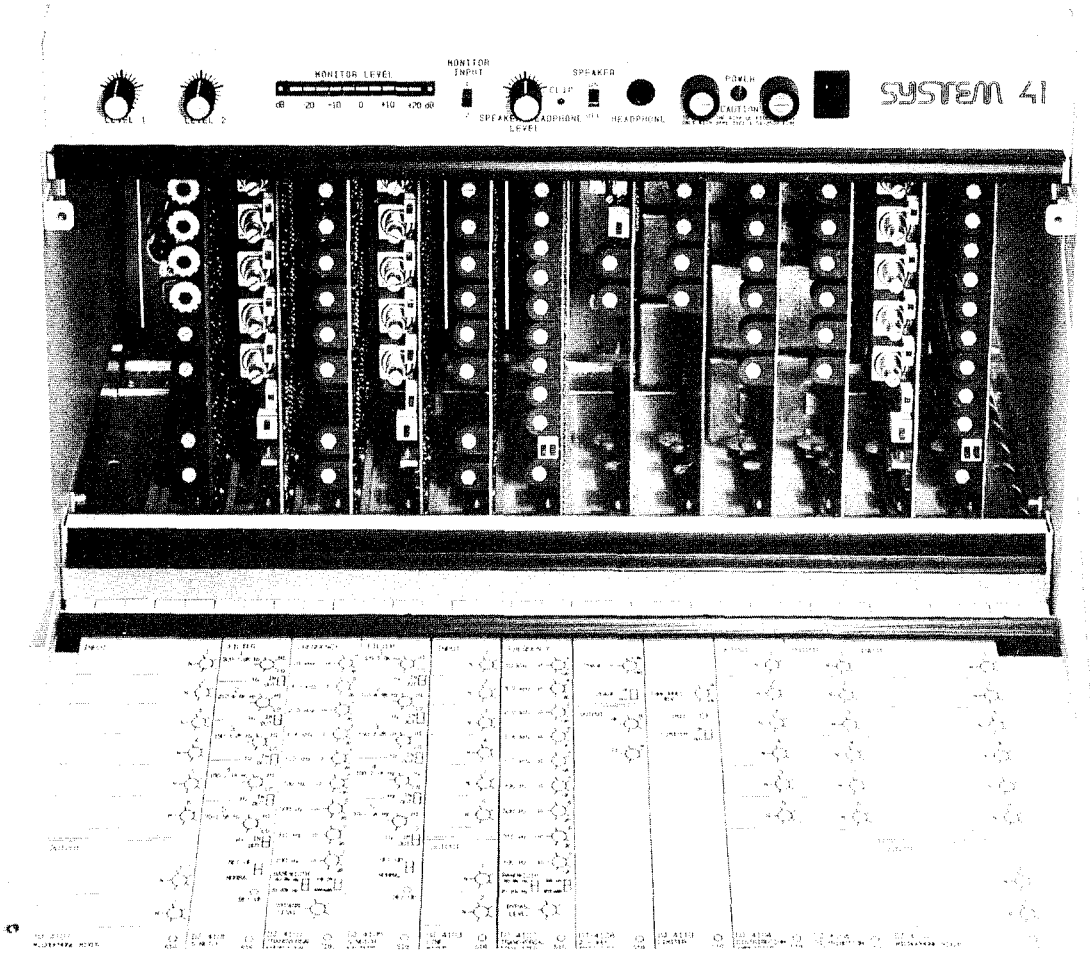
SYNERGETIC
SYN AUD CON
AUDIO CONCEPTS

newsletter

Volume 15, Number 4
SUMMER, 1988

The IRPI System 41—A Totally Professional Choice



MODERN, MODULAR, MAGNIFICENT

SYNERGETIC SYN AUD CON AUDIO CONCEPTS

Synergetic: Working together; co-operating, co-operative.

Synergism: Co-operative action of discrete agencies such that the total effect is greater than the sum of the two effects taken independently.

Editors: Don Davis
Carolyn Davis

Layout: Dashia Alfonso

The information conveyed in this NEWSLETTER has been carefully reviewed and believed to be accurate and reliable; however, no responsibility is assumed for inaccuracies in calculations or statements.

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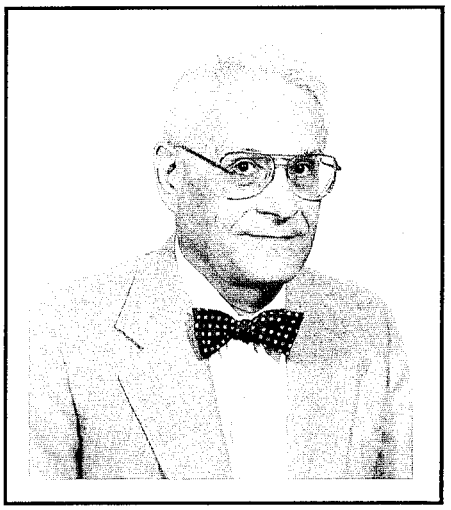
TECH TOPICS:

Industrial Research Products, Inc.

Industrial Research Products, Inc. has played an important role in Syn-Aud-Con's development. During our first year of existence, Mahlon Burkhard of IRPI approached us and offered to help in any way that he could as he felt our industry needed what Syn-Aud-Con was offering. His willingness to help and understanding of what we were trying to accomplish was a formative factor in our later approaching sponsors as a way to keep the cost of classes within reasonable boundaries.

The IRPI signal delay was the first unit (1972) that was both quiet enough and reliable enough to be used with confidence in an important system. IRPI pioneered the transversal equalizer in audio as well as one of the most innovative automatic mixers.

Shown on the cover is the way future systems will look. Mother Bell has done this kind of system engineering over the years. It is with genuine pleasure that we see professional audio equipment become modularized in this fashion. Testing of such systems by means of extender cards is far easier than conventional rack mount systems. We have reproduced a number of the data sheets here to illustrate the versatility that this kind of arrangement allows.



One of the great strengths of Syn-Aud-Con is the access we have to mentors of the caliber of Mahlon Burkhard through their sponsorship of Syn-Aud-Con. We have a remarkable list of such mentors and Mahlon is truly a peer among peers.

When you put it all together, it sounds pretty impressive. IRPI an old line company known for highly innovative, very reliable products with exceptional men at the helm—just the kind of company a Syn-Aud-Con grad is equipped to appreciate.

INNOVATION WITH PURPOSE

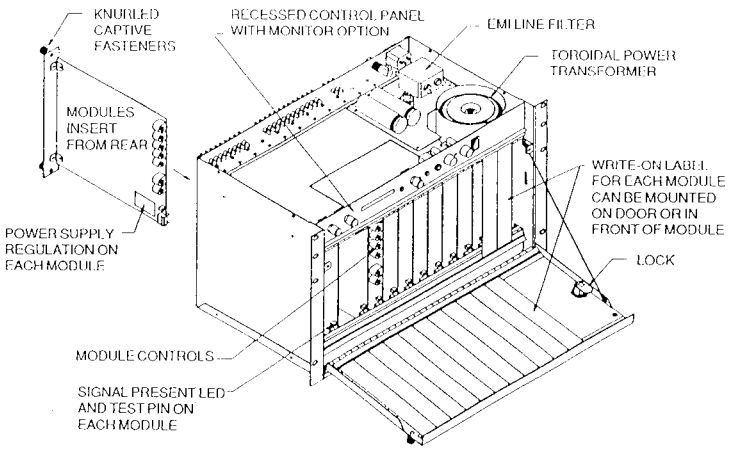
SYSTEM 41 differs in design from other modular systems. It is designed for quality sound reinforcement where the system must perform substantially unattended for long periods. The system requires minimum installation time.

SYSTEM 41 internal bus structure distributes DC power to each module but there are no signal busses. The input and output for each module are available on rear panel screw terminals. This provides rapid interconnection and highly visible signal routing. User controls, signal level monitors and outboard equipment can be connected at any point in the system. Hum pickup, crosstalk and ground noise are eliminated by extensive use of balanced inputs and outputs. Input and output signals are hard wired without intervening connectors to reduce the possibility of contact failure and unreliable system performance.

Modules are inserted from the rear. All controls and switches are accessible on the front edge of the module. With the hinged security cover closed and locked, the controls are inaccessible to unauthorized persons.

Documentation panels identify controls and provide a write-on surface for a record of settings. These panels mount either on the interior surface of the front cover or in front of the module as security panels. Reproductions of these panels appear on the set up instruction sheet for file records.

SYSTEM 41 modules provide the best in signal processing functions. Voice-Matic® automatic mixers, Level-Matic® AGC, TEQ® equalization, studio quality remote control, phase alignment crossovers and a host of carefully tailored filters, line drivers, mixers and customized modules provide innovative approaches to the increasing demands for quality sound.



SYSTEM 41 MODULES AVAILABLE AT INTRODUCTION

MIXERS	
6 x 2 MICROPHONE	DJ-4102
6 x 2 LINE	DJ-4103
EQUALIZERS	
9 BAND TEQ®	DJ4107
NOTCH FILTERS	
5 NOTCH FILTERS	DJ-4106
CROSSOVERS	
2 WAY 18 dB/OCT W/PHASE ALIGNMENT	DJ-4108
LIMITERS	
LIMITER	DJ-4110
DUAL LIMITER	DJ-4119
LINE DRIVERS	
2 LINE DRIVERS	DJ-4112
4 LINE DRIVERS	DJ-4105
DISTRIBUTION AMPLIFIER	
2 x 6 D.A.	DJ-4104
1 x 4 D.A.	DJ-4118
REMOTE LEVEL	
6 x 2 MIC MIX (MASTER)	DJ-4102
REMOTE SWITCH	
6 x 2 MIC MIX (INPUTS)	DJ-4102
CUSTOM MODULE	
SINGLE WIDTH	DJ-4124
DOUBLE WIDTH	DJ-4125

MAINFRAME AND ACCESSORIES

2 BALANCED ATTENUATORS	DJ-4143
STANDARD CHASSIS	DJ-4100
CHASSIS WITH MONITOR/ CONTROLS	DJ-4101
BLANK REAR PANELS	
SINGLE WIDTH	DJ-4140
DOUBLE WIDTH	DJ-4141
CUSTOM RACK PANEL	DJ-4142

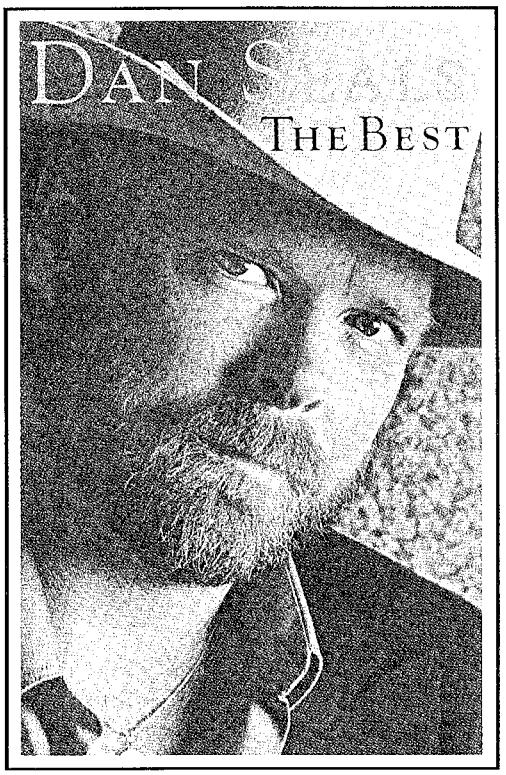
Additional modules are in development. Please let us know your requirements for modules to make the SYSTEM 41 ideally suited for your signal processing needs. Most of these modules have user or factory selectable features for further flexibilty and adaptability.

