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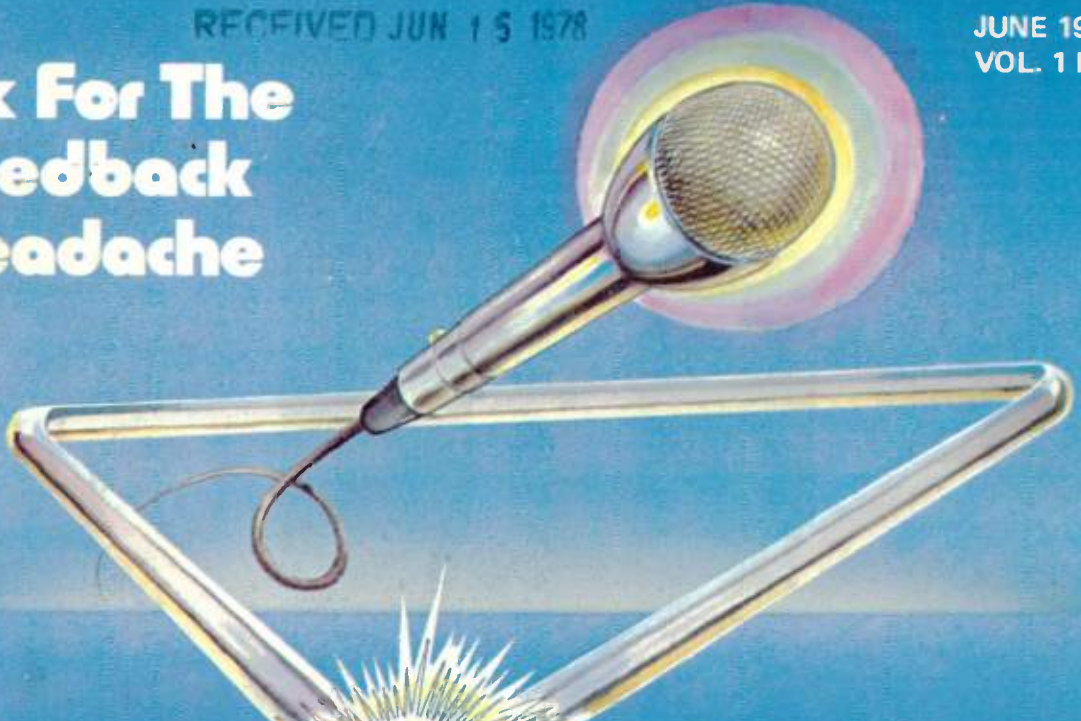
SOUND ARTS

M E R C H A N D I S I N G J O U R N A L

RECEIVED JUN 15 1978

JUNE 1978
VOL. 1 NO. 5

Rx For The Feedback Headache



The Complete
Consumer Seminar

Mixing the
Marketing Elements

How to Set Up a PA System



*In this studio,
you don't get a second take.*



When you perform in front of a live audience, you put everything on the line.

That's why you're so careful in selecting sound reinforcement equipment. Because once the music starts, you can't afford to have it stop.

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That's why we designed our PM-1000 Series mixing consoles to the highest standard of quality and reliability. Professional.

Whether it's our 16-, 24-, or 32-channel model, the PM-1000 Series is capable of surviving the kind of punishment and abuse that only "the road" can dish out.

Tough isn't enough. Realizing that every job has different sound requirements, Yamaha also designed the PM-1000 Series for maximum flexibility. With

features like an exclusive 4x4 matrix with level controls that allows four independent mono mixes.

There's also the complete complement of controls you'd expect to find on the most sophisticated consoles. Transformer isolated inputs and outputs. Dual echo send busses. An input level attenuator that takes the +4dB line level to -60dB mike level in 11 steps. Plus 5-frequency equalization. To give you plenty of headroom for clean, undistorted sound, the PM-1000 can drive a 600 ohm load to +22½dBm.

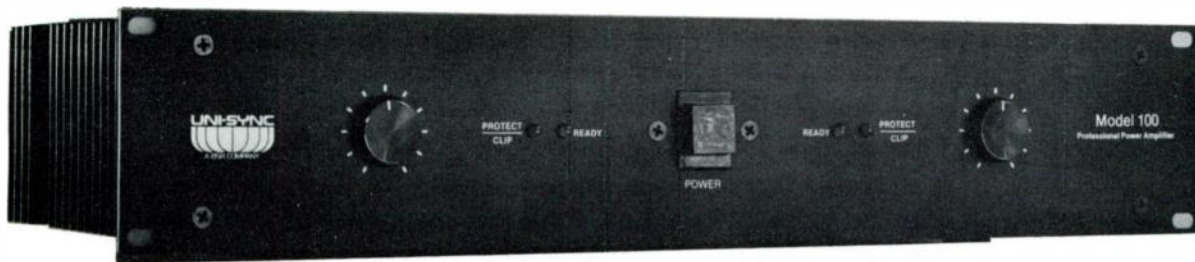
Get your band on the wagon. All around the world — night after night, gig after gig — you'll find Yamaha mixing consoles the choice of more and more professionals. People who don't regard professional quality as a luxury, but as a necessity. Your Yamaha pro sound dealer can give you all the reasons why you should join them.  **YAMAHA**

CIRCLE 87 ON READER SERVICE CARD

WRB

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THE UNI-SYNC DUAL PROFESSIONAL POWER AMPLIFIER MODEL 100



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Specifications: 8 ohm power outputs; 100 watts average continuous power per channel; power band 20Hz to 20kHz. Total Harmonic Distortion: .02%. Intermodulation Distortion: Less than .004% @ rated output. Frequency Response: -3Db 1Hz and 100kHz. Fully complimentary output.

Protection Features: On/off transient speaker protection circuitry for DC offset; SOA limiting circuitry; Independent Thermal Shutdown; and Available Power Monitor, provides accurate LED indication of amplifier status.

UNI-SYNC has made significant strides in the design and packaging of the MODEL 100 and companion power amplifiers. We invite you to take an inside look at the MODEL 100, see your local dealer or write for a free brochure.



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It was a market.

- 1970** First 4-Channel Tape Recorder with Sync for less than \$1,000 (TCA-40)
- 1972** First Mass Produced 4-Channel Tape Recorders with Sync. (A-3340 & A-2340)
- First Studio Quality 8x4 Audio Mixer for under \$2,000. (Model 10)
- 1973** First Studio Quality Recorder/Reproducer to provide 8-Tracks on Half-inch tape. (Series 70)
- 1974** First Mass Produced 6x4 Audio Mixer for less than \$300. (Model 2)
- 1975** First Studio Quality Mass Produced 8x4 Audio Mixer. (Model 5)
- 1976** First Studio Quality Mass Produced 8-Track Recorder/Reproducer for less than \$3,000. (Model 80-8)
- 1977** First Studio Quality Mass Produced 16-Track Recorder/Reproducer to use One-inch Tape and cost less than \$16,000. (Model 90-16)
- 1979**

TEAC[®]
First. Because they last.

When we introduced our first multitrack tape recorder in 1970, we were so far ahead of everyone else that many people thought it was a quad machine.

But the customers we built it for knew exactly what it was: a four-channel tape recorder with sync for overdubbing that cost less than \$1,000.

Since then, TEAC has continued to develop new products with price/performance breakthroughs as big as the market we discovered.

In fact, multitrack products—including our TASCAM Series—make up one of the most innovative and successful lines in the history of this business judging by the number of dealers who became wealthy selling it, and the number of competitors it spawned.

Getting to the market meant breaking a lot of rules and killing a lot of sacred cows. We put eight tracks on half-inch tape, for one example. And 16 tracks on one-inch tape, for another.

Doing things like that required a profound understanding of our customers' needs and their goals. But still it wasn't easy. We invested huge amounts of time, money and manpower to develop the market.

We created software to demonstrate how the products work. We developed consumer awareness through innovative sales programs using the latest videotape techniques. We even made consumer sales easier through our unique Finance America credit program.

Today, the power of the market is being recognized at last.

As profitable as it is, though, the business may not be for every dealer. It requires commitment, skill and imagination. So if you'd like to explore your potential in this market, drop by the TEAC Exhibit at the CES or NAMM Show. It could be *your* best idea.

TASCAM SERIES BY **TEAC**[®]

A new generation of recording instruments
for a new generation of recording artists.

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CIRCLE 94 ON READER SERVICE CARD

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CONTENTS

THE FEATURES

28

CONSUMER PROFILE: HOW TO SET UP A PA SYSTEM

By Doug Caraway

A West Coast retailer makes suggestions for optimum performance—and minimum hassle.



32

Rx FOR THE FEEDBACK HEADACHE

By L.A. Krause, Jr.

Peavey's engineer prescribes for the common good.



38

MIXING THE MARKETING ELEMENTS

By Eric Gaer

The president of the L.A. based ad agency, Gaer and Associates, discusses the retailer's marketing mix.

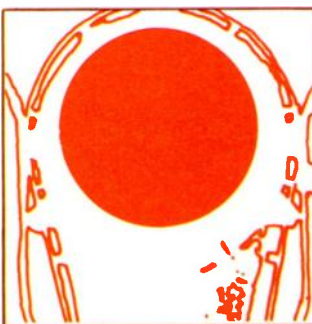


42

WHYS AND HOWS OF SUCCESSFUL CONSUMER SEMINARS

By Linda Feldman

The former TEAC training manager gets down to the nitty gritty of providing your customers with a learning experience.



THE STAPLES

PUBLISHER'S LETTER

6

EDITOR'S LETTER

8

FORUM

Sound Arts' Open Communication Line

10

TERMS

By Bob Heil, Mike Beigel, Larry Blakely

A Continuing Industry Glossary Of Commonly Used Audio-Oriented Terms With Their Definitions Angled Toward Today's Dealer

13

TROUBLESHOOTER'S BULLETIN

Easy Troubleshooting Tips That Will Relay To The Dealer Those Troubleshooting Items Not Readily Realized Or Understood By The Outlet's Staff.

16

COMMON CONSUMER QUESTIONS

The Questions Most Asked Of Dealers—Answered By 'Those In The Field In The Know.'

20

SOUND SHOPPE

By Charlie Lawing/Memphis Strings and Things
Memphis Strings And Things' Own Covers The New 'Goodies On The Shelf' for Sound Arts.

22

SO YOU WANT TO KNOW: FREQUENCY RESPONSE

By Craig Anderton

Part II Of A Primer On The Subject Of 'Sophisticated Audio' By This Noted West Coast Author.

26

DEALER DOSSIER

A look At L.A.'s Federated Group

48

INDUSTRY UPDATE

The Latest 'Poop' From Our Business Community

54

ADVERTISER'S INDEX

58

COMING NEXT ISSUE!

A Look at Polyphonic and Monophonic Synthesizers

An Overview of Effects

The Sales Seminar

Developing an Advertising Plan

Cover Illustration By
Frank Johnson

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panied by return postage.

A LETTER FROM THE PUBLISHER

Approximately one year ago at this time (the CES and NAMM summer season), several manufacturers approached me regarding the possibility of an educational trade journal for dealers and floor salesmen. At that time, I must admit, I was one of the first people to say, "Who the hell needs another trade book?" However, rather than give a definitive yes or no, I decided to study the dealer networks of several major audio and musical instrument manufacturers. After three months of homework, I became aware that there was, indeed, a severe need for a source of reliable and sophisticated educational material for retailers involved in the merchandising and selling of creative audio equipment and electronic musical instruments and accessories. So in November of 1977 SOUND ARTS Merchandising Journal began production. Its first issue arrived at the CES & NAMM winter shows cover-dated February 1978. Steve Caraway was transplanted from Los Altos to Port Washington in late November, and in eight grueling weeks turned out our very successful first issue. The major concern I had was to have SOUND ARTS sent to dealers as the only truly educational merchandising journal for what I believe to be a whole new active creative audio and music market. With this, our fifth issue, I am proud to say I feel we are on our way to accomplishing that task. Our dealership circulation is already in excess of 13,000 and our editorial goal has solidified.

In a very short period of time SOUND ARTS has become the highly visible, most talked about kid on the block. While that's nice, it's really not good enough. The educational process must travel a long way to keep pace with the technological developments in the semi-pro or professional marketplace. Understanding the product and its application is difficult enough, trying to merchandise and sell it to an anxious consumer becomes another problem. To attack this problem, we welcome Judy Lipton (former editor of *Audio & Electronics Digest*) as Editor to help us all become more adept at understanding and servicing this new market. As Publisher, I ask that you — the manufacturer & dealer — continue to give us as much input as possible.

In closing, I would like to take this opportunity to thank you for your support in helping us reach the people who reach the people.

Cordially,



Vincent P. Testa
Publisher

HOW MANY OF THESE FINE MUSICAL INSTRUMENTS DO YOU CARRY?

Selling multi-track tape recorders without dbx tape noise reduction is like selling electric guitars without amplifiers.

Why dbx? Why tape noise reduction at the semi-pro level?

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dbx tape noise reduction is easy to operate, too. Level calibration is unnecessary, and gain riding is seldom required to produce noise-free, full dynamic range recordings.

dbx 155 and 158 are fully compatible with the professional line of dbx equipment used by larger studios worldwide. We supply 2, 4, 8, and 16-channel versions, as well as dbx mono and stereo compressor/limiters. So now your customers can make demos and take them right to the big guys for anything from an audition to a record pressing.

Sell a key ingredient that will help today's aspiring talents to become tomorrow's recording stars: dbx tape noise reduction.

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A LETTER FROM THE EDITOR

Port Washington High School sits across the boulevard from our SOUND ARTS offices. The only thing unusual about Port Washington High School is its absolute normalcy. In affluent suburbia the *heads*, the *jocks*, the *wimps*, and the *brains* carry on their rivalries as they did in different incarnations in different times.

There's a strong music department at Port Washington High. The choir and orchestra people make international tours and perform in Manhattan each Christmas.

But as in schools all across the country, it's the unofficial musical population that's really interesting. There are several area bands made up of Port Washington students. The L.I.E., Mazarin and several single acts perform regularly. And when Port Washington High recently staged a show, the *school* borrowed the sound equipment from the *students*. In a reversal of roles, the traditional experts had to take advice from those they normally teach. The kids set up, tore down, and in between they performed on sophisticated electronic instruments.

Which brings me to part of the reason I'm here. As I said, the only thing unusual about Port Washington High School is its absolute normalcy, its position right smack in the middle of major American trends. And one of those trends is participatory sound.

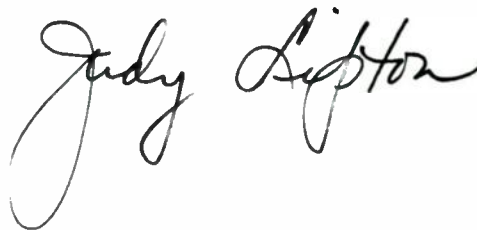
When word went rippling through this industry that a new trade magazine was breaking, I was interested—professionally—as an audio trade writer and editor. When I first saw SOUND ARTS MERCHANDISING JOURNAL, my reaction was (and still is) that this was a super property.

It's kind of neat that I'm beginning my tenure here during the month of both NAMM and CES, because it gives me a chance to renew industry acquaintanceships in a new guise.

SOUND ARTS readers are a voluble and cooperative lot. They've been giving us good information and good suggestions. I trust that will continue. Now that the Journal is an established entity, our efforts will be toward strengthening the vehicle and further defining and responding to the needs of our industry.

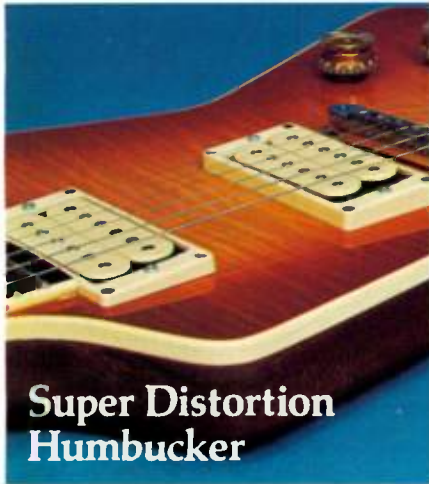
Keep that good information coming. The Archies and Veronicas of Port Washington High are swift turning into grown-up knowledgeable consumers. They're your customers, and SOUND ARTS can keep up the free flow of information on what they know and need to know—and how and what to sell them.

Regards,

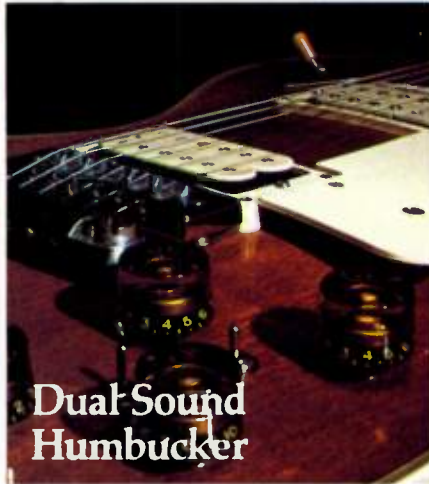


Judith Morrison Lipton

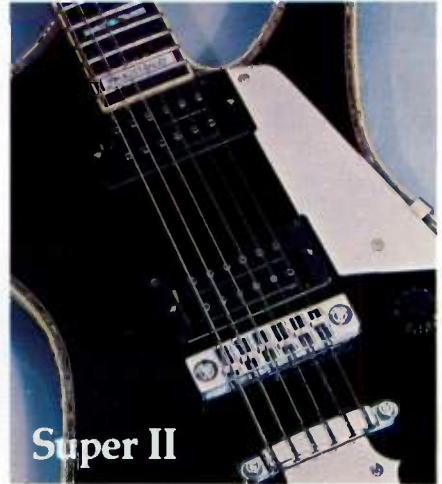
Don't choose one of these for our sound. Choose one for yours.



**Super Distortion
Humbucker**



**Dual Sound
Humbucker**



Super II



PAF

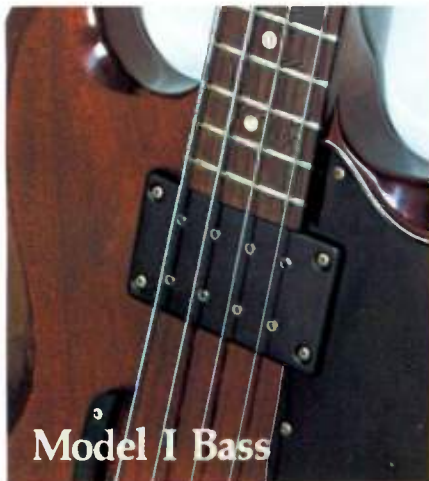


SDS-I

We also make the FS-I and Pre B-I direct replacement pickups for Stratocasters and Telecasters.



Model P Bass



Model I Bass



**Acoustic Model
& Acoustic Model II**

For a full color catalog on all our fine pickups, send 75¢. Also, if you'd like a poster of this ad, send \$1.00 to cover postage and handling.



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CIRCLE 99 ON READER SERVICE CARD

FORUM

With the first edition of SOUND ARTS, it looks as if the electronic music industry may be reaching adulthood. But, then again, the majority of manufacturers seems to feel differently. It seems odd that I can go down to the local drug store and purchase a \$16.99 tape recorder that includes a schematic diagram; but when a customer spends up to and over \$1000 for high end music products, a schematic is rarely included.

As a technician, there is no reason why I should not have the benefit of schematic diagrams with every piece of equipment we buy—whether or not we are a service station for that particular line. Further, as a service tech, I will use whatever influence I possess with our buyers and our customers to steer them to the lines of merchandise which include schematic diagrams, and away from those lines which do not. The benefits to the technician are obvious. The benefits to the customer, however, are not so obvious at the time of purchase; but, in the long run, they far outweigh the benefits to the service technician, as I point out to prospective customers.

Best of luck with your excellent magazine; it is sorely needed.

Dennis Garsh
Hogan's House of Music
Lawndale CA

Just wanted to drop a line and say that I liked the article you constructed from our conversation. In fact, the issue looks great altogether. Hope to see you in Chicago at the NAMM Show.

Robert B. Easton
President
360 Systems

I am pleased that the Coffeen organization was able to supply you with such an excellent cover shot for the April issue. I am surprised that they weren't a contributor to the interview.

It does concern me that none of the

cover products were identified. In fact, they are all Electro-Voice products. Unfortunately, the cover credit doesn't even tell where Coffeen is located—making it impossible for anyone not already "in the business" to get any additional information. Anyone not familiar with the famous "white horn" would read the feature article and automatically assume that they were Altec or JBL components. Not so!

I look forward to seeing similar articles, and I hope we might have the opportunity to participate to a greater degree in the future. Keep up the excellent work.

Very truly yours,
R. Timothy Rooney
Director, Advertising & Sales
Promotion
Electro-Voice, Inc.

[Coffeen, Anderson and Associates, Inc. is located at 5805 Outlook, Mission, Kansas 66202—Ed.]

First of all, I would like to congratulate you on a superior audio publication.

I was particularly interested in the article on equalizers, by Jim Furman, in your March issue. In fact that is my main reason for writing. I was hoping to obtain additional information regarding parametric equalizers. I would like to obtain a manual of some type on the different brands and models of parametric equalizers. If this is possible, it would be greatly appreciated.

Debra M. Mackes
D.M. Recording

Just got done reading the May 1978 issue of Sound Arts and would like to commend you on a job well done.

