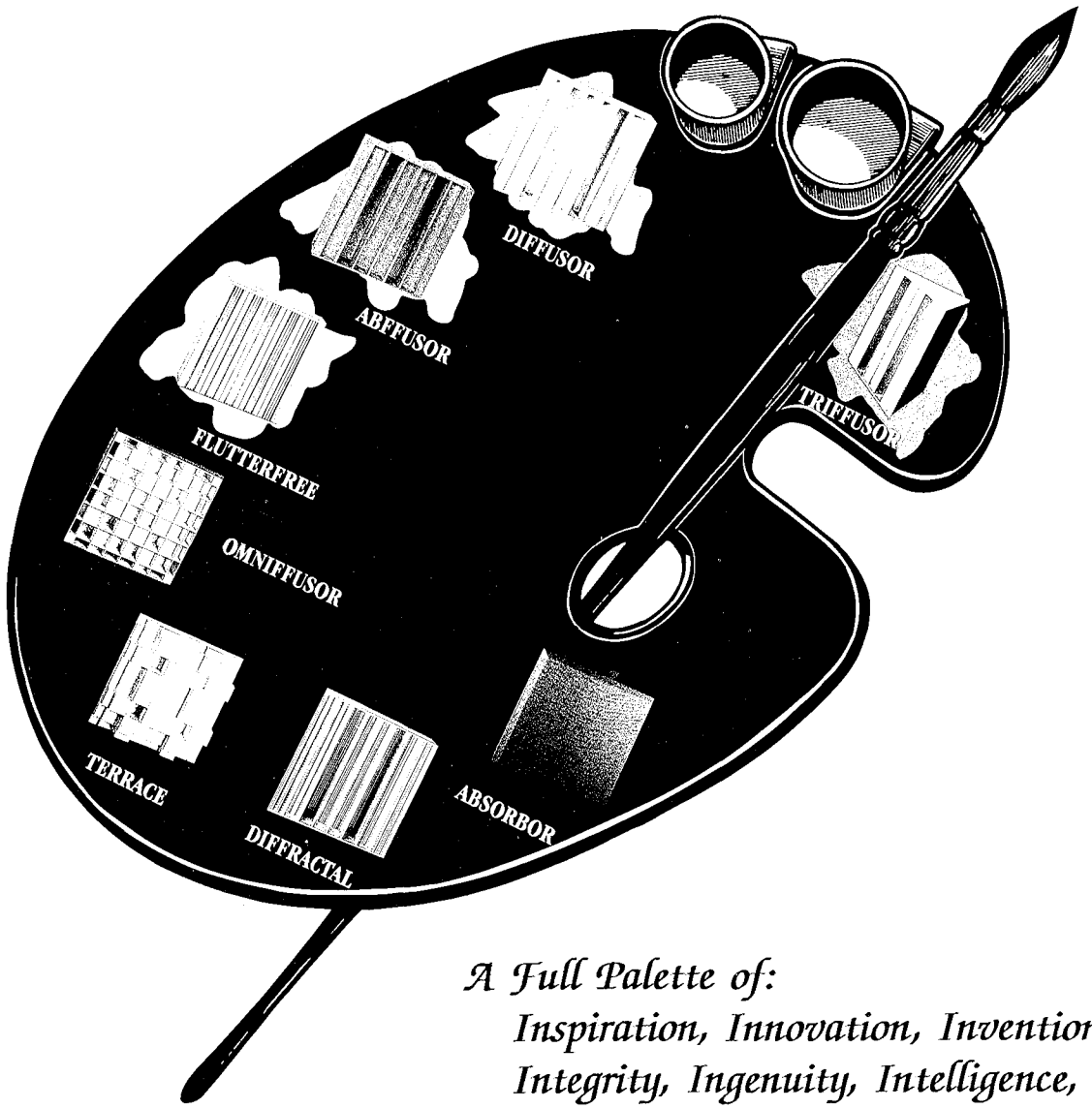
SYNERGETIC AUDIO CONCEPTS

SYN AUD CON

newsletter

Volume 18, Number 2
Winter 1991

RPG Diffusor Systems Inc.



A Full Palette of:
Inspiration, Innovation, Invention,
Integrity, Ingenuity, Intelligence,
and Important tools.

SYNERGETIC
SYN AUD CON
AUDIO CONCEPTS

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.

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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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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. 4-90). 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.

Regular People who are Giants

Dr. and Mrs. Peter D'Antonio

It takes a giant to recognize a giant and Manfred Schroeder's appreciation of Peter D'Antonio is living proof of this axiom.

When you observe a phenomenon like Peter D'Antonio, you are likely to say after the passage of years, "Yes, I watched him grow into what he is today." The truth is that those of us who are more ordinary mortals have grown up to more fully discern what Peter has always been - a remarkably talented and unbelievably energetic innovator touched by the divine to express creativity and ingenuity.

Hence, it is with delight and pleasure that we announce RPG's sponsorship of Syn-Aud-Con. Those members of the Syn-Aud-Con family that have, through many experiences with us, come to recognize that we recommend and promote many ideas, products and individuals who have no connection with Syn-Aud-Con and also know that we have no sponsors that we can't give our respect to.

RPG DIFFUSOR SYSTEMS, INC.

Peter D'Antonio has had our wholehearted support for his ideas and products since their very inception. Peter is a privilege to know. His ideas are unique and extremely clever, and his products have an unchallengeable integrity. That RPG has chosen to sponsor Syn-Aud-Con springs from their appreciation of our effort to truly serve the educational needs, particularly in acoustics, of our industry.

If you don't know about RPG Diffusor Systems, Inc., write 12003 Wimbleton Street, Largo, MD 20772. Phone 301-249-5647, FAX 301-249-3912.

Ah! Sweet Mystery of Life

If you don't believe there are sweet mysteries of life, take up the correction of grounding and shielding of audio circuits as a living.

> "In all electrical processes where there are potential differences or where there is current flow there are fields. These fields store energy."

The above is a principle stated in Ralph Morrison and Warren Lewis' new book *Grounding and Shielding in Facilities*, publisher Wiley, 1990. Cost is around $40.

They go on to say:

> "Fields are necessary in the operation of every known electrical component. Current will not flow in a resistor unless there is an electrical field across the resistor. Capacitors store electric field energy in a confined region in space. An inductor stores its energy in a magnetic field. A transistor operates when there is an electric field pattern established in the semi-conductor material. Components need fields to operate. The circuit conductors are there to make sure that the right fields are at the right place. This is a viewpoint not usually taken in circuit theory approach to electricity.
>
> "We intellectually fight field explanations of circuit behavior as we are steeped in circuit theory concepts. It is far easier to draw our circuit symbols and interconnecting lines than to attempt a field analysis. Besides, the circuit theory gives us good answers *most of the time*. The issue is when to change our approach so that the right tools are brought into action. Fields are at the crux of noise and interference processes and these processes cannot be controlled unless the fields are controlled. This discussion leads to a second principle.
>
> "All *signal* and *power* are transferred point to point by the presence of both an electric and magnetic field."

And then a final principle:

> "All electrical activity is fully contained if it is enclosed in a perfectly conducting surface. This same closed surface also excludes external activity from entering the enclosure."

These are but a few of the jewels available in this 228 page volume. The two figures showing the service entrance and service conductors are typical of the thorough, nothing taken for granted, completeness of the illustration in the book.

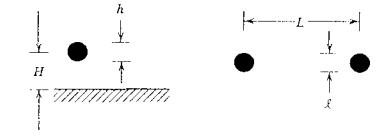
Table 1.4 and Figure 1.5 of characteristic impedance of cables delineates the parameters involved about as succinctly as this writer has ever witnessed.

In discussing the terms "quiet," "noisy," "computer grade," "isolated," "dedicated," "insulated," "single point," "separate," and "signal" grounds the authors have this to say:

> "Solutions to problems do not exist in words. It is futile to play semantic games. Man's laws may be argued this way, but not nature's laws. A unanimous vote from all the people will not repeal the 'law of gravity'. Word games suggest the possibility of a solution but they carry no weight. *Words such as 'clean ground,' better ground, and isolated ground have no meaning*. Solutions that follow these 'funny' ways are actually a form of desperation."

TABLE 1.4 Characteristic Impedance of Unenclosed Conductors

L/l	Z (Ω)	H/h	Z (Ω)
1.1	53	0.6	37
1.5	115	1.0	79
2.0	158	2.0	124
2.5	188	2.5	138
3.0	212	3.0	149
4.0	248	4.0	166
5.0	275	5.0	180
10.0	359	10.0	221
30.0	491	30.0	287
100.0	636	100.0	359



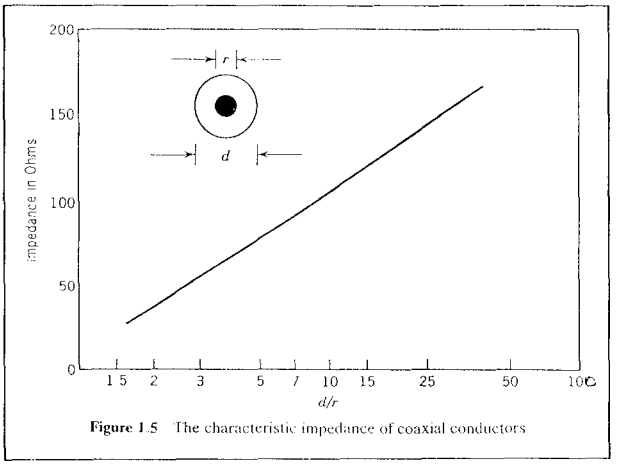
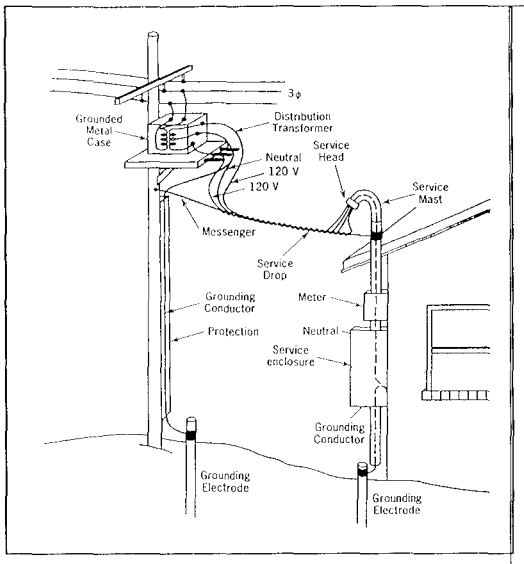
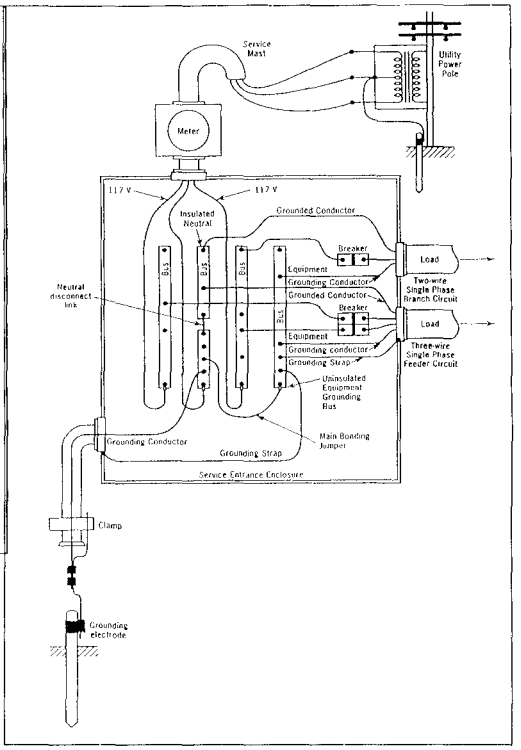


Figure 1.5 The characteristic impedance of coaxial conductors

"Interface does obey rules, but the rules are of field theory not circuit theory. 'sump theory' grounding stands as a unique and widely accepted theory even though outlawed by the NEC. There is increased pressure to rid the engineering community of this voodoo thinking."





One final remark from the book that the wire voodoo practitioner should heed and we would then be free of their bleating cries of superior hearing as an excuse for their succumbing to autosuggestion:

> "At frequencies below 100,000 Hz the control of field related currents can be handled by electrostatic shielding. At these low frequencies, for currents below a few amperes, magnetic phenomena are usually not an issue."

But then the self-deluded like to be deluded, and if you read the letters to the editor of any magazine stating the facts about cable, the virulence of the writers is unbelievable, but so are their claims.

When John Lanphere of Altec wrote me to tell me about this book's availability, he was as enthusiastic about it as I am now. I believe you will be too.

A Historic Photograph

Jeff Brower of Hyperception in Dallas, Don Davis of Syn-Aud-Con, Sam Berkow of Joiner-Rose Group in Dallas, and Brian Flinn of Techron—all aligned, but at the time of photo, not yet synchronized. Synchronization is well advanced at this writing and the results will be joyful for all serious users of TEF analyzers.

Our idea of "critical mass" is the TEF 20 hardware-wise and the Ariel SYSid coupled software-wise with Hyperception's adaptation of Sam Berkow's ideas for computer modeling. If we seem stuck on this note, stay tuned; it's a symphony not a tone.

If you really want to see Don Davis completely happy, put him in the midst of talented people, especially if they are talented men that Don feels should be talking and sharing with each other.

"The Most Amazing Thing We Have Ever Used in a Factory"

The Speech Processor—SP1

Quoting from the Syn-Aud-Con Newsletter V12N2, 1985: *New Analog Speech Processor"* by Craig Allen of the Navy Ocean Science Center.

> "This processor works by heterodyning the voice signal to R.F., severely clipping it, and then low-passing it and returning to the voice frequencies. There are, of course, a great deal of additional subtleties, but this gives you the basic idea behind this extremely effective technique."

We had taken Mr. Peutz to San Diego to hear the processor. He was just as enthused as we, which gave us encouragement to spread the word—and we did with a Tech Topic and in our book, ***Sound System Engineering***.