SOON TO BE RELEASED

LEVEL-MATIC® AGC
VOICE-MATIC® AUTO MIX
REMOTE VCA CHANNELS
LINE SELECT MIX, REMOTE

"We Have Met the Enemy and They is us!"

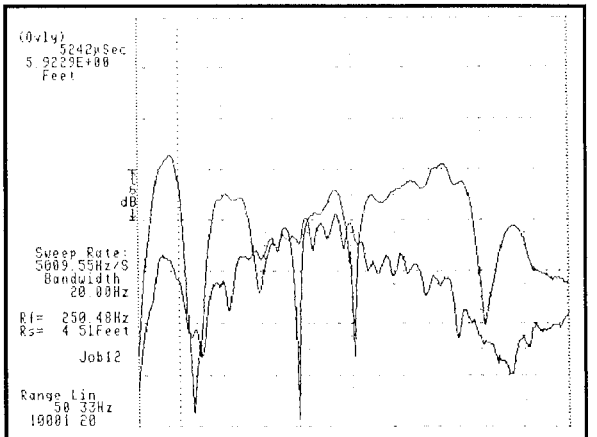
This spring we had an exceptionally pleasant experience, thanks to a group called MorningStar Productions. They, working with producer Kyle Lehning, have provided audio support and management for Dan Seals. They have produced many successful recordings for Dan Seals (also Randy Travis) in their studio. Not satisfied with the status quo, they contracted with us to do a class just for them at their recording studio headquarters in Hendersonville just north of Nashville, Tennessee. Because the AES Sound Reinforcement meeting was scheduled just afterward we had the further pleasure of having Ken Wahrenbrock join us and help us. As usual, Ken had new and better ways to use PZMs and was ready to share his hard won knowledge with everyone present.



(If I had to characterize Ken with a single word, it would be Sharing. Allowed two words I'd say sharing and caring, and allowed three words I'd say sharing, caring, and inspirational. This could go on for a long time but to sum it up our nickname for Ken here at Syn-Aud-Con is St. Ken.)

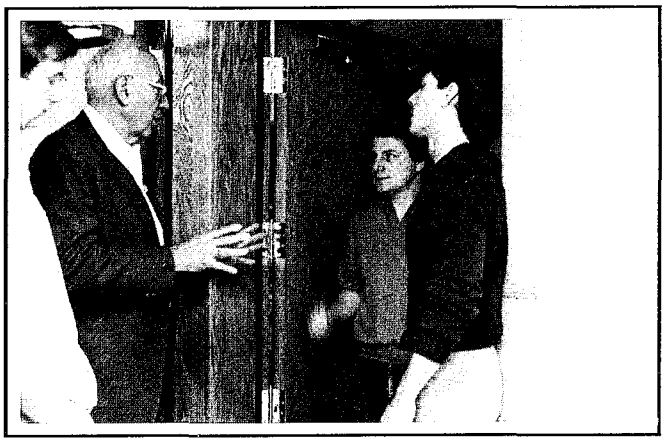
Dan Seals it turned out is a truly first class country—western musician with a genuine drive to make the best better. He attended a majority of the sessions along with his sound men and proved to be not only a great artist but remarkably alert to sound system details.

Dan is a left handed guitar player and was having trouble with acoustic feedback whenever he turned to his left at the microphone. His two monitors were on the floor. One to his left and one to his right just forward of his microphone position. It's not everyday that we get a chance to hook an artist up to a TEF analyzer so we quickly did so. The



Upper trace is Dan Seals with Cowboy Hat & Guitar.
Bottom trace is open mic.

curves tell the story of how (1) the monitors look at the microphone (2) how they are affected by the artists body (3) and finally how the combined guitar reflection and the hat brim reflection combine acoustically at the microphone to cause a genuine excess gain problem. When he turned to the left, the body of his guitar reflected the left monitor towards the microphone and his hat brim reflected the right monitor to the same place. The system operated with enough feedback stability margin to cope with either one or the other of these reflections but not both at once. When Dan



saw these curves, he turned around with a wide eyed exclamation and said, "We has found the enemy and they is us." This is just a small sample of the fun all of us had exploring the problems they wanted answers to but, it also demonstrated clearly why Dan Seals recordings and performances are so well received—he cares about audio quality and has assembled a team with real talent and the hardworking drive to solve them. MorningStar is no "laid back" group but rather a team of young men with "the bit in their teeth" determined to exploit every problem they encounter to the benefit of their total experience in the business. MorningStar personnel literally hummed with energy and receptivity. We came away with the feeling that what we had to share was usefully absorbed. Ken and ourselves felt privileged to have worked with such a dynamic team. If you like country-western, and I do, you'll totally enjoy Dan Seals recordings. I specially like one he wrote himself called "God Must Be a Cowboy". ■

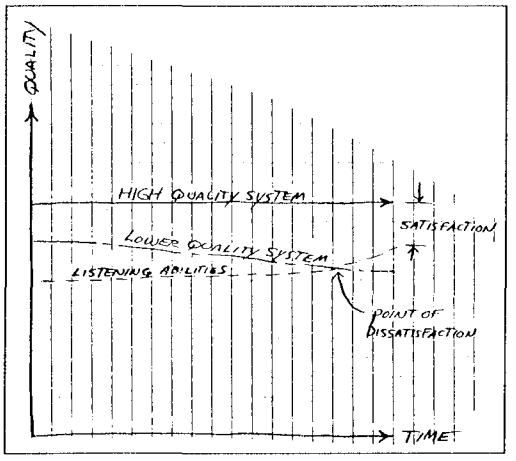
Dan is a left handed guitar player and was having trouble with acoustic feedback whenever he turned to his left at the microphone.

MorningStar Productions
May 5, 1988

Mike Wisniewski
John Condon
Mac Lacey
Tim Rathert
Tony Gottlieb
Kirt Odle
Kyle Lehning
Danny Seals
Scott Kaufman

Sound System Quality vs Time Analysis

We have reproduced this chart before (we used it in our Hi Fi business forty years ago) but we felt it could bear repeating.



1. A high quality system retains its quality over a long period of time.
2. A low quality system loses quality over a short period of time.
3. A listener will, with increasing experience, become a better listener over time.

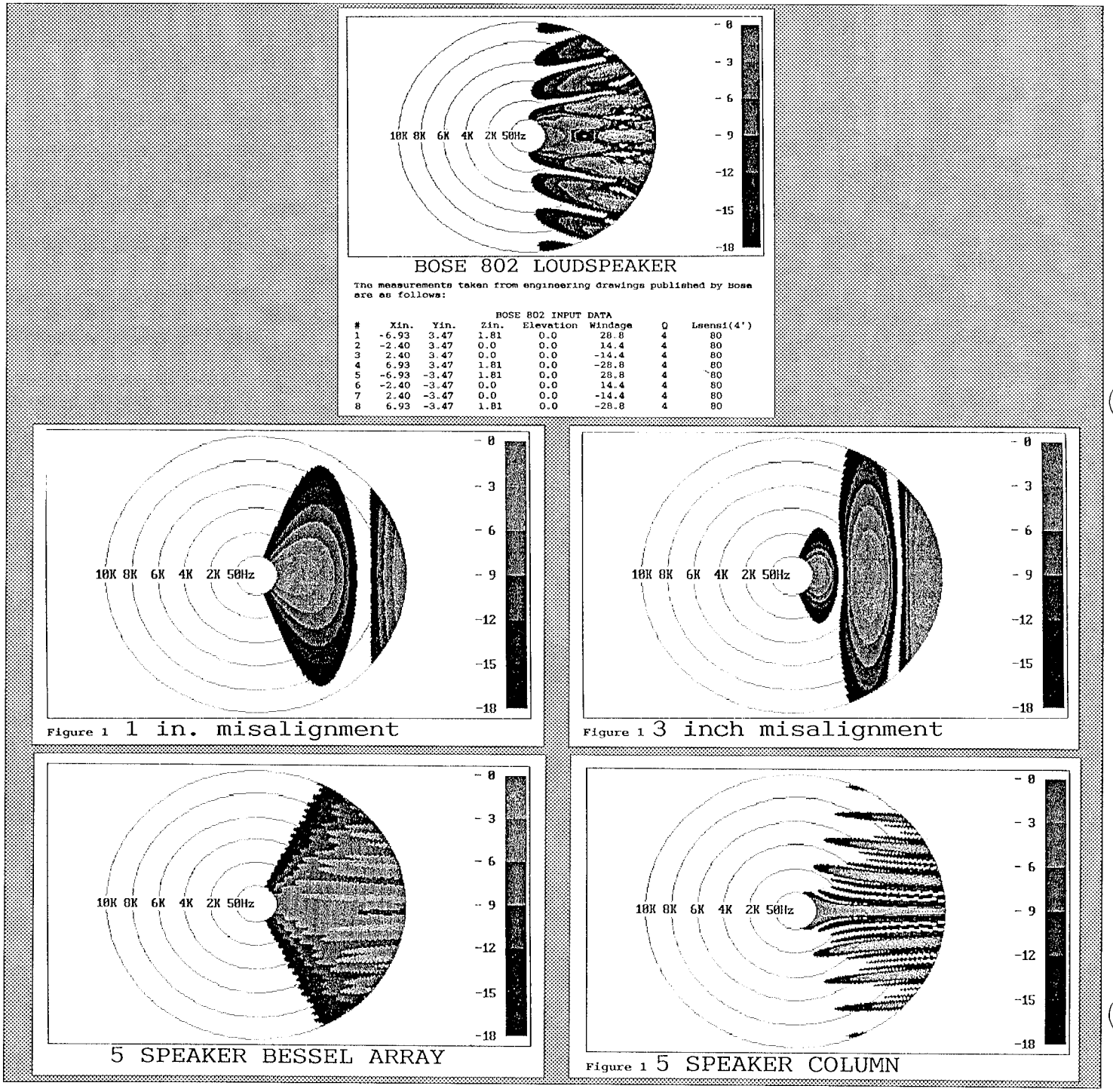
While "the penny wise pound foolish" seem born that way, most of us know that price is not the only criterion for satisfaction. We also can observe in the current esoteric Hi Fi market that spending excess money does not provide aural satisfaction either. Wisely spent dollars can. When the source, system, and room coincide in quality cost effective sonic, magic results. ■

Predicting Isobars

Joe Mitchell of the Saint Germain Foundation in Schaumburg, IL, has generated a remarkable computer program that maps the directivity characteristics of loudspeaker arrays. It is assumed that the Q and coverage angles remain the same at all frequencies. If you wish other views, it is simple to dial in other Q and coverage angles.

