up of melody, rhythm, and harmony. [With the *Soundstair*], the rhythmic aspects of the composition are given up to the activity on the stairway. But I control everything else. I'm there watching and listening to what's going on. In terms of a one-day sound installation, it's very much a duet between the energy and activity on the stairway, and myself. I'm changing what scales they're moving over, what instruments they're moving through, whether it's monophonic or polyphonic, things of that sort. Polyphony is not a problem with this instrument. It's beyond that into the realm of sampled sounds. So you can get much more into sound images. That's what I do now in all of the permanent installations. It's really a collection of melodic instruments and environmental sounds, so that you're making pictures in the person's *mind* as well as creating certain moods.

Duch: Do you feel that recent technological advances are responsible for this sort of artistic expression to have become a reality?

Janney: Especially today, *all* is possible. Now the onus is on the artist to be able to have the freedom to create whatever expression he or she wants. There are very few technical limitations, so "let's see what you can do." [But] let's not use any excuses. What we're trying to do here is make art, not make technology. We're trying to deal

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with self-expression, or expression — not integrated circuits. And my experience is that the simpler you can make it, the better.

Duch: It seems that some of your pieces, like *Hopscotch*, would be incomplete without the laughter and joy of children at play.

Janney: No. That *is* the piece. The “piece” is setting up a structure for children to be creative.

Duch: And?

Janney: In the end, that’s what *Soundstair* is, too. That’s what all these things are, on a certain level. It’s a way to put something in the public environment to allow somebody to relax, and if only for a moment on their way to work or whatever — be creative. Fortunately, or unfortunately, people *need* — just in the same way that sometimes we need structure to accomplish “things”, it’s also nice to have a structure that will let us expand and feel free. I mean, it’s very much in Eastern philosophy; it’s understood that the most creative moment is the moment of laughter.

Duch: I think it’s very important to encourage the child within. By putting sound installations into subway stations and construction zones, you connect with those who have lost touch with that child within.

Janney: Well, in that sense, it’s really site-specific and sound-specific work. That it pushes *against* the environment it’s in. I think that it’s one thing to create a work for a museum or a performance for the stage, and it’s an entirely different set of parameters to create a work for the public environment. To be a public artist, to do public art, it’s more like being an architect. You have to take into consideration the community, the weather . . . there are all sorts of limiting parameters, on a certain level, that one has to deal with. Constraints one has to work within, and then hopefully turn those constraints into advantages. You know. Find ways to make those work *with* the piece.

Duch: I found *Heartbeats* particularly interesting, because it involves the amplification of inner rhythms, as opposed to synthesized or sampled sound sources.

Janney: I’ve done *Heartbeats* a number of different ways, and there’s a lot of ways I haven’t thought of that I’m going to continue to do it in. Although it isn’t a synthesized sound, it’s such

a powerful sound that it helps ground me. If I was condemned to only do one work for the rest of my life, *that* would be the work. I can’t get enough of it. There’s all these things that I can feel going on inside my body when I hear it that I have yet to give any expression to. In that sense, it’s really an organic piece. It changes all the time. There’s always new questions that I

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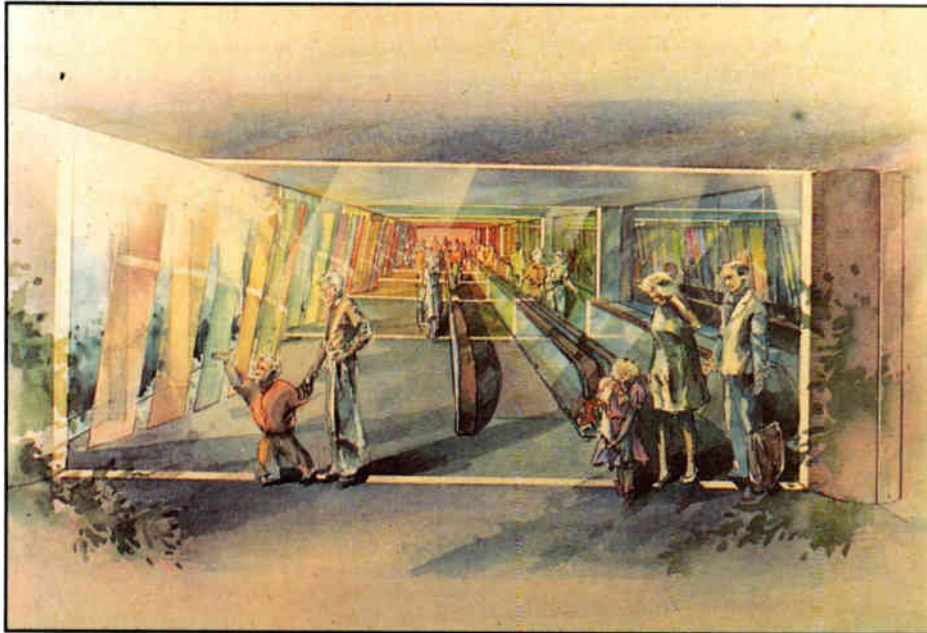
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Winds of Sound (Copyright 1992)

come away with. That, to me, is a sign of a good work of art; it's always generating its own new ideas. It's like something that's alive. It's organic. It's transforming over time. I love the other projects I work on, but that is the one that is closest to me.

Duch: Well, it's closest to everyone. It's the internal rhythm.

Janney: For me, it sums up so many things — the inner drum, the rhythm of life. But all of those intellectual things aside, the sound of the thing is very hard to capture [on tape]. A lot of the sound is under 50 Hz. It's even under 30 Hz. When you hear it live, it feels very warm, like a blanket. It really wraps itself around you, and just feels. You can get a sense of it on videotape, but you don't get it all.

Duch: It sounds as if your original idea is in constant evolution.

Janney: I was thinking about that the other day, and the notion of evolution implies a point "A," and a point "B." You're always moving from this point A, in the past. And you're moving on this line, however straight or not. It feels more like I'm going around in circles, and I'm digging in deeper each time I go around. I seem to be going

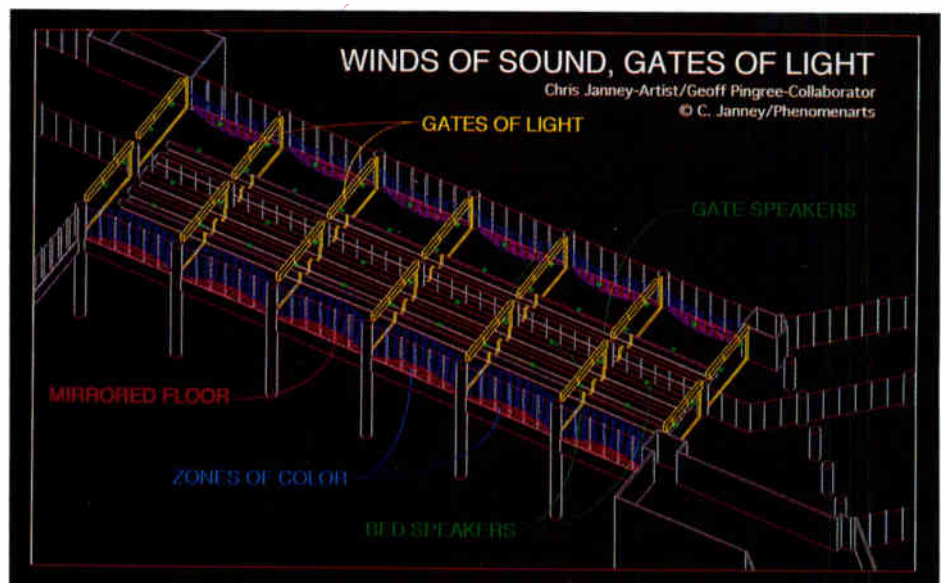
back and reminding "these veins of gold": going deeper into these same ideas about interactivity, about architecture, about music.

Duch: About mythology?

Janney: You know, three or four years ago I was reading a book by Joseph Campbell, *The Power Of Myth*, and I came upon this symbol of Shiva, the Indian God of Dance and Destruction. I was completely taken with it. In

one hand, Shiva holds the drum of time. And in Indian philosophy, the drum of time represents the rhythms of life. [It] represents the fact that everything in this plane of reality, anything you see, has rhythm. At the atomic level we've discovered this in theoretical physics. Nothing is solid. Everything is vibrating at some level. And if it's vibrating, it has a sound. And that if something is *not* it is then invisible. I see a very real relationship between this ancient philosophy and what I've been thinking about and pursuing.

You know, I've been teaching a course at The Cooper Union School of Architecture in New York for the last three years titled "Sound As A Visual Medium." This course ranges from exploring architectural acoustics to the "sound of one hand clapping." Guest speakers have included performance artist Laurie Anderson, poet Quincy Troupe and composer Morton Subotnick as well as field trips to the Metropolitan Museum of Art's musical instrument collection. Students' work ranges from creating ritual instruments to multitrack sound scores specific to architectural environments. Needless to say, it is often unclear as to who is the teacher and who is the



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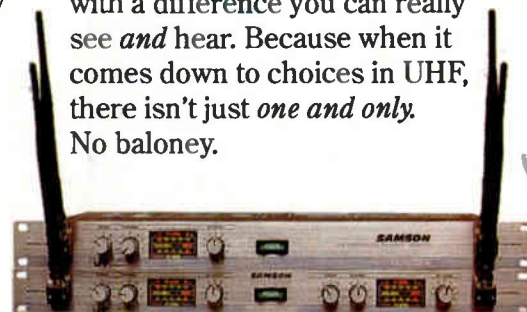
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Hopscotch (Copyright 1989)

student; we are all learning from each other.

At other times, I've read about Egyptian culture and their use of sound in healing, and the Chinese and things of this sort. I mean, there's just more

veins to mine. And it's wonderful.

Duch: I've read a little about Anglo Saxon shamanism, and it's basically the same thing — using sensory input, like herbs, chanting, and dance to help drive out the demons. Which reminds me. Aren't you involved in a new commercial venture which taps into just these sorts of ideas?

Janney: Well, *Estée Lauder* has started a new company called "*Origins Natural Resources*." Basically, the premise of the company is to use all natural-base cosmetics. [The] whole philosophy is really about total well-being. So they approached me, and asked if I'd write some music for their stores. And normally I really wouldn't be interested in a situation like this. But the more I got to talking with them . . . "Okay. This might be pretty interesting." Because we're *really* talking about writing sound for a particular space, for a particular environment. The larger picture is this notion that sound can also be something that contributes to one's well-being — in the same way that food can, in the same way that smell can. So for me, it's turned out to be a fantastic project! They're just about to release the first of eight CDs of music I wrote for them, just for their stores.

And now I'm going to give a series of lectures for them about sound and healing. It's great because I can go way back into Chinese and Egyptian

[healing arts], and show the relationship of sound, as it is, to even these contemporary products. That's turned out to be a really nice situation.

Duch: I bet! These days, it sounds like you don't have to worry so much, but how have you managed to find the money to keep your projects funded?

Janney: I write a lot of grants. I have a grants researcher. I had written a lot of grants when I was in graduate school, so I was aware that this was a way to fund one's research early on.

Duch: That's a very important skill to develop.

Janney: You have to learn where to look for the grants. You have to learn how to express yourself. I think that's *extremely* important. I really wish I could spend more time developing my visual skills, but, in fact, I spend more time developing my writing skills. In my experience, that's what it comes down to. Being able to express yourself "in the word," in conjunction with the image, is what's terribly important in terms of developing a conceptual idea in an effort to get some initial funding, whether it's public or private money. So, in the early years, I worked for a lot of different artists. I've also consulted to companies for special effects and for special projects. I know how to put things together, and also know who to ask if I can't figure out how to build something.

Duch: And *that's* important, too — human resources.

Janney: Absolutely. Again, we're back to this notion that the artist's responsibility is the vision. That is of utmost importance. Then you try to find the people who can help you bring the vision into reality in its purest form. For me, the most important thing is how I can express my ideas as clearly and as succinctly as possible to the people that I need to have help me build this thing. And that *includes* the people who can help me fund this thing. My experience is that you don't want your own personal technical limitations to hinder the vision. ■



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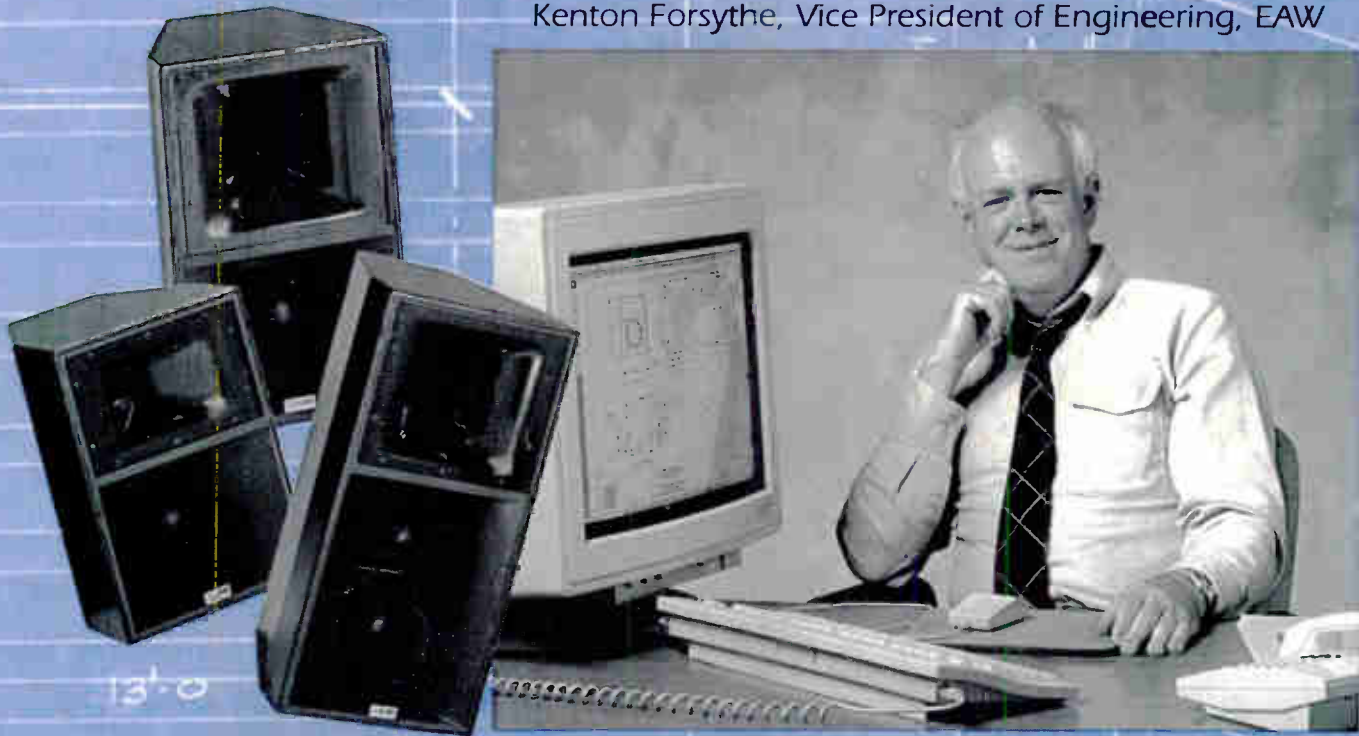
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Circle 217 on Reader Response Card

Fixing Speakers, Fixing Rooms

Dear Answerman,

I am servicing a pair of GLI Model I disco speakers. One horn is very distorted, and through troubleshooting, I found it to be a crossover problem. Do you remember the crossover frequencies, or where I can obtain replacement parts or have the crossover repaired?

Peter Scarola

New York, New York

[This month, the Answerman's cape is handed to Mike Klasco. Mike started GLI twenty years ago.]

ANSWERMAN

Dear Peter,

Peter, my best recollection is that the Model I was still manufactured up to about 10 years ago. Probably, a capacitor has finally opened, and too much low-end is getting into the mid-

range compression driver. The fellow that ran GLI's system design and service group was Charles Ferrari. He now has his own firm, Ferrari Custom AV (516-735-9073) in Levittown, New York. Charles can fix your crossover and maybe the Model I will make it to the next century!

Charles Ferrari, aside from taking care of GLI's offspring, also does sound contracting for clubs and restaurants and had a question of his own for the Answerman. Charles is working on a restaurant which is too noisy and it is losing business because people have to yell to be heard. How can this problem be resolved?

Dear Charles,

Ambient noise levels have an optimum range in restaurants: if the space

WITHOUT THIS TREATMENT, WHAT STARTS OUT AS AN AROMA FROM THE FOOD WILL BE ABSORBED INTO THE FOAM AND WILL SOON TURN INTO A NASTY ODOR.

is too quiet and acoustically dead, then diners will not have adequate privacy between tables, but if there is not enough acoustical absorption then a busy restaurant will have a "din" and patrons at a table may not be able to clearly hear their own conversations.

To quiet a restaurant, you may treat the ceiling with an acoustically absorptive material. More than "acoustical tile" will be needed as most mineral fiber tiles do not have much sound absorption below 2000 Hz. Sonex now

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Circle 267 Reader Response Card

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

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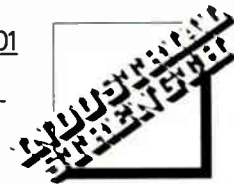
That's why every TASCAM CD player is rack-mountable. And why both the CD-301 and CD-401 feature balanced XLR and unbalanced RCA outputs for added flexibility.

