SERVING THE CREATIVE AUDIO AND MUSIC ELECTRONICS INDUSTRY

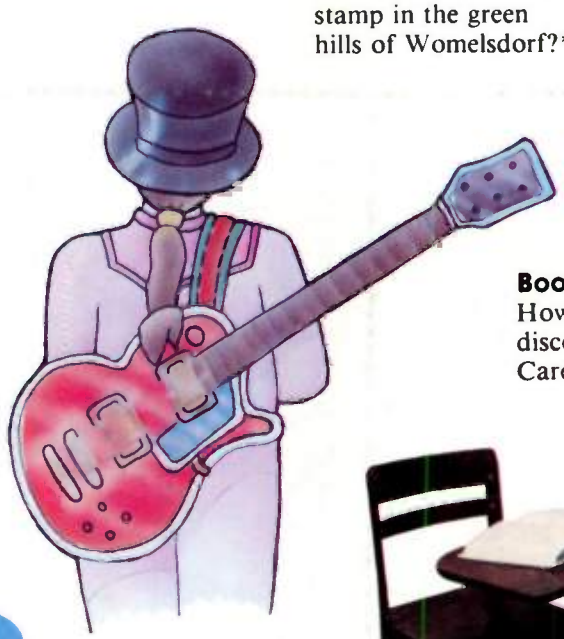
SOUND ARTS

MERCHANDISING JOURNAL

$2.00
VOL. 3 NO. 1
FEBRUARY 1980

Hurray!
We celebrate our second anniversary with best wishes to all of you!

Dossier!
What isn't a rubber stamp in the green hills of Womelsdorf?*



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How do you retail disco delights? Carefully.*

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The MXR Dual-Fifteen Band and Thirty-One Band equalizers are cost effective electronic signal processors designed to meet the most exacting equalization requirements in a wide range of professional applications.

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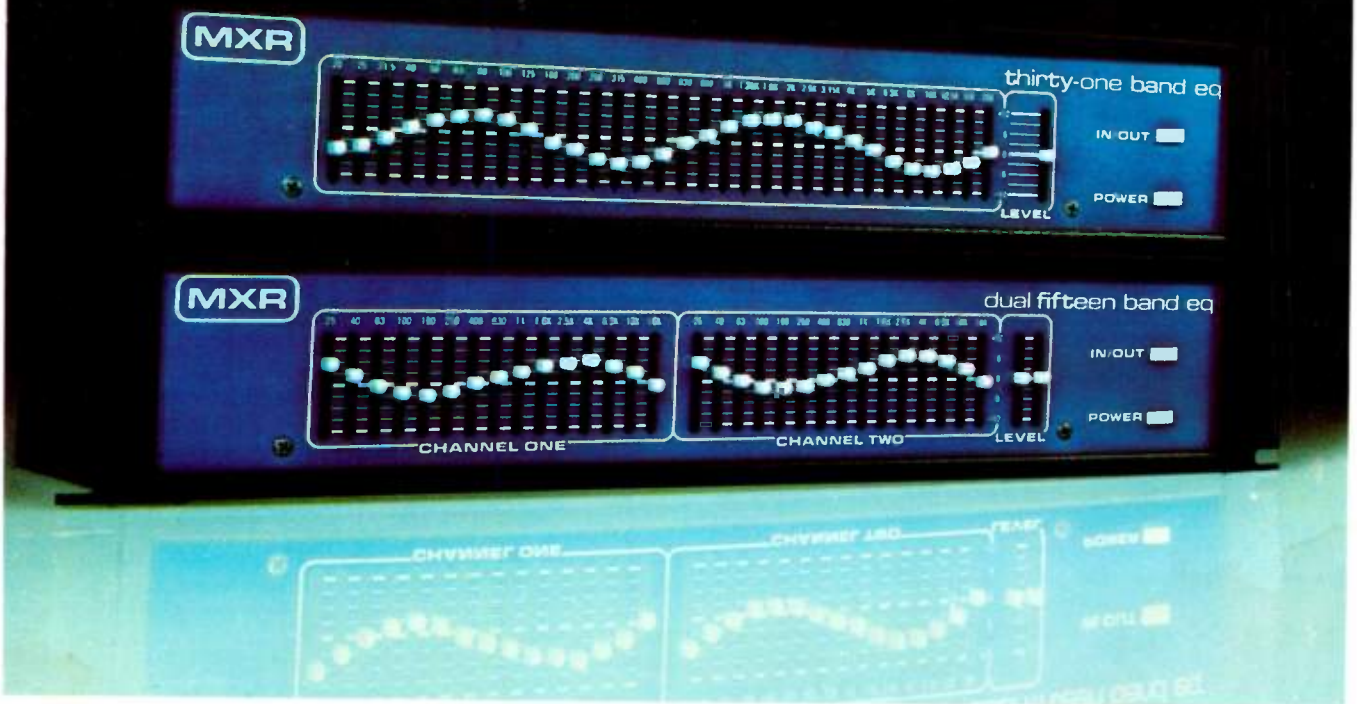

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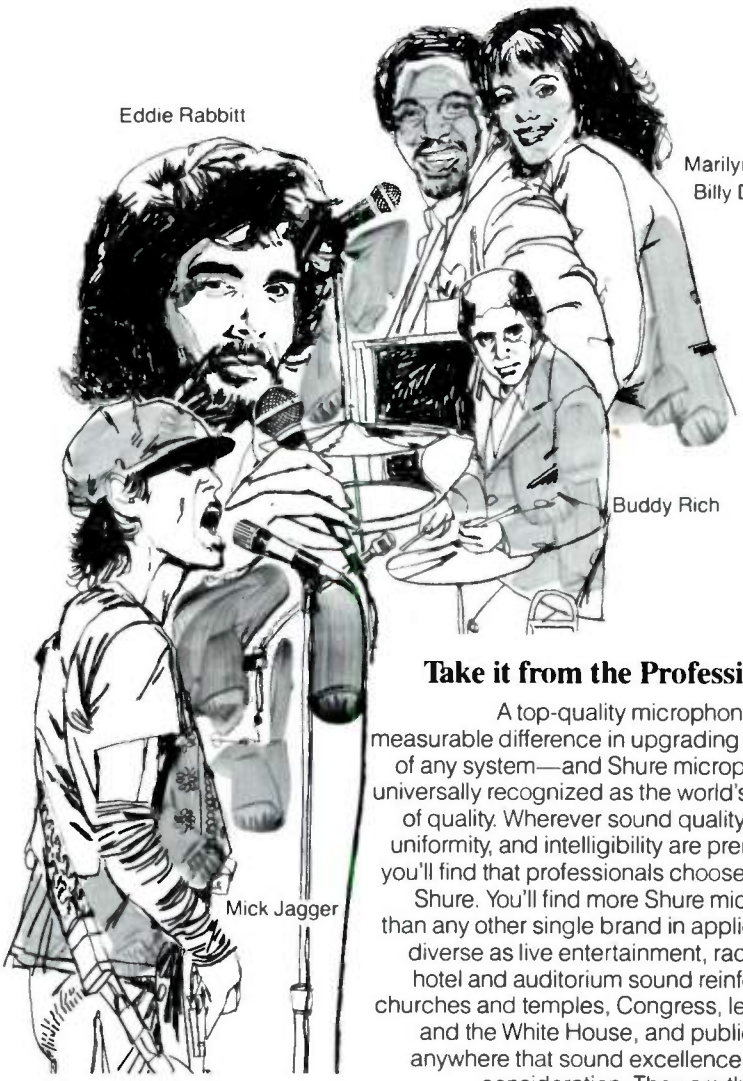

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SOUND ARTS

MERCHANDISING JOURNAL

FEB. 1980

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A LETTER FROM THE PUBLISHER

This is our 25th issue of SOUND ARTS MERCHANDISING JOURNAL, a silver anniversary of sorts. The start of the third year of SOUND ARTS is something I think worth celebrating. For me, magazine publishing is unique; each month we come up against that exciting but sometimes bloodcurdling *deadline.* That word *deadline* may be a misnomer; perhaps we should speak instead of a *lifeline.* Each month a new issue is born, coming alive over a four week cycle. Each birth has its own set of surprises, its own parcel of problems which are, more often than not, very different from those of any previous "birth." The fact that this is our 25th issue is an indication that this lifeline image extends throughout the industry.

SOUND ARTS, under the expert editorship of Judith Lipton, has become a lifeline to those dealers, salespersons and reps who make up our expanding industry. Two years ago, creative audio and music electronics was still something new to most retailers of traditional musical instruments and audio equipment. While manufacturers began introducing creative, semi-pro and pro audio and music electronics to the market as far back as four or five years ago, dealers in general have, within the past 12-18 months, begun to recognize the equipment—what it does; what it can do; and most important, who the buyer is and what his wants and needs are. The equipment and its implications have moved through the lifeline of the industry from factory to end-user.

SOUND ARTS was created as a conduit for that lifeline from the manufacturer to the dealer, and may even have been six to nine months ahead of its time. Looking at the growth in our readership over the last year, I see the life support system we have become to the retailers, the salesperson. He devours the magazine each month and aggressively responds to its editorial.

SOUND ARTS has helped the dealer to create a lifeline to his customers. Selling the new electronic musical instruments and accessories of our industry is very different from selling traditional audio, hi-fi and music products. The end user is different. His needs are vocational and are very different from the casual consumer's. By and large he is well-informed because he needs to be. It's his life, his career, his future.

Well, that can be said for the dealer as well. His career and his future are dependent upon how well he conducts his business and how well he responds to his customers' needs. SOUND ARTS has become his merchandising guide book, his educational journal, his trade book.

We sometimes hear in the market, "Trade books. Who reads them?" Well, after two years, we know we're being read. Ask any dealer today which book he reads, and in most cases (7 out of 10), he'll say, "SOUND ARTS." That's what we're celebrating in this, the birth of our 25th issue: Acceptance and recognition as the leader in an industry that has just begun.

Cordially

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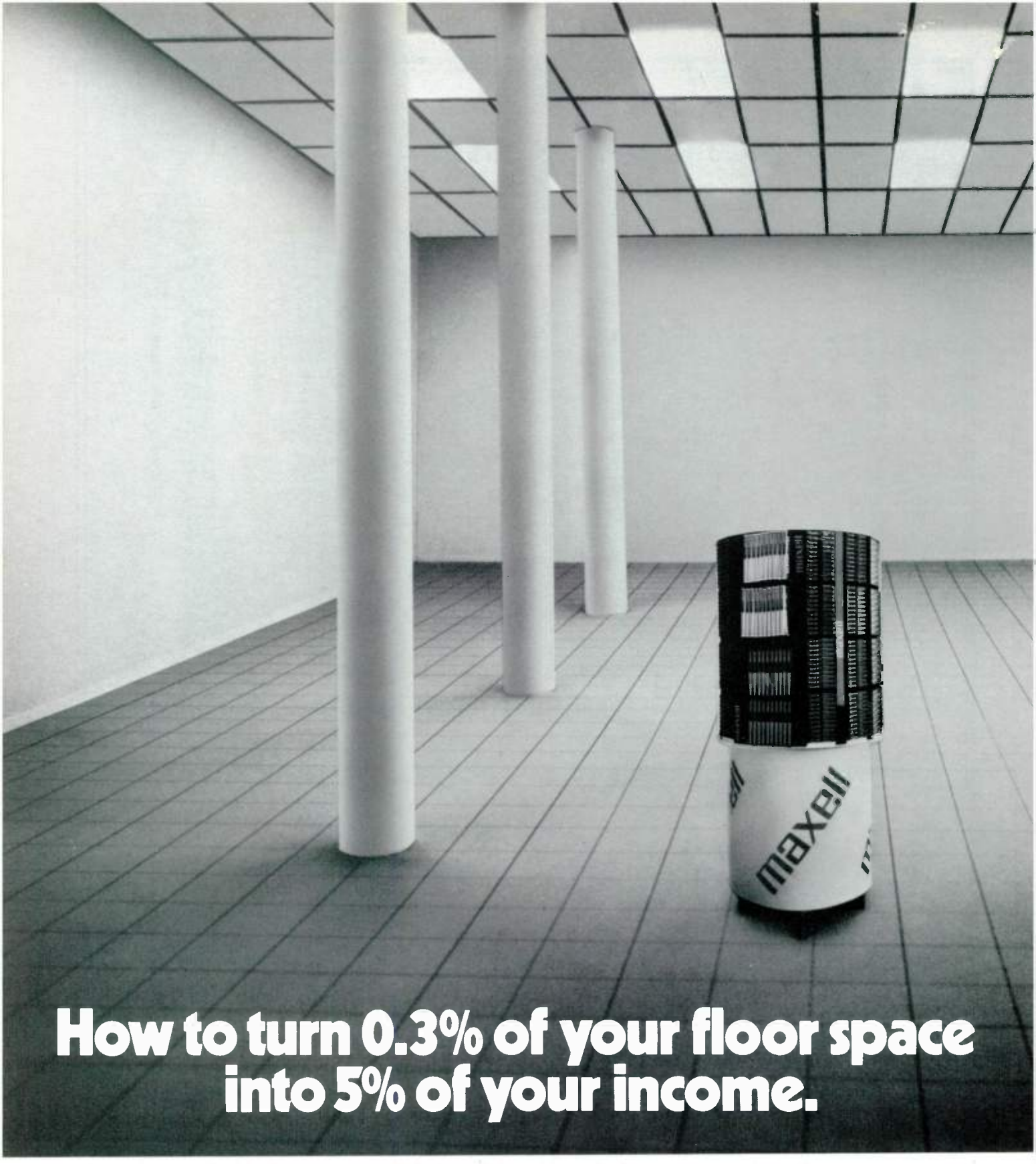

How to turn 0.3% of your floor space into 5% of your income.

In most stores, the blank tape department takes up very little space. But it takes up more than its share of room in your cash register.

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TERMS:

A CONTINUING INDUSTRY GLOSSARY

RECORDING | ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES | SOUND REINFORCEMENT

By Larry Blakely

Digital Tape Recorder: Utilizes a method of tape recording whereby the analog signal (the actual waveform) is converted to a set of numbers that is representative of the analog waveform. The representative numbers are then recorded and stored on tape. When the tape is played back, the numbers are then processed in an effort to reconstruct the characteristics of the original analog waveform. The main advantages of digital tape recording are greater signal-to-noise, wider dynamic range, extended frequency response, and the ability to make many copies (tape generations) *without* normal degradation in quality and without increase in noise.

Double Tracking: A recording process whereby a vocalist or instrumentalist will record a musical part on one track of a multi-track tape recorder, then listen to the previously recorded track and record the same musical part on an additional tape track. When the two tape tracks are played back together, a richer, fuller sound will result due to minor time and pitch differences in the two recordings. This process can also be done electronically with the use of electronic time delay units.

Triple Tracking: The same process as used in double tracking; however, this process requires the recording of three tape tracks instead of two. Triple tracking can also be done by electronic means by using the original recording and two different time delays of the original signal.

Foldback: a European term which means the same thing as *cue* or *phones.* Most of today's mixers have separate buses that will allow a separate mix to be derived for the musicians. In recording, this provides a separate balance that is ideal for them in overdubbing musical parts. In stage sound applications a separate mix is often routed to on-stage monitor speakers so the performers

By Wayne Howe

Vocoder: The vocoder is an electronic device which takes a complex audio signal such as the human voice and uses it to control the characteristics of another audio signal. The first signal, called the controlling or modulation signal, is analyzed for its frequency characteristics. This is usually done by electronic circuits at fixed frequency bands which determine the overall energy level in each particular frequency band. Once these levels are determined, a similar amount of level for a bandpass filter at the same frequency band may be used to modify the harmonics of a second audio signal called a carrier frequency. Vocoders usually have a microphone input so that an approximation of the complex formant filters of human speech may be reproduced on the carrier signal in a similar formant filter pattern. However, some vocoders also have facilities so that other instruments can be used as the modulation signal.