The views shown here proceed from low frequencies at the center to higher frequencies at the outer edges of the polar plots. The coverage angles are found by the angle from the center to the edges of the plots. The amounts of energy at the various angles are gradations in shading. Joe takes engineering drawings of given arrays and produces from them these informative and useful plots. Of course, in real life things get even more complicated, but the usefulness of knowing what the ideal case is for a given array is obvious. Certainly Joe's program should be the first design step before any real-life modeling is attempted.

Joe is going to share this very valuable program at a later date. He plans to do more work on it this summer.



BOSE 802 LOUDSPEAKER

The measurements taken from engineering drawings published by Bose are as follows:

BOSE 802 INPUT DATA

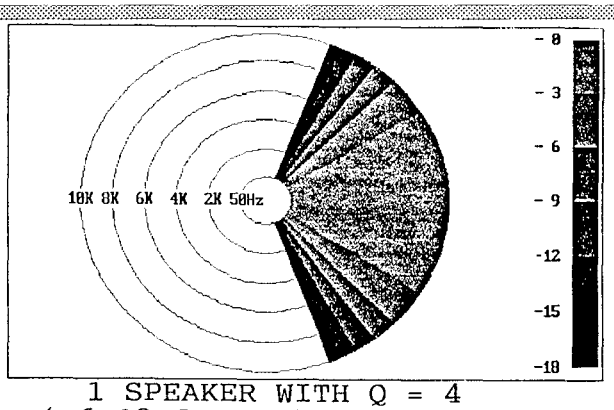
#	Xin.	Yin.	Zin.	Elevation	Windage	Q	Lsensi(4')
1	-6.93	3.47	1.81	0.0	28.8	4	80
2	-2.40	3.47	0.0	0.0	14.4	4	80
3	2.40	3.47	0.0	0.0	-14.4	4	80
4	6.93	3.47	1.81	0.0	-28.8	4	80
5	-6.93	-3.47	1.81	0.0	28.8	4	80
6	-2.40	-3.47	0.0	0.0	14.4	4	80
7	2.40	-3.47	0.0	0.0	-14.4	4	80
8	6.93	-3.47	1.81	0.0	-28.8	4	80

Figure 1 1 in. misalignment

Figure 1 3 inch misalignment

5 SPEAKER BESSEL ARRAY

Figure 1 5 SPEAKER COLUMN



1 SPEAKER WITH Q = 4
(-6.02 dB @ ±45 DEGREES)

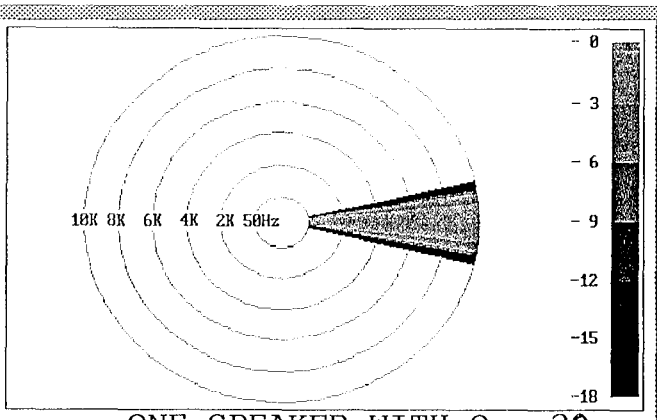


Figure 1 ONE SPEAKER WITH Q = 20

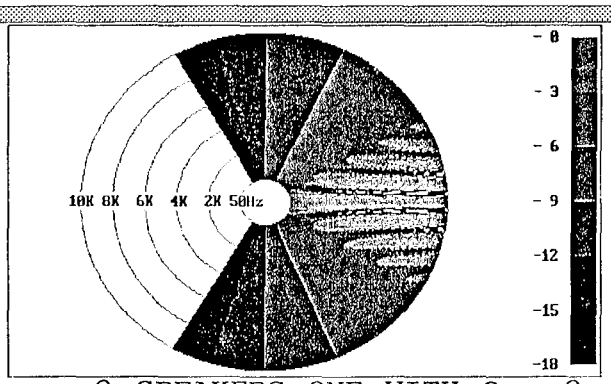
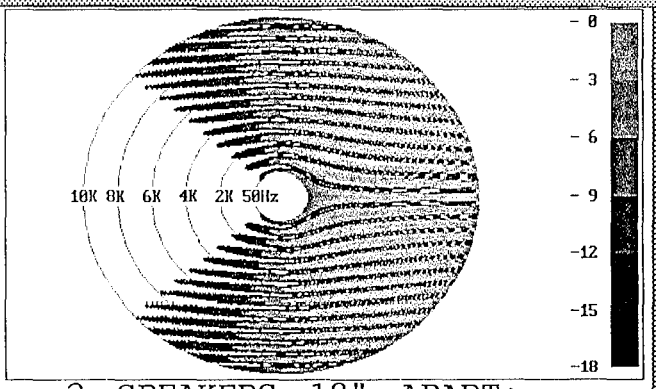


Figure 1 2 SPEAKERS ONE WITH Q = 2,
ANOTHER WITH Q = 10



2 SPEAKERS 18" APART:
VERTICAL RESPONSE

Joe Mitchell Shooting

Joe Mitchell and his wife, Diana, are prized friends of Syn-Aud-Con and Don and Carolyn Davis. They have proven over the years to have deep interest in the joy of learning and have exhibited out-of-the-ordinary talent for both the practical and theoretical sides of audio. That Joe shares more than audio with Don is shown in the photographs reproduced here. That Joe is serious about everything that he does is demonstrated by the quality of the equipment he is using in the photographs. The shooting is being done at our 100 yard shooting bench and we can assure you that Joe is a sure shooter and a straight shooter both with firearms and in life itself.

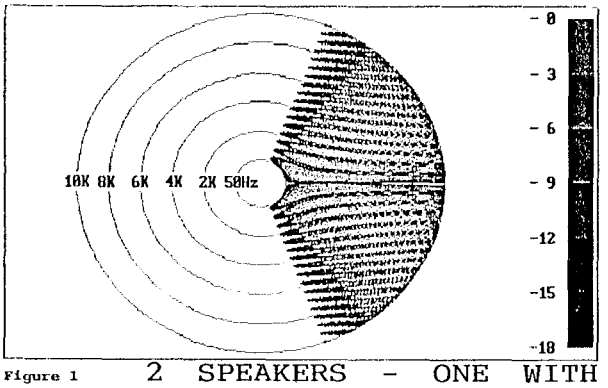
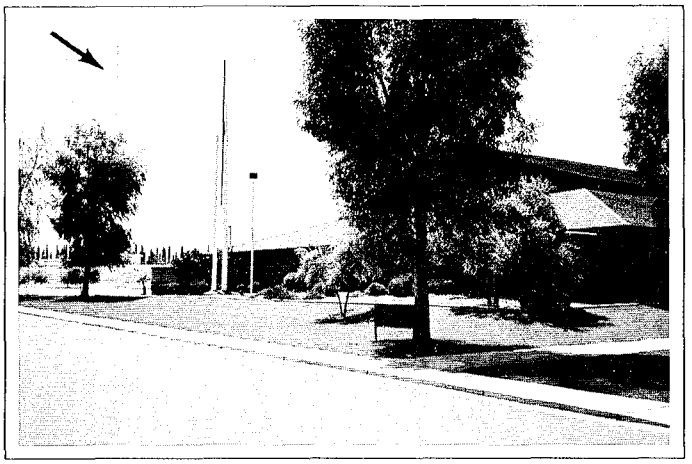


Figure 1 2 SPEAKERS - ONE WITH
REVERSED POLARITY

That Feeling of Warmth in Your Heart May Not Be Love

Brent Gabrielsen of Mesa, Arizona sent us the photo and letter shown here. The only further comment we have is that an R.F. level that high means it is not wisdom to expose humans to it for any appreciable length of time.



833 WEST MAIN STREET
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(602) 969-8663

GABRIEL
Sound & Engineering

June 1, 1988

Don & Carolyn Davis
Synergetic Audio Concepts
P.O. Box 1239
Bedford, IN 47421

Dear Don & Carolyn,

I thought you might find these pictures interesting. The church is a typical Latter-Day-Saints with a cluster speaker system in the Chapel and a large distributive system in the Cultural hall. Not typical are the two directional 5,000 watt AM radio towers a few hundred yards away.

We were contracted to get rid of radio interference and re-balance the system. This was certainly a challenge. The RF in the area is enough that the telephone system is almost unusable and the wireless hard of hearing receivers are not usable (front end over load).

To get rid of RF in the sound systems I used the traditional grounding and capacitor bypass techniques. Also I had to do the interior work on signal processing equipment and power amplifiers. The primary of the 70 volt output transformers on the distributive power amplifiers required filtering.

Sincerely,

Brent Gabrielsen

IEEE SPECTRAL LINES

SEPTEMBER 1987/VOLUME 24/NUMBER 9

Electromagnetic hazards

To the public's worries about electric fields, microwave radiation, nuclear power, video terminals, and computer keyboards may be added a new concern—the effects of low-frequency electromagnetic fields. A study commissioned by the State of New York was interpreted by the state health official who administered the study, David Carpenter, as appearing to link exposure to electromagnetic fields with leukemia and other types of cancer in children. Carpenter is dean of the School of Public Health Sciences at the State University at Albany.

The study, said David Savitz, an epidemiologist at the University of North Carolina School of Public Health and a member of the three-man study team, raises what was once a "flaky, fringe idea" to the level of reasonable scientific premise.

Critics have denigrated previous studies of electromagnetic fields (10 or so investigations over the past few years) as unscientific or otherwise flawed.

The other two members of Carpenter's study team were University of Colorado professors Frank Barnes and Howard Wachtel. The study investigated 128 homes in the Denver, Colo., area where cancer in a child had been reported. A control group of 207 households was part of the study. Carpenter concluded that 10 to 15 percent of the cancer cases may have resulted from exposure to residential magnetic fields.

In a statement to the *New York Times*, Savitz said that while the study team cannot cite a cause-and-effect relationship, there is a "strong justification for concern."

Leonard Sagan, program manager for radiation studies at the Electric Power Research Institute, Palo Alto, Calif., called the New York State study "well conceived and conducted," and said that EPRI is pursuing a similar study at the University of Southern California. Last year, in cooperation with that university, EPRI spent $500 000 to study the effects of residential electric fields on the incidence of cancer.