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

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

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

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



TASCAM



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Circle 229 Reader Response Card

July 1993 31

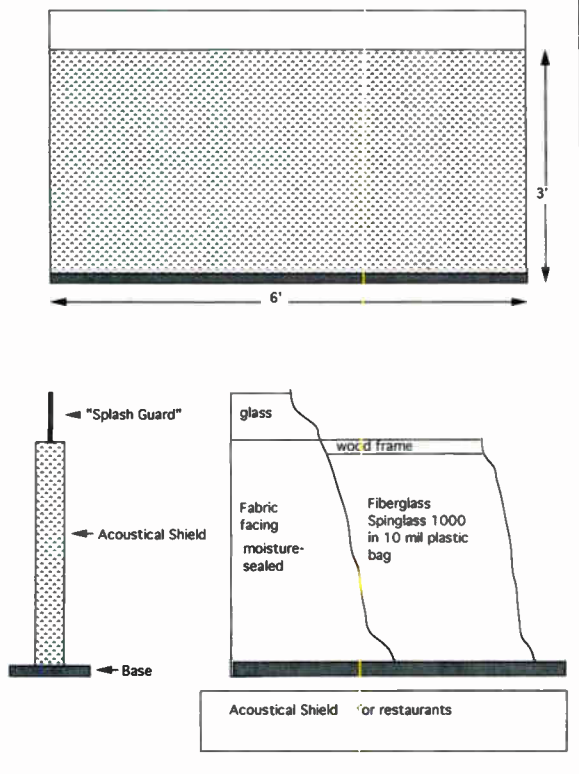


Figure 1.

offers foam tiles which meet fire code. A special sealing treatment is also required for these foam tiles (a standard option from Sonex). Without this treatment, what starts out as an aroma from the food will be absorbed into the foam and will soon turn into a nasty odor.

Acoustical barrier/absorbers are another solution. Essentially these are similar to the office dividers used in open-plan offices. Typically, a panel that is about three feet high breaks up a large floor space into smaller areas. For additional privacy, but without giving the patrons claustrophobia, a glass panel can extend another 6 inches (see Figure 1). The panel can be constructed from a wood frame with a 3.5-inch wood batt framing fiberglass insulation (unfaced) inside. I place the fiberglass into a 5 to 10 mil thick plastic bag, and staple the edges of the bag to the wood frame. The outside fabric facing should be both fire retardant and treated so as not to absorb odors or spills (use 3M Scotchguard spray available from the hardware store). A good cabinetmaking shop ought to be able to assemble the whole thing without much problem from the sketch. Remember, you do not have to put these barriers around every table, but only break up large spaces into groups of six or eight tables. ■

Barnes & Noble

Uptown

The Superstore Uses Sound and Display Technology

BY MARK MILLER

A reader's fantasy come true. 225,000 volumes on the shelves of four floors of store, accessibility to every book known to man and woman, 1,500 magazines and newspapers, coffee and pastries galore.

Plus music, poetry readings, book signings, Clifford the Big Red Dog, Peter, Paul & Mary, and activities never ceasing.

Also, there is the quiet. Pockets of silence exist to escape the New York insanity in the intimate 32,000 square foot space.

Barnes & Noble has opened a superstore on the Upper West Side of Manhattan adding to its family of 1,200 stores, 140 of which are superstores, the first appearing in 1990.

The newest member of the family features all of the above plus one of the latest retail and marketing tools — the Audio Book Preview Center.

The Center is used to market books on audio to the public, allowing customers to approach a kiosk with a video screen and three pairs of Telex headphones, and listen to 60 volumes of all types of books — mystery, classic fiction, self-help, etc. for three to five minutes, ending with a cliffhanger and an invitation to purchase the book. The customer can end the selection at any time and try a different title with simple button control. There are six half-hours of audio within the system,

Mark Miller is the Research Assistant for Sound & Communications and the Editorial Assistant for The Music & Sound Retailer.

all controlled by the customer. The visual display consistently changes, bringing information to the viewer about sales, community news, new books, etc.

The system was designed for Barnes & Noble (who made a "significant investment") by Marco Scibora, President of the Bloomington, Minnesota-based Advanced Communication Design (ACD). The system is an interactive multi-user sales-oriented system

that is based on an IBM-compatible 486 replaceable hard drive and provides the option of allowing up to 12 files to be accessed simultaneously with no loss of time. All of the information is digitized and works on a rotary basis, instead of the usual linear.

"A linear system tends to waste time repeating itself," says Norm Goldberg, consultant to ACD. "When you hit the start button in a linear system, it takes three or four seconds and people tend



Exterior of Barnes & Noble at 82nd and Broadway in Manhattan.

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Overnight? Overseas? Just tell us when and where.

Our after-the-sale service runs with the same expert efficiency. In fact, you'll find our follow-through program to be one of the industry's best.

American Owned, American Made.

At Pacesetter, we're very proud to be American owned. We're even prouder that all our products are American made.

You may have noticed we even call ourselves the American company. That's because that's who we are. And our pledge to you is we'll do our level best to stay that way.

If you'd like to know more about Pacesetter amplifiers, give us a call at 1-800-963-6363. But be prepared. You might be surprised at just how fast a forty-year-old upstart can move.



PACESETTER ELECTRONICS
The American Company

Circle 207 on Reader Response Card

to hit the button again in that time and then the process starts all over.”

ACD's proprietary filing system allows the machine to keep on searching for quicker access.

The information is all programmed in DOS so that they can connect with any existing system, according to Scibora. “When the future changes, we

are ready for it,” he says.

The future, according to Goldberg, for Barnes & Noble could contain CD-ROM or even satellite. Using a satellite provides even greater control from the management end, one of the most important assets of the Center.

“The amount of control is amazing and limitless,” said Paula Allen, Mer-

GROWL?



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Circle 254 Reader Response Card



The Audio Book Preview Center at Barnes & Noble.

chandise Manager. “We can control what the person hears and sees, how the book is presented. The options with this are endless.”

Control for management is in the ability to know exactly what is being said on the floor. Authors can be taped to do intros and outros for the reading of their novel. Special sales can be offered. Management can sell a book without the pushy salesperson on the floor being involved via the Center.

Control for the customer is also satisfied by allowing him or her easy access to information about the books. The process of getting this information is registered within the hard drive and then printed out in daily reports of what was listened to, for how long and with what result. As the system

becomes more intricate over time, more specific information will be stored and used for marketing purposes. Goldberg is hoping to place questions within the program so that management can stay in touch with the customer on the floor, discovering complaints or compliments.

"In order for the system to work," says Goldberg, "the information needs to consistently change. Otherwise, the customer won't look at it again after a week." Having a replaceable hard drive makes this easier, as some new titles are added every two months and some old titles deleted. In time, if the satellite plan comes to fruition, the information could be updated on a weekly or daily basis, simply being downloaded from the feed and then loaded on to the system's hard drive.

The satellite plan is not economically feasible at this point as only six stores have the Center nationwide. These six stores have had a one or two percent increase in book on audio sales. Ten more Centers are planned for installation before the end of the summer. More will come next year.

At the Barnes & Noble on 82nd Street, only three of the 12 possible lines are accessed at this point, but plans are in the works to run computer lines from the main Center to specific departments, concentrating information to each area. In Cooking there may be a chef discussing stir-fry, in Religion there could be choices from different sects, etc. Each section would have audio dealing with books on the shelves for customers to listen to and visuals to match.

The departments all feature activities with a frenetic pace. Activities include readings, book signings, folk singers and demonstrations. Barnes & Noble attempts to schedule simultaneous events that would attract the interest of an entire family.

The store is broken down into three different sound zones. These zones are specifically where most activities occur.

"We designed the store to be a col-

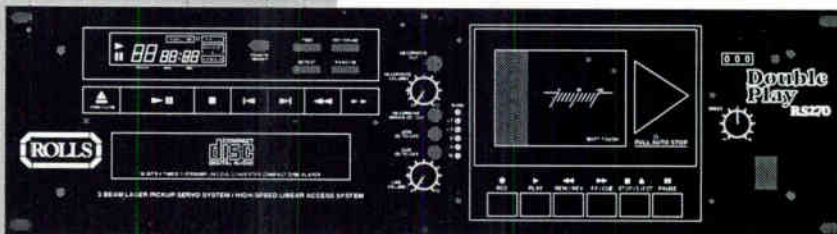
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MixMax6
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Circle 268 Reader Response Card

lection of spaces," says Joe Antunovich of Antunovich Associates, architects of the store. "We tried to keep activity ends separated from reading areas but unified by central circulation areas."

These circulation areas are usually signified by five different book search computers. These computers run a program designed specifically for Barnes & Noble from Wordstock, based in Boston, Massachusetts, which specializes in book search programs. The program lets a customer discover what is in stock, where in the store the book is located, when new ones are due in, and, if the need arises, with the help of a Barnes & Noble employee, order any book in print at the computer. This can also be done at any register.

The reading areas are spread throughout the store and are simply signified by a small group of chairs. All of the ceilings are acoustically treated and all of the floors are carpeted, except for one small area in the Children's section, the Children's Theatre.

The sound zones are kept to upper levels as the lower two consist of a wide-open retail area and a cafe tucked away on its own level and in a corner to dilute its sound of conversation and



View from the Science Fiction Catwalk.

food preparation.

The main sound areas are located in the Children's Theatre, on the Mystery Mezzanine and in the Events area. The Children's Theatre has a small, bright stage that the folk singers usually perform on as well as story-tellers. The Events area is located in the directly opposite corner of the store.

These two areas usually host the largest groups. The Mystery Mezzanine is a floor below and the events there are usually book signings or small gatherings.

Having separate events occurring simultaneously creates possible aural nightmares.

The sound system was one of the

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final things put into place before the store opened.

"We had some pre-wiring done but everything was close to finished before the sound contractor came in," says Gary Bellanger of By Three Group of New York City, Associate Architects on the project.

AEI, of Seattle, the music service for retailers and airplanes, finished up wiring of the store, placing their own music system in the store, which is also heard over the phone lines using University's TLA-70 Music on Hold Module.

The ProPac Cassette Deck runs this system with eight different tapes of jazz, classical or contemporary music. The tapes change each month to maintain a consistent ambience. According to Andrew Lee, AEI Director of Systems Sales and Marketing, AEI would like to experiment in the future with broadcasting this music via satellite to Barnes & Noble on a national scale.

The music can be switched on or off in different areas, allowing sound to be localized into each of the separate sound "zones."

AEI's installation included the TOA A912 MK2 and A903 MK2 amplification system, which includes in-store paging. Soundolier's C-803-T87 coaxial speakers, in flush-mounted enclosures, are spread throughout the store, focusing on the fifteen foot zones. In each zone is a Soundolier AT35 volume control.

When a big event happens, such as Peter, Paul & Mary playing in the Children's Theater, an outside sound system will be contracted with care to not spread the sound too loudly throughout the store.

"Books and bookcases act as great natural sound barriers," says Allen.

The sound in this Barnes & Noble stays where it belongs, behind bookcases, in its specified zones, allowing the many New Yorkers searching for a moment of silence, and maybe some information on the latest bestseller, to sit down, hang out, and read. ■



The Barnes & Noble Jr. section at the new superstore.

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Circle 251 Reader Response Card

MEETING SPEC USING NON-TRADITIONAL METHODS

Dear Dr. Wokka,

I am a successful sound contractor and have read your articles with great interest. Your brilliant advice has actually allowed me to land a large NFL stadium sound system contract and thus launch my former mom & pop business into the big time. However, one thing is a recurring problem:

**OF COURSE, WE ALL
KNOW THAT REALTIME
ANALYSIS IS A SILLY
CEREMONY PRACTICED
ONLY BY IGNORANT
AND OBSOLETE
DINOSAURS IN OUR
INDUSTRY.**

When it came time to “meet spec,” we had a big problem in meeting the realtime analysis curves specified by the consultant. We pointed the horns at the ceiling and all over like you said and everything. But the measurements just never came close in some areas. Of course, the consultant blamed it on our installation and we blamed it on his design, and the ensuing shout-fest has now gone to the courts. Our lawyer actually just got a two-year delay for some kind of reason. However, how can this measurement problem be avoided in the future?

**Danny “Donny” Dorfadonnatello
Detroit**

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

Dear Donny,

Well, at long last, here is a letter addressing me properly. My appreciation is semi-infinite (finite, but great, if you get the drift). Let me say that your problem is very common and, as you point out, only a real problem in a few areas of any new installed sound system. Of course, we all know that realtime analysis is a silly ceremony practiced only by ignorant and obsolete dinosaurs in our industry. However, it is a way to “meet spec” and the practice is more widespread than we are willing to admit as an industry. Your problem is easy to correct with a little-known secret of only highly astute sound contractors: *vocal techniques for correction of realtime analysis data.*

First of all, the key to this technique is controlling the realtime analyzer. This is easily accomplished by mere suggestion. The consultant is more than happy to be relieved the indignity of being the “caddy” of this piece of gear and would prefer being free to walk about and gesture like a movie producer to the arena production staff. Make this suggestion only at the time of the test and you will be assured of success. Timing is everything.

Also, most acoustical consultants spend much of their time in front of CAD screens, playing bridge with architects or listening to music. As a result, they are relatively weak and pale. Not carrying the analyzer will rid them of a future week of sorely aching biceps. You, the sound contractor, however, are tanned and muscular from your robust craft and can hold an analyzer for days without complaint.

Once you control the analyzer, you may proceed. Suggest that the tests be done at about 80 dB. This is optimum. In the normal pink noise testing procedure, an analyzer is held by hand at approximately waist level, noise is measured by a protruding microphone, and a button on the analyzer is pressed to take a “snapshot” of the noise spectrum at that particular spot. Make sure you begin the measurement session where the noise analysis is within spec (test this prior to the “official” test). Once five or six curves have been recorded, the consultant will tire of this tedium and become very disinterested in the results. This is the time you should move to the problem areas. When you encounter these, you can hold the microphone close to your face and actually make constructive and additive noise spectra to compensate for any deficiency.

If you “hiss,” or make a “SSSSS” sound through your teeth, you can raise the 6,000-16,000 Hz band. If you

**THE CONSULTANT IS
MORE THAN HAPPY TO
BE RELIEVED THE
INDIGNITY OF BEING
THE “CADDY” OF THIS
PIECE OF GEAR.**

make a sound like a continuously repeating “K,” sort of how you made the noise of a gunshot as a child, you can change the 2,000-6,000 Hz band. A “KOOO” sound gets 400-2000 and a “Huhhh” sound with the mike close to the chest gets the entire bass range. Once the correction is made on the

analyzer display, press the "save" button and proceed to the next test. It's that simple.

With these vocal sounds as a guide, you will find that you can sweep the entire band by making a sound like a Star Wars rocket ship or a "filter sweep" on a synthesizer. Looking at a realtime analyzer in the privacy of your home and practicing making the display go up and down the range is the best practice of all. What's more, it's fun and I must add this to the "video games for audio engineers" section of my up-and-coming book on the innermost secrets of this industry. Back to the task at hand: you *must* practice these techniques before attempting it for real. You will find that with training, you can develop a vocal technique that can compensate for virtually any deficiency in a pink noise curve. It is like magic, and at 80 dB, it is quiet enough for you to easily change the

DEVELOP A VOCAL TECHNIQUE THAT COMPENSATES FOR ANY DEFICIENCY IN A PINK NOISE CURVE.

curve but loud enough for you to do this completely undetected. Vocal training is a must, as you must be prepared for both wide and narrow-band correction. I cannot emphasize this enough. Also, you must practice in front of a mirror and do it without looking like you are. It is similar to the training that ventriloquists do and is much easier to accomplish. Once you have mastered it, it will be a simple matter for you to train your entire staff to do this. Then, you could send anyone out to do this and go to the golf club to relax, free from the worry that you won't meet spec. Have contests among your staff and give prizes for the most accurate "noise whistler." Before you know it, you will have consultants thinking you are the Pope of Sound Contracting Himself. ■

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Circle 292 Reader Response Card



I asked our dealer
**"How do we
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"Your best bet is the Jumbo Mount from Peerless," he told me.

Now that we've got it installed, I see what he meant. We really like the Jumbo's innovative features. Its unique "arm in arm" design gives it plenty of strength, even for our 35" monitor. This also provides extra rigidity and prevents excessive tilt.

Special adjustment slots help the installer find the set's balance point, so it's the most stable mount we've ever put up. It's even UL listed, and I like knowing that.

The optional patented security package is also important to us. It makes our installation theft-resistant.

But the biggest challenge we threw at our dealer was getting the job completed in one week. He said he could do it. "The Jumbo® Mount is American made and Peerless will ship within 48 hours," he told us.

Quality engineered, UL Listed, American made, and promptly shipped. Now that's the way I like to do business!