Most vocoders have a keyboard that determines the frequency of the carrier signal. This carrier signal's frequency determines the fundamental frequency of the output signal. Some vocoders have facilities to use other instruments besides the keyboard as the carrier signal.If an external signal is used *as the actual carrier signal*, a high harmonic content for the instrument will result in a more effective output signal. However, if the vocoder has facilities to convert the external audio device's pitch to a control voltage which drives an internal carrier signal oscillator, then the fewer harmonics that the input instrument has, the better it will perform.

Some vocoders have "Hold" circuits which hold the filters constant at whatever level they were when the hold button was pushed. This hold circuit enables the carrier signal to continue to be modulated even when the modulation signal has stopped. For example, if the performer is taking a

By Glen E. Meyer

Cone Suspension System: Made up of the spider and the surround, the cone suspension system is the part that suspends the cone on the frame. These parts also act like a spring to provide the necessary compliance to the system.

Vent Hole: It is the hole in the magnet that allows air to escape from underneath the dust dome.

Magnet: The magnet is defined as the flex generator in a speaker.

Front Plate: The front plate is the outside return path for the magnetic circuit.

Center Pole Piece: The inside return flux path for the magnetic circuit.

Back Plate: The back plate conducts a magnetic flux from the magnet to the center pole piece.

Magnetic Assembly: The magnetic assembly or system is made up of the front plate, center pole piece and back plate.

Gap: That part of the magnetic structure in which the magnetic flux is concentrated.

Voice Coil: The voice coil is a coil of wire mounted on a rigid form which is suspended in the gap and connected to the cone. Alternating current through the wire within the gap interacting with the magnetic assembly provides the conversion of electrical to mechanical energy. The wire used on the voice coil is either round or flat. The more expensive flat wire construction is used in order to gain efficiency because it allows one to put more wire in a given space.

Frame: The frame of a speaker is the mechanical structure that holds all parts together. Frames are either stamped steel or some type of diecast aluminum alloy or other compound. The more expensive diecast aluminum frame provides a frame that is stronger and more rigid, and thus able to maintain tighter speaker specifications than its stamped steel counterpart. Also, since aluminum will not conduct magnetic flux, it will not have

TERMS: (CONTINUED)

A CONTINUING INDUSTRY GLOSSARY

RECORDING

can hear themselves and other performers as well. Such a stage mix is often radically different from the mix that is being sent to the house speaker system.

Pinch Roller: A wheel that is used to force recording tape against the capstan on tape recorders. These pinch rollers are sometimes referred to as tape idler wheels, or a puck. The pinch roller is a small wheel with a rubber of soft plastic tire and usually one or two inches in diameter.

Pressure Roller: See *pinch roller.*

Splicing Block: Usually a metal block several inches long that is used to hold magnetic recording tape for the purposes of splicing or editing. These blocks usually have a guide slot in which the razor blade is placed to make the actual cut. Once the tape has been cut, the splicing block can be utilized to hold the two pieces of tape together while the splicing tape is applied which will hold the two pieces of recording tape together.

Analog Tape Recorder: Utilizes a method of tape recording whereby the actual analog signal is recorded on tape. Actual sounds are made up of sound waves. When soundwaves are converted to electrical signals, a waveform results. Waveforms contain all of the level, frequency, and other characteristic information that makes up a particular sound. Signals made up of these waveforms are called analog signals. An analog tape recorder records and plays back analog waveforms.

Print Through: The transferring of the magnetic information on one layer of tape to an adjacent layer. This often happens when tape is stored. It can be recognized when the slightly audible sound of a nearby loud passage can be heard during a prior quiet passage. These ghost type signals are caused by the print through of magnetic tape.

Tape Lifter: A device, usually in a metal-post-like shape, that is used to lift the tape away from the tape heads during fast forward and rewind modes.

ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES

breath or wishes to sing directly into the P.A. system and still play the vocoder, the vocoder will maintain the formant frequencies that were being pronounced when the hold button was pressed. This frees up the musician's voice for other purposes and still allows the vocoder to continue to be played.

Voice Talk-Box or Talking-Filter or Talking-Pitch: This phenomenon, for which there are several names, is a method of taking the audio source from a musical instrument and feeding it into the performer's mouth so that the musical notes sound like they are talking. This process is accomplished in several steps. First, the electrical sound source is fed into a power amplifier. The output of the amp is then fed into a driver that has had its face sealed with an enclosure having a small opening in it. A hollow rubber tube is connected to the opening of the enclosure on the face of the compression driver. The other end of the tube is then inserted into the performer's mouth. The performer must hold the tube in his mouth, play the note on his instrument, form his mouth in the vowel shape that he wishes to produce and stand in front of a microphone for the proper pickup to the P.A. system. The apparatus works well, in that the device gives effective vowel sounds, but practice is required in raising and lowering the pitch of the fundamental note being fed to the system. If the fundamental pitch is not changed, the resultant "talking-voice" has no inflection and sounds much more robot-like and less musically interesting. Proper control of the pitch being fed into the device and practiced control of the formant filter effects of the mouth result in quite interesting and varied effects.

Trigger Voltage: An on-off voltage that acts as a start or stop cue signal. The trigger voltage tells certain modules in the synthesizer when to start, change, or stop their chain of events. Generally a trigger voltage is a short or long DC pulse that turns on a slowly varying DC control voltage.

SOUND REINFORCEMENT

any effect on the magnetic flux field of the speaker.

Speaker Operation: When alternating electrical energy (power) is applied to the leads of the voice coil, it creates forces which interact with the magnetic field in the gap of the magnetic assembly which results in cone motion. Because the electrical energy is alternating in nature, the speaker voice coil will move in and out of the gap proportional to the amplitude and direction of the electrical energy. Because the voice coil is rigidly connected to the cone, the cone, spider, and surround move with the same motion as the voice coil (conversion of electrical to mechanical energy). This motion moves air and this produces sound (conversion of mechanical to acoustical energy).

Horn: A horn is a device which performs the function of acoustically coupling sound generated from a driver to the air. It transforms the small area diaphragm of the driver into the large area diaphragm of the mouth. The mouth has a radiation impedance that is more nearly resistive over the desired frequency range than that for a small area diaphragm. As a result, more power is radiated at lower frequencies for a given volume velocity of air. Perhaps a more simple way of looking at this is that a horn function is very similar to that of an impedance matching transformer.

The smaller end of the horn, known as the throat, has an area selected to match the acoustic impedance of the driving unit, and has to produce as little non-linear distortion (components not in the original wave) as possible. The mouth of a well designed horn has an area sufficiently large to radiate sound efficiently at the lowest frequency desired. As it is with a matching transformer, the lower the desired frequency, the larger the horn needs to be.

Comparing driver for driver, horns are typically more efficient than direct radiators. Their efficiencies usually lie between 10 and 50 percent.

THE 'OVER EASY' COMPRESSOR/LIMITER.

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Until now the recording engineer had to settle for a compressor/limiter that was somehow... limiting. Most compressor/limiters utilize a threshold above which compression kicks in, suddenly and audibly. The engineer has to use this device quite sparingly to preserve the "naturalness" of the music he's recording.

The dbx Model 165 is a compressor/limiter that is nothing short of revolutionary. "Over Easy"™ compression allows the signal level to pass through the threshold and gradually adds the desired amount of gain change over the range of several dB. The result is compression that doesn't sound "compressed." Engineers who have used it have checked to make sure it was really connected.

The 165 incorporates other exclusive dbx design features such as true RMS level detection and feed forward gain control. A separate input is provided to the level detector. Because attack can be completed before the signal arrives at the gain control stage, this input allows the creation of special effects.

The 165 is the most flexible compressor/limiter in the dbx line. It is strappable for true stereo operation. (A master/slave switch is located conveniently on the front panel). It has manual attack and release rate controls that can be switched on for special effects. Despite all its features, it occupies only 3½" of rack space.

In the hands of a good engineer, dbx's new 165 is more than the most natural-sounding compressor/limiter you can buy; it is an integral part of the creative recording process.

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dbx

Making Good Sound Better

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TROUBLESHOOTERS' BULLETIN

MATCHING TUBES

(1)

Matching vacuum tubes to enhance sound has been known to hi-fi buffs for years. The process has recently been employed by builders of "custom" instrument amplifiers.

Musical instrument amplifiers use a circuit known as "push-pull." Half the tubes push, while half pull; thus, each amplifies its half of the musical sound waveform. Matched sets reproduce the wave-

(2)

form identically on both sides, and wear evenly. If sustain, dynamic range, or tonal balance is lost, it may be because unmatched tubes are working against each other.

HUNT DABNEY
GROOVE TUBES

MATCHING AMPS AND SPEAKERS

To use a speaker system to full capacity, best results are obtained if

(3)

the power amplifier is two- to four-times the long-term average noise power rating of the speaker system. (The woofer rating may be thought of as the system rating if a separate system rating is not given.)

This arrangement is only for those people who can discipline themselves against "pushing" the system for ever-higher sound levels and who can avoid "accidents" such as catastrophic feedback or dropping microphones.

Special circuitry can allow the long-term average power output to be set to the speaker's rating, and still allow the entire muscle of the amp for short-duration program peaks.

A more conservative "nominal" amp size, which will produce audible results nearly equal to those of the "expert" system, is one equal to the long-term average noise power rating of the speaker system.

4

The caution here is to studiously avoid amplifier clipping. Although the small amplifier is less likely to produce damaging long-term average power output, it is more likely to be driven into clipping on program peaks. Distortion generated is high in frequency and thus fed to the high-frequency components of the system.

To be very conservative, one can use an amplifier rated at .5 to .7 times the long-term average noise power rating of the

5

loudspeaker. This will provide an extra margin of safety.

These remarks refer to multi-way systems, but also apply to one-way systems. However, the high-frequency distortion products generated by amplifier clipping will not in general be damaging in one-way systems.

JEFF WHITE
ELECTRO-VOICE

6

How can I be sure that my microphone preamp matches my mic?

By connecting a microphone to any preamp, we would like to achieve the following:

1. Minimum loss of microphone output signal.

2. Minimum degradation of frequency response.

3. Minimal pickup of unwanted signals, such as hum or buzz. Whenever a dynamic, ribbon or condenser microphone is connected to a preamp, a fraction of the signal generated by the microphone is not delivered to the preamp. This occurs because the preamp has a certain input impedance and when signal currents flow from the microphone, there is a small voltage drop across the microphone's internal impedance. (See figure 1 below.) To minimize this loss, the input impedance of the preamp should be at least three times the internal or actual impedance of the microphone.

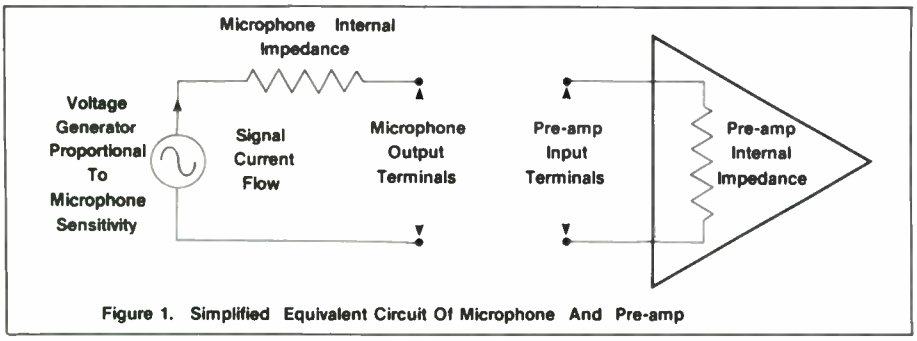


Figure 1. Simplified Equivalent Circuit Of Microphone And Pre-amp

Rated high impedance, or high-Z (Z being the mathematical symbol for impedance) microphones range from 10,000 ohms and above, low-Z microphones range from 50 to 250 ohms and medium-Z microphones range from 600-10,000 ohms. It's important, though, not to confuse the terms actual (or internal) impedance and rated (or nominal) impedance. When you ask about "matching" the mic to the preamp, you are matching the *rated* output impedance of the microphone and the *rated* input impedance of the preamp. The actual impedances of the two components are often different from the rated values and follow what we stated above about output loss. It is the rated impedance figure that is usually referred to and shown in a manufacturer's data sheet, though sometimes both figures are given. If you "match" the rated impedances, you'll automatically accomplish number one above.

Also, the microphone cable acts as a shunting capacitor to the microphone and, depending upon the cable length and microphone output impedance, noticeable high-frequency loss may occur. If the rated output impedance of the microphone is low (600 ohms or less), several hundred feet of cable can be used with negligible high frequency loss. If the output impedance is high, however (10,000 ohms or more), cable should be limited to less than 20 feet.

To avoid electrical noise pickup, the right kind of cable is necessary. Low-pitched hum is usually produced by electro-magnetic induction from devices such as power transformers or power lines. Buzzes are electro-static in nature, and are produced by such things as flourescent lights or neon signs. A good grade of microphone cable with a braided mesh shield should just about eliminate the pickup of the electro-static signal. With high-Z microphones, the pickup of electro-magnetic signal is generally not a problem due to the relatively high signal voltages produced and the shorter cable length. With the lower signal levels and the longer lengths of cable used with low-Z microphones, the amount of electro-magnetic hum picked up becomes a problem. In order to cope with this, "balanced" microphone lines are used in conjunction with transformers. A "balanced," or floating, line consists of a shielded cable with two inner conductors, as opposed to an unbalanced line, which is a single conductor shielded cable. The transformers serve two purposes. The first is to cancel out hum signals picked up on the microphone lines, and the second is to step up the output voltage of the microphone. Most rated low-impedance preamp inputs have built-in transformers or have an input circuit that performs the same function as a transformer. For best noise rejection performance, check the manufacturer's data sheet to see if the rated low-impedance preamp inputs are of the balanced or floating type.

If you have a rated high-impedance microphone and a rated low-impedance preamp, or vice versa, there are several matching transformers available that can be used between the mic and the preamp. (See figure 2.)

Paul Bugielski
Bob Schulein
Shure Bros, Inc.
Evanston, IL

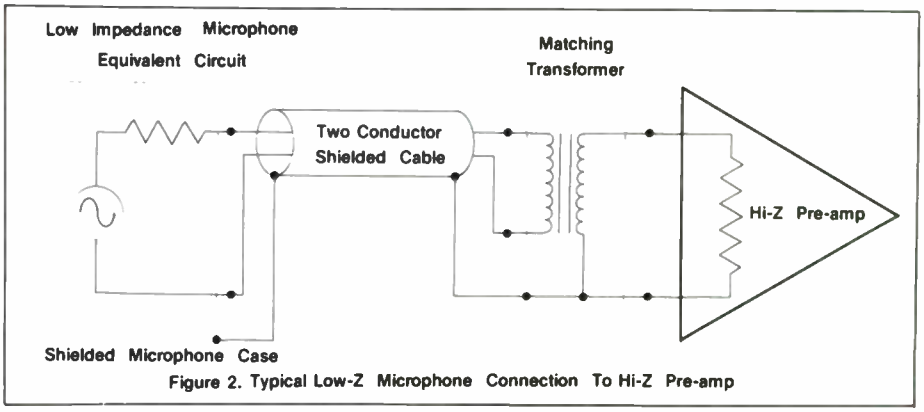


Figure 2. Typical Low-Z Microphone Connection To Hi-Z Pre-amp

When Stevie Wonder speaks for TDK, it works.

The story is simple but powerful. Stevie begins with, "Natural sounds go into my music and they sound natural on TDK." He ends with, "It delivers the best sound, for its size, I've ever heard."

Suddenly, across the country, millions of new customers know that TDK delivers music like no other cassette. Brand awareness as reflected in sales is at the highest level ever. The high impact television commercial is supported by a series of radio spots in which Stevie talks about his experiences with TDK. Each spot uses original music from his new album, Journey Through the Secret Life of Plants.

This is the first time Stevie has endorsed an audio product. It's the first time anyone of Stevie's stature has allowed the use of original music to be used in commercials simultaneously with the release of a new album. Most importantly, this is the first time TDK has invested so much in an advertising campaign.

