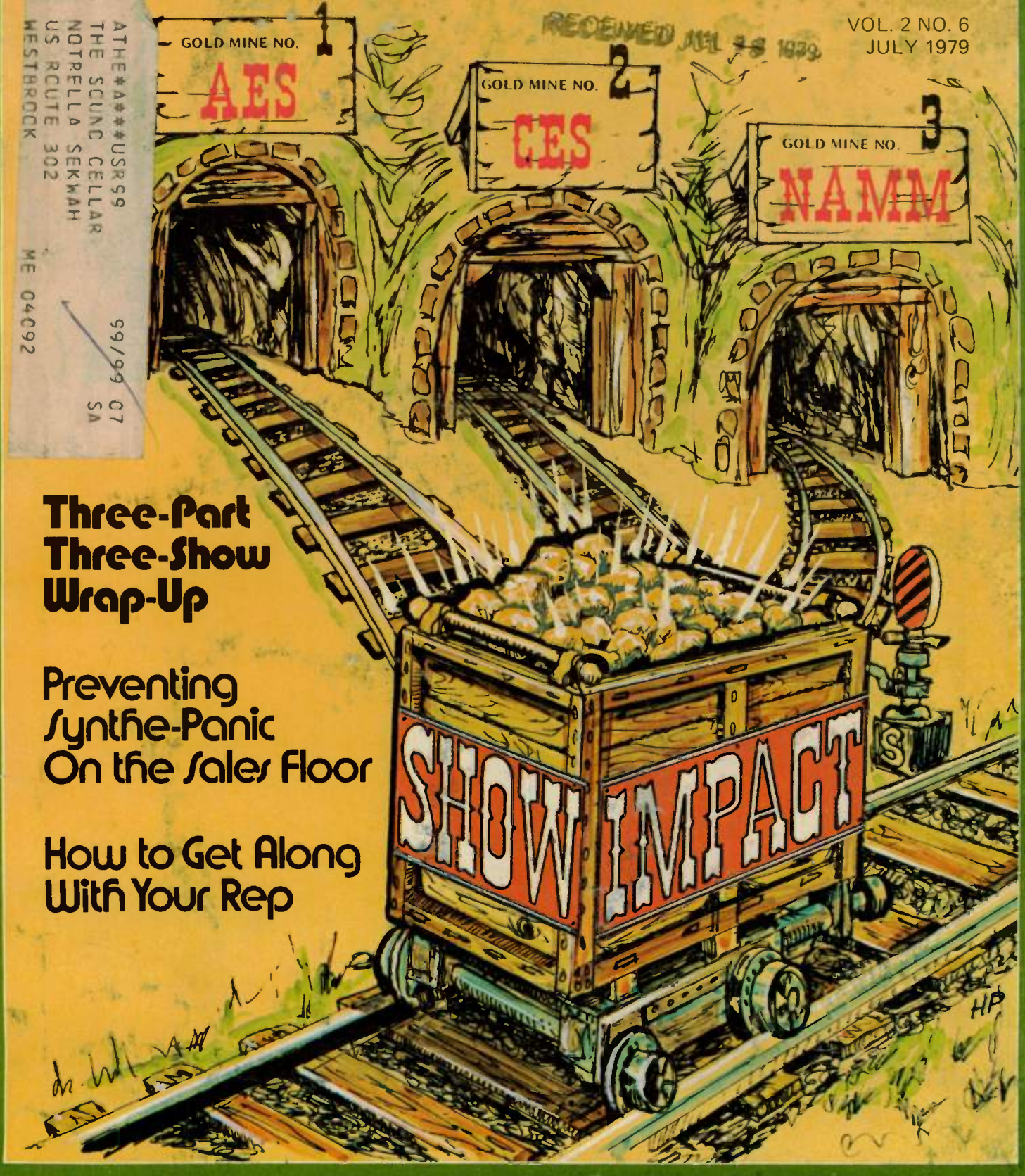
SERVING THE CREATIVE AUDIO AND MUSIC ELECTRONICS INDUSTRY

