SYNERGETIC
SYN AUD CON
AUDIO CONCEPTS

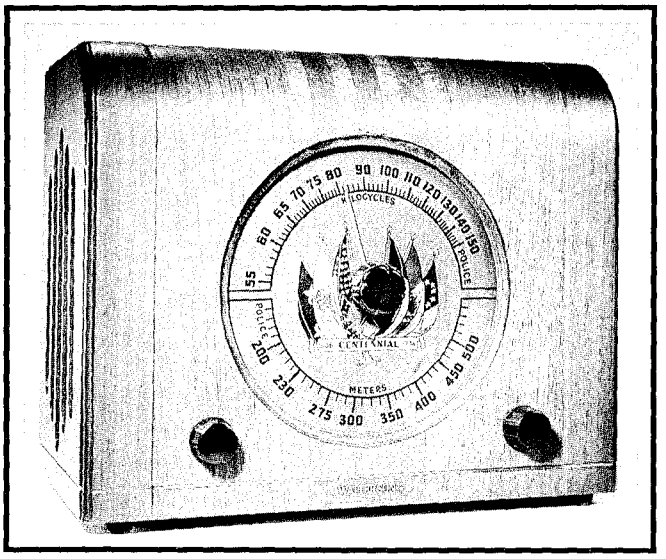
newsletter

Volume 20, Number 4
Summer 1993

J.W. Davis & Co.

60 YEARS

1933 & Still Going



Special Watterson Radio made for Texas Centennial in 1936. (It still works!)

Watterson Radio named for John Watterson Davis

Celebrating Our 60th Anniversary

SYNERGETIC
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EXCHANGE OF IDEAS

I met a man with a dollar
We exchanged dollars
I still had a dollar

I met a man with an idea
We exchanged ideas
Now we each had two ideas

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

Design & Layout: Dashia Meadows

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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No. 1— Constant Percentage Bandwidth Filters

When Do I Renew?

You can check to see when your subscription will expire by checking the mailing label on the envelope in which your newsletter was mailed. In the upper righthand corner, beside the name, a date will appear (i.e. 7-93). This means that you will receive this issue and it will be the last issue sent unless you renew. Renewal notices will be sent at this time. You must renew before the next quarter's newsletter is mailed or your subscription will become inactive.

POSTMASTER: Send address changes to Synergetic Audio Concepts, 12370 W. Co. Rd. 100 N, Norman, IN 47264.

1933 60 YEARS 1993

Celebrating Our 60th Anniversary

We delight in being associated with men and women so obviously dedicated to being of genuine service to their wide-range customer base.

I'd like to give you a little background on a company that has served their customers for 60 years, with only 3 owners and an A1 rating by D&B. There are not that many audio companies that can make that claim.

The company was founded in 1933 by John Watterson Davis, who had secured one of the first RCA-Hazeltime licenses west of the Mississippi river. His company initially produced battery powered radios and sold them primarily to rural markets in the Southwest. (In the 1930s the various REMC companies did not exist and electricity was a large city perk.)

Surviving the Great Depression, World War II and the changeover from tubes to solid state electronics, J. W. Davis now in the hands of John W. Davis's son, Jay Watt Davis, moved from the radio business into the commercial sound business (1957).

Jay's Jargon Newsletters were an early educational effort designed to inform the users of J. W. Davis products of the best practices applicable to them.

In 1974, following the death of Jay Watt Davis, the company was literally re-founded by Mr. & Mrs. Harvey Earp. One of Mr. Earp's earliest acts was to attend a Syn-Aud-Con class and we have been friends since that time. Harvey is that extremely rare combination: an entrepreneur, skilled financial manager, astute businessman, and enthusiastic audio innovator.

Harvey Earp made friends with Dick Heyser and was one of the very first manufacturers to purchase a TEF analyzer. They have currently updated to a TEF 20HI.

They pioneered the Bessel Array loudspeakers in this country, being the first in the United States to license to Philips for its production.

J. W. Davis was the first to offer Heyser's Signal Biased Amplification (SBA) technology. The current major trend of horns within horns had its genesis in the Patronis Pataxial systems commissioned by J. W. Davis.

In business practices they have innovated with free freight if not shipped the same day (order in by 2:00 p.m. Dallas time will be shipped that day) for what is probably the largest and most diverse commercial sound inventory in our industry.

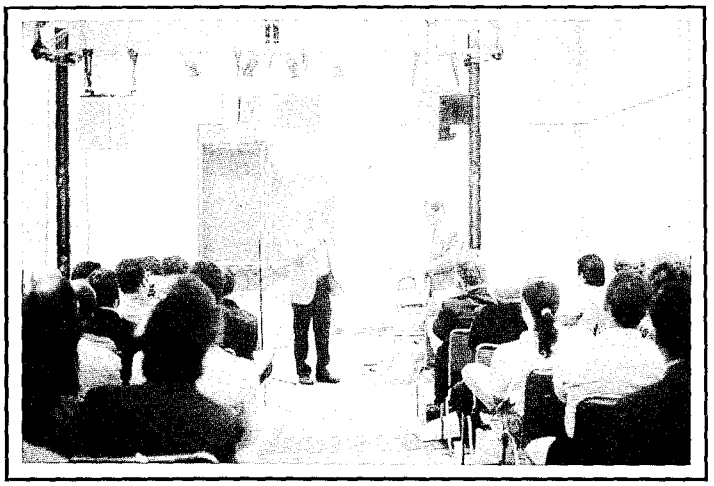
Top all of this off with super people in a company small enough to enjoy daily direct interface with enlightened management and you have why so many Syn-Aud-Con grads have the J. W. Davis catalog handy.

NSCA 1993

Products come and go - some good, some not so good - but products are not the audio industry. People are the audio industry. Shown here are some of the movers and shakers of our audio world.

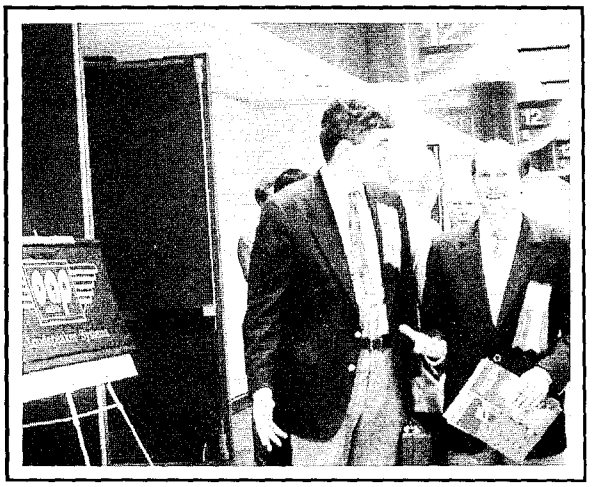
Yes! people are the industry. Good people who love audio. We are a small industry and it has been said that "you should never slam a door" because you may end up working with or for everyone you know.

Lucky indeed is the newcomer who gets to meet and talk with these men.



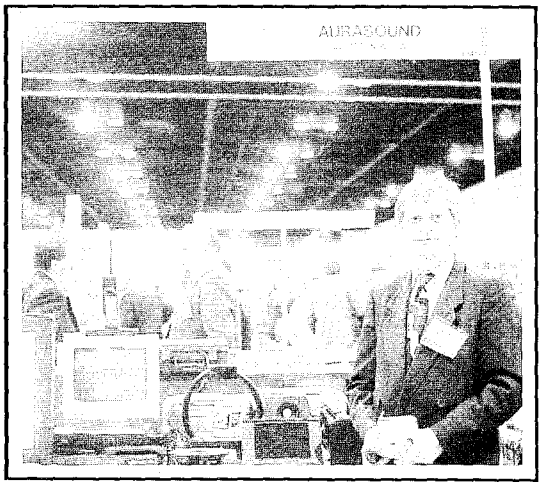
Dr. Patronis at NSCA lecturing to a full house for OAP and their Patronis designed loudspeaker systems.

Do I have all these great pictures of Dr. Patronis because he is photogenic or because so many interesting people stop to talk to the great man?



John Bareham, formerly of B&K, Denmark, and now an independent consultant, talking with Joel Lewitz, a San Francisco consultant.

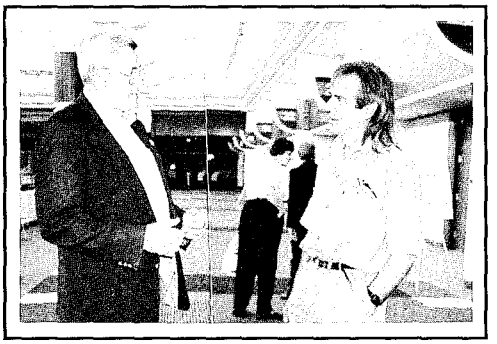
Dr. Patronis greeting **Cliff Henricksen.** U S Sound is under the wing of Carver Sound and we will be hearing a lot more from a great talent. In fact, Cliff asked if we would consider a workshop on "loudspeakers"? I said "YES! choose your staff." He immediately suggested Don Keele. There will be one more on the staff. The workshop will be in 1994 and John Murray has already asked to coordinate the workshop - much as he did so successfully for our 1992 Horns Workshop in Orlando.



Tom Gallagher was with the professional sound division of Klipsch & Associates until the professional division was sold to Audio Animation in Knoxville, TN. Now Tom is Director of Sales for AuraSound in El Segundo. Aura Sound is in the aerospace industry and is searching for new markets in the audio industry for their unique products and concepts. Unlike some other aerospace companies, AuraSound hired sales/marketing and engineers from the audio industry. "You've got to know the territory." Contact Tom at Ph (310) 643-5300 or Fax (310) 643-8719. It is worth your time to learn about a "new-generation speaker."

Dr. Patronis and Dave Andrews, two men who truly understand one another and have a mutual respect for each other.

Dr. Patronis with **Glen Ballou** of *Handbook for Sound Engineers* fame. That is OAP president, Michael O'Rouke, with his back to Dr. Patronis.



Chuck McGregor of TOA played a key part in our Horns Workshop in Orlando. He gained our total respect both for his intelligence and his total involvment.

Mark Gander of JBL. Mark is a good man and a good friend of Syn-Aud-Con. The sign doesn't tell the whole story of JBL's demo rooms. It took three rooms to show all the products under JBL's umbrella.

Norm Schneider was an early Syn-Aud-Con rep who left repping to become a premier manufacturer of motion picture theater equipment. He calls his company SMART Digital Audio Products. Norm is shown here holding his 500 watt, 5 lb, $500 amplifier!
We greet friends at NSCA by asking them what should we see. Norm's products were mentioned several times. (800) 45-SMART or (404) 449-6698.

Jay Mitchell, designer/ consultant for Frazier, at NSCA with his design of the CAT® 70 and VSE® Series Horn Systems. Horns within horns is truly an idea whose time has come.

Political Microphones

The design of a political microphone is complex. It is to receive messages out of both sides of the mouth, be garbled enough to allow a claim of being misquoted and complete failure upon being connected to a hidden recorder. It was not always so and herein is described one of the first microphones used politically

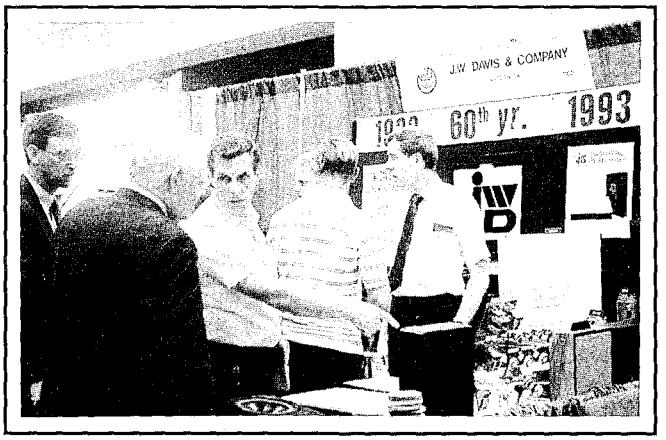
Don Washburn of N. Miami, Florida loves audio and instrumentation. He knew we were attending the NSCA Convention in Orlando, FL and he brought along a present for Don -- a very early version of the Western Electric 618-A Moving Coil microphone. The "equipment bulletin" is dated Dec. 27, 1933 and is marked "Restricted distribution - ERPI personnel only." This W.E. 618-A microphone was destined to spend its early career in front of Franklin Delano Roosevelt. It's impedance is stated as: 28 Ω at low frequencies with 0° phase angle; 38 Ω at 10,000 cps with 20° phase angle.

It's frequency response (labeled "response") substantially uniform from 35 to 9500 cps.

This microphone is in operating condition and has a flat edge wound aluminum voice coil rigidly fastened to a flexibly supported duralumin diaphragm.

Don Washburn included a cable with the W.E. connector for the microphone and an XLR for our use. We are deeply touched by the many individuals who have entrusted such treasures to our care. It is like our original edition book from 1657 which Dick Heyser remarked about "You're not the owner of that book - only the temporary custodian." We are very pleased that circumstances have allowed us to have such artifacts pass through our hands.