Newspaper ads are spreading the TDK story even further. There's a free-with-purchase Stevie Wonder poster to bring them into your store. Counter cards. A forthcoming consumer magazine campaign. Nationwide publicity. Nothing has been overlooked that could stop this from being the most successful year in TDK's history. If you're already part of it, you've seen the results in your sales. If you're not, tune in Stevie and listen to the story. It's hard to resist.

TDK.
The machine for your profit machine

Supplier to the U.S. Olympic Team

CIRCLE 80 ON READER SERVICE CARD

So... u want to know about Audio for Musicians Part 3

By Craig Anderton

Last month, we discussed the subject of tape recording from a very general standpoint. This month, we're going to limit our scope somewhat and talk about track width, tape width, and reel size.

TRACK WIDTH

The first tape recorders were mono—that is, there was a single piece of tape going past the erase, record, and playback heads; the erase head would erase across the entire width of the tape, the record head would record over the full width of the tape, and the playback head would play whatever was recorded on the tape. (See figure 1.) This is called *full track* recording, because you are recording your audio signal (a "track" of information) over the full width of the tape.

With the advent of stereo, where you need to have two independent tape tracks, the process of full track recording obviously wouldn't be able to deliver two independent tracks of sound. So, the tape was electrically divided into two halves, as were the various record, erase, and playback heads. (See figure 2.) This is called *half-track* recording, because you can record one audio signal on one half of the tape and another audio signal on the other half of the tape.

Unfortunately, while we have doubled the amount of information our tape can hold, we've made a few tradeoffs in the process. For one thing, since we've split the tape in half, we're also halving the number of particles available to the record head for magnetization. (Refer to last month's column if that concept isn't clear.) Since we cannot put as hefty a signal on the piece of tape, the signal-to-noise ratio suffers as a result. We've also increased the complexity of the various heads, since they must be able to handle two independent signals instead of just one signal. This requires an extra set of playback amplifiers, record amplifiers, input and output jacks, and so on.

As four-channel started to become a reality, the tape was further subdivided into *four* individual tracks of audio information. Again, this meant changes in the various heads to accommodate the four separate tracks, as well as additional electronics, jacks, and the like. And again, we've made another set of tradeoffs, since we're trying to cram even more information on to the same piece of tape.

The audio industry did not stop at four track machines, however; 8-track, then 12-track, 16-track, 32-track, and now even 40-track machines are all available. But packing so many tracks on to a piece of tape meant that we needed to make some changes in the tape width itself. . .and now would be a logical time to investigate the subject of tape width more fully.

TAPE WIDTH

The most common tape width is 1/4" for reel-to-reel machines; cassette tape is about 1/8" wide. When people were only putting one or two tracks on to that 1/4" wide piece of tape, there were plenty of particles available on the tape for magnetization. But trying to cram four tracks on to 1/4" tape meant that each track had to fit in a narrower piece of tape, which (as mentioned earlier) adversely affects the signal-to-noise ratio. In order to overcome this problem of limited track width, wider tapes were developed. With half-inch wide tape, for example, you could record four tracks on that tape and retain the same quality of sound as if you were putting two tracks on to ¼" wide tape. Similarly, if you use 1" wide tape, you can put on eight tracks and still maintain the same quality as if you were recording two tracks on ¼" tape. Professional 16-track recorders use 2" wide tape, but once you get past 2", tape handling becomes difficult to deal with and at the moment you won't find tape in common use that's over 2" in width.

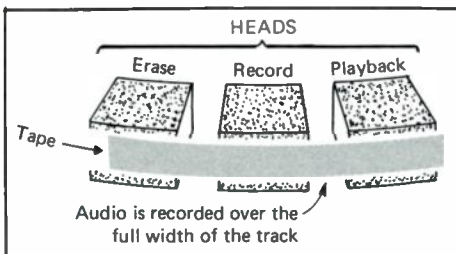


FIGURE 1

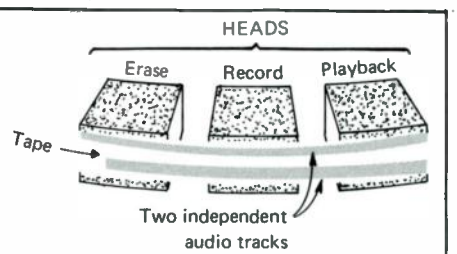


FIGURE 2

TAPE COST

As in every other aspect of life, you have to pay for quality. Half-inch tape is more expensive than 1/4" tape, and 1" tape is more expensive than 1/2"

We keep the music safe in sound.

GLi

Integrated Sound Systems, Inc. was organized to develop and manufacture high performance sound equipment for professional applications. Our GLi product line consists of individual speakers and related audio electronic components such as mixers, preamplifiers, signal processors, and power amplifiers. It was GLi that first defined the difference between consumer Hi-fi requirements and theatre & PA systems as applied to stage and discotheque sound. Over 5000 clubs and 1000 skating rings (a market we created) throughout the world use GLi equipment, equipment that has become synonymous with innovative state of the art sound systems.

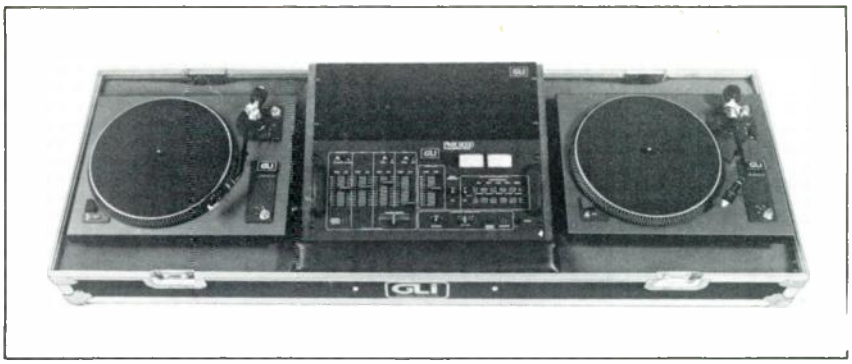
Beyond just creating individual components, our overall approach to sound simplifies installation by using pre-packaged consoles in which all the desired electronic equipment is housed. You need only position the speakers and connect to the console, and the system is ready to go. And, by using GLi's free system design service, the installer can avail himself of the needed GLi expertise required for more intricate installations.

GLi maintains its engineering, assembly and warehouse facility in New York City, conveniently located at the hub of all major shipping and communication facilities. With a large inventory of finished materials always available, GLi is in a position to ship to qualified customers immediately from stock.

This short catalog is designed to give you some brief insights into what we do, and how we do it. Please contact us for complete information on any of our fine products.

Total Systems

GLi is ready to create systems for you, either for mobile or permanent installations. Both feature our unique "turnkey" operation—all you do is plug them in, without a lot of wasted time fooling with wiring. And, if you have a special project, GLi engineers can help you devise cost-effective solutions, at no charge for the consultation. All GLi systems come fully loaded with speaker systems to your specs. You get exactly what you're looking for, every time.



FCC-9000 Flight Case Enclosed Mobile Disco Console

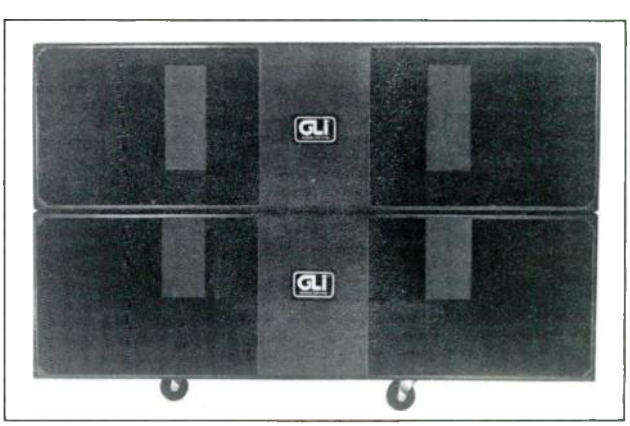
(Both systems shown with optional equipment.)

CC-11 Triple Bay, Permanent Installation Control Center

Full range speakers. Back row, left to right: Point 5, Model 1, Model 3. Front row: FRA-2, MR-II.

Speaker Systems

When it comes to high performance sound systems, GLi speakers speak for themselves. No matter what the application, we have the speakers to fit your needs. And GLi's full range of product allows you to upgrade your system without sacrificing GLi quality and reliability.

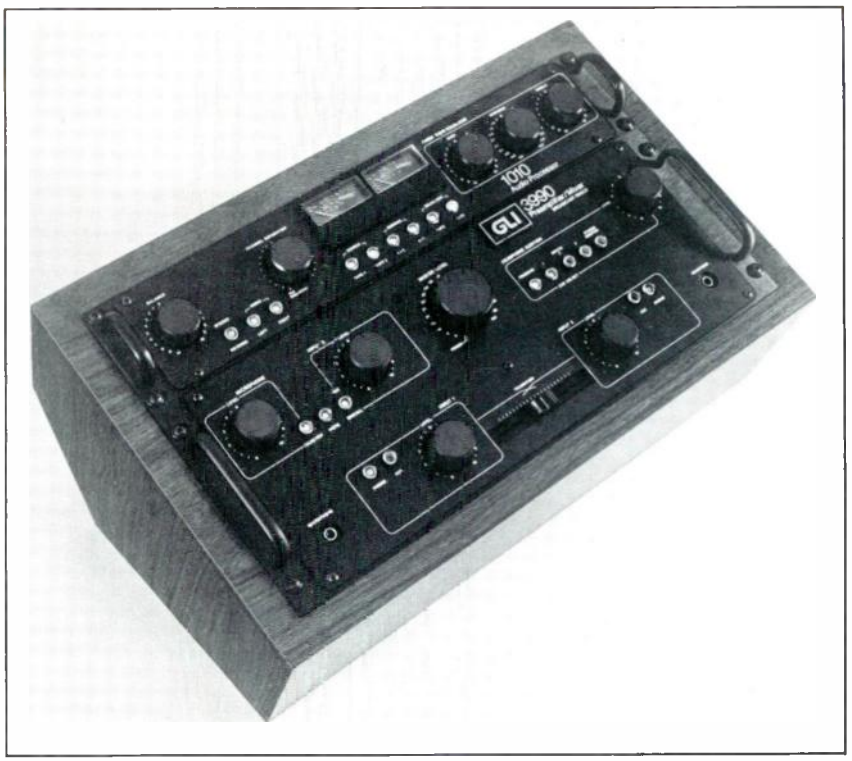


GLi stocks 5 Bass Reinforcement Speaker Systems, plus a Special Effects Tweeter Array, the TA-2. Shown in photo is the largest, the DB-50.

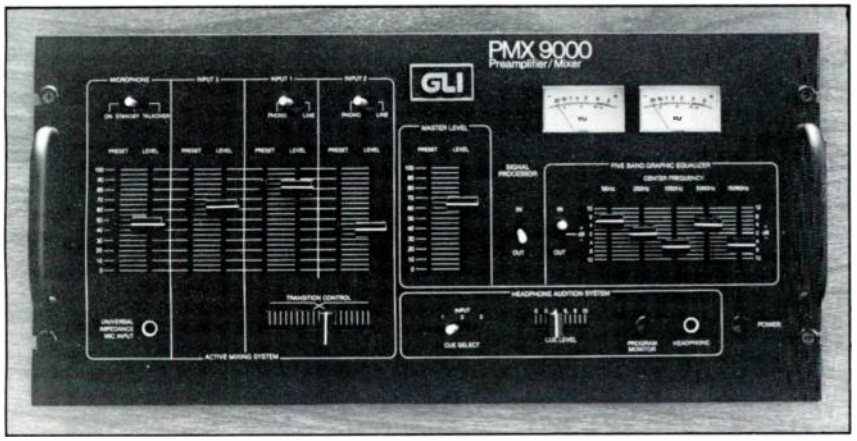
Mixers

The control center of the sound system. GLi mixers have proven themselves for years in the most demanding environments, and offer maximum control and versatility in creating any music program. All mixers feature pre-cueing capabilities.

(Optional wood cabinets available. We also offer the Model HS-4 Headphone for use with any of our products.)



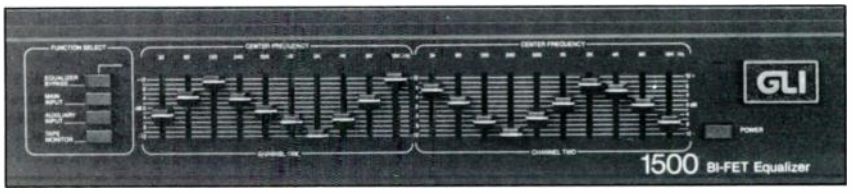
The professionals' choice, the 3990 Preamp/Mixer and 1010 Audio Processor.



PMX 9000. . . for precision control at a very affordable price.

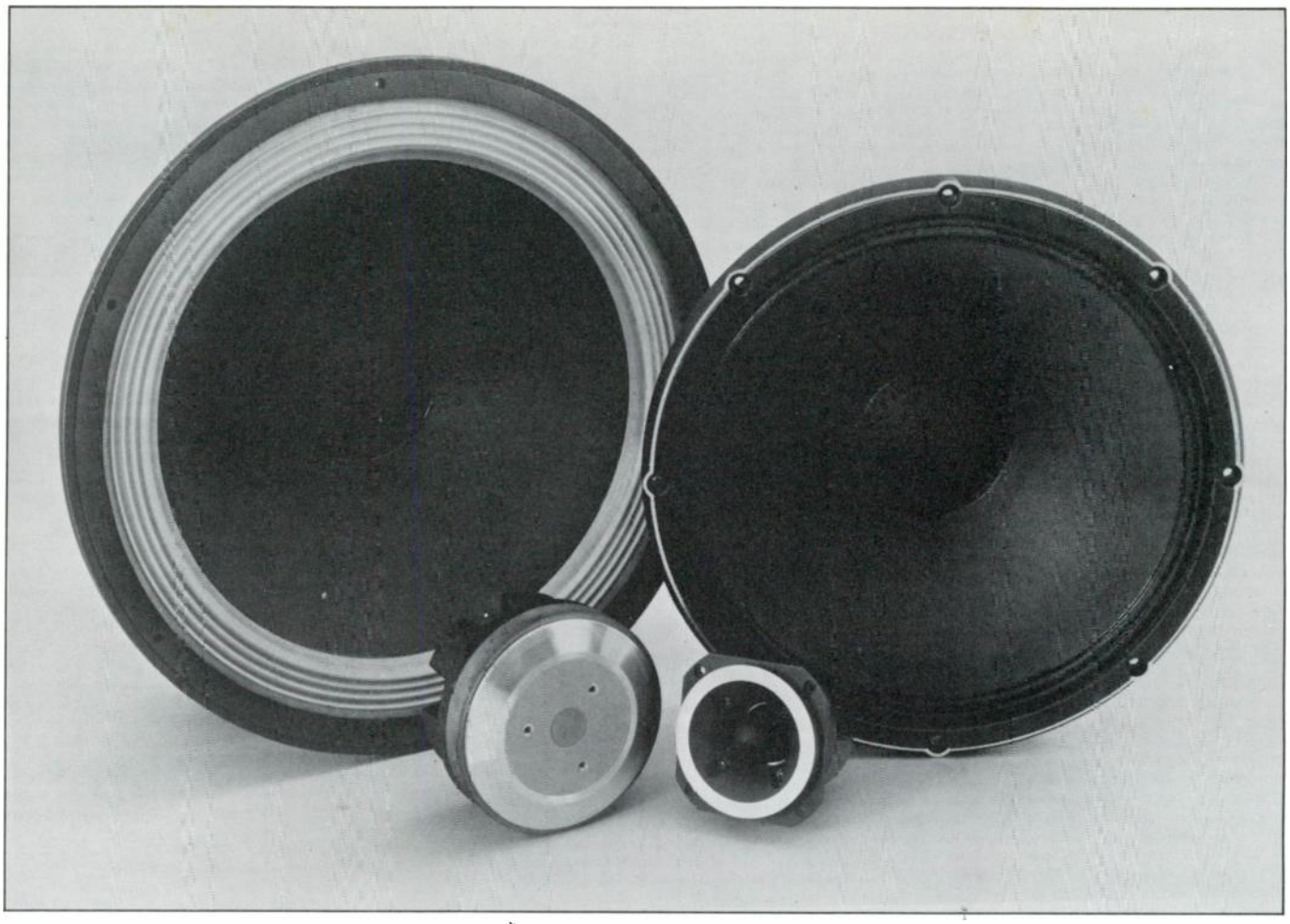
Equalizer

Frequencies respond to our EQ-1500 Graphic Equalizer, and so will you. This 10-Band unit, featuring Bi Fet circuitry, assures you optimum octave to octave control, from deepest bass to soaring highs, and everything in between.