We had calls from people to discuss it with us and I am sure that Craig Allen had many, but it was Vic Hall at Communications Company, who is always looking for "niche" market products, that first licensed the processor to manufacture and distribute. Vic is well aware of the value of the processor for he provides sound reinforcement each year at the Long Beach Grand Prix. Communications Company started manufacture of the product a couple of years ago, but ran into delays because Craig Allen had a severe physical problem with his eyes to work out.

Before the product was fully tested, Lynn Synder, Syn-Aud-Con grad from 1978, read about the processor in ***Sound System Engineering*** and called Craig Allen to talk about it, and consequently was sufficiently convinced that it might solve a complete lack of intelligibility in the Subaru plant in Lafayette, IN that he ordered a prototype of the processor from Communications Company.

Recently, David Johnson told me that Lafayette Electronics had ordered six of the processors. I called Lynn Synder to find out what his experience was with the Speech Processor. Of course, you always hold your breath when you ask such a question—this was the first commercial use of a product that we had been "promoting" for five years.

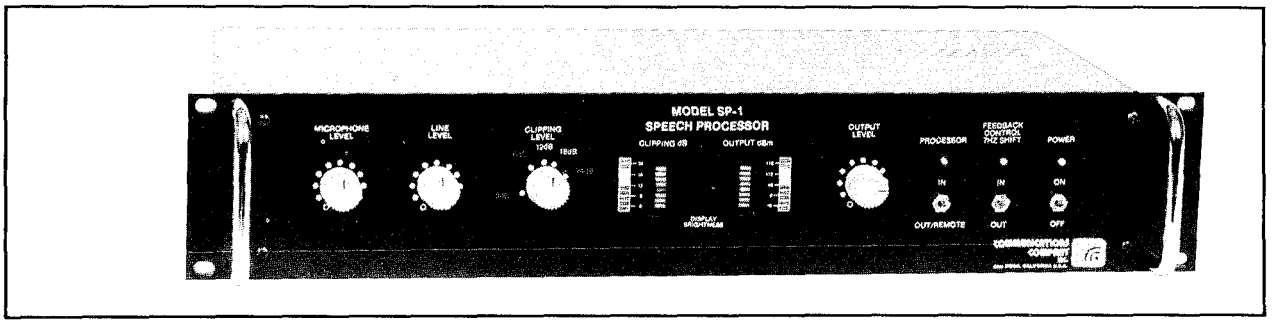
The first thing Lynn said was, "It is the most amazing thing we have ever used in a factory." The second thing that he said was that Don was too conservative when he said that the processor would provide an additional 10 dB of gain in a noisy environment.

Lynn said that when he and his company, Lafayette Electronics completed a $400,000 CCTV and training center for the Subaru plant that they were so pleased with their work that management asked them to consider a solution to their sound reinforcement problem: they had not been able to understand a single page over the sound system in the two years that it had been installed. And it was no easy solution: ambient noise level of 100 dB, 25' ceiling height and a layout of equipment that might change from year to year.

Lynn wanted to do the job and discussed it with three acoustical and electroacoustical consultants who said, "Don't try it!" Lynn had read about the Sound Processor in ***Sound System Engineering*** and started talking to Craig Allen and then engineer, David Johnson of Communications Company. He ordered a prototype on loan for three months and prepared a demonstration for the management at Subaru. The rest is history. Lynn says, "They think I'm God."

And the best news for a sound contractor, the phone is ringing from management of local plants who have heard the Subaru system, one saying, "We've had a paging system for 30 years and haven't heard anything. What can you do for us?"

Don't miss an opportunity to try the SP-1 Speech Processor if you are designing and/or installing a sound system in a noisy environment. It sells for around $900 and is available from Communications Company, 3490 Noell St., San Diego, CA 92110. Phone number is 619-297-3261.



A Discussion of the AES paper by David Gunness:

"Loudspeaker Directional Response Measurements"

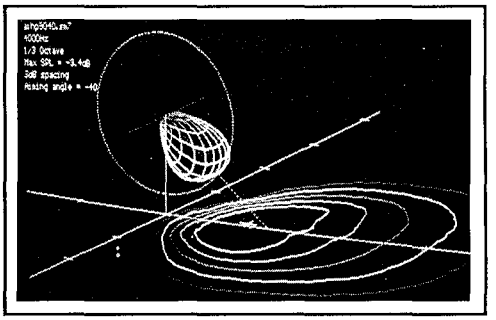


Figure 2 is of an EV single horn and driver.

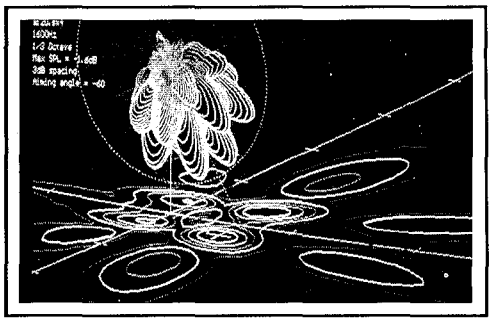


Figure 3 is of six small-horn EV speaker systems in a 3X2 array.

We have been one of the strongest critics of the various loudspeaker manufacturers spending so much time and money on developing individual loudspeaker CAD programs. And there are legitimate reasons to criticize this action. But, there is good coming from each manufacturer doing his own research. He is learning a lot of about loudspeakers and the environment that they live in: a lot that he wouldn't know if the research and development was left to an independent development team, such as we have advocated. Our audio industry is going to be enormously benefited by the loudspeaker manufacturers becoming more knowledgeable. Witness the recent papers given by Mark IV Audio, JBL, Renkus-Heinz, and yes, even Meyer, on the subject of the often detrimental interaction of two loudspeaker systems in close proximity to each other. JBL, Renkus-Heinz and Meyer gave their papers at the 1989 AES in New York and we discussed those papers in an earlier Newsletter. David Gunness of Mark IV Audio Acoustics gave an outstanding paper at the 1990 Los Angeles AES, "Loudspeaker Directional Response Measurement."

We Need Standardization

John Murray, also with EV, sent us an advanced copy of the paper and I would like to reproduce John' s letter as he brings out a key point: perhaps it is desirable to have each manufacturer making his own measurements but let's be sure we are measuring the same thing.

"1. High angular resolution of polars or 3-D computer data files is essential for arrays and some multi-component speakers. The 10-degree spacing used in most current databases is not adequate.

"2. In evaluating different sound system CAD programs, the database needs to be scrutinized very closely with respect to how the data was collected. Since garbage-in yields garbage-out, a standard desperately needs to be developed before a vast multitude of non-agreeing databases floods the industry.

"3. The low end of horn beamwidth plots has a variable that has not been considered in past measurement methods. Even in Ureda's apparent apex correction method, the effect of a moving "apparent source" can drastically change the resulting -6dB points. For those interested in the pattern control of high-Q horns at 2kHz and below for intelligibility, the apparent beamwidth can vary drastically depending on the measurement method and its inherent errors.

"I have already encountered many inquiries about different firms' horns of very similar design and dimensions having isobar databases that indicates one performs vastly better than the other. As Don Keele says, "Similar horns of similar dimensions must perform similarly." I believe that unless the devices are measured under identical conditions, one cannot objectively compare polars, isobars, or 3-D reponse balloons." Yet with the proliferation of design programs with databases supplied from different sources, that is exactly how many are making their component selections.".

I leave the careful technical review of a paper to Don, but I was reading through the paper, not appreciating the full extent of the paper, but I understood enough to appreciate the importance of the work. On the last page of the paper Gunness reproduced several balloon isobars (not by name), one beautifully controlled (obviously EV) and another looked like a footprint that I was very familiar with (See Figure 1). I called John, and said, hey, that's not fair to compare a competitor's multiway loudspeaker and an EV single horn and driver. John said both were EV products. (See Figures 2 and 3.) "The severely lobing balloon was an array of six speaker systems using small CD horns. Any small horn reproducing frequencies below its limit of beamwidth control cannot array well because its 6-dB down-points vary over its bandpass. If the horns employed are too small to control their entire bandpass, they cannot avoid lobing. This compromise is present in any of today's little "wonderbox" speakers. Using small horns, there are no virtual point-source arrays, not by Meyer, EAW, EV, or anyone else. Until the laws of physics are changed, if you want smooth polars from your arrays, have a TEF and some large format horns on hand."

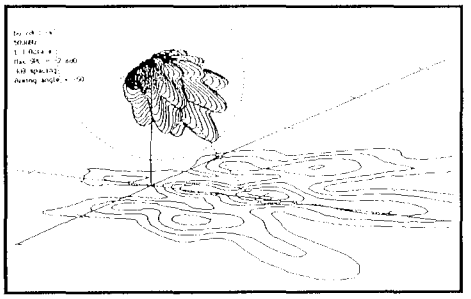
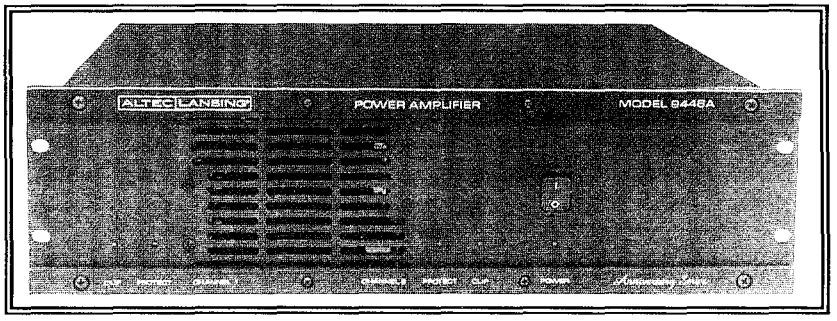


Figure 1

The Old Altec & The New

Altec Lansing recently sent us one of their new 9446A anniversary series power amplifiers to use in our class demonstrations here at the farm in Indiana. Rated at 1200 watts bridge mode at 8Ω and 600 watts per channel dual mode at 4Ω this 52 lb powerhouse has very wide frequency range, low distortion specifications. Full power bandwidth is 20-20,000 Hz +0/-1 dB with variations referenced to full power at 1000 Hz as 0 dB. Full bandwidth is 10 Hz to 90,000 Hz at 1 watt with 1000 Hz as the reference frequency for +0/-3 dB. THD is rated less than 0.1% (typically 0.01%). IMD & TIM is rated less than 0.05%. I rarely look at an amplifier's specifications except to see if it's a special purpose response of some sort. I put them into systems we are using and listen to them. The Altec 9446A turns on without any kind of noise—turns off the same way and is absolutely transparent on the main channels of our PAR playback system for the ITE recordings.



The instruction manual that comes with it is a model of how to write such a manual. Every question that came to mind had an answer in the manual saving me from the need to make telephone calls as is so often the case with poorly written manuals.

We recently recorded the Messiah on our DAT using our ITE technique, and its playback over the Altec 9446A into the UREI monitors is a beautiful example of the power of the amplifier and the beauty of sufficient headroom.

The ruggedness and total professionalism of this unit means, of course, that it was designed for heavy commercial sound usage. It also will serve with complete satisfaction in any state-of-the-art playback system trying to fully utilize the dynamic range of a professional DAT recorder.

Faces From the Past

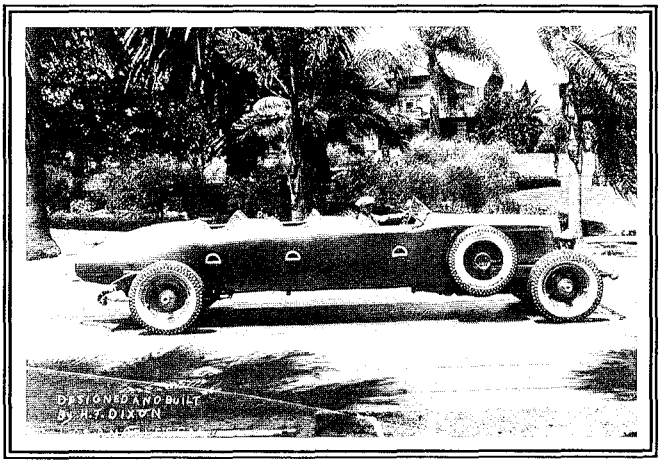
Apart from the arrival and testing of this superb amplifier was the rediscovery while finally unpacking the last of the boxes from our move from California to Indiana, of two early photographs that go back to the mid 1930's. (I'd guess about 1937 at the latest.)

In the group picture is James B. Lansing, Ercel Harrison and Bill Martin. The picture was taken at the original Lansing Manufacturing Co.

1st row, 2nd from the left: Ercil Harrison,. Next to Harrison is Jim Laning. 2nd row, middle is Bill Martin. This was the Lansing Manufacturing Co in the 1930's.

The family name for James Lansing was James Martinelli. When he came to Hollywood and observed how actors changed their names to create a different image, he decided to do the same. When his brother, Bill, arrived soon after, Jim advised him to do the same so he shortened the family name to Martin.

Ercel B. Harrison was the exceptionally talented engineer who built the first audio transformer capable of going from 20 to 20,000 Hz and who later became the head of the Peerless division of the old Altec Lansing in 1946. Jim Lansing retired from Altec Lansing at the end of WWII and later founded JBL. He couldn't use the name Lansing because he had legally sold it to Altec in 1941. Jim Lansing remained at JBL for only a short time before his untimely death by suicide.



For those in sound work for the major studios in the 1930's it was 1Ω across Fort Knox. Some of the toys were different than the Model T's and A's that the rest of the world were driving.

Bill Martin, Jim's brother, was the head of the Altec Lansing machine shop until his retirement in the 1970's.

The other picture is of an automobile they all used to go to Tijuana in the old days when the audio business in Hollywood was one Ohm across Fort Knox.

These men were giants in the audio business of their day. Quality was their fetish and they led the way to full range audio reproduction. To the best of my knowledge, their only peer still active today is S.N. Shure, which truly makes him one of the most remarkable men in the history of audio.

The histories of companies like the histories of individual human beings reflect all the facets of infancy, adolescents, maturity and, in some cases, ill health along with miraculous recovery or final interment.