J.W. Davis Hospitality Suite at NSCA



I currently belong to the IEEE, ASA and NSCA. We particularly enjoy attending the NSCA conventions because it has become the focal point for serious professonal sound reinforcement engineers. We primarily belong to the IEEE and the ASA for their publications.

The NSCA conventions provide us with the opportunity to share the J W Davis hospitality suite with our Syn-Aud-Con grads.

We marvel at the grey heads that have survived the years with us and their success in our industry.

"Bo" Earp with Eric Simonson of J.W. Davis

Jack Tucker of J.W. Davis talking to Dr. Patronis (c) and Mr. & Mrs. Paul Peace, chief engineer of Frazier Co.

Don Washburn of the Audio Bug in N. Miami (l) talking with Vic Hall (somewhat retired from Communications Company in San Diego) and Don Davis.

Bob Diamond (l) and Tom Gallagher (r) of AuraSound - a company we are going to hear a lot about.

ShuttleCAD Software Review:

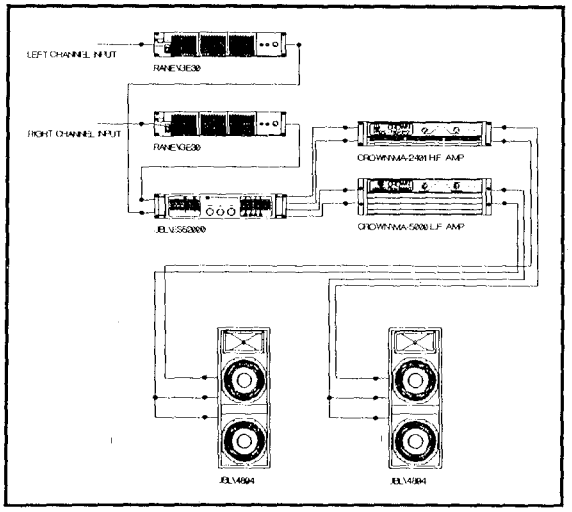
By:
Don Van Oort
R & D Industries, Inc.

Overview:

ShuttleCAD® was developed by a sound contracting firm in the U.K., Shuttlesound, Ltd., and is marketed as "A fully integrating, engineering and presentation software package." In short, ShuttleCAD is similar to conventional computer aided design (CAD) packages (like AUTOCAD®), but has been specifically written to produce sound system drawings. For instance, in the "rack layout" module, detailed equipment rack drawings can be created in less than 15 minutes, provided that the equipment used exists in the drawing database. Using conventional CAD packages this same drawing could take a day or more, even with an expert CAD operator.

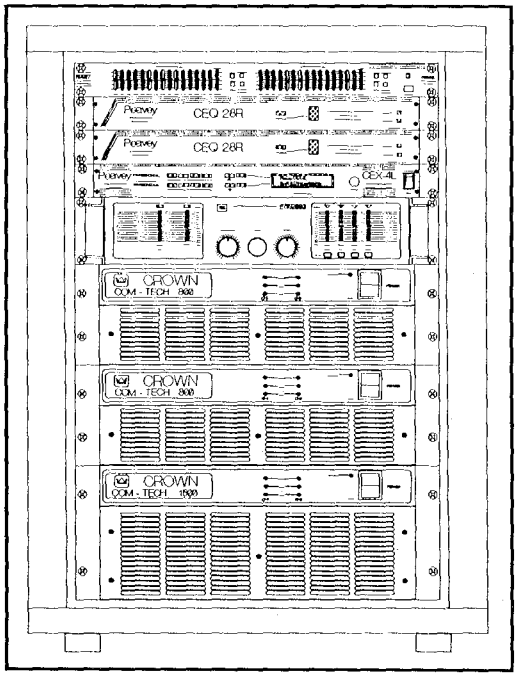
ShuttleCAD ships with a "generic parts" library and data disks containing drawings of equipment from several popular manufacturers may be purchased individually. As their data library grows, so will the strength of their software. If the equipment you wish to use is not available, you may draw it yourself. If you are familiar with CAD drafting, it is easy to produce parts drawings that can be inserted into a project drawing, in the same way that factory drawn parts are inserted.

Drawings can be imported and exported to a variety of drawing formats including .DXF a standard format used by AUTOCAD. The software that you are purchasing as



Sample Pictorial Schematic

"ShuttleCAD" actually uses the CAD engine of EasyCAD 2®, a drafting package written in the USA. This means that printer, plotter and video drivers may be obtained from the authors of EasyCAD2, within the USA. We have found printer, plotter and display drivers are available for a large variety of hardware. Furthermore, technical support on Easy CAD2 has been very good.



Sample Equipment Rack Drawing

The result of their efforts is a DOS based software package that is both powerful and easy to use. The starter package is comprised of five basic modules:

- Standard CAD — Allows use of the EasyCAD 2 standard CAD interface to draw anything desired.
- Rack Layouts — Allows detailed front, rear and side views of equipment racks
- Panels — Has been developed to design and draw custom panel layouts.
- Block Schematics — Used to create schematic drawings using block representations of equipment.
- Parts Utilities — Used to add or remove parts databases.

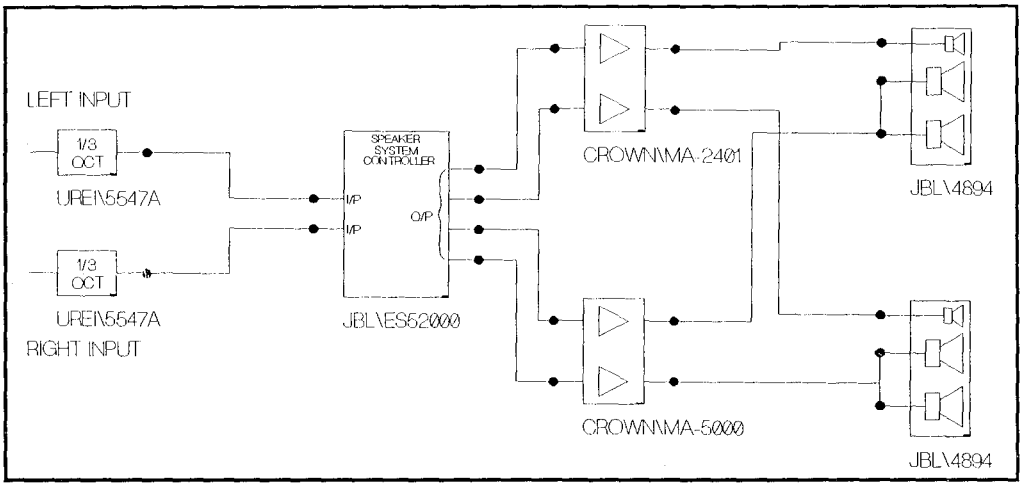
Optional Modules Include:

- Pictorial Schematics — Used to create schematic drawings using pictorial representations of equipment.
- Rack Parts Utility — Creates listing of equipment in drawing.

Caveat Emptor:

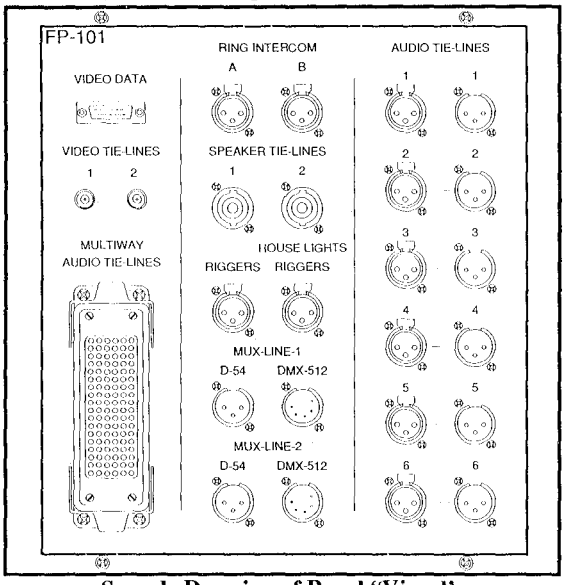
All this convenience is not without a price. The basic single user software package lists for $999.00 U.S. plus freight, and data disks range in price from $29.95 to $49.95 per manufacturer.

As with all new software, the current version (initital release) has a few bugs that will need to be worked out. I have experienced problems that caused menus to disappear and not return, or have caused the computer to lock up entirely. Technical support has stated that they will release an update as problems are identified & solved.

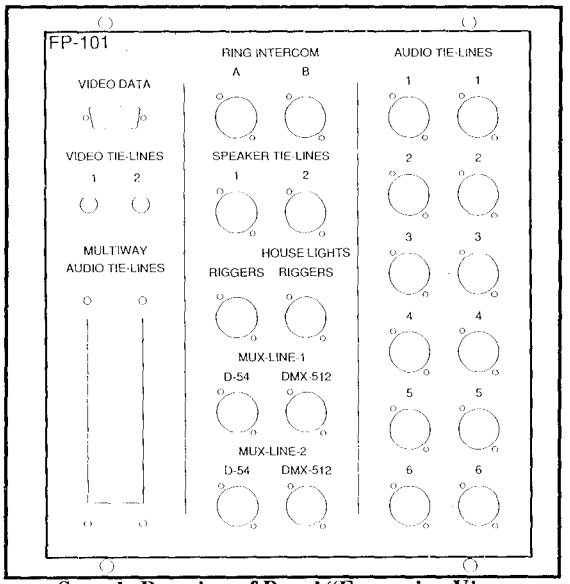


Sample Block Schematic

ShuttleCad® can generate multiple views of the same information, here is a sample from the Panels application.



Sample Drawing of Panel "Visual' (for presentation)



Sample Drawing of Panel "Engraving View (for manufacture of panel)

You should also know that ShuttleCAD is exceedingly copy protected. Their form of copy protection does not allow the original program disks to be copied. This protects the author of the software, but says nothing about your need to have a backup copy. The copy protection employed, copies a "token" to the hard drive upon installation and prevents additional installations to be made from the original disk. If you want to install the software on a different computer, you must move the "tokens" from the installed computer back to the original program disks, then move the "tokens" on to the hard drive of the second computer. Furthermore, if you have a local area network, only the station that has the original "token" may be used to run the ShuttleCAD program. This means you can't install the software on a file server and use it at whatever CAD station you desire, in our office this has proven to be very frustrating. I would hope that pressure from users could help develop a better, more user friendly, copy protection system.

Shuttlesound is planning a forum on Compuserve to support ShuttleCAD.

In the event of a hard drive failure, one can call Shuttlesound in England and they can give the owner a code to allow one to install the program from the original disks.

If you need to produce drawings for sales presentations, engineering drawings, shop drawings, or final system documentation, I believe you will find ShuttleCAD is up to the task. If equipment manufacturers assist Shuttlesound in making drawings of their equipment available, ShuttleCAD could become the de facto standard package for sound system contracting. Highly recommended.

UK Office:
ShuttleCAD
4 The Willows Centre
Willow Lane
Micham, Surrey CR4 4NX
England
PH : 011-44-81-687-2523
FAX: 011-44-81-646-7084

US Office:
ShuttleCAD N. America
9512 W 93rd Street
Overland Park, KS
66212-4801
PH: 913-894-9499
FAX : 913-492-6226

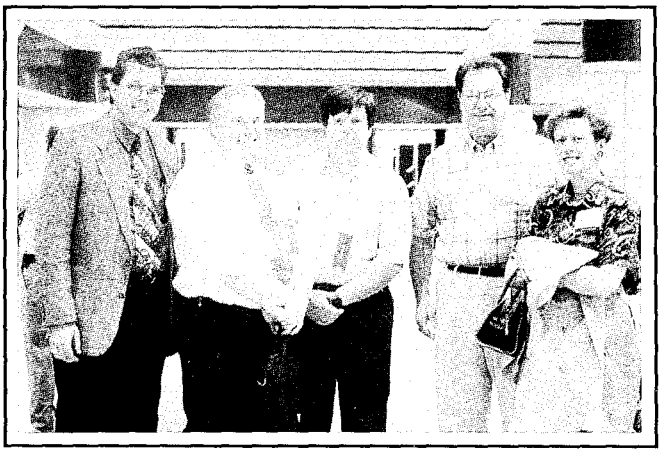
International Language

(Left - Right)—Dr. Feistal, Dr. Ahnert, Don Davis and Farrel Becker

We have always been fascinated by the fact that one mathematical and one musical notation can equally serve all nationalities. So, too, computer programming does the same. The uniqueness of language in building intellect and in programming our brain's processing modes (i.e., which hemisphere is used for what sounds) means that I wouldn't necessarily want a single language.

Shown here is as international a group as you could want, all communicating respect and appreciation for each other's efforts in a common field of endeavor. (NSCA) Drs. Ahnert and Feistal are showing Don and Farrel the latest version of the EASE program. To watch directional dots impinge on the surfaces at the Medora gym in millisecond steps is overawing, to say the least.