In the past, the possibility of a relationship between transmission line exposure and the incidence of cancer has gotten more attention than cancer's possible links to residential electric or electromagnetic fields. In fact, EPRI anticipates spending some $7 million to investigate transmission line exposure over the next several years.

The results of the New York panel's study were summarized as part of a larger report released July 1 by the State Department of Public Health. That report is already in its fourth printing. Undoubtedly the general press will follow the study panel's findings with tenacity and some enthusiasm, and, one hopes, with a minimum of "yellow journalism."

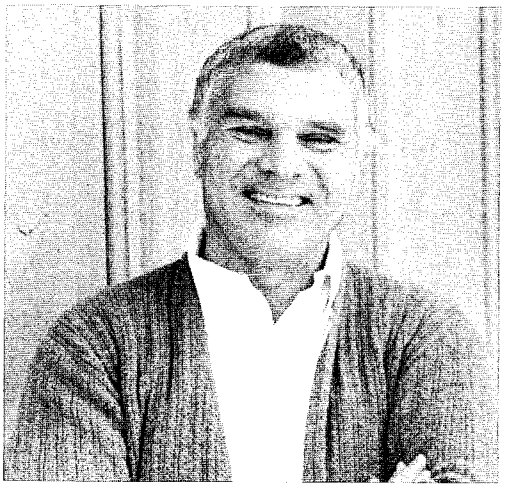
The research, as it should, will go on for years and will ultimately determine the nature of the hazard and the degree of risk, if measurable

More on Home Listening Rooms

From Jim Fullmer

We recently received a letter from an old friend and fellow skier containing what we felt were relevant remarks about research into home listening systems. The only surprise Jim is in for is how remarkably realistic we are able to make the illusion with a minimum of interference with room decor—more on this later.

Jim's letter expresses an integrity of thought that we appreciate as an inherent part of his makeup. ■



Acoustical Engineers Inc.
Consultants
1864 South State Street, Suite 270 Salt Lake City, Utah 84115 (801) 467-4206

May 17, 1988

Syn-Aud-Con
R.R. 1, Box 267
Norman, IN 47264

Dear Don & Carolyn

It was good to see proper credit given Herb Chaudiere and his pulse generator (Newsletter Vol. 15 No. 3). It is one of those devices that many of us have thought of, but he was the one that took the time to work it out, and has been free in sharing it. He's a fine man.

I am intrigued by your attempt to define a properly designed listening space for the home. It has always been a private joke to me that 95% of the professional recorded product, with $$$ x 10^6, and vast arguments as to technique and equipment, is finally delivered to, and judged by listeners using $50 ghetto blasters, or in cars with a background level of about 80 dB A.

The other paradox is that the majority of the Hi-Fi/Music enthusiasts are in reality equipment freaks, with an ego to feed. Their musical tastes can be judged by the large portion of the record review department in the popular "stereo" magazines that have been given over to rock. Any connection between this "art form" and the sane world totally escapes me!

I have been a devout seeker of good, home reproduction, for over 35 years. In fact, it has been this interest that led me into my profession. It has become obvious to me that the listening room environment was a major factor, if not the major factor in the perceived effect. The problem, from the standpoint of consumer awareness is that there is no product or device that could be easily commercialized, and sold, and thus the general public goes on seeking nirvana by bigger amplifiers, fancy wire, or exotically named speaker systems, (most of which are conveniently no bigger than a breadbox).

Having said all of this, let me express a few opinions:

1. It would seem inappropriate to place much constraint on the loudspeakers. There is still too much to be learned here, and any premature "standards" would soon become icons, such as the Altec A-7. Perhaps some appropriate guidelines could be provided, covering frequency response, and SPL capability. Despite all of the new instrumentation and metrics, these two items, (along with THD), are still fundamental in determining the sound of a system. Any reasonable loudspeaker that could come even close to the 30 year old standard of 25 to 15 k Hz ± 1dB, with less than 3-4% THD, and capable of delivering 110 dB in the lower portion of that band will sound pretty spectacular.

2. Listener qualification, air-ear-brain transforms (AEBT?) etc. might be fun, and could lead to a cadre of truly elitist "golden ears", who could rent themselves out for proper blessing of facilities!

In reality, each of us live with "what we got", and it doesn't matter much what the other guy hears, unless he is the one paying the bill. In our homes, hopefully, we are trying to satisfy ourselves. I have found it useful over the years to be able to vary things somewhat, as my taste changes or matures. This is likely an educational process, requiring time, exposure to live music, better sources and facilities, etc. etc.

3. It would seem that the best help might be a set of designs, or construction plans, that have been tried and proven to result in a well behaved listening room. Such could be copyrighted, and made available thru a qualified L.E.D.E. practitioner. His prices and help supplied could be tailored to the clients needs and dollars committed.

I would be very interested in contributing to the program somehow.

Regards,

Jim

Advance In Detecting Bugs

Measurement Specialties, Inc. in Wayne, NJ has received U.S. patent 4726048 for a "Tele-privacy guard" which detects unauthorized telephone taps and causes your telephone to go dead if one is detected.

By causing an impedance mismatch with any eavesdropper as well as incorporating a silicon controlled rectifier (SCR) subcircuit that acts as a latching switch, your telephone will go dead the minute the eavesdropper lifts his extension even if his is very high impedance or has its own privacy device.

Price is said to be about $50. You plug your telephone into the device and the device into the standard RJ-11 modular telephone jack. ■

Janssen Electric West Berlin

Tech Topic Vol 15, No 4, "Audio Activities in Europe" had an abundance of words and a dearth of photographs. Here's a collection of photos from a TEF class in Berlin. Hellmuth Kolbe invited us to help him teach the class for Janssen Electric in Berlin.

Our hosts in West Berlin & East Berlin. Left to right: Sabin Muggelberg, Udo Peter Primbs, Hellmuth Kolbe, Horst Janssen, Dr. Wolfgang Ahnert, and yours truly in the courtyard of Janssen Electric.

Hellmuth Kolbe, Wolfgang Ahnert, and Udo Primbs concentrating on a TEF measurement

Sabine and Udo of Janssen. Udo Primbs is a very talented loudspeaker system designer who has developed some interesting arrays being used in Moscow.

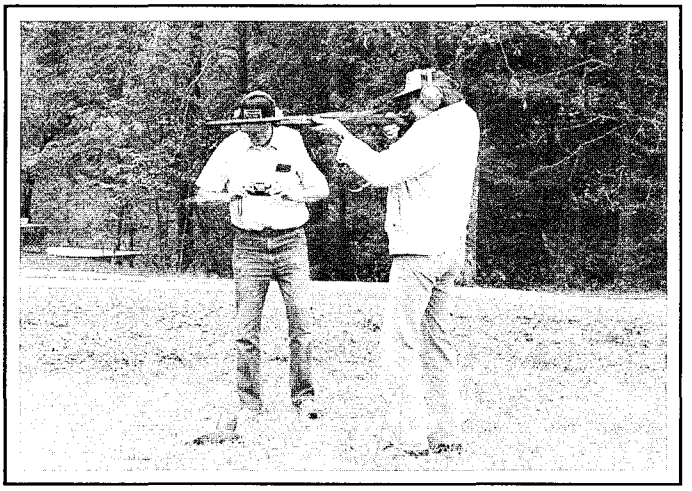
A few members of the Janssen TEF workshop—West Berlin

Dr. Wolfgang Ahnert

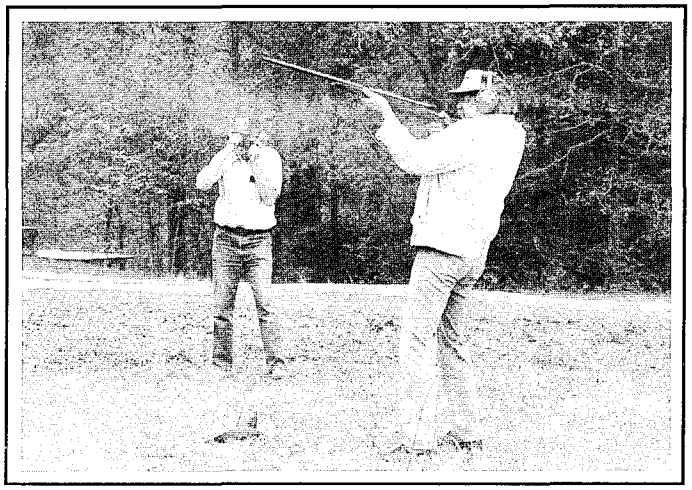
Dr. Wolfgang Ahnert from East Berlin travelled with us in our motorhome from Nashville, TN to our farm in Indiana. Dr. Ahnert was over to give an invited paper at the AES Sound Reinforcement workshop in Nashville. He has now joined the elephant rifle club by shooting the Weatherby 460 magnum. Dr. Ahnert is good at anything he tries and hit the target squarely.

Dr. Ahnert is a very gentle man and all the cattle on the farm would have been overfed if he had been given his way after one of them looked at him with pleading brown eyes as we were feeding the horses.

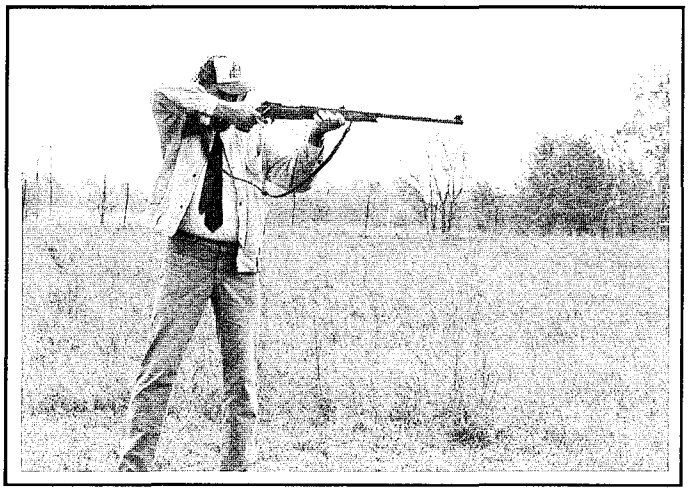
He is a clear thinker who does not accept new ideas without his own investigation of them. If men like Dr. Ahnert are truly representative of the present generation of leadership in the East, then there are grounds for meaningful exchange of ideas between us. ■



Preparing to shoot the 460



Caught in full recoil



After but a few minutes of practice, a greatly improved form.

Emperor's New Suit Enters New Field

One of our grads, after surveying a very expensive approach to teleconferencing, stated, "I'm not sure I'd want to spend $40,000 for 1 dB."

Mario Maltese of TSI was called by the Chairman of the Board of a prestigious international company and told that the chairman had recently been in the then Secretary of Defense's conference room in Washington, DC, and that he wanted a conference system like Mr. Weinberger had. He further stated that everything was hidden—no microphones or loudspeakers in view—and that everyone had heard everything with clarity and ease.