We sincerely believe that one is benefitted by knowing history. So too is one benefitted by knowing those who made it. Gifted men and women do make an important difference in how our world develops. We hope studying them is contagious.

IRP — The Sound Connection

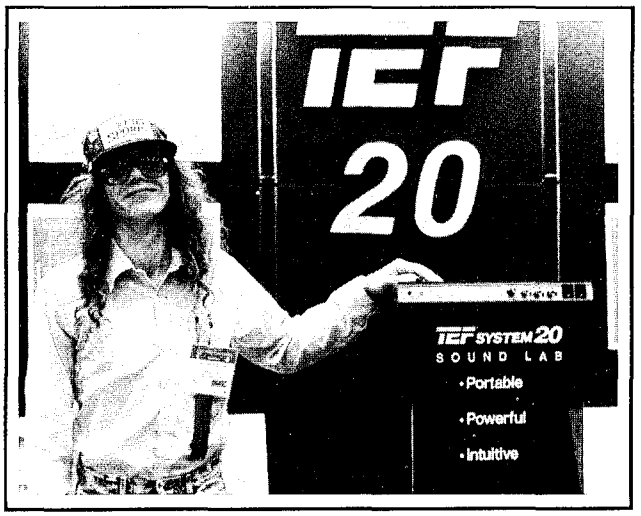
We are very grateful when a manufacturer starts a Newsletter for their customer base. We are even more grateful when it continues publication on a regular basis. It is so easy for management to sit around a conference table and assign someone to "put out a Newsletter" and they do—for a couple of issues. Then we only receive an occasional copy.

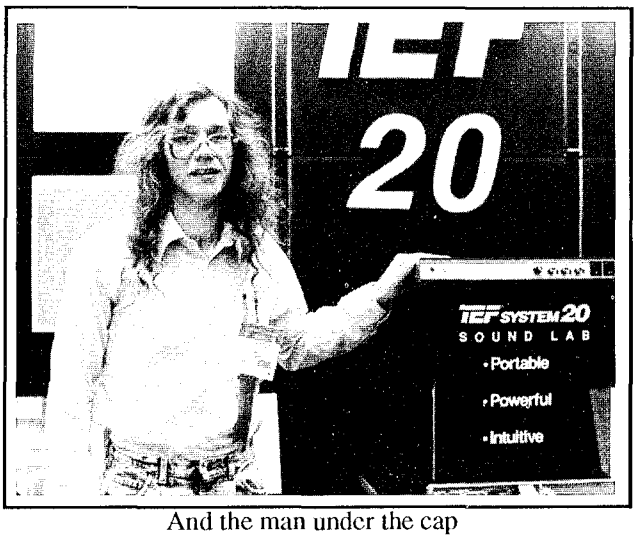
IRP recently received an award for the "Ad of the Year". It must be the same advertising firm that prepares their ads that oversees the production of the Newsletter because it reeks of quality and good taste - and the information is tops. A good Newsletter is like a visit with a friend and The Sound Connection fulfills this requirement perfectly.

What Talent LOOKS Like

I intend one day to write a book that contains pictures of talent and short descriptions of the individuals involved.

Keith Jebelian is talent. No one can argue that. What men like Keith do is out think the fastest, biggest, most complex computers. The sign on the right could describe Keith as easily as his new effort, the TEF-20: portable, powerful and intuitive. And, from personal experience, we'd add from Man of LaMancha, "We like him."





And the man under the cap

A Double Take— The TEF-20

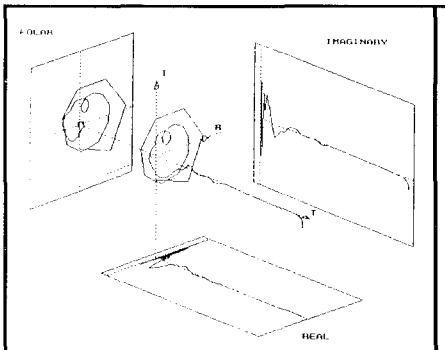


Fig. 1—Analytic signal in the time domain for a rectangular windowed energy event.

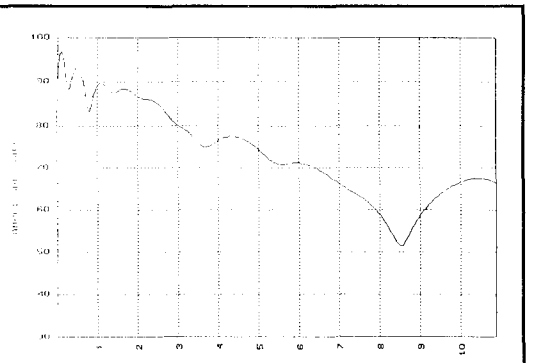


Fig. 2—The ETC of the analytic signal in Figure 1.

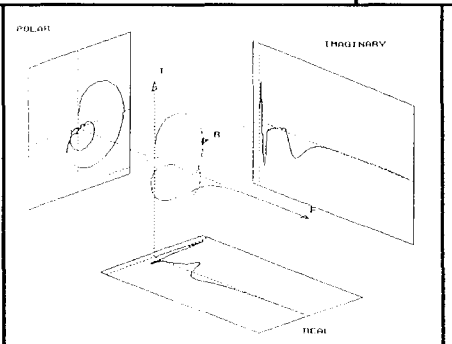


Fig. 3—The analytic signal in the frequency domain (i.e., the time domain analytic signal after a Fast Fourier Transform) of the same energy event.

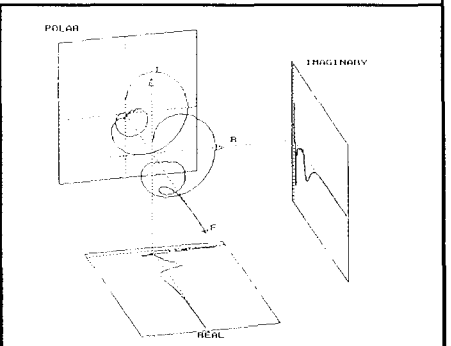


Fig. 4—The same analytic signal rotated to show how the Nyquist plot is the shadow of the end view of the analytic signal.

Since the first look at the TEF-20, Ron Bennett has lifted my expectations for the unit to the stars. Ron is a man you'll be hearing a great deal more about in these pages in the future.

Ron has programmed, for use in this year's Syn-Aud-Con classes, the full Heyser spiral and its shadows, the real, imaginary, and Nyquist plots. This caused a rapid and significant double take on our part at the TEF-20.

This powerful tool has been one of the greatest educational tools I've ever been handed. Dick Heyser did this sort of viewing in his head. Those of us less fortunate are grateful to finally partake of this insightful feast of analytic signal analysis.

Dennis Gabor's remarkable paper "Theory of Communication" in the proceedings of the IEE (English) Vol. 93 in 1946 wherein he invented the analytic signal was the seed from which a major portion of Dick Heyser's work grew. Dick wrote:

> "From energy balance consideration it now appears evident why Gabor was forced to develop the analytic signal. I heartily recommend that pioneering paper as background reading for anyone involved in signal theory. . .
>
> "The total acoustic signal will arrive in discrete bundles for those components which are the result of diffraction and reflection in the loudspeaker and its enclosure. The magnitude of the analytic signal will show a peak for each discrete component of energy arrival. The rate of change of the phase of the analytic signal bears a relation to the spectral distribution of the separate energy arrivals. When the analytic signal is used, the mysterious bumps and wiggles of the scaler impulse response are quickly revealed as discrete arrivals in signal energy and the subsequent decrement in energy for each arrival."

Who can ever forget the progress we all made with the advent of the ETC measurement. Now we have an even more detailed and insightful view point. We only need to raise our perception of its clues to another wave of acoustic understanding.

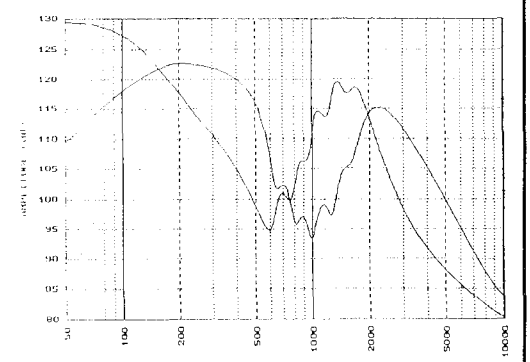


Fig. 5—The Magnitude and phase response of the energy event shown in the ETC in Fig. 2

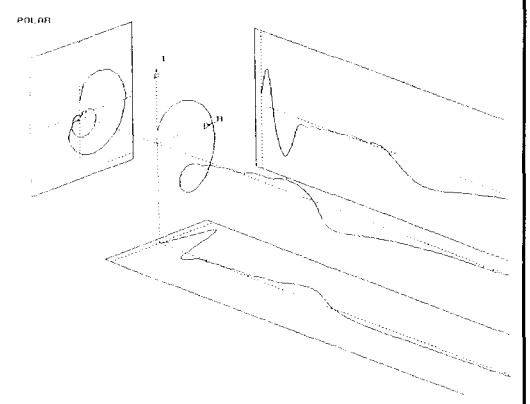


Fig. 6—When detailed analysis is called for, these new plots can be expanded indefinitely.

An Easy & Accurate Way to Stack & Splay Loudspeakers

Figure 1a. is two small TOA speakers stacked and splayed.

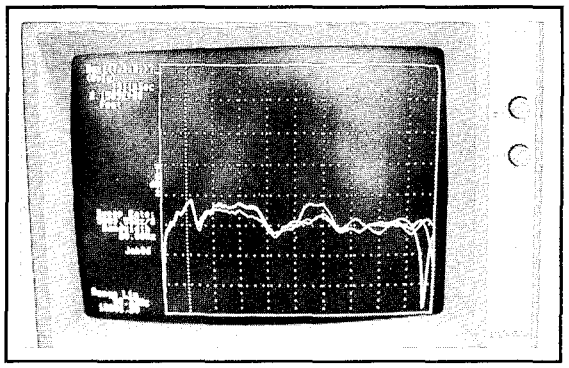


Figure 1b. Frequency response of the TOAs stacked and splayed, 10, 20 and 30 degrees off-axis using Pink Noise and the RTA.

Bill Lewis from technical services at Indiana University gave us the neatest way to quickly and accurately stack & splay loudspeakers to get the acoustic centers in perfect alignment. During the October class he watched the demonstration on µsec signal delay on both the TEF and the RTA. Later we were showing the problems associated with split speakers and recommended stack and splay where a wider horizontal coverage is desirable.

We pointed out that lining up the acoustic centers is important in stack and splay, but it has always been a trial and error - move one speaker in relation to the other by a fraction of an inch and take a measurement. Bill said, "why don't you use pink noise & watch it on the RTA." It was fast and it was accurate. It was the very best "stack and splay" we have accomplished in class. One is able to see a 1dB change.

We made a measurement of the speakers stacked and splayed 10, 20, and 30 degrees off-axis. See Figure 1. This measurement is 0 to 10,000 Hz. You can just see the notch between 9 and 10,000 Hz at 30 degrees off-axis.

After the class, we realized that we should have recorded the measurements for the split speakers, so we set up the measurement in the lab with different speakers.

The upper trace in Figure 2 is of both speakers on, lower trace if one speaker only. This verifies that the speakers are matched and that there is no degrading of the signal by turning on the second speaker.

Figure 3 shows 10, 20, and 30 degrees off-axis with split speakers.

Figure 4 is of stack and splay by the trial and error method. Note that it shows the superiority of stack and splay over side-by-side configuration but the trail and error method is not as effective as the use of Pink Noise and the RTA shown in Figure 1.

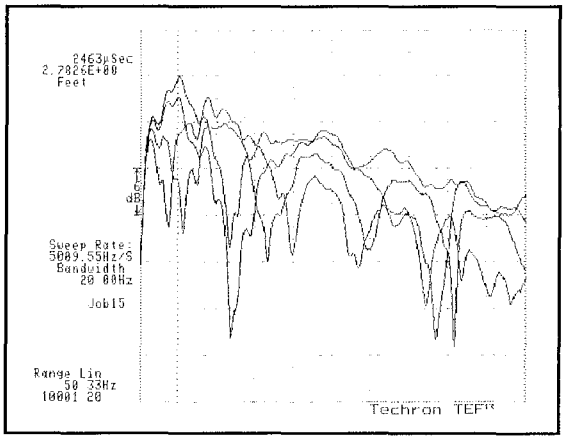


Figure 3. Two split speakers 10, 20 and 30 degrees off-axis, showing the problem inherent in splitting speakers.

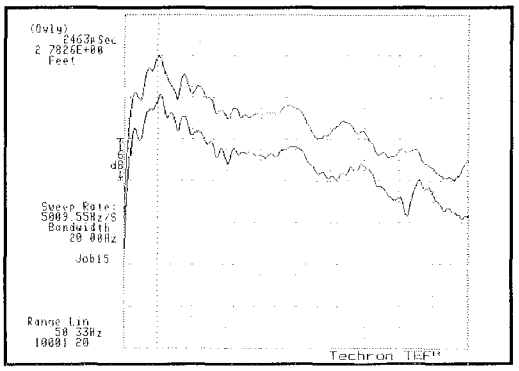


Figure 2. The upper trace is both speakers on. The lower trace is one speaker on showing a 6 dB add and that the curve was not degraded by adding the second speaker.