Synergy in Action

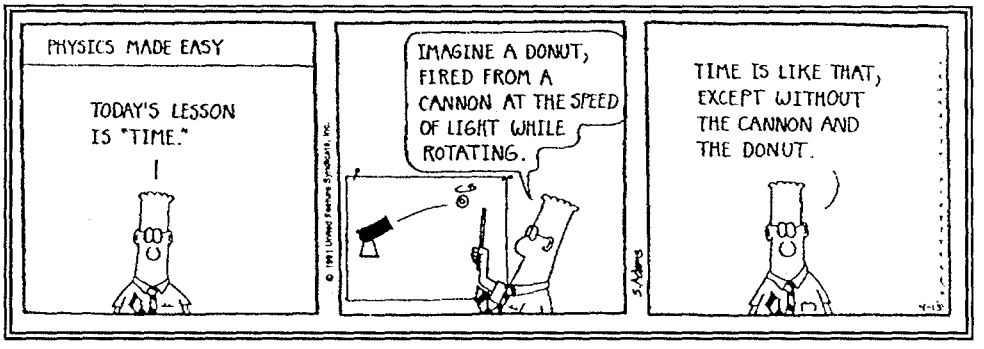


The group in this picture represents leadership in church sound systems. They live in all parts of the south. Though of differing denominations they work together like a well-oiled piece of precision machinery. Very fortunate indeed is the church that receives the benefit of their expertise.

Left to right: Mike Stukey, J. Michael Stukey & Assoc. in Lakeland; Jim Carey of Carey Associates in Nashville; Chris Hinkle, technical director at First Baptist Church in Orlando; Phil Allison with wife, Kathy, of Allison Audio in Fort Worth, TX.

"Gedanken" Experiments

Occasionally we are presented with "thought" experiments. This cartoon expresses our thoughts about "thought" experiments. We thought you'd like to know in case you had ever thought of trying thought experiments.



Pat Brown, Instructor Par Excellence

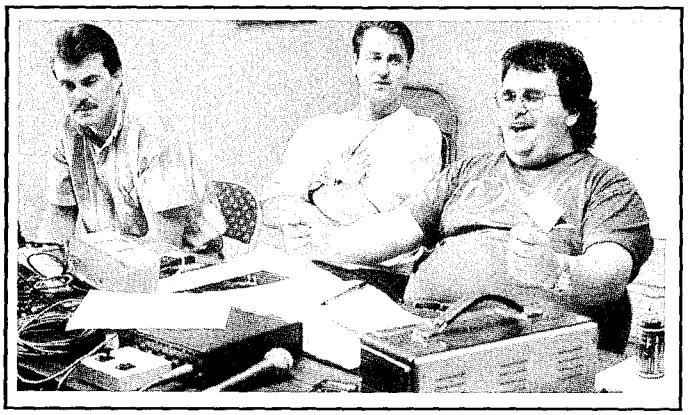
Pat Brown, shown here with Don during the May class, is the Assistant Instructor for May, June and July.

Pat owns Pro Sound Audio Services which is about an hour's drive from the farm (Louisville area). Pat is well qualified, having been involved in a number of Syn-Aud-Con classes, workshops and the revamping of the farm house demos for 1993.

Pat worked with John Royer to design and install the new sound system at the Pepsi Coliseum at the Indianapolis Fairgrounds, and he was part of John's sound crew at this year's Indy 500.

It really has been an outstanding experience to have Pat working with us for three consective classes as it means that he can implement his suggestions in the next class. Since we started our Assistant Instructor program we have been blessed with superb assistant instructors but it has to be frustrating for them to see things that could be improved "next time" and next time may be a year or two away - time to forget what you planned to do.

Our Pal, Buddy



Buddy Ward, shown here telling Poncho his latest story, quickly became an unforgettable and treasured member of the May class. (Don Fillers told Buddy that anytime he had a new story to call him collect!)

Carolyn caught a magic moment when, after Pat Brown had spent the morning going over impedance, polarity, levels, circuit configuration in great detail, Buddy asked, "Can't we just do it the 'natural way' and just see what happens?"

The story Buddy was telling Poncho went like this:

A Kentuckian had just crossed over the river into Indiana when a State trooper stopped him.

"Where are you headed?" the trooper asked.

"Indianapolis." replied the Kentuckian.

"What do you do for a living?" asked the trooper.

"I'm a woodcutter. " said the Kentuckian.

"Well," said the trooper, "I can't let you go to Indianapolis. There's no wood to cut there and you'd end up on welfare."

"Would you tell that to my brother when he comes over?" asked the Kentuckian.

A few minutes later along came the brother and the trooper pulled him over. "Where are you headed?" asked the trooper.

"Indianapolis." said the brother.

"What do you do for a living?" asked the trooper and he heard the reply, "I'm a pilot."

"Oh, " says the trooper, "you can go ahead. They have an airport at Indianapolis and I'm sure you can find a job there."

"Now just a minute," said the first Kentuckian, "you're letting my bother go to Indianapolis and you're not letting me go?"

"Well," replied the trooper, "your bother is a pilot and he'll be able to find a job."

To which the Kentuckian replied, "How's he going to pile it if I don't cut it first?"

Happiness is---

Why are these people so happy? They have just seen the new EASE 2.0. That's Harro Heinz, (r), President of Renkus-Heinz, Mary Gruszka (c) and our computer consultant, Fred Fredericks (l). What they had just witnessed boggles all of our imaginations. Drs. Ahnert and Feistel have generated a computer assisted sound system design program (functioning) beyond the wildest "Vaporware" speculations of anyone in the industry.

The "Movie" feature alone brought spontaneous applause from a consultant-based audience (Renkus-Heinz breakfast meeting for over 60 top U.S. consultants). Watching a dotted wave front emerge from a directional loudspeaker and millisecond by millisecond reflect from early surfaces intact (Medora Gym) finally to begin to scatter on about the third surface was an eye popping visualization of troubles we all had heard but not seen.

Dr. Ahnert's auralization program, EARS, distributed by Renkus-Heinz, is now binaural with custom head transfer functions available (for those willing to travel to Bochum, Germany or compromise transfer functions for those who are not willing to travel).

We are now demonstrating these programs (in part) at our farm classes.

HME System 800 UHF Wireless Intercom at Indy 500

Its axiomatic that "if it ain't broke don't fix it" but experience also tells us that progress does occur in the real world and we should continuously engage in re-evaluating older ideas while re-evaluating new approaches.

John Royer and Tom Allebrandi run the Indianapolis Motor Speedway radio network feeds around the track and have developed good RF techniques for handling the task free from RFI of every conceivable kind (all cars use telemetry, have two way communication, and often use complex technology in the spread spectrum realm).

This year John and Tom tested the new HME Series 800 Wireless Intercom to see if it would serve their future needs.

The System 800 is designed for hands-free full duplex operation, with a range of up to 2,000 feet from belt-pac to belt-pac.

Suspenders and Belts

They did not use it for the broadcasts this year but did test it fully in sound system applications during Time Trials and during the running of the Indy 500. It worked flawlessly and passed all their tests with flying colors.

Tom was ready to use it this year on the broadcast feeds but John is a suspenders and belt kind of person. The approach may hold up "progress" but it can prevent disasters and loss of livelihood.

The pictures illustrate their use of the remotes in the pit areas and the master unit up in the tower where the sound equipment is housed.

Already John is talking to HME about next year and their need for Interrupted FoldBack (IFB) for communications with the pit reporters.

After the race John Royer came down to the farm to tell us about the race and we showed him the press releases we had received from HME.

His confidence before the race would have soared if John had seen the press releases we recently received:

"The new Series 800 Wireless Intercom from HM Electronics was selected by Systems Wireless Ltd., of Herndon, VA to provide a flawless audio link for President Clinton's inauguration festivities.

"Ted Bennett, President of Systems Wireless, Ltd., highly recommended the Series 800, 'The Series 800 should definitely be considered by anyone seriously interested in a true professional application."

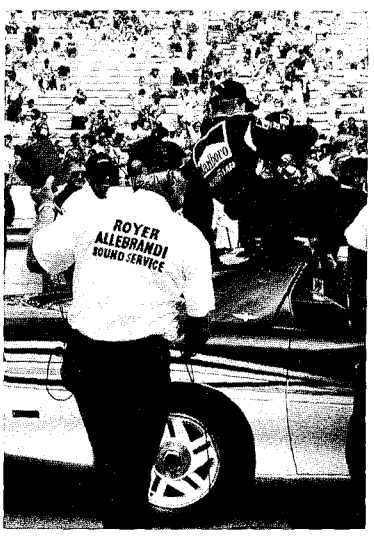
Another press release mentioned that it was used on the Billy Graham World Crusade for one of the largest broadcasts of its kind in the world: 48 countries in 25 different languages. Now HME was talking about someone that I knew who worked on that particular Crusade.

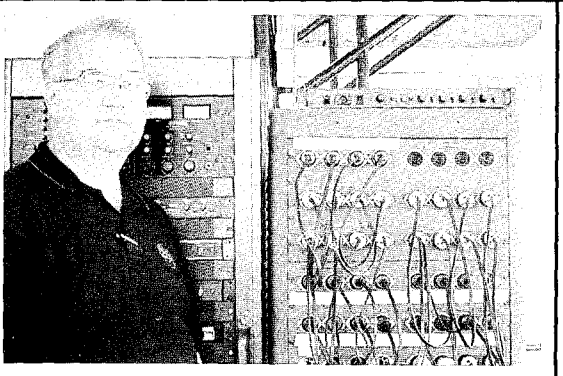
I called Bill Trasher with some trepidation. If he wasn't totally enthusiastic it would cast a doubt over all the enthusiastic releases. Bill said, "The best wireless I have ever used. I have been using the HME 800 Wireless Intercom since March. I'm using a bunch of them now here in Houston for the First Baptist Convention." He couldn't say enough good. I was pleased!

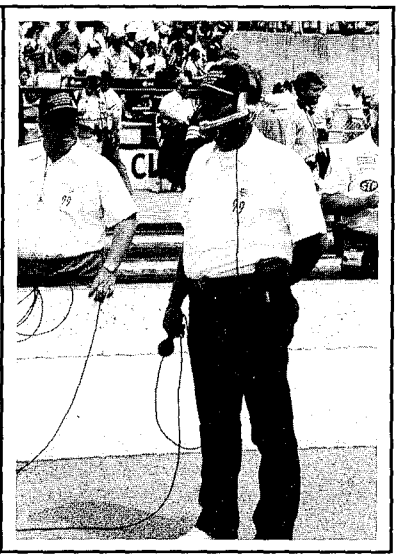
Other press releases told of the System 800 being used very successfully for the 1993 Grammy and the Academy Awards.

HM Electronics

HME has been manufacturing Pro Audio wireless intercoms and wireless microphones for over 20 years - and we have had the good fortune to know Harry Miyahira for most of those 20 years and to witness the incredible growth brought about by his integrity, ingenuity and foresight.







John Royer (center) with the HME Series 800 Wireless Intercom control on top of a rack of equipment in the control tower. Pictures (left and right) show the sound crew using the equipment during race day.

Syn-Aud-Con 1993/94 Seminar & Workshop Schedule

Horns II, Further Work on Signal Alignment & Arrayability

- Further research and experiences by last year's staff on arrayability
- New input and experiences by last year's attendees
- In-depth lectures and demonstrations on alignment methods and crossover selection
- Expanded experimental demonstrations
- Site facility not yet selected
- To be held in early November, 1993

Schedule of Rigging Seminars

Washington, DC Area—Oct. 25-27, 1993
New York Area—Nov. 1-3, 1993
Anaheim, CA—Jan. 17-19, 1994
Orlando, FL—Feb. 14-16, 1994
Las Vegas, NV—April 4-6, 1994
Chicago Area—June 6-8, 1994
Minneapolis (1 day)—July 28, 1994
Specifically for Venue Managers as well as Technical Directors and company administrators
New York Area—Oct. 10-12, 1994
San Francisco, CA—Nov. 6-8, 1994

Arraying Full-Range Speaker Systems

- Lectures on working parameters, limitations, and practical considerations
- Array measurement techniques and difficulties will be discussed
- Demonstrations and lectures on acceptable versus unacceptable interference comb filtering
- In-depth discussions on crossover-filter slopes and driver alignment
- Driver protection methods and considerations will also be covered
- Final staff not yet selected
- Site facility not yet selected
- To be held in the summer of 1994

❖ 3—Day Seminars—$550
Farm—Norman, IN

Sound Engineering Seminars

September 16-18 October 14-16

Thirty 30 Years Ago

Nearly thirty years ago I wrote in "Acoustical Tests and Measurements" (1964) page 12.

"Here is a good place to stress that nothing can be done with a sound system to change a room condition: it can make the room neither quieter nor less reverberant. A system must be tailored to fit a room, not to change a room."