SOUND ARTS

MERCHANDISING JOURNAL

VOL. 2 NO. 6
JULY 1979

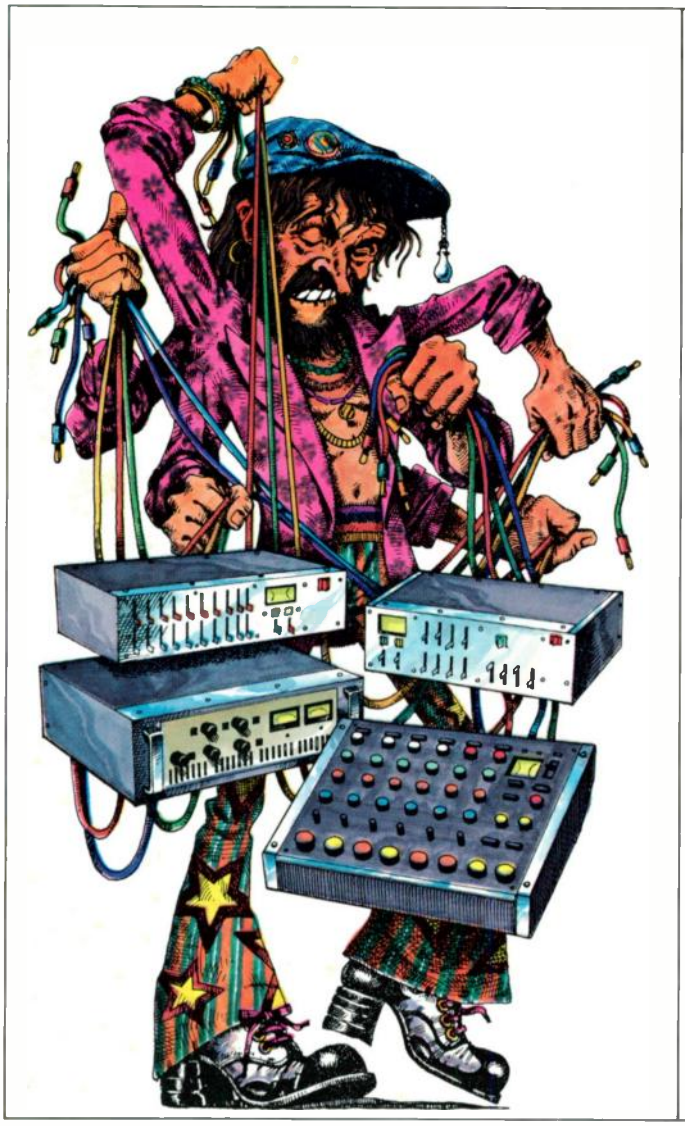


Three-Part Three-Show Wrap-Up

Preventing Synthe-Panic On the Sales Floor

How to Get Along With Your Rep

THE LONG AND THE SHORT OF SOUND REINFORCEMENT.



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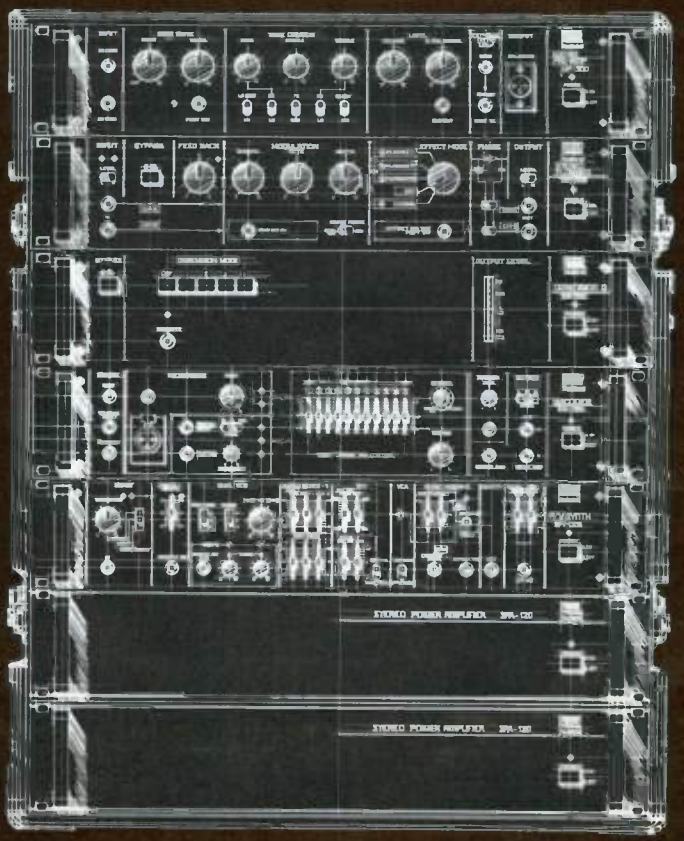

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VOL. 2 NO. 6

SERVING THE CREATIVE AUDIO AND MUSIC ELECTRONICS INDUSTRY

SOUND ARTS

MERCHANDISING JOURNAL

JULY 1979

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COMING NEXT ISSUE!