Mario asked us if we could find out what kind of a system was in that conference room. We, in turn, contacted a good friend in Washington with sufficient clearance to receive such information and asked him if security considerations would allow him to find out for us what kind of a system it was.

The answer is an interesting one and one that deserves careful study by all who are putting in such systems. The room had no sound equipment in it but was a live room with good geometry and diffusion. We're not against conference systems but many installers make the job exceedingly difficult by going for too dead a room instead of informed acoustic design supplemented by an unobtrusive sound system. ■

New TEF Owners

Trinity Electronics
Bremer STR 28-30
4600 Dartmund 1
W. Germany

Lausanne Federal
Institute of Technology
LEMA-CH-1015 Lausane
Switzerland

Knud Eskeldsen Agros
Hobrovey 347 DK-9200 Aalbong SV
Denmark

Electro Voice XSA
Keltenstrasse 5 2563 IPSACH
Switzerland

Robert Peppato
Viole Remembranz
Di Lambeate 20133 MILA
Italy

Arwen Producciones SA
Lerida, 9 28020 Madrid
Spain

Mark Micelli
Advanced Product Services
1035 S. Tyndall
Tucson, AZ 85719

John Murphy
Carvin Corporation
1155 Industrial Ave.
Escondido, CA 92025

Avalon Acoustics Inc.
P.O. Box 704
Boulder, CO 80306

Don Heavener
7936 Camino Circle
Miami, FL 33143

Glen Ballou
Pratt Whitney Corporation
United Technologies
P.O. Box 109600
West Palm Beach, FL 33410

Rod Sinbow
Professional Sound
550 N.E. 124th St.
Miami, FL 33161

Amil Hill
Hill Audio Products Inc.
Univ. of Central Florida
Progress Drive
Orlando, FL 32826

Robert Montgomery
Technical Audio Systems
3095 H Presidential
Atlanta, GA 30340

John Miller
Iowa State University
Jake Ewalt/ISU CTR Scheman Bldg.
Ames, IA 50011

Dennis O'Shea
Museum of Contemport Art
237 E. Ontario
Chicago, IL 60611

Clay Barclay
1662 Brookwood Drive
Elkhart, IN 46516

Jim Stratman
Delco Electronics
1800 E. Lincoln Road
M/S E110
Kokomo, IN 46904

James Young
American Audio Inc.
P.O. Box 1719
1104 Cooktown Road
Ruston, LA 71270

Alactronics
192 Worcester Street
Wellesley, MA 02181

Wenger
666 Park Drive
Owatonna, MN 55080

John Struckhoff
Atlas/Soundolier
1859 Intertech Drive
Fenton, MO 63026

Kevin Cornish
202 Evans Way
Somerville, NJ 08876

Diane Elliott
Reynold Electrical & Engr.
P.O. Box 98521
Las Vegas, NV 89193

Jerry Haenen
Adv. Composite Tech. Corp.
599 Broadway
New York, NY 10012

Gregory Pitcher
Solutus
Suite 2 22 High Street
Westerly, RI 02891

Steve Durr
Durr & Associates
6216 Bresslyn Road
Nashville, TN 37203

Shipley Landis
Nashville Network
2806 Opryland Drive
Nashville, TN 37214

Fred Brown
Comdial Corporation
P.O. Box 7266
1180 Seminole Tr.
Charlottesville, VA 22906

Jeff Rowland
Rowland Research
20-C Mountview Lane
Colorado Springs, CO 80907

Bob Oswood
Impulse Group
635 Monroe Street N.E.
Minneapolis, MN 55413

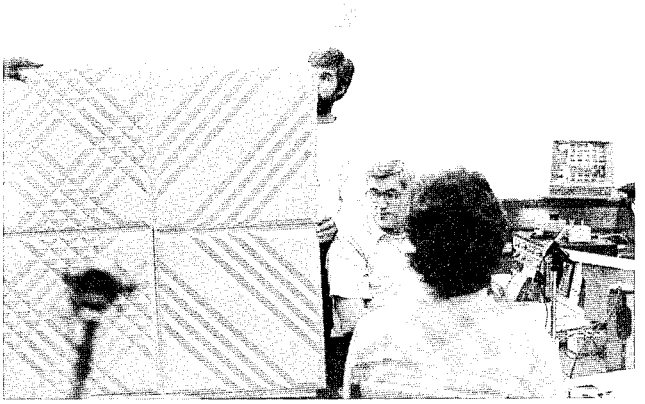
Alpha Audio Class

On our way from the White House Communication Agency class in Washington, D.C. to the Nashville AES we went through Richmond, VA and stopped over for a one day special class for Alpha Audio. Alpha Audio, as most of you already know, distributes Sonex to the audio industry. They also are a modern, up-to-date recording facility as well as being involved in a number of other audio related projects.

Alpha has a young, talented and enthusiastic group of employees who appeared genuinely interested in helping solve their customers' problems. The Alpha facility is extensive and included a large conference room suitable for the class.

We measured various Sonex samples and the competitive, or should we say imitative, products. There are so many TEF analyzers out in the field these days that most people already know that "look alikes" are not necessarily "perform alikes".

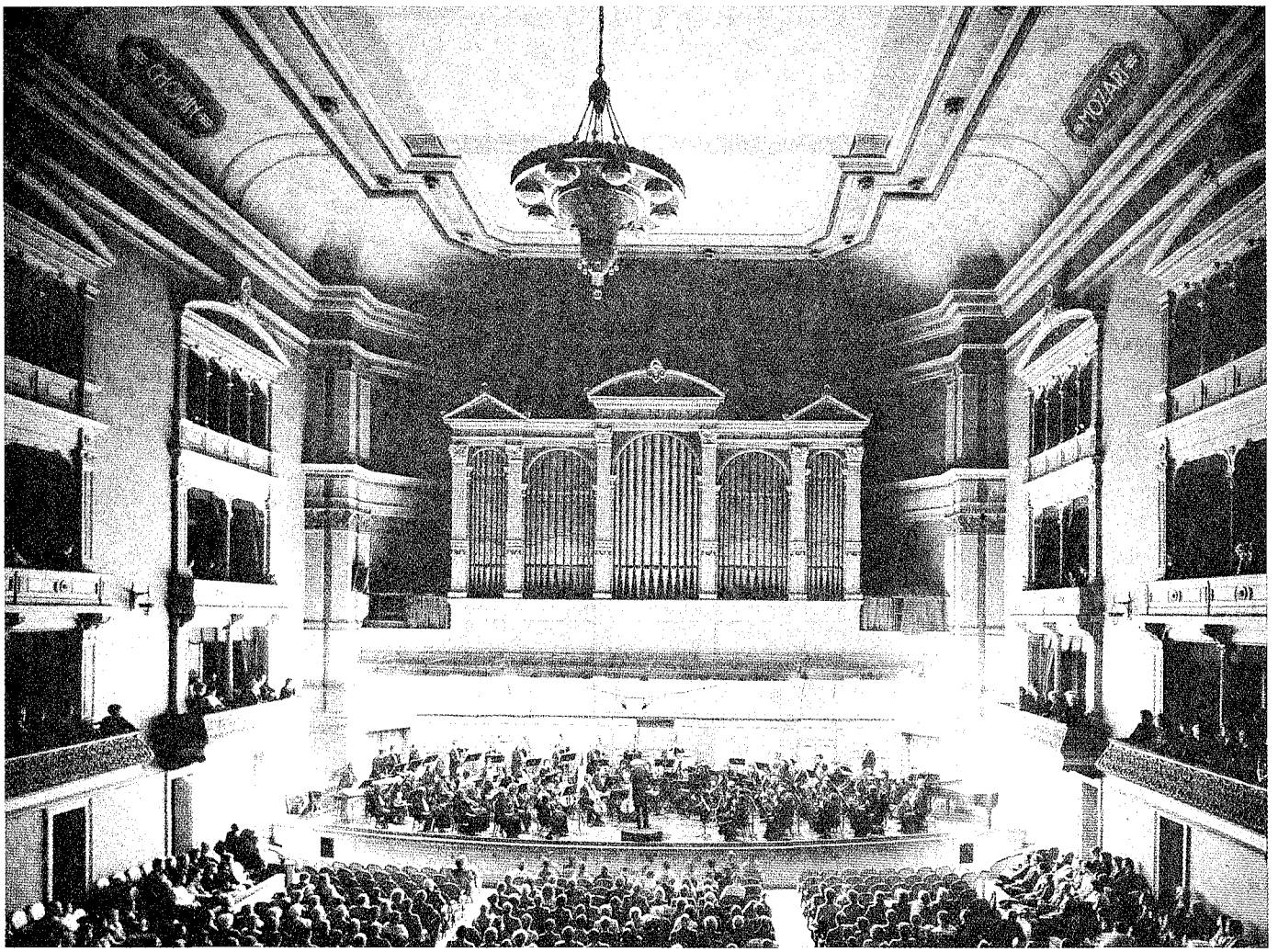
We are always pleased with and impressed by companies that make such special efforts to keep their team on top. ■



Alpha Audio
April 29, 1988

Eric Johnson	**Bobbie Winn**
Mary West	**Dick Smith**
Kathy Fitzgerald	**Mike Binns**
Nancy King	**Spence Burton**

UPDATE ON TROY SAVINGS BANK MUSIC HALL



Our regular readers will recall that we did some TEF measurements in the Troy Savings Bank Music Hall in Troy, NY, in June 1985. (Tech Topic V12N12.) Dr. Wolfgang Ahnert from East Germany was with us and Phil Clarke from DCI in Marcellus came over to help. Troy Music Hall at that time was in disrepair and a cause for genuine concern. The late George Szell said that if Troy Savings Bank Music Hall was ever in danger of being torn down, he would rush to Troy and stand outside the hall's entrance, arms outstretched.

Troy Savings Bank, the owner of the Music Hall which is located on the second floor of the bank, decided to close the Music Hall, but the local citizenry rose in protest to such an extent that the bank has pledged to invest $400,000 to renovating the concert hall. The bank obtained the hard-to-get insurance needed to keep it open, and accepted a renter (Craig Dory) to use it as his recording studio when it is not in use for regular concerts. (I say accepted because Craig Dory worked for over a year to be allowed to establish a recording studio in Troy Music Hall.

Craig Dory

Craig Dory, an applied mathematician, a Bell Labs employee (6 years), a musician and skilled recording engineer, accompanied a group called Solid Brass to Troy Music Hall where he made a hasty recording that turned out to be the best he had ever made. Craig has a record label, Dorian Digital Recordings, Inc. and specializes in "minimal micing". He uses no signal processing devices and achieves his excellent results by means of microphone selection and placement.

Dory frequently uses the new

B&K recording microphones and strives to include the hall's signature in his recordings. This makes them a valuable resource for playback in LEDE listening room tests where you want to see if the listening room masks the signature of the hall the recording was made in or allows it to be heard.