Just for Life

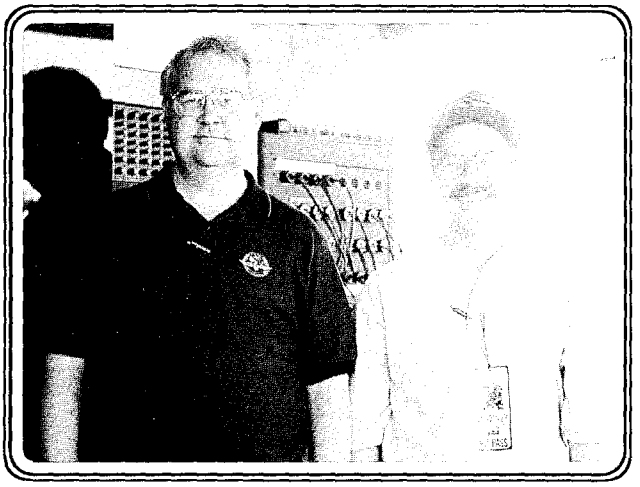
Michael Murphy knows how to make the most out of life. He came to the farm class in May from Las Vegas, did very well in the class, took the day after class to explore French Lick, IN, and therein lies one of two tales we have to tell.

Michael, also known as Murf, loves sports, especially basketball. He admires Larry Bird and has read his autobiography, **Drive,** so he took advantage of being in Larry Bird territory to go to French Lick, Bird's home town.

As Murf drove into town, he stopped at the Dairy Queen for a break. A voice behind him said, "Hi Murf." Naturally he was startled. He looked around and there was Buddy Ward, his classmate at the May farm class which had concluded just the day before. Buddy was in French Lick with his crew to install a sound system in the high school gym that Larry Bird attended. Murf went with them and spent a couple of hours looking over the Larry Bird memorabelia in the gym. Buddy asked Murf if he would like to see where Lary Bird lived. A map to Bird's home was quickly drawn. Soon Murf was driving by Bird's fenced-in estate. To complete his day, Larry Bird was pushing a mower near the road. Murf didn't stop or stare as he knew from Bird's autobiography that he doesn't appreciate uninvited intrusions.

The next day Murf met us for an early lunch at the Speedway restaurant and then on to the track to meet with Pat Brown and John Royer. Note the pass on Murf's shirt. John saw to it that he got to see the garages, pits, tower and all the inner workings of the Indianapolis 500.

I (Don) saw my first 500 race in 1941. Floyd Davis and Mauri Rose were co-winners. The legendary Rex Mays was second and the man I felt as a boy was the greatest driver of that period, who took third, was Ted Horn. This year's race was the 77th.



John Royer with Murf Murphy in the Tower at Indy

Renkus-Heinz Starts Training Classes for EASE

Ron Sauro, representing Renkus-Heinz, found his computer demo area filled during the NSCA, thanks to the latest version of EASE. When you see EASE 2.0, you will want to join the crowd.

It is a sign of the times. Manufacturers, consultants, sound contractors and end-users are recognizing that the audio industry is no longer a simple "plug it in and see what happens" business. We have to be trained.

Renkus-Heinz has just announced that they will hold 3-day seminars on EASE. Ron Sauro works many hours a day with EASE and EARS. He has discovered that the program has an incredible amount of undocumented features. That is one of the goals of the seminars, as well as the important aspect of being sure that EASE users are realizing the full potential of the documented features of the program.

The training sessions will be held on the 1st Wednesday-Friday of the month. The cost is $75 for the three days and they have arranged hotel rates of $42/night including full breakfast and shuttle from the airport. R-H will arrange transportation from hotel to their factory in Irvine (hotel is 3/4 mile from factory).

You can contact Ron Sauro at R-H: PH 714-250-0166, Fax 714-250-1035.

Rigging Seminars 1993/94

As those who have been reading the Newsletters know, we took on the "organization and promotion" of the Rigging Seminars because we heard Harry Donovan's talk at the last JBL conference. Subsequently we hired Mr. Donovan to evaluate an existing sound system in Indianapolis.

We were impressed and worried, worried that sound contractors are being held responsible for hanging multi-ton sound systems in which they don't really have full knowledge of the safety factors of the existing structure as well as the rigging hardware.

After a few discussions with Harry Donovan, we agreed to "organize and promote" seminars for him. This meant that he had a manual to write and a lot of preparation to go through to bring off a successful seminar. And, we had a lot of work creating promotional material and mailing lists.

We were successful because there obviously was a serious need for what we were offering. We had long waiting lists for the two seminars scheduled: Atlanta and Anaheim in March. We started out determined to hold the class to 30. When we got to Atlanta, we saw that we could seat 36 in 4 rows of 9 as easily as 30. We called people on the wait list and filled the class to 36.

The Anaheim class had a wait list over 40 and we scheduled a second class in May, ending with a wait list for it.

We're proud to be associated with the Rigging Seminars. Harry Donovan is a man of enormous integrity and knowledge. The class responds to him with respect and gratitude for what he and his teaching staff are teaching.

RIGGING SEMINAR

May, 1993

Conducted by

Dr. Randy Davidson
Harry Donovan
&
Jay Glerum

Schedule Of Events — Day 1

Time:	*Instructor:*	*Topic:*
8:30 am	R.D.	Overview of the day's events
8:35 am	R.D.	Safety, Liability, and Inspections
9:45 am	Attendees	Q & A
10:00 am		Morning break
10:15 am	R.D.	OSHA, Proof Testing, Links, Synthetics, Safety Belts, Tools
12:00 am	Attendees	Q & A
12:15		Lunch
1:15 pm	H.D.	Dangers, Safety, Arena Rigging, Slings, Fittings, Strength Loss Factors.
3:15 pm		Afternoon break
3:30 pm	H.D.	Load Increase Factors, Shock Loads, Vectors
5:30 pm		End of Day 1's workshop
7:00 PM	H.D.	Algebra Review (Optional)

There is a lot of problem solving in the class. Those in the class that finish first help those who have questions: it is a very warm family atmosphere. In the class picture Dr. Davidson is in the front row, 3rd from left, and Harry Donovan is 4th from left.

Class Diversity

The class is very diverse but with one thing in common - a desire to know about rigging safety. The diversity made the class interesting: theater and auditorium managers, technical directors of performing arts centers, professional riggers, sound contractors, loudspeaker manufacturers, and so on.

1993/94 Schedule

Mr. Donovan and his staff will hold eight seminars in 1993 and 1994, starting with a seminar in the D.C. area, October 25-27, 1993, followed by New

York area on November 1-3. The one-day seminar in Minneapolis, July 29, 1994, is the day before the IAAM convention and specifically planned for venue managers, technical directors and administrators.

If you are interested, please be in touch with us.

ARENA RIGGING MANUAL

MAY, 1993

CONTENTS

Arpil 19, 1993

Mr. Harry Donovan
Donovan Rigging Inc.
2416 Third Ave. W.
Seattle, WA 98119

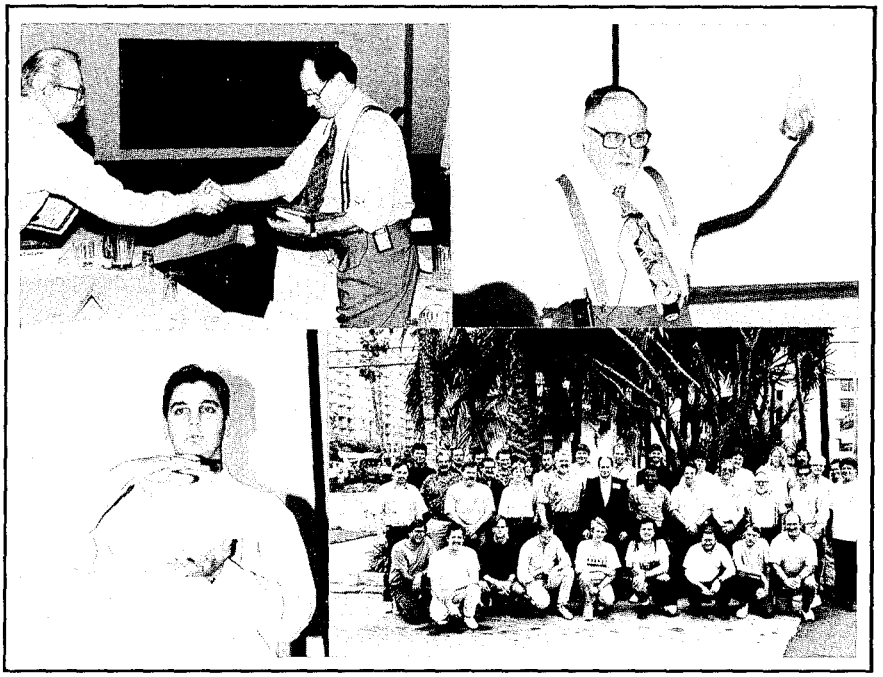
Mr. Donovan:

I would like to thank you for your substantial contribution to my rigging education. I refer to the recent Rigging Seminar in Anaheim, CA. As a Lighting Designer and Technical Director, my rigging knowledge was and is woeful. Now I am at least aware of the blank pages in my education. I attribute this lack of education to the current method of "Arts Education". I realize now that it's probably best to learn how to use a tool before learning how to create art with that tool, whether a paintbrush, welding torch or rigging system.

In addition, I thank you for requiring the working of math problems. As a student, I terminated my mathematics education after high school Algebra. This because of poor grades in that subject and an inability to understand it's application to my life in the Arts. Suffice it to say, I was pleasantly surprised to find that I retained more of my high school algebra than I ever suspected, and that I could work the problems without the depression algebra once caused a 17 year old acting student.

In closing, please let me thank you again for an exciting and revealing three days.

Gary A. Mintz
Technical Director
Lancaster Performing Arts Center
Lancaster, CA



Schedule of Rigging Seminars

Washington, DC area—Oct. 25-27, 1993

New York area—Nov. 1-3, 1993

Anaheim, CA—Jan. 17-19, 1994

Orlando, FL—Feb. 14-16, 1994

Las Vegas, NV—April 4-6, 1994

Chicago, IL—June 6-8, 1994

Minneapolis (1 day)—July 28, 1994
Specifically for Venue managers as well as Technical Directors and company administrators

New York area—Oct. 10-12, 1994

San Francisco, CA—Nov. 6-8, 1994

May Anaheim class; Mr. Donovan passing out certificates; Dr. Davidson (often called Dr. Doom) scaring the wits out of the class with his discussion of liability. (For instance: any employee is legally required to report an unsafe condition, and when you modify "anything," you are now legally responsible.) That's Andy Martin of ATM rigging helping Mr. Donovan with the evening session on permanent installations. Andy took the pictures of the May Anaheim class, as well as being our eyes and ears. We attended the first Rigging Seminar in Atlanta but as a rule we will not be present at the Rigging Seminars.

"If I Have Seen Further, it is By Standing on the Shoulders of Giants." Isaac Newton in 1675

Reading about the Electrical and Electronic pioneers I find Southey's poem, paraphrased, a fitting opening statement:

"My thoughts are with the pioneers;
With them I live in long passed years,
Their virtues love, their faults correct,
Partake their hopes and fears; and
from their lessons seek and find
instructions with a humble mind."

A visitor to my office, looking at the couple thousand books lining the walls, asked, "Have you read all of them?" My answer was, "Yes, of course. That doesn't mean I've understood all of them, but I certainly read what I buy or am given." All of us have had the experience, I am sure, of picking up, as an adult, a book we have read as a young person and thanks to thousands of experiences between the readings, found it an entirely different book.

I understand that some poor souls use books decoratively, but not me. Books are to be read, referred to, cross-checked with other books and with life. Theory is fine, but fact is final.

Readers of these Newsletters know how often we have rediscovered together that "the ancients are stealing our inventions."

As I write this, it is a cold May day, and I have been deep into the 1800s with Kennelly, Pupin, Steinmetz, Westinghouse, Heaviside, Kelvin and the like. Just 100 years ago was the age of magic in communications.

The first engineering societies (AIEE) were forming and men sat in awe of the leaders building the foundations of a new civilization of worldwide communications. It was one of the transition times between inventor-entrepreneurs and scientists and managers.

All fledgling industries go through this and in the process often confuse the men who caused the effects with the men who profited from them. A historical perspective truly helps understand much about where real progress comes from and why it is always first individual and only later manageable. The great lie today is that there is a collective intelligence. History and experience teaches the opposite.

"The Recollections of Eugene P. Wigner"

There is a new autobiography on Eugene P. Wigner entitled, "The Recollections of Eugene P. Wigner," written by Andrew Szanon from 30 recorded interviews with Wigner.

In this book, Wigner tells of the four Hungarians - Von Neumann, Leo Szilard, Edward Teller, and himself bound together by their common origin and education based on the high cultural level of the Jewish upper middle class of those days. They survived the terrible years of Communism, Fascism, and anti-Semitism in Hungry and Germany, where all four went for higher education.

These four men made the atom bomb a possibility. Imagine what would have happened if Germany had cultivated them instead of castigating them. (Wigner and Teller are alive and very much with us.)

Of special interest to me is Wigner's discussion of the limitations of present day physics in explaining biological and psychological phenomena, in particular, the elusive concept of consciousness.

"Consciousness is beautifully complex. It has never been properly described, certainly not by physics or mathematics. It is shrouded in mysteries. And what I know of philosophy and psychology suggests that these disciplines have never properly defined consciousness either."

"Why are physics and the natural sciences kept separate? Why have we divided the world into physics and psychology, the physics describing external nature and psychology the mind's inner workings? Why not unite these two worlds in a science that addresses the meaning of emotion and memory?"