Power Amps

Rugged, lightweight and dependable, our 250 Watt SA-2125 Power Amp is perfect for the most demanding professional applications. A built-in fan constantly cools the unit, and easy front panel access to breakers make for fast sound system trouble shooting.



Back row: Model 18160, Model 1560. Front row: MF-2000 Midrange, HF-3000 Tweeter.

Vortec

Our line of Vortec drivers are the same ones that are used in our GLi speaker systems. These rugged, high performance drivers will handle a variety of custom applications, no matter how critical, and our full line insures you'll find one that's right for your sound requirements.

Integrated Sound Systems, Inc., with its product lines, GLi and Vortec, is ready to fulfill your needs for professional sound systems efficiently, reliably and cost effectively, with both our systems design service and immediate shipments from stock. Look to us for even more innovative solutions to the problems of sound reinforcement. For information on any of our products, please write us.

INTEGRATED SOUND SYSTEMS, INC.
29-50 Northern Blvd., Long Island City, N.Y. 11101
(212) 729-8400
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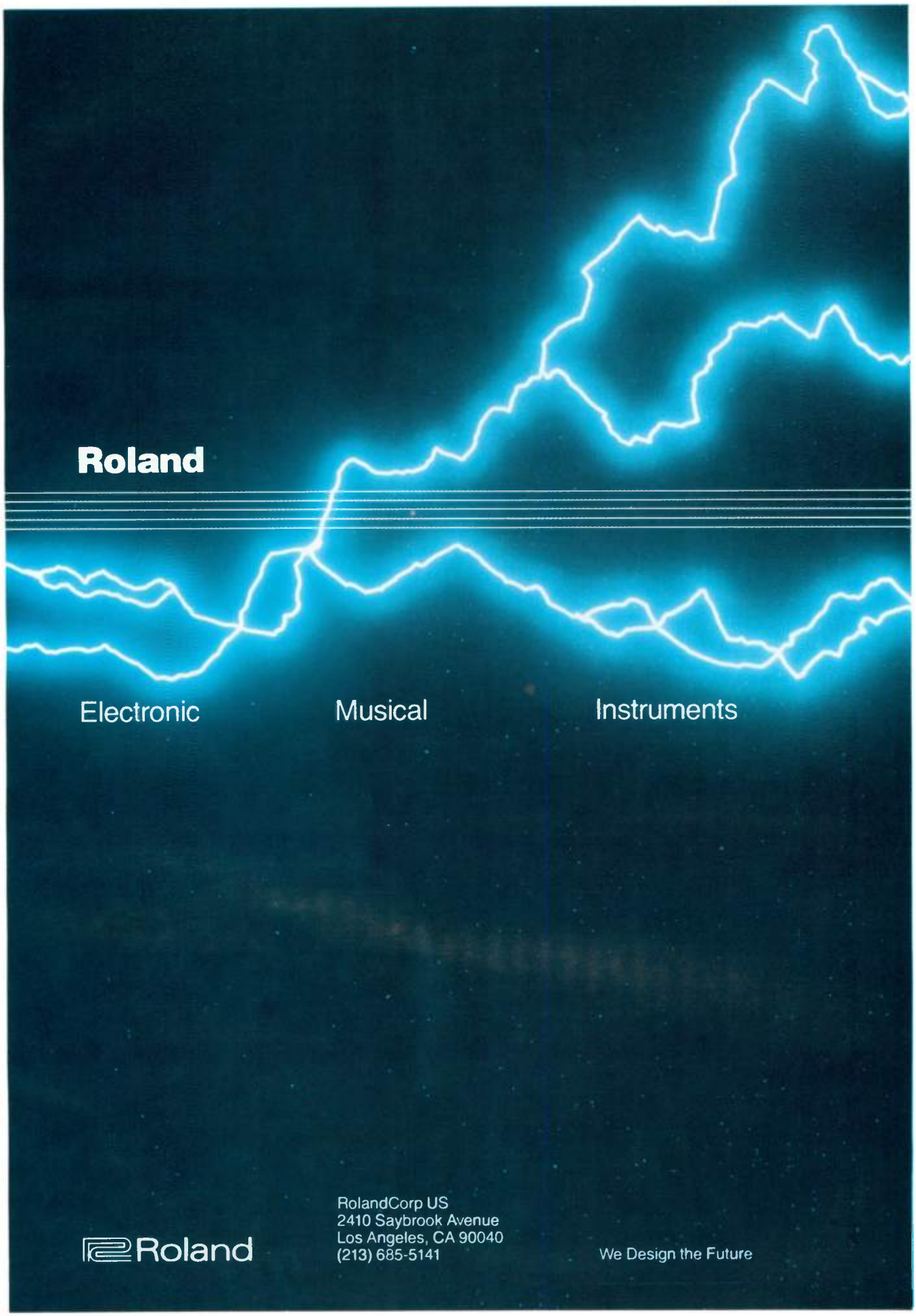


CIRCLE 82 ON READER SERVICE CARD

tape. Since most of these machines run at 15 IPS or 30 IPS for best fidelity, that means you can go through a lot of expensive tape if you're using wide tape and recording at a fast speed.

While professional studios seldom worry about tape costs (after all, the cost of tape is pretty much insignificant compared to other studio expenses), tape cost is a significant part of the budget of home recording and semi-pro studios. As a result, the most popular machines for home recording tend to use a smaller tape width than the industry standard. For example, semi-pro four-track machines squeeze four tracks on to 1/4" wide tape, which helps keep tape costs down. Similarly, eight-track semi-pro machines use 1/2" wide tape—far less expensive than the 1" wide stuff.

This brings up the question of how much quality is really lost by using narrower tape tracks in a semi-pro context. The answer, surprisingly, is that very little quality is lost at all, because most home recording studios employ some type of noise reduction that all but cancels out any increases in noise due to using the narrower tape width.

REEL SIZE

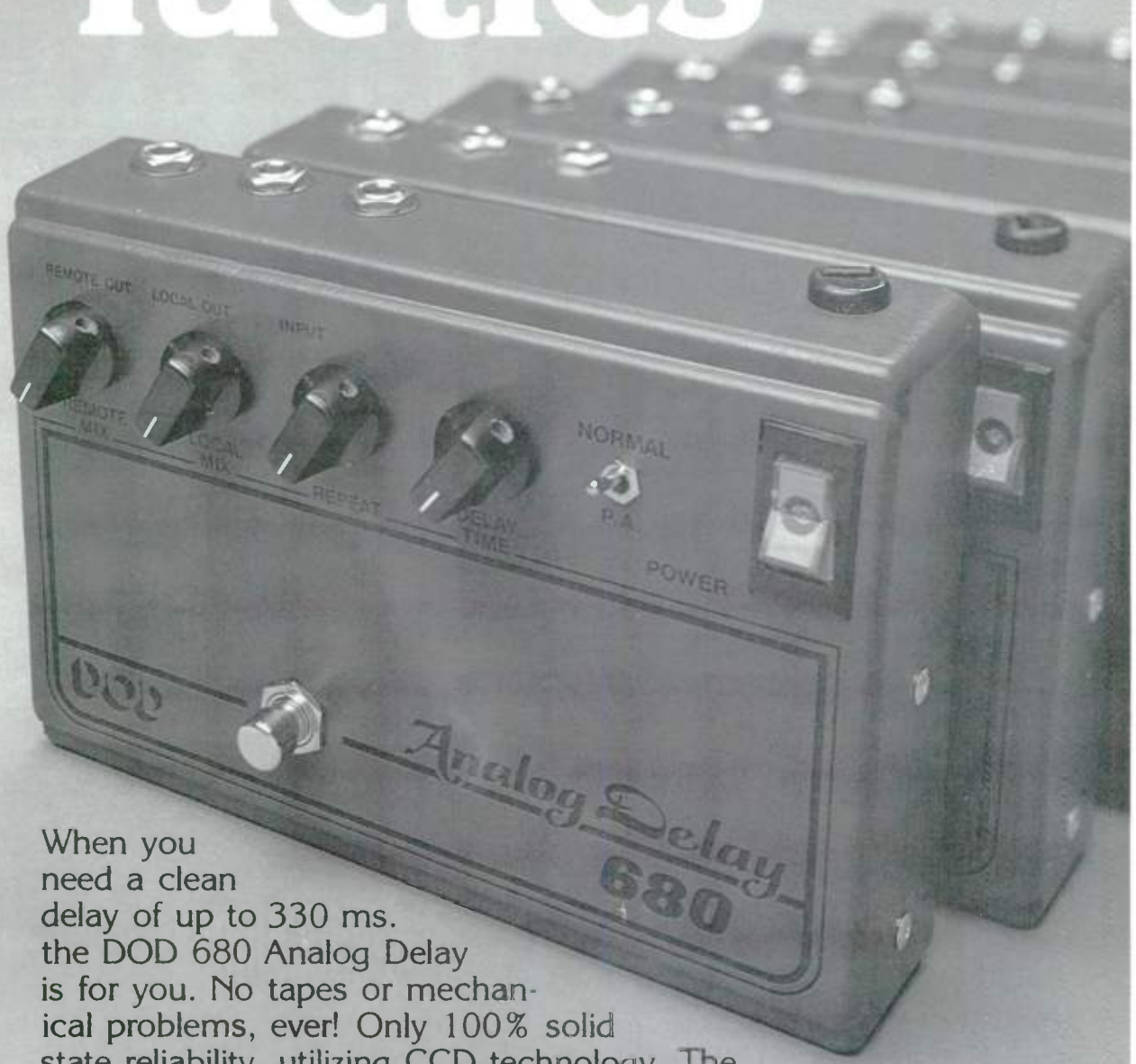
As mentioned earlier, studio recorders tend to run at 15 or 30 IPS, as opposed to consumer oriented recorders that run at 3.75 or 7.5 IPS. While this increases the sonic quality, it also increases the tape costs, since running a tape at 15 IPS means you're going to use up twice as much tape as if you ran it at 7.5 IPS. As a result, studio recorders accommodate large sized reels, usually 10½" in diameter, whereas consumer and audiophile tape recorders will typically hold the smaller 7" diameter reels. A larger size reel means that you can hold more tape, and therefore help compensate for that fact that you're running the tape at high speed. If you were trying to record a session at 30 IPS using 7" reels, you'd have only a few minutes between reel changes. A larger reel helps solve this problem.

WHAT THIS ALL ADDS UP TO

Now that we're using larger reels, which hold more tape, and since this all goes at a relatively high speed, we need a rugged transport that can handle these demands. Audiophile decks get by with relatively small motors, since they don't have to shuttle much tape around and a 7" reel of 1/4" tape doesn't weigh much. But when you're using a 10 1/2" reel of 1/2" or 1" tape, you've got a *heavy* reel of tape on your hands; the motors of the transport must be correspondingly stronger to handle the extra load. So with a multitrack deck, you must pay more—for complex heads that can handle several audio tracks simultaneously, for rugged transports, and for many identical sets of electronics to handle the various audio tracks. Additionally, tape costs are more, and you need to use top quality tape to help offset the disadvantages of narrow track width and other compromises inherent in the multitrack process.

But all in all, while some might complain about the high cost of multitrack machines, the reality of the situation is that despite inflation, a weak dollar, and spiralling costs of raw materials, multitrack recorders continue to be a very cost-effective deal. Nowadays you can buy a 16-track recorder using 1" tape for about $10,000 , and to anyone who has been following the price of multitrack equipment over the years, that represents quite a breakthrough.

Delaying Tactics

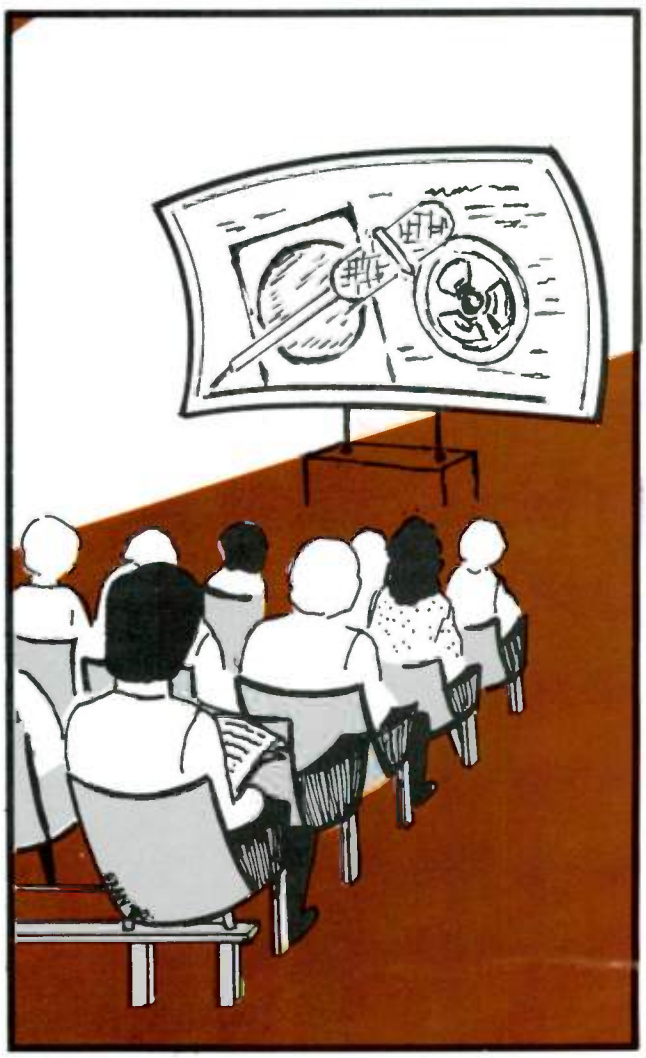


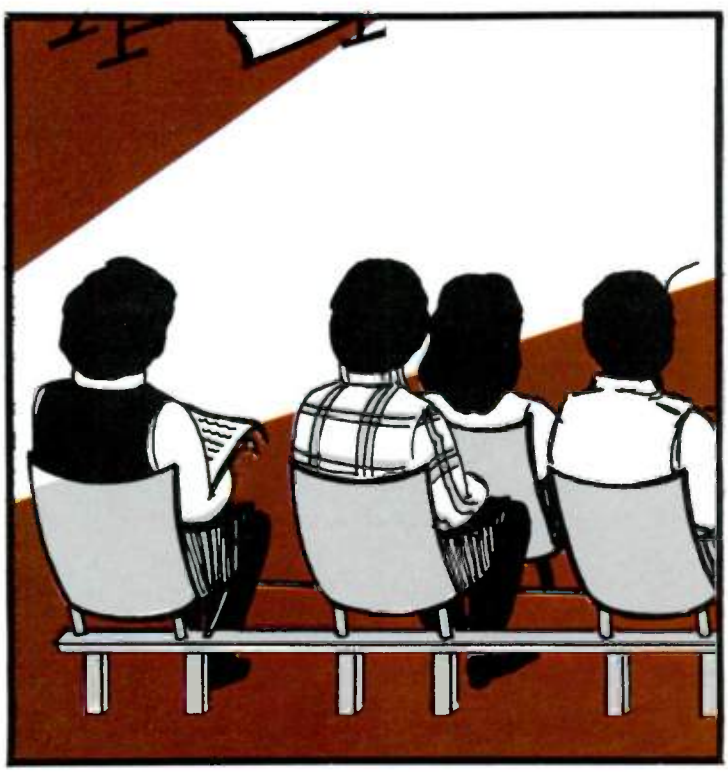
When you need a clean delay of up to 330 ms. the DOD 680 Analog Delay is for you. No tapes or mechanical problems, ever! Only 100% solid state reliability, utilizing CCD technology. The DOD 680 is ideal for instrument, mono PA or stereo PA by using the dual mix controls and output jacks. And more good news, the DOD 680 Analog Delay is only $189.95 list!