Dorian Digital Recordings

Craig Dory has sent us a CD sampler of some of his recordings including those made in the Troy Savings Bank Music Hall (TSBMH). Craig also included a poster with a reproducible picture of the front 1/3 of the hall (shown here). The Dorian Digital Recordings are absolutely superb and you can hear the hall literally sing between the performer's notes.

Craig Dory writes:

"I'm enclosing this time the Dorian Sampler CD. I hope you will enjoy these recordings. Only Julianne Baird, Emanuel Vardi, and Antonin Kubalek were recorded in the TSBMH. The organ recording might be of some interest to you: It was recorded in a church, 2000 meters up the side of a mountain in the French Alps!"

The church recordings are spectacular. In looking at the picture of TSBMH you can quickly see all the attributes of a great hall. High ceiling, diffuse side walls, small stage well coupled to the auditorium and easy for the performers to hear each other as well as feel the hall's response. "Taking a sound shower" was how one musician described playing in the hall. We wish every success to Craig Dory and Dorian Digital Recordings. They are worth their weight in gold.

The Dorian Digital Recordings are absolutely superb and you can hear the hall literally sing between the performer's notes.

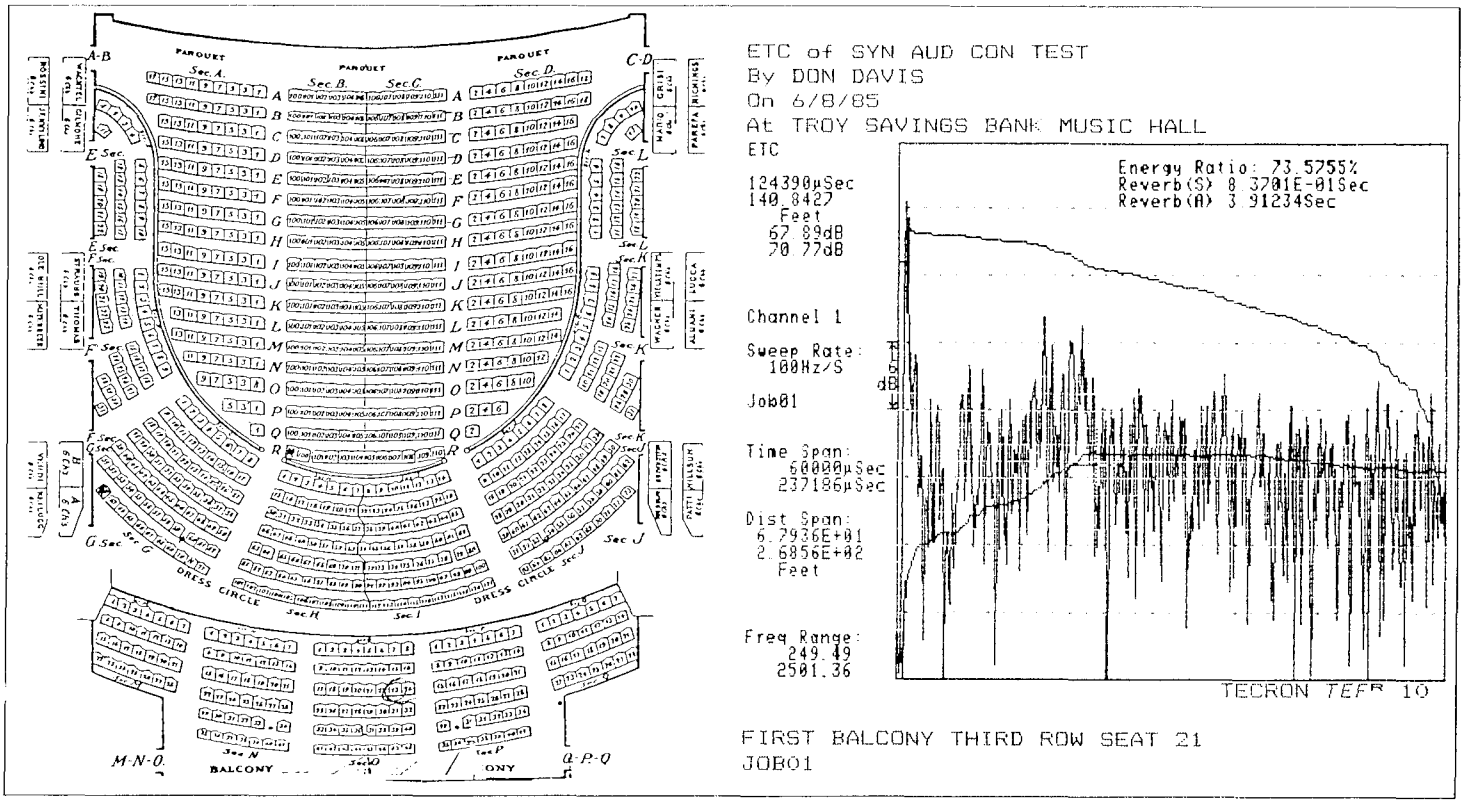
The sound of the hall, voices and instruments is thrilling. Anyone with an interest in classical music and great concert halls will want to own at least one of the CDs. If you want to contact Dorian Digital Recordings directly, their address is 17 State St., Suite 2E, Troy, New York 12180. Ph (518) 274-5411

WFMT-FM in Chicago

WFMT, surely one of the art treasures of America, has a program series sponsored by the Lincoln Motor Car Co. which samples music played in great concert halls. Gordon S. Carter, in the engineering department at WFMT, sent us a tape copy of the program they did in and about Troy Savings Bank Music Hall. The tape contains recordings they made plus Dorian recordings and truly marvelous interviews with patrons, musicians and supporters of the hall.

The program starts with Ray Norstrand saying, "We had heard rumors that this was a great hall. Let's start off at the beginning by saying all that we had heard about it was true!"

Truly, Troy deserves to be called the greatest concert hall in the United States and we are thrilled at the role our good friends at WFMT have played in spreading the word and sound of the hall with editorial and technical integrity of the very first rank. S-A-C



SYN-AUD-CON SEMINAR AND WORKSHOP SCHEDULE

2-Day SEMINARS

Chicago, IL
September 22-23, 1988

Minneapolis, MN
September 27-28, 1988

St. Louis, MO
October 4-5, 1988

Anaheim, CA
November 1-2, 1988

San Francisco Area
February 8-9, 1989

Vancouver, B.C.
Spring 1989

Dallas, TX
Spring 1989

The Farm
April, May & June 1989

Price increase for seminars:

1 participant	$450
2 participants	$425 each
3 or more	$400 each

Effective Immediately

3-Day WORKSHOPS

TEF Workshop
Braunschweig, West Germany
September 6-8, 1988
Sponsored by
ANT Nachrichtentechnik GmbH
Staff: Don Davis, Don Eger, Hellmuth Kolbe & Dr. Eugene Patronis

Grounding & Shielding
The West Coast
January 27-29
Note: This is a new date. Was November 1988
Workshop Chairman:
Allen Burdick, Benchmark Media Systems

Concert Sound Reinforcement
The West Coast
January 17-19
Workshop Chairman:
Will Parry, Maryland Sound

Advanced TEF Workshop
The Indiana Farm
April 1989

Sound Reproduction
The Indiana Farm
May and June 1989

Syn-Aud-Con will participate in 2-Day conferences sponsored by

EV/International
October 13-25, 1988
Frankfurt
London
Stockholm
Milano

There is no Quicker Way to Don's Heart...

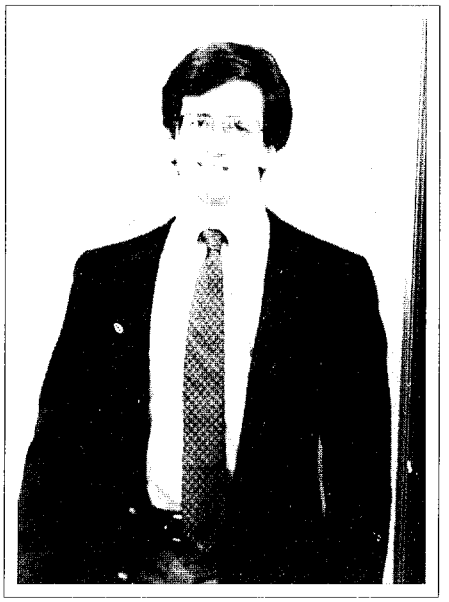
Present Don with a pioneer piece of test equipment still in working order and you have won a lasting friend.

Steve Durr of Nashville, TN made just such a presentation during the AES meeting on Sound Reinforcement. Steve arrived with a Western Electric sound level meter circa the late 1930s. (actually an Electrical Research Products, Inc.) It's a W.E. type RA 358 serial #521 with the original W.E. 633A microphone. It has a full complement of tubes and looked like it had experienced minimal usage.

Steve Durr has our sincere thanks and appreciation for a treasured addition to our instrumentation collection. ■

A NEW GENERATION FROM AN AUDIO GREAT

James Hannon was a member of the Anaheim, California class in January. The son of Andrew Hannon and now working with his uncle, Pat Hannon, his presence in the class opened a flood gate of memories. The Hannon brothers were major Altec dealers back in the 1960's with such major jobs under their belts as the Ontario Motor Speedway and the first Acousta-Voicing job ever performed. The Hannon organization shared much with us that helped solve many of the early problems in equalization. Andy Hannon was the very first to call my attention to how the reverberant sound field rose in level as we added speakers and led me to evolve the 'N' Factor. We expect young Jim Hannon, a grad of Princeton University, will carry on the tradition without trouble as he is a bright, thinking young man. ■



James Hannon of Hannon Engineering in Los Angeles

"I Would Have Provided the Alignment ADD-3 From the Beginning and Not Have Worried About the Budget"

From Mark Doubet of D. B. Acoustics, Inc in Marion, Iowa:

DB ACOUSTICS INCORPORATED
formerly WMT Music and Sound
5007 8th AVENUE
MARION, IA 52302 (319) 373-1425

"In reply to your question about the First Assembly of God church system, when the system was originally installed, we had not done time alignment."

"Two months ago I returned to the church and added an additional ADD-3 delay and time aligned™ the system. This resulted in a great deal of improvement in all of the overlap areas. Now when you walk the main floor with music playing, you do not notice the phasing problems.

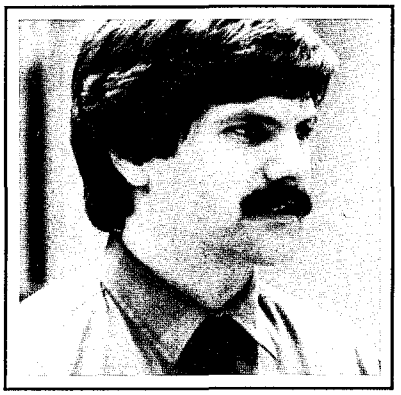
"Looking back at this project, I would have provided the alignment ADD-3 from the beginning and not have worried about the budget." ■

Time alignment is a registered trademark of E. M. Long & Associates

He Quit Before Being Fired

A man, who had been employed for twenty years as a human cannonball, approached his boss and told him he was quitting. The distraught boss replied, "Where will I ever find another man of your caliber?"