I read with interest Larry Blakely's short article on microphones in the Terms section. I would like to take issue with one point, however. In the article Larry states that there are few ribbon microphones in existence

today. Speaking for Beyer Dynamic alone, we have six different ribbon microphones, four currently in production and two that can be manufactured on special request.

Shure also has a few ribbon microphones, including the SM33 seen every week night on the Tonight Show with Johnny Carson. I have also been informed that RCA plans to revive the BK44 and BK77 if they haven't done so already.

I feel that as long as Sound Arts plans to remain the most informative dealer magazine available, that all the information within should be as correct as possible. Again, I commend you for a job well done.

Jack Kelly
National Sales Manager
Professional Products Division
Hammond Industries, Inc.

Mike Beigel responds: Your point is well-taken. My definitions are limited by the requirements of space and simplicity, and your clarification is appreciated.

It's about time the trade got a magazine like yours. We are a sound reinforcement company, relying on sales to discos, bands, etc. I'm sure we will find your publication quite valuable in our business.

Thank you,
Walter Bender
Authentic Rolling Sound Co.
Crewe VA

Congratulations on a job well done. I find your journal both interesting and informative and an asset to our industry.

In Issue Three, I feel I must respond to Mike Beigel's statements on "Electronic Musical Instruments and Accessories: Reverberation." It should be noted that a few misleading statements were made. He describes the reverberation spring design as being "the simplest and cheapest form of

If all we did was build great sound systems, we'd be in trouble.

Fortunately, at Altec Lansing we manage to do a lot more.

Because even the highest quality products can't sell themselves, we have to be good businessmen too.

That's where you come in. We're looking for quality-conscious dealers who are interested in good profit margins and product turnover. We've found that superb products coupled with sharp business sense is a successful combination. We know. We've been doing business with music retailers since electronic instruments were invented. Successfully.

Incidentally, we do build great sound systems.

At Altec Lansing, we manufacture a full line of top quality, portable sound reinforcement speaker systems, each designed to meet the tough and demanding requirements of professional and semi-pro musicians. Roadworthy. Reliable. Ask the pros. Ask our competitors. They'll tell you Altec Lansing is a name to be respected.

What can Altec Lansing offer you? The best. National advertising support, sales promotion, excellent delivery, a complete dealer financing program, a new sales organization sensitive to your needs, top quality products, and a reputation as good as our clean, clear sound. We won't brag. We'll just let our products and programs speak for themselves.

If you're interested in becoming an Altec Lansing dealer and are not afraid of making a good profit selling top quality sound equipment, write to Jim Johnston, Vice President-Consumer Sales. Share the reputation that has made Altec Lansing number one among professionals.



Altec Lansing International, 1515 South Manchester Avenue, Anaheim, Calif. 92803



CIRCLE 97 ON READER SERVICE CARD

WRH

electro-mechanical reverb system . . . disadvantages include a metallic, or one dimensional, type of reverb effect and sensitivity to external mechanical noise and shocks." This is true of many but not all "spring" designs on the market. Making this type of a categorical statement is an injustice.

After critical consideration, AKG developed the *torsional transmission line* which offers the best means for the realization of a portable reverberation unit. The torsional vibration of specially rated coil springs yields

excellent performance in reverberation, intensification, and tonal quality. The proper selection of electrical and mechanical parameters provides excellent insensitivity to external vibrations that equals or exceeds any other electro-mechanical reverb on the market. These parameters along with other new and innovative design features (motional feedback, limiters, mechanical damping, etc.) make the AKG portable BX-10 and studio BX-20 excellent units for performance, size and value. In fact, they are the

"standard" of several European and National broadcasting systems.

Thank you for the opportunity of this forum.

Sincerely,
Peter Wellikoff

National Marketing
Representative/AKG

Philips Audio Video Systems Corp.

This letter comes to you from a flight to Denver from Kalamazoo via O'Hare in Chicago. I'm out here telling folks about mixers and stuff on a two week trip and, well, you learn the damndest things on the road. (After all, that's where I picked up on SOUND ARTS). I'm writing to comment on the publication and spout a little about how welcome this gem must be to many, many folks in the music trades today. The magazine is for people like me who not only work in the "trades" but are part of the new era of music merchandisers.

During my daily visits to music stores all over America, I am probably very lucky to be able to see just where music retailing is today. It's great to be a part of this humanistic industry and see its change from a big business approach (selling of pianos, organs and band instruments) to a more diverse business of selling many types of electronic and acoustic instruments. We are the music trades and SOUND ARTS is a product of that human-to-human exchange. A leading music retail "personality" who runs a chain of New York music stores once told me that his father started with a single store that gave people what they needed to express themselves—and even though the operation has doubled a coupl'a times, that's the reason he still enjoys the business. SOUND ARTS is part of that, and really a sum total of the past ten years. I thank you for putting all this into one comprehensive magazine.

Regards and Support,
Cliff Miller
National Sales Manager
Technical Audio Products Corp.
Redmond WA

Correction: The gremlins were frolicing in our May issue. One letter in Marvin Welkowitz's name was inadvertently inverted. Our apologies. Marvin Welkowitz heads up Quantum Audio in New York.

Top of the line keyboards from a company concerned about your bottom line.



If you want to sell keyboards, we've got two very good reasons that make it easy to sell Crumar.

First, we offer the most innovative and musically creative keyboards on the market. The T-1 organ. The incredible Orchestrator. Our new digital synthesizers, the DS-1 & DS-2. Keyboards that sell themselves.

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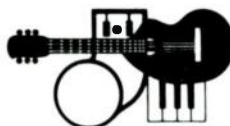
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CIRCLE 84 ON READER SERVICE CARD

TERMS:

A CONTINUING INDUSTRY GLOSSARY

RECORDING

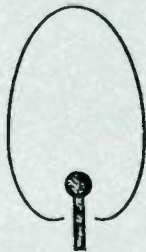
By Larry Blakely

Carbon: These microphones use elements of carbon to create electrical voltage. All of the above—crystal, ceramic, ribbon and carbon microphones are normally used only for voice and communication equipment and are really not good enough to use for high quality recording.

Ribbon: This microphone is a different form of *dynamic microphone* which has a metal ribbon suspended between 2 pieces of magnetic structure. These microphones were popular in the early days of recording and are considered to have good sound quality. However the ribbon microphones are extremely delicate as the ribbon elements are easily broken.

Crystal: These microphones are very inexpensive and use a crystal rock type of element to create the electrical voltage.

Super Cardioid or Hyper Cardioid Microphone: These microphones have a much tighter cardioid pattern with



even less sensitivity to picking up sounds on the side or rear of the microphone. These will provide even more isolation of sound at the side and rear of the microphone than the standard cardioid pattern.

Figure 8 Microphone: The Figure 8 is sensitive on 2 sides of the microphone, and relatively non sensitive in between (see illustration). This type of microphone is commonly used if 2 vocalists wish to face each other and sing into the same microphone. It also can be used if there are 2 groups of instruments facing each other and it is de-

ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES

By Mike Beigel

By this time, most musicians understand the word "synthesizer" to mean a collection of analog tone generators, processors and controllers connected together (usually in one package) to produce a musically acceptable output. Sometimes synthesizers are played like musical instruments (keyboard or guitar interface or Lyricon), sometimes automatically with sequencers or programmers, sometimes computer-controlled, and once in a while connected to strange controllers or even brain waves. Their "musical" outputs range anywhere from mimics of acoustical musical instruments to some of the strangest sounds ever heard.

The terms associated with the musical use of synthesizers form a basic vocabulary for almost all electronic manipulation and processing of music. We will start with sound generators, or signal sources.

Synthesizer Signal Sources: The components of a synthesizer that produce the "raw material" or electronic basis of the sound that is later processed to give a "synthesized" output. They can generally be divided into three classes: oscillators, noise sources, and external signal sources.

External Signal Sources: Any electronic sound input to a synthesizer from a microphone, tape recorder, "electric" instrument, etc.

Noise Sources: Generators of non-periodic or random electrical signals for subsequent processing. Noise is generally thought of as a "whooshing" or hissing sound. Some synthesized sounds which have noise as their basis are "snare drums," wind-like or surf-like sounds, "thunder" sounds, etc.

White Noise: A noise source that has equal energy distribution throughout the audio frequency range. It sounds like a high-pitched "hiss."

SOUND REINFORCEMENT

By Bob Heil

Ambient Noise: The normal sound level in a room.

A.G.C.: The abbreviation for automatic gain control.

A.M.: The abbreviation for amplitude modulation where a radio frequency (r.f.) carrier (signal) is modulated by an amplitude signal.

Ammeter: An instrument for measuring the flow of current—either alternating (a.c.) or direct (d.c.) current.

Amplification: A process of increasing the voltage, current or power of a signal; usually expressed as a ratio in decibels (dB).

Attack: Referenced to a keyboard synthesizer, the time necessary for the tone to acquire its full intensity after the initial keying.

A.V.C.: Abbreviation for automatic volume control.

A.W.G.: Abbreviation for American Wire Gauge.

Bandwidth: The range of frequencies within specified limits. *Ex.* the bandwidth of an amplifier or filter is considered to be the range of frequencies between the two points which are attenuated 3.0dB below the *average* level of the entire range.

B.C.I.: Abbreviation for broadcast interference.

Beat frequency: One of two frequencies produced when two different frequencies are combined. One beat frequency equals the difference between the two frequencies while the other frequency is equal to the sum of the two frequencies.

By Pass Capacitor: A capacitor used to provide a very low impedance for an A.C. path around a particular circuit.

Cardioid Pattern: A heart shaped polar response or radiation pattern exhibited by the response characteristics of certain microphones.

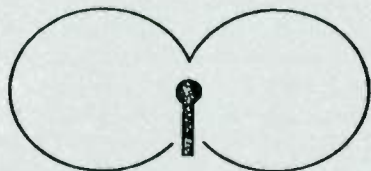
Contact Microphone: A microphone which receives its vibrations directly from its source and converts

TERMS: (CONTINUED)

A CONTINUING INDUSTRY GLOSSARY

RECORDING

sired to have both groups of instruments picked up by the same microphone.



Shotgun Microphone: Of the same family as the hyper-cardioid. This microphone has little sensitivity at the sides with most of the sensitivity at the front, and could be likened to a pen-spotlight. It is an extremely directional microphone and can pick up pinpoint sound sources from a long distance. These microphones are rarely used for studio applications, but are used at times in on-location live performance recording, where their very sharp focused pickup pattern will provide a good pickup with a high rejection of ambient noise or leakage.

No matter which type of microphone listed above is used, each microphone will have a pickup pattern (the direction at which the microphone is sensitive). These patterns are cardioid, or super cardioid, omni and figure eight.

There is understandably much confusion with neophytes in audio, regarding microphone impedance, but one must first understand the various types of microphones—condensor, dynamic, ribbon, etc. along with the different types of pickup patterns—cardioid, omni, figure eight etc. After you have studied these carefully, you will know that for a certain application that a dynamic microphone with a cardioid pickup pattern will obtain the results you desire. You walk into the studio very confident and knowledgeable with this newly acquired information. A man looks at you and says "Should that microphone be high or low impedance and should it have a balanced or unbalanced output".

ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES

Pink Noise: A noise source that has descending energy distribution throughout the audio frequency range. This means that the intensity of the noise decreases as the frequency gets higher. It sounds like a medium-pitched "rumbling" sound.

Waveform: The basic tone color emitted from an oscillator depends on its waveform output. This is the shape of the wave as viewed on an oscilloscope. The specific shape repeats itself once for every period of oscillation. While an infinite variety of waveforms is possible, some standard waveforms have evolved into use in most synthesizers. Note that the shape of the wave is determined by the number and intensity of the "harmonics" of the basic period of the wave. Different wave-shapes reflect different amounts of harmonic content, which is vitally important in shaping the "timbre" of the sound.

Sine Wave: The most basic (though not the easiest to generate) of all wave shapes. This is the shape generated by a "fundamental" frequency with no overtones at all. It is a very "pure" sound, but it is not easy to alter by filters: it will only change its amplitude. Flutes most closely resemble sine wave outputs.

Triangle Wave: A symmetric triangle-shaped wave, with a small amount of overtone coloration. By itself it has a very pleasing sound, and is sometimes used in synthesis of plucked string instruments.

Sawtooth Wave: Somewhat like a triangle wave but with an abrupt edge on one side and a much more intense overtone series. Often used in synthesis of sustained string instruments, and very useful in combination with voltage-controlled filters.

Square Wave: A symmetric and easy-to-generate waveform, having only odd overtones in its harmonic series. This gives it a peculiarly "hollow" sound and is useful for synthesis of clarinets.

SOUND REINFORCEMENT

them into corresponding electrical currents and/or voltage.

Damped Wave: A wave in which each successive cycle diminishes in amplitude.

Decade: The interval between any two quantities having a ratio of 10:1.

D.P.D.T.: Abbreviation for double pole, double throw switch.

D.P.S.T.: Abbreviation for double pole, single throw switch.

Dyne: The force that produces an acceleration of one centimeter per second on a one gram mass.

Dyne Per Square Centimeter: The unit of measure of sound pressure.

Symbols Used in Electronic Formulas:

- B—Susceptance (mhos)
- C—Capacitance (farads)
- E—Voltage
- F—Frequency (Hz)
- G—Conductance (mhos)
- I—Current (amperes)
- L—Inductance (henrys)
- P—Power (watts)
- Q—Coil Efficiency (ratio of coil reactance to coil resistance)
- R—Resistance (ohms)
- T—Time (seconds)
- Z—Impedance

Microphone: A sound transducer or device for converting sound waves into electrical energy of the same frequency.

Microphonics: The noise caused by mechanical shock or vibration of elements in a system.

Mixer: A device by which signals from two or more sources can be blended and fed simultaneously to a power amplifier at the proper level and balance.

Treble Boost: An accentuation of the higher audio frequencies in amplitude-frequency response of a system or transducer.

Tweeter: A loudspeaker designed to reproduce only the treble or high frequencies of the audible spectrum.

It's The Little Things That Count

See us at Booth 5106 at the NAMM International Expo.

MXR Innovations Inc., 247 N. Goodman St., Rochester, New York 14607, (716) 442-5320.





TROUBLESHOOTERS' BULLETIN

1
Troubleshooters' Bulletin is designed to assist the dealer with various troubleshooting tips that may be applied at the dealer level. Submissions are welcome. Contributions to Troubleshooters' Bulletin should be sent to SOUND ARTS MERCHANDISING JOURNAL, 14 Vanderventer Avenue, Port Washington, New York 11050.

2 STEREO-MONO SPEAKER PROBLEMS

In our experience, a consumer will frequently question his amplifier's mono mode performance specs. With most amplifiers, as simple as the conversion from stereo to mono may be, many complex and useful things occur.
The obvious advantage of operating

3
an amplifier in mono is the increased output wattage. For example, the Crown D-75 amplifier will easily drive a set of 8-ohm speakers at 35 watts per channel in the stereo mode. However, that same amplifier in mono will send 95 watts to one 8-ohm speaker.

This increased wattage is simply due

to the fact that now the two independent channels are working in series. In fact, not only is the wattage increased, the voltage output is now doubled. This is particularly helpful in producing voltage distribution systems without the use of step-up transformers.

4

Rules to follow:
There are several basic rules to follow when changing the mode of an amplifier. Because load impedance plays a major role in this system, a few points are worth mentioning.

1. A DC-coupled stereo amplifier will produce approximately twice the output

5

wattage when the load is decreased by half. This means if you parallel two 8-ohm speakers across the 80-watt-per-channel output of a Crown D150A amplifier (total load 4 ohms), the wattage will increase to 160 watts. With this set-up, be sure that the speakers are capable of handling this increased wattage.

6

7

2. An amplifier in mono, assuming adequate power supply size, will produce approximately three to four times the normal output wattage. For this reason, the load impedance should not normally be lower than 5 or 6 ohms. This will reduce the chance of the amplifiers current protection circuitry being unnecessarily activated.

8

3. Always observe the manufacturer's recommended speaker connections. In mono, a balanced output configuration is usually suggested with no connection to ground speaker terminals.

4. Observe proper input set-up, simply because only one input stage is now being utilized rather than two.

9

Amplifiers with the ability to be used in stereo or mono are extremely useful and versatile only if used correctly. Follow the manufacturer's recommended set-up - and if all else fails, read the instruction manual.

Craig Smith
Crown

10

SYNTHESIZER CLEANING

Problems that are often attributed to such things as "the VCO1 is drifting" are often actually due simply to the need for contact cleaning.

For example, when the contacts on our Omni are dirty, the chord retriggers -

even if no keys are being changed. A Q-tip
should be dipped in denatured alcohol -
not rubbing alcohol (rubbing alcohol con-
tains 30 percent lanolin, which will at-
tract dirt from the atmosphere and put
you right back in the same boat). Open
the unit and clean the buss bar. If that
doesn't do it - if you have an old machine
that's never been cleaned, or one that's
been used in a smokey club atmosphere -
you may have to use a pencil eraser as an

(11)

abrasive. We use a pencil-shaped type-
writer eraser. But you have to be careful
not to sand the gold plating off the buss
bar. This is a last resort.

The cleaning of contacts applies to
any synthesizer - more than to an organ,
for instance, because of the 15 milli-
second trigger pulses. Dirt will rub
across, breaking the contacts. Another
word of caution applies to the disassembly

(12)

procedure. Our Odyssey and Axxe offer no
problems. Once you open the unit, the
keyboard is exposed. But on the Omni, the
back has to be lifted before it's brought
forward. If you're not careful, you can
break the master oscillator. I wouldn't
recommend cleaning the Omni unless you
knew exactly how to open it.

Bob Schmidt
ARP

(13)



Each month Sound Arts will take your common consumer questions and have them answered by experts in the field. Send your questions to Sound Arts, c/o Common Consumer Questions, 14 Vanderventer Ave., Port Washington, NY 11050.

* * *

What are power ratings?

Power ratings quoted for audio amplifiers are among the most misunderstood of all audio product specifications. Reproducing sound in any space (outdoors or indoors) requires power—the air has to be pushed and pulled by the loudspeaker cone, and energy is expended in doing so. But only a very small percentage of the amplifier power fed into a loudspeaker gets converted into sound power (in much the same way that a car's gasoline engine delivers only a fraction of the power produced to the drive shaft). Still, the more power you feed into a speaker from an amplifier, the louder the speaker will play.

The power that an amplifier can deliver to a loudspeaker is quoted in watts (much like the rating of a lightbulb or other electrical appliance). But, unlike most appliances, an amplifier hardly ever delivers its full power. That's because it is amplifying musical signals, which have moments of soft sound and other moments of loud sound. So, in the case of an audio amplifier, the maker should tell you what the *maximum* power is that can be delivered by the product, before the audio signals produced become highly distorted. The most conservative way of rating power is to list how many watts the amplifier can deliver on a continuous basis (as if the music were always at its loudest). Since trying to exceed that power level will lead to higher levels of distortion, the manufacturer should also tell you at what distortion level (quoted in percent) the amplifier can deliver that power (the lower the distortion percentage the better). In addition, most amplifiers

can deliver somewhat more power at mid-frequencies than they can at the low bass and high treble extremes, so the maker of the amplifier should specify over what tonal extremes the amplifier can deliver its rated power.

Finally, amplifiers are likely to deliver higher power to a 4-ohm impedance speaker than to an 8-ohm type, so the speaker impedance should accompany the power rating as well. Makers of home audio amps are required to tell you all of these things in quoting the power ratings of their products. Manufacturers of professional audio amplifiers are not governed by this Federal rule, and so they sometimes employ less stringent criteria in rating their product's power output capability. Because an amplifier can often produce somewhat more power when amplifying music (rather than continuous) signals, some manufacturers rate the power output of their amps in terms of so-called "music power" in order to come up with a higher published figure. Still others use such terms as "peak power" and even "instantaneous peak power" to make the numbers seem even higher.

You may be surprised to learn that while an amplifier may coast along at an average power level of a watt or two, the dynamics of music signals are such that often, the amp may have to deliver 100 times that amount for a short time. The sounds produced during such peaks will not *sound* 100 times as loud simply because our hearing perception is not linear. For one sound to seem twice as loud as another requires that sound to be ten times more powerful as the first one! The analogy to a car holds here, too. Most of the time, you coast along using but a fraction of the car engine's horsepower. But when you come up against that steep hill and press the accelerator down to the floor while downshifting, you may be calling upon all that extra available horsepower for a brief time.

It's always better to have reserve power in your amplifier for those occasions when you need extra power to achieve the sound levels demanded by loud passages of music. Too, since different speakers have widely varying efficiencies, some speakers require much more power than others. Some low efficiency speaker types may require ten or twenty times as much amplifier power to produce the same loudness levels as other high efficiency speaker systems.

Len Feldman
Feldman Labs
Great Neck, NY

What is triamping and what are its benefits?

Triamping technically is the process of using three separate amplifiers, each driven by one band of a three-band frequency divider to power three different speaker loads. In more general terms, triamping is the use of a three-way electronic crossover to drive separate bass, mid and high frequency amplifiers, each loaded with the best reproducing speaker for the particular range.

What triamping is, however, seems of less import than its benefits. Consider using a violin to play the musical score of the double bass, or vice versa. The same relationship exists between bass woofer speakers and horn or tweeter type high frequency drivers. And by the way, what about the mid frequencies of the cello, which are best reproduced by a driver designed for midrange? It is obvious that these three speakers could be driven by one amplifier and a passive three-way crossover as a vast improvement to a single speaker. So why triamp?