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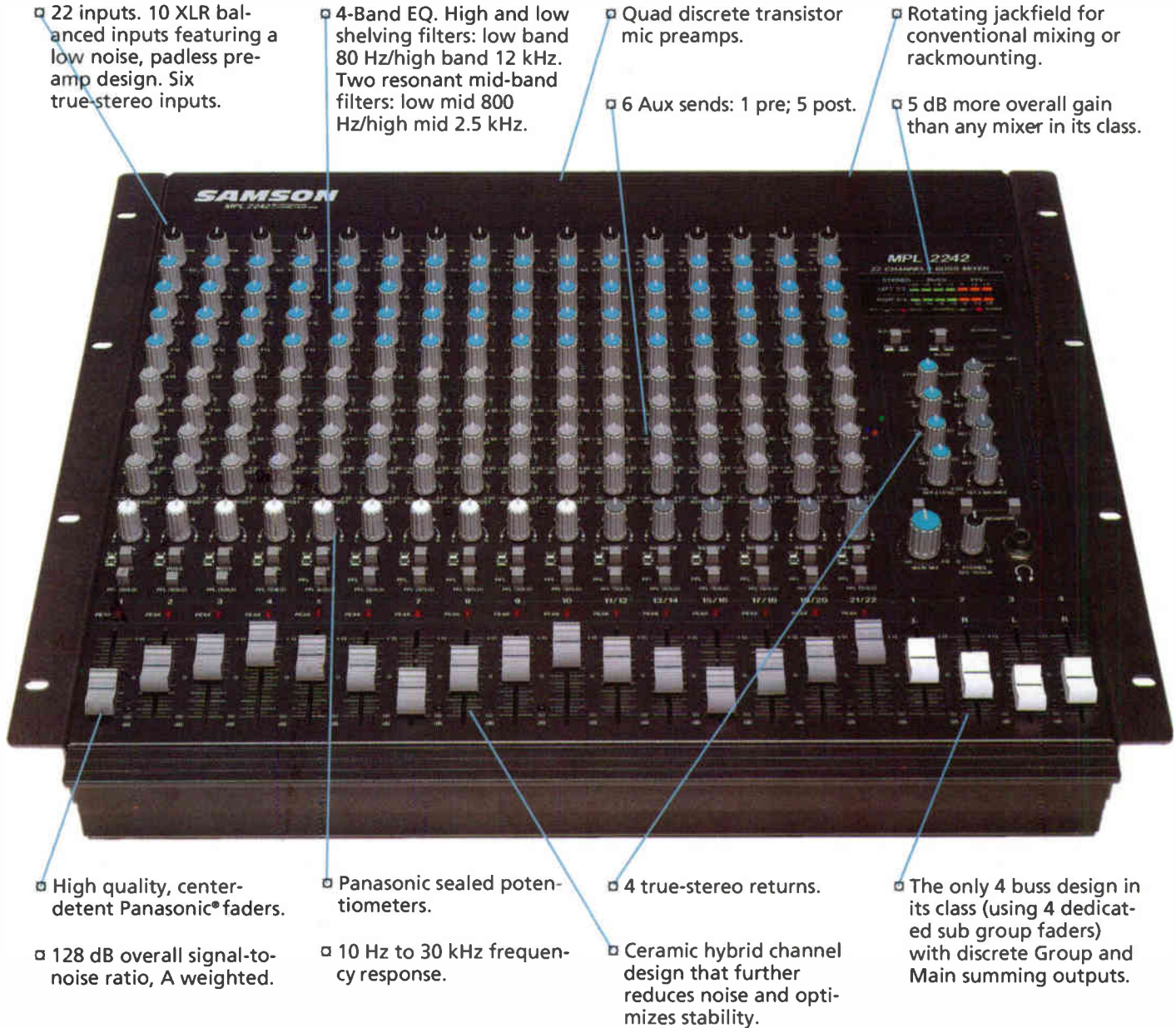
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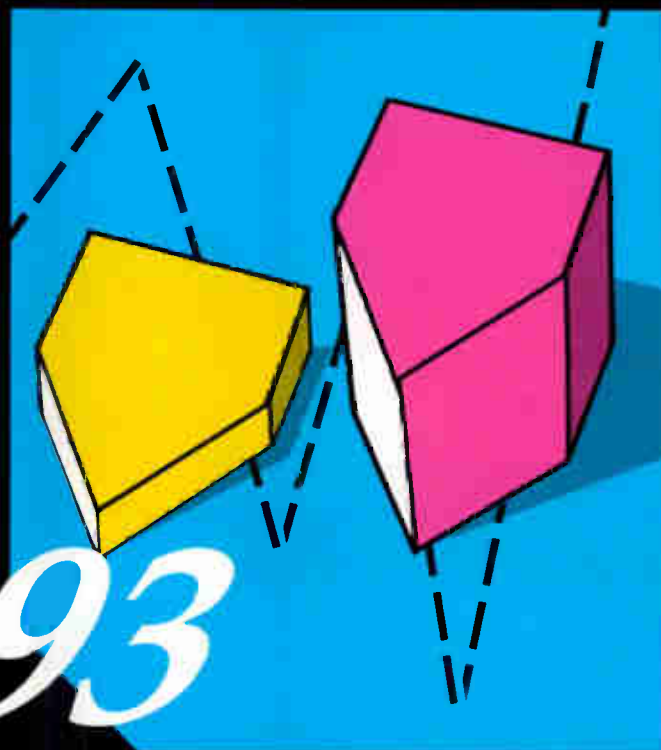
SAMSON AUDIO

For more information about the MPL 2242, please contact Samson Audio, a division of Samson Technologies Corp., P.O. Box 9068, Hicksville, NY 11802-9068 (516) 932-3810 FAX (516) 932-3815

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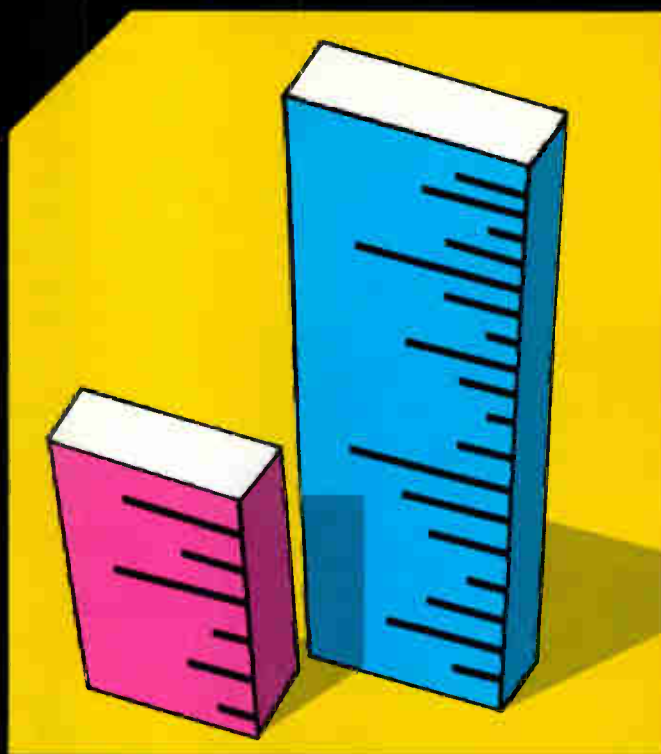
Circle 203 on Reader Response Card

SOUND & COMMUNICATIONS



1993

CONTRACTORS SURVEY



Most Important Markets for 1992

- Commercial Sound Reinforcement (installed)
- Entertainment Sound Reinforcement (installed)
- Factory Paging/Talk Back
- Other Wired Intercom
- Integrated Systems Reinforcement
- System Hardware Sales/Installation
- Nurse Call
- CCTV
- Alarm/Security/Life Safety
- Pro Sound Equipment
- Video Systems (non-security)

Markets to Expand Into

- Residential
- Fire Alarm
- Teleconferencing
- Intercom
- Security
- Video Systems
- Nurse Call
- Interconnect
- Business Music
- Churches
- Arena Sound
- Commercial
- Hospitality
- CCTV

Projected Importance to Sales For 1993

- Commercial Sound Reinforcement (installed)
- Nurse Call
- Entertainment Sound Reinforcement (installed)
- Other Wired Intercom
- Video Systems (non-security)
- System Hardware Sales/Installation

The most important criteria for getting most jobs

	PERCENT RESPONDING		
	1991	1992	1993
Low bid	11.9	18.1	23.9
Fair price	16.4	16.9	18.3
Service & maintenance availability	10.3	20.3	16.9
Installation availability	4.3	6.8	8.5
My company's presentation	23.3	23.7	22.5
Equipment carried	2.6	1.7	9.9

DOLLAR SALES (in thousands)

	PERCENT OF CONTRACTORS			
	1989	1990	1991	1992
\$100 & Under	11.9	20.3	12.1	7.0
\$100-\$500	36.5	23.7	24.1	23.9
\$500-\$1,000	17.6	22	15.5	22.5
\$1,000-\$5000	24.5	30.5	37.1	35.2
\$5,000-\$10,000	6.9	3.4	6.9	4.2
Over \$10,000	6	1	2.6	7

Average Percent of Sales

	PERCENT RESPONDING			
	1989	1990	1991	1992
SOUND REINFORCEMENT				
Commercial sound reinforcement (installed)	24.8	29.8	32.2	24.6
Commercial sound reinforcement (portable)	2.3	1.4	3.0	2.7
Entertainment sound reinforcement (installed)	6.5	2.2	4.2	7.2
Entertainment sound reinforcement (portable)	2.5	2.0	2.6	2.4
Sound service (rental & operation)	5.5	4.3	4.3	3.0
Pro sound equipment	4.8	3.7	3.3	3.6
MI/musical instrument	0.9	2.5	0.4	1.6
Recording equipment	—	—	—	0.4
Integrated systems reinforcement	—	—	—	4.0
INTERCOM (Non-telephone)				
Office-to-office	1.0	1.1	0.8	1.0
Nurse Call	4.0	5.6	4.0	7.7
Other Hospital/health care intercom	1.0	1.4	1.8	1.4
Factory paging/talk back	2.5	2.4	4.6	2.4
Other wired intercom	3.7	1.3	2.5	5.9
BUSINESS MUSIC				
System hardware sales/installation	3.6	2.1	2.9	5.5
Sales of tape/cartridge	0.7	0.2	0.2	0.5
SCA/Satellite	1.6	5.4	2.2	2.6
Music library rental/programming	1.0	0.3	0.5	0.1
INTERCONNECT				
Keyphone sales/installation	4.4	5.0	2.0	3.4
PBX sales/installation	1.0	1.5	0.5	0.6
Hybrid sales/installation	1.4	2.2	1.4	0.0
Support & peripheral equipment	1.5	0.8	0.4	0.1
Centrex sales	—	—	—	0.1
OTHER				
Video systems (non-security)	3.3	5.2	6.3	6.6
CCTV	2.8	6.8	4.3	4.2
Alarm/security/life safety	6.1	6.2	7.0	4.4
Sound masking	0.8	1.2	0.5	2.3
Teleconferencing	0.6	2.2	1.3	1.0
Residential systems	1.7	5.5	6.6	3.0

Actions Manufacturers Should Take

"Don't sell to everyone/anyone who calls."

"Cut back on reverse engineering. If a design can't be improved then keep it the way it is. Don't change for the sake of changing."

"Quicker turnaround for factory repairs."

"Better training programs."

"More personal touch. When I call I want to talk to a person."

"Send people into the field to observe real life."

"Bar codes on all equipment for inventory and trading."

"Cut the crap e.g. talk that doesn't mean anything."

"Treat us as a customer—not just the end user."

"Have faith in the economy and keep things in stock."

"Protection of dealers and price structure-standards."

"Include price lists with their sales literature—to allow ease of estimating and reduce calling for prices."

"More co-promotion. Educate customers on quality not lowest price."

"Get rid of unqualified/unskilled/lying and cheating contractors."

"For large projects, do not sell to non-sound contractors (electrical, telephone, security)."

"Better customer service when there is a problem with their products."

"Extend terms, as cash flow is always tight."

"Sell direct to authorized dealers in Canada."

"Make sure architects are aware of their products."

Survey of the Sound And Communications Contracting Business.

By Judith Morrison

Once again you allowed us and our readers to know what you are thinking. And you are thinking about business.

Our Eighth Annual Survey of Contractors is hot off the presses, and here is an analysis of what you said. Tables and charts are available throughout these pages. There's much more information than space allows, but here are the highlights.

Once again we broke our survey into three parts: Business, Organizations, and Markets. While we added some questions, we didn't tamper too much

We've seen, as one might expect, growth in the middle and at the very top.

with the questionnaire because we know our survey is unique in that we can offer some historical references and provide it to the industries. Some of the information in our tables will show the differences among years dating back to 1989.

As far as dollar sales, we've seen some changes. We've seen fewer small dollar sales (in 1989, 11.9 percent of our respondents reported total dollar sales of under \$100,000. Today that

percentage is seven.) Conversely, we've seen, as one might expect, growth in the middle and at the very top. These figures are roughly spread through all territories.

The average number of employees of contractors is 16.2, with over 40 percent of our respondents employing between four and ten employees. Over a quarter employ between 11 and 25. And over 15 percent employ between 16 and 99.

Companies tend to see themselves as all-inclusive services. Over 95 percent of respondents provide equipment sales, and well over 90 percent also offer system design, system installation, and repair and maintenance. Only 64.8 percent offer consultation services, however. Nearly all of our respondents engage in some sort of system installation.

The average size of the largest system done by an installer has also risen — to over \$352,000. That figure is skewed by some very large scale projects. The average size of all installed systems is over \$21,000. And the typical time from order to finished system is 3.5 months, a little less than last year, but more than in 1991. Larger contractors tend to take more time — but they also get the big jobs.

As far as organizations, 69 percent of our respondents belong to NSCA, and nearly 30 percent belong to AES. Far fewer belong to NAMM, ICIA,

Judith Morrison is the Editor-in-Chief of Sound & Communications magazine.

Total Dollar Sales for 1992

	Percentage				
	1988	1989	1990	1991	1992
Under 100,000	18	11.9	20.3	12.1	7.0
100,000-499,999	38	36.5	23.7	24.1	23.9
500,000-999,999	13	17.6	22.0	15.5	22.5
1 Mil.-4,999,999	23	24.5	30.5	37.1	35.2
Over 5 Million	8	7.5	3.4	9.5	11.2

Installed System Jobs

(Dollars In Thousands)

	1990	1991	1992	1993
Average size of systems	15.8	21.4	35.2	21.7
Largest size of systems	96.0	170.4	245.7	352.8
Typical time from order to finished system (months)	2.6	3.3	3.9	3.5

Top Selling Lines

1. TOA
 2. JBL
 3. Rauland-Borg
- Other manufacturers receiving a sizable number of votes:**
- Crown
 - Electro-Voice
 - Altec Lansing
 - QSC
 - Atlas/Soundolier
 - Bose
 - Dukane

Average Projected Percent of Sales

	1990	1991	1992	1993
SOUND REINFORCEMENT				
Commercial sound reinforcement (installed)	28.4	28.9	32.1	25.7
Commercial sound reinforcement (portable)	2.1	1.5	2.3	2.7
Entertainment sound reinforcement (installed)	6.0	3.2	4.9	6.6
Entertainment sound reinforcement (portable)	3.4	1.1	1.8	2.3
Sound service (rental & operation)	4.7	3.5	3.2	2.0
Pro sound equipment	4.0	3.5	3.5	3.7
MI/musical instrument	0.9	—	.4	1.5
Integrated systems reinforcement	—	—	—	4.5
Recording equipment	—	—	—	.5
INTERCOM (Non-telephone)				
Office-to-office	1.5	1.2	1.0	1.1
Nurse Call	4.1	5.7	4.9	8.2
Other Hospital/health care intercom	0.6	1.8	2.2	1.6
Factory paging/talk back	1.8	1.6	4.3	1.9
Other wired intercom	4.4	3.0	2.2	6.0
BUSINESS MUSIC				
System hardware sales/installation	3.7	1.5	3.2	5.4
Sales of tape/cartridge	0.5	0.3	0.3	0.0
SCA/Satellite	2.7	5.8	2.8	2.9
Music library rental/programming	1.5	0.4	0.5	0.1
INTERCONNECT				
Keyphone sales/installation	4.0	3.2	2.2	3.4
PBX sales/installation	0.9	1.5	0.6	0.8
Hybrid sales/installation	1.5	2.5	1.5	0.0
Support & peripheral equipment	0.7	1.2	0.5	0.3
Centrex sales	—	—	—	0.1
OTHER				
Video systems (non-security)	4.5	6.2	6.2	5.6
CCTV	3.0	9.0	5.4	4.4
Alarm/security/life safety	6.3	6.6	8.3	4.8
Sound masking	0.7	1.5	0.7	2.3
Teleconferencing	0.7	2.4	2.1	1.2
Residential systems	2.5	6.2	5.8	3.3

Most Important

SOUND REINFORCEMENT

- Commercial sound reinforcement (installed)
- Commercial sound reinforcement (portable)
- Entertainment sound reinforcement (installed)
- Entertainment sound reinforcement (portable)
- Sound service (rental & operation)
- Pro sound equipment
- MI/musical instrument
- Integrated systems reinforcement
- Recording equipment

LOCAL WIRE INTERCOM (Non-telephone)

- Office-to-office
- Nurse Call
- Other Hospital/health care intercom
- Factory paging/talk back
- Other wired intercom

BUSINESS MUSIC

- System hardware sales/installation
- Sales of tape/cartridge
- SCA/Satellite
- Music library rental/programming

INTERCONNECT

- Keyphone sales/installation
- Support & peripheral equipment

OTHER

- Video systems (non-security)
- CCTV
- Alarm/security/life safety
- Sound masking
- Teleconferencing
- Residential systems

Manufacturers With Best Relationship

1. Crown
 2. TOA
 3. JBL
- Other manufacturers receiving a sizable number of votes:
- Altec Lansing
 - Rauland-Borg
 - West Penn
 - Telex
 - Electro-Voice
 - Biamp
 - Community

Markets Projected

1990	1991	1992	1993
47.8	52.5	56.9	47.9
7.5	5.1	14.7	8.5
17.0	10.2	18.1	22.5
6.9	3.4	5.2	7.0
10.7	16.9	16.4	7.0
12.6	11.9	19.8	15.5
1.3	—	1.0	1.4
—	—	—	15.5
—	—	—	4.2
9.4	8.5	8.6	2.8
13.8	13.6	19.0	18.3
6.9	5.1	12.9	9.9
10.1	8.5	15.5	15.5
13.8	5.1	15.5	18.3
9.4	10.2	15.5	15.5
3.8	3.4	4.3	2.8
6.3	6.8	11.2	5.6
5.7	1.7	5.2	1.4
8.2	6.8	6.9	4.2
3.8	5.1	3.4	2.8
14.5	15.3	21.6	8.5
11.3	16.9	19.8	16.9
11.9	8.5	19.8	12.7
6.3	10.2	10.3	4.2
2.5	8.5	15.5	8.5
5.7	8.5	12.9	9.9

ASA, CEDIA and SMPTE.