A Useful Test Box



Allen Schultz of Listen Up in Denver attended a Syn-Aud-Con seminar last fall. During the first day of the class he told us about a magical black box that he had built. We asked him if he would bring it in and show it to the class. We were impressed! We asked Allen if he would be willing to share it in the Newsletter and he has written an excellent Tech Topic, "A Test Box to End All Test Boxes", included in this mailing.

We also remember Allen for a statement that he made in class, "If you look in the dictionary under tangent, you will find Don's picture." ■

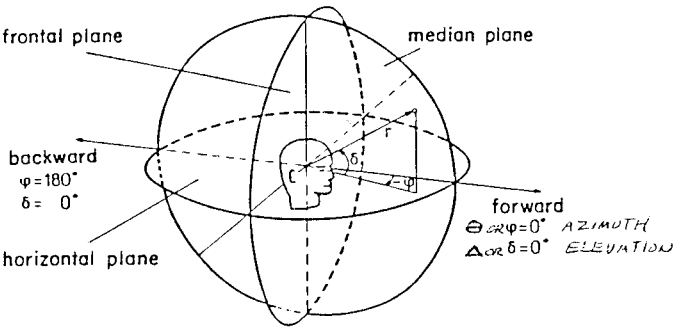
Pinnae Transforms

Pinnae transforms take many fascinating forms. There are the transforms that vary with direction of the source, there are the variations caused by the head shape and shoulder, and there are the pinnae transforms of the maximum level due to the ear channel resonances.

The last category is the one we want to discuss here. We are able, thanks to TEF analysis, to make very accurate, highly repeatable measurements of this "amplification" factor.

Our microphone is a special probe unit made by Mead Killion's company, Etymotic Research in Elk Grove Village, Illinois. The free field measurement of this microphone is shown in Fig. 1. We then differenced this curve against each subsequent measurement by placing the individual's head that was to be measured in the same location as the microphone, only this time with the microphone installed in his ear (the probe tube only) and with the end of the probe tube a millimeter from his or her eardrum. When the probe tube is being installed, it is gently pushed against the eardrum and the person being measured hears a sound like a timpani being tapped. The loudspeaker used for these tests was placed about five feet away at an angle 45 degrees horizontally from the zero axis (the Azimuth) and 45 degrees above the horizontal plane (the elevation) i.e. 45 degrees azimuth in the right forward horizontal plane and 45 degrees elevation to the right of the median plane (see Fig. 2). Mike Lamm's transform (Fig. 3) is one of the three principal variations we have observed thus far. Gene Patronis (Fig. 4) exhibited a quite different response from Mike Lamm. Peter D'Antonio's transform (Fig. 5) is another distinct variation. Peter receives almost 25 dB of amplification at 6000 Hz to 9000 Hz.

We do not, at the present time, know the significance of even these principal differences, to say nothing of the more subtle ones, but we now have ways to conduct listening sessions wherein we can seek correlation if indeed it exists, between such transforms and how we perceive sound. We will be performing DAT recordings of typical ears for other ears to listen to. I, for one, want to try Peter D'Antonio's ears as it is sufficiently different from my own transform as to be audible in the type of recordings we will be making in the workshops this summer exploring the listener, the listening room and the loudspeaker. ■



A head-related system of coordinates used in auditory experiments; r is distance, φ the azimuth, and δ is the elevation.

SYMBOLS AND ABBREVIATIONS

Table 1. Greek Alphabet

A	α	Alpha	H	η	Eta	N	ν	Nu	T	τ	Tau
B	β	Beta	Θ	ϑ θ	Theta	Ξ	ξ	Xi	Υ	υ	Upsilon
Γ	γ	Gamma	I	ι	Iota	O	ο	Omicron	Φ	φ	Phi
Δ	δ	Delta	K	κ	Kappa	Π	π	Pi	X	χ	Chi
E	ε	Epsilon	Λ	λ	Lambda	P	ρ	Rho	Ψ	ψ	Psi
Z	ζ	Zeta	M	μ	Mu	Σ	σ ς	Sigma	Ω	ω	Omega

Fig. 2 Symbols & Abbreviations

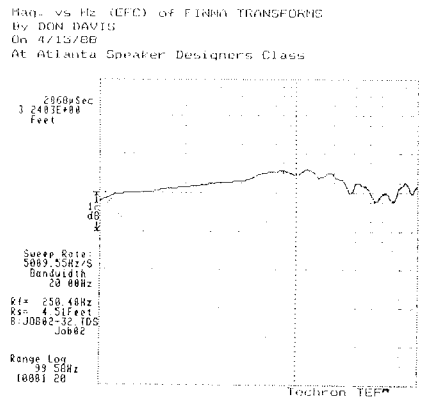


Fig. 1 Free Field Measurement of Mead Killion's probe microphone

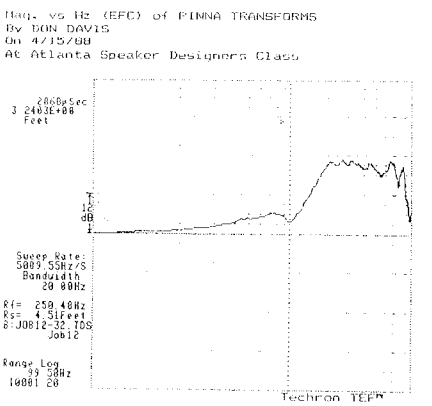


Fig. 4 Gene Patronis' pinna response

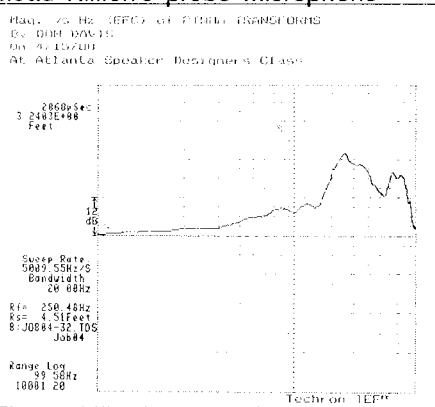


Fig. 3 Mike Lamm's pinna response

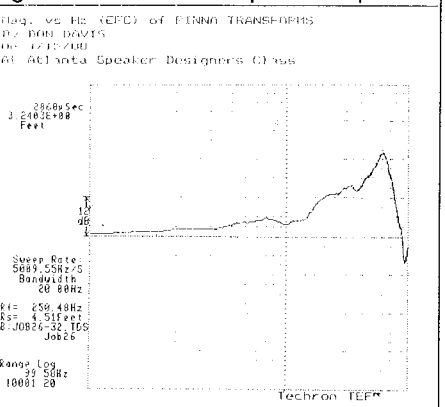


Fig. 5 Peter D'Antonio's pinna response

Motion Pictures Dying? –

Only the Sick Ones.

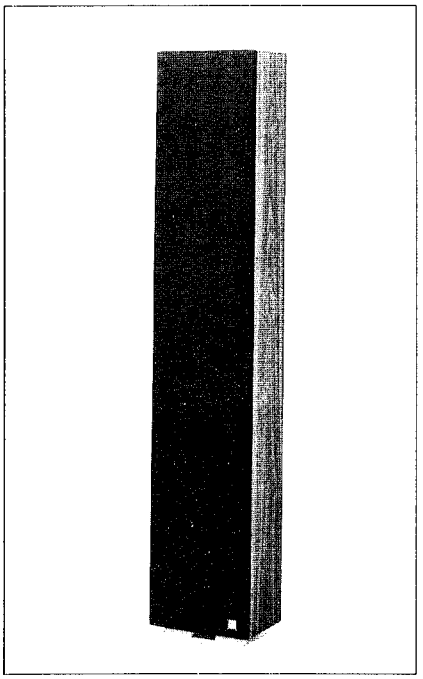
Everytime someone goes to write off motion picture theaters, and it's been done often in our lifetime, one of the key factors they often overlook is its social function. When I was a young man, going to the movies was about the only entertainment that I could afford to take a date. We rode a bus (5 cents), attended a movie (25 cents), had a chocolate soda after the movie (20 cents) and walked home. Our idea of sin was an elicit cigarette and while I knew of young people who drank, I never personally had a friend that could afford to.

With this kind of background lurking in my ROM, it is with pleasure that I see motion picture chains like AMC designing theaters with comfortable high back seats with side arms, sockets for popcorn boxes, drinks and candy bars. AMC has a new loudspeaker system designed by Dr. Eugene Patronis for Electro-Voice. Now we can hear synchronized wide range, distortion free dialogue, and screens with improved visual capabilities because they are no longer perforated. These small attractive theaters are fun to attend.

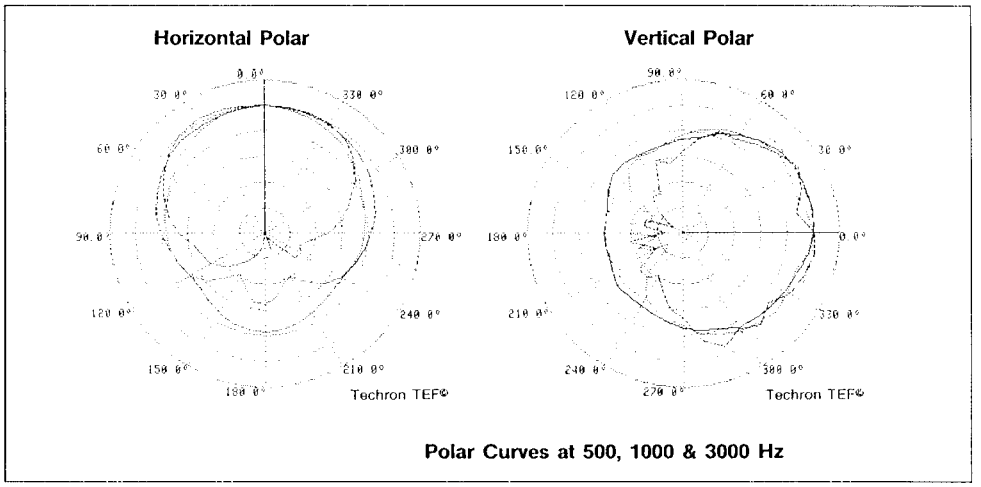
What interests me just as much is the audience, which tends to be dating couples, entire families, and all well behaved and obviously out for an afternoon or evening of entertainment.

Motion picture theaters dying? - only the sick ones. ■

The J. W. Davis Bessel Array



Mike Lamm at J. W. Davis has redesigned the BE-40 Bessel Array. We're using it in our classes now. It is good. All for $85.



Polar Curves at 500, 1000 & 3000 Hz

We have been pushing the Bessel concept for almost five years. We are beginning to sense that the audio world is ready for the Bessel. It took *over* five years for Syn-Aud-Con to encourage a manufacturer to build a microsecond signal delay. Now very few question the need of microsecond signal alignment. The Bessel Array is taking longer to be accepted, but people are beginning to listen to what Stage Accompany in the Netherlands is accomplishing.