"Physics pretended to describe the workings of all the world: every property, every behavior. But the two most basic theories in physics, quantum mechanics and relativity theory, had never been truly united. I admire profoundly the practical success of Quantum mechanics. But I felt that its reliance on inaminate objects was a major blemish."

Plenum Press, New York, 334 pages, ISBN 0-306-44326-0 $24.50.

The Theory and Design of Loudspeaker Enclosures - J. E. Benson

"One of my most prized possessions. . . .I highly recommend it."
D. B. (Don) Keele, Jr.

The most complete detailed, and rigorously correct text on the design of loudspeaker enclosures was written by the late Dr. J. E. Benson, Australia. Dr. Benson was Richard Small's teacher. The Theile-Small technique is a simplified analog version of Dr. Benson's much more complete version for use with digital computers.

Paul W. Klipsch, Robert Ashley, Dr. Theile, Dr. Benson and Dr. Richard Small (photo in 1970s)

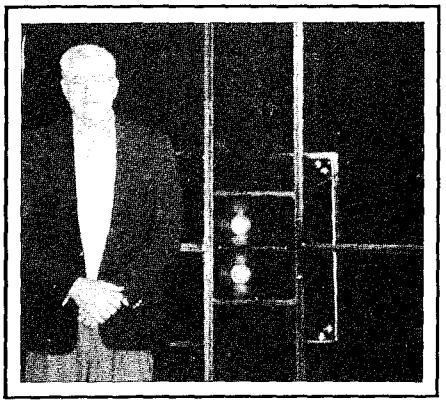
We have legal permission to offer these papers as a book. If we can collect 300 interested purchasers at $24.95 per copy, we will go ahead with the publication of this 350+ page book.

Dr. Benson wrote us before he past away that "Dick Small's work was done with an analog simulator whereas all my results were obtained by digital computation from theoretically derived equations."

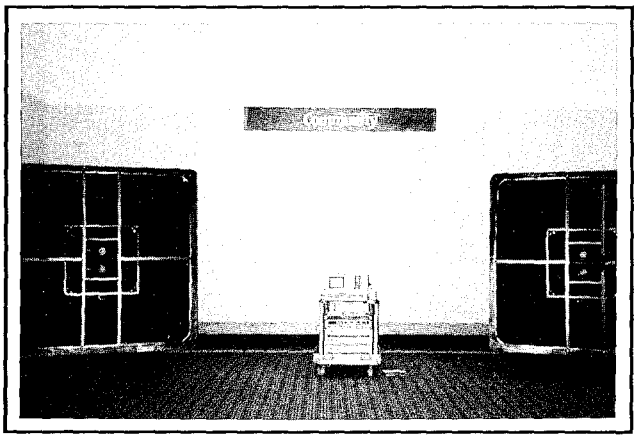
It is Syn-Aud-Con's opinion that these papers are the most valuable material ever written on this subject. If you are interested, please fill out the accompanying form.

There are Cone Men & There are Horn Men

There are men in this world who don't like to compromise. Men who cajole someone into selling them an F-16 so they can commute faster or who think anything smaller than a Weatherby 460 is a small game rifle. In audio such men are naturally attracted to horns. Shown here is yours truly in front of one of a stereo pair.



Built into a home at the construction site with wide screen projection video, movies become feelies. (I'm sure Bruce Howze had very large scale sound systems in mind. In fact, the first showing at NSCA was outdoors at Universal Studios.)



It would be difficult not to feel a genuine affection for men who conceive and build their dreams.

T. E. Lawrence wrote, "All men dream: but not equally. Those who dream by night in the dusty recesses of their minds wake in the day to find it was vanity; but the dreamers of the day are dangerous men, for they may act their dream with open eyes, to make is possible."

Our congratulations and admiration to Bruce Howze for his ingenuity and creativity. Do they sound good? They sound great!

Incompetence Multiplied - One Consultant's Opinion

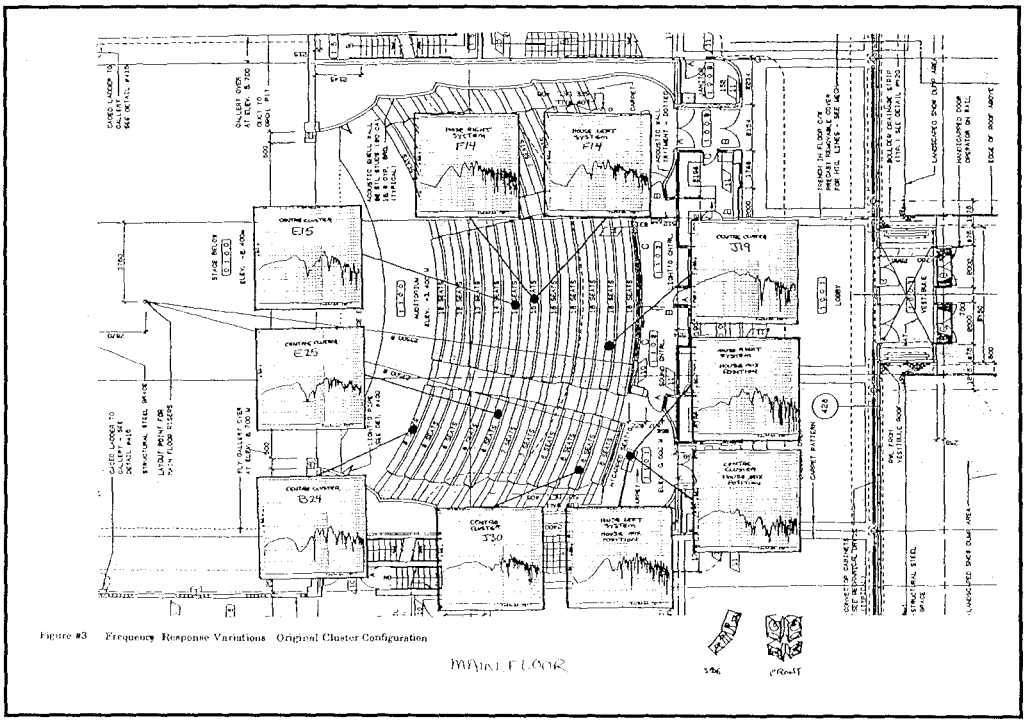


Figure #3 Frequency Response Variations Original Cluster Configuration

Paul Klipsch once remarked "a bad movie in 3D is three times as bad."

Arrays of packaged systems surely fall into that general category, especially when you start with a package that is already corrupt itself.

From Barry McKinnon

Barry McKinnon is with a consulting firm in Vancouver: Barron, Kennedy Lyzun & Associates. We are reproducing a portion of a letter he recently sent us on the subject of arraying packaged boxes. (The sound system described here was not designed by Barry nor his firm. They were hired to "fix the problem.")

"The data I've included here is the prime reason why I don't believe packaged box systems are the answer where more than a single device is needed for vertical coverage. The TEF measurements shown here are 100 Hz to 10 kHz with 100 Hz resolution. I've sent along Figures #3 & 4 which show the system as it was configured when we began the measurements (there's a little cluster sketch in the lower right). The balcony and the house mix position are especially amusing. Figures #10 and 11 show the measurements after flipping the bottom speakers over (the speaker frame was rigid and would not allow any other changes). There was enough variation that I considered offering the client a shot of every seat and they could sell tickets based on the quality of sound.

"I used the Renkus-Heinz ALS computer program to show why having four 12" speakers so far apart was a poor idea. There's also a measurement showing the

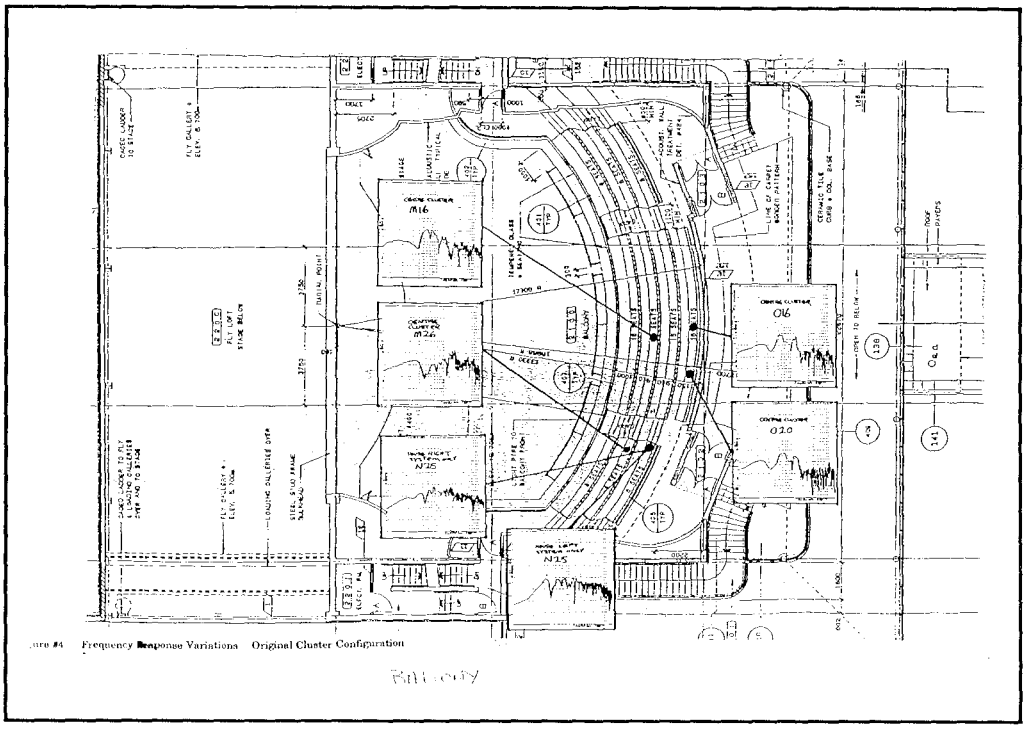


Figure #4 Frequency Response Variations Original Cluster Configuration

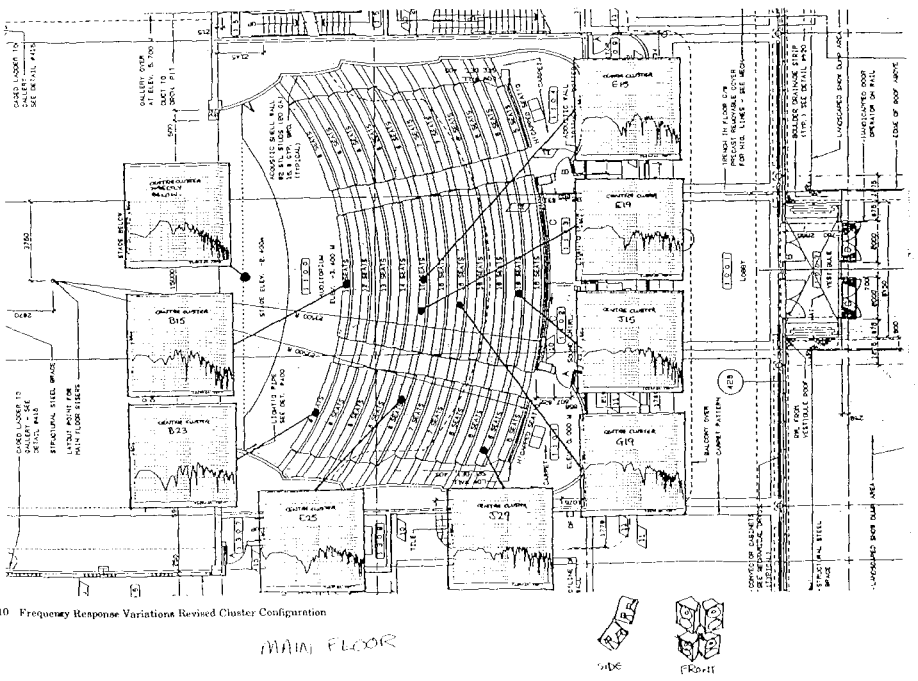


Figure #10 Frequency Response Variations Revised Cluster Configuration

to get better performance out of components if they were being handled by competent people. I will say that most box systems produce OK sound in many applications, but only OK when compared to the same money spent on components and good design."

Workshop in the Planning Stage

We are planning a workshop now that will address the problem of arraying packaged systems. Cliff Henricksen and Don Keele will be on the staff. I suspect we will have a consultant on the staff also. The workshop is scheduled for 1994.

response changes with each additional 12" in the cluster. I need not point out that there was no house equalization possible with this loudspeaker system. See Figures 7 & 8.

"Every time I see a design that calls for little package systems in speech reinforcement applications I shudder. Even well designed boxes can't get around this law of physics, the drivers get spread too far vertically. Theatres and churches keep showing up with little boxes where a well done horn and box system could do a far better job.