What do respondents expect of organizations? Here are some of their thoughts: "improve stature of industry," "discourage hyperbole," "education," "training," "coordinate standards."

And what conventions are attended? Nearly 72 percent attended the NSCA convention, and over 18 percent attended the AES convention. Other conventions attracting our readers are NAMM (12.7 percent) and Infocomm (11.3 percent). Only 2.8 percent attended CEDIA, but 4.2 percent attended DJ Expo, which was firmly fixed in the middle ground of sound

Integrated systems, rather than being a totally new classification, is pulling from people used to call commercial sound to entertainment sound to perhaps life safety.

contractors. But no one attended SMPTE despite their being members.

This year we added the classification "Integrated systems reinforcement" to the list of endeavors our readers are involved in. As expected, the term *integrated systems* has gained its adherents, with over 28 percent reporting that integrated systems reinforcement accounted for over 1 percent of 1992 gross sales. However, those respondents reporting on integrated systems reinforcement only reported four percent of their sales coming from this classification, with contractors in the northeast far more likely to use this term. Our most likely scenario is that integrated systems, rather than being a totally new classification, is pulling

from classifications that people used to call commercial sound to entertainment sound to perhaps life safety.

Overall, the most important markets are commercial sound reinforcement, entertainment sound, integrated systems, pro sound, nurse call, factory paging, business music, video systems, CCTV and alarm.

There is a continuing disparity between what companies expect and what actually happens. Last year correspondents expected to be doing less business in nurse call. Yet in actuality, nurse call accounted for 7.7 percent of sales — and actually increased. This year, the most important projected markets shows an increase in wired intercom and entertainment sound. The new *integrated systems* category was expected to gain 15.5 percent of the business, which we presume came from other market segments. Our new classification of recording equipment was expected to garner 4.2 percent of our respondents business, but for 1992 recording equipment was reported as a paltry .4 percent. Yet, attitudes are positive and the truth shows more variation and success than projections tend to.

Actually the most successful markets expected in 1993 include not only commercial and entertainment sound, but nurse call, factory paging, business music and CCTV. Respondents may see less of their gross profits coming from the top market segments. Nearly 10 percent expect residential systems to be one of their top markets in 1993.

Venues providing most of the work again are worship houses. Over 22 percent of our respondents do most of their work in worship houses. Schools came in second and after that hospitals and offices. Only 1.4 percent of our readers include auditoriums and concert halls among their most important venues. But over 70 percent mentioned them as important in their work. This was true most visibly *near* the top of the scale — but not *at* the top. Eighty

THE BEST REPS

Manufacturers' rep/distributors having the best relationship with contractors. (In alphabetical order)

<i>A/V Marketing</i>	<i>Jamm Distribution</i>
<i>Audio Marketing Associates</i>	<i>Kodo Associates</i>
<i>AVCOM</i>	<i>Meyer</i>
<i>Bencsik Associates</i>	<i>PCM Marketing</i>
<i>Burcaw Company and Associates</i>	<i>Secom Systems</i>
<i>CL Pugh and Associates</i>	<i>Warren Associates</i>
<i>Graham/Davis</i>	<i>Western Audio Sales</i>
<i>Henry Phillips</i>	<i>World Wide Electronics</i>

Other companies receiving a sizable number of votes (In alphabetical order)

<i>Aldridge</i>	<i>Ouzunoff and Associates</i>
<i>Allied Communications</i>	<i>Pacnor Marketing</i>
<i>AMH Sales Company</i>	<i>Palmieri Associates</i>
<i>BC Elec.</i>	<i>Peregrine Southwest Reps</i>
<i>Carlberg-Warren and Associates</i>	<i>Piper Associates</i>
<i>Cordial/Riley Marketing</i>	<i>Ponto and Associates</i>
<i>Design Factors</i>	<i>ProTech Marketing</i>
<i>Dick Bellew Sales</i>	<i>Pusecker Sales</i>
<i>Eakins/Berstein and Associates</i>	<i>Radon and Associates</i>
<i>Excellence</i>	<i>Rancilio Associates</i>
<i>Fuchs/Crescendo</i>	<i>RP Sales</i>
<i>George Marconis</i>	<i>RW Sales</i>
<i>GMI</i>	<i>Shalco</i>
<i>Gravley and Associates</i>	<i>Silver Peak Marketing</i>
<i>Hudson Marketing</i>	<i>Sound Marketing</i>
<i>Kleiman and Associates</i>	<i>St. Louis Music</i>
<i>Loppnow and Associates</i>	<i>Star Enterprises</i>
<i>Lowell</i>	<i>Starin Marketing</i>
<i>Ludwig Marketing</i>	<i>W 3 Marketing</i>
<i>Mainline Marketing</i>	<i>W. Ray</i>
<i>Monfort Electronics Marketing</i>	<i>WesTech Marketing</i>
<i>Nets</i>	<i>White and Associates</i>
<i>New Horizons</i>	<i>William B. Allen</i>

More Time Should Be Spent With...

	PERCENTAGE			
	1990	1991	1992	1993
Architect	27.7	22.0	19.0	21.1
General contractor	4.4	1.7	2.6	1.4
End user	20.8	25.4	25.9	36.6
Electrical contractor	5.7	5.1	0.9	5.6

Markets with 1

SOUND REINFORCEMENT

Commercial sound reinforcement (installed)
Commercial sound reinforcement (portable)
Entertainment sound reinforcement (installed)
Entertainment sound reinforcement (portable)
Sound service (rental & operation)
Pro sound equipment
MI/musical instrument
Integrated systems reinforcement
Recording equipment

LOCAL WIRE INTERCOM (Non-telephone)

Office-to-office
Nurse Call
Other Hospital/health care intercom
Factory paging/talk back
Other wired intercom

BUSINESS MUSIC

System hardware sales/installation
Sales of tape/cartridge
SCA/Satellite
Music library rental/programming

INTERCONNECT

Keyphone sales/installation
PBX sales/installation
Hybrid sales/installation
Support & peripheral equipment

OTHER

Video systems (non-security)
CCTV
Alarm/security/life safety
Sound masking
Teleconferencing
Residential systems

Venues of Concentration

	PERCENTAGE		
	1991	1992	1993*
Worship houses	50.8	50.0	77.5
Schools	40.7	37.9	71.8
Boardrooms	20.3	18.1	52.1
Auditoriums/concert halls	33.9	35.3	70.4
Offices/factories	44.1	44.0	77.5
Hospitals	20.3	25.9	52.1
Clubs/restaurants	30.5	22.4	54.9
Stadiums	—	—	60.6
Residences	—	—	28.2

*denotes new way of quantifying

percent of Sales

PERCENT RESPONDING			
1989	1990	1991	1992
85.5	79.7	86.2	80.3
26.4	20.3	28.4	16.9
37.1	27.1	37.1	42.3
20.1	8.5	17.2	15.5
36.5	33.9	28.4	19.7
40.9	27.1	36.2	25.4
1.9	1.7	6.0	4.2
—	—	—	28.2
—	—	—	7.0
31.4	27.1	24.1	19.7
23.9	33.4	22.6	33.8
21.4	20.3	22.4	23.9
49.1	40.7	37.9	43.7
34.6	20.3	33.6	40.8
27.7	28.8	27.6	32.4
8.8	11.9	8.6	5.6
11.3	13.6	19.8	15.5
11.3	5.1	12.1	7.0
18.9	20.3	14.7	15.5
8.8	11.9	6.9	7.0
9.4	5.1	9.5	4.2
11.3	15.3	2.3	8.5
32.7	37.3	33.5	28.2
39.0	49.0	45.7	42.3
19.5	25.4	28.4	23.9
22.0	20.3	22.4	22.5
10.7	22.0	16.4	8.5
13.8	27.1	22.4	21.1

eight percent of respondents in the \$1,000,000 to \$4,999,999 1992 sales categories mentioned auditoriums and concert halls as being important.

What are the criteria for getting jobs? Contractors think they know what they are. Nearly a quarter of them think that the low bid is the most important criterion, and that judgment runs across the board from smaller to larger companies. That figure has shown a steady increase, rising from 18.1 percent last year. Over 63 percent mention low bid as having some importance, and here larger companies are more apt than smaller companies to mention it. Under a fifth think that a fair price is the most important criterion for getting a job, although three quarters of the respondents think it has some importance. Sixteen point nine percent think that service and maintenance availability are most important, down from 20.3 last year. Installation availability is seen as most important only by 8.5 percent of the respondents (although nearly all *do* installation, as you'll remember). Nearly a quarter of respondents consider their company presentation most important (smaller and larger companies were both more apt to see this as most important. Companies in the middle were less likely to make this appraisal. Even equipment carried was seen as most important only by 10 percent of the respondents (although 62 percent mentioned this as important).

Our respondents spend over half their time interfacing with the end user. Smaller companies are far more apt to do this, and the figure steadily falls off, with the largest companies only spending a little over a third of their time with the end user. The figure is converse for the electrical contractor, with the average percentage of time being 14.6 percent. Over 10 percent of the time is spent with the architect.

And who do you want to spend more time with? Thirty-six percent of you want to spend even more time with the

end user (this is more true for large companies than small; since the small company is already spending a great deal of his time with the end user, large companies are also feeling the need). Over a fifth want to spend more time with the architect. But only 1.4 percent want to spend more time with the general contractor. And nearly 17 percent want to spend less time with the electrical contractor. (Only 4.2 percent want to spend less time with the end user.)

Attitudes toward the business as a whole were rather positive. Although nearly 38 percent said its attitudes are very positive, over 45 percent said "positive" and only 5.6 percent said negative. As always, no one said they felt very negative (presumably those people got out of the business before our survey arrives each year). And also as always, more people feel positively towards their own business as feel positive towards the industry as a whole. Fully 91.6 percent feel either very positive or positive, while 5.6 percent feels neutral. Again, no one felt very negative.

Once again, we at Sound & Communications were gluttons for punishment. Not letting well enough alone, and allowing our independent stat house to compile your answers and furnish us with the raw numbers, we also asked a number of write-in questions, which had to be compiled by hand. We do this not because we want more work, although we're known to be workaholics. But we think the most interesting and unsolicited information comes out of giving you a chance to speak your minds. And again we were not disappointed.

For instance, we asked our contractor readers which reps they particularly admired. Remember, this was a write-in answer and the respondent had to think and then go to some trouble to write in his answer. That is why, again this year, we feel that those just being mentioned deserve a lot of

ATTITUDES

	PERCENTAGE		
	1991	1992	1993
VERY POSITIVE	40.7	29.3	38.0
POSITIVE	39.0	54.3	45.1
NEUTRAL	10.2	10.3	9.9
NEGATIVE	5.1	2.6	5.6

credit. To our dismay, once again some of our readers again wrote in companies and individuals who are not manufacturers reps. We have here used our judgment, and included those people if they are not too far off base.

We again asked for the line that was top selling, the best value, and the most reliable. We also asked which manufacturer the contractor had the best relationship with. You can see the answers in these pages, and once again TOA came in at the top or near the top of each list. We have had some explanations that some of these responses are due to wide distribution. And that is true. But a good relationship is a good relationship. And our respondents are anonymous.

We also asked which are the least likely brands our respondents would sell and why. The answers are consistent with last year's, and we won't print them, consistent with the libel laws. You know who these companies are. The most frequent reasons given are: "poor service," "no profit," "unreliable," "poor quality."

We left room for comments from our respondents, and here is a selection:

"Like everyone else in [the business], we are looking at the future and wondering what will happen."

And our favorite advice to manufacturers: "Better Communication." ■

Research assistance by Jeff Colchamiro.

S-8 Sound & Communications

Best Value

1. TOA	
2. Rane	
3. Atlas/Soundolier	
Other manufacturers receiving a sizable number of votes:	
Telex	Community
Crown	QSC
Shure	Electro-Voice
Altec Lansing	Klipsch

Most Reliable Brands

1. Crown, TOA (tie)	
2. QSC	
3. Bose	
Other manufacturers receiving a sizable number of votes:	
Rane	Biamp
Altec Lansing	Rauland
JBL	Atlas/Soundolier

Most Important Markets

	PERCENT RESPONDING			
	1989	1990	1991	1992
SOUND REINFORCEMENT				
Commercial sound reinforcement (installed)	60.4	61.0	63.8	57.7
Commercial sound reinforcement (portable)	12.6	10.2	16.4	8.5
Entertainment sound reinforcement (installed)	21.4	15.3	18.1	28.2
Entertainment sound reinforcement (portable)	10.7	5.1	6.9	9.9
Sound service (rental & operation)	16.4	22.0	18.1	9.9
Pro sound equipment	23.9	11.0	19.8	15.5
MI/musical instrument	1.3	1.7	3.4	1.4
Integrated systems reinforcement	—	—	—	18.3
Recording equipment	—	—	—	4.2
LOCAL WIRE INTERCOM (Non-telephone)				
Office-to-office	14.5	13.6	13.8	7.0
Nurse Call	13.8	22.0	12.2	18.3
Other Hospital/health care intercom	10.7	10.2	13.8	7.0
Factory paging/talk back	22.6	18.6	23.3	25.4
Other wired intercom	17.0	10.2	19.8	22.5
BUSINESS MUSIC				
System hardware sales/installation	13.8	20.3	17.2	18.3
Sales of tape/cartridge	5.7	5.1	3.4	4.2
SCA/Satellite	6.9	10.2	13.8	5.6
Music library rental/programming	8.2	1.7	6.9	2.8
INTERCONNECT				
Keyphone sales/installation	12.6	10.2	7.8	8.5
PBX sales/installation	5.0	3.4	2.6	2.8
Hybrid sales/installation	5.0	1.7	4.3	2.8
Support & peripheral equipment	5.0	5.1	5.2	2.8
OTHER				
Video systems (non-security)	14.5	22.0	22.4	12.7
CCTV	21.4	27.1	26.7	16.9
Alarm/security/life safety	10.7	11.9	21.6	15.5
Sound masking	7.5	11.9	9.5	7.0
Teleconferencing	3.1	10.2	8.6	4.2
Residential systems	5.7	13.6	14.7	9.9

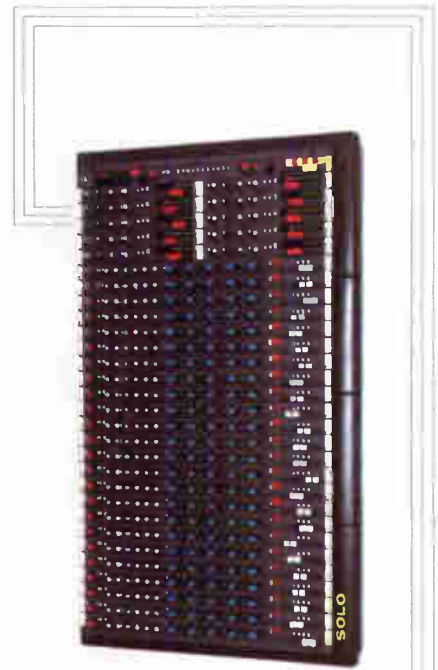
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Automatic Mic Mixers, Part One

The Overall Story

BY ROB BAUM

Automatic mic mixers have been around for about 15 years, yet many sound contractors never specify them. Are there jobs that you should be using automatic mic mixers for, at least for certain functions, but you are unaware that an automatic mix mixer would be a better solution? Or do you avoid specifying these devices because you are not familiar with what the functions and features are, and you do not want to spec in a product that may not work correctly in your job?

From the cheapest models to the most expensive there is almost a 10 to 1 cost ratio. What do you get for the extra money, and what is left out on the less expensive designs? What are the trade-offs between optimizing for voice versus music in the detector circuits; in naturalness; and in attaining maximum gain before feedback? How does the performance of an automatic mic mixer compare to a skilled human operator? Should you select your mic pickup pattern any differently when an automatic mic mixer is used? This series of articles will explore the technical and commercial development, de-

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

sign philosophies and applications of automatic mic mixers, as well as how to select and specify the most appropriate solution for the job at hand.