PA Sales
Impedance Ratings in Speakers
More Worst Sound Problems

Cover art by Bill Travis

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SOUND ARTS
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A LETTER FROM THE EDITOR

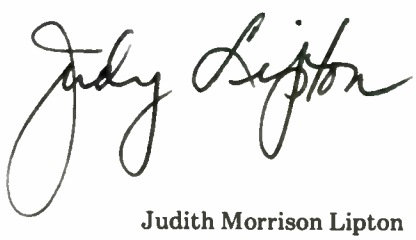
I lied last month. I promised a trade show wrap-up for our August issue. However, we later decided to push the info up into July for a more timely presentation. We braved tirades from our typesetter, our production staff wanly agreed, and we are presenting here "Showimpact," a three-part review of all three recent trade extravaganzas—the AES Convention, the Summer Consumer Electronics Show, and the NAMM International Music and Sound Expo. In our cross-over market, it seemed fitting that we present the articles together for cross-over reference. I think the extra pressure was worth it.

High technology can lead to high anxiety. When artistic sensibility meets that technology, the anxiety can produce malfunction or at least a loss of artistic potential. Michael Skinner writes in this issue on how to prevent "Synthe-Panic" or the fear of flying with the high tech instrument.

My comments in our February issue quoting some dealers' negative comments on the competence of manufacturers representatives evoked much response, as expected. To those who have threatened to lynch me, let me reiterate: Those comments were not *mine*; they were unsolicited remarks made by retailers. Having been in this business for awhile, I was not surprised at the comments themselves, but at their vehemence and frequency. At any rate, I hoped by printing them to provoke some intelligent rejoinder. As an exhibit, Tony Vespoli writes in this issue on "How to Get Along with Your Rep."

As I am writing this, we are all recuperating from show-time, as we do every six months. This particular show-time, however, produced an unexpected mood alteration with the crash of the infamous flight 191 outside O'Hare just one week before the summer CES in Chicago. The combination of its being a domestic flight on a frequently traveled business route flying a group of people to a convention would have been enough to cast a pall over our business flights into Chicago. But unfortunately that pall was intensified, since Tom Koneski was, tragically, on that downed DC-10. Tom was the Vice President of the Musical Instrument Division of Anvil Cases, and had spent 11 years with Yamaha. He was a musician and a respected marketing executive. I am told that another industry executive has on his desk a confirmed ticket for that flight that was never used. Regrettably, Tom used his. All we can do now is offer condolences to the folks at Anvil and to Tom's family.

Regards,



Judith Morrison Lipton

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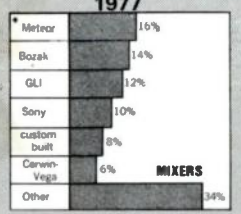
* Reprinted from Billboard Source Books: 1977, 1978, 1979.

1977



1978

* Meteor	20%	
Bozak	15%	
Cerwin-Vega	13%	
GLI	12%	
Showco	6%	
Sony	6%	MIXERS
Others	28%	

*Honorable Mention: Disco Scene, Erath, Peavey, Russco, Sparta, Teac, Yamaha

1979

* **Meteor (Clubman):**	**25.9%**
GLI:	**14.1%**
Bozak:	**10.6%**
Showco:	**6.1%**
Numark:	**5.5%**
Cerwin Vega:	**5.5%**
Others:	**32.3%**

Honorable Mention: Teac/Tascam, Sound Workshop

Clubman one-one

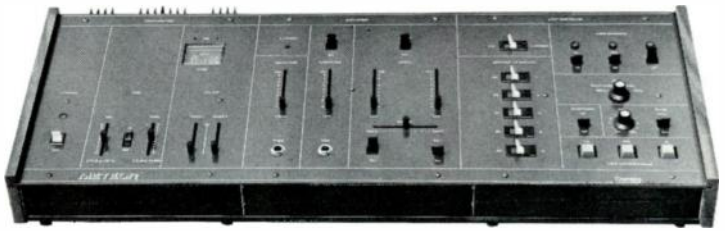
Clubman one-one-m

Clubman two-two

Clubman three

Clubman four

Clubman Duo



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CIRCLE 58 ON READER SERVICE CARD

FORUM

We at the New Hat Studio love your magazine! We've only seen three issues, and already have put them all to use. Your industry glossary (Terms) comes in very handy when explaining technical questions to both veterans and first-time buyers of studio time. And hats off to Troubleshooter's Bulletin. We would also like to acquire back issues, as our subscription began with April 1979.

Michael Morgan
The New Hat Studio
Prescott, AZ

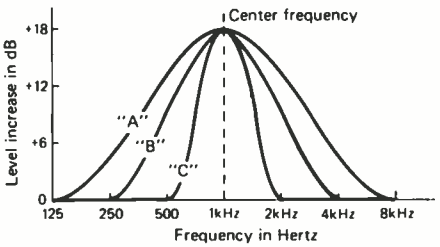
I have been reading your publication regularly and find it to be quite informative. However, I would like to clear up a few points Mr. Blakely made in the "Recording" column of the Terms page in the March 1979 issue.

First, Mr. Blakely's "indicated frequency" should in no way be confused with the equalizer's cutoff frequency, i.e. the −3 dB or half power points.