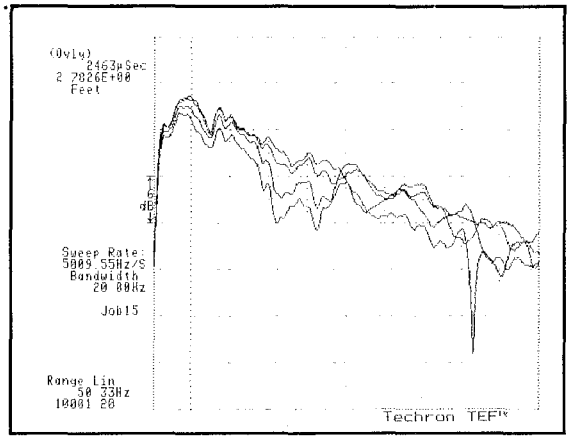
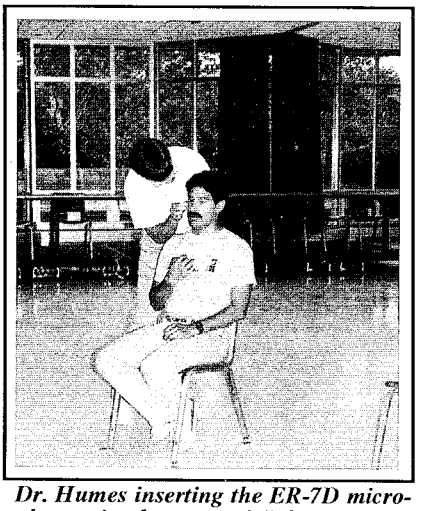


Figure 4. Two speakers stacked and splayed. The acoustic centers were lined up by trial and error. Note that it is much better than the side-by-side configuration but still not as good as Figure 1 where Pink Noise and the RTA was used.

ITE™ Microphones



Dr. Humes inserting the ER-7D microphones in the ears of John Murray during the October Intelligibility Workshop. Pinnea response measurements were made of both ears of all participants of the workshop.

We had a letter from Mead Killion recently telling us that they had sold three sets of the ER-7D microphones (the number that Etymotic Research has given to what we call the In-the-Ear probe microphones. Mead says that the D is for Davis. We are honored.)

Two of the three pairs were sold to Neil Grant at Harris Grant Associates in England and Tom Breithaupt of Blaupuntkt.

Blaupuntkt (Bosch)

Tom Breithaupt of Blaupuntkt is using the microphones for research in car stereo (he has just received his microphones). Already he has discussed innovative uses of the microphones.

Neil Grant

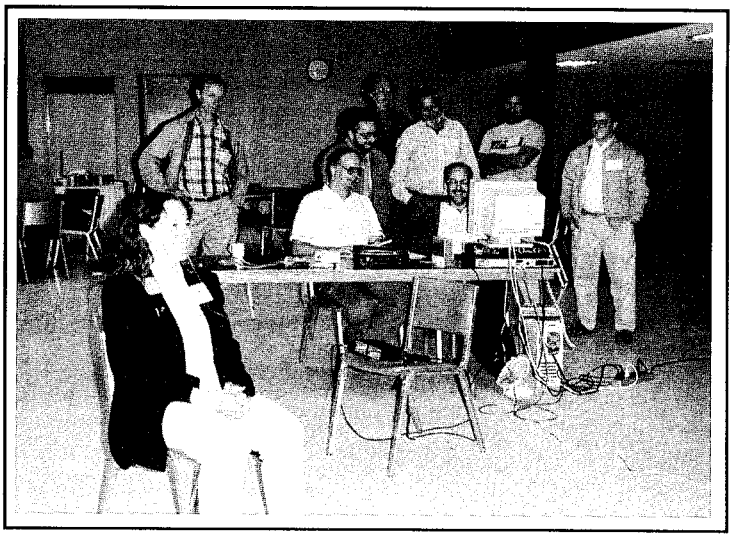
We faxed Neil asking him how he was using the microphones. While we are absolutely delighted to hear of any use of the microphones, it is audio recording and audio measurements that holds our fascination.

Neil didn't disappoint us. He faxed us back,

"I have now taken delivery of the Etymotic microphones...the intention is to take a whole series of Control Room "human microphones" measurements to examine firstly the measurement implications of the head that are not considered in the conventional omni measurements, secondly the important reflections that are lost in the ETC clutter in the standard measurements, and thirdly, the further implications of the mechanisms of lateral image location in the Control Room. You remember the work that I did with Peter (D'Antonio) on Interaural-Cross-Correlation of some years ago."

Recording

As you can image we are anxiously waiting for reports back from these marvelous pioneers. We need one more pioneer - someone in the recording industry. I hope that it won't be long before we hear from Etymotic that this important use of the ER-7D microphones is being made.



Mary Gruszka (L) while measurements are being made by Larry Shank with the new TEF 20. Several members of the workshop are waiting their turn for their measurement.

Etymotic Research Update

If you have any interest in hearing aid research, In-the-Ear microphony, or the new ER-15 ear plugs that allows the musician or sound engineer to use ear plugs that *reduces the level equally at all frequencies,* you will want to contact Etymotic to get on their mailing list for their Newsletter, The Etymotic Update. By the way, Etymotic is a "new ancient Greek word" which means true to the ear. Etymotic Research, 61 Martin Lane, Elk Grove Village, IL 60007. PH 708-228-0006, or FAX 708-228-6836

Workshop on Understanding TEF Measurements

"The generation of understanding is a low yield process." Understanding TEF measurements means that one has the ability to apply correctly the generalizations of acoustics to specific cases, particularly ones that have not been met before.

Most purchasers of TEF analyzers have proven their ability to think and their motivation to learn inasmuch as TEF is not a "run-of-the-mill" system and the expense involved clearly delineates motivation.

We are planning small hands-on, intensive, 3-day workshops in difficult spaces based at the farm and nearby public spaces in serious acoustic difficulties. The workshop will be expensive. Cost will be $750 instead of our usual $600.

Prequalification: You must know operationally how to run your TEF. This is not a basics TEF class. If you need basics, you should attend the Techron classes taught by Farrel Becker.

The curriculum: Find out what your needs are and in what order to address them, and a rigorous one-on-one session with the instructors until you have mastered the basic skills for effectively interpreting TEF measurements so that you will know how to further your skills as your confidence and ability increase.

Special concentration will be on properly employing ETC measurements especially speech intelligibility measurements. How to use the TEF to equalize a system more effectively than you can with conventional real time analyzers will be another goal. Both TEF 12's and TEF 20's will be utilized.

Be prepared to learn how to listen to a space prior to attempting measurements. Your body may hear, but your mind must listen if anything significant is going to occur. These are not experimental workshops, but rather have the goal of sharing experience with you and to expose you to very typical learning opportunities.

These special TEF workshops will be strictly limited to 12 persons and a minimum of two fully qualified and experienced instructors.

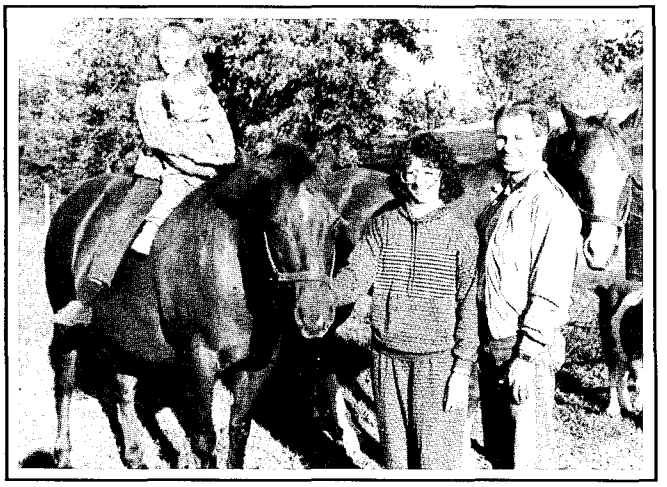
I sincerely doubt that understanding is ever "taught". I believe it occurs in the mind of the learner. I first became active in electronics just prior to WWII via ham radio. I became involved in my first acoustic experiences just after the war via building Hi Fi systems, first for myself, and then as a business. I still remember some of the pain of unlearning the false concepts in my thinking that occurred because I was, at the time, innocent of the fundamentals of any physics related to my business. While I don't recommend that everyone do as I did and spend the next 40+ years learning the fundamentals, I do suggest that you will be severely handicapped if you don't learn them. The question is, how to shorten the 40 years? It took me a good while to discover my needs. Until you recognize that need, the physics of audio and acoustics is a mysterious experience through which you wander in a daze. Syn-Aud-Con classes have been described as "trying to get a drink from a fire hydrant." Since our original classes were largely intended to and designed to motivate, that accusation was partially true. Our "floodgate" approach, however, washed many an attendee into the mainstream of audio endeavors.

Learning physics must not be like drinking from a fire hydrant. The learner must come away with some feeling of achievement and satisfaction; the experience cannot be one of unrelieved frustration. For that reason, we are keeping these workshops small, the number of instructors high, and your potential for learning extremely high.

Bendat's Law

"People who think like computers will be replaced by computers."

A Book on Tangents



Ken Hanbury and his family enjoying the farm after the October seminar.

I walked into the October farm class where Don was supposed to be discussing acoustic gain, instead he was talking about how to rub off speed in a crash at Indy.

I looked around and asked how did we get from acoustic gain to rubbing off speed in a crash? Don said he was on a tangent and that he was going to write a book on tangents. Ken Hanbury in the class said, "You will never get it finished!"

(It was in Newsletter V15N1 that we wrote about Allen Schultz from the Denver Class telling us that "if you look up tangent in the dictionary you will find Don's picture." The older Don gets, the more experiences he collects around each technical point he wants to make, hence all the tangents.)

Jeff Loether Electro-Media Design Presentation & Entertainment Systems

Jeff Loether attended a Syn-Aud-Con class about 1980. He was a new employee at Marriott Hotels in a new department started to oversee the design and installation of sound systems for Marriott, which involved hotels, conference centers, and night clubs. Jeff didn't know much about sound systems then, but he did know that he didn't know, and he really was (and is) a devoted student of learning. He asked permission to spend an extra day with Don following the 3-day class to review the material and to get guidance on further study.

Jeff was living in Maryland near DC so we recommended that he get to know Mel Sprinkle. Mel was the walking encyclopedia of audio and he loved to communicate. Jeff became a Mel Sprinkle student.

Jeff would occasionally come to a Syn-Aud-Con class for review and to catch up on what was new in the industry. Then, suddenly we realized that we were going to Jeff to find out what was new. He introduced us to FSR and introduced new product ideas to FSR, Altec, etc., We began to hear about Jeff from contractors, like you had better do it the right way or you were off the job. Some of the disgruntled contractors said that the only right way was Jeff's way. By this we knew that Jeff was making his mark in our industry. He encouraged many contractors to work with CAD programs.

Now we hear that Jeff has started his own company. As he describes it, "I am networking with many of the fine contractors and manufacturers with whom I have worked in the past, marketing our services to the lodging, hospitality, training and entertainment industries."

We wish him the greatest success!

Crown at the Indy Speedway

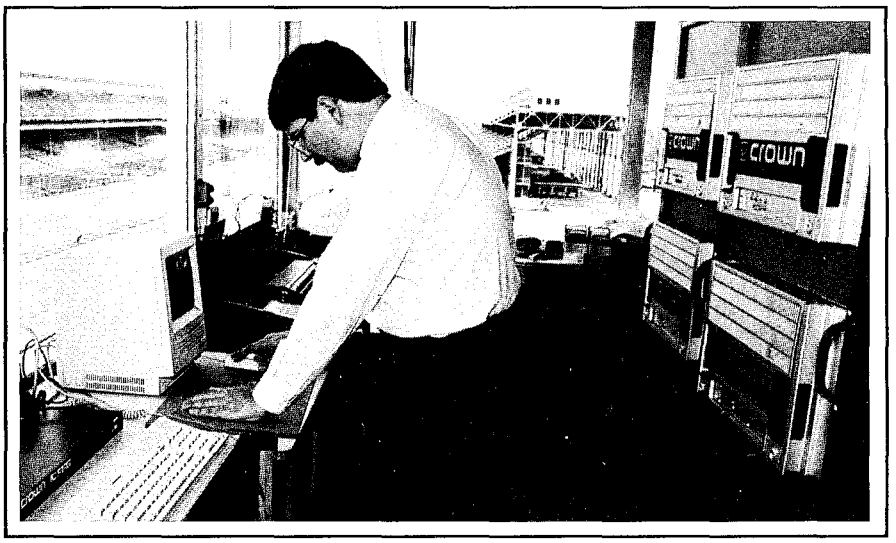
The legendary Bill Webb ran the sound system at the Indianapolis Motor Speedway from the end of WWII to his passing in the 1980's. Bill's original system used a series of 1200 watt RCA surplus battleship amplifiers. These later became the "preamps" to five Ling 5000 watt "shake table" tube type power amplifiers (EIMAC). Bill's systems always, yes always, worked and provided clean very high level reinforcement that could be heard over individual cars passing by and reasonably well even when the pack went by.

When Bill Webb died, Tom Allebrandi and his assistant, John Royer, "inherited" the system and in 1986 started working on Indy Sound III since WWII. In April of 1986, Crown engineers were consulted in the track's efforts to bring new amplifiers to the system.

Upon completion of the engineering study, which included testing to determine load impedances, the engineers concluded that Crown's big amplifiers would be appropriate for the job. Tom Szerencse, a member of Crown's engineering team which worked on the system recalled. "When first installed that year, four Crown amplifiers were delivered. Two actually powered the system, while the other two remained on the shelf as backups."

The "big" amplifiers Szerencse refers to are Crown Macro-Tech 10,000's, which, as their name implies, are capable of delivering 10,000 watts of power. Today, all four amplifiers have been put into use, and the system is distributed at 240 volts, the same as the old system.

"The Macro-Tech 10K's are the perfect complement for the system" Dennis Badke, Crown's product application engineer believes. It is a large system: there are over 460 loudspeakers used for the entire area of coverage, which measures 600 acres and includes the infield. It's also worth noting that the longest runs from the amps to the loudspeakers are 2-1/2 miles.



Crown Engineer, Dennis Badke, in the control tower at the Indianapolis Motor Speedway.

"The Crown IQ System 2000 was added this year to prepare them for next season, when the amplifiers will be moved to a new location in the control tower much farther from the mixing console.

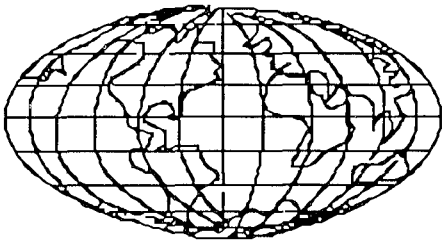
"With the IQ's installation, a much broader range of control and monitoring features has been obtained as well. ...By looking at the IQ's ODEP readings, you can instantly tell how much reserve is available in the system. Significant changes in impedance can also be rapidly detected, which is a good way to track down shorts in the loudspeaker lines or open loudspeaker lines."