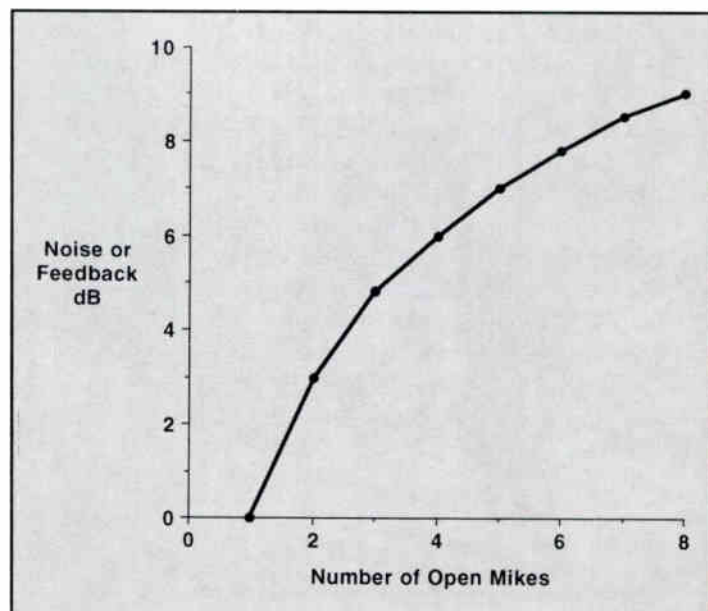
WHY USE THEM?

Automatic microphone mixers are devices that try to mimic a skilled mixing engineer. Mic mixers are needed because they give a sound reinforcement system or teleconferencing system more gain before feedback, cutting down on the excess reverberation and ambient noise that would otherwise get into the system as more mics are opened up. If only one mic is

needed, but other mics are open, the mixer's output will have far too much ambient noise and reverberation, degrading the signal-to-noise ratio of the speech, making it harder to understand. Automatic mic mixers, like human operators, turn the gain down on unused mic channels, and turn the gain up on active channels, all the while ensuring that the overall level remains roughly constant. The result is clearer and louder sound.

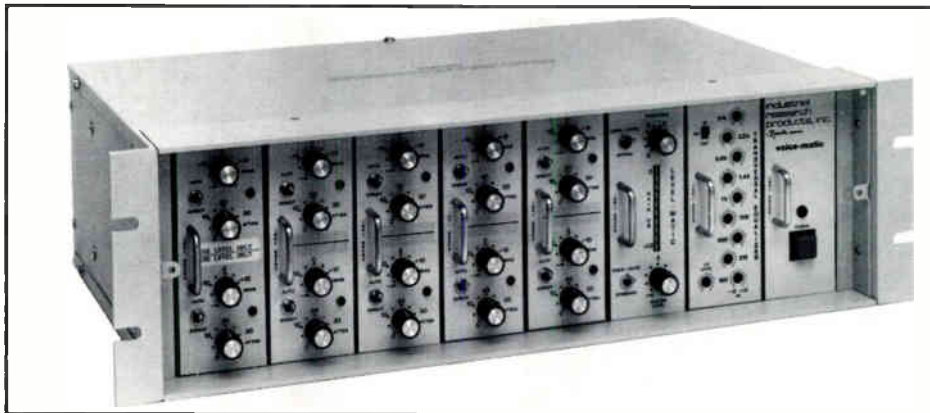
As a rough approximation, each doubling of the number of open mics (NOM) cuts available gain before feedback by 3 dB. So as more mics are

Figure 1. Number of Open Mics (NOM). As more than one mic becomes open, noise and feedback increases. The curve follows the mathematical function $10 \log(NOM)$. It is assumed that mics have the same acoustical gain and are in the reverberant field.



opened up, the mic mixer must reduce overall gain. If not, as mics open and close, the reverberation and ambient noise would fluctuate intrusively. NOM attenuation techniques try to provide the gain, stability, low ambient and room noise qualities of a single open mic, with the benefits of using multiple mics.

In addition to reducing the ambient noise, another important way mic mixers improve quality relates to prevention of "comb-filtering" effects. When two mics are open at about the same gain, the time-delayed sound picked up by the second mic creates a comb-filter effect, severely degrading sound quality. "Comb-filter" refers to the comb-like teeth in the summed frequency response, due to the two mics going in and out of phase with each

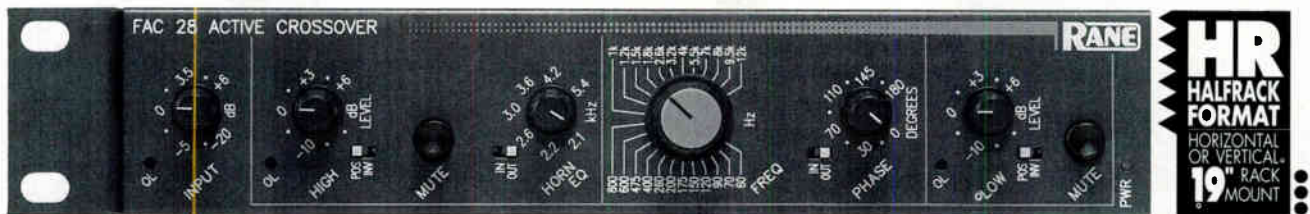


IRP's Voice-Matic.

other. The resulting amplitude/frequency response alternates between deep nulls and peaks. Note that reflections off nearby hard walls, table tops, or podium tops can also result in comb-filter effects with only one mic.

Before considering microphone mixing, it should be noted that the miking of multiple sources is not a simple job. If too few mics are used, coverage of each participant will vary — talkers near mics will be loud and clear, while

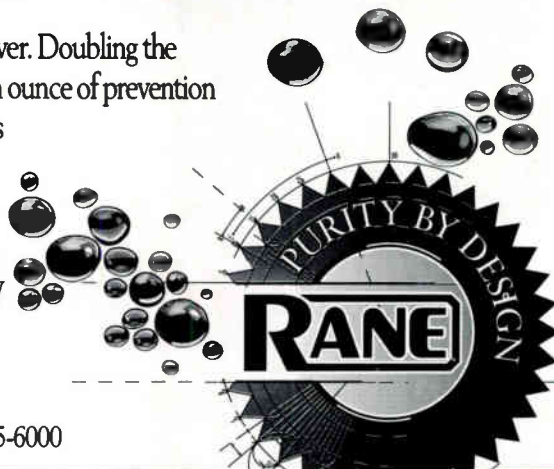
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talkers far from mics will be reverberant and muddled, since the mic will be picking up less of the direct sound. A mixer can use too many mics, which boosts background noise, reverb, and sacrifices gain before feedback. As always, basic guidelines for good mic practice apply: get the mics as close as possible to the source, and as far as possible from speakers or noise (like air conditioning, audio-visual equipment, or noisy fluorescent light ballasts).

MAN VERSUS MACHINE

It would be very convenient for sound contractors if someone invented an automatic mic mixer that was flexible and easy to use, and really worked. Why? Some events do not financially warrant a mixing engineer, or sometimes the mixing engineer

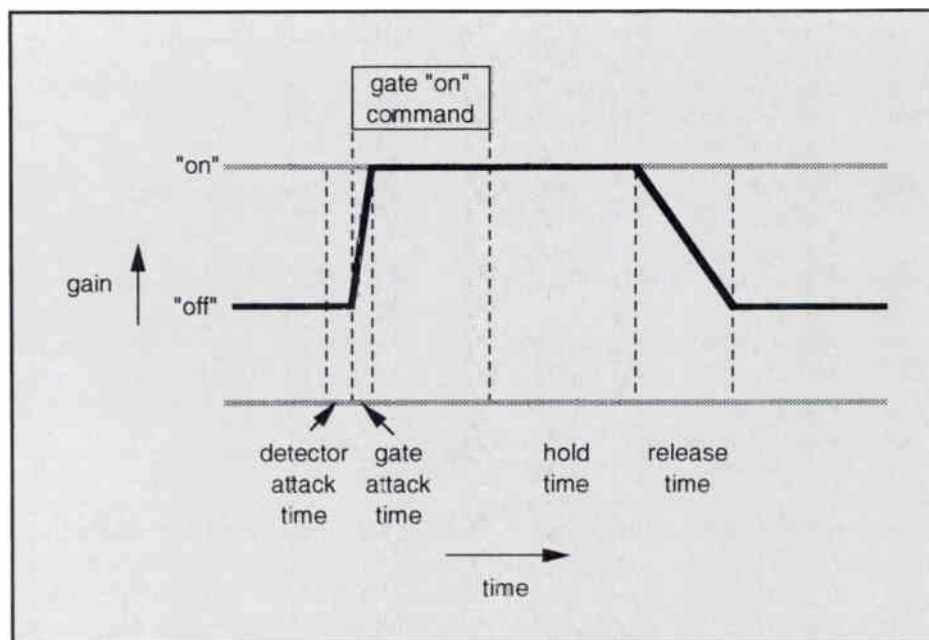


Figure 2. Gate Terminology (after Dugan). Most automatic mic mixers gate a channel open, hold to bridge between syllables, then attenuate that channel.

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does not show up, takes breaks, and so on. Even if a competent mixing engineer is at the controls, one person is not always enough to control 24 mics or more; it would be nice to dump eight of the less critical inputs onto an automatic mic mixer. On the other hand, automatic mic mixers have up-front costs, must be installed and set up correctly (no mean feat), and need occasional maintenance. Machines also make mistakes, sometimes in ways that are very unnatural sounding. Hence the continuing mission to boldly go where no mixer has gone before.

MIC MIXERS' PURPOSE

A skilled human operator does three key things which automatic mic mixers try to duplicate:

1. Decides/detects which channel(s) need to be on and which need to be attenuated.

2. Makes a smooth and quick transition between these two states, *on* and *attenuated* (or any intermediate setting). If a proper "gate envelope" is chosen, very little program material is lost. Mixers may: Quickly switch between on/attenuated; linearly ramp up/down to smooth the transition;

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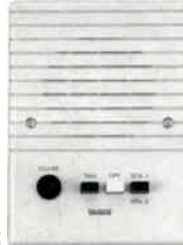
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undergo expansion/compression of gain as they change from attenuated to on (and vice-versa).

3. Controls the master gain, which must vary as the number of open microphones (NOM) varies. To preserve a system's feedback stability margin, master gain must decrease as the NOM increases.

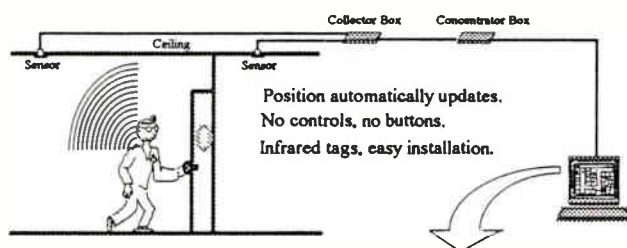
WHEN A MIXER GATES "ON"

Referring to Figure 2, the pattern of gain over time for a gate that has been switched on is shown. First is the detection/gate on stage. Mixers gate on at various rates. Some switch on quickly, some fade up, and some fade up with 2:1 expansion. Next is the hold time (called "release time" by some manufacturers). Gated mixers use the hold time to bridge the silent times between a talker's syllables. (Without some hold time, or with poorly chosen time constants, some syllables will be chopped off.) When most mixers gate off or release, they quickly attenuate the formerly active mic channel. A few mixers fade down, or fade down with 2:1 compression.

ENQUIRING MINDS WANT TO KNOW

Automatic mic mixers do work, but they do not all work equally well. There are many automatic mic mixers on the market, and they function differently. Note that the three primary objectives listed above can, in many cases, be considered independently. Various designers mix and match among available techniques, and throw in useful features and various degrees of signal routing flexibility. Popular features include high-pass filters to reduce hum and noise, priority override for the moderator's mic channel, and logic to control cameras or other devices. Also popular is "last mic hold on," which holds the last open mic on until another mic is gated on, to maintain a uniform ambient sound in a quiet environment, and to partially

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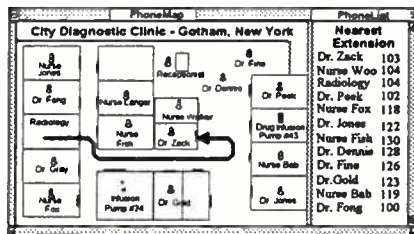
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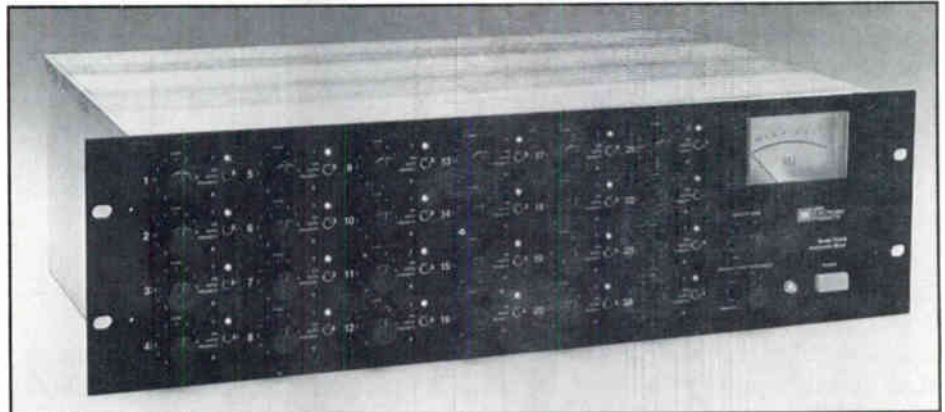
conceal transients from mics abruptly gating on.

Let's take a stroll down memory lane, and review the different ways automatic mic mixers have evolved in their quest to achieve the first of the three primary objectives outlined above: signal detection/decision. (A detailed breakdown of products' method of operation and major characteristics will be listed in the next installment of this article.)

TYPES OF AUTOMATIC MIC MIXERS

HISTORY

The earliest systems were "semi-automatic," since detection was not directly activated by speech. People who wanted their mics on pushed or



JBL's 7510B automatic mixer.

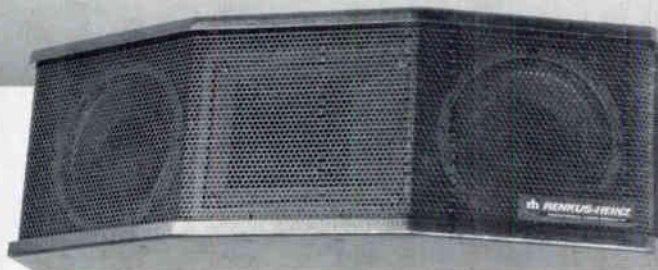
stepped on a switch. Control over gain was retained by either limiting the number of mics that could be open at any one time, using a master gain attenuator that responded to the number of open mics (NOM), or a

combination of the two.

FIXED THRESHOLD

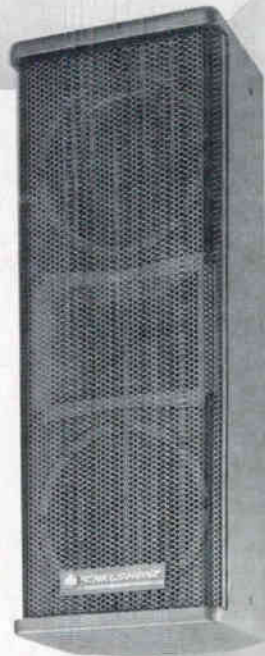
In fixed threshold systems, a "noise gate" or voice operated switch (VOX) was the first attempt at automating mic

the difference is obvious



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mixing. They are "fixed" in the sense that the operator sets a threshold level that does not change as the acoustical situation changes. When the signal level of the mic passes this pre-set point, the mic is turned on. There is no actual "mixing" of the individual mic levels. On the plus side, fixed threshold systems are simple. On the minus side, a too low threshold is falsely triggered on by room noise like applause or music, or by a loud voice at an adjacent mic.

Naturally, as more mics pass their turn-on threshold, NOM rises and master gain must drop to avoid feedback which would otherwise keep all the gates open. If the threshold is set too high, a signal like an off-axis or weak talker's voice may periodically drop below threshold, and get chop-



Altec Lansing's model 1684A.

ped off — a very obvious mixing error. The performance of these systems is improved when the decision/detection circuits are more sensitive to vocal frequencies, as some are.

ADAPTIVE THRESHOLD

Experience with fixed threshold systems indicated mixer performance would improve if the threshold chang-

ed with the ambient sound, such as loud applause, music or spill-over from an adjacent talker. The ideal threshold is a level that when turned on is just below the level that makes any noticeable contribution to the mix. In adaptive threshold systems, if a specific mic is not hearing anything above the current reference threshold, the system attenuates that mic's gain. Usually, the mics are not shut completely off, so they do not have far to go when they come up. There are several ways to set up an adaptive threshold system:

Ambience Sensing

A reference or ambience mic may be placed everywhere a signal mic is, or one or two "room ambience" mics may be used. These ambience mics dynamically adjust the mixer's threshold for mic switching between the *on* and *attenuated* states. Merely raising and lowering thresholds runs the risk of losing or chopping off speech. Basic adaptive threshold systems either replace a fixed threshold with a variable one, or combine the two. It should be noted that a constant pickup of ambient noise is important in broadcasting and recording applications. Otherwise, a lull in the conversation would let all the mics turn off, making it sound like the signal has been lost.