J. W. Davis has a switchable version called the BE-40/SC-40 for $100. This will let you prove to yourself that the Bessel works. It's just like the one we demonstrate in classes. ■

A Positive Note in Syn-Aud-Con's Management Forum

It is always with extreme pleasure that we hear that someone we like, respect, and have long experience with is recognized within their own organization. To quote James Kogen, Shure Brothers President, "Lottie Morgan has distinguished herself as one of the most professional and effective salespeople in the electronics industry."

Lottie is the new Shure Vice President of Sales and will be responsible for the supervision of all domestic distributor sales of Shure products. In our book that means lucky distributors as Lottie has uncommonly good sense, a genuine interest in the people she deals with and a receptive mind to all that's new and contains potential good for Shure and its family of distributors. ■

NEW YORK CLASS

An Award for the Highest Rating on the Laugh Meter

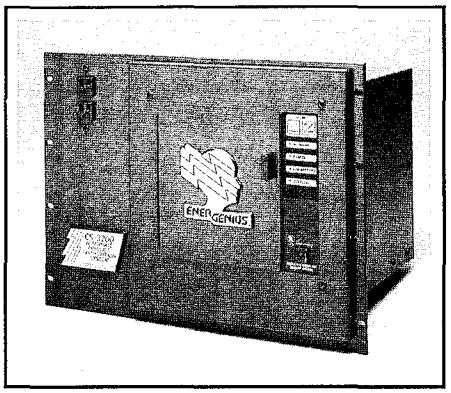
We would like to see an award given out each year for the article, press release or ad that causes the highest rating on the laugh meter. We are not making any judgment on the value of the product, only on the hype with which the product is presented to the public.

From *ProSound News* -- a press release from Monster Cable:

"For the first time, musicians will hear the true tone of their instruments and be able to get the full message of their music across to their audience."

"Each of Monster's proprietary technologies minimize phase errors in the time domain and reduce frequency-dependent delay distortion, permitting the sound to arrive at the listener's ears on time and in focus." ■

ENERGENIUS CS—3200



The Energenius CS-3200 backs up sound systems when the AC power is down, for hours or days.

Dr. Clay Barclay recently called us at the farm to discuss a new activity he has undertaken in addition to his work at Crown and his medical duties at the hospital. You have to know Clay to appreciate that he's probably still not fully engaged.

Clay is now a part of the "Eneractive Group, Inc." of Elkhart, Indiana and their first product is a set of alternate power and distribution systems. The photograph shows the "Energenius™ CS-3200." This unit provides 1000 watts (surge rating up to 2500 watts). The CS-3200 becomes your power source for your audio system wherein batteries run through a high efficiency electronic inverter system which, when on 120 volt AC, keeps the batteries maintained but when AC power fails, keeps right on running because it's always on batteries. Modern "shaped sine wave" electronic inverters are extremely high efficiency and we have employed similar ones back at our old west coast office where we alternated between generators and inverters.

Eneractive also offers an EG 6900 that gives 1500 watts continuous and 3000 watts surge rating.

These units definitely look worth a test. I'd suggest that those of you interested in such a unit purchase one and run for a few months on a system in your shop. It's worth the time and effort because such a unit uniquely solves a majority of the power system grounding problems.

Quoting from Eneractive's press release:

"The CS3200 is a UL listed, 'Alternate Power and Electrical Distribution System,' intended to back up sound systems when the AC power is down. In addition, it provides a convenient, 14" EIA rack mounted, AC power distribution system. This allows the contractor to wire a 30 AMP AC power feed to each rack with the 'AC mains' breakers conveniently located in the audio rack. Not to be confused with the computer type 'UPS's', it will operate PA systems for literally hours or days if necessary! It is specifically designed for audio applications, with total isolation of AC common and chassis ground to eliminate troublesome ground loops.

The Energenius 3200 operates from 12 volt storage cells, which include the readily available automotive maintenance free types. The product features a 12 volt, 80 AMP 'quick restoration' automatic battery charging and maintenance system.

The Energenius 3200 is intended for organizations that must constantly have operable sound systems such as schools, business offices, restaurants, train and bus stations, night clubs, nursing homes, churches and police stations, etc. It is also useful for sound masking system backup. The installation cost of the 3200 system is said to be only a fraction of the potential consequential costs of a sound system failure in a public place."

More information on the Energenius system is available by writing ENERACTIVE GROUP, INC., 25416 CR6, Suite 313, Elkhart, IN 46514 or call (219) 264-1393.■

Reflections on Specular Reflections

Want to improve home listening conditions by a worthwhile, noticeable margin? Choose an absolutely bare room of about 20L x 15W x 10H with wallpapered drywall surfaces, a plastered ceiling and a hardwood floor that contains two symmetrical corners free of any deviation for at least six to eight feet. In our case the wall opposite the wall with the two corners contained two windows symmetrically placed.

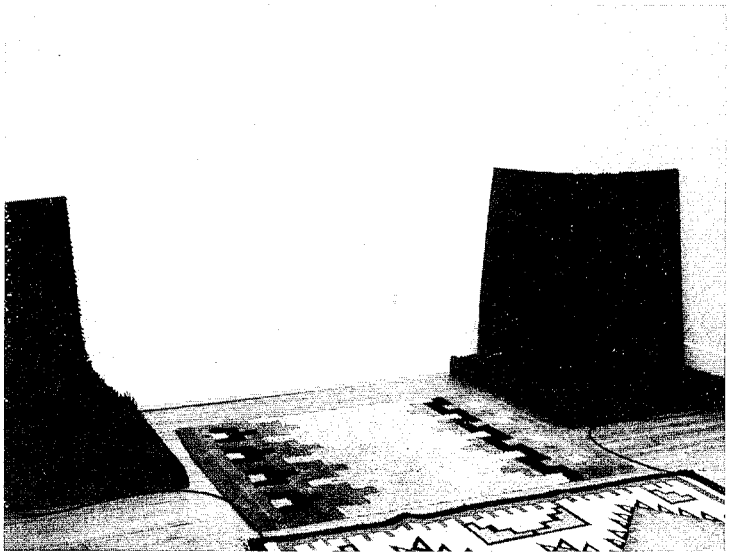
Now take two Spica loudspeakers, four pieces of 4" Sonex, two American Indian rugs, and window shades and convert the room into a surprisingly good listening environment. It should be noted that this room empty was a horror chamber of flutter echoes.

Early Reflections

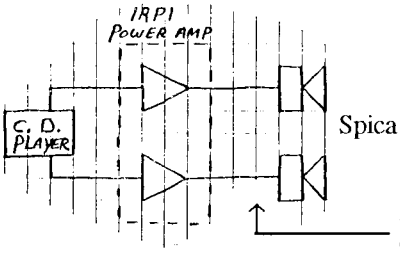
Remembering that absorption is frequency dependent and that the frequencies that must be controlled for accurate reproduction of recorded spatial geometry are all high frequencies (i.e. the specular frequency region) we place a 4' x 4' x 4" Sonex panel on the floor in each corner where the loudspeakers are to be placed (i.e. the symmetrical corners). Then place the two Spica loudspeakers in the center of each piece of Sonex and aim the on-axis point at the listener position (5 to 6 feet from the rear wall is the listener position and equidistant from the two loudspeakers). Now place another 4" piece of Sonex behind the loudspeakers and allow it to lean back into the corner. Place the two throw rugs as shown in the picture. The listening position is just outside the picture on the other side of the Navaho rug. Finally, hook up system shown in diagram and listen to the organ on section two of the first Telarc CD demo disc. Then demonstrate to startled friends what a private listening room can be and don't tell them the price.

Why does this system sound so good? We're not yet entirely sure we know why. But we do know that we've heard the best bass reproduction we've ever heard from this combination before in other rooms, a more solid and in depth curtain of sound, and remarkable imaging with stability of the images. What's surprising to us is that we have used this equipment for years with the same source material but never with the kind of sound quality we are hearing now. That's what makes tuning rooms such fun—they contain genuine surprises. Since we expect to do far better in this room during the workshops (better CD players, diffusors present, larger loudspeakers etc.) we no doubt will be even more enthusiastic in our next report.

Our first guess about why it worked so well: the specular frequencies from the loudspeaker are going past our ears up to the upper rear wall to ceiling to front wall to floor before we ever receive it. All of our initial reflections are from the side walls (low interaural correlation). The speakers low in the corner are getting full benefit from a trihedral corner (remember Sonex disappears acoustically at bass frequencies) and we have a remarkably harmonious relationship modally between loudspeaker placement, listener position and the room's modal distribution. We suspect that tight polar control of the higher frequencies is important in this highly reflective space and the tweeter is horn loaded.



Analysis—What analysis? We have been listening with our subjective judgment. Next time we'll make the measurements and show you the objective side.■



Spica Loudspeakers

Ken Wahrenbrock assembled wire and connectors plus polarity reversal for both channels at the same time (necessary when using Telarc CDs

Test playback system in new laboratory

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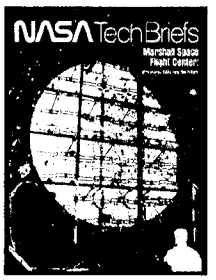

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The proceeds from the PHD Program is a very generous gift from John Prohs and Ambassador College in the memory of Richard C. Heyser, a beloved memory to all who knew him. And there were many Syn-Aud-Con grads who had this valued privilege.

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All orders received to date have been shipped. There were snags, snafus, and delays. Once David Andrews received the record of orders and shipping labels from *Sound & Communications,* orders were shipped within the week. David copied all the disks and mailed them all at his expense. A contribution of many hundreds of dollars, but as David said, it was one way he could say thanks to Dick Heyser.

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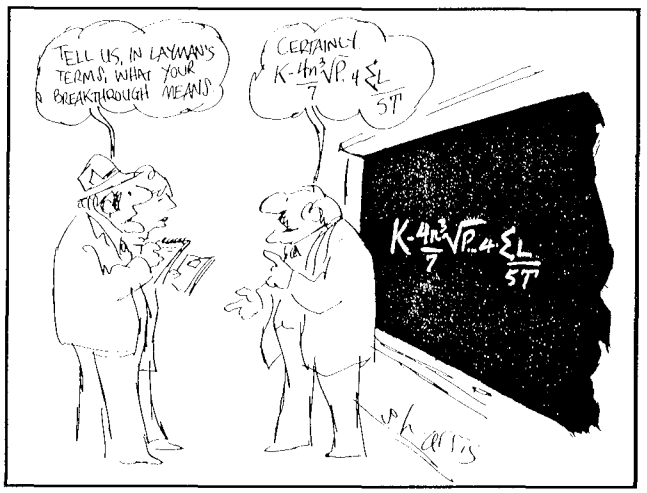

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