The microphone engineers at Crown designed and built a custom "tridundant" microphone for the Indy sound system. It contained three separate internally-mounted discreet elements which effectively feed redundant signals to the track PA, the famous Indianapolis Radio Network, as well as ABC-TV. It was the one used to relay the famous starting message, "Gentlemen, start your engines . . ."

The Paranoid's Prayer

We say that a person is paranoid when they suspect and fear situations that a normal person wouldn't respond to. That famous bumper sticker "Just because I'm paranoid doesn't mean someone's not out to get me" defines it as well as anything. Psalms 17:7 expresses the nebulousness of such thinking.

"Shew thy marvellous loving kindness, O thou that savest by thy right hand them which put their trust in thee from those that rise up against them."

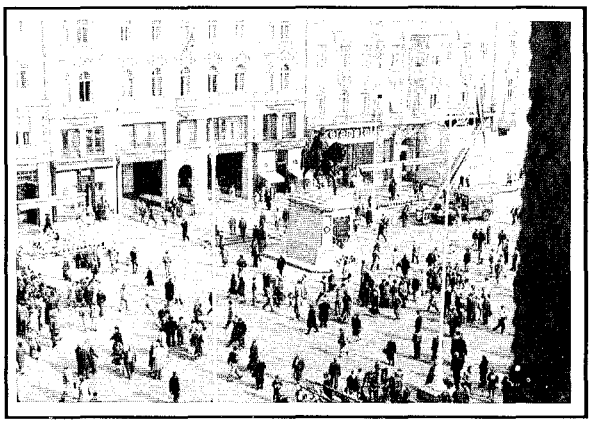


An Invitation to Zagreb, Yugoslavia

Don was invited to teach a TEF class at the ISOT in Zagreb, Yugoslavia. ISOT is an organization formed to keep engineers updated in current technology, much like our continuing education programs at various universities in the U.S. Ivan Stamac, acoustician at Zagreb Radio/TV, invited Don to participate in a 3-day program in October. Zagreb Radio/TV owns a TEF 12 and Dr. Stamac and his son are both acousticians and make good use of the TEF. Some 22 talented men and women came together for a perfectly hosted meeting.

Our host, Ivan Stamac, on the left

To find our hotel in Zagreb we asked a motorcycle policeman (Militia) and he gave us a motorcycle escort to the front door. The hotel Dubrovnik was directly on the Republic Square and the Croatians had just resurrected



the statue of Ban Josip Jelacia which had been removed in 1945 and saved from the Communists who had wished to destroy it. Zagreb looked prosperous and very busy. Their opera house is superb and we heard Verdi's Nabuko, with the students in the upper balcony. We walked back to the hotel after the opera fairly late at night and the street were still full of people enjoying their city. The Dinar is the official currency and just last January, because of severe inflation, they lopped off four zeros. Still, we were paying our bills with $100,000 dinar notes (about $1 U.S.).

Ernie and Viv Pence went with us. While Carolyn and I were in Zagreb teaching, they rented a car to go to the Yugoslavian Adriatic Sea Coast. They encountered the road blocks you may have read about and were glad to get back to Zagreb without undue problems. The states of Slovenia and Croatia in the north want their independence as separate countries. The Serbs do not want them separate. Only time will tell the outcome. Yugoslavia was a collection of separate peoples put together after WWI (Remember it was an assassination in Sarajevo of an Austrian Hungarian arch duke which gave the excuse for WWI). Strong man Tito held these disparate people together after WWII by repression and a strong personality. The glue has since evaporated and the times are troubled.

Yugoslavia is one of the most beautiful parts of the European continent. The people are exceptionally friendly and courteous. We rarely have seen as many large men as we did in Zagreb and if we wanted to recruit a professional football team, Zagreb would serve well as the place to do so.

One has only to look back a few years to find that these people have suffered unbelievable savagery. A village of 7,000 men, women, and children executed in reprisal for partisan activities. Celakula and its tower of skulls is somber reminder that men determined to remain free aren't broken by even the most fiendish crimes of the enemy.

We were reminded of how much of the Roman Empire's History centered here and how it was the territory now called Yugoslavia that enticed Ulysses to tarry on his way home from Troy.

A rebellious spirit has smoldered here throughout recorded history, flaming up in the medieval peasant revolts, the first republic of the Balkans at the turn of the century, and the partisan fighting of WWII. I know that I will hold in memory all my life the poignant conversation with two professors at Zagreb University where we were being entertained for the afternoon.

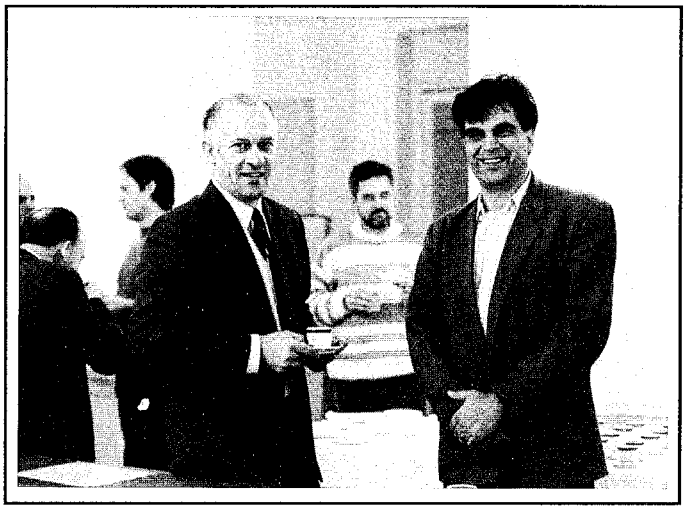
Yugoslavia is one of the most beautiful parts of the European continent. The people are exceptionally friendly and courteous.

We left Yugoslavia with the fervent prayer that some miracle will free their spirit from the blanket of anxiety they now live under.

European Driving (An Update)

Ernie and Viv reminded us that the kind of driving we so enjoy is not understood by a majority of United States drivers. One hundred twenty-five mph (200 km/hr) seems fast to the uninitiated. Too fast can be defined as any speed that one couldn't recover control of the vehicle if a tire blew off the rim. For some drivers that's 35 or 40 mph and for others, Grand Prix drivers for example, it's in excess of 150 mph.

In reflecting on how we came to enjoy such driving, especially when



it's raining hard, I go back to my ill spent youth and dreams of Mercedes and Auto Unions driven by the likes of Rudolph Caracciola (the Regenmeister) and Bernard Rosemeyer (the Nebelmeister) in rain and fog over courses like the mountain track at Nurburgring, and Spa (with its La Source bend that good drivers took at 150 mph in the pouring rain.) Such stories stirred an irresistible desire to emulate, even in a small way, such skills. My early heroes were men like Tazio Nuvolari who invented the four wheel drift and until Juan Manuel Fangio was a lonely legend.

Then after WWII, Carolyn and I sold our pioneer high fidelity store (The Golden Ear) and took the Queen Elizabeth to Cherbourg, France with our 1953 Porsche Cabriolet in the hold.

Our pilgrimage to the Porsche factory for a blueprint rebuild of our car followed by a run around the Mille Miglia in Italy. A 1000 mile road race circuit on ordinary two lane roads from Brescia in the north, down the Adriatic sea coast and over the mountains to Rome and then up the peninsula again to Florence, Turin, Milan and Brescia again was our youthful initiation to European driving.

We witnessed and reported on the fabulous Mercedes team with Fango and Moss. We rubbed against Mike Hawthorn, Peter Collins, and other great British drivers who competed in the same manner the RAF had over London in 1940-41.

Out on the roads, whenever we met another fast car, we'd simply go at it. We made many friends by either leading well or following hard.

The reason we limited our speed to 125 mph is because the car we had wouldn't go any faster. (Ford Sierra—they wouldn't dare introduce a car this good in the U.S.). It approached 1.0g braking at 0.9g cornering and that's something in a four-door, five passenger sedan with all the comforts. You can feel the front wheels hydroplane through your fingertips and the 5-speed gearbox lets you downshift at 110 mph (with care) to regain your front wheel grip on the road. Hands off braking at any speed left the car straight in it's tracks and the steering (which Ernie pointed out to me would be rejected by most women in America once they tried to park) was absolutely precise, and when let go of, whirled back to center and stability in a flash. Yes, Europeans export cars. No! they don't export them set up the way they do in Europe. Perhaps that's their ultimate expression of contempt for our retarded automotive attitudes.

Imagine driver's education where young people were put in small, but competent cars on skid pads to learn how to regain lost stability, where they were taught to use a gear box properly, how to modulate brakes against power, and learn what quick (1-1/2 turns lock-to-lock) steering does for you and what road feedback feels like through a good suspension to the seat of your pants.

The reason we limited our speed to 125 mph is because the car we had wouldn't go any faster!

Ignorance of what can be done chains a young driver in the bonds of ignorance reinforced by being introduced to bad machinery. The tragedy about bad machinery is that sloppy devices encourage sloppy thinking and it's the thinking that needs changing. Like the people in Plato's cave who think the shadows on the wall are reality and have their backs turned to the real world until they can somehow be turned around they'll prefer the familiar shadow world.

Munich, Salzburg, Vienna, Zagreb, Vienna, Linz, Fussen, Ottobeuren, and back to Munich. Not bad for two weeks with five days of it in Za-

greb. We had occasion to talk to tourists with their round of buses, castles and planned tracks, but we'll continue to operate on the packing two months into two weeks Davis plan.

Vienna

In Vienna we had some exceptional musical experiences thanks to Mr. Sobol of AKG who upon the request of Dr. Ahnert helped us get tickets to both the opera and the Musikverin. Gidon Kremer, violin, and Valerij Afanassiev, piano, were the artists and artists is a title they richly deserve. The entire performance was exceptional, but the Beethoven Sonata No. 9 "Kreutzer" with its fantastic third movement finale—presto—was one of the truly great musical moments in my individual experience. Perhaps it was the magic of the Musikverin, or the standing-room-only audience, or the total surprise of hearing greatness without having heard of the reputation of the artists.

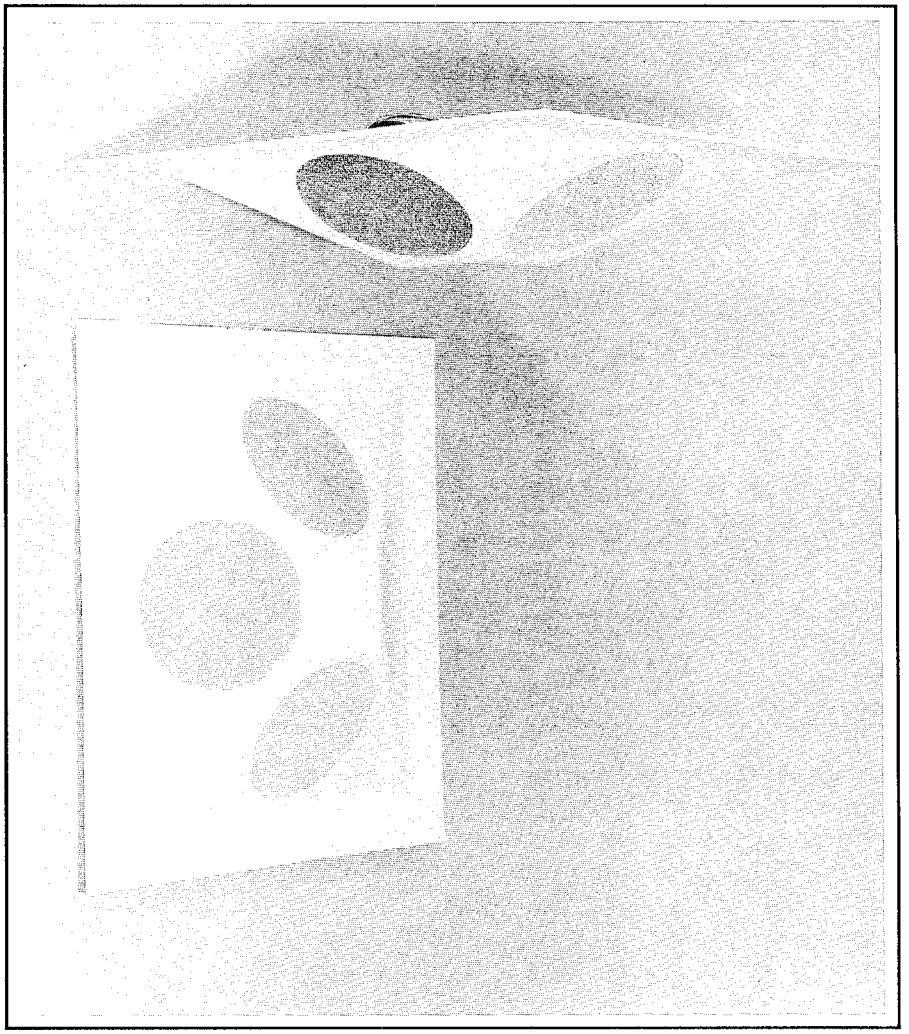
It was one of those nights in Vienna that in itself reminded me of the many rainy nights in other capitals of Europe with the lights reflecting from the wet streets and the massive monumental buildings rising around famous squares. The very atmosphere reeked of traditional homage to the arts and the dedication of generations of artists, listeners, and seekers like myself to the Muse.

I would not exchange life in the Indiana woods for life in Vienna, but I can't help enjoying the special moments while I'm there. As I've said in these pages before, "I am willing to live in a class system so long as I can be king," which, if you think about it, is what the good ole USA is all about.

"I Listen With My Bowels"

Many years ago when Carolyn and I had a Hi Fi store in Lafayette, IN, we'd attend concerts at the Purdue Music Hall. Often the next day our friends from the university would come to the shop and discuss the concert of the night before. On this particular occasion I said to an extremely well qualified music fan that I envied him his intellectual knowledge of music. He replied, "Intellectual hell! I listen with my bowels." His reply removed all barriers between me and the total enjoyment of music.