Hi-to-Low Adaptive Threshold Scanning

Another approach to gated mic mixing and adaptive thresholds is based on the Peters patent (US #4,149,032 issued 1978). This method scans from a high level downward, moving over

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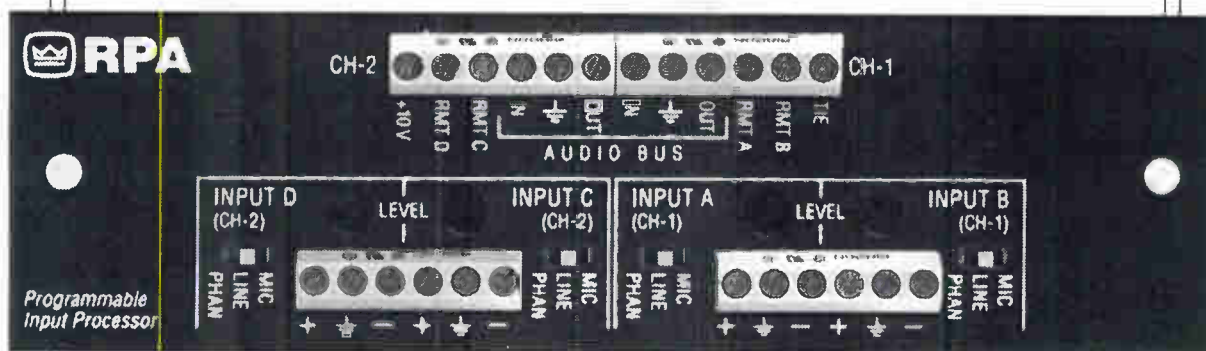


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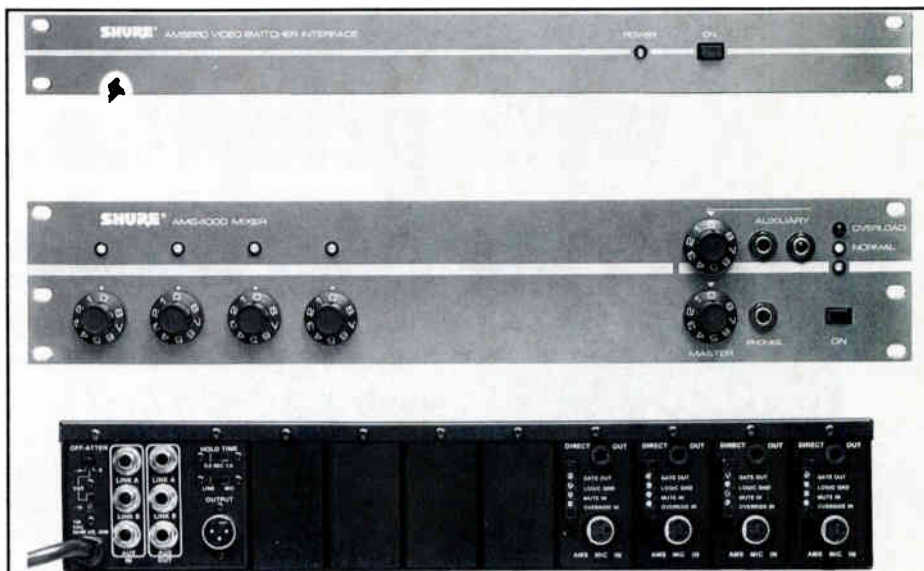


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Shure's Automatic Microphone System – AMS880 video switcher interface (top) and AMS 4000 mixer (center and bottom).

an 80 dB range in 10 milliseconds or less. The system simultaneously compares the instantaneous positive-going signal amplitudes of all channels against a reference voltage. The highest level mic input at any moment is found and that mic is gated on and held for a short, fixed time (usually about 200 milliseconds). The scan process is then repeated.

All the channels are initially held in their attenuated condition. The reason a mic channel is not totally shut off is to make mic reactivation fast and smooth. The first mic channel whose level is equal to the downward-sweeping reference voltage is gated on (and all others are off). When an amplitude match occurs, the downward sweep is restarted at its high value and the gate is reset "on" for another 200 ms. Several mics can be "on" at the same time, because mics that used to be loudest (when someone was talking) are held open for 200 milliseconds. Gain is reduced by 3 dB for each doubling of the number of simultaneously active mics. Usually, a mic channel in use will be found in only 3 or 4 ms, and then gated on, according to IRP, a manufacturer of mixers using this principal. The IRP mixers also permit "chairman over-

ride" when a set of external switch contacts is closed.

Low-to-Hi Adaptive Threshold Scanning

This is the method of the Ponto and Martin auto mixer patent (US #4,374,300 issued 1979), Ponto's NOM attenuator patent (US #4,239,938 issued 1979) and several others. In this scheme, a low initial gate threshold is increased by the average of the input levels. Release time is gated and adjustable from 0.5 to 8 seconds. The release time is the time it takes for a gated input to turn off. This method was first used in the JBL 7510 mixer in 1979 and later in the IED mixers introduced in the mid 1980s.

Detection of active mics in IED's current 4000 Series is achieved by sensing the first half cycle of an audio signal after the signal exceeds the threshold. Since audio spans a 20 Hz to 20 kHz frequency band, and 1/frequency is the period, the time span varies from 1/20 Hz (0.050 sec/cycle or 50 milliseconds) to 1/20,000 Hz (0.000050 sec/cycle or 50 microseconds). Since the IED unit looks at the first half cycle, the mixer is basing its detection decisions on the first 25 milliseconds

to 25 microseconds of signal. At a typical speech frequency of 500 Hz, that is 1.0 millisecond.

GAIN SHARING

Gain sharing systems do not have thresholds or gates, and can be thought of as the ultimate extension of ambience sensing. Each mic's audio signal level is used as raw data by the mixer, to figure out how the available gain (potential acoustic gain minus the feedback stability margin) should be distributed among all mics. Gain is continuously adjusted by the mixer. Altec Lansing and Dugan Sound Design systems use this approach, based on Dugan's "speech system" patent (US #3,992,584 issued in 1975).

Working backwards from maximum gain before feedback, this system shares the available gain among all the microphones. If one mic has more signal than the average of all signals, then that mic channel gets more gain and the other channels get less gain. The Dugan system's internal reference is the sum of the level of each mic channel. This summed input signal reference level envelope is then subtracted from each individual channel. The result is each mic channel's gain. It sounds simple — but it works (even with coherent or in phase inputs from multiple mics). This system responds to ratios between input signals — absolute signal levels do not affect the gains. A NOM attenuator is not needed in the final output stage of the mixer, since it is implicit in the way gain is shared.

DIRECTION SENSING

Direction sensing automatic mic mixers are offered only by Shure (AMS series), and use the Anderson, Bevan et. al. patent (US #4,489,442 issued in 1982). This system uses special dual element cardioid mics to sense direction within a pre-defined space, a 120 degree arc in front of the mic. Sounds outside this arc will not gate the mixer on, even if they are

loud — very clever. Each mic independently analyzes its own sound field to determine if a sound source is within the acceptable 120 degree arc. A sound within this space must be 9.65 dB above the level from the rear (as picked up by the rear-facing mic element) to gate the mic channel on. Unfortunately, these mics can be fooled by strong reflections from hard surfaces behind them, so the area behind these mics should be kept clear for about one foot. Attenuation is by fade-out.

The Shure system works like a variable-threshold system, with its threshold 9.65 dB above ambient noise sensed by the backwards-facing mic element (with a minimum level of 45 dB). Logic outputs and inputs allow control of external equipment like cameras. NOM attenuation of master output level is achieved by loading the mic bus with increasing impedance as the NOM increases.

SIGNAL PROCESSOR BASED

As you read this, Audio-Technica is introducing the "SmartMixer," a compact (8.26" w x 9.3" d x 1.73" h) four channel microprocessor controlled automatic mic mixer for about \$800 retail. More details will be available next month. This approach is clearly the future of automatic mixers, if for no other reason than the low cost of digital signal processing power will be made available as a byproduct of the pursuit of the conferencing market by big telecommunications firms like AT&T and NTT.

In the next installment, we will take a look at the automatic mic mixers that are available, discuss features, functions, cost and appropriate applications.

REFERENCES

D. Dugan, "Application of Automatic Mixing Techniques to Audio Consoles," SMPTE Journal, Jan. 1992, pp. 19-27. G. Ballou (ed), "Handbook for Sound Engineers: The New Audio Cyclopaedia, 2nd Ed.," 1991, pp. 627-632.

Thanks to: Dan Dugan, Dugan Sound; Gary Jones, Applications Manager, Altec Lansing; Mike Sims, Senior Engineer, Lectrosonics

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Cirque Du Soleil

Reinventing The Circus and its Sound System in Las Vegas

BY JESSE WALSH

Sandwiched in between the glitzy casinos and hotels on the strip of Las Vegas lies a rare jewel. The Cirque Du Soleil is a diamond amidst a sea of rhinestones. Subtitled as “Nouvelle Experience,” its festive tent holds much more than the conventional circus. It is a blend of fantasy, magic, music, and theater. It is what circus’ secretly dream of being.

The show features a remarkable collection of the world’s finest acrobats, contortionists, trapeze artists, stilt-walkers, tightrope and balancing acts, and of course, clowns. Admittedly, it sounds like a circus on first description, but there are indeed some differences. First, the Cirque has no animals. It is a showcase of human talent; not a zoo. The formulas for most of the acts have also been slightly twisted. There is a much stronger flair for the dramatic. Clowns are not simply clowns. They’re much more mysterious disguised as Angels, Devils, and Flounes (a mix of Quebec slang for “childish clowns”). Light and sound are no longer simply elements of the background, but almost an equal to the performers who are saturated in a

Jesse Walsh is the President of Jesse Walsh Communications in Buchanan, Michigan.



*Cirque Du
Soleil at the
Mirage.*

AL SEIB

fantastic array of Felliniesque costumes and colors. The show is a breathtaking vacation for the senses.

The Cirque Du Soleil first began performing during the summer of 1984 in Quebec City. However, its 800-seat blue and yellow big top soon became too small a venue for the massive crowds wishing for a glimpse of this

“reinvented” circus. The following year, in response, the act was taken on the road. Today, there are two separate Cirques: one that tours the world under the name of “Saltimbanco” and the “Nouvelle Experience,” commissioned and built to the troupe’s specifications adjacent to the Mirage hotel and casino in Las Vegas.

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The "Nouvelle Experience" troupe of Cirque Du Soleil at the Mirage.

SOLVING THE AUDIO PROBLEM

As one can imagine, designing audio and lighting systems for a 1330-seat round tent presents some unique problems. Rather than having unlimited wall and ceiling space to rig equipment, the choices for speaker placement are much more limited.

"When initially discussing a sound system for the Cirque, we had to understand that we weren't dealing with just an audio picture," says Wayne Duncan, general manager for the Vegas production. "We had cables, ropes, lights and spots that all needed to be attached to the same masts. We couldn't simply say, 'Ideally, we want the speaker systems here,' and that's where they would go. Since everything became a compromise in positioning, it was crucial to find a sound system that would be small, yet be capable of providing high intelligible sound pressure levels with a limited number of enclosures."

After extensive testing with this in mind, Guy Desrochers, sound designer for the Cirque, chose to employ an exclusively Clair Brothers' loud-

speaker setup. "Guy wanted a full-range box that sounded good and could be rigged in a relatively small area," explains Duncan. "He also required a system that would provide a wide, even dispersion because the speakers could only be rigged in a very limited number of areas."

Eighteen Clair Brothers' P-4 loudspeakers were flown in several clusters, as well as individually, on both the four mast poles and a mainframe rigging arch positioned over the stage area. Twenty-two R-2DP passive satellite speakers were also mounted above the audience on the tent's parameters, firing up at the tent, as opposed to toward the audience. "This provides a better surround effect," says Duncan. "Because the sound reflects off the tent, the effect is much different than if it came directly from a source. If they faced directly down at the audience, the people in the back rows would have a strong source coming down on top of them, and the surround effect would be lost."

In addition, four CBA ML-18 low-frequency enclosures are mounted behind the seating, facing the wall, pro-

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Eighteen Clair Brothers' P-4 loudspeakers were flown in several clusters, as well as individually, on both the four mast poles and a mainframe rigging arch positioned over the stage area.

viding low-bass for the live musicians. Two keyboard players, a bass guitarist, a drummer, and a saxophone/flute player comprise the band who provide live stereo music throughout the performance.

"The music has to be live, because no performance is as precise as a sequencer," claims Duncan. "If one of the trapeze artists misses and falls into the net, he's going to go back up and try the same move again. The musicians interact with the performance and adjust accordingly on the spot."

The musicians are also responsible for their own monitor mix. A separate console allows them control of their own personal volume with all monitoring done through stereo headphones.

The speaker clusters are each independently controlled via four-band parametric equalizers through a Midas 40-channel house console. "With four bands, you can zone in on problem frequencies and expand your band width to cover both sides," says Duncan. Clair/Carver amplifiers additionally power the entire speaker system.

Patrick Martin, chief sound engineer, operates the house console during the performances. Formerly a student from Duncan's sound-engineering-instruction days in Quebec city, he was chosen by the Cirque to serve at the helm of all audio activity for the show.

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SETTING UP AND TUNING THE SYSTEM

Due to the configuration of the tent, deciding on the exact placement and angle of each speaker was a difficult task. "It was really trial and error," points out Duncan. "We tried to take the dimensions of the dispersion patterns of the Clair boxes and design a configuration that would theoretically

work. We were originally going to put a cluster of four boxes on each of the four masts, but that just didn't work. The placement we ended up giving the loudspeakers provides a much better coverage, but it's always hard to determine that at the start. The specifications of a box are one thing. But when you get it up in the air and start pumping signals through it; that's some-



Guy Desrochers, sound designer for the Cirque.

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B15	949.000
B21	947.750
B22	949.750
B23	950.750
B24	951.250
B25	948.500
B31	949.250
B32	948.750
B33	950.000
B34	951.500



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thing else. We experimented with different angles and positionings until we found a good, solid coverage."

Desrochers and Duncan, both accomplished audio engineers, opted to tune the room by ear, unaided by a pink-noise generator or a TEF. "Neither Guy nor myself are fans of pink-noise units," explains Duncan. "They're useful in some areas as a reference, but a lot of people use them too extensively to tune rooms and systems. I don't think machines can adequately gauge how a human ear is going to react."

"The real test came when the live musicians were there," he adds. "We feel very strongly that you should use as your final evaluation the thing you're going to be working with. For us, it was live music. To tune the system, Guy sat in different sections of the audience seating, judging how it sounded and felt while the musicians performed. After each song, he would adjust the system slightly for that section, then move on to another area. It's the only true way to evaluate your dispersion and sound quality."

Duncan has had more than 20 years in the business, touring with various bands and musical groups, as well as teaching at several colleges and universities. His past has provided him with the ear to be able to pick out problem frequencies, as well as the



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knowledge to fix them. Duncan's experience provided Desrochers with a valuable resource for assistance when setting up and tuning the sound system.

"It's a weird thing. It's like a musician's talent," he elaborates. "Some people can pick up a guitar and play it right away. Others might become very accomplished guitarists by

Twenty-two R-2DP passive satellite speakers were also mounted above the audience on the tent's parameters, firing up at the tent.



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practicing eight hours a day, but will never be virtuosos because they lack the ingrained talent. I think it's the same with sound engineers; some people just have more natural talent for it than others. Guy has this natural talent, and it has enabled him to become one of the best sound-design engineers in the world.

Obviously, the more experience you acquire, the better you become at it; the more developed your ear becomes. I have a hard time listening to music on the radio like everyone else because I just automatically and inadvertently break it down into components. It comes with the territory. You train your ear as highly as you can to be able to pick up the cello section of a 96-piece orchestra and isolate them above everything else."

SOUND CONCLUSIONS

The time invested in selecting and adjusting the Cirque's sound equipment was, indeed, time well spent. Today, the music and sound effects are an integral piece of the show's vision, linking the diversity and accentuating the performances of the characters and acrobats.

"Most of our patrons really are amazed with the music, which is a compliment to the audio system," says Duncan. "The sound is great and has an incredibly even dispersion, making the show equally enjoyable from any location under the tent. Our number one selling item, over shirts and hats, is the CD of our soundtrack, and we think that the Clair Brothers' speaker system has a lot to do with that." ■

Audioconferencing Enhancement; Carver in Toronto

Multilink Enhances System

Multilink has enhanced its System 70 multipoint audioconferencing system to accommodate network requirements in the United Kingdom. The E1 imple-

mentation replaces the existing T1 interface in either a DASS2 or DPNSS format. This will support up to four E1 trunks of 30 channels each, for a total capacity of 120 conferencing ports per system. The E1 release operates us-

ing 240VAC, 50 HZ power. Features include fastdial, blastup, record/playback, music, security, lecture and help. System 70 can be managed by an operator or unattended whereby the system routes each participant to the appropriate conference. System screens will be altered slightly to reflect the difference in port capacity.

"The European market represents a tremendous opportunity for Multilink," said Multilink vice president of sales and marketing Bruce Bower, "With the introduction of our E1 compatible System 70, Multilink will provide superior interactive voice clarity in a fully digital environment which we hope will facilitate audioconferencing acceptance and growth in this important market."