Headroom limiting, spectral power inequity, IM and TIM distortion products, as well as severe mid and high frequency distortion during portions

of clip, usually caused by the much larger bass signals, are all common aberrations of single amplifier systems. An additional common problem is poor bass reproduction due to passive crossover components which can allow bass driver overhang and a muddy bass sound.

Biamping provides the largest single improvement by electronically separating the bass and HF signals and eliminating the passive crossover. Triamping provides the next most measurable improvement with separate low, mid and high frequency amplifiers driving appropriately designed speakers.

One should conclude that additional frequency separation and still more amplifiers could provide additional benefits. They would; however, after the first or second separation, the reducing magnitude of each step versus the cost reaches the point of diminishing returns. It was with this economic reality in mind that we at AB Systems designed the Model 720 dual biamp/mono triamp. I must confess though that during certain blue sky periods I contemplate that a separate amplifier and speaker for each frequency to be reproduced would

be the ultimate system and would most nearly approximate the receiving system of the human ear with its multitude of fibrous hairs.

*Robert J. Bird
AB Systems
Folsom CA*

What are the basic differences in microphones?

The most popular microphones being used today are the moving coil dynamic and the electret condenser mics. They're esthetically pleasing, reliable and afford the user excellent performance for reasonable price. The applications are the same although they have different internal workings.

The moving coil dynamic microphone converts sound to electrical energy in the same fashion as a speaker. A coil of wire is attached to a movable diaphragm. The coil is suspended in a magnetic field. Sound pressure hitting the diaphragm causes it and the coil to move in the magnetic field, thus producing an output voltage. The moving coil dynamic is typically extremely rugged and reliable and virtually indestructible. It

requires no source of power in order to operate. It is widely used in TV, recording and sound reinforcement applications.

The electret condenser mic converts sound into electrical energy by changing the capacity of the internal generator. Like a capacitor, the electret has two plates, but one plate of the electret is movable and contains a permanent electrical charge. Sound hitting the movable plate (diaphragm) causes it to move and hence vary the capacitance between the points. The electret condenser typically can have lower lows or higher highs than a dynamic and it can also have a smoother overall frequency response. The electret condenser does require a source of power to operate properly.

Lower lows and higher highs and a smoother response sound enticing but it is not unusual for a moving coil dynamic to have a usable frequency response of 50 or 60 Hz on the low end to 15 kHz on the high end and still be reasonably smooth.

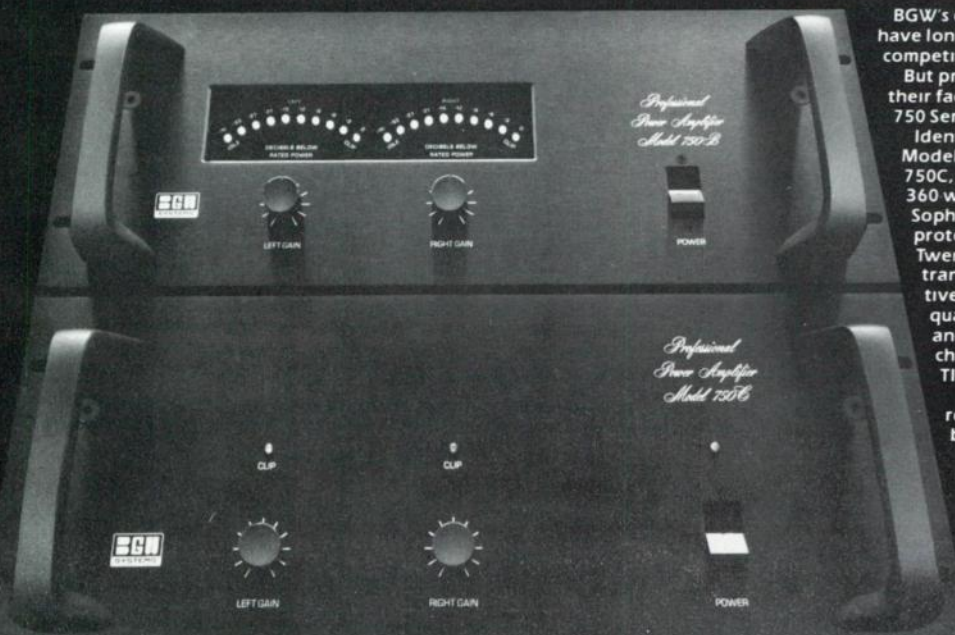
*Robert Herrold
Audio-Technica U.S.
Fairlawn, OH*



GET BEHIND BGW's NEW 750 SERIES

The Competition Already Is.

CIRCLE 76 ON READER SERVICE CARD

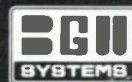


BGW's characteristic rack handles, front panel LED's and fans have long been exploited as symbols of design excellence by competitors who know good amplifiers when they see them.

But professional power amps live or die by their guts, not their facades. And that's where BGW's new top-of-the-line 750 Series leaves the competition behind.

Identical but for their front panel power indicators, the Model 750B, with light-ladder VU meter, and the Model 750C, with clipping indicators, each generate more than 360 watts of continuous power per channel into 4 ohms. Sophisticated arc-interrupting and time-delay circuits protect monitors and guarantee transient-free switching. Twenty (20) large-geometry, full complementary output transistors provide unequalled SOA in an ultra-conservative design. These professional power amps employ high-quality magnetic circuit-breakers, XLR-type connectors, and input transformer sockets. Separate circuit and chassis grounding eliminates annoying ground loops. TIM figures are held to an incredibly low 0.02%!

Your franchised BGW dealer can give you still more reasons why your professional peers are getting behind BGW... and why the competition stays behind!



BGW SYSTEMS
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Hawthorne, California 90250 **Get Behind Us!**
213/973-8090

In Canada: Omnimedia Corp., 9653 Cote de Liesse,
Dorval, Quebec H9P1A3
*Measured according to Leinonen/Otala/Curl
method, AESJ, Vol. 25, No. 4.

The SOUND SH

Two new signal-processing devices were recently introduced into the professional audio market by MXR Innovations, an organization already well-established in the area of sound-modifying and special effects devices for both voices and instruments. The latest additions to the MXR line are two graphic equalizers, one of which is a dual-channel 15-band EQ, the other a single-channel 31-band equalizer. Both units have level controls on the front panel, Bypass and Power switches also located on the front panel, standard 19-inch (483mm) rack mount dimensions, a 12db Boost and Cut on all controls, and active balanced inputs.

The Dual Fifteen Band EQ has (as one would expect) two channels of 15 bands each, with frequency centers designated in the preliminary data sheet as "alternate one-third octave (ISO) centers," which means that the in-



dividual bands read as follows: 25Hz, 40Hz, 63Hz, 100Hz, 160Hz, 250Hz, 400Hz, etc., with the highest center frequency being 16KHz. On the Dual Fifteen EQ all the input-output connections are standard 1/4" phone plugs, whereas on the Thirty-One Band EQ the phone plug connections are augmented



with the more professional Cannon XLR plugs. Furthermore, the Thirty-One Band EQ has closer frequency centers than the Dual Fifteen. Compared to the first seven bands of the Dual Fifteen mentioned above, the Thirty-One reads like this: 20Hz, 25Hz, 31.5Hz, 40Hz, 50Hz, 63Hz, 80Hz, and so on.

The electrical specs on the two units differ slightly; for example, the Output Impedance of the Dual Fifteen is @ 100 ohms, while the Thirty-One is rated at 300 ohms (single-ended) and 600 ohms (balanced). The T.H.D. also looks a little better on the Thirty-One: less than .01% @ 0 dBm (20Hz-20KHz) compared to less than .02% @ 0dBm (20Hz-20KHz) for the Dual Fifteen. The frequency response of the Dual Fifteen is 3dB down at 5Hz and 60KHz, while that of the Thirty-One is 3dB down at 5Hz and 40KHz. The input impedance of both units is 40K ohms balanced; maximum input level for both is +20dBm for both; and the maximum slew rate is listed as 7V/microsecond for the Dual Fifteen and 7V/microsecond (single-ended), 14V/microsecond for the Thirty-One band equalizer. The projected list prices are \$325 for the Dual Fifteen and \$350 for the Thirty-One. These new equalizers are available from MXR Innovations, Inc., 247 N. Goodman St., Rochester, NY.

CIRCLE 10 ON READER SERVICE CARD

Glass Speakers!! Barcus-Berry has unveiled the new Audioplate (tm), the revolutionary speaker which employs a glass plate as its sound emitting surface. It offers "unequaled reproduction of signal transients throughout the entire audio spectrum, and provides a



broad dispersion pattern which gives astonishingly even coverage within any listening area," according to advance reports from Barcus-Berry, 15461 Springdale St., Huntington Beach, CA. 92649.

CIRCLE 11 ON READER SERVICE CARD

OPPE

By Charlie Lawing

STAGESTIK Adhesive Tapes, the highly regarded tape once available only to such heavyweight outfits as Kiss, ELP, Criteria Recording Studios, and Clair Brothers Audio, has now become available to musical instrument and audio retailers through the marketing services of Infitheatre, Inc. STAGESTIK is a high quality adhesive that can be used for temporarily securing audio cables, lighting cables, portable staging, color coding, or any other application one can conjure up in trying to hold an act together. Those interested in STAGESTIK should contact Infitheatre, Inc., 5773 Park Plaza Court, Indianapolis, IN 46220.

CIRCLE 12 ON READER SERVICE CARD

From the manufacturer whose power amps shook your theater seat in "Earthquake" comes the latest in a rock steady line of professional power amplifiers: two new models from BGW, the 750B and 750C, both of which have a hefty 360 watts per channel into a 4 ohm load. The only real difference in these behemoths is their metering displays: the 750B has big VU meters for both channels while the 750C has the more familiar clipping indicators which are already standard fare on BGW gear. The front panel is finished in black with brushed aluminum rack mount handles. There are gain controls for both channels and a power switch. The amplifier's sparse appearance (no gaudy array of switches, knobs and gizmos) underscores the company's confidence in their product. The conclusion one comes to after using a BGW for very long is that, well, all you really have to do is connect everything properly and turn it on, because the amps are so well-designed that they work well even under the worst conditions. The unique protection circuitry of the BGW line, combined with massive heat sinks and a low-noise rear-mounted fan with a removable filter element virtually eliminates



thermal shutdown even under extreme load conditions. A new magnetic circuit-breaker with an increased time constant assures the continuous performance of the 750 Series in the presence of sudden signal surges and momentary overloads. BGW's exclusive arc-interrupting design will protect the speakers even under such catastrophic conditions as



are often encountered during the live performance of rock and roll bands.

The transient intermodulation and steady-state distortion levels on these new 750 models are practically immeasurable; TIM and IM figures remain below 0.02% from 0.25 watts to the full rated power of 360 watts per channel into 4 ohms. The hum and noise levels on these new amps is so slight as to be termed negligible by industry standards. Both the 750B and 750C include full XLR professional connections with provisions for plug-in matching transformers. Quarter-inch phone jacks are also provided for single-ended operation. The model 750B, which features the LED light-laddered VU meter, has a suggested retail of \$1,099; the model 750C, with its dual-channel clipping indicators, lists for \$999. Further info can be obtained from BGW Systems, Inc., 13130 S. Yukon, Hawthorne, CA 90250.

CIRCLE 13 ON READER SERVICE CARD

TEAC is introducing a new four-channel open reel deck with Simul-Sync to succeed its 3440 model series. The A-3440 is a three-head, three-motor, two-speed (15 and 7½ ips) unit, and features a new transport, circuitry and logic boards. The unit accepts up to 10-inch reels and carries a suggested retail price of \$1,500. Optional pro curve dbx interface is available, as is remote control. Professional



micro-switch, touch-button controls are provided. Other features include a manual cue level for fast search, cueing and editing, four VU level meters, mic/line input selectors, four front-panel mic jacks and independent output level controls for each channel. Specifications include 0.04% wow and flutter, 65 dB S/N ratio, and 35 to 22,000 Hz frequency response at 15 ips.

CIRCLE 14 ON READER SERVICE CARD

JBL has announced a "new family" of professional single channel amplifiers—the 6000 Series—designed "to provide studio quality performance for sound reinforcement applications." Six amplifiers are included in the Series, delivering minimums of 60 watts, 100 watts, or 200 watts, including models with audio output transformers and without. With the exception of the power supply and output transformer, the entire amplifier circuit is mounted on a single board, which can be removed from the rear of the unit with the main-frame still mounted in a rack. Suggested prices range from \$450 to \$642.

CIRCLE 15 ON READER SERVICE CARD

If you're looking for feedback suppression in sound systems and stage monitors, the Model 1500 from Audioarts Engineering is something to look for. It allows precise control of up to five different feedback frequencies within a 52 Hz to 7.3 kHz range. Unlike graphic equalizers, which must rely on fixed



frequency centers, each of the model 1500's five filter selections may be individually tuned anywhere within the frequency sweep range, insuring control of only desired feedback frequencies. The five continuously variable frequency controls, coupled with narrow 1/6 octave bandwidth and variable notch depth controls (0 to 16 dB), allows significant reduction of feedback without tonal loss common to less sophisticated equalization units. Because the model 1500 has five bands, it is far more cost effective than general purpose parametric equalizers. The Model 1500 fits one standard rack space. The unit utilizes balanced output. \$340.00.

CIRCLE 16 ON READER SERVICE CARD

Tom Oberheim's Two-Voice, Four-Voice, and Eight-Voice polyphonic synthesizers are already unique among the industry in that they are *modular*; the basic component of each being the Synthesizer Expander Module (SEM), which is a complete synthesizer in and of itself. Each SEM contains Two Voltage-Controlled Oscillators (VCO's); a four-mode two-pole Voltage-Controlled Filter (VCF), Voltage-Controlled Amplifier (VCA), Low Frequency Oscillator (LFO), and two Attack, Decay, and Sustain (ADS) Envelope Generators. When used with the other modules available from Oberheim such as the Polyphonic Synthesizer Programmer (a memory device for storing patches or programs for the Four-, Six-, and Eight-Voice models) and the Mini-Sequencer, a 2x8 sequencer with self-contained clock, sample-and-hold and noise generator, the Oberheim

The SOUND SHOPPE REAR ENTRANCE

modules can be used together in a variety of ways that are easily more flexible than other existing synthesizer product lines, be they factory-assembled or in kit form. Yet for all his success in providing the synthesist with the maximum in versatility from the compact SEM, Oberheim apparently saw room for improvement in meeting the demands of the performer who must be able to change sounds on the synthesizer without interruption. Hence the introduction of the OB-1, a unique synthesizer that combines the Oberheim sophistication with simple yet engaging features that make it a viable alternative to other better known synthesizers in the price range (\$1,895 list).

The OB-1 contains two VCO's, each having sawtooth and variable pulse waveforms; one VCF; a VCF Envelope comprised of Attack, Decay, Sustain, and Release; a VCA Envelope with ADSR as well; one LFO with variable delay controls and a choice of three LFO modes: sine, square, or sample-and-hold; Portamento; Octave Transpose; Oscillator Sync; and a couple of unique features that set the OB-1 apart from the rest of the field in terms of quick programming and pitch-bending accuracy.

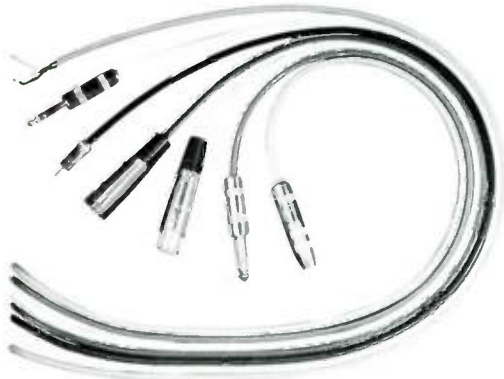
Specifically, the most unique feature of the OB-1 is the programmable memory bank which allows the storage of up to eight programs (completely programmable, built from scratch by the player and not preset in any way) which can be recalled by the touch of a button during a performance. Such a feature in a synthesizer which lists for less than \$2000 puts the OB-1 in a class all by itself.

One other unique feature of the OB-1, although some might scoff at the seeming simplicity of it, is the Pitch-Bend lever. Whereas some other brands have a wide-range pitch-bend wheel that is hard to bend accurately, the OB-1 pitch-bend can be preset to bend up or down one whole tone or one complete octave, and it returns to the proper pitch automatically upon release of the spring-loaded bending lever. Maybe that doesn't sound like much, but invariably, keyboard players find themselves floundering in and out of tune with other models that have no

such built-in performance aids. The OB-1 should be a tremendous success and a more than equal alternative to the competitors whose similarly priced units fall far short of the OB-1 in ease of operation. More information on these synthesizers is available from Oberheim Electronics, Inc., 15499 9th St., Santa Monica, CA 90401.

CIRCLE 17 ON READER SERVICE CARD

Color-Coded Audio Cable in a choice of seven colors and two thicknesses is now available from Sound Applications, Ltd. The SA-191 cable assemblies have a cable jacket of polyurethane (extremely resistant to abrasions and solvents), inner conductors made up of 45 strands of tinned cadmium bronze,



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CIRCLE 18 ON READER SERVICE CARD

By Craig Anderton

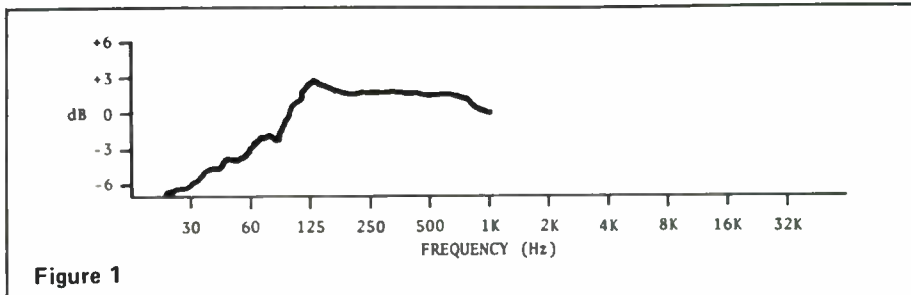
Last month we looked at the subject of frequency response. This month we're going to add a little bit, and then proceed to relate this knowledge to the real world of audio equipment.

First, we must examine one more technical term: the deciBel (or dB). Actually, there are several different kinds of dB. A complete treatment of the subject could take several

important, so we can listen at any volume level. What we're looking for are *changes* in volume level so we can set up some ratios.

A good reference frequency to start off with is 1 KHz; as we mentioned last month, the biggest response anomalies occur at the limits of response, so 1 KHz is a good reference frequency since it lies in the approximate "middle" of the audio spectrum.

A signal that is stronger than our

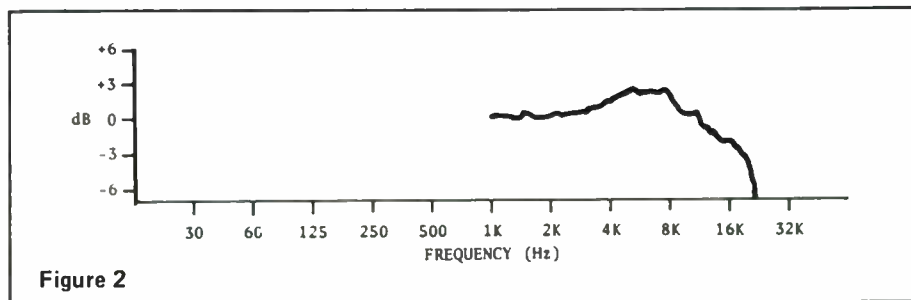


columns, so for now we'll deal with the dB in general terms. Simply stated, the dB is a unit of ratio between two audio signals; probably the best way to become familiar with the dB is through some examples.

Let's say you're listening to an amplifier/speaker combination, and have a sound level meter calibrated in dB that registers changes in the acoustic output of your system. Furthermore, let's suppose the input to the amplifier is not a complex musical source such as a recording, but instead is a very pure audio test tone that can

reference creates a ratio that is + so many dB; a signal that is weaker than our reference creates a ratio that is - so many dB.

So, we have our reference frequency (1 KHz) and our reference level (0 dB). Now, let's change the test tone frequency and see if there are any changes in the sound level. Figure 1 shows a plot of a loudspeaker low end response. As our signal generator starts going down in frequency, we don't notice very much change in the sound output. It might deviate a dB or two from the reference. But after a



vary in frequency from 20 Hz to 25 KHz.

Remember, since the dB expresses a *ratio*, we're going to need some kind of standard signal which we can compare other signals against in order to derive this ratio. Under ideal circumstances, you would adjust the level of the tone for a comfortable listening level, and adjust your meter so that it reads "0 dB" at this reference level. Notice a big advantage already to working with the dB ... the absolute sound level coming out of the speakers is not

slight boost around 125 Hz, the response starts dropping off and becomes relatively uneven.

Now, let's perform the same type of exercise, but move upwards in frequency from 1 KHz instead. Figure 2 shows a plot of the upper end of our speaker. As you can see, there is a slight peak in the upper midrange region; but the response starts to fall off dramatically around 16 KHz.

If we wanted to summarize the performance of this speaker, we could say that it is flat within 3 dB (or ± 3 dB)



from 60 Hz on up to about 18 KHz. We could also express the response as being ± 3 dB, 60 Hz-18 KHz, which is the type of short form summary often given with loudspeaker specifications. We could alternately characterize the speaker by saying that it is ± 6 dB from 30 Hz to 20 KHz. Either way of looking at the speaker's performance is correct.