"I know that this sounds like the same old horn hangers versus box guys feud, but I've always felt that it was possible

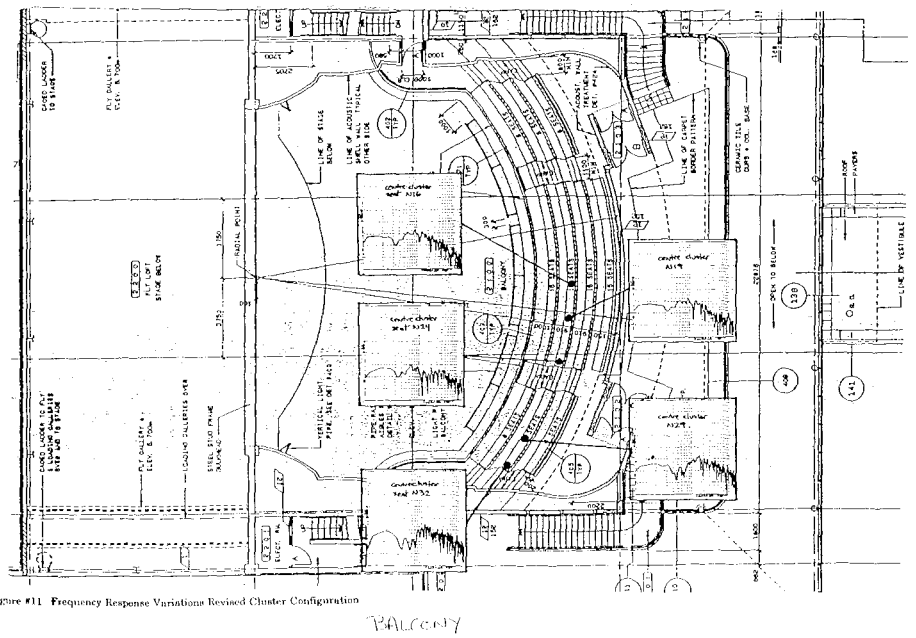


Figure #11 Frequency Response Variations Revised Cluster Configuration

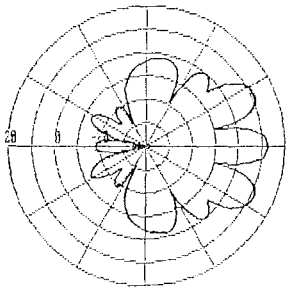


Figure #7 Predicted Horizontal Sound Field 1000Hz

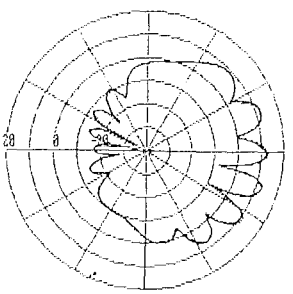


Figure #8 Predicted Vertical Sound Field 1000Hz

Galaxy Audio
A Press Release of Substance

Galaxy Audio, 625 E Pawnee, Wichita, KS 67211 Ph 1-800-369-7768, makers of the Hot Spot personal monitor has just done what we wish every loudspeaker company without extensive testing facilities would do, namely have someone competent do it for them. Good news from a manufacturer of useful products:

Polar Plots to Become Available

During the past few months L. J. Shank & Associates of South Bend, Indiana have measured the sensitivity and the half sphere polar response, on 5 degree centers, for all of the HOT SPOT and PRO SPOT loudspeaker. The performance data is now available for the Renkus-Heinz EASE program and the Bose Modeler Program. The EASE data is included, from Renkus-Heinz when you purchase a new version of their program or require an update. Data for the Bose Modeler V4.1 program is available, to registered owners, free of charge, on disk from Galaxy Audio. They will release data for the JBL CADP2 program as soon as conversions become available.

Executives We Admire

We are privileged to know Don Eger, shown here with his wife, Sylvia and children, Tim and Heather. Over the years he has matured into a key executive at Crown. (We met Don in 1979.)

Don's talents range from being one of the late Dick Heyser's closest friends to skillful guidance of multimillion dollar projects. When they coined the words "Christian family," they had to have the Egers in mind.

The whole family is skilled, qualified shooters and we enjoy sharing the range with them. One of our earliest experiences in shooting with them was about 1982 when Sylvia took her turn at firing the Weatherby 460 - over the protests

of Carolyn who was sure she would land flat on her back from the kick of the 460. Instead she outshot most of the men and hit a bullseye!

TOA is Listening

When the Manager of Engineered Systems at TOA, USA calls and says that he would like an hour of our time at NSCA to "discuss" a new product, you think, Wow, an hour of my time at a busy show? Why an hour?

It was surprising how quickly that hour went and how enjoyable and worthwhile it was.

John Murray brought together groups of 4-5 consultants and leading sound contractors all during the 3-day NSCA. He had, on hand, top people from TOA Corporation, Japan to LISTEN to the input from top people in the industry.

It was totally surprising to me the number of useful and innovative ideas that were contributed by the group we were with. And it was interesting the number of times that the engineers from Japan would question why there was the need for the suggested item, which told me that such interfaces were vital.

Mr. Nakazawa and Mr. Nakamura took pages of notes. It will be interesting to see how many of the suggestions will reach the marketplace.

John Murray (seated at the computer) and going left to right, Naoki Fukumoto for TOA, U.S.A., Satoshi Nakazawa, Manager, Pro-Sound R&D Division in Japan, Syoji Nakamura also of the Pro-Sound Division and Yoshi Urashima of the International Marketing Division.

Brainless Cellular Exposure

Much to our surprise there has been an IEEE standard C951-1991 purposed for limits on exposure to electromagnetic fields. It is reproduced here. This standard is still under review but is due to be finalized in August of this year.

The "specific absorption rate" SAR limit is 0.08 W/kg for the average SAR over a person's entire body, and 1.6 W/kg for peak SAR delivered to any one gram of tissue for 30 minutes or more. The maximum allowable power density is 0.57 mW/cm^2 for whole body exposure.

Defining Terms

Incident Power Density

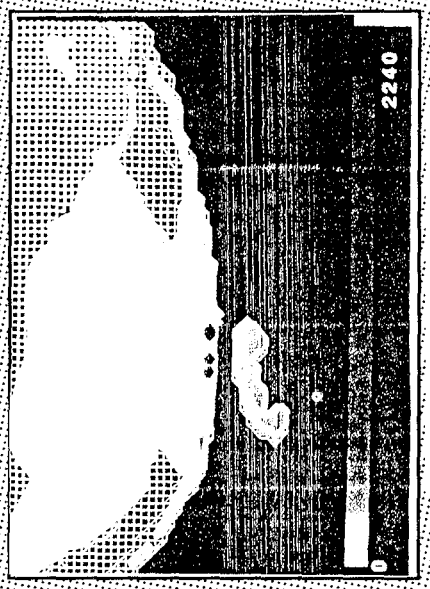
The power density of radiation incident on a square centimeter of a person's skin.

Specific Absorption Rate (SAR)

The rate at which human tissue absorbs microwave energy per unit of weight.

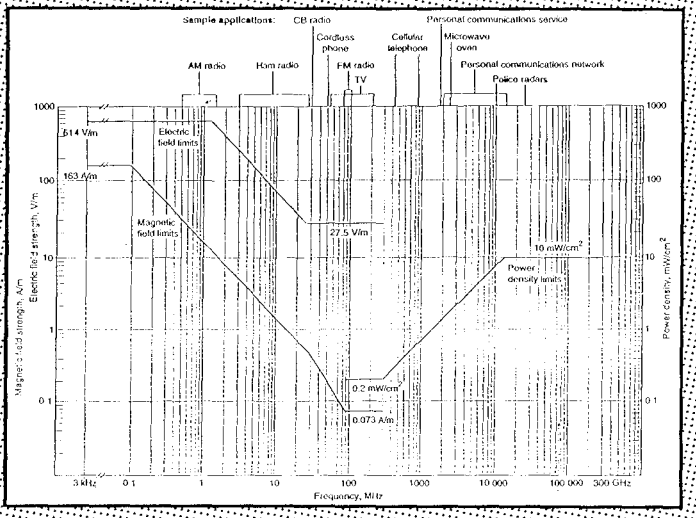
It is known that exposure to more than 100 W/kg delivered continuously for more than 100 minutes would cause enough heating to initiate cataract formation. The worst case exposure from cellular phones is a person's head 9 cm (roughly 8.5") from a 3.5 W car antenna which comes out as less than 0.8 W/kg or about one half the exposure of 1.6 W/kg limit of C95.1.

Our personal conclusion is, don't stick your antenna in your eye while talking on the cellular phone.



This magnetic resonant imaging scan (left) shows RF energy in the head of a test subject holding a cellular phone operating at 835 MHz and 1 W of power. Made in April by Om Gandhi at the University of Utah, the image shows a horizontal slice of the temple region, with the grid (one square is 2 mm on a side) outlining the head and ear. Representing the antenna is the small red dot, while the hot red spots on the skin behind the ear cartilage represent the maximum absorption rate: 2.24 W/kg. The color scale is logarithmic, with the orange and yellow regions absorbing well under 0.05 W/kg, and the blue and white regions absorbing even less. Gandhi calculated the corresponding peak value at the 0.6-W cellular phone level would be 1.34 W/kg, lower than the IEEE's upper safety limit of 1.6 W/kg.

The IEEE Standard C95.1-1991 sets safety limits for human exposure to RF electromagnetic fields, shown at right for an uncontrolled environment (that of the general public). At frequencies higher than 100 MHz, limits are described in terms of the power density of the electro-magnetic field emitted by various products, such as the antenna of a cellular phone or the door of a microwave oven. At frequencies below 100 MHz, electric and magnetic fields interact with the body in distinctly different ways, and hence are given their own thresholds. In the transition zone, either can be used, depending on the type of equipment involved.



Reproduced from June issue of IEEE Spectrum, *Cellular Phone Scare* by Mark Tischetti.

Noise Exposure Limits

A recent call reminded me that we had not included a Table of Noise Exposure limits in the 2nd edition of Sound System Engineering.

While not in sympathy with federal regulation of noise, primarily because of draconian enforcement at the beginning, we do feel that Syn-Aud-Con grads should be aware of the existence of the Table. See Figure 1.

The problem "of what noise annoys an oyster" is more complex than a simple number and the chart shown in Figure 2 results in a subjective response evaluation.

The Walsh-Healey exposure limits, as incorporated in OSHA, are given in Table 9-2. The exposures given

Table 9-2. Noise Exposure Limits

Band	Noise Level (dBA)	Maximum Exposure (Hours)
	Under 90	Unlimited
A	90 to 92	6
B	92 to 95	4
C	95 to 97	3
D	97 to 100	2
E	100 to 102	1.5
F	102 to 105	1
G	105 to 110	0.5
H	110 to 115	0.25
	Above 115	None

are those permissible for a normal 8-hour working day. When the noise consists of differing levels throughout the day, the combined effect is considered as follows:

$$C_T = (C_A/6 + C_B/4 + C_C/3 + C_D/2 + C_E/1.5 + C_F/1 + C_G/0.5 + C_H/0.25) \times 100 \qquad (9\text{-}1)$$

where,

C_T is the total cumulative noise exposure (level/time) expressed as a percent (100% is the maximum allowed),

C_A, C_B, etc., are the total times the noise level is in band A, B, etc.

Figure 1

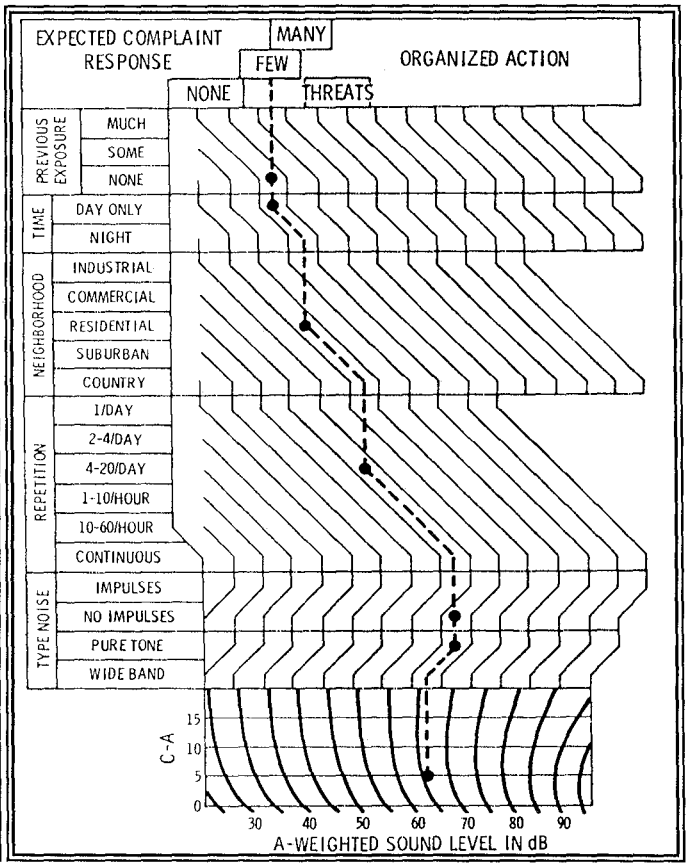


Figure 2

Woofers

We now have four "woofers" (three shown here.) They are, left to right, Wade, Patch and Roe. (Pedro was out hunting). The cat population is now three - Pete, Tilly and Rascal -Francine has gone on to the land of perpetual tasty prey.