Maple Leaf Buys Carver Amps

Maple Leaf Sound Systems, based in Saskatoon, Saskatchewan, purchased 11 Carver Professional PM-1201 power amplifiers. The amplifiers will be used to power both monitor and house systems. Their first use on the road will be powering monitors for Northern Pikes, a popular Canadian band.

Code-A-Phone Introduces New Products

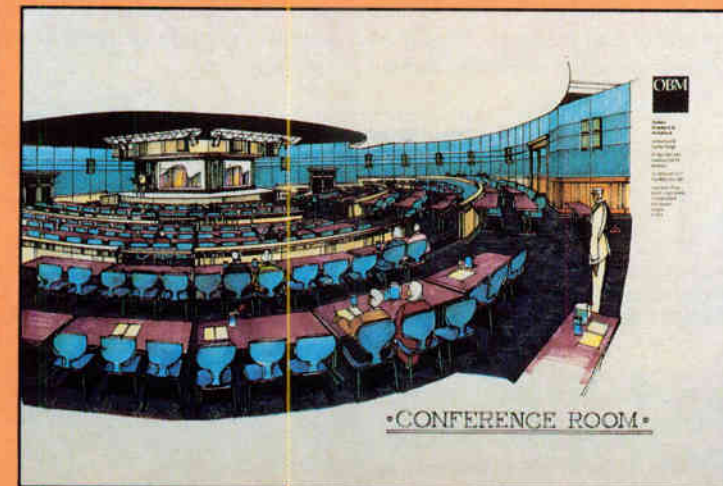
Code-A-Phone has announced several new products, including the Phoenix Series answering systems and a series of commercial products aimed at small to medium sized businesses.

The Phoenix Series includes

Recreating Empire

The Southampton Princess, a Bermuda luxury resort, is recreating its Empire Room to offer meeting planners the largest multimedia amphitheater available in the resort market in North America and the Caribbean. The amphitheater's audio-visual system is being designed and instal-

led by Multivision Electrosonic Limited, part of the Electrosonic Group of Companies. Onions Bouchard & McCulloch, a Bermuda-based firm, is handling the architecture and interior design for the \$1 million project.



led by Multivision Electrosonic Limited, part of the Electrosonic Group of Companies. Onions Bouchard & McCulloch, a Bermuda-based firm, is handling the architecture and interior design for the \$1 million project.

This 7,400 square-foot, ultra-modern conference center-style facility will include: a built-in dual rear-screen projection system featuring 18 slide projectors in a dual 9 format, twin video data projectors, a video overhead projector and video players for multi-formats and systems; a lighting system that includes a computerized pre-set activated dimming system and personal task lighting so participants will be able to take notes

when the overall lighting has been dimmed; oval room design and tri-level configuration to allow for no more than five rows of people between audience and stage and to provide good sight lines; built-in dual screens that will appear and disappear in seconds on command; a computer-

ized remote control system that will operate all equipment from anywhere in the room; an aerial projection booth where all video, computerization and synchronized lighting can be controlled; wireless lavalier microphones that allow presentation by several speakers, as well as microphones for audience participation; a dual high-fidelity sound system and a remote-controlled video tracking system that will automatically follow the presenter.

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two all-digital, tapeless answering systems. The Phoenix 800, an all-digital answering system is expected to sell for about \$170 and the Phoenix 900, an integrated telephone and answering system will cost about \$200. Lower models in the series come in a variety of configurations and are priced

between \$59.95 and \$149.95.

Other new Code-A-Phone products are designed to automate office communications. MailVox is a PC-based voice mail and automated attendant system which provides automatic call routing for up to five ports and 900 mailboxes. VMS-II is a less expensive



automated attendant/voice mail system which has two ports and up to 128 mailboxes. Call Processor routes calls automatically, serving as an automated attendant or as a backup for a busy receptionist. The Audio Conference System is a speaker phone which allows both parties to speak at the same time, allowing a more natural flow in the conversation. Other new products include smaller answering and voice mail systems.

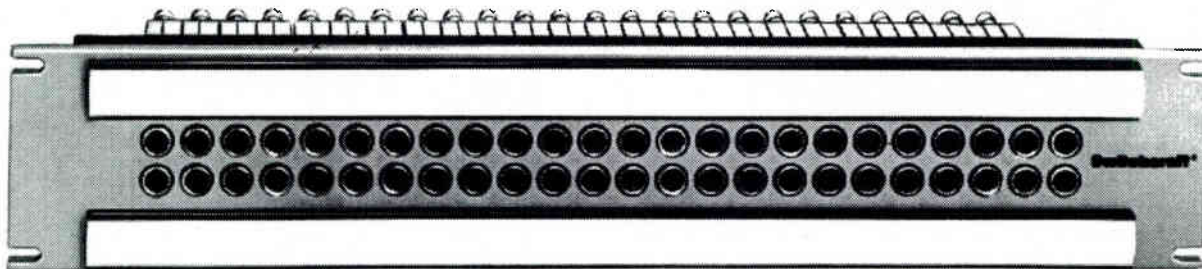
GM Hughes to Launch DirecTV Satellite

A contract between DirecTV, Inc., a unit of GM Hughes Electronics, and commercial launch provider Arianespace calls for an Ariane 4 rocket to lift the second

DirecTV direct broadcast satellite (DBS) into orbit.

The satellite, North America's first high-power DBS, should be in service in the summer of 1994 and will also carry the world's first optical storage time capsule. The time capsule was conceived and developed by SpaceArc, a non-profit educational project of the Rochester Museum & Science Center in Rochester, New York. To participate, individuals fill out SpaceArc forms, writing essays, poems, musical compositions, drawings and letters to future generations. Completed forms will be optically scanned and placed into the SpaceArc time capsule which will be inside the payload module of the DirecTV satellite.

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The satellite will provide 70-90 additional channels for DirecTV subscribers. With their two satellites, the company will offer 150 channels to households equipped with 18-inch receive antennas. The first satellite will be launched this December, and the DirecTV business will begin early in 1994.

The two DBS satellites are currently under construction by Hughes Aircraft Company. Based on Hughes' HS 601 design, each satellite will carry 16 120-watt transponders broadcasting in the DBS portion of the Ku-band frequency. United States Satellite Broadcasting will operate five transponders on the first Hughes DBS satellite.

DirecTV programming will be received with the Digital Satellite

System (DSS) manufactured by Thomson Consumer Electronics under the RCA brand name. The system consists of an 18-inch satellite antenna, a decoder box and a universal remote control, and will retail for about \$700.

Corning Achieves ISO Standard

Corning Inc. has received ISO 9002 registration, a standard that sets quality system thresholds for manufacturing, for its optical fiber manufacturing facility at Wilmington, NC.

ISO 9000 is a series of quality standards originally designed to address a need for uniform standards in Europe.

Gerald J. McQuaid, vice president of manufacturing and engi-

neering for Corning's Telecommunication products division said the standard "adds a new level of convenience for Corning's customers." McQuaid also said that ISO registration will serve as a "shortcut for customers," who will not have to conduct extensive quality system audits.

TTC Establishes Scholarship

Telecommunications Techniques Corporation (TTC) has established a scholarship at the University of Maryland at College Park to be awarded to an entering electrical engineering student. The Joseph A. Sciulli Memorial Scholarship was established in memory of the company's founder, who received his Master's of

Science degree from the University in 1966. Sciulli, who founded TTC in 1974, passed away last year.

TTC CEO and President John R. Peeler said, "Joe Sciulli would be proud of TTC's performance since his death. His ability to combine entrepreneurship and accountability inspired all those who knew him. TTC is pleased to be able to create this living memorial to his accomplishments."

The scholarship will be awarded to a Maryland resident based on financial need, scholastic performance in math and science, leadership and work ethics.

George E. Dietr, Jr., Dean of the University's College of Engineering said, "We are very grateful for TTC's establishment of a

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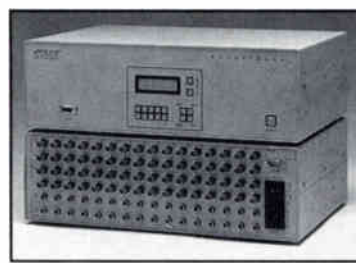
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scholarship in memory of one of our most distinguished alumni.

Inline Receives Technical Achievement Award

The ITVA awarded Inline the 1993 Technical Achievement Award at their 25th Annual International Conference in Phoenix,



AZ for the company's IN60016 Pathfinder. The Pathfinder is a 16 port reconfigurable matrix switcher for RGBS and stereo audio signals featuring RS-232 control and a video bandwidth of 120 MHz.

ITVA Technical Support Services Committee Chairman William J. Ryan said, "the committee was very impressed with the technical design of the switcher, especially its reconfigurable capabilities which allow users to change the number of inputs and outputs in the switching matrix."

Peninsula Grows in '93

Peninsula Engineering announced a 59 percent growth rate for its fiscal year which ended on March 31. The company, which designs, manufactures and supports a proprietary line of microwave and cellular repeaters and microCell, a new microwave and lightwave product to enhance the performance of radio telecommunications systems, announced its sales had increased to more than \$14 million, compared to \$8.9 million in the prior fiscal year.

"This dramatic growth is due to an increasing demand for our new microCell product line," said Peninsula President and CEO Edward D. Sherman.

78 percent of Peninsula's sales in the last fiscal year were foreign. The company attributes this to the need foreign countries have to improve the performance of their phone systems.

Polycom SoundStation Travels The World

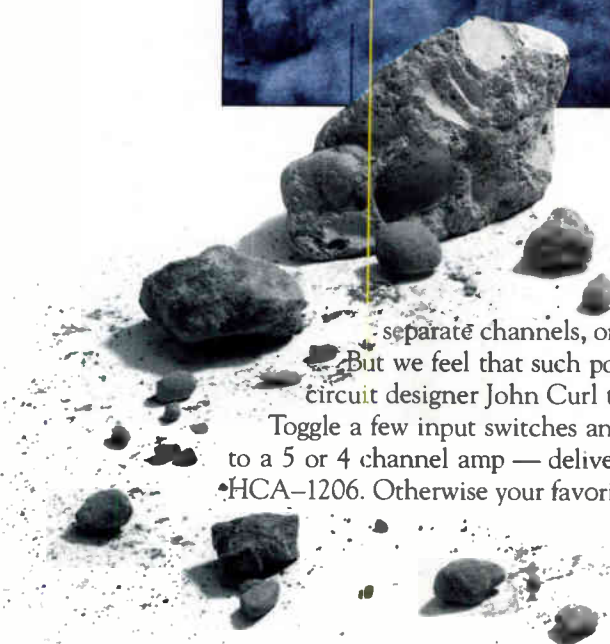
Polycom, Inc. announced an addition to its SoundStation product line that meets the power and telephone interface requirements of virtually any country in the world.

The new package consists of a tabletop audioconferencing console and a country-specific universal power/telephone interface module with the appropriate telephone and power cords. The universal module is switch selectable. Europe, South America and most of the Far East can use the international SoundStation model, and countries that adhere to the North American power and telephone standards can use the North American SoundStation model.

The new SoundStation meets all international standards on safety, emissions and quality, as well as local requirements for power, electrical, telephone line and telephone standards. Polycom expects to receive approval in 16 countries by September and is applying for type approval in an additional 14 countries by the end of the year.

"Multinational companies are particularly reliant on teleconferencing to bring teams together," said Polycom President, CEO and co-founder Brian Hinman, adding that "SoundStation is the only high quality, full-duplex audioconferencing unit that meets the regulatory requirements of all major industrialized nations." Hinman expects half of the company's business to be international in the next two to three years.

APARTMENT 4-C JUST INSTALLED OUR NEW 720 WATT HOME THEATER AMPLIFIER.



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Circle 220 on Reader Response Card

World Radio History

PRODUCTS

Clair's Passive Speaker; AmPro Projection

Passive Loudspeaker System

Clair Brothers Audio Systems, Inc., has introduced its first two-way passive loudspeaker system, the R-2DP. The cabinet features a rotation horn and weather-resistant design. The speaker has a full-range high output system that can reproduce speech or music program material indoors or outdoors. The speaker assembly includes a convex grille design, trapezoid sides, and a solid epoxy overcoat.

Circle 1 on Reader Response Card

Projection Systems

AmPro Projection Systems has introduced its new 7000 series liquid crystal Light Valve projector video, data and computer graphics application. The 7000 Series

features two projectors; the 7000D with autolock from 15 to 58 kHz and the 7000G with autolock from 15 to 90 kHz. Both projectors have a single-lens design.

Ampro has also unveiled its seven-inch magnetically focused CRT projection system, the 2300. The 2300 provides 1400 lines of RGB resolution and 850 lumens of light output and is compatible with most video, data, and high-resolution computer graphics. The system is available in a 67 and 72 inch Retro Console which can be customized for size and color requirements.

Circle 2 on Reader Response Card

BNK DSP 'SpEq'

BNK has introduced its new signal processing device, the

'SpEq' — a real-time digital signal processing loudspeaker equalization system. This system offers active frequency division, system equalization and time delay achievable only in the digital domain. Other features include Finite Impulse Response crossover and correction filters, precise transducer alignment, and 24 bit DSP.

Circle 3 on Reader Response Card

New Mixers

Rolls Corporation has introduced three new mixers, the RM42, the RM64, and the Mix Max 6. The RM42 has a 4u high rack mounting chassis and may be used in either the horizontal or vertical position. Features include XLR mic input, two phone/line channels, two line channels, an assignable cross-fader, tone controls and LED output meters.

The RM64 is a six in two out console mixer in a 1u high rack mounting chassis. Each channel has volume, monitor send, pan, bass, treble, and FX send. The master channel has FX return and level controls for left and right channels.

The Mix Max 6 includes six XLR mic inputs, six 1/4 inch line inputs, and separate phantom power switches for each XLR. It also offers right and left master volumes, right and left bargraphs, and an FX return in the master channel.

Circle 4 on Reader Response Card



Programmable Controller

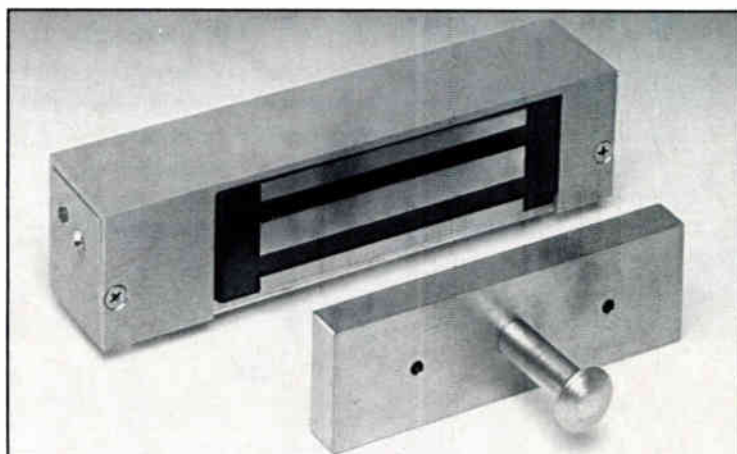
Artisan Controls Corporation has introduced its new seven day controller, the 4750H. This controller programs two separate 15 amp SPDT relays to turn on or off up to 56 times in a seven day period with a maximum of eight events per day. Operating voltages for the system are: 12, 24, 120, or 240VAC, and 12, 24VDC. In addition, the 4750H does not require batteries or power to sustain programming in the event of a power failure.

Circle 5 on Reader Response Card

Door Release Sounder

Doortronics has introduced its new Door Release Sounder which beeps for five to seven seconds to indicate an electro-magnet has been de-energized and that the door is free to open. A green LED showing door locked and secure status is on an end plate of the Maglock, and can also be mounted separately on the wall on a switch plate.

Circle 6 on Reader Response Card



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Circle 281 on Reader Response Card



Biamp Systems SPM412 and GM/2

Biamp Systems has introduced the SPM412, a stereo pre-amp/mixer, and the GM/2, a dual gain manager. The former provides four stereo line inputs, one microphone input, and two independent outputs. Other features include automatic talkover muting when the microphone is in use, an optional remote control transmitter and receiver, and

40dB trim control and level control for the microphone input.

The GM/2 provides four gain managing functions, including long-term leveling, soft-knee compression, peak limiting, and soft-gating. Further features include independent bypass switches for processing and soft-gate, and electronic balanced inputs and outputs on XLR connectors.

Circle 7 on Reader Response Card

Q-Series Graphic Equalizers

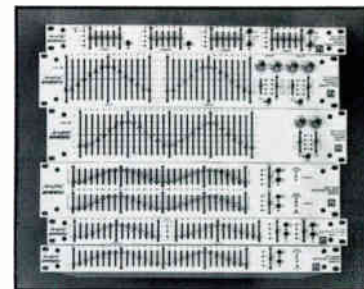
Furman sound has introduced its new Q-Series line of graphic equalizers, consisting of six models: the Q-151, the Q-152, the Q-301, the Q-302, the Q-602, and the Q-541. The first five members of the Q-Series all feature constant-Q equalization, Output Level slider controls and four LED meters.

The Q-541 is a special purpose model with four channels of five band stereo equalization. The first two channels may be switched for phono turntable use or normal line level use.

Circle 8 on Reader Response Card

Virtual Reality Design Tool

The Real-Time Convolver from Signalogic features mono or bin-



aural real-time audible simulation. It supports impulse responses up to 25000 pts and sampling rates up to 100kHz, depending on DSP board speed and memory. The Real Time Convolver is fully compatible with the Hypersignal-Acoustic audio signal analysis environment, and the DSP/Analog hardware can be used for other purposes, such as real-time Spectrum Analyzer, data acquisition, filter design, and difference equations.