DOD ELECTRONICS CORPORATION, SALT LAKE CITY, UTAH, 84115

A REP LOOKS AT CONSUMER WORKSHOPS

By Perry Solomon





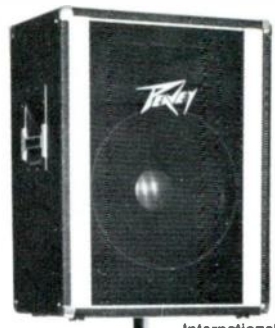
There are many ways to put together a sound system. You can spend a lot of money on mixers, equalizers, power amps, and accessories. Or, you can buy one of the new XR Series compacts from Peavey. The working musician who makes his money playing clubs, lounges, and small auditoriums will be hard pressed to find a more functional system.

The XR compacts have been designed for maximum versatility in a highly portable package offering features and specifications formerly available only with separate components. Take for example our built-in graphic equalizer that allows you to tailor the tonal response of the system to any playing environment while maintaining effective control of annoying feedback. Or, the independent monitor send controls on each channel that can be mixed and adjusted separately for each performer. Convenient patching facilities are provided for direct hookup with external power amps, effects devices, and monitor systems.

Two high impedance inputs are featured on each off the XR's channels. This means you can run as many as twelve microphones into the six channel XR-600. Using Peavey PBH microphones and cables that same setup is automatically converted to a low impedance balanced line, totally eliminating any hum or interference,...a feature usually found in much more expensive mixers.

The XR compacts are compatible with any four ohm speaker setup but, if you're after maximum performance in a portable package, our International Series enclosures are without equal. These extended range, high efficiency enclosures out perform many of the "professional" permanent installation systems that are much larger and more expensive.

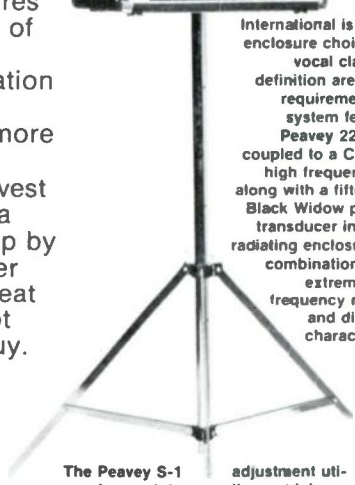
Before you invest a lot of money in a sound system, stop by your Peavey Dealer and see what a great sound system a lot less money will buy.



The 115 International is an ideal enclosure choice when vocal clarity and definition are primary requirements. The system features a Peavey 22A Driver coupled to a CH Series high frequency horn along with a fifteen inch Black Widow precision transducer in a direct radiating enclosure. This combination insures extremely wide frequency response and dispersion characteristics.

Peavey PBH high impedance microphones are specially designed with a converting transformer built into the cable plug at the input of the amplifier. This advanced design retains all the interference cancelling advantages of the low impedance, balanced line setups of larger, more expensive systems.

Peavey microphones feature wide response with tight cardioid patterns for clean, realistic vocal reproduction. Each mike comes equipped with a rugged case, deluxe holder, and a twenty foot cable.



The Peavey S-1 heavy-duty speaker stand represents a vast improvement over previous speaker stands. The S-1's height adjustment utilizes a high-strength aircraft "locking pin" and does NOT depend on a "thumb screw" which can easily slip and cause the stand to collapse.

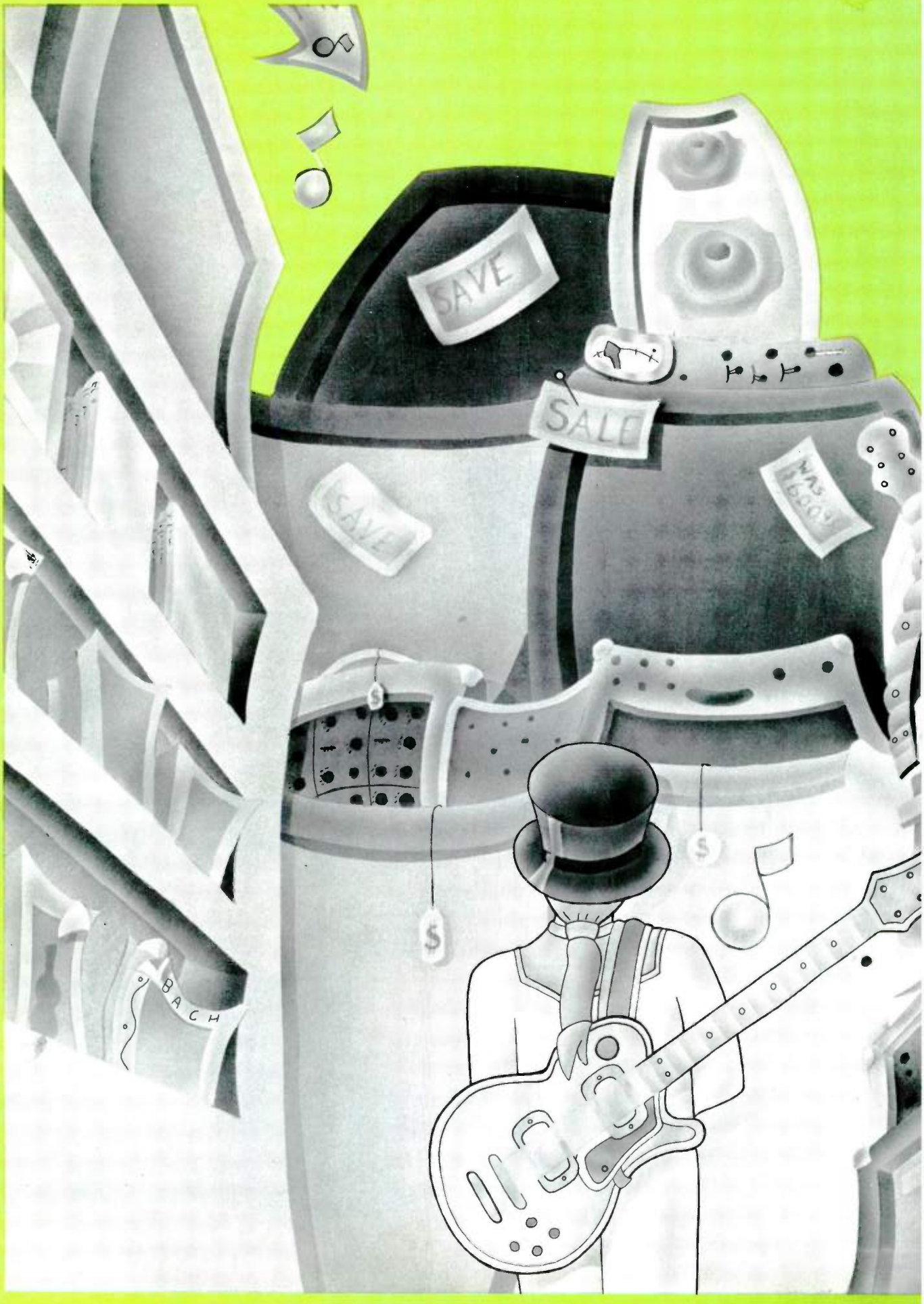
THE XR SERIES COMPACTS

XR-600
Six channels
Auxiliary input channel
Nine-band graphic equalizer
Complete patch panel
210 watts RMS power amp
with DDT® compression

XR-500
Five channels
Auxiliary input channel
Complete patch panel
Seven-band graphic equalizer
130 watts RMS power amp
with DDT® compression

XR-400
Four channels
Auxiliary input channel
Complete patch panel
Five-band graphic equalizer
100 watts RMS power amp

 PEAVEY ELECTRONICS
711 A Street/Meridian, MS.


SAVE
SALE
SAVE
WAS $600
BACH

A Musician Looks At The Retail Store

By John Amaral

In this article I'm going to suggest some ways of looking at your store that you perhaps have not considered; points of view that may help you reshape the concept of your business and expand its scope. I am writing partly from a musician's viewpoint, and I want to mention my experience and bias. Although I now teach guitar and electronics at the Berklee College of Music in Boston, a school well-known for training professional musicians, I have spent a good deal of the last ten years playing music for pay and visiting hundreds of music stores that would help my playing and teaching. For a time I was a partner in a retail music shop. During the course of these adventures I received an education that has proven invaluable regarding how retail music stores perceive musicians as customers. Additionally, the last few years have been increasingly interesting for me as my teaching and consulting activities have given me the opportunity to analyze and evaluate pedals, effects, synthesizers, guitars, and other music and music electronics products from many aspects: product development, circuit design, market research and strategy, advertising, and retail sales. This article is an opportunity for me to speak to dealers and salesmen about my observations, opinions, and suggestions which I hope will prove helpful to you to increase sales and customer satisfaction.

PERSONALITY

Every music store has its own personality. You can tell something

about it the minute you walk in. The floor plan and displays give subtle clues to the store's concept and what type of clientele it has been designed to service. Are you as clear about the types of customers you're trying to attract and service as is an advertiser in a national magazine going after his segment of the market? Within the population of all possible customers you could service, do you put a lot of energy into attracting those you can service best? I think it makes a lot of sense to consciously develop a firm "market base," then expand into other well-defined areas. Often stores will try to be all things to all customers: guitar sales, band instruments, sheet music, pedals, repairs, percussion, teaching studios, etc. Many times such stores are mediocre in every department.Lack of focus and the too-thin spreading of resources and manpower can undermine any business. On the other hand, if you have established a firm market base *and* have excess resources, expansion into other well-defined areas such as pro audio, speaker cabinetry, band instrument repair, rehearsal studios, etc. can be beneficial to all concerned. On behalf of potential customers, I would ask you to do a good job with each category you service, rather than paying lip service to many areas, as I have often found to be the case.

IMPRESSIONS

I want to tell you how I size up a music store. Although I'll list sequential steps, the process is pretty spontaneous. First, I get a general impression of the floor plan and displays. If there's a lot to see—something interesting in every direction—I deduce that this store is interested in making my visit visually stimulating. Although front window displays are often interesting, I've found little correlation between them and the concept and usefulness of the stores. They do tell me: "Here is a music store!" Past that I generally ignore them because I'm more interested in what's inside. At this time I also form initial impressions about the lines of instruments carried and the physical size of the pedal and effects displays. The presence of several major brands of instruments is an indication of how much of the local market is serviced by this store, which gives me some idea of what kind of service to expect. The size and functionalism of the effects displays is of paramount importance. If I see a large display of the latest, most useful signal processors, especially if they're set up for quick comparisons on a rack or a board, I immediately rate this store as "hip" and interested in players—musicians who play with other musicians, who earn money playing and want to spend it on improving and expanding their sound. If all I see is a few pedals hidden in a glass display case under the guitar picks, experience shows that this store can probably be written off as uninterested in servicing players. Most stores fall somewhere between these extremes.

SALESMEN

Second, I notice what the salesman is like. Does he swarm all over me? Does he ignore me? Will he leave me alone to browse? Does he try to get me to think he knows more than I do? How long does it take to get waited on? Does he recognize me from previous visits? What is his general attitude? I've noticed that many salesmen seem unaware that while they are sizing up a customer, he is sizing up them and their store. As you know, the initial size-up and first contact with a salesman are very important for optimum sales effectiveness. If I find a salesman friendly, helpful and not pushy, I will be more likely to buy from him this time or seek him out in the future. It is frequently the case, however, that music store salesmen know very little about people or selling. They often have an automatic need to display superior intellect or musical knowledge rather than make the customer feel comfortable. My advice in this area is to hire only those men or women who are genuinely interested in people, who understand the concept of selling themselves to a customer, regardless of their musical experience. Too many times salesmen turn a transaction with a customer into a confrontation of egos by being unaware of the doubled emotional qualities obtained when music is mixed with buying and selling.

PRICE

Third, unless I'm seeking a specific item that I need immediately, I price an item. The most successful stores I'm in contact with give its salesmen some flexibility. Periodic bonuses are issued based on volume of sales. Incentive policies like this coupled with careful attention to setting profit margins, can result in increased sales and happy customers. Informed salesmen are always clear about three things: how much the customer is saving, how much the store is making, and how much they are making. This means they know how to use a calculator to everyone's best advantage.

COMPETITION

At this point let me make a passing mention of mail order, which is a touchy subject with most retailers. A certain amount of the industry's total business is absorbed by mail order houses who offer, at a discount, products which consumers may have demoed at an ordinary retail store. This marketing concept is likely to grow more effective with increases in gasoline prices and inflation. I think it's best to consider mail order as a special kind of competition. Rather than ignore it, be aware of its strong points and weaknesses, subscribe to mail order catalogs and read them. You may be surprised at your ability to compete with them. Taking comparison shopping into consideration, at the very least I would be aware of the services and discounts that other stores in your area offer. Some dealers find mail order an additional reason to have lax demo policies. Let me say that, as a musician, there are few things more annoying than coming up against a reluctance to let me try out instruments, signal processors, and amps with the tired excuse that they may get shop-worn. I have rarely found this petty policy in effect in stores which do a high volume.

KNOWLEDGE

Lastly, I inquired about the musical community. The hippest stores know who are the best teachers in the area and how to find them. They are informed about musical events, clubs, bands, etc. They are knowledgeable about sharing that knowledge.

Visiting a hip, active music store is one of my favorite pastimes and it's always a pleasure to discover one which merits repeat visits.

VMR™... the most talked about new component in years!

"Unbelievable!" "Demo it, and it sells!" "We cranked it up, and smiles were everywhere!" "I never heard high SPL's sound so clean!"

No wonder dealers telling the VMR story have made the Electro-Voice S15-3 one of the best selling single-enclosure PA systems in the country. Instrumentalists, vocalists and sound men all have learned that a VMR in their system means incredibly clean midrange reproduction. Dealers displaying the bold VMR baffle are getting attention – and plenty of it.

The massive 16-lb magnet structure found in the VMR reproduces unmuddied midrange frequencies with the efficiency you would only expect to find with a horn. Plus the integral Thiele-aligned VMR enclosure rids systems of the "honky" sound typical of small horns. Maybe that's why companies like ARP, Oberheim, Moog and Crumar have used the S18-3 stage keyboard

system to demonstrate their synthesizer products.

The VMR is the speaker that has made the B215-M and B115-M bass guitar systems *the* bass systems to own. No wonder companies like Gibson and Kramer have used these systems to demonstrate their basses at trade shows and seminars.

The VMR's basic accuracy is the reason you see the FM12-3 floor monitor so often on television musical broadcasts. When artists hear themselves accurately, they perform better. That's why FM12-3's sell.

If you're one of our dealers who has made VMR-based enclosures sell so well, give yourself a well deserved pat on the back. You've earned it. If you're one of our dealers who is not fully benefiting from this great opportunity, you should learn more about the VMR story. You're missing some great opportunities.

If you're not currently selling Electro-Voice VMR-based speakers, maybe you should be. They're the hottest selling systems around.

For further information about getting on the VMR bandwagon contact Chuck Gring, Music Products Sales Manager at Electro-Voice.