New Ceiling Speaker



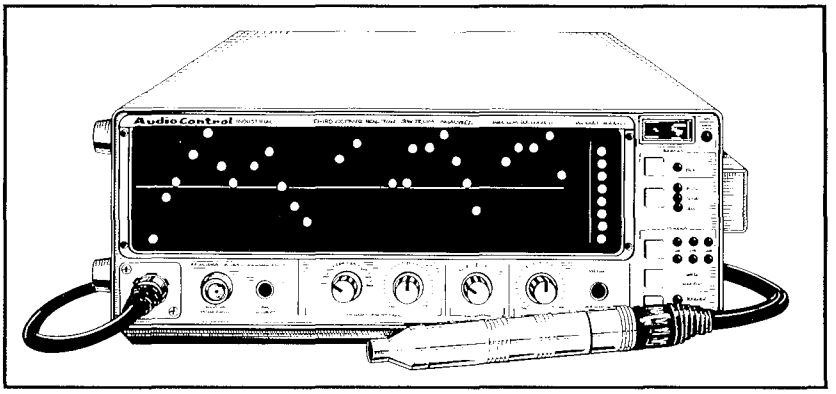
One of our grads, Emery Kertesz of LA East in Hatfield, PA, has designed a loudspeaker, the SD-48, for 2x2 suspended ceiling tile. He tells us that the speaker system uses four 8-inch drivers that are angled and cover a 360 degree pattern. Retail is $189 to $479 depending on qualtiy of cone speakers. It looks like an idea that should work well. We would like to hear from anyone who has installed the SD-48, especially two or more of them in the same ceiling.

I talked to one of the installers of LA products and found an enthusiastic user. Mike Dodson of Lawson Music said he uses two of the speakers in stereo configuration by wiring four speakers in each system L and R in stereo. That way people seated in a restaurant has a good stereo effect from two of the SD48-LC which retails for $259 each. For more information, contact L A. East, Inc., 127 Union Street, Hatfield, PA 19440. 215-362-2890.

Audio Control Industrial 1/3-Octave Analyzer

The Audio Control Industrial 1/3-octave Analyzer model SA-3050A is rapidly becoming an indispensable auxiliary in our master measuring system. The features that make it valuable to the serious measurer are:

1. Very portable battery operation for quick surveys of loudspeaker coverage.
2. Meets ANSI S1.11-1971 Class II, Type E standards (4 pole filters accurately spaced and calibrated).
3. Six internal memories with averaging of all six.
4. Has a printer output to Epson type printers.

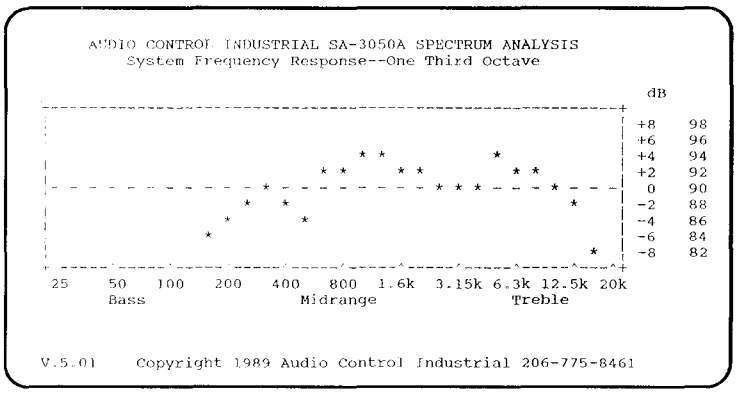


The SA-3050A has many other features not the least of which is the extremely reasonable price of $1,300.

The SA-3050A is an excellent first analyzer buy, not only because it does its job well for the beginner and is so easy to use that it encourages lots of "in the field" experience, but because it also, thanks to its microprocessor technology, fits into a more involved measurement system as well.

The system we will be demonstrating acoustic fundamentals with on the road consists of:

1. A TEF-20
2. Ariel SYSid
3. SA-3050A
4. Our 386-33 computer system.



We were, once again, impressed with Fred Fredrickson's acumen in choosing the 386-33 configuration for us after reading the latest computer magazines, utilizing a year's hindsight, that states that between all the 386 and 486 choices what Fred picked is the best overall choice.

The Most Profitable Ten Minutes of Your Time

FREE: J. W. Davis is making available to Syn-Aud-Con grads a 10 minute installation video for the SST-1 Speaker Support Truss (T-Bar Bridge) and the SE-1 Speaker Enclosure (Back Box). The video shows a step-by-step process of installing 8" speakers in a typical lay-in type ceiling. It requires less than 2 minutes per speaker to install the speaker assembly in the tile when using the SST-1 Speaker Support Truss.

It is an excellent video and you can't beat the price. Normally available on loan or for purchase at $14.95.

Tell J. W. Davis you read about the offer in the Syn-Aud-Con Newsletter. Box 26177, Dallas, TX 75226, 214-651-7341 (Dallas), 1-800-442-1564 (Texas), 1-800-527-5705.

Mechanical Impulse Noise Generator

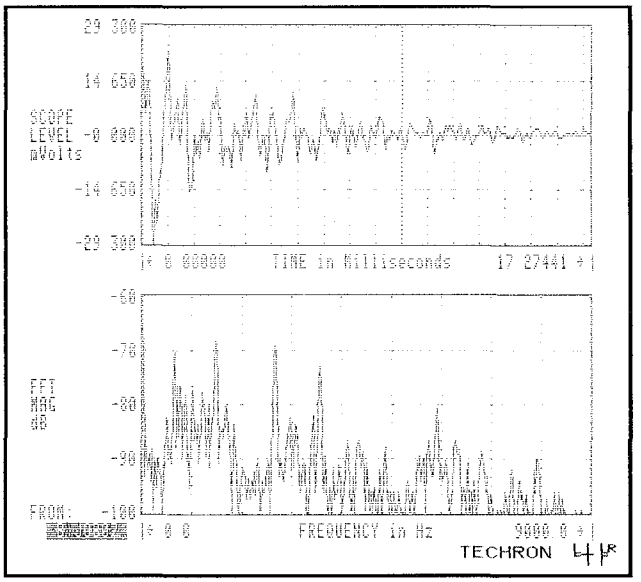
Wade McGregor has shared here another way to "shock excite" a sound reinforcement system. There is no sacred way to "properly" perform this type of measurement because there is no way to determine the "proper performer". What Wade has accomplished is to add one more useful tool to our toolbox. We are particularly interested in Wade's line of thought and his development of it. He thought it out, made measurements, and followed through with field testing.

It should be noted that Wade has paid particular attention to being able to "listen" to his signal. I especially liked his remark about "This allows judgments to be made in terms of direct arrivals (i.e., who gets there first), whether we are getting any benefit from amplifying the sound or actually making things worse, etc." It's experiments of this kind that lead to better knowledge of audio and acoustics. I also like his expression, "ears of experience".

From Wade McGregor

I have enclosed a description of MING (Mechanical Impulse Noise Generator). This method of "ringing out" a sound system has proven very effective to me and I thought that it might be of interest to others. The idea is based on the technique of sweeping a tone through the audio band while increasing system gain to establish feedback modes, as demonstrated to me in your SSD seminar. I have been using it during the past season and have found it simple and accurate.

The MING has a very distinct aural signature that allows a certain amount of judgment to be made on the quality of reproduction not possible using a more pure impulse noise (without analyzing instrumentation). The fact that it is acoustically generating the impulse allows direct comparison between the acoustic transmission and the reinforced sound from within the audience areas. This allows judgments to be made in terms of direct arrivals (i.e., who gets there first), whether you are getting any benefit from amplifying the sound or actually making things worse, etc. The MING does not replace the voice of the performer or the music rehearsal, but does allow some aspects of the sound system to be checked in their absence. I have instructed other sound technicians on this technique and they have found it to be faster and more effective than their previous methods.



Equalization of a Sound System Using a Metronome

The setting of gain and equalization within a sound system can be a difficult procedure. To assist in achieving consistent and reliable results there are many specialized instruments available. Unfortunately most of those instruments are too expensive or cumbersome for everyday use in amplifying speech and music.

I found an alternative in a local music store; a spring activated metronome. This proved to be an excellent alternative to the swept oscillator tone that Don demonstrates in Syn-Aud-Con classes. The acoustic output of the model I selected was approximately 73 dB SPL C weighted, RMS and so was close in output to an average speaking voice at 3 cm. Its output was consistent over time and required no subsequent calibration, maintenance or batteries!

The impulse generated has sufficient harmonics to create a format that allows the character of equalization adjustments made in the system to be apparent to the trained ear. The impulse is very quick to initiate feedback modes as the amplification is increased to their threshold.

The metronome is wound up and placed at the same distance as the performer (talker) is assumed to speak or sing into the microphone. Modifying the metronome to fit on a mic stand is recommended. The gain of the sound system is increased until a feedback oscillation is heard and adjustment is then made to the placement of the microphone(s) or loudspeaker (s), and if that is not possible, then adjustment may be necessary in the frequency response of the system (EQ). The gain is then increased until you are no longer able to make reasonable adjustments to eliminate feedback oscillation from occurring or you have arrived at a gain setting far in excess (greater than 10 dB) of the needs for that situation. If modifying the sound system physically or electronically is not appropriate then at least you are aware of the gain settings that are below the threshold of feedback and those that are not. With experience this method of setting gain in a sound system will allow judgments to be made in microphone placement, loudspeaker coverage, and equalization that have a consistent point of reference.

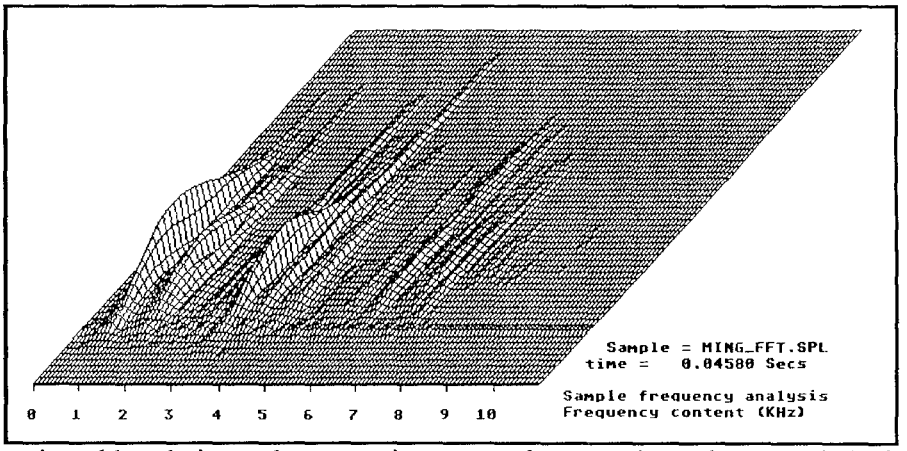
Comparisons Easily Made

With the metronome in place and ticking at reasonable rate (less than the RT_{60} of the venue?), it is easy to compare EQ settings, gain before feedback margins, stage monitor levels and their effects on "front of house" sound qualities, etc. The impulse will also show flutter and slap echoes, and other acoustic anomalies that may be masked when playing back music to check a system, as well as making open microphones that are near feeding back more obvious as they cause an increase in the apparent reverberation time (hollowness) of the room.

A direct comparison may be made to the amplified and acoustic qualities of the impulse by muting the system to allow a judgment to be made of whether tone or perspective are being altered in a positive manner.

The impulse makes many time domain distortions within a sound system, especially those that are the product of speaker placement, microphone placement, array interaction, etc., audible to the trained ear. The use of the impulse in setting signal delay within a system will reflect whether the arrival is within the integration time of the human auditory system and may be directly compared to the acoustic arrival time.

The sound of the metronome is slightly more pleasant than a swept sine wave at higher levels of amplification although it too becomes tiresome to the more highly strung individual after a period to time. It does not display phase cancellations within the system as obviously as the swept tone, as these appear as a subtle tonal balance shift in the character of impulse. The Ming is definitely an additional tool available to the sound technician rather than a replacement for them.



Measurements

The two printouts may help you visualize the acoustic nature of this device. One which you will recognize as an EasyTEF FFT display and the other, a screen dump of the FFT display in a sound sampler I use in my home MIDI studio.

The TEF measurement as made with a B&K 4007 microphone at 1 cm from the resonator port of the metronome, a Wittner Taktel Piccollo. I did a few overlays when making these measurements (not included) that seemed to show a very good correlation between impulses.

The 3-D FFT display from the sound sampler was made from the same metronome sampled at 22kHz. This seemed to display the most information, although of course, high sample rates did show the impulse rise time more clearly. The original sample file was recorded with an EV N/D 408 at 1 cm from the resonator port.

Conclusion

After a season of using the MING, I found I had been able to equalize a sound system in a shorter period of time, using less drastic EQ, achieve more consistent results, and have a high degree of confidence that the sound system was optimized to the venue. In those worst case situations where a soft spoken amateur performer would arrive too late for a mic check, or a professional performer would ask for a lot more monitor level during the performance, I was always confident that I had maximized the gain of the system without limiting the quality or intelligibility of their voice and I was aware of the range that would safely allow an increase in gain before any feedback would be audible.

The mechanical impulse noise generator is certainly not the only tool that can achieve this result, but it is a small, inexpensive, and wireless acoustic radiator. To be effective as a tool, the MING still requires sound systems that are in need of small adjustments, and not wholesale revision, as well as well-trained technicians with "ears of experience" to perform the appropriate adjustments.