Circle 9 on Reader Response Card

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Circle 257 on Reader Response Card



CD Jukebox

Rowe/AMi has introduced its LaserStar CD jukebox. The exterior features chrome plated metal castings, hand rubbed wooden inserts, and colored

bubble tubes. The interior has a 250 watt amplifier, a touch button flip page mechanism, and Rowe's CD mechanism changer.

Circle 10 on Reader Response Card

Terminal Emulator

MultiLink, Inc. has introduced its enhanced Linx Emulator Software, a DOS based terminal emulator for use with its new multipoint audioconferencing bridge, the System 70. The enhanced terminal emulator is also compatible with MultiLink's System 60, and can be integrated into end user networks without special hardware or interfaces.

Circle 11 on Reader Response Card

Loudspeakers

EgglestonWorks Loudspeaker

Company has introduced four new loudspeaker systems. "The Bookshelf" is a two-way system that has an antique Mahogany or natural color. It features a ¾ inch titanium dome tweeter, and a five inch double magnet polypropylene mid-bass driver.

"The Pedestal" has a Mahogany and marble inset on its top and an antique Mahogany color. It has a one inch double magnet titanium dome tweeter and a six inch double magnet polypropylene mid-bass driver.

"The Hepplewhite" is a four-way system with a one inch double magnet titanium dome tweeter, two six inch double magnet polypropylene mid-bass drivers, and an eight inch double magnet polypropylene



bass driver.

"The End Table" is a six-way system with two one inch double magnet titanium dome tweeters, three six inch double magnet polypropylene mid-bass drivers, and one 10 inch double magnet polypropylene bass driver.

Circle 12 on Reader Response Card

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Circle 252 on Reader Response Card



Visual Presenter

Elmo Mfg. Corp., has introduced its new visual presenter, the EV-700AF. It features a half inch three chip CCD for 650 lines of resolution. The EV-700AF also has a 12X two-step power zoom lens system with autofocusing, a built-in base light box, built-in overhead lights, fully automatic iris control, and a remote

control terminal.

The presenter is fully compatible with NTSC television systems and can be used with a computer. Outputs include S-video (two outputs), NTSC (two out-puts), and analog RGB (one out-put). Inputs include stereo microphone, two video inputs, two audio inputs, and an RS-232C serial port terminal for computer applications.

Circle 13 on Reader Response Card

Residential Speaker Switching System

Atlas/Soundolier has introduced its new Speaker Switching System. The ASL-4 is designed to control up to four pairs of loudspeakers in four different rooms. It allows access to different program material from each area, swapping of front/rear channels of a surround sound system, and the design of custom audio configurations.

Features include independent volume controls, on/off switches, and automatic impedance matching protection for amplifiers and loudspeakers. In addition, the unit can be used with one or two stereo amplifiers so that two different sources can be selected in each room, or with four channels of a surround sound system.

Circle 14 on Reader Response Card



D.W. Fearn's VT-1

The VT-1 is a vacuum tube microphone preamplifier from D.W. Fearn. The VT-1 is designed to recreate the sound of the classic tube mic preamps of the 1960s while using modern components and computer-optimized circuitry.

Circle 15 on Reader Response Card

SOUNDSPHERE SPEAKERS KEEP NEWSDAY PRESSES ROLLING...

The Newsday corporate offices and printing plant are in a large building in Melville, N.Y. It contains the largest color offset operation in the country with ten printing presses. While they operate at the highest efficiency, the collation and inserting operations could not be stopped quickly when problems were encountered. The insert machines could not be turned off resulting in improperly collated newspapers.

After trying flashing lights, buzzers and various horn speakers, a Soundsphere #2212-1 model was tested and five more were installed in the extremely noisy inserting operations room.

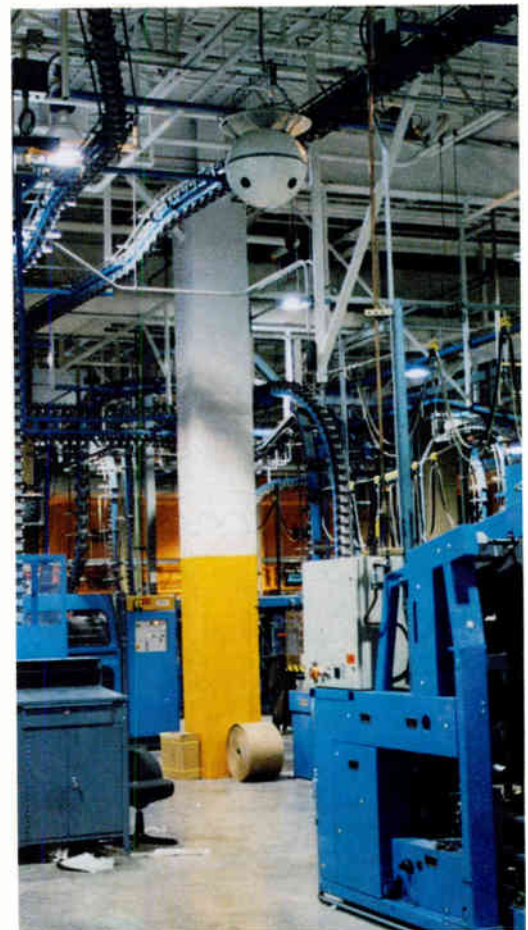
Patrick O'Hanlon, Production Maintenance Electrical General Foreman at the site states, "The area in question is a high density noise area and communication is difficult. When Bernie Lory of Craftsman Sound talked about Soundsphere speakers in airport terminals, I knew it was the system for us. The even distribution allowed us to maintain a volume level that would not be overbearing, to permit quick quality control adjustments in the insert area and to still be heard in remote corners of the room."

The installer, Bernie Lory has also put two Soundsphere #2212-2 speakers in the stacker area to improve the efficiency of that portion of the operation. He is planning to use more Soundsphere loudspeakers at this site to solve other operational problems.

Write or call direct for further information.

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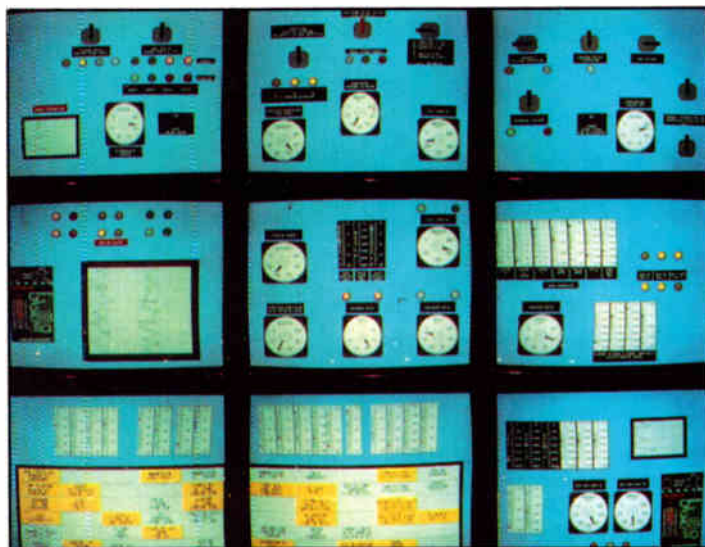
Circle 250 on Reader Response Card

Multiple Display System

RGB Spectrum has introduced the MediaWall multi-screen display system for control room and simulator applications. MediaWall displays graphical or photographic information on a "wall size" array of monitors or projectors, and the images are under the control of a single computer.

The basic system supports nine display devices and can be expanded to drive up to 144 monitors or projectors. It can be driven by a PC through a direct digital interface or by a Unix workstation via Ethernet using an X-terminal emulation. MediaWall functions under normal room lighting and accommodates various types of monitors or projectors.

Circle 16 on Reader Response Card



Infinity KAPPA Loudspeakers

The Kappa series of loudspeakers, by Infinity, consist of three pairs of voice-matched front/rear speakers, a center channel speaker, and a subwoofer. The KAPPA

line consists of the 8.1, 7.1, 6.1, and the KAPPA Video speaker.

The Video loudspeaker features a dual woofer system and a circular and planar-design tweeter. The woofers and tweeter are magnetically shielded to elim-

inate color shift and picture warp.

Circle 17 on Reader Response Card

Portable Label Printer

Kroy has introduced its new one-inch portable industrial label printer, the K2000. The model has a 6000 character expendable memory that allows the user to store files for later retrieval. Resident in the system are bar codes 3 of 9, 12 of 5, EAN 8&13, UPC A&E, and Codabar. Text variations include bold, outline, vertical, italic, frame, shadow, mirror and underline. Text can be justified left, right, or center and vertical print is available for rack labeling or unit-spaced applications.

Circle 18 on Reader Response Card



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Circle 245 on Reader Response Card

LITERATURE

Digital Instruments; Floor Boxes



LeCroy Test & Measurement Catalog

LeCroy Corporation has announced the publication of the 1993 Reference Guide to Digital Waveform Instruments, a catalog featuring product information, application information and tutorials. The catalog contains full product descriptions and specifications, along with a current price list. It also includes tutorials which review basic concepts associated with the use of digital waveform instruments. A selection of applications has been added including communications, TV signals, disk drive testing, power supply design and test, mass spectroscopy and time domain reflectometry.

Circle 19 on Reader Response Card

FSR Brochure

A new brochure featuring various styles of floor boxes designed specifically for conference centers, meeting rooms, stages and schools is available from FSR. New items include a carpet flange designed to meet ADA requirements.

Circle 20 on Reader Response Card

Fiber Options Catalog

Fiber Options Inc. has released a 32-page catalog describing their line of fiber-optic transmission products. The catalog is divided into sections covering transmission of video, data, audio,

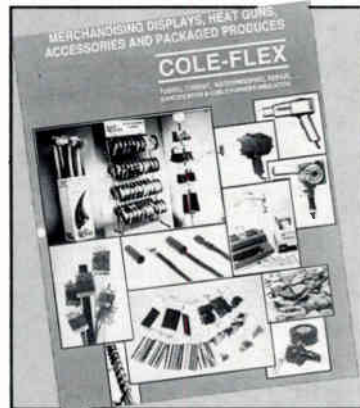
mixed signals and custom-configured systems.

Circle 21 on Reader Response Card

BMI Explains Power

Basic Measuring Instruments' (BMI) Application Note #227 "How to do a power quality survey" provides five steps for understanding a power quality problem, gathering necessary information, and determining the best solution. The application note discusses the importance of using logical procedures, which will reveal the cause of the problem, appropriately assign responsibility, and help avoid conflict between concerned parties. It is available for free by contacting BMI, 335 Lakeside Drive, Foster City, CA 94404.

Circle 22 on Reader Response Card



Cole-Flex Catalog

Cole-Flex has made available a new catalog featuring the company's merchandising displays, packaged tubing assortments, heat shrinkable tubing markers, spirally cut tubing, tapes, heat guns and accessories. The eight page catalog is suited to electronic, electrical, marine, automotive, hardware, sound and cellular phone distributors, as the products are designed for use on wire, cable harness, bundling and insulation assemblies. The catalog, MD-93, contains photographs, features, specifications, pricing and ordering information.

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CALENDAR

Upcoming Events

JULY

Institute for Professional Development (ICIA): Minneapolis, Minnesota. Contact: (703) 273-7200. July 11-16.

Image World: Dallas, Texas. Contact: (800) 800-6474. July 12-16.

AUGUST

SIGGRAPH: Anaheim, California. Contact: (312) 321-6830. August 1-6.

Shure Applied Business teleCommunications, BASIC Seminars '93: Denver, Colorado. Contact: 303-987-2000. August 4-6.

International DJ Expo: Los Angeles, California. Contact: (516) 767-2500. August 23-26.

International Security Conference & Exposition: New York, New York. Contact: (708) 299-9311. August 31-September 2.

SEPTEMBER

CEDIA: Dallas, Texas. Contact: (800) CEDIA-30. September 8-11.

Electronic Imaging International: Boston, Massachusetts. Contact: (214) 239-3060. September 14-16.

National Hearing Conservation Association (NHCA): Philadelphia, Pennsylvania. Contact: (515) 243-1558. September 23.

AEI Business Music Conference: Seattle, Washington. Contact: (800) 345-5000. September 24-26.

DSP World Expo: San Francisco, California. Contact: (617) 964-3817. September 28-October 1.

OCTOBER

Image World: New York, New York. Contact: (800) 800-5474. October 4-8.

Audio Engineering Society: New York, New York. Contact: (212) 661-2355. October 7-10.

Visualization '93: San Jose, California. Contact: (510) 422-1657. October 25-29.

SMPTTE: Toronto, Canada. Contact: (914) 761-1100. October 30-November 2.

NOVEMBER

International Hotel/Motel & Restaurant Show: New York, New York. Contact: (212) 340-9234. November 6-9.

TeleCon XIII: San Jose, California. Contact: (800) 829-3400. November 8-10.

PEOPLE

BEC Appoints; Sanyo in the Midwest

BEC Management

Tom Makofske and Herb Clann have been appointed to fill two management positions at BEC Technologies' headquarters facility in Orlando, Fla.

Tom Makofske has filled the position of chief financial officer for the company. He comes to BEC with experience in financial and operations management for companies such as Vernitron Corporation and GTE Corporation.

Herb Clann has been appointed to serve as the company's production manager. He is responsible for coordinating all aspects of manufacturing, as well as for design engineering. Clann previously served as a sales and applications engineer for Time Electronics.

Sanyo Appoints MacRae

Sanyo's Industrial Video Division has appointed Eric MacRae as Midwest Sales Manager and Product Manager for the division's G.A.P. (Graphics Animation and Presentation) products group.

In this dual capacity MacRae is providing sales assistance for security products to dealers and distributors in the Midwest region.

Lantronix Expands Management

Lantronix has added three management-level staff members as part of the data communications company's continuing expansion. The company named John J. Gallogly vice president of finance, Mark Galbraith product marketing manager and Cathy A. Vicari as domestic sales manager.

Gallogly was formerly corp. vice president of finance and secretary at Genisco Technology Corp. One of his new responsibilities at Lantronix will be preparing the company for an eventual public offering.

Galbraith had been a manager of product marketing at Rockwell's Digital Communica-

tions Division in Santa Barbara. He will be responsible for readying the coming new generation of products for the market-place.

Vicari was national sales manager for industrial distribution at Western Digital. At Lantronix, she will coordinate the company's relationships with resellers and distributors.

RAM Names Gottlieb

Adele Gottlieb has joined RAM Communications Consultants, Inc. (RCC) as a senior consultant.

Gottlieb, former public information director for the Greater Harris County 9-1-1 Emergency Network in Houston, Texas is also a past Gulf Coast vice president for National Emergency Number Association (NENA) and chairperson of NENA's Public Awareness Committee in 1989 and 90.

Her expertise includes the design and implementation of advanced 9-1-1 systems, establishment of training guidelines for public safety agency personnel on the use of 9-1-1 equipment and the development of a public awareness program to educate citizens on the appropriate use of the 9-1-1 system. Gottlieb has spoken on these topics at numerous national and local conferences, and has also been called upon to testify in court cases to explain how the 9-1-1 system works. In addition, she appeared on NBC Today and Oprah to inform public safety agencies of the importance of educating the public.

At RCC, she is responsible for assisting in the implementation of telecommunications systems, development of 9-1-1 public awareness programs and the implementation and upgrades of 9-1-1 systems.



Gottlieb

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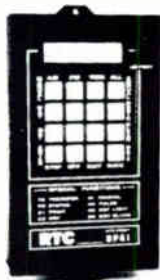
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CCTV Cameras	SONY	BURLE	SANYO
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* Indicates tie

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	FIRST PLACE	SECOND PLACE	THIRD PLACE
Amplifiers	TOA	BOGEN	DUKANE
Alarm Siren Systems	RAULAND-BORG	NOTIFIER	THORN
Intercoms	AIPHONE	TOA	DUKANE
Loudspeakers	ATLAS/SOUNDOLIER	DUKANE	ALTEC LANSING
Telephone Systems	TOA	AIPHONE	RAULAND-BORG
CCTV Cameras	BURLE	SONY	SANYO
Video Monitors	BURLE	SANYO	PANASONIC
Access Control	THORN	INTELLIGENT CONTROL	GALAXY
Microphones	SHURE	ELECTRO-VOICE	ALTEC LANSING

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SURVEY METHODOLOGY

1. The sampling pool for the survey consists of sound and communications contractors from Sound & Communications' subscription list. Only contractors within the United States and Canada are called.
2. In a telephone survey, contractors/installers selected at random are asked to identify what brand they used for various products in installations completed in the past six months and those in progress. A different type of installation is highlighted each month.
3. On completion of the survey, results are tabulated and the product brands are ranked on a scale from one to three, with number one having the most votes. Separate rankings are made for installations occurring in the past six months and for those in progress.
4. An asterisk (*) denotes a tie for that ranking.

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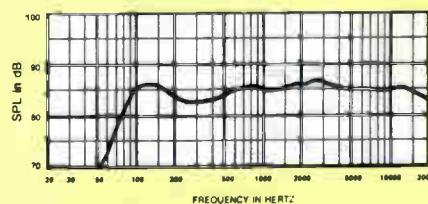


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