Having this knowledge enables us to do certain things. For one, since we now know our system is not flat, we can twiddle with the amplifier tone control knobs in order to help compensate for the speaker's anomalies. Or, what about that peak in the treble range? If we combine this speaker with, say, a phono cartridge that also has a treble peak, then the resulting sound of the two working together will be unnaturally tinny and bright. On the other hand, by choosing a cartridge with a more subdued high end, the speaker/cartridge combination will complement, rather than oppose, each other.

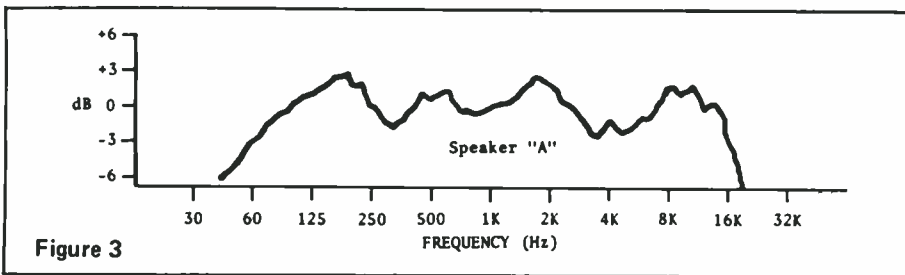


Figure 3

Let's look at two comparative speaker response curves (figures 3 and 4). Notice that for a short form description, A would be ± 3 dB from (approximately) 60 Hz to 16 KHz, whereas B would be ± 3 dB from (approx) 125 Hz to 13 KHz. If this was the only information we had, we would conclude that speaker A has a more wide-range response, and assume this is the superior speaker ... but it ain't necessarily so. Let's compare points on the two curves where the speaker response is down 6 dB. For speaker A, this occurs at about 50 Hz on the low end, but for speaker B this occurs at 30 Hz ... indicating that speaker B has a slightly better low end response overall than speaker A. At the high end, A is down 6 dB at about 18 KHz, but B goes up to about 20 KHz before the response goes down an equivalent amount.

Also, let's look at the nature of the curves. Speaker A is very "peaky," and suffers from a very fast dropoff in responses at both the extreme high

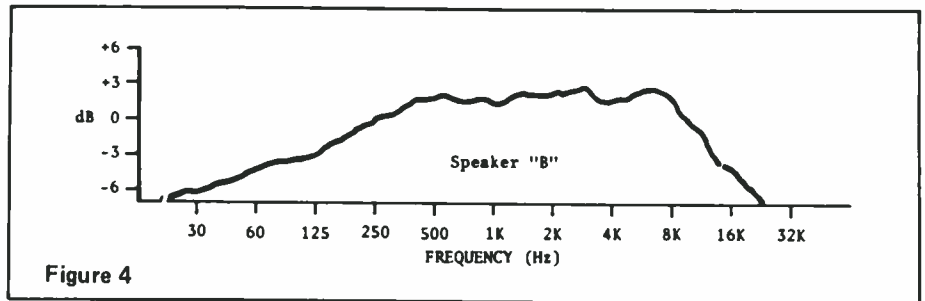


Figure 4

and extreme low ends. Speaker B has a much smoother response, and its roll-off is much gentler at the extreme limits of response. This speaker could probably be made pretty flat through the judicious use of tone controls, but speaker A would be much more difficult to equalize.

So, notice how, according to one interpretation of the specs, speaker A comes out ahead. But when looked at in greater detail, speaker B is actually a speaker with greater potential fidelity and evenness of response.

As another example, I was asked to look at a tape recorder that had a

boost may have been improper bias and/or equalization settings on the machine; but these controls were not accessible, so we had to do the best we could with what was available.

Luckily, the recorder's owner had a pretty flexible equalizer (tone control) unit, so I suggested cutting the bass at the peak's frequency during recording to offset the boost induced by the tape recorder. As it turned out, this action offset the boost just enough to give a fairly flat response. As for the high frequency boost, I suggested recording *without* attempting to offset this boost. As a result, on playback there was an artificially bright high end. However, by using the equalizer again to take off some of the high end during *playback*, not only did the artificial brightness go away, but any tape hiss was brought down a little bit at the same time.

If you want to try running some tests like these, it's not too hard ... especially if you have equipment with some VU meters built in so you can easily monitor the results (mixers, tape recorders, etc.). Most electronics people would use a piece of test equipment called a sine wave oscillator as the signal generator; the sine wave is a very pure type of signal that is ideal for testing audio equipment. However, if you do not have access to a lab quality signal generator you can often get by with a synthesizer oscillator module. Many synthesizers can produce acceptable quality sine waves over a wide enough range to give good qualitative results.

"boomy" low end and a "funny sounding" high end. I ran a variable test tone that was perfectly flat into the input of the recorder; but what came out the output was anything but flat. In fact, it looked somewhat like Figure 5. Here was an obvious explanation for the "boom": a large peak, about 3 dB, in the bass range. The "funny sounding" high end was attributable to a boost in the 10 to 12 KHz region. Although this boost brings out the sheen of instruments, it can also make them sound thin. Part of the reason for the high frequency

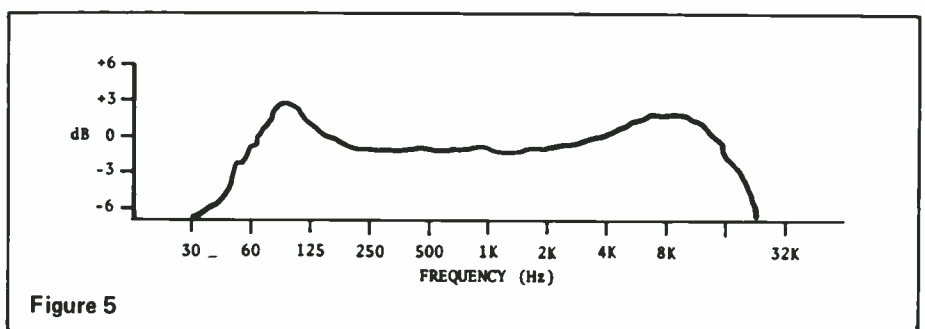


Figure 5



By Doug Caraway

It usually happens when there are wall-to-wall people in the store and it's ten minutes to closing time. A customer will walk up to me and ask:

"What's the difference between high and low impedance?"

or

"What's bi-amping?"

or (the best one)

"What does a mixer do?"

And I wonder why I'm losing my hair!

I became interested in the retail end of sound reinforcement via the practical experience route, and if I briefly outline how I set up a basic and relatively simple system, it might help you to stop *your* receding hairline!

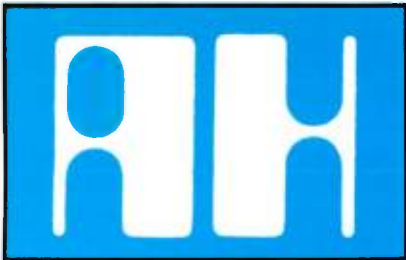
When a customer first comes in to shop for PA system components, he never puts enough emphasis on the most important points—"How big will it be, how heavy will it be and who's going to move it?" As a retailer, one of your foremost questions is "Where am

I going to put it?" Bulk and weight are equally important to the buyer, even though he may not realize it when shopping. He will come in shopping and outline his basic needs and budget, but never does he tell you how it will be hauled around or who will haul it. So the dealer must offer guidance. If it's a casual gig, he's going to haul it himself and it should fit in the trunk of his car. If it's a typical local rock and roll band he will more than likely have a platoon of "roadies" and "band aides" to lump his gear and they will have larger vehicles.

With my system, I'm the "Roadie," so I cart it around, usually in a 12-foot moving van, and I don't have the size limitations that some customers have. My gear doesn't have to fit in a small to medium-size van along with all the drums and guitar amps. After all, what good is a PA if it will cost "an arm and a leg" to move it? My truck bed is only about three feet high and I

have a handy ramp to help me, but after going up and down that thing a couple of dozen times, "ya get kinda' tuckered out." The important thing here is to cut the footwork down to a minimum. Consolidating miscellaneous paraphernalia into one lot rather than a box for cords, a tool box, a mike box, etc. is a step toward loading and unloading ease. Try suggesting a road case to hold all that audio miscellany. This also offers an easy inventory method. Before he shuts the lid, a glance will tell him if he's missing his long speaker cord or bag or mike clips or whatever.

Once inside the building, I decide where my speakers are going—someplace where they won't hinder business or fall on someone's head. Many times the best place to put them is on that nice long table next to the wall. The only problem is that the long table is the bar. I once decided to locate my speakers next to the main entrance



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and at about ear level. Because of the volume, when people entered the room they either found a table very quickly or they got their "hair parted" from the SPL. It's very difficult to subtly locate a big stack of speakers, but if your customer is doing casuals you might suggest a tripod or chains for suspension. If the speaker is small, it can be set on the tripod or can be chained to the ceiling or light support.

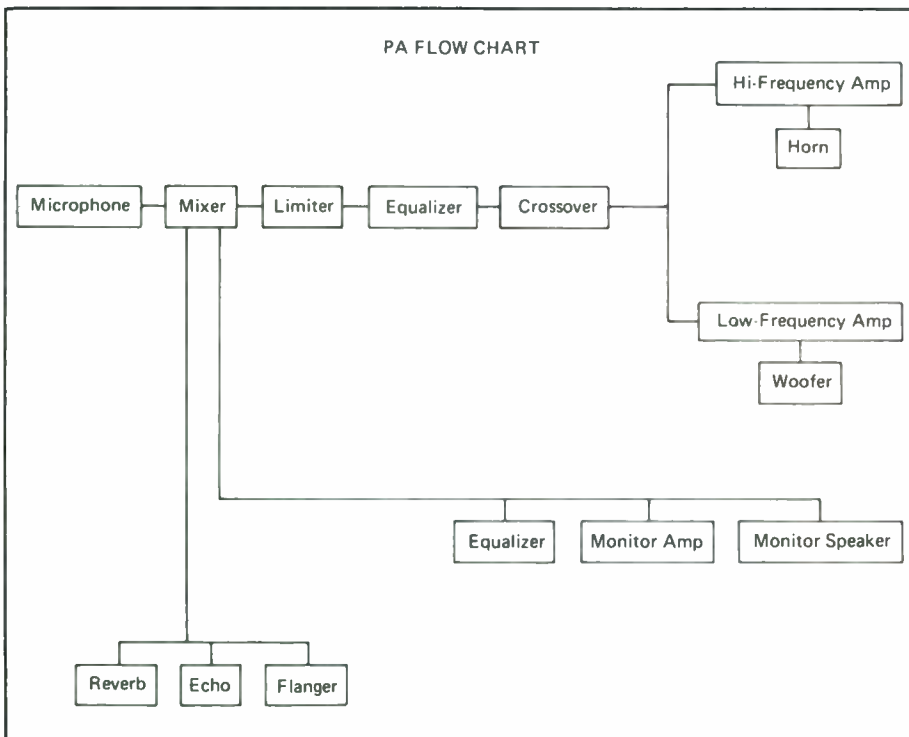
In locating the power amps, I choose a lopsided configuration. That is, all the power is on one side behind the speaker and a long cord is run to the other speaker. If your customer can afford it he should have a power amp behind each speaker cluster. That way

fier in a 19-inch rack. An amplifier can't take the rough treatment of bouncing around in the back of a truck. To protect *anything* for transporting, you put it in a box—in this instance a road case. For a small extra charge, case manufacturers will put two extra rails on the back. The front rails are made to hold the amp, and the back rails could be used to hold a "false back." On this false back any desired connectors could be mounted. The only bad thing is that then any cooling air circulation the amp was getting is cut off and it could overheat. To remedy that situation, a fan or two could be mounted on the panel, and the result would be forced air cooling.

blames you, the guy who sold it to him. He'll then probably use Phrase No. 140B—"Gee, I really wasn't driving it that hard." Just once I'd love to hear someone say, "Yea, I was just driving the hell out of it." If an amplifier has gain controls on the front, they should be kept all the way down, the power amp, electronic crossover (if there is one), mixer, limiter, reverb, echo and everything else along the line should be turned on—and then, and *only then*, should the gain controls be turned up. This way the operator has to *try* to ruin something.

One vital device that is growing in popularity is the "audio snake," or as I have dubbed it, the umbilical cord. I consider this my security blanket. Once the customer uses one, he'll never again do without. Whom is the concert for? The audience. Who can hear the best? The audience. Who is most qualified to mix the sound? A member of the audience—the sound man. This little "marvel of science" enables the sound man to become a member of the audience and mix out front and away from the stage. These little "cuties" are easily made from the raw materials by the customer or, if he has little patience, can be purchased already assembled. This piece of gear is really nothing magical—it is simply a single cable unit encasing 12, 15, 19, 21 or however many mike lines are needed. Low impedance mikes should be used. The mikes should be run to the mixer, these signals are mixed (or processed) and the mixed signal should be run back to the stage and *then* amplified. This is, of course, meant for larger systems. The trio in the lounge doing "Pinky Lee's Greatest Hits" definitely does not need this piece of gear.

Should your customer decide on a bi-amplified system, just be aware that the only difference between this and the conventional passive crossover setup is that this electronic (or active) crossover is before the power amps. The passive crossover setup was used for forty years, and in all that time no one realized how incredibly inefficient it was. With an active crossover there is nothing but the bare minimum between the end transducer and the amplifier. There should be a capacitor before the high frequency component to prevent DC. This may sound like the ultimate in PA's, but it's just the start. There are bi-amped systems, tri-amped systems, quad-amped systems, and heaven only knows what's around the corner.



his cords are only about five to six feet long.

Immediately after buying a power amp, your customer will probably take it out of the box, get the proper connectors, plug it in and use it. How wrong, how wrong! If a quality power amp was made to be used that way, those annoying little "fins" would have been taken off the front, a fan put on and it would have been put in a tolexed wood case. But that wasn't done—and good reason. An amplifier manufacturer has no idea how each person is going to use the product, so he makes it as versatile as possible—he does absolutely nothing. Those "annoying little fins" on the front have a purpose. They hold the ampli-

What has been eliminated is two or three loose amplifiers lying on stage, overheating, kicked-out cords and damage due to spilled drinks. What your customer now has is his amplifier, fans and connectors, all mounted in one roadworthy case. All he has to do is plug it in, connect the input and output and turn it on.

Just flipping on the power is not as simple as it sounds. Some amps turn on with a thud. This, to some, gives a sense of security—to others (speaker reconers), it gives a sense of increased business. This thud could be very damaging to speakers or diaphragms. It could pop that moving diaphragm so hard it could hit bottom, and your customer is stuck with a repair bill—and

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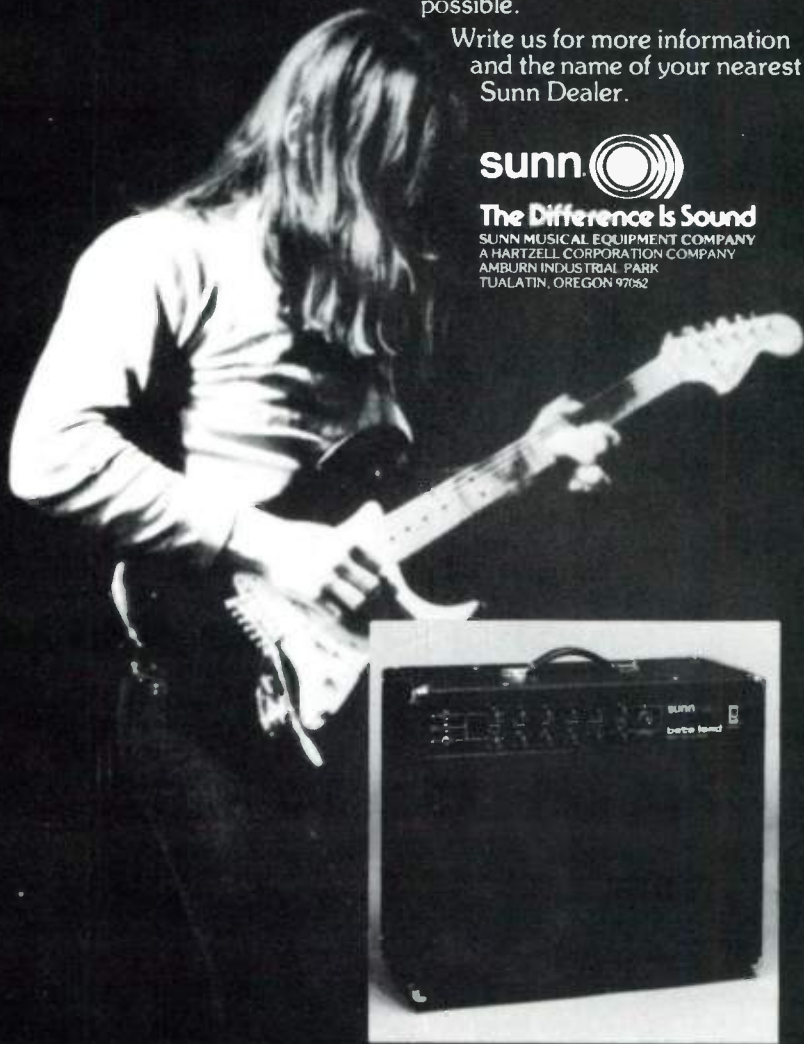
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There are such a multitude of mixers on the market today, it's enough to make one want to go acoustic! Some are noisier than others, some deliver a louder signal than others, some are fancier than others, but I can't think of one that would actually do your customer injustice. A little forethought is necessary in that the mixer your customer buys should grow with him. If he wants a reverb and is not too critical, make sure the mixer he chooses has an internal reverb. If he is critical, make sure there is a bussing network for an external reverb. If he's planning to add a horn section in six months, look into its capabilities of expanding the number of channels.

A section on "effects" could take up an entire encyclopedia. I will only mention where to place them in the circuit. Reverbs should be hooked up to an echo or reverb "buss." This lets your customer choose which channels get reverb and how much. The same holds true with flangers, phasers, harmonizers and the like. These are all extraneous devices that alter or enhance what is already happening. The more an equalizer is used, the more important it becomes. The equalizer should be inserted after the mixer and before the power amp. Many mixers have a network that allows the equalizer to be inserted within the mixer circuitry.

In doing sound for "funk" groups, I found the SPL increases quickly whenever the brass has a lead. The result is that in less time than it takes to open a can of beer, I must take down the volume on the brass. There are now devices that do that for the operator. It limits what the mixer and amps can do. Once the threshold is set where the limiter will kick in, the brass cannot peg the listeners against the back wall in pain. The place to insert this type of sound processing gear is *after* the mixer and *before* the equalizer or amp.

Hopefully the setup procedures outlined here have been informative. If this has started some wheels turning, but you're still confused, I suggest anything short of going to a concert and making a complete nuisance of yourself with the sound crew. Ask questions, read books and evaluate what others say. My philosophy is, "Look at what the big boys play with." They have their choice of just about anything. It may not be right for *your* customer, but it is at least a start.

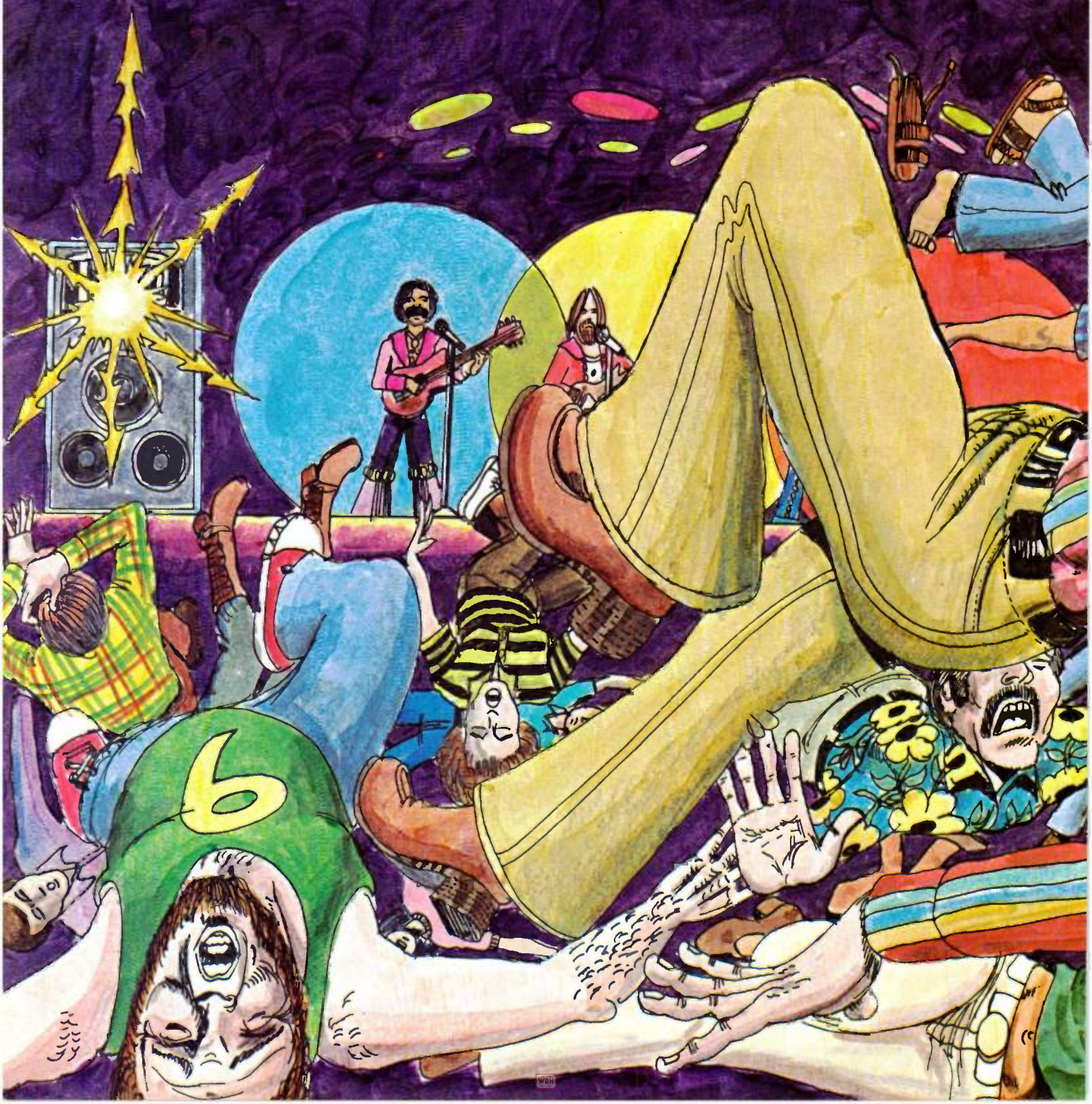


CIRCLE 89 ON READER SERVICE CARD

FEEDBACK

A CONSUMER HEADACHE

By L.A. Krause, Jr.