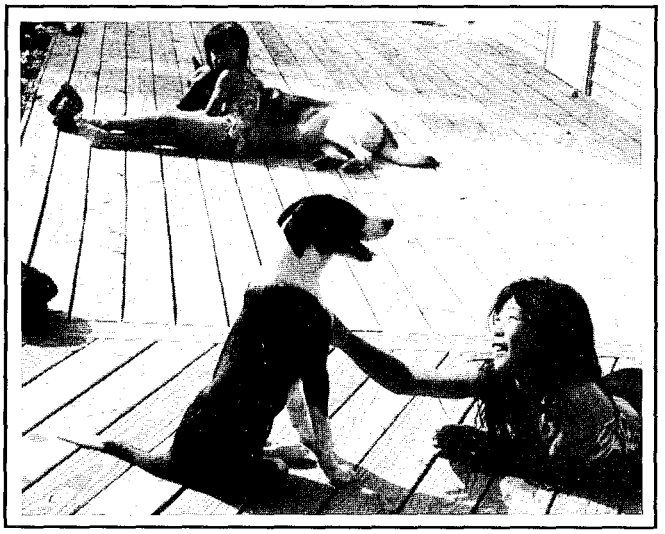
A Puppy Named Pedro

For several days we heard what sounded like a dog whining in the deep woods. Returning to the house one morning after the morning chores, I heard a whimpering distress cry under the low rear deck to the house. I was able to gradually coax out a little black and white puppy who was very hungry and afraid of the two German Shepherds hovering over him. After two full bowls of dry dog food, which the puppy lay in while eating it, he decided to totally wholeheartedly and without wavering in loyalty become a Davis dog. Since we now have a Poncho, Patch, Punch, Pete and Princess--why not have a Pedro. The first time we drove away in the truck it ran piteously after us, providing a clue as to how it might have come to be starving in our woods.

This morning, two weeks after Pedro's arrival, I watched him run joyously through the woods with Patch and Princess, at one point grabbing Patch by the tail and pulling hard.

Pedro has had a speedy learning curve such that:

1. He knows not to go near Princess's feeding dish if he wishes to remain among the living,
2. His dish is the one on the far left--but he still insists on taking a quick glance at the other two first,
3. A rifle in my hands means a walk in the woods,
4. When Patch and Princess have their noses in the ground up to their eyeballs, he can run in under their bellies a have a chance at a mole,
5. He has learned that cats are fast with their claws if you're deaf to their warning hisses, so he now has a built in bypass when the cats are in his path,
6. He's found that his soulful brown eyes and rotary rear end will get any lady visitor to pick him up,
7. Finally, he's found that if he sits still and endures having his ticks taken off with the long nose pliers, he gets a food treat for his stoicism. At one point he got so many ticks on him he had enough to start an independent political party.



Speaking of Ticks

Speaking of ticks--I've been able to better understand politicians through a careful observation of tick behavior. First, find a host with blood, then attach yourself to them and tax their supply. As soon as you're well established, bring in others on your back until you have enough to totally drain your host. It's not commonly known that when ticks bite politicians, they exchange mutual infections. The politician goes on the tax and anti-gun committees which are then headed up by the ticks who have been in turn infected by politician and have swollen to enormous size and power on federal blood. These committee heads that are, in actuality, disguised ticks can be discerned by two telltale clues. First they can't reason logically and believe things are animated and evil. Second, they cannot imagine even in the wildest stretch of their imagination that any individual is responsible for his or her own acts. A special subspecies is found on television raising money via religious appeals where their message is "give me your blood and you'll receive a special blessing." The most prominent disease ticks spread is the lying disease (often misspelled Lyme) which uniquely aids their favorite activities mentioned above.

TOA Introduces New Precision Signal Delay

TOA has just introduced the D-1103 one-by-three digital audio delay. The D-1103 has 10 µsecs increments (1/8-inch) from zero to 655 milliseconds (655,000 µsecs and 750 feet).

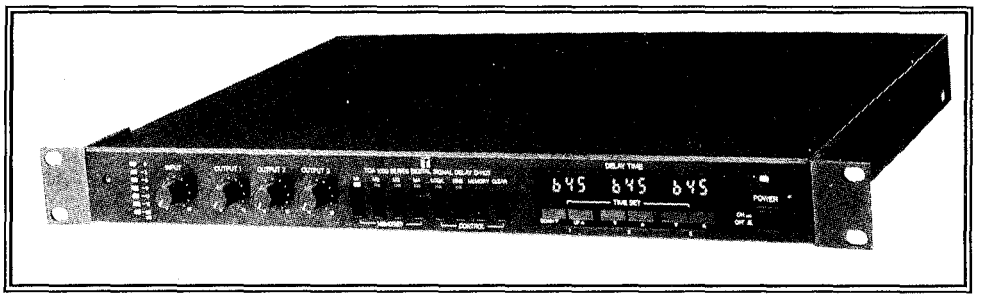
This one-rack space device uses 16-bit, 100 kHz A to D conversion. The noise floor is better than 90 dB below the signal and THD below 0.03%. Four non-volatile preset memories permit storage of delay information.

One feature we like is a rear panel "protect" switch that disables all front panel functions (except level controls).

We are very heartened by the number and quality of digital delay devices capable of accomplishing loudspeaker synchronization, but the TOA D-1103, like IRP and JBL, is one of the few that provides 10 µsecs adjustment. The TOA D-1103 ranks high in this special group of useful delay devices.

Chuck McGregor joined TOA this past year. McGregor was for many years with Jaffee Acoustics and more recently with Joiner Rose Group in the New York office.

The presence of Chuck McGregor at TOA has all the earmarks of a very useful advance in their communications with their customers, especially consultants. Chuck has the background necessary to the task and has the energy and drive to carry it through. He is now generating TOA application notes, the first of which is on the TOA Saori.



TOA 1000 Series D-1103 One-by-Three Digital Delay

A Winning Team

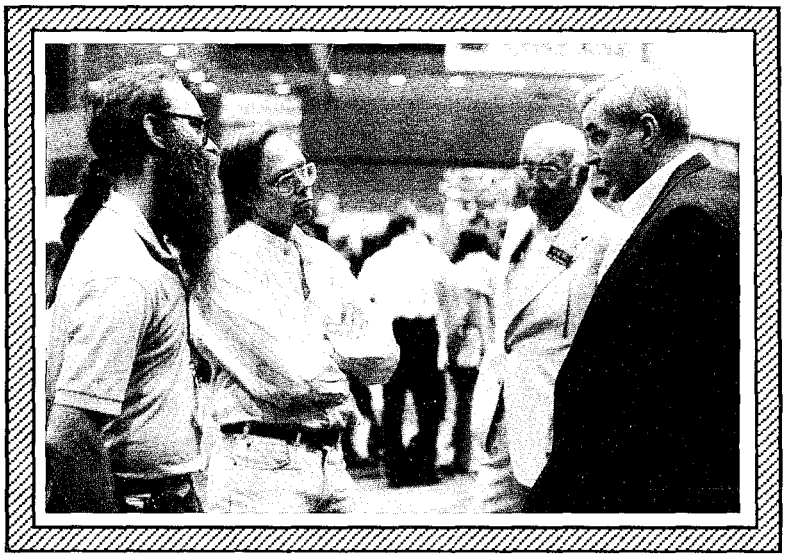
We walked up to Peter D'Antonio's booth at AES (RPG Diffusors) and who did we find celebrating the virtues of his new products but Dr. Prof. Manfred Schroeder.

The word synergy is exemplified by these two men. Greatness is in their countenances, their careers, and their relation with each other. Dr. Schroeder was delighted with Dr. D'Antonio's new work applying fractals to diffusion. Give Peter a mathematical hint and an advanced product line appears. His competitors truly have a hard row to hoe, and they indeed are "sweating and stealing a year and a half behind."*

**Taken from Kipling:*

"They followed all they could follow,
but they couldn't follow my mind,
so I left them sweating and stealing
a year and a half behind."

Do I What ?!



The two great mediators in this world are David Andrews and Ken Wahrenbrock, and they both are trying to work their magic at a chance meeting at AES. That's Bob McCarthy of Meyer Labs on the left with David, and Don is on the right with Ken. The startled look on Don's face came from Mr. McCarthy asking Don if he "believes in" FFT's. Such a question is shocking to one that paid $15,000 for a GenRad FFT in 1978 so that he could make early TDS measurements.

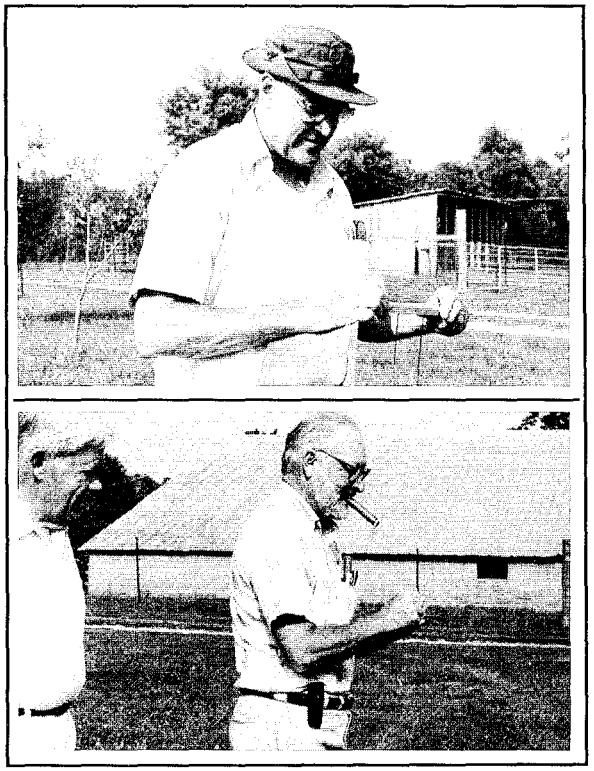
We found Mr. McCarthy a likable young man, and as with our very good friend, David Andrews, we don't have to agree to get along. As far as I am concerned, SIM remains a process being hyped in the press and having anti-gravity claims made for it. If it has any virtues, other than the obvious financial ones for the parties pushing it, they have yet to be demonstrated to the likes of us. But, we look forward to the time when we can have an objective presentation of SIM. It's promised.

The Power of Training and Belief

Water witching is an ancient and still practiced art in southern Indiana. We have repeatedly watched skilled witchers find buried water pipes and electric lines using everything from willow switches to the wires in a block of wood shown here. We are always delighted by the irrational so long as it is essentially harmless. The statistical laws of chance are often bent completely out of shape by true believers.

Our interest in water witching was renewed this summer when the "ditcher" arrived to put in a new water line. We told him that he would cross a separate water and electric line. He proceeded to take two pieces of baling wire and accurately located both the water and electric line!

When Ernie Pence, Carolyn and I carried the wires over the pipes the wires turned in our hands and pointed downward. When Gene Patronis attempted it, nothing happened, though some of us thought it might have turned upward toward the cigar as the stronger of the two influences. In fact that might be the answer: the cigar overwhelmed the wire and it cancelled to zero.



There are two schools of thought on this. One: a trained physicist will have to go without water or two: maybe there's a scientific flaw in water witching. If you have ever wondered what people who don't watch television do for entertainment, this represents a partial answer.

The story of Gideon, from the book of Judges in the Bible, has a wonderful passage regarding the selection of the most fit men for the attack on the Midianites' camp. Gideon watched how they drank water at the brook and chose those who were most alert and active and who didn't drop to their knees to drink, but lapped the water in their hands instead.

Today we have to be very alert that we are not being sold analyzers while we are on our knees lapping up ease of measurement, one button to push, automatic answers.

Recently I read in a magazine a promoter being quoted, I hope inaccurately, "We incorporated the STI and RASTI measurement because it removes human judgment and makes the measurement automatic." If you buy that theory, Gideon would send you home as not fit for battle.

The "drop to their knees, lap the water" individuals will often pick the unit that offers the most displays with the least thinking required.

People like to measure what's easy and familiar. Instrumentation companies have made a success of supplying well established, electronic tests in an easy-to-use format with acceptable accuracy. The measurements they make have relevance only to an electronic design laboratory.

What's my point? Those parameters that affect a human listener are what needs to be measured, and you need them measured accurately and meaningfully. That mandates the use of human judgment and lots of it. It means hard work in order to come to grips with the physical realities you are trying to measure. The realities are not going to adjust to the measuring device. You must adjust the measuring device to the realities. If it's automatic and unadjustable, you are stuck with a measuring dinosaur. Think before you buy; think even harder before you use; and, think hardest of all about the results you obtain from an analyzer for sound system work.

Editor's Note from Carolyn

When I typed Don's comments about measurements, I thought of a letter that I had written the day before to Cameron Grainger of Backstage, Inc., in Richmond, Virginia in answer to his fax asking when we were going to hold an application's oriented TEF Workshop. I would like to reproduce here an excerpt from his fax and an excerpt from my letter.

From Cameron:

"As a TEF 12 owner, a contractor, and basically a self-taught engineer, I have found that one of the most difficult tasks for me has been learning to interpret my data and correlate it with the room and my own ears.

"I would be extremely interested in a class structured around applications—interpretation. The hardware and programming I can learn on my own—the wisdom is not so easily acquired."

Letter to Cameron Grainger

"I appreciate what you are saying about measurement interpretation being so critical, and not easy to learn on your own. One can read a manual and learn how to make the measurements—albeit frustrating and time consuming. But, it takes someone with experience to teach you how to interpret the measurements.

"We had a wonderful example of this in Europe when the TEF analyzer was brand new. We had a class in a control room in a famous recording studio. We made a measurement to show them how to find the direction of a reflection. We put Sonex between every surface in the place for about ten minutes (sweating all the time), and we could only get the reflection to go down 3 dB—not very impressive amount for a strong reflection. Finally Don realized that it was a double reflection coming in at precisely the same time from floor and ceiling. When he put Sonex between both surfaces at the same time, the reflection was completely negated—with a great sigh of relief.

"We met Mr. Peutz later and Don just barely got started relating the experience and Mr. Peutz interrupted him to say, 'Oh, you had a dual reflection!' Don said, 'How did you know?' to which Mr. Peutz said that when the reflection went down 3 dB, you knew that you were intercepting only one path of the reflection. Now we know and can never be fooled by that again.

"There are so many things like that hidden in every measurement. Don has loved measurements for many years and used to spend every nickel he had on instrumentation (he still spends plenty, but not the proportion of total income that he used to). That gives him forty years experience plus he has had the opportunity to learn from some real masters."