Patch, our German Shepherdess, is our model citizen. Roe and Wade don't know what they want to be when they grow up, but since they're still growing we plan for them to be obedient large dogs. Like children, the struggle for dominance is on, but a new electric collar should give us the upper hand (parents take note).

When Circuits Need Termination

There are:

1. Matched circuits. (A truly matched circuit is matched impedance and conjungate phase)
2. Unmatched circuits
   A. Appropriately mismatched
   B. Inappropriately mismatched

Most components used in audio systems today are connected in an appropriate impedance mismatch (i.e., low Z sources to higher Z loads).

Matched Circuits

Matched circuits are occasionally still required. Passive crossovers, passive equalizers, and certain active devices are examples of units requiring an impedance matched to the input and output.

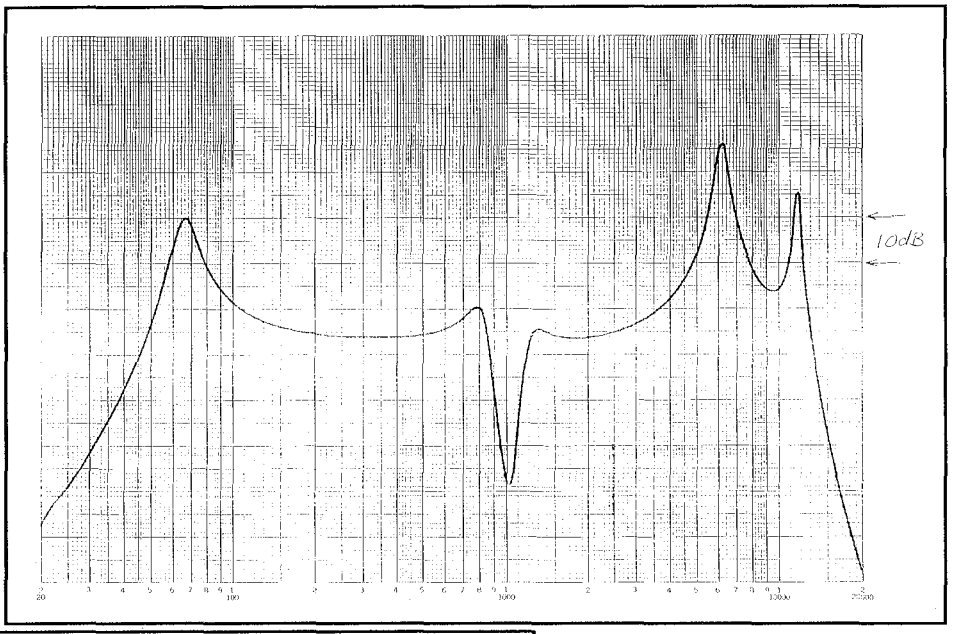


Figure 1, Curve #1, is of a passive filter set with both the high pass and low pass filters activated and with correct input and output impedance matches.

Curve #2 shows the same device terminated at the output but connected to a too low source impedance. Curve #3 shows what happens when both the input and the output are mismatched.

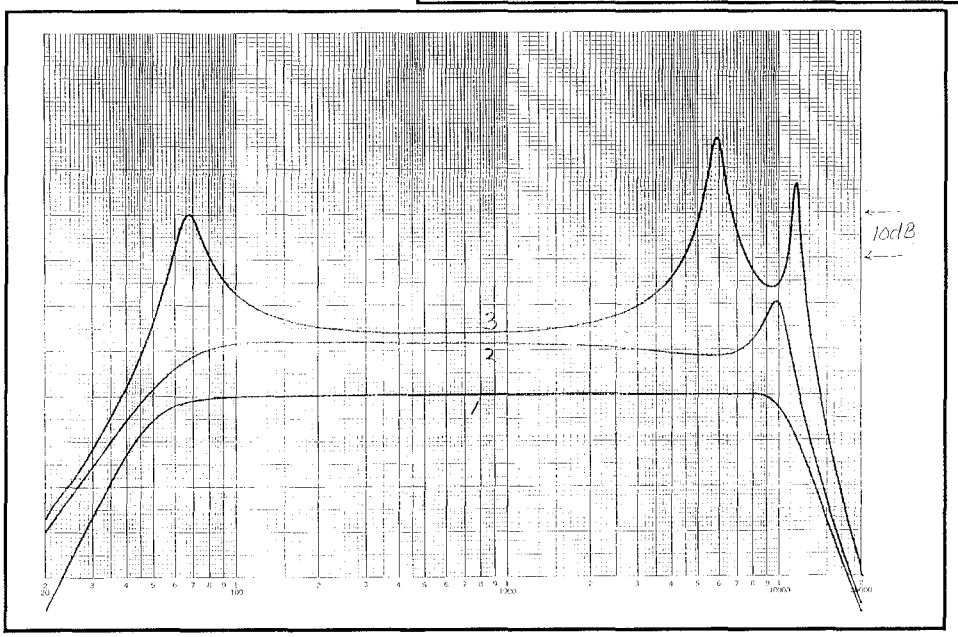


Figure 2 shows the same device with one notch filter added to the high pass, low pass combination and with all three mismatched.

In using a component new to you be sure to check the instructions regarding what impedances are present at the input and output of the device and what impedances are appropriate as sources and loads to the device.

Audio/Acoustics "Dream" Sound System Computer Design Program

In June 1991 we invited the presidents or their representatives of several audio companies (and John Prohs) to an all day meeting in Indianapolis to come together to discuss sound system computer design programs.

Those attending were Dave Merrey from Altec, John Wiggins of Community, Don Eger of Crown, Brian Benn of IRP, Gary Hardesty of JBL, Harro Heinz of Renkus-Heinz and John Prohs of PHD.

The results of the meeting were not as we expected but the on-going meetings of representatives of these companies at every AES and NSCA convention has been extremely fruitful: "Standardization of Loudspeaker Databases for CAD Software."

I don't think it is any secret that we felt the interests of the audio community would be best served with one program developed from the input of a group of people - mostly acoustical consultants.

Dave Merrey started the meeting by saying that he wanted "it on the table at the beginning that this would not happen; therefore, let's use this time together to accomplish some very important things that can be implemented." It is ongoing. (Probably you have noticed that we are no longer on this soapbox as we realize that Darwin will make this decision, not corporate management.)

During the meeting John Wiggins asked if we would write a group of consultants asking for their input for an Audio/Acoustics "dream" design program and share the returns with Don Eger, who heads the on-going committee, who would distribute them with others on the committee. We collected a thick file of valuable input for the companies to consider.

I thought it would be worthwhile to share some of the ideas with readers of the Newsletter, thinking that might encourage you to share your input with the program developers and with us. I would like to start with the input from Kurt Graffy of Paoletti Associates in San Francisco.

From Kurt Graffy, Paoletti Assoc.

Please find the desired features for the "dream" design program. Basically, this program would provide in a single package all the design work which now gets spread around between two and three design programs, custom programs, and spreadsheet analysis. Therefore the requirements are for the program to include acoustics, audio, and the ability to generate hard-copy documents of all of these elements. I didn't go easy, I wanted it all!

The Dream Audio Program System

General

1. The program would have a simplified method of entering the room data into the computer. A combination of graphical and numerical entry of data/planes/vertex points would be supported. The method of entering the room into the program must be efficient in order to make the program cost-effective to the user. If room entry takes too long, or is too tedious, then the program becomes much less valuable as a real design tool.

2. The program would be capable of importing AUTOCAD DXF files directly. This would allow the potential use of existing AUTOCAD disks from the project architects.

3. The use of a mouse for drawing and data/menu selection would be incorporated into the program. The mouse would also be used for selecting and moving objects/planes.

4. The system would utilize pull-down menus configured in a similar format to that of AUTOCAD. (A basic group of commands would be available via the pull-down menus, however, a more advanced user could customize these menus for his/her particular needs or usage.) Along with the basic set of pull-down menus, a selection of different menu configurations would be provided so that the non-advanced user could configure the program with the menu set that was most appropriate for his/her use.

5. The loudspeaker data files would be an open data base, comprised of any and all manufacturer's devices, as well as to allow users to add loudspeakers on their own (using manufacturer's measured data or their own). Although single quadrant symmetry could be utilized if desired, the data files would also allow entry of non-symmetrical quadrant devices.

6. An Appendix in the manual should provide information on all of the equations and algorithms used by the program for its acoustical and electroacoustical calculation, including RT, ray-tracing, loudspeaker energy summation, multiple driver phasor effects, intelligibility predictions, etc.

Acoustics

1. Reverberation time, ray-tracing, modal distribution, energy-directional data, energy-ratios, and auralization would be available features.

2. Reverberation times could be entered directly into the program, to allow measured data to be used for calculations, as well as calculated from the room model and the associated surface absorption coefficients.

3. Sabine and Fitzroy's versions of the reverberation time equation would be supported. Non-uniform or single-surface treatments of absorption would bring up a message to warn the user that the Sabine equation may not be accurate, and the use of the Fitzroy equation may be indicated.

4. A database of materials and absorption coefficients will be part of the program. This database will be open to allow the user to import and enter data from other sources. In fact, one of the data fields will allow the user to list the source of the absorption coefficient data (the database supplied with the program will have already listed the sources for each of its material's coefficients). modeling

5. A "target" set of octave-band reverberation times will be able to be entered, and the room model calculated (or real-world measured) RT times compared against the "target" values. The program would then indicate (for each octave band) the calculated (or measured) RT time/number of sabins versus the "target" RT time/number of sabins and list the number of excess or deficient sabins for each octave band relative to the "target" values.

6. The "target" set of RT times should be able to be entered directly as octave band times, or expressed as ratios to a nominal 500 Hz pivot frequency (to allow easy "target" values determined from existing literature, much of which indicated desirable RT times at 500 Hz, and ratios the other octave band times against the 500 Hz time).

7. The graph of RT times should allow graphing multiple RT values within a single graph, to allow indication of the impact of various audience sizes, proposed and/or alternative room treatments, etc.,

upon the RT time. An option at time of printing would allow plotting a greyed or dashed area as the desirable range of reverberation times for a particular project, against which the measured or calculated RT values can be referenced.

8. The ray tracing or image modeling method of deriving time/energy data should take into account the directivity of the sound source and the absorptive characteristics of the surfaces encountered on the route from the source to the receive point (this will be important for auralization use).

9. A "library" of potential sound sources should be available, which include the sound power level and directivity of the devices, including the human voice and various orchestral instruments/sections.

10. The ray tracing or image modeling method of deriving time/energy data should allow the user to designate specific surfaces/planes, which in actuality will be seating, and diffusive/absorptive rather than reflective.

11. The time/energy data should be able to be "stepped through" reflection by reflection, with the appropriate "rays" and surfaces being highlighted to indicate the path and surfaces encountered during the transit path from source to receiver.

12. The ray tracing or image modeling method of deriving time/energy data should provide the ability to indicate median/lateral/horizontal positioning of energy arrivals (and relative magnitude as well) at the receiver's location.

13. The ray tracing or image modeling method of deriving time/energy data should provide the ability to generate early/late energy ratios, with an adjustable "cut-off" of # of reflections and/or time which is included as the "infinite" portion of the equations.

14. The ray tracing or image modeling method of deriving time/energy data should provide the ability to indicate interaural cross-correlation (IACC) as well as lateral energy coefficient predictions at the specified listener positions.

15. The program should allow the entry of octave band data into a section of the program which would plot this data against the NC curves to indicate measured NC levels (keeping the same format for presentation of all acoustical data).

16. The program should provide the ability to port time/energy data to a data file which could be used by Hypersignal to auralize the room time/energy signature by convolving the time/energy data with anechoic music/speech source material. Ideally the ability to generate a binaural datafile would be possible. An optional selection would provide the calculated "reverberant tail" to the early reflection data, and provide a more realistic sound to the auralization for client listening.

Audio Systems

1. As mentioned in the General category, the loudspeaker datafile should be open to additions of any manufacturer's devices, or the user's measured information on a loudspeaker. Additionally, the program should allow defining the passband of a device at whichever octave bands are appropriate, rather than limiting the devices to the categories of "bass" or "horn" frequencies. This would allow modeling devices such as coaxially mounted midrange/high frequency devices.

2. The program should allow the user to derive 'Q' from measured polar data.

3. The program MUST utilize some kind of isobeam/isobar method of initial aiming of devices, preferably utilizing the -6dB contours for this task.

4. The program should query the user for the desired SPL (and the hoped for headroom) of the system, and automatically adjust the power provided to each device (with a warning when the power required exceeded the capabilities of the device) based upon the desired SPL of the design, the sensitivity and directivity of the device, the distance of throw, and the number of devices.

5. The ability to add the contribution of the reverberant field energy to the direct energy for determining uniformity of coverage/SPL should be available at the user's discretion. The use of "modified" direct plus reverberant data which makes use of the Room Constant to account for the energy lost at the first reflection should also be available for selection.

6. PAG/NAG calculations should be available based upon the parameters of microphone/loudspeaker/listener/talker, which take into account the number of microphones and/or arrangement of loudspeakers.