Feedback may be harmful or beneficial. In the design of low distortion audio amplifiers, radio frequency amplifiers, or closed loop servo systems the beneficial aspects of feedback are tremendous. But when feedback is referred to in audio processing systems composed of microphones, mixing consoles, power amplifiers and other black boxes of the trade it is usually spoken of in terms of a direct kinship with the devil.

Feedback, as referred to in this article, is of the type most often encountered in sound reinforcement systems and related applications. More specifically, it is an undesired sustained oscillation at some dominant frequency and several other less dominant frequencies. There are two major modes of feedback in sound reinforcement systems—electrical and mechanical.

Of the two feedback groups, the electrical, in which I include the complete acoustical path, is the most difficult to control. I shall not endeavor to completely cover this subject. To do so to any comprehensive degree would require a rigorous mathematical analysis which is beyond the scope of this writing. To describe the phenomenon of feedback in the most general of terms: In order for uncontrolled feedback (sometimes mistakenly called positive feedback) to exist, you must have a loop gain of 1.0 or greater and a phase shift of 180 degrees.

The mathematical analyses of these conditions are described in the works of Bode, Hurwitz, and Nyquist. Any analytically inclined reader may find extensive material in any control system engineering handbook.

There are many factors which will determine how stable (not inclined to go into oscillation) a sound reinforcement system will be under actual operating conditions. It is not my purpose

to cover every possible condition, as I feel that it is an impossible task due to the number of variables involved. I am, however, going to present the most dominant factors and try to give some practical suggestions for coping with feedback in sound reinforcement applications.

The first and most important point is to try to obtain a flat acoustical and electrical response throughout the audio system. Power amplifiers and mixing consoles do not present problems, as they are the most uniform signal processing elements in the system. In terms of potential feedback-related problems, I am most concerned with amplitude variations as opposed to phase irregularities. Power amplifiers can be considered flat even if there is a 2.0 dB roll-off at 20.0 Hz and 20.0 kHz. In terms of stability, these roll-offs are completely acceptable and perhaps even desirable. The mixing console, on the other hand, has the potential for boosting certain frequencies or bands of frequencies. Any time you have the potential for boosting or changing the gain at a certain frequency you also have the potential for creating feedback. At this time, consider the mixing console as being adjusted for an indicated flat frequency response.

The two most critical elements of any sound reinforcement system are the microphones and the speaker systems. It is very important to keep in mind that these devices must have as uniform a frequency response as possible. There will be some critical point at which any sound reinforcement system will go into feedback, and this point is primarily determined by the lack of uniform frequency response of the microphones and speaker systems. Because uniform frequency response and gain can be related, it is easy to see how the critical point is referred to as the maximum allowable gain before feedback point.

MICROPHONES

In considering microphones as potential trouble spots we must remember that there are many types of microphones. While all manufacturers make claims relating to their products, no two microphones exhibit the same characteristics. As an example, if you go into a recording studio you will probably find a couple of dozen microphones of different brands and types. While you are looking at these expensive devices, remember that in a

recording studio environment feedback is of minor concern.

In order for a microphone to be used for high level sound reinforcement applications, the microphone must have an electrical output which is a very close approximation of the acoustical input. As an example, let's assume that your system has a maximum gain before feedback of 50.0 dB. We shall also assume that all of the equipment used in this magic system is perfect in the respect of having a flat frequency response. The first thing we shall do is to replace the perfect microphone with a microphone that exists in the real world. You will now have a system that is in a state of feedback. The reason for this condition is that the real world microphone has a response curve that is anything but flat in frequency vs. amplitude response. If you have a 1.0 dB peak at any frequency that did not exist with the perfect microphone your system will now oscillate at that frequency. If you have ever studied the response curves of different microphones, it will soon become clear why some microphones are not suitable for sound reinforcement applications. I am not saying that a \$500 studio microphone is better for sound reinforcement applications than a \$100 microphone simply because it has a flat frequency response; there is much more than meets the eye.

Microphones, in addition to having unique frequency response characteristics, also have a variety of polar response patterns—the most popular being the cardioid pattern which is characterized as having a high rejection from the rear of the microphone. This allows you to orient the pickup pattern as required. Another characteristic pattern is the omnidirectional polar response. It is hard to convince people that in some applications an omnidirectional microphone will be less likely to feedback than a microphone with a cardioid polar pattern. The basic reason for this phenomenon is that an omnidirectional microphone often exhibits a much more uniform frequency response than its cardioid counterpart. Try an omni sometime when the front-to-back rejection characteristic is not the dominant factor. You may be very pleasantly surprised. Remember that the cardioid microphone affords the greatest rejection from the rear of the unit and if you should cover any of the slots or ports you will most likely destroy the directionality of the unit.

SPEAKER SYSTEMS

The most important link in the total sound reinforcement is your speaker system, and within that group the fold back or monitor systems are the most critical. A loudspeaker system is by nature a most irregular device in terms of frequency response and phase linearity. Another problem is that of pattern control. All of these factors make for a potentially unstable system. In the previous example of a perfect system we changed things for the worse by substituting a microphone with a non-linear response. For explanation purposes, let's now replace the microphone *and* change the speaker system. I will use an on-stage monitor system for the example because this represents the most difficult aspect of high level sound reinforcement. Most stage monitor systems are located directly in front of the performer and in close proximity to the microphone. It is now readily apparent that we have all the ingredients for a feedback condition. If any part of the system is going to feedback it will be the monitor system. The two keys to a useable monitor system are flat frequency response and tight pattern control. The requirement for flat frequency response is obvious and the necessity for tight pattern control will become apparent after a little thought. If you can aim the sound at the null of the cardioid microphone the chance for feedback is going to be greatly reduced. As a general rule try not to point any speaker system at the front of a microphone. There are times when this is unavoidable and all you can do is reduce the gain of that channel and hope the performer gets in close to the microphone. Try to think of sound as having the directional characteristics of water, and with a little common sense you can avoid a lot of problems.

EQUALIZATION

There are two general forms of equalization: room equalization, and equalization for the reduction of feedback. Room equalization is used to obtain a proper "sound" within a given area such as a recording studio control room. Feedback is not usually a problem in this environment and all types of equalizer boost and cut are acceptable within certain limits.

However, the process of equalizing a concert hall for maximum gain before feedback is an entirely different matter. Equalization for feedback con-

trol must take into consideration a large number of variables; as a result compromises must be made. You cannot have the sound pressure levels required for a rock concert and at the same time have the frequency response associated with a recording studio control room. I have found that for most concert applications, when the sound as perceived by the mixing engineer is considered to be good, a real time analysis of the system will reveal that anything but a flat frequency response condition exists. I have watched professional sound engineers bring in many thousands of dollars worth of test equipment, spend many hours of time, and completely ruin a good sounding rock and roll sound system. It is interesting from an academic point of view to know what the real time response of the system looks like, but when it comes down to actually adjusting the system, your ears can provide you with all the test equipment that is required.

There are two basic types of graphic equalizers, and a working knowledge of both is required for proper feedback control. Some equalizers have a cut-only characteristic while others have the capability for both boost and cut. An equalizer is a series of filters tuned to a set of predetermined frequencies which are spaced on one-third octave centers. There is a certain degree of interaction among filter sections which allows you to "tune out" a dominant feedback frequency if it is not on one of the third octave centers. A parametric equalizer can be a very useful tool for feedback control due to the fact that it can be tuned to the exact frequency, the Q adjusted, and the degree of attenuation adjusted as required. Regardless of the type of equalizer used you must remember that the total system gain is what determines when and if a particular system will break into a feedback mode. With this in mind it becomes obvious that in actual use an equalizer will be used in the cut configuration much more often than in the boost mode.

There are many proper procedures for the equalization of an acoustic environment for feedback control. I make no claims that my approach is better than any other procedure, but it works well for me and the end results are all that really matter. The following procedure is presented as a guide to the correct setup and adjustment of a typical sound reinforcement system.

1. *Phasing.* It is an absolute necessity that your total sound reinforcement system be in phase. This includes the microphones, cables, mixing console, graphic equalizer, power amplifiers, and speaker systems. A single microphone cable which is miswired can cause no end of trouble. If you are going to Europe, please remember that the standard for XLR type connectors is that pin 2 is positive with respect to pin 3. The standard American system is that pin 3 is positive with respect to pin 2 and the shield is connected to pin 1. This is an important point to remember when you are using any type of equipment in Europe.

A quick way to check for proper phasing of a system is to first make absolutely sure that the complete speaker system is in phase. A simple way of ascertaining the proper phase of a speaker system is to turn up the mixer gain (use a channel without a microphone or any other type of input) until you have a very good noise source. With the channel assigned to all of the speaker systems, including the stage monitors, side fill monitors, and the main stacks, you should adjust the level as required for a reasonable sound pressure level. Walk in front of the system and make sure that there are no "holes" or dead spots. Make a complete circuit around the stage area looking for any radical differences in the sound pressure level. If you locate a dead spot, start looking for an incorrectly wired speaker system component. Remember that even the best of manufacturers make mistakes with regard to the polarizing marks. Check every component when assembling your system or when replacing elements of the system.

After you have ascertained that the speaker system components are properly phased, reduce the console gain and bring up a channel with a live microphone. Adjust the console equalization for a low end boost and a sharp roll off of the mid and high frequency response. Observe each bass speaker, or in the case of a folded horn enclosure, place a small sheet of tissue paper in front of the cabinet and tap the microphone. All movement should be in the same direction. This may seem like a lot of trouble, but once you have gone through the procedure you will have eliminated possible feedback problems.

2. *Console Equalization.* Adjust all

console equalization to indicate flat response. This includes all roll-off filters and effects send or return equalization controls.

3. *Graphic or Parametric Equalizer Adjustments.* Adjust all system equalization elements for an indicated flat frequency response.

4. *Level and Mix Adjustment.* Starting at a nominal level, adjust your mix as required for the proper balance. At this time you can also adjust the console equalization and roll-off filters as required for the desired "sound."

5. Slowly bring up your system master level until the system starts to go into a feedback mode. *Do not* try to remove the feedback with the console equalization. This is not an iron-clad rule, because some consoles have very sophisticated parametric type equalizers which can be used for feedback suppression. Even if this type of equalization is available, use it when all else fails.

6. Using the graphic equalizer or filter set gain control, adjust the gain until the feedback stops. Make sure that any limiters or compressors are in the bypass mode at this point in the procedure. With one hand on the equalizer gain control and the other hand free to adjust the filters, slowly bring the gain up until the system goes into feedback. Find the feedback frequency by adjusting each filter section until the feedback is removed. Adjust one section at a time and if there is no noticeable effect, return that section to its indicated flat response position. After the first feedback mode is eliminated, slowly raise the gain until the second mode appears. Repeat the equalization procedure for the second and possibly the third feedback modes. *Do not over equalize!* You can go to the point of having all of the filter sections in the cut position, which is exactly the same as turning down the system gain control. If you can eliminate three feedback modes with moderate (3.0 to 10.0 dB) equalization, any further adjustment will result in overall sound degradation.

7. At this point have someone go on stage and place his hand over each microphone. You can be assured that at least one microphone will cause the system to go into feedback when

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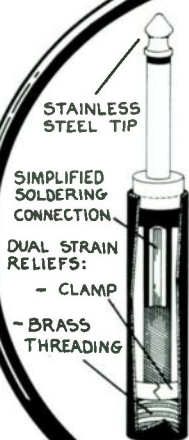
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CIRCLE 85 ON READER SERVICE CARD

A Tip from the Experts



For years, everybody thought that connectors were about as basic as you could get—so nobody improved them. Then along came Whirlwind. We recognized the musicians' needs for high-quality, rugged and noiseless cords that *lived up* to their guarantees, and so we started designing our own cords, having them manufactured by Belden, and selling them to you.

Now our designers have recognized another need in connectors that no one has bothered to think about before— $\frac{1}{4}$ " phone plugs. We went beyond the "standard;" constructing a plug that exceeds the positive contact properties of the "military" or "computer" plug, by using a new, stainless-steel diamond-shaped tip, and then designed a tougher strain relief system and outer shell, to make the plug virtually indestructible.

We call it the Tip. It's a phone plug that's designed from scratch to combine the most secure strain re-

lief available with a reliable contact-making diamond-shaped tip.

The Tip looks just like a "military" plug, with a high-impact, shatterproof black housing, and brass body—but its stainless steel tip is an instant giveaway. A double strain-relief system and simplified soldering arrangement complete the picture, to provide you with the most secure phone plug there is.

The Tip—sure it's not big; but we got big by caring about the little things. Only at authorized Whirlwind dealers.

Another Whirlwind exclusive.

the tip
Pat. Pending T.M.

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CIRCLE 82 ON READER SERVICE CARD

covered. You now have two alternatives: you can reduce the gain of that channel, or you can use the channel equalization controls to remove the feedback. My suggestion is to reduce the gain and try to have the artist work as closely as possible to the microphone. If possible, move the microphones in various directions; a few inches can make a tremendous improvement. Remember that all microphones are not created equal and that it will not hurt to try a different microphone.

8. After adjusting all of the levels, channel equalization and overall system equalization, tape, glue, or weld all of the microphone stands to the stage. If something is moved, you will have to change the console channel gain. Do not touch the system graphic equalizer.

9. If you are using limiters or compressors, adjust the threshold and output level controls for unity gain and place the device in the signal path. It is very important that the overall gain of the limiter be unity (for example, a one volt input results in one volt output). The threshold control should now be adjusted for the desired dynamic alteration effect. The important thing to remember is that you do not want the leveling device to raise the system gain when the input signal is below the threshold point. If your system goes into feedback with no excitation and the feedback stops when there is an input, you have managed to alter your threshold/output level relationship. Leveling devices are very useful when correctly installed and operated. Take your time and learn how to correctly adjust these units during practice sessions. When a concert starts you will have no time for experimentation.

IN CONCLUSION

I have endeavored to provide a general description of why feedback occurs and how to prevent problems when setting up a portable sound reinforcement system. Every system exhibits unique problems which have to be handled on an "as required" basis. Use common sense and do not expect recording studio quality in a live concert environment. Learn from your mistakes and develop your own procedures.



Our point of view:
You can't know too
much about a good
thing. Number 35 in
a series of factual
discussions.



audio-talk from audio-technica®

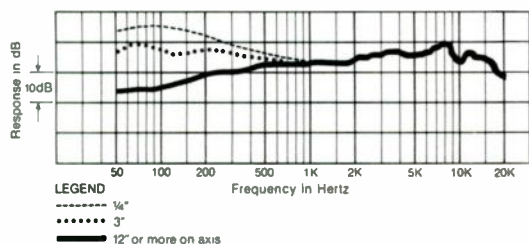
Basic Terms Nos. 5, 6, and 7 Proximity Effect, Feedback, and Impedance

If you've wondered how someone with a light, thin speaking voice can sound rich and full when singing, it could be *Proximity Effect*, our *Basic Term No. 5*. That's what happens when you get ultra-close to most unidirectional microphones. The effect is rarely discussed but can be most useful when understood.

UP FROM THE BOTTOM

The frequency response below is of a typical cardioid (unidirectional) microphone. At a distance of a foot or more it is quite flat. But as you move in close the bass begins to rise until you may have 20 dB more output at 100 Hz when working at $\frac{1}{4}$ " than at one foot.

Influence of proximity effect on unidirectional microphone response



This can help light voices, and is a creative tool for talent who use proximity effect to get a very "earthy" close-up sound, then change to a more penetrating balance simply by moving the microphone away while increasing volume.

Proximity effect can also help control feedback, when used with careful equalization. By keeping the talent close to the microphone, then equalizing out the "extra" bass, you will also be reducing the microphone's sensitivity to all bass sounds arriving from a foot or more away.

WHAT ABOUT FEEDBACK?

Feedback is our *Basic Term No. 6*, and a major factor in the success or failure of most sound reinforcement systems. When the talent, microphone, and loudspeaker are all in the same area, the sound amplified by the system can be picked up again by the microphone and re-amplified over and over. As it gets louder, the system becomes unstable and starts to "ring" or howl until the volume is turned down. It's an almost universal problem, but the right microphone can help.

The solution is to keep the speaker sound from the microphone. So a cardioid microphone, aimed *away* from the speaker may stop the feedback. Of course sound may not be coming *directly* from the speaker, but might be bouncing off one or more walls, the floor or ceiling. A cardioid can still help, however, since it reduces the pickup of sound arriving from random directions by 67% compared to the on-axis pickup. It may also help to move speaker and microphone farther apart. Or ask the talent to move in closer to the microphone (so that input gain can be reduced).

In some instances, an omni microphone may prove best. Feedback usually triggers on peaks in the system. A glance at the frequency response curves included with A-T microphones will show that omnis generally have smoother response curves, both on and off-axis.

Because every sound reinforcement situation is different, trial-and-error—and experience—may be your best guide. And while the entire system—mikes, speakers, amps, the room, and their locations—all influence the feedback problem, not all of these factors may be controllable. We don't have room to list all the "tricks" you might try, but there are a number of good texts on the subject our microphone experts will be happy to recommend.

IMPEDANCE IS NO MYSTERY

You don't even have to understand what our *Basic Term No. 6, Impedance* is, to know how to use it in microphone circuits. Technically, impedance is the measure of AC resistance, and is often abbreviated "Z". The important thing is to match the microphone output to the circuit input: low impedance microphones to Lo-Z inputs (usually professional and better semi-pro equipment) and high impedance microphones into Hi-Z equipment (usually home and low-cost semi-pro units). Low impedance is anywhere from 50 to 600 Ohms, while Hi-Z is at least 20,000 Ohms or more.

THE BALANCING ACT

While most Hi-Z inputs are unbalanced (i.e. one "hot" lead and a ground) Lo-Z circuits may be either unbalanced or balanced (i.e. 2 "hot" leads and a ground). All A-T microphones are 600 Ohms impedance to match most pro and semi-pro gear and all but the miniature AT805S have a balanced output. Balanced Lo-Z outputs are favored when you must run more than 20 feet or so of microphone cable, since the shielding plus balanced nature of the cable cancels most induced hum and noise, and there is little loss of signal. Even so, a balanced output can be fed into unbalanced Lo-Z inputs, or into Hi-Z inputs with an accessory matching transformer.

In our last issue in this series we'll wrap up our last basic term and offer some general advice on the choice of microphones for your customers.