Sound Reinforcement Classes in Phoenix

Walter Rapaport attended three Syn-Aud-Con classes in one year, so we had an opportunity to get acquainted with him. It was great to hear that he will be teaching classes in sound reinforcement and equipment trouble shooting at the Conservatory of Recording Arts and Sciences in Phoenix. Walter specializes in location recording and sound reinforcement and has 20 years experience in sound system design, live recording and concert sound, including major tours with Bill Graham's Fillmore Productions and Procol Harum.

Last winter Diane and Walter Rapaport invited us to visit Jerome, a very picturesque ghost town in N. Arizona. Diane gave us a very special tour of this unusual town. It was built precariously on the side of a steep mountain. The projecting hill is a billion dollar hill that has produced gold, silver, lead, copper and other precious metals. Unbelievable wealth has been made, spent and lost there. My favorite story about the town is how the "House of Joy", now a restaurant, was saved in one of the holocaustic fires that regularly swept Jerome. You can easily imagine how fast the jerry-built town on the side of a sheer cliff could burn. The "House of Joy" as the name might suggest was a brothel and the Madam was the wealthiest woman in Arizona at the time of the story. As the fire roared toward her establishment, she offered lifetime passes to any heroic men who would save it. Witnesses reported that the charge up the mountain to save the building had to be seen to be believed, but then these were lusty men in lusty times.

Going back to Walter and his teaching assignment in Phoenix, if you are interested in more information, call 1-800-562-6383.

Intelligibility II Workshop

In October 1990 a second Speech Intelligibility Workshop was convened at Indiana University under the auspices of Syn-Aud-Con. Dr. Larry Hume of the I.U. Speech and Hearing Department and Peter Mapp, prominent British acoustic consultant, helped conduct new research into the use of the existing algorithms.

TEF-12 and TEF-20 analyzers were the primary tools with Modified Rhyme test tapes from Dynastat were again used with the live listeners. We were fortunate to have Sonic Perception's Aachen Head and their digital BAS (Binaural Analysis System). Mahlon Burkhard and Ed Wolfrum from Sonic Perceptions were distinguished additional staff.

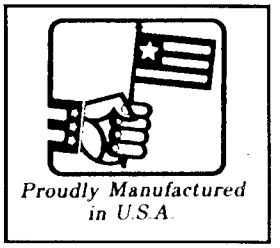
The results from the workshop are exciting and important. We are preparing the report now. The report and DAT tape will go to members of the workshop first; we will get their feedback, then a Tech Topic will be written for a Newsletter mailing.

The Positive Terminal

WPW WEST PENN WIRE

In the midst of all the fraud and fury of phoney cables we want to remind our readers of the solid citizen wire manufacturers who work so hard to serve the sound contractor business with integrity.

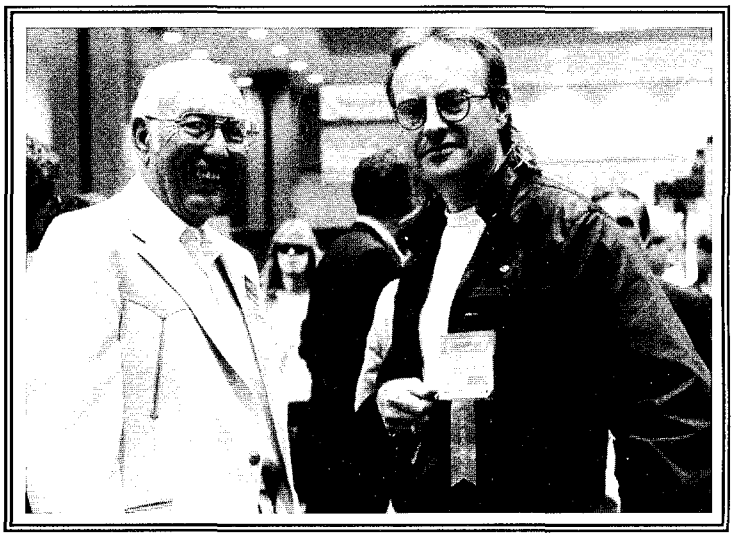
West Penn Wire has been a loyal and early supporter of NSCA. They have concentrated on the legitimate needs of the sound contractor and built a business to serve those needs.



Wire is a bread and butter business that doesn't necessarily have a lot of glamour but a good reliable wire line that lets you be competitive in a tough marketplace does have an appeal all its own.

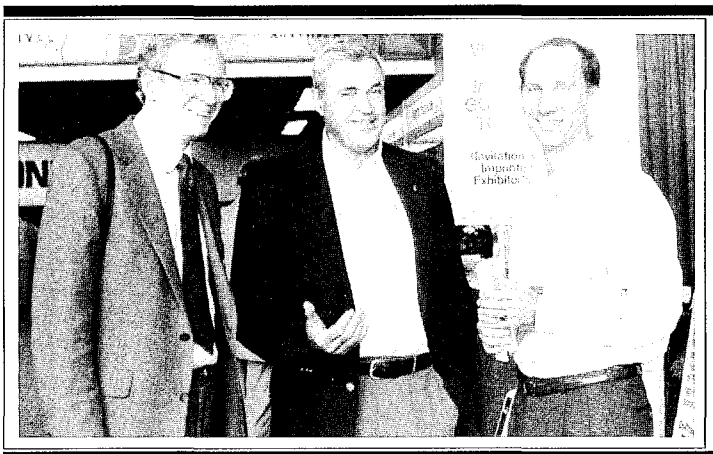
So, while we'll continue to lambast the fairy tale producers we want to salute the truly good producers for continuing to market excellent products without the need of false claims.

PZM Innovators



It takes real talent to recognize real talent. That's PZM innovator, Ken Wahrenbrock* on the left, and SASS (a PZM advance) innovator, Mike Billingsly on the right. As one would suspect, when two creative men meet, they are equipped to appreciate each other's work.

**We have so many people asking us about Ken. The picture says it all: a happy man in beautiful physical condition. Ken celebrated his 70th birthday by riding 99 miles on his bicycle and he celebrated his 71st by riding 101 miles (to make up for being short one mile on the 70th)—and it wasn't downhill. In fact, there were a lot of hills and headwinds.*

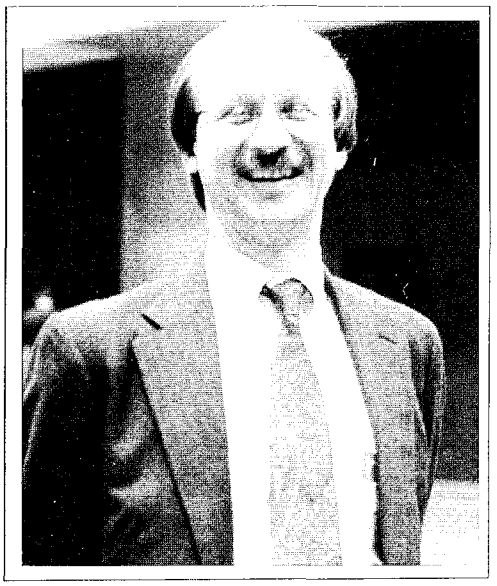


Mark Ureda

The Mu Factor

That's Mark Ureda on the right with John Prohs and Don. Mark put that smile on Don's face by telling him about a change in his employment which brings him back into acoustics. For newcomers, Mark is the man who originally identified the apparent apex (now renamed acoustic center) problem in constant directivity devices, among many, many other contributions to better horn design.

Why is This Man Smiling?



First, he has a beautiful wife and a new baby daughter, a well advanced career in loudspeaker design, he's on the staff of the Syn-Aud-Con Loudspeaker Designer's Workshop, and finally, he's among friends and feels the joy and exhilaration that goes with personal accomplishment and peer recognition. He's Jay Mitchell, famous for the Frazier Cat series and presently with Sonic Associates in Birmingham.

Talent

You can tell from all the pictures taken at AES that we enjoyed seeing old friends and making new ones. We don't often take a camera along to AES, but we did this fall and we are delighted that we did. Here we have Bill Gelow of Renkus Heinz, Dr. Ahnert of EASE fame, and Mike Billingsly whom we admire for his creative SASS microphone work and his excellent sample recording distributed by Crown, and of course, that is Don on the right.

These men are at the most creative stage in their careers and it's always exciting just to sample their enthusiasm for and insights into new and better ways to do what we do.

More Dorian Recordings

If it seems to you that we tend to over do raving about Dorian Recordings it's probably because you haven't heard them yet. We have been introduced to many worthwhile artists listening to Dorian Recordings. It's not that we don't appreciate many of the offerings of the major labels and the big name artists, though many times we find ourselves wishing some of the greats had received the sensitivity and integrity inherent in Dorian's engineering.

It's always an additional special thrill to both hear well recorded familiar music and then realize that the artist you are hearing is matching artistically the technical quality.

I make no claims as to artistic criticism so my remarks are from the heart, not the head (exception - the technical quality remarks.)

Schubert: The Complete Works for Violin and Piano, DOR-90137. The 2 CD set with Jaime Laredo, violin, and Stephanie Brown, piano, is an outstanding example of what we are talking about. When we listen to these two discs, it takes only a split second for the machinery to disappear and for the music to transport us to a new emotional level of total delight.

Smetana: The Complete Czech Dances DOR-90122 with Antonin Kubalek at the piano is another of the Dorian Recordings that we find ourselves playing over and over with the illusion that we have a personal pianist in the house to cheer and inspire us with his playing.

I suggest that if you like this kind of music superbly recorded, you should write Dorian Recordings for a complete listing: 17 State St., Suite 2E, Troy, NY 12180, PH 518-274-5475, FAX 518-274-4276.

Professional Services

Acoustical Consultants may list their cards on this page. There is no charge. The only requirements are that you are a full-time consultant, that you have attended a Syn-Aud-Con seminar, and have an active subscription to the Syn-Aud-Con Newsletter. If you would like to be on our Consultants page, send in four (4) business cards for our file.

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Is It The 1890's or The 1990's?

It's the next to the last day of December on a frosty morning. The sun appeared at 7:45 a.m. with a sky blue as only a cold morning can deliver. There is white frost on everything in sight. The ground is frozen on top and soft just underneath so that every step is supported, but cushioned. The dogs are with me, of course, and we work our way through the woods toward the back field via the main trail. The white sheen covering everything leads me to the center of the field slightly to the north. Pedro and Patch have their noses to the ground and are doing wide hopeful circles. I look north and see a different dark shape at the edge of the woods. I stand quietly for a moment and the shape raises its head to reveal a doe with a fawn. It just stands there and looks back at me. The dogs can't see them because they're too close to the ground. I quietly call "come" to the dogs who immediately obey thanks to no competing attraction. The doe and fawn don't move, but four more deer quietly begin to leave the field just beyond the first two deer. I decide to turn to the left so as to not disturb them since it's only two days past hunting season for firearms. The dogs and I walk downhill toward the creek that flows past the house. As fortune would have it the deer have decided to circle as well and halfway down the slope Patch suddenly raises her head and then turns on the afterburner. Pedro follows with blind enthusiasm and a series of "yips." Chaos ensues!

As I stood there watching, I couldn't help but wonder what, if anything, was different when the picture of my great grandfather was taken in the Ozarks back in the 1890's. He was in a woods down on the Current River in a deer hunting camp. The woods in the picture are indistinguishable from the woods I'm standing in, the deer are more plentiful now thanks to hunting licensing fees and conservation measures, and the concerns in my mind are different, but the physical setting could have been in any era of hunting man. My maker had allowed me a glimpse of eternity where time was no more and I was the witness to a perpetual scene.

As I now write, I'm sitting at the dining room table wrapped in the warm glow of the fire in the wood stove. It's the last day of 1990 and a light snow now covers the ground. Once again I'm in an 1890's sense of things. The table I'm writing on was my great grandmother's in Missouri, and it may have been her mother's as well.

Carolyn is feeding literally hundreds of birds on the snow covered deck that sets high above the flooded branch that is five times normal size from the rains we have had plus the melting of an eight inch snow just two days ago.

Pete, the cat, watches the birds through the floor to ceiling window with an intenseness of an African lion with an extra tasty tourist in view. Carolyn also has bird feeders on the outside of the window and, on occasion, Pete has exceeded six times his height in leaps on the inside, not understanding the magic of glass.

What does all this 1890's ambience mean to audio and acoustics? When you immerse yourself completely into an environment without external outside input, your mind can relax sufficiently to output new and complex combinations of inputs stored away over the past year. For me, forty years of wonderful memories surface, especially of the giants I have been privileged to know and work with. I had an appreciation for the uniqueness of those individuals when I was with them. Future generations can only imagine their greatness.

Our wish for all of you is that you too seek out a quiet, contemplative haven so that you enter the new year refreshed, inspired, and appreciative of the remarkable people all around you.

V. M. A. Peutz

The very name is a title. Mr. Peutz is now officially retired from his consulting firm and like all inherently creative men, busier than ever. He was at AES with R.N. Metkemeijer of Peutz & Assoc.

Carolyn and I went to the Orange County Performing Arts Center to hear the Concertgebouw Orchestra which Mr. Metkemeijer and Mr. Peutz were recording for their on-going file of this orchestra in concert halls around the world.

Classified Ads

FOR SALE: Magazines (back issues): dB, REP, Sound & Communications, Radio Electronics, Modern Recording, Electronics World, Audio, IEEE/IRE Transactions on Audio & Electroacoustics, J. Audio Engineering Society, Stereophile, The Absolute Sound, Audio Journal, International Audio Review, Sensible Sound, Audio Amateur, Sound Advice, The Audio Critic. Many from Volume #1 and early 1960's to present. Call for specific dates and prices.
CONTACT: Tom 214-392-7591

FOR SALE: NEI 1010 Octave RTA/Noise generator/ octave EQ $225, NEI 2709 1/3-octave RTA/Noise generator rack mountable. $400, 8-track recording equipment: Otari 1/", StudioMaster 16x8, outboards.
CONTACT: Brent Gabrielsen, Gabriel Engineering, Ph. 602-969-8663 or fax 602-834-9511.

FOR SALE: TEF-12 Analyzer—new condition.
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October Farm Seminar 1990

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