Ev Electro-Voice
a gulton company
600 Cecil Street, Buchanan, Michigan 49107

CIRCLE 90 ON READER SERVICE CARD

A Practical Look At

Disco Mixers

By Mike Klasco

Deep in the heart of any disco there's one component that functions as "Control Central." Literally the operations center of a club's music program, the disco mixer, perhaps more than any other component, mandates the success or failure of the club that selects it as well as the supplier that stocks it.

While the disco mixer is only one component in a full line of products now being produced specifically for the disco market, it is probably the least understood component. Whether you're already in the disco market, considering entry into it, or just in the market for a good mixer, this article will, I hope, be worth your time.

The goal is to give you some very practical guidelines for selecting a disco mixer line. Being able to read the specifications on a unit is one thing, and that's important, but I want to call your attention to an area of evaluation that, given equal specs between competitors, will make the selection process most likely a successful one.

The market for disco equipment is an exciting and profitable field, and promises to remain so. The key to your success in this market is a thorough knowledge of the products and real-time experience with those products. From these you can acquire an accurate perception of the market's directions, select the right lines to carry, and train your people to articulate the sales message. All these will work together to build sales and make you the most knowledgeable source for all disco components.

A STRANGE BREED

The disco business is a unique combination of technologies and synergism that creates an industry that is at once familiar and strange. Most of us know the sound reinforcement business very well, and the disco field not so well. Naturally, it's the uncharted waters that get us into trouble.

Take for example the semi-pro dealer who knows exactly what to look for in a recording studio board, a sound reinforcement or PA board, but has never ordered a disco mixer. Even if he has

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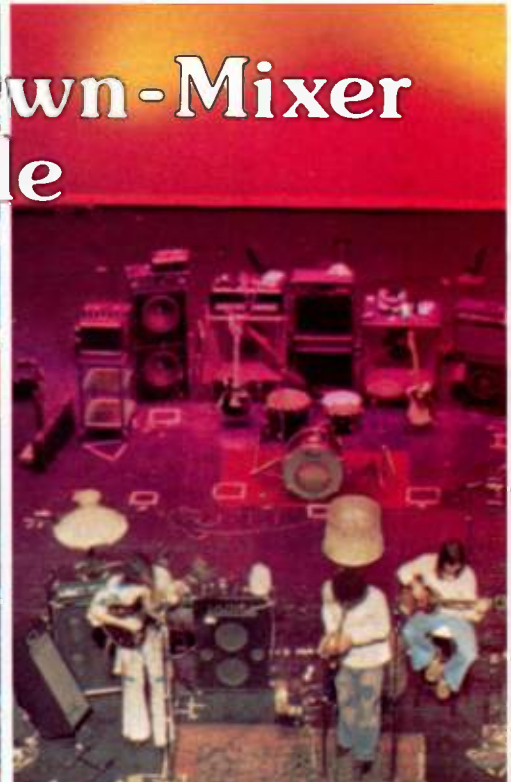

Nobody but you could ever know exactly how you want to use a mixing console. So instead of manufacturing a cut and dried mixer which defines your system's limits, or giving you a plug-in module approach which might fit one job but not the next, Altec Lansing created the 1690 Mixing Console to give you options rather than boundaries.

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ordered a disco mixer and sold it, he's probably never *used* the product. He may know just enough to get into trouble. He's just not equipped to make proper judgments on which line of mixers to carry, or even what to sell his customers.

Give that same dealer some real-time experience on a mixer, let him "solo," add the tips in this article, and he'll be ready to fill his customer's and his own needs. He'll have the experience, knowledge, and the confidence to build a good business.

It's easier on paper than in reality. One good mixer doesn't make a line. You'll want a source for disco mixers that offers a reasonable choice. This way you can judge your customer's needs honestly and fill them. Products should be available for the budget-minded as well as those ultimate instruments for the "glitter-cities" in your area.

IT'S BEAUTIFUL! DOES IT WORK?

As in any profitable business, more and more companies are entering the disco business. Where previously you might have looked at two or three suppliers to make your decision on a mixer, you may now have to screen eight or ten candidates. As you get more entries the choice gets tougher. Many of the mixers on the market are excellent. Some of them, however, were designed by the textbook, and they "should" work. Other companies did their design homework too, but they also did field testing, learning their lessons from real front-line experience and bringing each lesson learned to new generations of products.

THERE IS NO SUBSTITUTE FOR EXPERIENCE

You, or someone close to you, should actually use a disco-mixer. Once you've done this, you can look at prospective mixers and actually visualize their operation. Beyond the salesman's words and the practiced demonstration, you'll actually know if it works. Nothing can replace this experience.

Imagine the inherent value of having stood at a disco console, cueing-up records, using level and transition controls to segue from record to record on their respective turntables. You could bring in a tape from a third input for a pre-recorded segment, even press the talk-over switch, fade the music and use the mike to see if it's convenient to use. It's that experience that allows you to look at the mixer milieu and pick the ones that work. Then you can begin to separate "paper theory" from reality. Remember, the man who'll operate the mixer will literally spend hundreds of hours using it. He'll learn his instrument very, very well and then add his own personal creative touches. If you sell him one that works, he'll be back. If not. . .

HUMAN ENGINEERING

As you spend time watching or using a disco mixer, you'll notice that 95 percent of the action on a properly designed mixer takes place within a small circle of carefully spaced and marked operating controls. A circle about as big as the reach of one hand.

In the next zone of controls will be the less frequently used functions, and so on. A good design will also allow the best spacing where controls are used most, and devote the least space to infrequently used functions. This gives the DJ a positive feel and control; he's less likely to make mistakes during the pressures of a disco "flow." No discophile will stand by silently while a DJ, cursed with a poor mixer design, fades Grace Jones in mid-sentence.

One hand should reach and operate all key controls of the major board functions. Inputs for the mike and headphone jacks should be located so as to keep the wires away from the controls.

THE CUEING SYSTEM

One of the goals of operating a disco mixer is a smooth transition from record to record or cut to cut all night long. Standing at the console, the DJ is flanked by a turntable on either side. Working with the mixer, his main action involves selecting the cut or record, adjusting the speed of the turntable to match the beat of the record, setting the proper volume level, and then when he's ready bringing in the new record and taking out the old.

All of this is done on the headphone only. To accomplish this smoothly, a mixer must have *both* level controls for the two turntables and ideally a transition slide to go from turntable to turntable. Working with the headphone, you can then match the beat between records and use the transition slide to bring the new music on line.

WHAT ABOUT THE FUTURE?

We've looked at the value of experience and human engineering in a disco mixer. Now let's deal with the expansion capabilities of the system—its ability to grow with the club and the operator. Here again, experience and a knowledge up front of your customer's plans will help you select the right units or line. Having expansion capability and choosing not to use it is one thing. Not having expansion capability at all is quite another.

Mixers in the line you choose should be able to accept other system accessories without modification. This allows your customer to build from the basic mixer, adding more amplifiers, tape decks, reverbs, foot-switches, and various other audio and signal processors. Instead of selling a dead-end type product, you can steer your customer to an open-ended system, tailoring his immediate and future installation in one program. Open-ended or modular systems also continue your business relationship and profits for years to come.

LOOK FOR COMMITMENT

After narrowing your candidates to two or three possibles, you can qualify the finalists still further. Look more closely at the company that's offering you its line. You'll want to determine how firmly and deeply committed the company is to the disco industry. The more commitment the company can demonstrate by way of products, people and other resources dedicated to the business, the more comfortable you can feel.

Try to determine how important the disco line is to the company's success or failure. Foreign cars had a rocky start in the U.S. because most of them couldn't afford their own distribution network, so they signed on as "second-sister" to dealers with other major franchises. It worked for the manufacturer, at least for a while, but never for the customer.

WHAT ABOUT THE SPECS?

This is meant to be a practical guide for selecting a good mixer line. For this reason, we'll make passing reference to some key specs. If there's one thing you probably know very well, it's how to read specs. I'm sure you've spent a weekend or two doing just that. Given equal specs, you can use

the tips above to sort out a winner and stock his line.

While a careful review of all specs is certainly in order, certain specs should be looked at with the demands of a discotheque clearly in mind.

THE PHONO SECTION

In hi-fi gear, the quality of the preamp is most important; for a disco mixer, not enough can be said about the phono section. When it comes to long hours of strenuous use, disco gear almost corners the market. Disco music is recorded loud, and it's played back loud. In fact, DJ's love to give their music a good kick in the bass. Disco records are even cut deeper, and the grooves are wider than conventional records. All of this makes the phono input and the phono section itself very important.

Given the odds of a few warped records, assorted rumble and feedback hitting the system from time to time, you'll want a mixer with built-in defenses against this low-frequency junk. While the hi-fi at home may never need more than 100 Mv phono input capability, the disco mixer regularly experiences inputs in the range of 75-200 Mv. The mixer can either be built to handle this regimen, or operate crapped-out, modulated and overloaded most of the time. This is a condition not conducive to clean sound.

GLI, for example, adds a subsonic filter to each phono input before the phono stage. This prevents phono input overloading, protects against warped records modulating the phono input, protects the amps and the speakers.

RF PROTECTION

While it seems a small worry, RF signals such as police calls and the neighborhood CBer shouldn't be interrupting Ethel Merman's new disco album. If the mixer is protected against spurious RF noise, it's a good sign of thorough engineering —defensive engineering, if you will.

S/N, PHONO SECTIONS, MIKES, AND HEADPHONES

Signal-to-noise is a term much bandied about, but don't pick a disco-mixer with an S/N ratio that isn't as good as the hi-fi at home. At home, you push a button and draw from only one input at a time, and generally play the music at lower volumes than the local disco. In the disco you may be calling on up to three inputs at one time plus added volume. You don't want the cumulative noise from the inputs to impact your sound at all.

When people pay five to fifteen dollars each for a night of music and dancing, Donna Summer should sound better at your customer's club than she does at home. If the music is less than great, you can color the dancers gone.

A FINAL WORD...

These tips, hands-on experience and knowledge of your customers' needs will keep you from the big mistakes in selecting a mixer, or any component in the disco line. Just as in any business or skill, there are amateurs and professionals. If you work at it, you will be able to tell the difference, and sort out the better lines from the lesser ones. You will do a pretty good job of selling these lines too, because you'll believe in them. If you choose to make some compromises in selecting your lines, you'll at least be doing so intentionally.

Mike Klasco is Chief Engineer of GLI, Integrated Sound Systems, Inc.

A TECHNICAL LOOK AT DIGITAL TECHNIQUES

Part 1

By Richard DeFreitas

For the past few years the audio community has been made aware of the virtues of digital recording. Digital audio is, in fact, a reality. But the digital audio encoding process has not necessarily reached perfection.

The fundamental advantage of digital audio, whether in time delay or tape recording or other applications, arises from the fact that the audio signal itself is not subjected to processing. Only a representational code is stored in memory on tape, time-delayed, circulated in an infinite-repeat loop, etc. The digital storage medium may have amplitude variations or a poor signal-to-noise ratio; but as long as the code's on-off pulses remain recognizable to the decoder, the faults in the medium will be invisible in the output. Thus in a digital time delay system the subjective quality of the recovered audio signal can be exactly the same at all delay settings—from one millisecond to thousands of milliseconds. The frequency response, noise, speed and distortion of a digitally processed signal are unaffected by the distortions of the storage medium, regardless of whether that medium is shift registers, RAMs, or magnetic tape. The quality of the recovered audio is entirely dependent on the performance of the analog-to-digital circuits which create a code to represent the audio and then regenerate the audio signal from the code. If a critical listener can discern any difference between the original audio signal and the re-created audio resulting from digital processing or playback, the fault lies not with the digital memory circuits or digital tape, but with the design of the A/D encoder and D/A decoder.

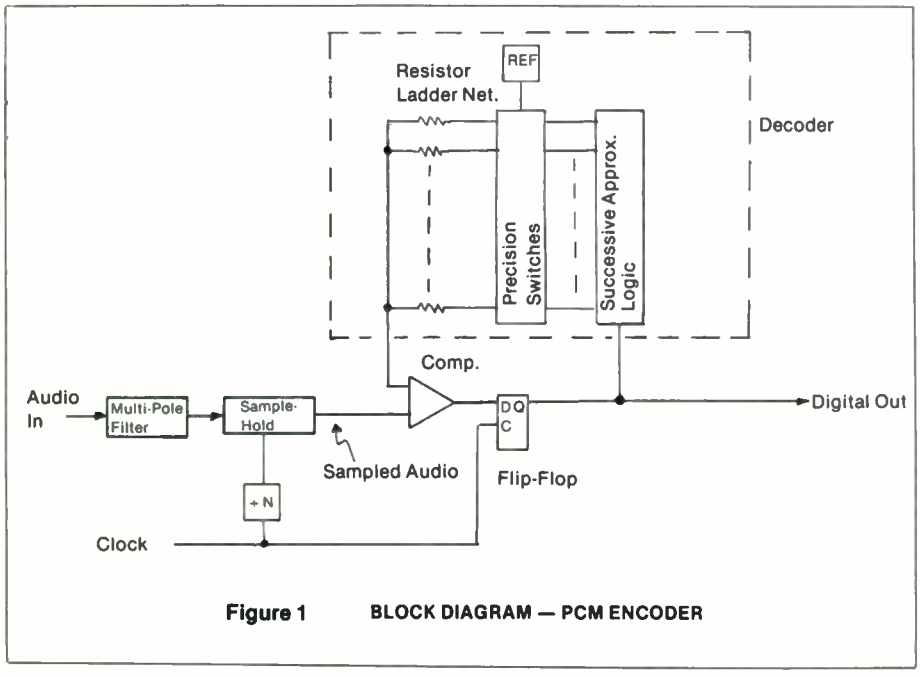


Figure 1 BLOCK DIAGRAM — PCM ENCODER

Most digital audio equipment employs an encoding technique of the PCM (pulse code modulation) type. A small number of other manufacturers employ a fundamentally different class of encoding called ADM (adaptive delta modulation).

PCM encoding is a two-step process. (See Figure 1.) The audio signal is first quantized in time and then is quantized in amplitude. The process begins with extremely sharp filtering, to eliminate any energy at frequencies above half the sampling frequency. Then the signal encounters a sample-and-hold circuit which samples the signal at regular intervals in time

OPPE

By Charlie Lawing

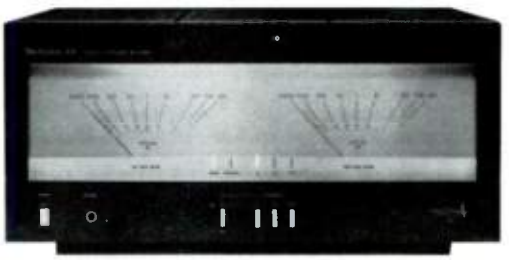
The new SM18 is described by the manufacturer as a "low profile" mic in what has to be a new level of understatement. In fact, the 3½" egg-shaped mic, covered in either white or dark brown foam, looks more like a party favor than a microphone! But because it is so small, the SM18 can be placed on a table or podium in front of the lecturer in such a way that the voice travels over the mic rather than directly into it. The result is that reflected sound waves reach the mic at about the same time that the direct waves do, which makes the spoken message more intelligible in the audience.

Another desirable feature of the SM18 is its resistance to wind noise, popping sounds, and mechanical vibrations.

The SM18 is priced well under a hundred dollars and thus should be well within the budget of even the most humble organizations.

CIRCLE 3 ON READER SERVICE CARD

New from Panasonic is the **Technics** Recording and Broadcast Division's Model SE-A3 stereo DC power amp. This new product is a class A amplifier which is "ingeniously designed" to eliminate switching and crossover distortion without being limited by a traditional class A design.



The SE-A3 has class A circuitry and a power rating of 200 watts per channel into an 8-ohm load. THD is no greater than 0.002% from 20 Hz to 20 kHz, and the signal-to-noise ratio is maintained at 123 dB. This amp boasts both the distortion-free fidelity of class A amplifier design as well as the high power efficiency of class B amplifiers.

One of the outstanding results of the new class A circuitry in the SE-A3 is the elimination of the time delay that appears as crossover distortion. This is achieved via a "synchro bias" in the new circuitry. The SE-A3 also has independent left and right channel power transformers, a dual linear power transistor, and low-inductance power supply capacitors.