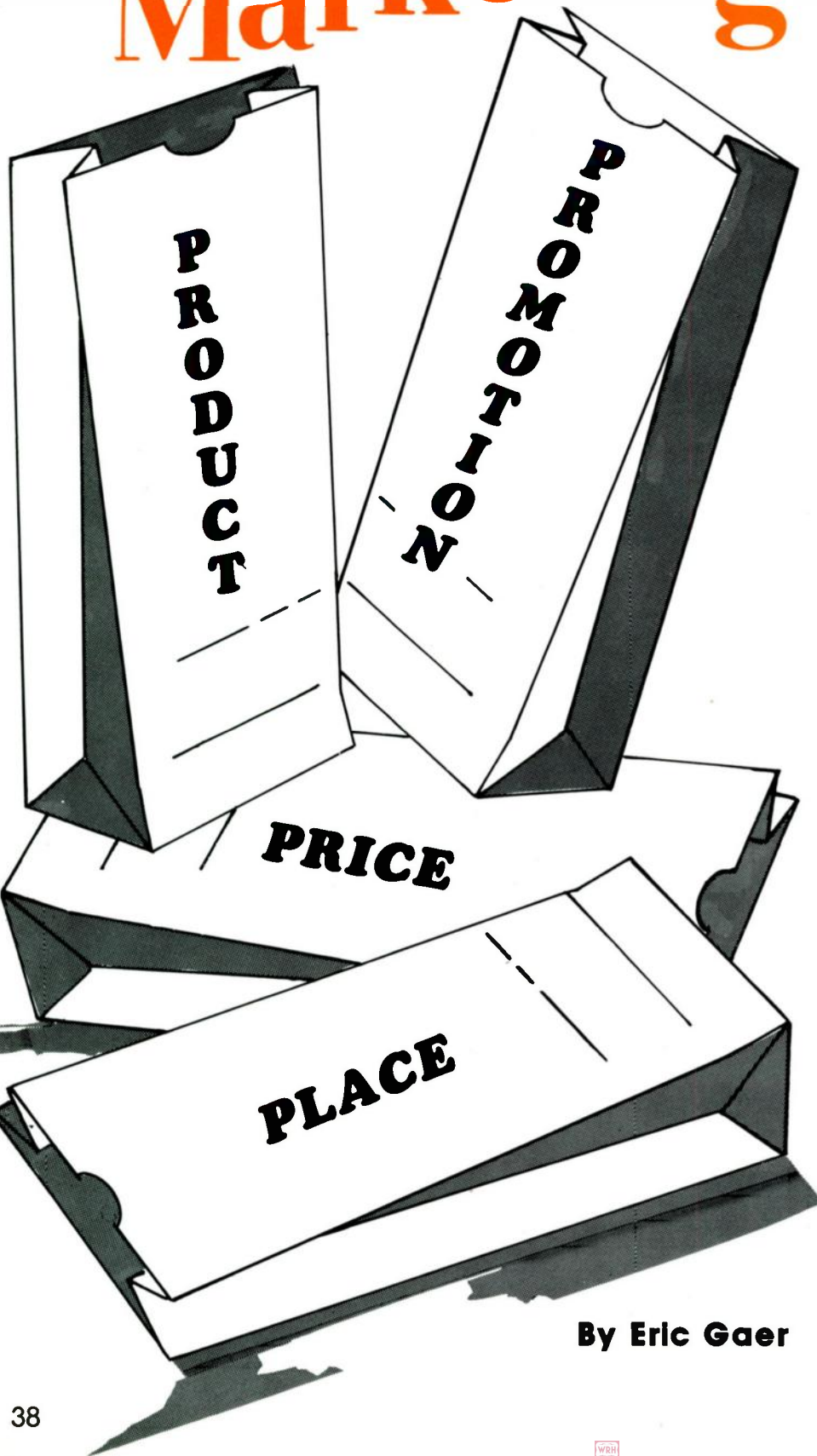
Jon R. Kelly
Vice President & General Manager



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Let's Go Marketing



Advertising is a business of outsiders looking in. Big as it is, it is only one part of the total marketing arsenal a firm has at its disposal. Consequently, before we can examine advertising, we need to put advertising into perspective with the other tools available to increase sales and maximize profits.

WHAT IS MARKETING?

Basically, marketing consists of all the activities your company must engage in to get its products and services to the final consumer (end user) except those activities that involve production and manufacturing. The list of marketing activities is particularly extensive. However, they all break down into what are commonly called the *Four P's of Marketing*. These are: Product, Place, Price and Promotion. Whoever is in charge of marketing in your company should be involved in the decision-making process in each of these disciplines, as each will affect his ability to sell. The relative proportion of company resources allocated to each of these disciplines is called the *marketing mix*.

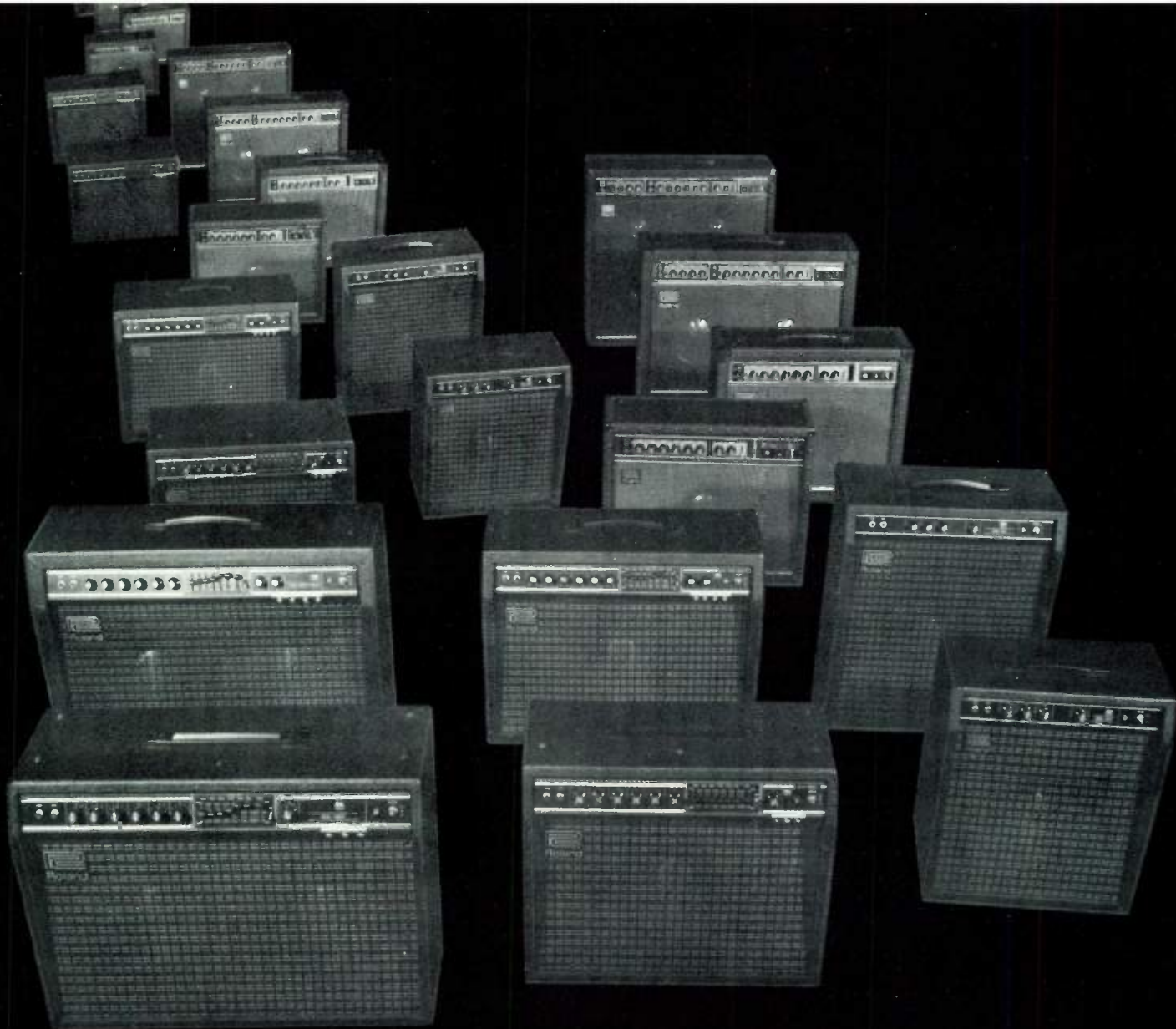
PRODUCT

This marketing decision is very often misjudged. Many companies still market their goods and services as if they were offering something totally unique without competition. Deciding what it is you are going to sell and then trying to decide how you are going to sell it is marketing-in-reverse. By the time you have developed a strategy to sell, it is often too late and you sit there stuck with a product that may or may not become successful depending on the ability of your salesmen and/or your good fortune in the marketplace. Simply stated, you're out of control with no way to structure consumer behavior or properly "position" the product. In view of the investment necessary to bring a product to the market, this method would seem an extremely imprudent risk.

The first step to reach this marketing decision (product) is to clearly establish the identity of your business. Prior to making this decision, you need to better understand what business you are *really* in. That is, what *needs* are you fulfilling? Most advertising/marketing professionals agree that people rarely buy a product. What they buy is the "utility" they get from it.

We don't really sell amplifiers or musical instruments. We sell sound,

By Eric Gaer



ROLAND AMPS: BETTER BEFORE LOUDER.

When it comes to amplifiers, Roland doesn't believe in simply making your sound louder. Roland believes in first making your sound better. That's why you find so many valuable features on the 12 different models of Roland amps . . . like Compressor Circuitry, Graphic Equalizers, Extra-Heavy-Duty Pioneer Speakers, and Roland's Exclusive Chorus Effect. There's much more, too. Roland Vibrato actually changes the pitch of your sound like a true vibrato should. And then there's the specially-designed Roland Reverberation that all but makes you immune to poor acoustics.

Roland must believe right. Because superstars like Neil Diamond, Rufus, Linda Ronstadt, Alice Cooper, James Vincent . . . to name a very few . . .

have all switched over to Roland. And so should you. Because then you'll really have something to be louder about.

FREE—Complete information on all of Roland's famous guitar amplifiers is available from your local Roland Dealer, or write Department 10-091, RolandCorp US, 2401 Saybrook Avenue, Los Angeles, CA 90040.

(Not all features listed are available on every model.)



RolandCorp US

2401 Saybrook Avenue
Los Angeles, CA 90040

quality, stardom, enjoyment, etc., etc. You must isolate the functional or psychological utility of your product to position it to fill a market need. Beyond this, each special need creates a separate market segment which also needs to be identified.

PLACE

This marketing decision involves distribution of your product; where, how, and—even—why. Each of these variables will affect both your positioning and advertising strategy.

The number of outlets you have and your inventory level is a crucial relationship. Inventory ready for sale is inventory ready for advertising. With this in mind, advertising must be matched to distribution channels. Yet inventory is only one concern in this regard. You must also analyze the selling practices of your distribution outlets. Discounting, competition, complementary merchandise, key buying influences in a particular geographic region or market segment ... all relate to this critical decision of "place."

PRICING

Of course, pricing has a profound effect on advertising decisions. Obviously the larger your profit margin, the more potential advertising dollars available. You either price your goods on a "cost-plus" or "competitive" basis. A unique product allows for cost-plus pricing and arbitrary advertising expense. Ordinary products (those that fall into a competitive category) result in competitive pricing—and advertising expense as well as the product's price will be dictated by the marketplace.

The influence of pricing on sales merits particularly close attention. The factors that affect demand when the price increases are quite far-reaching. Among these are: product substitutions, consumer attitudes (loyalty), quality, product category, product availability, and degree of differentiation (unique properties of product).

PROMOTION

This marketing decision is saved for last, as it is ideally made after all the

others. Promotional activities (personal selling, advertising, public relations, and sales promotion) should be looked upon as a group, not separately, as they represent different "tools" for reaching the same objectives.

We would all agree that personal selling is preferable to all the others, as it has been proven most effective. However, in view of its cost and logistical limitations, it requires a support system.

Advertising makes mass contacts and is accepted as repetitive so that it can be understood and remembered. Public relations seeks third-party endorsement and helps create a climate to buy. Sales promotion activities serve to speed the buying decision and induce consumer action.

Effective marketing (and consequently, increased sales) requires synchronization and coordination of all the support functions along with the sales program. The design of the program should be documented in a "Marketing Plan" in which advertising plays a supportive role.



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- SPECIFICATIONS -

Gain	Unity
Bandwidth	20 kHz
Dynamic range	85 dB
Output impedance	1 kohm
Input impedance	500 kohms
Maximum input level	2.5 V peak
Notch depth	Variable from 20-40 dB
Delay time	Variable from .5-15.0 msec
Auto flanging rate	Variable from .1-8 Hz
Power requirements	105-125 V a.c., 50-60 Hz, 10 mA

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CIRCLE 90 ON READER SERVICE CARD

Anatomy of a profit machine.

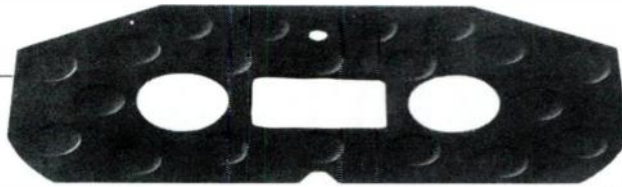
To make a cassette that performs on your sales floor, we had to engineer a precision machine that performs in your customers' homes. Consistently. Magnificently. We get down to small details so you can build up to maximum blank tape profits and avoid the hassles of heavy returns and customer complaints. Consider:

Precision Molded Cassette Shells—are made by continuously monitored injection molding that virtually assures a mirror-image parallel match. That's insurance against signal overlap or channel loss in record or playback from A to B sides. Further insurance: high impact styrene that resists temperature extremes and sudden stress.



Five-Screw Assembly—for practically guaranteed warp-free mating of the cassette halves. Then nothing—no dust or tape snags—can come between the tape and a perfect performance.

An Ingenious Bubble Surface Liner Sheet—commands the tape to follow a consistent running angle with gentle, fingertip-embossed cushions. Costly lubricants forestall drag, shedding, friction, edgewear, and annoying squeal. Checks channel loss and dropouts.

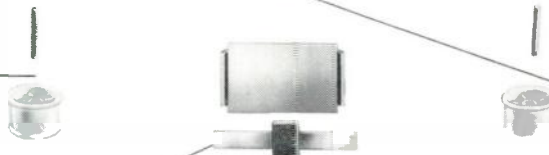


Perfectly Circular Hubs and Double Clamp System—insures there is no deviation from circularity that could result in tape tension variation producing wow and flutter and dropouts. The clamp wedges the tape to the hub with a curvature impeccably matched to the hub's perimeter.



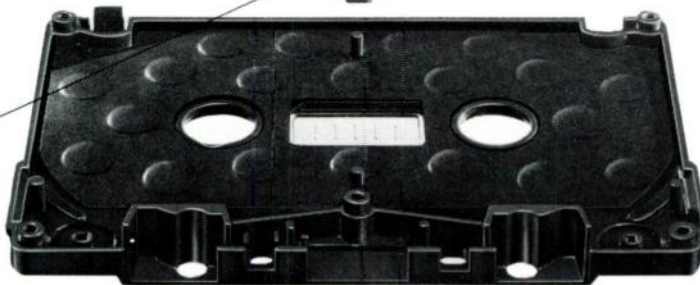
Head Cleaning Leader Tape—knocks off foreign matter that might interfere with superior tape performance, and prepares the heads for...

Tapered, Flanged Rollers—direct the tape from the hubs and program it against any up and down movement on its path towards the heads. Stainless steel pins minimize friction and avert wow and flutter; channel loss.



Our famous SA and AD Tape Performance—two of the finest tapes money can procure are securely housed inside our cassette shells. SA (Super Avilyn) is the tape most deck manufacturers use as their reference for the High (CrO₂) bias position. And the new Normal bias AD, the tape with a hot high end, is perfect for any type of music, in any deck. And that extra lift is perfect for noise reduction tracking.

Resilient Pressure Pad and Holding System—spring-mounted felt helps maintain tape contact at dead center on the head gap. Elegant interlocking pins moor the spring to the shell, and resist lateral slipping.



TDK precision cassettes—we put a lot into them, so you can get high profits out of them. And at the same time, you get the satisfaction of giving your customers what we are certain is the best cassette available for their money. Contact your TDK representative to discover how TDK's full line of premium cassettes,

open reel, 8-track and accessories can put you well ahead of your competitors in the fastest-growing product area in high fidelity.



The machine for your profit machine.



The old adage says, "It takes money to make money." That's a pretty fair assessment of the world of business—especially the world of retail business—but there are still a few ways to beat the odds; to get solid, positive results without spending a fortune up front.

One of the best ways is the in-store seminar. Seminars work any time there is a need for education and information. And they are ideal in the semi-pro audio market.

You can spend a lot of money on a huge production, or you can run a seminar literally on a shoestring. But whichever way you choose to go, attention to some basic information will help assure the planning and execution of a successful "consumer seminar."

We're using the word *consumer* to differentiate your customers from your sales staff. (Next month, we'll be talking about the seminars for your staff.) But don't confuse the semi-pro consumer with the typical day-to-day

Great American Consumer. You already know that your customer has a completely different set of needs and motivations. If you understand them, you're more than half-way down the road to running sales-getting, market-developing seminars.

Benefits of a Seminar

Seminars are educational. And in the semi-pro market, information is a priceless commodity. Perhaps more importantly, seminars build sales at a faster growth rate. They strengthen your present market, create new markets and build repeat business.

A good seminar or series of seminars will increase your store's credibility in the semi-pro marketplace. Remember, there is probably a musician out there right now who wants to record his band to make that all-important demo tape. He may be afraid to buy your product. Because, until recently, store seminars were almost non-existent for

this client. By conducting seminars you give many people who lacked the assurance to purchase the gear the motivation and confidence to do so. You may also speed up the buying process. And, of course, seminars help reinforce your own sales staff's knowledge of the products and procedures of professional multitrack recording.

Seminars set you up as the *knowledge center*, the people to see when there's a question. That's important.

Getting Started

Manufacturers are the best people to start with in gathering information on running seminars. Many manufacturers have existing courses of which you can take advantage. Some will come to your store and help assist in running a seminar. Still others have training departments that can help you plan your seminars.

For example, TEAC offered the Tascam School, Phase 1 to their reps

Meet the AKG "C-450 Microphone System"



At our place, there is an interesting credo ... "When perfection is attained, improve upon it."

Eight years ago, AKG introduced the *first* modular concept in professional microphone design. It was *then*, and is *now* the only true condenser modular system to provide for a myriad of applications through interchangeable components...much the same as cameras with quality interchangeable optics. Since the inception of the system, each component has been continuously upgraded and refined to the ultimate in technical perfection...while new ones have been added to form the broadest in-depth product range suitable for any known application.

Matching the widest possible scope of end-use, the C-450 Condenser System presently offers: *four* cardioid capsules, *four* different omni capsules, *one* figure-eight capsule, *two* shotgun capsules, *five*

preamplifiers and *seven* powering options. Added to this is an assortment of swivels, pads, extension tubes, shock mounts and windscreens. These quick-change "screw-on" components provide an almost limitless variety of combinations to extend the flexibility and capabilities of the microphone as changing uses in audio applications require.

Returning to our credo...we are constantly searching, and as applications requirements, materials and techniques are discovered to further improve upon the system components, they will first be found bearing the trademark AKG.



The Mark of Professional Quality...
in microphones, headphones,
phonocartridges, reverb units

PHILIPS AUDIO VIDEO SYSTEMS CORP.

A NORTH AMERICAN PHILIPS COMPANY

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CIRCLE 92 ON READER SERVICE CARD

and dealers during 1977, designed primarily for dealers who wished to increase sales. (A Phase 2 is now in the development stages).

During Phase 1, information that explored the market and the products was presented for four days—constituting a high-intensity seminar. Technical information and *how to* lessons were given on signal processing, noise reduction, EQ, limiters/compressors and the like. Then recording methods were taught: the studio signal chain, alignment, microphones and their use. The school ended up with field trips to working Tascam studios and then a live recording session in which all participants were able to mix and come home with a cassette tape of their session.

Other tools are now offered. Videotapes and 8-channel dbx encoded software are available. The audio tape can be extremely important during your own seminars. With it, you can offer “hands-on” experience—the most important kind there is. The videotape can be used as a tool in helping to qualify your customers. Information presented covers the background of multitrack, the recording studio as a functional system, signal flow with the added outboard equipment, and of course product information.

The professional division of JBL has started a 3-day workshop that travels around the country. Sound reinforcement techniques are taught and demonstrated. Both the layout and installation of sound reinforcement systems are covered. Topics include practical acoustics, sound in free space, sound in an enclosed space, wavelength-dependent phenomena and how to predict the gain of a sound reinforcement system (acoustic feedback and potential system gain, criteria for optimum sound systems geometry and the like). The course is offered to participants for \$175.

Another source of information is your reps. They can tell exactly which manufacturers are offering what dealer support programs. And they usually have the most current information about available software. But never be afraid to give your manufacturer a call and tell him exactly what you need.

Sometimes, consultants can be called in to run or help you run a seminar. John Worman staged a 10-week semi-pro recording course in cooperation with Audio by Zimet on Long Island, New York. In three-hour ses-

sions, one night each week, Worman covered basic theory, microphones, loudspeakers, signal processing, tape and tape recorders, alignment, noise reduction, recording consoles and basic techniques. The cost for the entire course was \$150 per person.

No matter who runs your seminar, you or an outsider, remember to include your salesmen in part of the program. They gain credibility plus the purely commercial benefit called making contacts. Quite often, your salesmen can be your best presenters. Set them up as experts—either in specialties or overall recording techniques—and your customers will always have someone to call when they need something.

What You'll Need

Some obvious things are the most often forgotten. You'll be needing chairs and writing materials for all participants—don't expect the “students” to bring anything. You'll also need a large blackboard or flipchart, something that can be seen without leaning or squinting.

It's a good idea to have some refreshments around—light snacks only. Don't serve anything that'll fill your people up. They'll only get sleepy.

Twenty to thirty people are the ideal for many seminars. A larger attendance is hard to handle in terms of fully satisfying all the needs of the individual. And don't forget, you may want to break things up later—create smaller groups of say four or five people for hands-on training. If you do this, make sure you plan carefully.

The easiest way to start your plan is to take a hard, objective look at your store. Do a trial setup, then a trial run. If you plan the physical layout well, everything will follow.

Gather up all your support materials well in advance. Don't wait for promised items. If you don't have something in hand, don't plan on it coming in time for your seminar. Excuses and surprises are remembered long after great events are forgotten.

And don't miss out on the chance to promote your store in all your support materials. You probably should assemble some kind of notebook for each person attending. Include such things as literature packages, block diagrams, written materials to support your efforts in the seminar; materials that can and will be used at a later date. Talk about your own philosophy,

the people in your store, salesmen, anything that might set you apart from the crowd. Keep the *hype* to a minimum. Please . . . be conversational.

The last things to check are your working systems. You'll need a few working set-ups if you want to let a few small groups get the all-important hands-on experience. (If you ever doubted the value of hands-on teaching, picture the look on a musician's face the first time he performs a simple mixdown).

Insist on advance registration. Advance registration is like “asking for the sale” and closing the deal. It's also the best insurance against having an unexpected hundred people show up on the date of the seminar. Advance registration lets you separate the more knowledgeable multitrack recordists from the pure beginners. Mixing these two groups can be deadly. And letting beginners take up space that should go to more advanced recordists, especially for a high technology seminar, can ruin one more chance at sales.