7. A graph of time-arrivals (direct, direct + reflected, reflected only) should allow the user to normalize or not normalize the first energy arrival as required by the design, and adjust a signal delay device to "pull" the devices into synchronization (via distance and the Haas effect).

8. Predicted interference patterns between devices should be displayed at the user's option, with the ability to provide signal delay to the appropriate devices to "pull" the devices into acoustic alignment. These interference effects should be based upon theoretical sound radiation calculations (Olson/Beranek) of "ideal" sources, since the measured phase response of real world devices may vary significantly from device to device.

9. Once the aiming, power setting, and alignments are completed the program should provide a visual coverage map (by gray scale or, preferable color) of the predicted sound system performance. This coverage map should take into account the directivity of the devices as well as the impact of occluding or shadowing planes, surfaces, and provide three different display formats:

a. Predicted sound pressure level, viewed at octave band frequencies, or as an average of these frequencies.

b. Predicted intelligibility values (at the 2 kHz octave band, or at the user's option, the weighted average of 500 Hz to 4 kHz octave band data) throughout selected areas, listed in %Alcons, with derived STI values as a user option.

c. An inverse coverage map that displayed only the overlap areas of systems which were being covered with too many (or too few) devices.

10. The program should allow the selection of multiple "probe" or listener points, which would display the frequency spectrum versus amplitude, and the intelligibility prediction at these points. The listener or "probe" positions should be able to be "memorized" and available to be called up for hard-copy documentation via the printer.

11. The program should provide the ability to generate mechanical drawings of the loudspeakers, either in a stand-alone routine, or by exporting them to AUTOCAD. The mechanical drawing routine should also allow the user to construct new devices (or custom devices)as required.

Miscellaneous

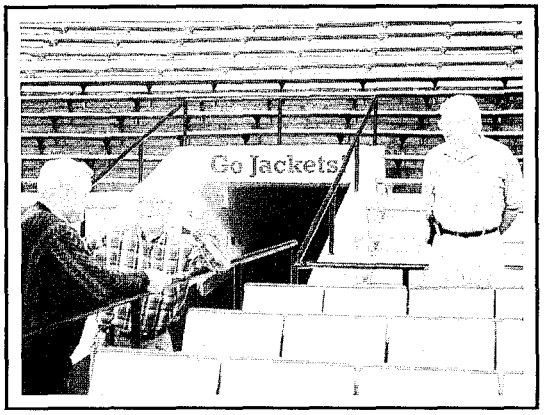
Since this is the "ideal" program, I'm going to include design factors which are currently done by spreadsheet analysis.

1. The program should provide the ability to determine system gain and levels through the various devices. The use of the available input power method of determining the system gain/loss from input to output is preferred. Provisions for the user to load the data base with the name and characteristics of the desired devices is essential.

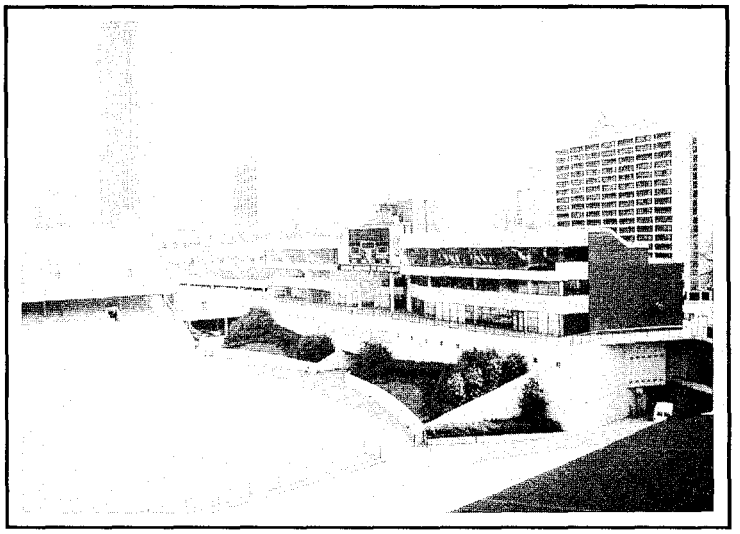
2. The program should provide the ability to calculate the Electrical Power required, as well as the heat load (in BTU's) which the system will generate. Provisions for the user to load the data base with the name and characteristics of the desired devices is essential.

Two Grey Heads

When I was young and following legendary grey heads around, (Klipsch, Hilliard, Art Davis, Dr. Boner, Bill Snow, Jim Noble, Ercel Harrison, Alex Badmaieff, and other giants) I little dreamed that one day I would still be doing it when I was grey headed.

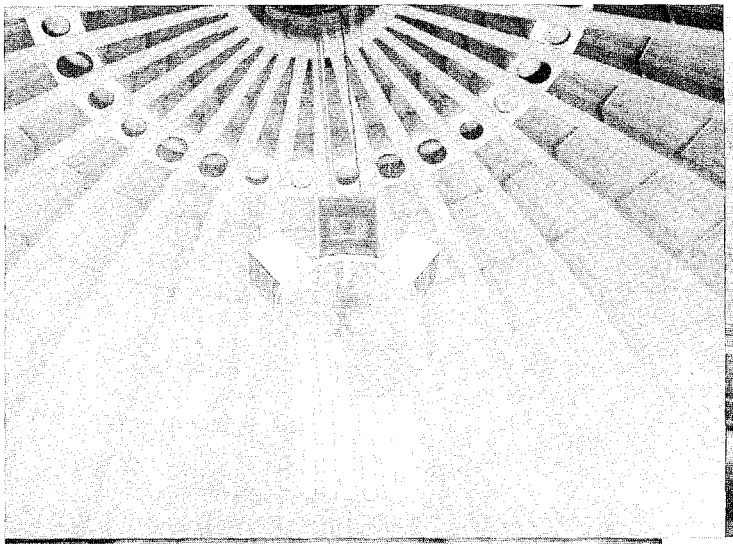


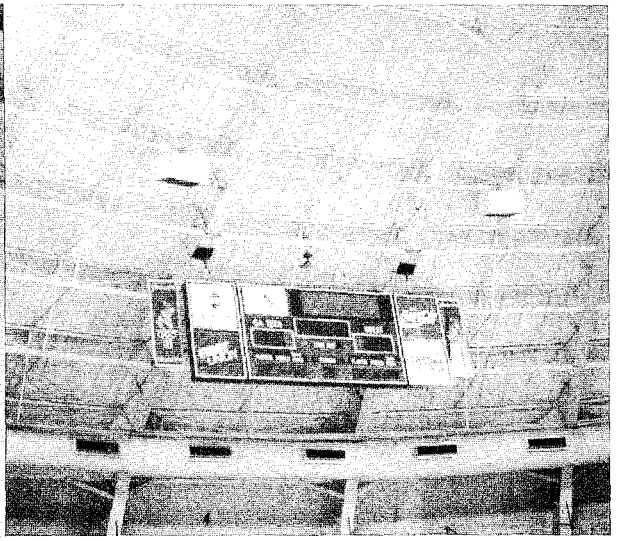
Jess McCurry of the Fox Theater joined us while we were there and brain power approached a critical mass.



This is a picture of the Georgia Tech football stadium which includes a sound system designed by Dr. Patronis. The picture shows two of the 5-column Bessel arrays. Dr. Patronis says that an announcement to anyone standing on the field sounds like someone talking to you over your shoulder.

I felt an immediate kinship with their football program as they were national champions the year I was born (no, not 1917).





Here's living proof of FOFs, Davis and Patronis, conferring about weighty audio and acoustic matters, namely Gene's array of Pataxials in the basketball arena at Georgia Tech.

The sound system consists of the central array plus a circumferential system facing downward towards the rear seats. Clear, powerful, seamlessly joined by the digital signal delay. Dr. Patronis is justifiably proud of a superlative system in a difficult venue.

Eric Simonson Advanced to Vice President-Engineering

We were pleased when the announcement came in the mail that Eric Simonson was now a VP of Engineering at J. W. Davis. Eric is a quiet young man with some very important qualities such as being able to look at a complex department and self-starting the improvement of it. It's always a pleasure to hear of the hard working young people we know advancing in their careers.

Eric received his B.S. and M.S. degrees from Oklahoma State University in the Electrical Engineering Department. His post-graduate work was concentrated in analog circuit design and digital signal processing. He joined J. W. Davis & Company in 1989 as Chief Engineer.

Police States and State Police

I was raised to consider policemen as my friends. When I was just a kid, an Indiana State Police radioman taught me the international Morse code back before WWII so I could get my Ham license. Don Lash, the local FBI agent and former Olympic runner, let me run marathon distances with him when I was on the track team at Purdue University. He later helped me obtain a high quality high powered rifle (a Star gauge 1903 Springfield). My closest friend in California was an outstanding California Highway Patrolman.

As I grew older and traveled over part of this world, I also became aware of what are called Police States where the police are feared bullies maintaining extensive dossiers on all citizens.

Here in Indiana, two of our close neighbors are Indiana State Policemen. We asked Sarge Richey if he could come over and let Fredrich Ahnert learn about policemen in the United States as compared to the STASI of East Germany before the wall came down. (Dr. Ahnert and Fredrich spent two weeks with us while Dr. Ahnert participated in both our 1992 May Workshop and May Seminar.)

As photos show, Sarge had an eager receptive recruit who got to take a drive in the squad car and learn how a baton is properly employed.

Fredrich also enjoyed our special Geodes and made quite a collection.

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Classified Ads

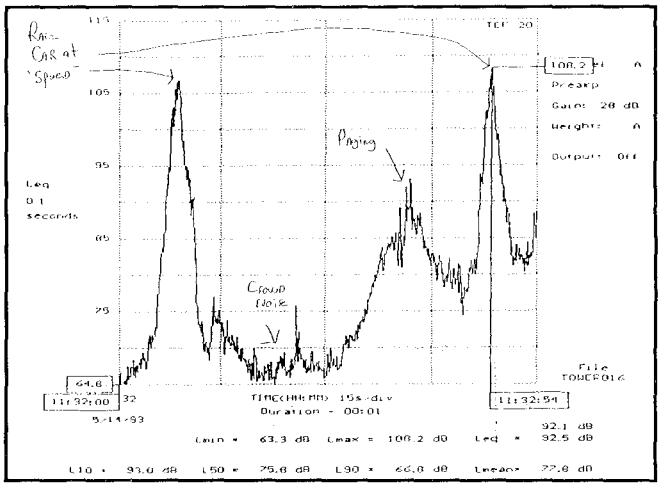
FOR SALE: 1988 EuroCoach 35', Ford 460 basement motorhome with lots of storage space (carried our entire classroom equipment when we traveled to classes).

We have modified the inside somewhat, but can be restored to original. We took out two chairs and a table to provide a desk which holds a computer, printer and copy machine with built-in filing drawers and storage space.

The motorhome has HWH levelers, full awnings, queen size bed, 6.5 Kw Onan generator, dual AC, rear TV monitor and camera, day/night shades, new Michilen tires. Excellent condition $40,000. Ph 812-995-8212. Fax 812-995-2110.

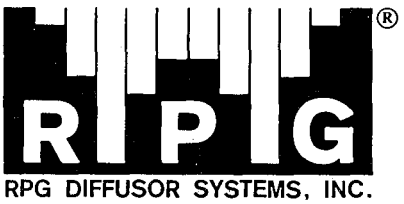
WANTED: a stereo radio (new or used) for someone in prison. Not allowed to have a radio with tape deck, cassette, CD, police or weather bands. If you have such a radio that you would be willing to denote or sell, please let us know. We will either give you the name and address where to send it or we will take care of it for you.

NLA Data from the Indianapolis Motor Speedway



Anyone called upon to design a sound system for a race track needs NLA data. In fact, anyone designing a sound system needs NLA data of the environment in which the sound system is going to operate.

May Farm Seminar—1993



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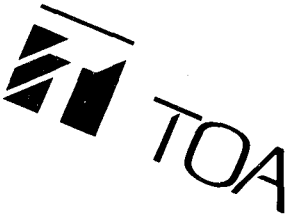
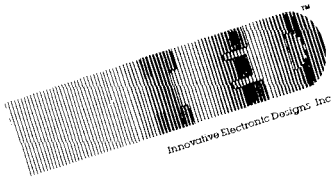
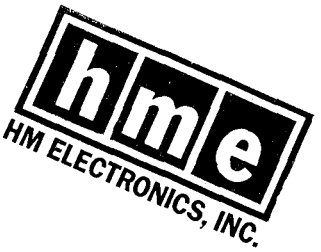
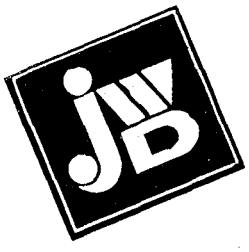
Personnel from these manufacturers receive Syn-Aud-Con training which provides still another link in the communications circuit between the ultimate user and the designer-manufacturer of audio equipment. They are "in tune" with what a Syn-Aud-Con grad needs.

Their presence on this list as a Syn-Aud-Con sponsor indicates their desire to work cooperatively with you in professional sound.









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