This amplifier can drive two sets of speaker systems with no problem. The amp even has an instant speaker switching device that makes comparative listening in a display situation a very easy thing to do. This could come in really handy in a sales presentation.

Other features include: peak meters, protection relay with automatic recovery, an indicator LED and a DC low-cut filter.

CIRCLE 4 ON READER SERVICE CARD

Probably one of the most difficult aspects of playing a stringed instruments is keeping the darn thing in tune all night long! It requires careful listening and careful adjustment, often in less-than-optimum locations and situations.

No small wonder, then, that guitarists have come to rely on electronic tuning devices more than on their ears.

The **Roland** TU-120 is one such electronic device that can make a frustrating task a lot easier and faster. The TU-120 can tune with an accuracy of ±1% in a matter of a minute or so. The unit has all twelve notes in the chromatic scale and a three-octave range so that any instrument can be tuned with it. Guitarists who plug into the unit can tune via an LED display on the front panel which indicates flatness or sharpness of each string; other players can tune horns and such by listening to the built-in tone generator of the TU-120. The instrument works off house current or 9-volt batteries, and easily packs into a guitar case.

If you are tired of trying to tune up with a jukebox blaring in the background, get a tuner. It's not a crutch, it just makes life a lot easier.

CIRCLE 5 ON READER SERVICE CARD

Here we have your basic high-dollar cassette deck that will do everything but poach an egg. The **Eumig** FL-1000 not only handles three types of tape, including the new metal-particle tape, but has a variety of microprocessor-assisted features.

The opto-electronic capstan control and transport, which operates without a flywheel, continuously corrects speed accuracy at a rate of 15,000 times per second! Needless to say, the wow and flutter is extremely low (0.035% WRMS). Microprocessor control allows fast access to any point in the tape, with logic control and a four-digit tape counter.

A microprocessor-coupled test progam allows complete control and calibration for optimum bias and Dolby noise reduction for all three types of tape. A 14-segment per channel fluorescent level display enables the user to monitor VU/peak reading or peak/hold characteristics.

In addition, the FL-1000 has two mixable inputs with reverb, master fader and Dolby noise reduction. Naturally, a cassette deck of this caliber has excellent frequency response and signal-to-noise ratios, but unlike most decks, Eumig's test generators produce frequencies of 400 Hz and 16 kHz. Audiophiles the world over are sure to be elated with this sophisticated new product.

CIRCLE 6 ON READER SERVICE CARD

Okay, here we have four kinds of Funk, four kinds of Disco, Reggae, Rock and other exotic rhythms in one neat little package from **Electro-Harmonix**. The new DRM-16 Digital Rhythm Matrix is at first glance just another effects gizmo that Joey Guitar fumbles with between songs, but wait!—this thing's got rhythm, and plenty of it.

The DRM-16 is a rhythm unit, but it doesn't look like one and it sure doesn't have all that corny stuff like "samba" and "beguine" and "bossa nova." This thing has the Rock and the heavy Get Down, complete with any combination of bass drum, tom toms, snare, ride cymbal, hi-hat, wood block and hand clapping.

There are a total of 16 basic sounds to choose from, including a good country beat and a shuffle as well as all the other "hip" stuff. In each instance, any sound can be altered by filtering out a few of the drums, cymbals or claps.

The DRM-16 has Emphasis, Volume and Tempo controls, naturally enough, but it also has a separate output for the bass drum and tom toms, which means that the user can get a really solid bottom end sound from this unit and still have the freedom to play around with the cymbals and other treble sounds without losing the all-important beat.

This is a good rhythm unit for a couple of reasons: It is ruggedly built and very compact, for one thing, and the DRM-16 has all the "now" sounds of Young America (that is to say, it's all in 4/4 time and heavy on the bass drum!). Seriously, this is the kind of thing that musicians sometimes avoid, because they feel it is too mechanical, but the truth is, everybody who plays an instrument would benefit from owning a rhythm unit like this because it makes a player conscious of *timing*. If for no other reason than for practicing, the DRM-16 is a good investment.

CIRCLE 7 ON READER SERVICE CARD

KEF has something available for the ambitious audio lover—a pair of speaker kits. These kits come complete with the drive units and crossovers already mounted and tested on the front baffles, thus leaving only the construction of recommended enclosures and installation of the baffles.

The 104aB kit contains a mid/bass drive unit, a tweeter, an Acoustic Butterworth filter section and an acoustic bass radiator. The radiator increases the bass response from this relatively small enclosure. The 104aB kit becomes a reflexed system with an impedance of 8 ohms and a maximum power handling capacity of 100 watts.

The Cantata kit has a bass unit, a midrange unit, a tweeter and a Butterworth filter section. This kit makes up into a closed box loudspeaker with an impedance of 8 ohms and a power rating of 150 watts.

Both kits include fuse units that protect the speakers, and contour controls that allow adjustment of the acoustic output to match the listening area.

CIRCLE 8 ON READER SERVICE CARD

The **Ruslang Corporation** has a new tabletop transport console now available, the RL 300. This housing unit will accept any 19" by 15¾" tape transport. The instrumentation overbridge on the RL 300 is 19" wide, and the unit will accommodate whatever height needed.

The top of the RL 300 sits at a 12 degree angle, which makes operation easier for the engineer. The console will tilt up for easy servicing of the electronics. Maintenance is easy without having to remove the tape transport or go in through the rear panel of the console.

Although the RL 300 is marketed as part of a package that includes the RL 350 rack base, the unit is available as a separate item. The RL 350 will accept Scully, Ampex, MCI, Otari and many other high quality tape transports.

CIRCLE 9 ON READER SERVICE CARD

By Jessie DeMedici

DEALER DOSSIER

Dimension Five Sound Studios, Womelsdorf, Pennsylvania

Tucked away in a tiny town far from the metropolitan hype that so often clings to the recording and sound reinforcement retailer is one of the largest pro sound sales organizations in the United States. From the outside it's a four story house that just happens to have a Bose mural covering one wall. But inside, from the dimly lit crushed velvet conference room to the upstairs computer confidently ticking off the names of Charlie's hard-won sales leads, it is a model of professionalism, determination and success.

We talked to Doug Wilkins and Charlie Moore, owners of Dimension Five Sound Studios, and to Richard Feld, sales manager for their branch office in Philadelphia. As it turned out, they had a lot on their minds. So here he is, folks, the Professional Audio Dealer, an authoritative and uncompromising Purveyor of Systems stuffed with glittering hardware and backed by impeccable service. And whatever else he is, he isn't cheap.

How did Dimension Five begin? When did you two get together?

Doug: We were both working for an international broadcast network in Monte Carlo in the early seventies. I was the Chief Engineer, designing recording studios, electronics for broadcast chains, and Charlie was the Financial Director. We hit it off, had a few interests in common, and decided to form a studio design company.

Why did you opt for the States instead of Europe?

Charlie: Because the state of the art in Europe in the early seventies was non-existent, non-existent in terms of equipment and hardware. But studio design itself was far advanced. We were sure that everyone here would beat a path to our door to learn all about the great design techniques we were using; acoustics that were properly thought out instead of carpet stuck all over the walls, which was the technique of the day. So we bought the building here in the wilds of Pennsylvania, built our studio, and ran it pretty successfully for two years.

How did you get into retailing?

Charlie: By accident. I was adamant that we would never do any retailing. Adamant. I was completely fed up with the music store situation that was here in the States, the discounting, etc., and at that time, 1974 or thereabouts, there was no pro audio to speak of.

Doug: I remember what happened. I went to this church in Pottstown and I heard a church sound system that sounded good for a change. For 1973 it

was really pretty good. So I called up Community Light & Sound, and I said, hey, sounds good. And they said, hey, you can be a dealer.

That was your first line?

Charlie: No. We had Revox and Beyer for studio applications. Actually retailing had become sort of necessary. People were coming in to the studio saying how can we do this and where can we get that and eventually we were spending too much time on that sort of thing without making any money at it. So we started aggressively hunting down lines. We started out doing mostly church systems and then we expanded into traditional entertainment systems and grew from that.

What made you a success? Often when a studio becomes a retailer or a retailer becomes a sound company it doesn't work. Yet you have moved across most of those barriers and made it work for you. How are you different?

Doug: I would say that most people that do this type of thing are either sales people with no technical background or technical people with no business background or whatever. We happen to have a solid combination of sales and business management background and the technical knowledge necessary to do it.

Charlie: Also we came at it from a different angle from most people. We weren't a music store that decided to become a professional sound dealer. We didn't go from low grade to high grade lines. We sought out the high grade lines right off the bat.

How do you pull customers to Womelsdorf? Does the location present any problems?

Charlie: The location is basically irrelevant. A pro sound retailer doesn't need major metro. It can work out of a hole in the wall. It works off of its name, the installations that it has done. You don't need anything fancy. Our local market for this office is a seventy-five mile radius of central Pennsylvania. This location has many benefits. Being a business in a small town, we have financial arrangements with our bank that are unique and envied. Here the banks are used to dealing every day with mortgages for a farm or a new barn or whatever. We came along and showed some potential for them and they worked with us. They are willing to sit down and hear anything from us. They may not be willing to do everything that we want them to do, but at least they are willing to listen. Some city banks won't even talk to you.

Are there any other advantages that this location gives you?

Charlie: Low overhead. The cost for the same facility in any metropolitan area would be maybe double the cost we face here, in taxes, overhead, and so forth. And crime here is just about non-existent.

Tell me about your operation. What do you have here?

Charlie: Well, on the first floor is the reception area, the conference room, and the sales office. Behind that is our showroom, which is basically a demo facility. We don't show anywhere near everything that we sell. We show representative systems from all of the manufacturers. But it's not like the traditional music store kind of thing. We don't sell any instrument amplifiers, so that kind of plug-in doesn't happen. We have bands in on an appointment basis to use the PA's for an evening, or bring in their PA and compare it to whatever we're suggesting, which is why it is more of a demo facility than a sales floor.

Doug: Our floor trade is very good. I would say amazingly good. We have about ten to twenty buyng customers come in a week, which is not bad when you consider that there is no sign outside, no windows, and the front door is locked. When you arrive here you have to state your case over the intercom, who you are and why you should be allowed to come into the building. Then when you do get in you sit in a waiting room that might belong to a psychoanalyst; there's no appearance of a sound company.

Charlie: On the third floor is our service area. We're factory service re-coning for JBL, Altec, Gauss and E-V. We do about 400 re-cones a month. Then we service not only our individual end-

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buyers throughout Pennsylvania, but we also service music store accounts, professional touring companies, and we do all of the wiring and back-up for our own installations. On the second floor along with the offices is the studio, which isn't operational right now. . . it's in the process of being revamped. When we originally opened it, it was an 8-track, and it was pretty good, but as we got more and more into sales and doing more engineered systems, we had less and less time for the studio. Also, we had purchased a touring sound company. So the studio was sort of phased out. We just had too many irons in the fire. It sat there for almost a year and then we sold most of the equipment in it and used that money to enlarge and expand the touring company.

Why are you re-activating it? What will it be like?

Doug: Well, most of the basic expense of a studio had been taken care of; the room, the isolation, it's all there. What we are going to create now will basically be a demo facility for Teac/Tascam. It will be a functional studio that makes money, but it will also be a functional showroom, not only for Teac/Tascam, but also for signal processing equipment, so that people will be able to listen to digital delays, equalizers and compressor/-limiters and noise reduction in a first class environment. It is really the best place to hear that sort of thing.

Why would a potential customer come to you as opposed to another retailer?

Charlie: Definitely not for the best price.

Then it must have something to do with service?

Doug: Not only service but engineering. Even with a small system for a show band—say a four to five thousand dollar system including mics, cables, ancillary hardware that doesn't need an excessive amount of power, a relatively compact, decent system of quality—even a system like that, there's a certain amount of serious thought that goes into the planning. If two bands come in, even though they seem about the same in what they do, we still sit down and work out an individual system, because what is good for one may not necessarily be good for the other one. We don't have a system on the floor with a sign that says, "This one's for you, kid." Each person gets an individual treatment. The only cost we have built into our

sale price is the fact that the people who sell it are on commission. So there is a fair bit of money paid to salesmen. And our sales people are not former used car dealers, they are people who are deeply familiar with the industry and the equipment.

Where do you find your salesmen?

Charlie: Not very often. There are just not that many qualified people. We've taken relatively unqualified people with a background in sales, thinking that perhaps we could train them, and that doesn't work, or at least it hasn't worked for us. That doesn't mean that you have to be an engineer to sell equipment, it just means that you must have had first hand knowledge of working with good equipment.

How do you break down your sales, percentage-wise, between the walk-in and the engineered systems?

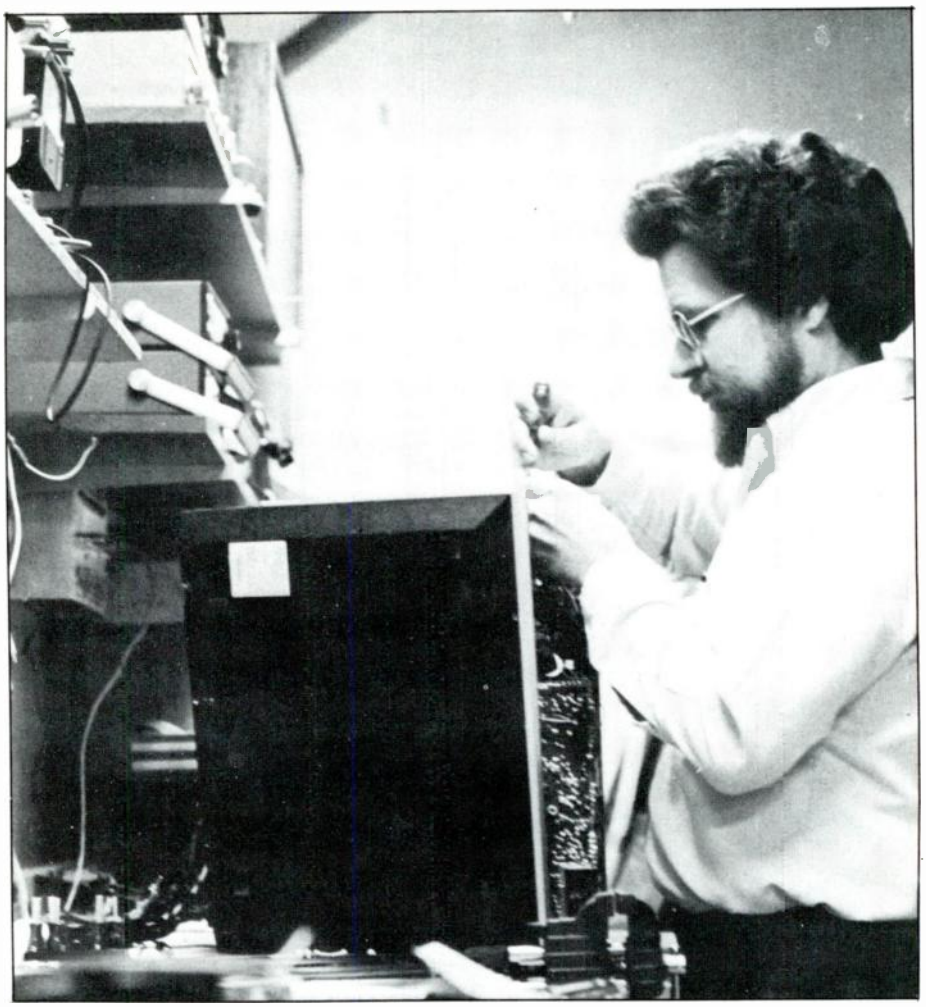
Charlie: In the beginning it was almost 90 percent professional audio systems for the end-user, be it rock and roll or what, where he bought the system and took it out and toured or whatever. About 10 percent were engineered systems. Now we've been selling since 1974, about five years, and it has gone uphill to the point where we haven't lost any of the volume of our end-user sales, but we now are doing about 45 percent engineered systems and 55 percent end-user sales.