Prepare some kind of feedback cards. They should be filled out and turned in at the end of the class. They let you evaluate the seminar and begin measuring its results. Feedback cards also let you build a mailing list, so make sure *qualifying* questions are asked.

When you've gathered the materials needed and prepared a physical layout that works, dress your store for the event. Spend some time decorating and cleaning up. Make the seminar look like a very professional event that's taking place in a very professional environment.

Promoting Your Seminar

Promotion is almost too obvious to mention. But enough dealers have blown their seminars through poor promotion that a few essentials could have eliminated.

Start by planning your announcements. You'll probably need something to mail and something to show (like a poster). You might also need a newspaper ad. Make whatever piece you create look professional, even if you print it at the corner instant-print shop. And remember, while you're being creative you might consider that “straight and informative” invariably outpulls “cute and confusing.” Save funk and flash for in-person meetings. Let your printed materials and com-

Sure, you've played a lot of good guitars. But never anything as wild as the new Westbury. Because Westbury feels, sounds, and plays unlike any instrument ever made.

Take the Westbury Custom. It's body-cradling contour, arch-top design, and one-piece joined neck (with ebony fingerboard), provide extraordinary playing comfort and ease.

The Custom's exclusive 6 position pickup programmer produces more than 18 variations in single and double pickup coil structures. Anything from a mellow moan to a shattering scream.

Duplicate the tonal characteristics of other guitars. Or create a rocking rainbow of new tonal tapestries. Sounds remarkable. But it's just the beginning of the remarkable sounds you'll create.

Mean and Lean

Meet the new Westbury Track IV Bass. Many professional musicians say its the first new bass good enough for stage or studio work. Its dual split pickups are incredibly powerful.

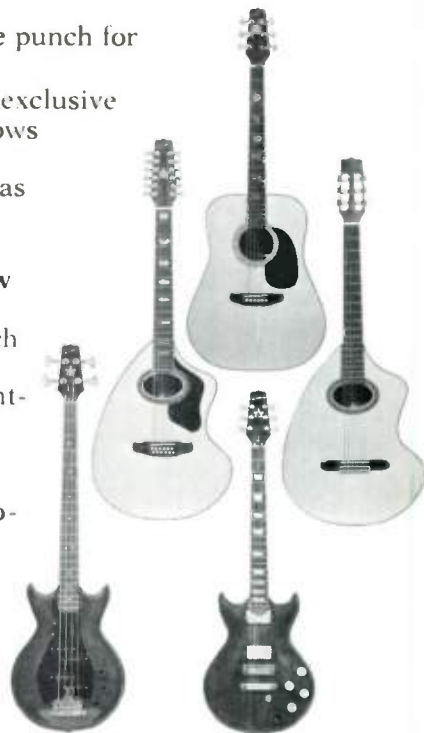
With more response. And more punch for finger-pops.

What's more, the Track IV's exclusive long travel die-cast bridge allows precision adjustment of string intonation and playing action as well as accurate tuning over the entire neck.

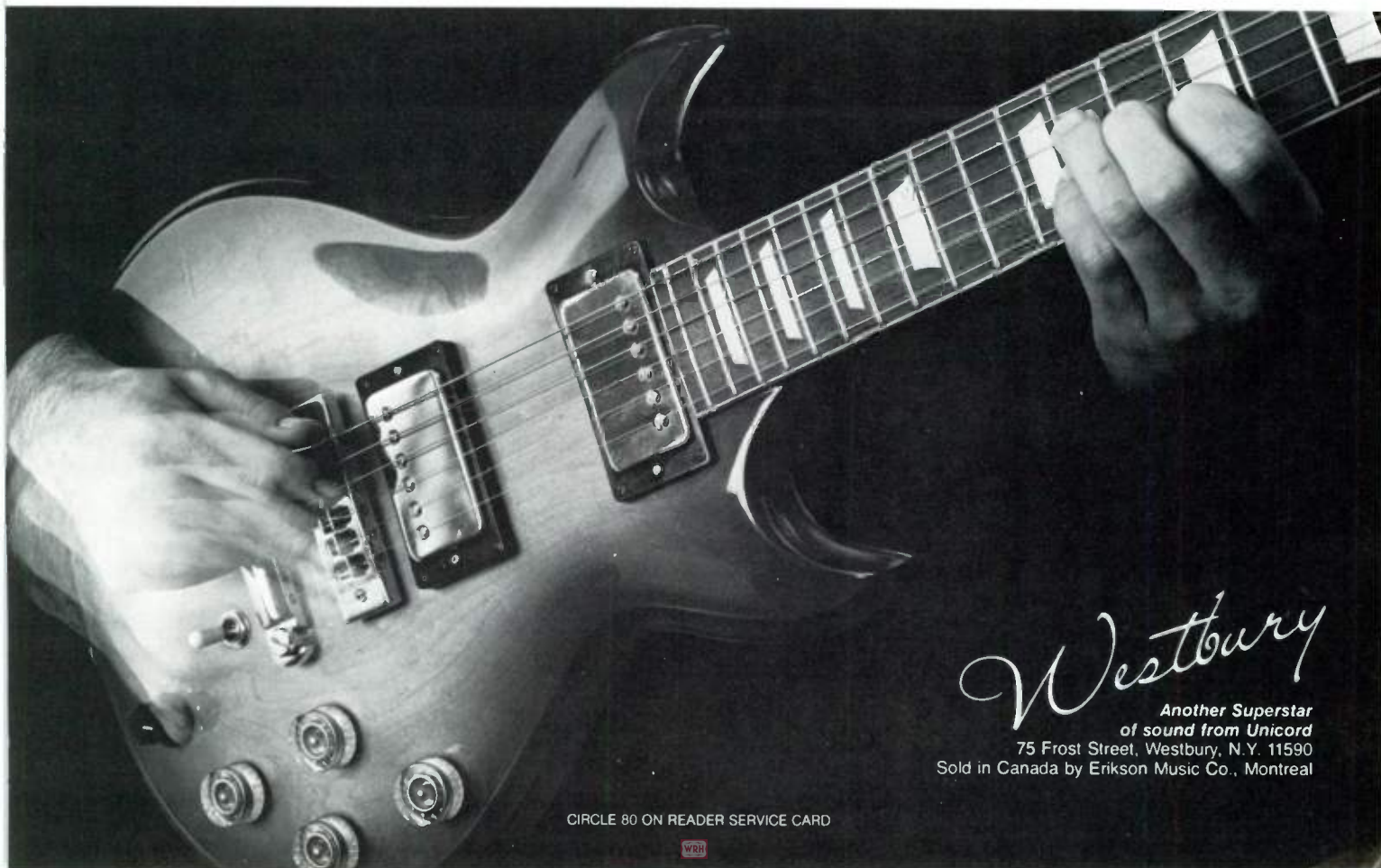
Smooth and Mellow

For exciting, new acoustic instruments, nothing can match the new Westbury Baroque. Masterfully crafted and thoughtfully designed, the Baroque produces a tone of uncommon warmth and purity. Each folk, classic and 12 string model provides fast, smooth action even on the highest fret positions.

So, if you're tired of the typical. Of strings that smile instead of scream. If you're tired of the tame, you're ready for the wild, wild Westbury.



Introducing the wild, wild Westbury



Westbury

Another Superstar
of sound from Unicord
75 Frost Street, Westbury, N.Y. 11590
Sold in Canada by Erikson Music Co., Montreal

munications tell your story simply and quickly. Some of the most powerful words in communications are *how to* and *introducing*.

Use your mailing list. W.L.A. Music has run very successful multi-track seminars by using the store's mailing list. They also experienced large sales at the end of the seminar. Go back two or three years for names. If you don't have a list, check with the local night clubs or musician's union. Perhaps some kind of promotional trade-off can help secure a list. When you send out a mailing, make sure you have enough lead time—three or four weeks are ideal. Then follow with a small newspaper ad—either local musicians' papers, college freebies or the city paper that has some kind of related advertising. The response I've seen from advertising a seminar in the local musicians' paper has been overwhelming. Sunday papers pull well. Mid-week school papers also do well. Just make sure your seminar is not in conflict with any other major event such as Monday night football, finals, etc.

If you're going to do a large printed piece, like a poster, spend a few extra bucks and let a professional do the job. The yellow pages are full of graphic arts services. Talk to a few. Then pick one you like and work with them. It's their business to communicate effectively.

Choosing the Format

Let's go beyond the preliminaries and get specific. To choose the exact kind of seminar you'll run, first examine your market. Decide what you want to accomplish. Ask yourself whether you want to develop the market by talking to beginners. Or do you want to talk to your local pros about something specific or special? Are you just after sales? If you are, make sure your salesmen are sales-oriented. That means, of course, they will mingle, introduce themselves and generally make contacts.

Some formats you might choose include:

- A one-day introduction to multi-track.
- An open house demonstrating your products. Introduce yourself, your company and your sales staff.
- A high technology or high intensity course. These courses are excellent methods of introducing new products and new technologies. And quite

often a manufacturer will send a representative to help you and sometimes participate.

- Outsider-run seminar. Talk to a consultant. See what the costs and benefits of his handling the whole show can be.

- Stage an event. Bring in some local bands and record them. In Atlanta there is an annual event called the Carnival of Music in which local bands get together and have an opportunity to perform and be recorded. This can be sponsored by someone like you. Free radio time for public service events, seminars, etc. may be available. Let your customers mix the final product. Often, a demo tape is enough compensation to secure a band's services. You might also want to record one musician. Solo recording sessions can give beginners a better picture of the total process. Just make sure you keep control, that the whole thing is smooth, orderly and organized.

- Run a three- or ten-week course. Or something in between. These courses let you develop a better rapport with your customers. They also give your salesmen time to plan for upcoming purchases.

- You might try to arrange a visit to a local studio. If you build studios, demonstration by example is very effective promotion.

Checklist for Planning the Seminar

Plan your subject matter. Do you want to cover one specific area, *e.g.*, something for advanced recordists? Or do you want to introduce multitrack recording to a general audience? Write an outline, listing the subjects you'll cover. Here's a sample (from John Worman's 10-week course):

1. Some basic theory.
2. Microphones—theory and applications.
3. Loudspeakers and listening rooms.
4. Signal processing devices: echo, reverb and EQ units.
5. Signal processing devices: compressors, limiters and expanders, phasing and flanging.
6. Tape and tape recorders.
7. Tape recorder alignment.
8. Review of previous sessions.
9. Recording consoles.
10. Recording techniques.

Plan the format. Will you need a few evenings to cover the material? Or can you do it in a few hours? Will you

devote an entire Saturday? Monday? Or an entire weekend? Go over your outline and you'll decide how much time you need.

Decide whether you can run the seminar yourself. Talk to reps and manufacturers. Then talk to some outside consultants.

Gather the necessary materials. First, get the support for your seminar. That means videotapes, audio tapes, literature, booklets, course outlines, anything that can be used as a teaching tool. Make sure everything is in-hand before you start promoting. Promises are not something you should bank on.

Gather the tools to get started. Chairs, pencils, snacks and soft drinks.

Lay out your store. Plan your dressing-up. Then dress your store up! Make sure all the necessary chairs fit, that video monitors and blackboards or flipcharts can be seen, and make sure everything can be heard.

Check your live systems, hook-up and audio performance. Flatter all your equipment. It'll make you look good in the long run. Have fuses and back-up systems ready to go. Let your customers know that you're a professional, that you know what you're doing.

Do a dry run. There's nothing more important than knowing what you're going to do. So do it. Try several presentations, several presenters. Maybe there's hidden talent among your sales people.

Promote the event. Do a professional job of letting people know what you're doing. And insist on pre-registration. Once your seminars become well-known, you *can* charge admission. (That must be considered carefully, however). But in the beginning, you're probably better off offering the seminar for free (promote it that way, too).

Preparation and organization will work for you. They are essential. But if you haven't studied your market, the needs and motivations of your customers, you might be wasting a lot of effort and a lot of money. There are lots of places to go for information. Talk to reps and manufacturers. If you promote them properly and handle them professionally, your seminars should help build your business, expand your market and ring up extra sales dollars.



Copyright © Linda Feldman 1978.

Last year, under the direction of the U.S. State Department, the Nitty Gritty Dirt Band made history by being the first American band to do a tour of the Soviet Union.

From a diplomatic stand point, it would prove to be the most significant series of concerts an American group had ever played.

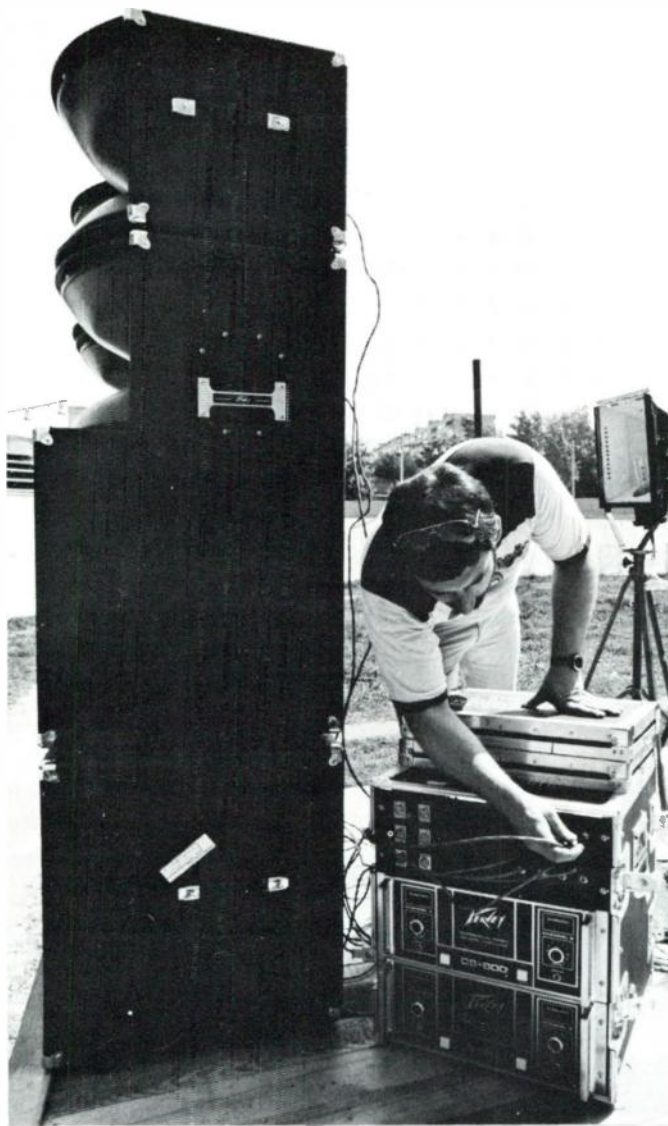
The prerequisites for such a tour were obvious. Only the most reliable, high performance sound equipment should be used. Maximum efficiency, versatility, and compactness would be absolute necessities.

The choice was Peavey. SP-1 enclosures bi-amped with CS-800 power amplifiers would create the backbone of the system. Artist and LTD instrument amps would make up the on stage gear along with Peavey monitor enclosures and a 1200 Stereo Mixing Console.

May 2, 1977 the tour began through five cities and twenty-three performances in every imaginable condition from large auditoriums to outdoor bicycle tracks.

Dirt Band sound man Gary Mullen recalls, "One of the problems we faced was severe drops in

The sound system that raised the Iron Curtain!



“The system was set up with FH-1 bass cabinets stacked two high with two MF1-X horns on top of each stack and two stacks on each side of the stage. It looked pretty small but the system totally covered the area with no dead spots and enough acoustic power to make it loud enough to wake the dead!”

Gary Mullen
Dirt Band sound man

voltage. At times we were running on voltages as low as 80 volts. I can't tell you how or why, but the equipment kept on working. Not only was it loud, but through the wonders of bi-amping, it was crystal clear. In the five shows at the bicycle track, the system was left on the stage each night and two nights brought enough rain to float a barge. Each time we uncovered it for a show it worked great,...the tour was a total success!"

The folks at Peavey appreciate the Dirt Band's confidence in our equipment. We're proud to have had a part in bringing a piece of the U.S.A. to the U.S.S.R.



Peavey Electronics Corp.

711 A Street
Meridian, Mississippi 39301

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I'd like to know more about the Peavey line of advanced sound gear. Send me a free catalog.

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By Phillip Missimore

DEALER DOSSIER

The Federated Group Los Angeles, CA.

It may seem unusual to find professional-type recording gear in a large consumer electronics retail outlet, but the people at the Federated Group in Los Angeles don't think it's strange at all. In fact, they prefer to think of the Federated Group as a retailer with a long background in semi-professional equipment and recording studio supply, who has branched out into home entertainment equipment, rather than the other way around.

From its beginnings in 1970, with one outlet, the Federated Group now numbers five huge retail locations—each one of them with its own selection of high-performance tape recorders, mixers, microphones and related accessories. The enthusiasm shown by the Federated people toward the creative recording market is unmistakable. As they joke about it, they could create their own rock group overnight, with musicians, engineers, producers and songwriters. SOUND ARTS went to Los Angeles and talked

with Kirk Lamb, vice president and director of operations, to find out more about Federated's unique position in electronics retailing. Joining in the conversation were Hank Greenberg, director of merchandising for Federated, and Cheryl Deering, advertising manager.

Let's begin with the history of the Federated Group; where it got started, and how it began with the semi-professional recording market.

Lamb: The Federated Group was the idea of Wilfred Schwartz, the president. It started when he took over an operation called Federated Purchasers, and that was in 1970. They were basically a parts house, catering to hobbyists, kit builders and the like. He branched into consumer high fidelity slowly, shifting the emphasis of the business to that kind of merchandise over his first few years. Then in 1973, in March, he merged with an outfit in Hollywood called Magnetic Televideo, Inc., which was at that time the oldest

retailer of professional and consumer electronics in the city. The founder was Charles Kierulff, one of the original founders of Radio Pioneers of America. He sold the first solid state device in the state of California, and that goes back a way. His son—Cap Kierulff—is still with the company as a vice president.

Magnetic TVI was already firmly established in the areas of sound reinforcement and supplying recording studios, musicians, small-time backyard garage and portable recording enthusiasts and that genre. There's always been a place in our stores and our hearts for the creative aspects of recorded sound. The company has always provided a room, literally and figuratively, for this kind of interest. The philosophy of the company is a "super department store" of sound. We'd like to be able to sell a man his JBL or McIntosh systems, and also sell his wife a stereo for her home or office, and their son who's away at college a compact, and their daughter who's in grade school a portable cassette recorder. Going hand in hand with this is the fact that we can help someone if he's a musician, if he's a songwriter, if he's a young man with a lot of friends who are creative musicians and he wants to record demos for them, or even if he wants to open his own studio. Lots of equipment we sell has a dual purpose, and can function equally well in home entertainment as it can in creative sound reinforcement.

We find that a lot of the manufacturers that supply us have the same philosophy. As a matter of fact, I can say that, were we not involved with semi-pro recording, and catering to the creative arts, there would be certain products we wouldn't be selling at all.



Photos by Judi Shaw

We really expanded more into home entertainment from creative sound than from creative sound from home entertainment.

What kind of marketing efforts are you directing toward the semi-professional area?

Lamb: To be quite frank, we haven't had to put a large marketing effort into semi-pro because of the carryover reputation of both Magnetic TVI and Federated Purchasers. The current sales crew we have in Hollywood, particularly, is selling semi-pro as something they've been doing for years and years, as well as supplying studios and musicians. Selling home entertainment is what they do for their bread and butter, but it's basically falling off a log for them in terms of the technical expertise required.

Do you find a greater awareness on the part of customers for semi-professional equipment? Is there a strict demarcation between home entertainment and creative recording customers?

Lamb: I wouldn't say that it's a strict demarcation, but I also wouldn't say that generally people who buy home entertainment get into recording. We have lots of customers who buy multi-thousand-dollar systems, who have no intention of recording, and we also have those who can barely scrape together \$300 to buy a hi-fi system who will sell their souls to buy microphones and four-track recorders. I couldn't make a connection between the two. In a way it is a different customer, and in a way it isn't. It's a matter of passion. I think more people would be involved in recording if there weren't so many legal barriers involved. You could take your microphones to a concert, no matter where it was, and do your thing. That would be great; it's a lot easier to go to a musical event when you know that it's professional, the sound is going to be good and all you have to do is stick your microphones in the air and it's yours forever, than it is to deal with your local garage band or whatever. It's harder to get high quality tapes to play back for your own enjoyment when you have to go through a longer creative process.

Do you know of any other large electronics chains that are as involved in semi-professional gear as you are? Is Federated the only chain, for example, that carries Tascam?

Lamb: We're the only ones. I don't think it would be insulting to anybody





if I said that all the major, visible marketers in this market are essentially uninvolved with the semi-pro market.

What kind of salesperson training programs do you have at your stores?

Lamb: I can't say that we do train them. I can say that it's a fact that the consumer business has been outgrowing the semi-pro market for a number of reasons. It's all we've been able to do to keep pace with the new people we

have, keeping them up to snuff on new consumer products. I'd like to say that if the company folded we could start up a rock group tomorrow. We've got so many musicians, recording engineers, producers, songwriters; there's essentially not anyone in the company that doesn't have some creative musical roots. Selling consumer products is what we do for our bread and butter, and we like it, but the

creative aspects of recording are a matter of passion for so many people in the company it would be hard to keep them uninvolved. We find that we don't have to go out of our way to get them involved.