How do you rate the desirability of installed vs. end-user sales?

Charlie: Depends. If your design is good and your working relationship with the client is good, engineered is very desirable. Our designs are good. But sometimes things will go sour in the middle because of contractor problems or if the architect fails to incorporate our drawings in his prints because he feels slighted, or whatever. Many times it takes as much time and effort to sell, design and get ready to deliver out the door a rock and roll system for $10,000 as it does to do the $50,000 engineered job, which obviously makes the engineered work a more desirable figure. It is steady, but you may not get paid completely for a year and a half. Rock and roll comes through the door and it is cash the day they buy it. So each has its place.

How did disco affect you?

Charlie: About a year ago it was hurting us. The only people who were successful at disco were the ones who specialized in it. Very few people were successful at being involved in live



music and disco at the same time. A lot of musician clients took very heavy offence to that because it was putting them out of work. I know of at least a dozen instances in this area alone where a bar owner went out and put down two grand at the local hi-fi or music store and became an instant disco. Result—bands out of work. So there were four or five months of bands not buying anything because they weren't getting any gigs. And we weren't getting any of the disco market because we don't have anything to offer in the $2,000 price range. So the first quarter of 1979 was pretty bleak.

You have your branch store in Philadelphia. Why did you open it?

Charlie: Our purpose there was to better cover the eastern part of the state. Our territory as defined by the manufacturers was the eastern half of Pennsylvania and we weren't getting very much out of Philadelphia. Philly is a unique city. It's sort of cut off from the rest of the state by the turnpike. The people there like to market in that area. In early 1976 a pro sound store had gone under and for nearly four or five months there was just no availability of our kind of product in Philadelphia. If a musician wanted something he ended up going up to New York or down to Washington. So we were getting a lot of encouragement from the manufacturers to open an outlet in Philly. In October of 1976 we did.

How did you go about finding your customers?

Richard: We did extensive advertising. For the first year or so we were on the air a lot. We picked one or two of the better FM rock stations and pitched our campaign at making the musicians aware of our existence. We also advertised in some of the "alternative" newspapers, but I doubt that we'd use them again. The radio spots did the trick, shotgunning the market, letting people know who we were and what sort of equipment we have. But the advertising that works best for us is word of mouth. When a customer walks in here he is pre-sold. He's heard about us and knows our reputation. He knows the kind of expertise we offer. He knows when he walks in here that the reason he is here is not price. It is support. And the support is extensive. I must get twenty-five phone calls a week with technical questions. And

some aren't our customers, but we take the time to answer their questions in hopes that we'll get them later and also to establish our credibility. We are not interested in matching anybody else's price. We are interested in full support. When the customer leaves here with his sound system the support is just beginning. That's when the questions really start, because some of them have never seen this kind of equipment before.

Are most of the sales out of Philadelphia to musicians?

Richard: Probably 65 percent of our sales are to the local musical groups, the rock and rollers, punks, touring gospel, the Christian act, anybody who is out there professionally. We pull from about a fifty mile radius. We prefer to work as close as we can, because the closer we are to our customer the better support we can give. If I get a call from a New York band that doesn't play this area I usually recommend him to a New York dealer, and by the same token I'll get referrals from him.

Do you finance your customers?

Charlie: Not internally. We write paper through FinanceAmerica, but we don't have an in-house financing system. It is unique because we can do it through our offices. We get clearances, all the information and paperwork through here, and we can deliver the goods based on their authorization. And that's good, because Finance America is a lot cheaper than the banks right now.

How are your relationships with manufacturers? Are they receptive to your ideas or complaints? Do they act on them?

Charlie: Some are. But the average manufacturer leans towards being mediocre. And with independent reps they lean towards being non-responsive. Manufacturer's reps in reality are not working for the manufacturer, yet they are; they are not working for themselves, yet they are; but they *are* working for the dealer because dealers indirectly pay them. If the dealer doesn't produce, the rep doesn't get paid. It doesn't necessarily matter where that check comes from, it is the dealer who made it possible. However, a lot of reps don't understand that. Their approach to the dealer comes in basically three ways. The rep can approach the dealer with a billy club, and say, "Hi, I'm your local cop from the factory, your figures are low, buy more, and if you don't I'll find someone else who will." The second approach is, "Hi, I'm a nice guy." What he's saying is if you sell a lot he's going to be rich and happy and if you don't he is not going to be happy. That's the guy who is working for himself. And then there is the third guy, the rare and wonderful individual who comes in here and is genuinely working for us.

Doug: He wants to know what he can do. Can he get leads? Can he help us get the product, explain the product, sell the product? Can he get the factory to give us more aid? And *he* is the guy who is really trying to help the dealer *and* in turn helps the manufacturer and himself. The rep who comes out to our location, educates us and our salesmen about the product, may not make immediate sales happen overnight, but he makes the salesman more comfortable with the product, so that the next time he's facing a customer he feels that he's got a few cards up his sleeve.

What kind of advertising can a manufacturer do that is most helpful to you? How should he present his product?

Charlie: How? Make it sellable. The product must be represented as something that is desirable to purchase. It has to be more than a list of technical specifications—even for engineers. The reason that certain turntables sell more than others, even though they both have very good specs, is that one manufacturer will spend his whole ad talking about wow and flutter, while the other says very little about specs, talks a little about price, shows you a beautiful picture, says many neat things that aren't necessarily technical, and walks away with the market in three years.

Doug: There are such things as cosmetics. You ask, what difference do cosmetics make to an engineer? None, *if you ask him.* But down inside he likes the pretty product with the LEDs. He will tell you that it doesn't make any difference, but when it comes down to writing a request, he'll buy the pretty one.

Charlie: Manufacturers should pay more attention to what the dealer has to say in many phases of advertising, product planning, etc. You know what he should have? Every manufacturer should have in the factory a pedestal with a dealer on it. And every morning they should all come out of their offices and bow and scrape. Just a little bowing and scraping. . .to the dealer. . .from whence cometh all light.

Doug: It is standard operating procedure in the MI business to do exactly that. Witness the trips to Bermuda, Hawaii. . .We're not asking for trips, but what we are saying is that those people, the people in the MI business *understand.* They are making their dealers feel like a million bucks, *and it is worth it.*

Charlie: They should ask the dealers about new products. Unfortunately they come to you at a dealer's forum, and say, "Hey, look at this, it's the greatest thing since sliced toast." And we say, "Ugh, what is it? We don't like it." And the manufacturer says, "Well, you're going to sell it because I have five million of those whatevers in stock."

Well, does everybody introduce a product that way? Who do you know who will ask you about a product before *it's ready to go?*

Doug: Well, there's one company that we no longer represent that does. Yamaha. They probably did a better job of inquiring into potential marketability, cosmetics, sales, than any manufacturer we know of.

What about advertising?

Charlie: Bose is absolutely the best as far as getting a hitter ad in a magazine and getting a return on your dollar by getting leads to you. Uni-Sync was just as good. They qualified every lead for us. But most companies do nothing or next to nothing.

Do you belong to any trade organizations?

Doug: AES is of course basically educational. We attend the conventions, the exhibits and seminars, read the Journal.

How about an organization for professional dealers, or perhaps the manufacturers and professional dealers?

Doug: We would like to see a dealer organization. I don't know if the manufacturer's interests and dealer interests lie in the same place. They do, of course, but they don't realize it. But a dealer organization, an informal one, would be good. It would be difficult, because the pros in this industry are probably the most independent bunch of people there are. We once tried to get six of us to sit down at a dinner table together, and they couldn't do it, or thought they couldn't. Three of them ended up going someplace else. But the time will come when it will probably be necessary. This is a small industry; we should probably work together more than we do.

INDUSTRY UPDATE

Lindsay E. Freese has been appointed National Sales Manager for MXR's Professional Products and Musical Products Groups. Freese was most recently Western Sale Representative at MXR. Previously, he worked on the film "The Rose," owned a concert production company, managed a retail music store, and has performed professionally throughout the U.S. and Japan.

Tom Sharples has been named Special Project Engineer at Otari Corporation. For his first project, he will be in charge of the MTR-90 multitrack support program. Sharples has, for the past three years, managed Proper Sound, is a former partner in Bear West Studios, and is currently an owner of a 16-track studio.

Intersound, Inc. and E & E Instruments International have completed an agreement for the foreign distribution of Intersound's line of professional sound products. E & E will have exclusive distribution rights for all countries except the U.S., Japan, Canada and Australia.

NAMM has added a second Retail Operations Institute to its calendar. The first of the 1980 Retail Operations Institutes will be held March 16-19 in Atlanta. The second, scheduled for April 13-16, will be in Phoenix. Registration at each Institute is limited to 75 people.

George H. Miller and **Loyd L. Ivey** have acquired Matrecs, Inc. from GC Electronics. A manufacturer of home, auto, commercial sound and OEM speakers, and a marketer of audio accessories and car stereo amplifiers, Matrecs reports annual sales of about $2.5 million.

Milo Kosich has been named Field Sales Training Manager at Electro-Voice. Kosich was previously a factory representative for the Koss Corporation, has a background in film production and is a practicing musician and sound engineer.

Alan R. Pearlman Chairman of the Board of ARP Instruments, will resume the office of President of the company effective April 1, 1980. **David Friend**, who has been serving as President, will become the Vice Chairman of the Board of Directors.

Sonic Systems, Inc. has sold 75 of their Soundsphere speakers to Future Sound, Inc., the official consultant and supplier of sound reinforcement systems to the 1980 Lake Placid Winter Olympics. The Soundsphere models are to be used for sound reinforcement at exterior and interior locations at the Olympics.

dbx, Inc. has added three regional managers to its marketing team in the Consumer Products Division. **Robert Hatcher** has been appointed Eastern Regional Manager. He was previously with the Bose Corporation. **Scott Berdell** is Central Regional Manager. He was previously the head of his own sales rep firm, and was with Sound Advice before that. **Scott E. Sylvester** has been named Western Regional Manager. He was with Wright's World of Sound.

Audio Consultants, Inc. of Nashville has appointed **H. Graeme Goodall** Vice President. He was previously sales manager of the company.

Charles Burke has been appointed Manager of Exhibits and Public Relations for Bose Corporation. Burke has been with Bose since 1976.

New staff appointments have been made at Audio Magnetics Corp. **John Jackson** has been named Manager of Consumer and Professional Products. He was previously with Maxell-Hitachi and BASF. **Phil Kuss** has been named Corporate Materials Control Manager. **Charles Trausch** has been named National Sales Manager. He was formerly with Audio Devices and Capitol Magneticss. **Paul Talley** has been named Vice President of Research and Product Development.

Brian F. O'Donohue has been promoted to Vice President/Finance and Administration for KLH Research and Development. O'Donohue joined KLH two years ago from Ventron Corp.

Osawa has appointed several new representatives for its audio line: J.H. Lawrence Company, Newtonville MA; B&H Sales Co., Fayetteville NY; Jerry Roth Sales Co, Marlboro NJ; Afco Electronic Sales, Garland TX; Associated Reps Ltd. Philadelphia PA; and DB Sales, Akron OH.

RMS Sales, Inc. was the recipient of a 1979 Mercedes Benz as first place winner in the Optonica High Fidelity Products sales incentive quota contest. Second place winner was Marketing Connection; third place went to Moulthrop Sales.

Reich and Bernstein, Inc., metro New York electronic representatives, have formed a wholly-owned subsidiary servicing the upstate New York region. The new company, Empire State Electronics Sales, managed by **Kent Springer**, now represents Sansui, Unitronics, Ultralinear and Keith Monks.

The "PA Bible," a guide to PA speaker systems, has been brought out by Electro-Voice. According to the company, "the guide is written with the musician in mind, but is very useful to the dealer who sells contract sound installations to discos and other related music environments."

Rick Lozano has joined Avid Corporation as Regional Manager for audio products, responsible for sales in the southeast and southwest. Lozano was previously with Avid's representative, Roger Nader Sales.

Tandberg of America has appointed two new sales representatives: Harry Rosenblum Company for metro New York; and Creative Marketing Associates for Florida.

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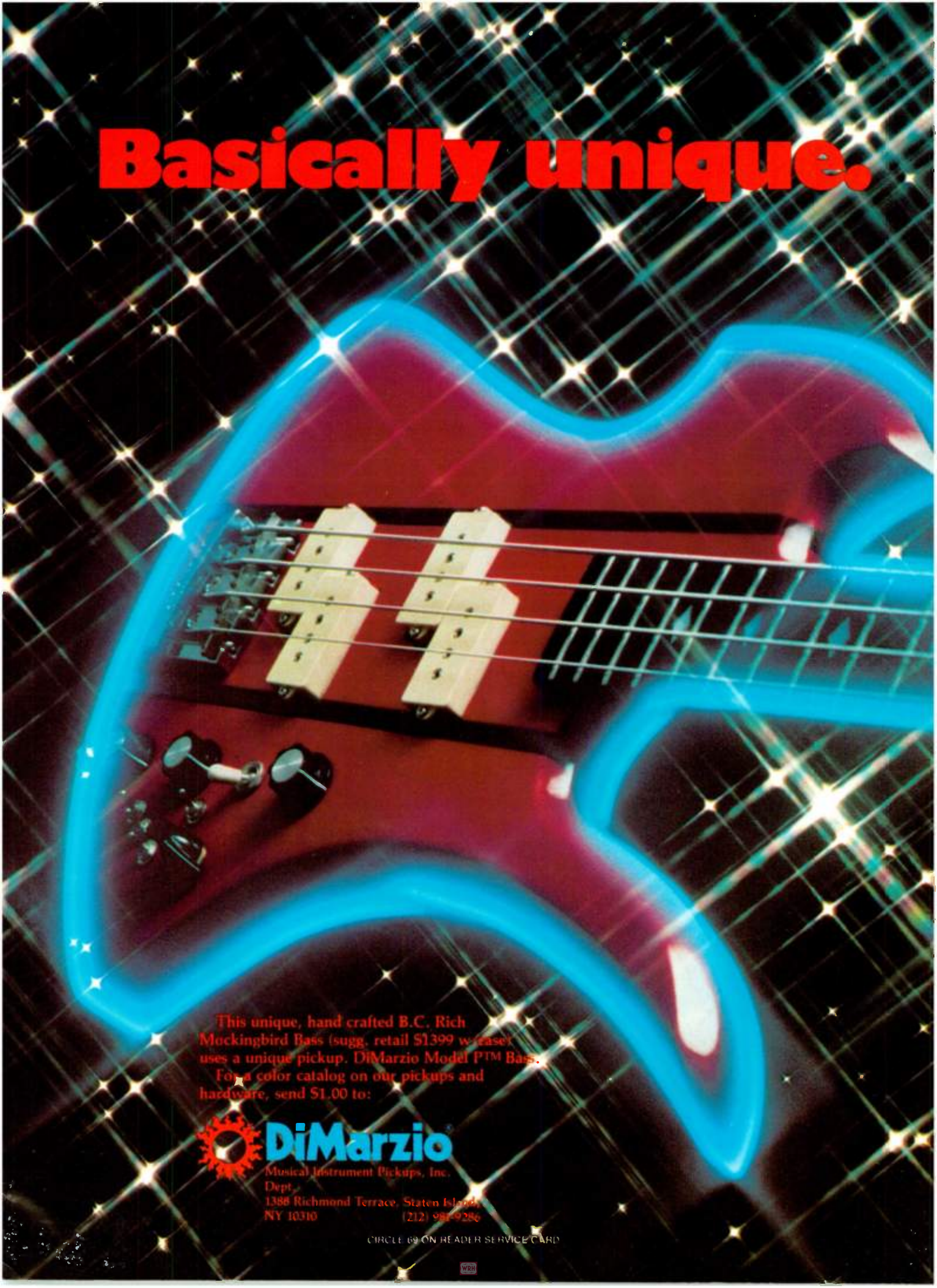
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