Greenberg: It's interesting because we've just had a chance to do something with our high end and semi-pro salespeople. We called a meeting about two or three weeks ago, and I said, "Let's define what we're talking about." We decided that there was no such thing as an "esoteric" salesman, although a salesman could sell esoteric equipment. Everybody had a different idea on what semi-professional meant.

Lamb: I don't think home entertainment equipment should be included at all in semi-pro, unless it's involved as an extension of someone's recording.

Greenberg: What if he has a little system with a couple of mics and does some recording around the house?

Lamb: Live recording, using mics?

Greenberg: Yes.

Lamb: Sure, if he uses microphones, I say he's a semi-pro. Because eventually he's going to be involved in four-track; he's going to want to know about mixers. A guy who buys fancy equipment and goes home to play records is not a semi-pro. Any equipment that can be involved in creative music making, not re-creative, is semi-pro. To me, semi-pro is microphones, mixers, tape recorders with anything more than two channels, and then all the paraphernalia like cables, mixdown panels and meter bridges, equalizers of certain varieties, noise reduction devices of certain varieties, etc.

What kind of price ranges does the Federated Group offer the semi-pro customer? Can someone get started for a relatively small amount of money?

Lamb: A guy can be in semi-pro with a Nakamichi 550 and three microphones, which means he could be in it for \$850, plus whatever he wants to buy to play it back on. On the other hand, the top end could run someone up to \$15,000 to \$20,000.

In terms of your overall balance between home entertainment and the creative recording aspects, do you see a change? A shift more toward the semi-pro market?

Greenberg: Actually, we see it in steps and grades. A guy who bought a compact unit a year ago and outgrew it comes back for a bigger system, and now he's really happy with it and wants to do his own recording. It's always on the upgrade.

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Features

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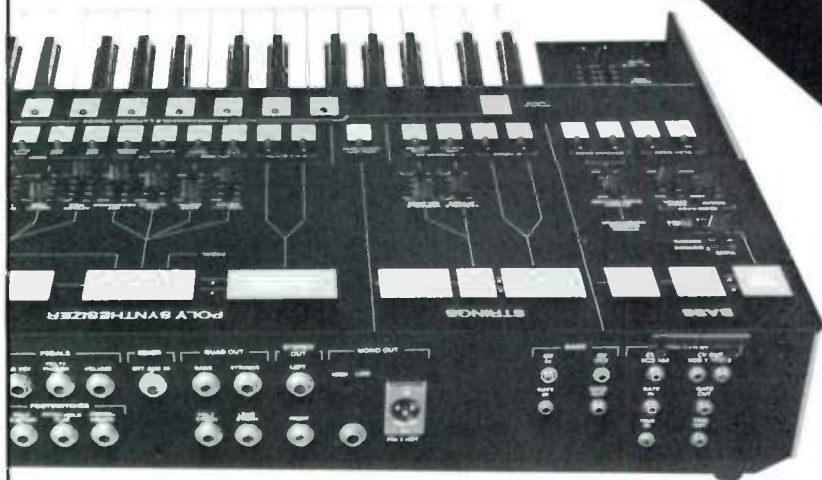
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CIRCLE 79 ON READER SERVICE CARD

Deering: Federated, as it is today, is eight years old. And the customer that we first got eight years ago is stepping up, and that's why our advertising is moving back to first time buyers again. There's a new buying group entering the market.

Lamb: Let me handle that question from a market point of view. I don't know if our mix is going to become more semi-pro or not. It depends on whether or not the public becomes more interested in semi-pro and recording equipment. If they do become more interested, there's no question but that we will become even more involved in it. Whether or not they do depends on a lot of things that have nothing to do with our marketing philosophy, or our equipment mix.

Greenberg: The point is, I as a salesman am interested in pro gear, and I have the option of selling you pro gear or other alternatives. I may find out that you have the equipment, knowledge and interest, and will steer you toward semi-pro gear. If I know the equipment and you're capable of semi-pro, you may like what you see. If, on the other hand, we don't have the man that has the expertise to sell you semi-pro, you're never going to be introduced to it. It's kind of a haphazard situation that we get ourselves into, because it depends upon the salesperson. I mean I could turn you

either way. If I don't introduce you to the semi-pro market, you're not going to be turned on by it. So we have a sort of trade off situation. There is a market there. How big it is and how can we better tap into it are the next questions. We're selling the right equipment, but how can we further add to your enjoyment of life by turning you on to a whole other field?

Lamb: I'm sure that there are customers who walk into our store who never had the slightest idea or inclination to do their own recording, but some salesman said "do this, and

touch this, and sing into this," and the guy all of a sudden went wild.

In terms of product evaluation, what kind of programs do you have?

Lamb: Usually we'll use our sales people, the more qualified ones. There are usually at least a half dozen in different places and we send the equipment out to them. We don't have an isolated department for testing.

Greenberg: We've called in the esoteric, high-end salesmen and started talking about semi-pro gear, and the reaction was interesting. They'd say, "I'm not the man to talk to," but they referred us to other salesmen who did know. Now it's a separate thing. We have our pro-gear salesmen, and we can call them in and find out what we can do to help them sell better. Are we handling the right products, for example? We're finding out just what salesmen can handle this equipment, and we're finding out there are a lot of them. We'll find out what equipment we need to further expand our market. What I'm saying is, we're starting to communicate with the floors, rather than trying to buy every piece of equipment that comes through the door. We're trying to find out what lines we should be bringing in the door.

Deering: It's another example of Federated doing things opposite other retailers. A lot of companies would just buy whatever they saw, ship it out there and say, "Sell it." Federated goes to the floors first and asks, "What should be there?". Because the salespeople know.

What future directions do you see Federated taking?

Lamb: I think that within the category of semi-pro equipment, it's going



to get better. I think our contact with the semi-pro specialists in our stores is going to improve. I think that's the first step. I think probably as a result of that we'll become better identified in the industry as a semi-pro dealer, although I think it's pretty easy to identify with us on that level already. We've got complete displays and miniature recording studios in each store, so if the customer wants to get involved it's there.

Do you see any prospect of other large retailers moving into these areas?

Greenberg: I think we're best suited to it. I don't know any other mass merchandiser who can handle it, like we have, because of our people. The semi-pro market looks fragmented, to me. You have people who can sell it, but they're usually specialists and small.

Do you have any plans for a more specialized advertising approach aimed at the semi-pro market?

Greenberg: I think we'll be redirecting ourselves, understanding who are our sales people and what they need. And we may determine then that we really don't need any advertising in that field, or that we do need it. We may find that we need to send out



blind brochures, or advertise one particular product. I don't think that we're quite to the stage when we can make a firm commitment to that kind of advertising.

Deering: The problem is, you can't advertise to a specific group of people, whoever they are, without educating them first as to what you're trying to get them into. We're trying to get our

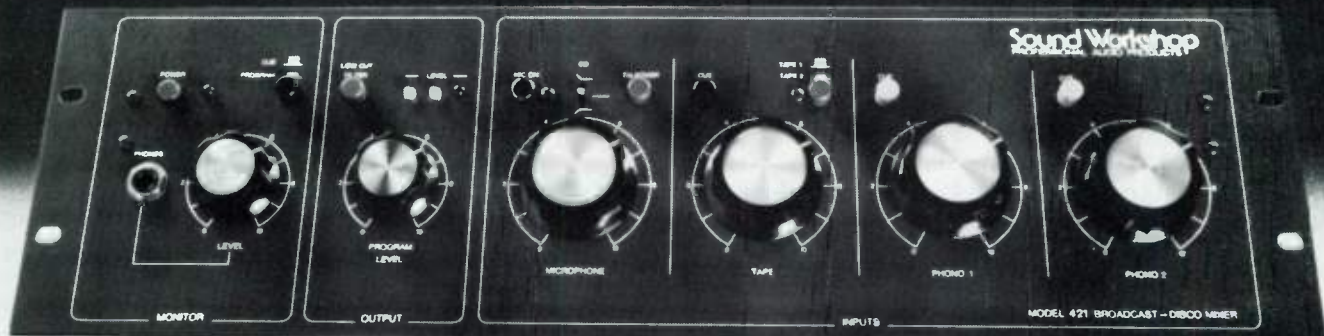
educational programs off the ground. We've started an advice column in our ads, on a very simple level. We're featuring a different salesman each week, and we hope to build it up to where it talks about high end components and semi-professional gear. But until you educate the consumer, the advertising isn't effective.

Lamb: That's the truth.



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CIRCLE 75 ON READER SERVICE CARD

INDUSTRY UPDATE

John Harrow, recently named dbx Professional Products Sales Coordinator, has taken on additional responsibilities in the firm's program to license major record labels' titles for its dbx-encoded disc process. dbx encoded discs offer, according to the company, "totally noise-free, full dynamic range musical playback," and can be played on any standard high fidelity system which includes a dbx disc decoder component. dbx reports it is "all but signed with one of the largest record conglomerates." In other news at dbx, **James F. Camacho** has taken the reins of the company's export business as International Sales Manager. Camacho was previously with H.H. Scott and Acoustic Research.

Audio-Technica U.S., Inc. has appointed **Howard Harman** Western Regional Sales Manager. His territory includes California, the Pacific Northwest and the Rocky Mountain states.

Cal Jam II attracted an estimated 250,000 people, and boasted "the biggest sound reinforcement system ever designed" according to TFA Electro-sound, sound contractors for the event. The 12-hour concert at the Ontario Motor Speedway featured performances by Heart, Aerosmith, Santana, Dave Mason and other luminaries. The sound system is being registered in the Guinness Book of World Records. Valued at nearly \$2 million, the system consisted of 150 JBL 6233 professional power amps, "hundreds" of JBL loudspeakers, compression drivers and horns loaded in custom-built enclosures and two 32-channel mixing boards. Peak power levels delivered were reported to be in excess of 100,000 watts. Two main towers positioned on either side of the stage and measuring forty feet by forty-eight feet provided seventy-five percent of the total sound. This primary system was electronically synchronized by digital delay lines with two rear towers, erected 650 feet into the audience. A crew of 30 TFA personnel spent a week setting up, and four semi trucks were used to transport it.

Now that the June NAMM show has been renamed the NAMM International Music & Sound Expo (having experienced a 450-percent increase during the past five years in exhibitors of instruments, products and accessories related to electronic technology), the name of the January Western Market will be changed to the "NAMM Winter Music & Sound Market." The annual Market has seen, according to NAMM, a 760-percent increase in electronics exhibitors in the past six years.

Audiomarketing Ltd., exclusive distributors for Allen and Heath and HH Electronics, has moved its operations to 652 Glenbrook Road, Stamford, Connecticut. The new offices were designed by studio construction specialist, **John Storyk**. A special sound demo area at the new facility acoustically simulates a studio control room. Audiomarketing, a wholly owned subsidiary of Audiotechniques, Inc., also plans to increase staff.

Steve Wicks has been named Fender/Rogers/Rhodes instruments sales manager for Virginia, West Virginia, Maryland and Washington, D.C. Prior to joining the company Wicks managed Walko Music and House of Music in Springfield, Illinois. He will represent Fender guitars, amplifiers, PA systems and accessories; Rogers drums, and Rhodes keyboard instruments.

Robert Blumberg has resigned as National Sales Manager of Bozak, due to "internal policy differences," according to the company. **Joseph Schlig**, President of Bozak, made the announcement.

Koss Corporation has named **George J. Magdech** to the newly created position of Vice President Operations. Magdech is responsible for managing production, engineering, manufacturing services and manufacturing engineering. He was previously with JFD Electronic Components, Shure Brothers and Warwick Electronics.

Parasound, Inc. of San Francisco has acquired the Orange County Elec-

tronics product line of signal processing equipment. Parasound will be offering consultation services to the professional audio industry—to include sales and marketing functions, new product development, advertising design and placement, and market research.

Lawrence G. Jaffe has been named Vice President in charge of marketing for Uni-Sync, Inc. Jaffe had been marketing manager of the company since its purchase by BSR last year. Prior to that, he was Creative Director for Kieffer/Jaffe where Uni-Sync was an account.

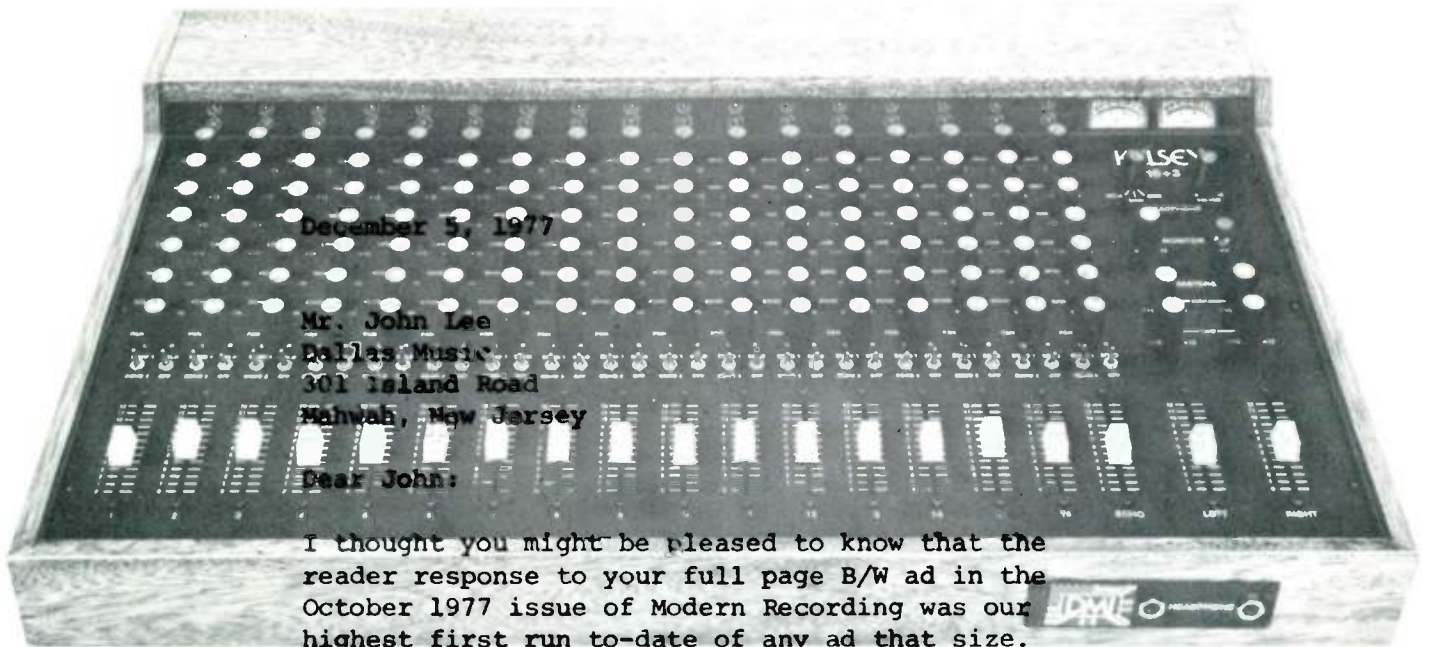
Shure Brothers has made a number of staff changes. **Patrick J. Dalton** has been named domestic distributor sales manager, with responsibility for management of all sales to retail outlets in the U.S. **Ken Reichel** has been named manager of the company's newly created Technical Markets and Product Management Department. Reporting to Reichel are three new product managers. **John F. Phelan** has been named manager of professional sound products. **Al Groh** has been named manager of high fidelity products. **Jerry Quest** has been named manager of communications and government products. **Lee Habich** has been appointed manager of advertising and sales promotion with three section managers reporting to him: **Ruth Delke**, advertising administrative manager and merchandising fund administrator; **Jim Paton**, convention/advertising literature coordinator; and **Shelly Brown**, audio/visual technical coordinator.

Almon Clegg has been promoted to Assistant General Manager, Product Engineering Division of Panasonic. Clegg's responsibilities include supervision of television engineering, audio engineering, high fidelity inspection and VHS inspection. Clegg joined Panasonic in 1974 as Audio Engineering Department Manager, and serves as this year's chairman of the annual Audio Engineering Society convention.

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December 5, 1977

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Best regards,[®]

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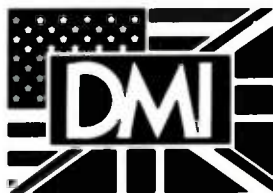
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Modern Recording

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In response to the recent growth of the semi-pro market, *Modern Recording and Sound Arts Merchandising Journal* are conducting—in cooperation with CES—a Creative Audio Market Seminar at CES Monday June 12 from 2-3 p.m. at the CES Theater #2, Mall Level, McCormick Place. Chaired by Vincent Testa, the seminar will consist of participants representing various segments of the retail market discussing market potential and merchandising aspects of semi-pro equipment.

Meeting in Los Angeles on May 6,

the Creative Audio and Music Electronics Organization (CAMEO) elected its first permanent officers. Elected for the first year are: President, Ken Sacks, national sales manager, TEAC Tascam Series; Vice President, Larry Blakely, director of marketing, dbx; Secretary, David Friend, president, Arp; Treasurer, Ron Wilkerson, director of marketing, MXR. Four board seats (out of twelve) were filled: Fender Division of CBS Musical Instruments in the area of musical instruments; SAE in the area of signal processors and interface; AKG for microphones

and speakers; and Tapco in the area of amplifiers and mixers.

To date, nineteen companies have either committed to joining or have joined CAMEO: JBL, BGW, TEAC-Tascam, MXR, dbx, AKG, SAE, Arp, ITX/Aphex, Tapco, Phase Linear, RolandCorp, Fender, Oberheim, Tangent, Altec, Sirius Music, KM Records, and Soundcraftsmen.

Another open meeting is planned for June 26 (following the NAMM show). For information, contact David Schulman at the Creative Audio and Music Electronics Organization, Suite 3501, LaSalle Plaza, 180 N. LaSalle Street, Chicago, IL 60601, 312-332-7400.

British Industries Company has changed its name to B.I.C./Avnet. According to Simon Sheib, President of Avnet, Inc., "The change of name implies no differences whatsoever in B.I.C. personnel, departments or functions." British Industries merged with Avnet Electronics in 1960 to form Avnet, Inc.

Beckmen Musical Instruments, Inc. has changed its corporate name to RolandCorp US, marketing Roland synthesizers, amplifiers, musical instruments and speakers and Boss musical instrument accessories and mixers. In other news, Don Lewis, the west coast musician, has been signed to stage organ clinics for Roland dealers nationally. Lewis will begin dealer clinics in mid-summer to launch the VK-9 professional electronic organ (\$7,000), as well as the Roland synthesizer line. Jeff Baxter, lead guitarist with the Doobie Brothers, has been signed by Roland to do dealer demonstrations and research projects.

Peter Wellikoff has been appointed National Marketing Representative for the AKG Acoustics Division of Philips Audio Video Systems. He will be traveling throughout the country assisting AKG representatives in strengthening existing dealer networks for all AKG product lines (microphones, headphones, phonocartidges and reverberation units).

PAIA has issued a new 24-page catalog featuring the most recent additions to the PAIA line: digital computer controlled electronic music synthesizers, orchestral string synthesizer, low cost video display module and single board computer. The catalog is available from PAIA Electronics, 1020 W. Wilshire Blvd., Oklahoma City, OK 73116.

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Advertiser's Index

RS #	Advertiser	Page #
92	AKG Mahwah, NJ	43
97	Altec Anaheim, CA	11
79	ARP Instruments Lexington, MA	51
74	Audio Development Palo Alto, CA	50
86	Audio Marketing Stamford, CT	29
93	Audio Technica Fairlawn, OH	37
95	Beckman/Roland Los Angeles, CA	39
76	BGW. Hawthorne, CA	21
85	Calif. Switch & Signal Gardena, CA	36
96	Dallas Mahwah, NJ	55
91	DBX Newton, MA	7
99	DiMarzio Staten Island, NY	9
90	Keas/Ross Chanute, KS	40
88	Marlboro Syosset, NY	56
78	Meteor Light & Sound Co. Syosset, NY	57
84	Music Technology Garden City Park, NY	12
73	MXR Rochester, NY	15
83	Peavey Meridian, MS	47
72	Sony New York, NY	Cvr. 3
75	Sound Workshop Hauppauge, NY	53
89	Sunn Tualatin, OR	31
98	Tangent Phoenix, AZ	Cvr. 4
94	Teac/Tascam Montebello, CA	4
77	TDK Garden City, NY	41
80	Unicord Westbury, NY	45
81	Uni-Sync Westlake Village, CA	3
82	Whirlwind Rochester, NY	36
87	Yamaha Buena Park, CA	Cvr. 2



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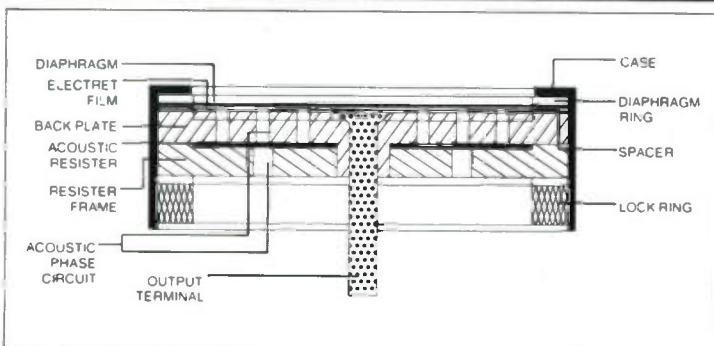
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