Second, and most important, the Q, or quality factor, of a filter is not "the rate in dB/Octave at which an equalizer increases or decreases its level." Q is a unitless quantity sometimes referred to as the "selectivity" of an equalizer's bandpass or bandreject filter, and is a direct relationship between the filter's center frequency and its bandwidth.

Now, I know this is a non-technical publication, but to get the correct idea of an important quantity such as Q, it helps to use numbers and formulas.

Q is the center frequency on a filter divided by the bandwidth: Q=center frequency (Hz)/bandwidth (Hz). The bandwidth being the difference, in hertz, between the two frequencies on either side of the center frequency at which the filter output is −3 dB the center frequency's level. As can be seen, when the bandwidth increases the Q decreases and vice versa. To get a better understanding, let's refer back to Mr. Blakely's diagram entitled "Peaking Type Equalizer." Now everybody take out your electronic calculator, straight edge and "fudge factor," when used with the diagram we can calculate Q for each of the three curves. Using the straight edge, draw a horizontal line at the +15 dB level, 18 dB−3 dB (half power points)=+15 dB, crossing all the curves. If we drop a line from where the horizontal line and the EQ curves intersect, we get the frequencies of the cutoff or half power points.



PEAKING TYPE EQUALIZER

With this information we can just drop it into our Q formula and find the Q of the curves. For example, curve A has cutoff frequencies of, and this is where we need a good eye and the "fudge factor," 505 Hz and 1990 Hz, the difference between the two being 1485 Hz, which is the bandwidth in the formula. We put 1000 Hz, the center frequency, over 1455 Hz and, letting the calculator do its thing, we get a Q of .673. Doing likewise for curve C we get a smaller bandwidth, 840 Hz, and a larger Q of 1.19.

If anyone has any more problems with Q, I would advise Mr. Ronald Tocci's book "Electrical Circuit Analysis," Chapters 21 and 22.

It is quite difficult to talk about the way electronic devices work without getting into electronics and that nasty mathematics, but your publication is trying hard and doing a good job at it.

Jonathan P. Kendall
Chief Electronic Technician
Eastern Audio Associates
Columbia, MD

Larry Blakely responds: *Some of the definitions of the Recording Terms column may not be strictly accurate from a deep technical basis. However, they do indicate the standard vocabulary utilized in the recording industry. The scope of this column is not for electronic design engineers. Definition of terms has, as you know, been a stumbling block in the recording industry because we are dealing with very technical subject matter. Moreover, the users of this equipment are often not design engineers, but artistic types without a working electronic technical background.*

In the column in question, I wrote: " 'Q': often referred to as the rate in dB per octave at which an equalizer increases or decreases its level. This is also referred to as the 'rate' or 'slope' of an equalizer." Mr. Kendall is correct in his technical definition of "Q." However, it was not my purpose to define "Q" in those terms. It was only my purpose to state that in the recording industry *"Q" refers to the rate in dB per octave that an equalizer increases or decreases its level.*

I just thought I would take the opportunity to express my very sincere appreciation for an outstanding article in your magazine [Dealer Dossier, March 1979].

I would be interested to know if you provide any type of reprints so that we may use them internally. If you do and if there is any charge for them, please advise me so.

Thank you again for an extremely fine article.

Yours truly,
Tom Poulos
Sales Manager
Grice Electronics
Pensacola, FL

Reprint permission may be obtained in selected cases by written request to the publisher.

The issue of SOUND ARTS that I just received looks like more of what we've come to expect from you. Keep up the good work. How about some back issues?

Gordon Neault
Custom Stereo Systems Ltd.
Saskatoon, Saskatchewan

TEAR HERE

TERMS:

A CONTINUING INDUSTRY GLOSSARY

RECORDING

By Larry Blakely

Reverberation Spring: Yet another reverberation device used to simulate a reverberant room by means of electronically exciting a metal spring.

Reverberation: Multiple, blended sound images caused by reflections from walls, floor and ceiling. Reverberation can also be created artificially by electronic and electromechanical means.

Echo: One or more discretely and yet discernable delayed sound images.

Schematic Diagram: The electronic blueprint of an electronic device or system. Electronic symbols are used to illustrate all of the electronic parts. Lines are used to indicate the electrical connection between all of the electronic component parts. Typically, schematic drawings show all specific electrical and/or signal connections as well as grounding information. Schematics are usually very detailed.

Block Diagram: A schematic-like drawing of an electronic device or system. Such drawings use basic electronic symbols to identify the major parts of the electronic device or system. Typically, the main circuits are shown in block type symbols. Block diagrams are used to indicate the signal flow and do not usually show specific details.

Amplification: The increase in a signal level. Often referred to as an increase in amplitude or magnitude.

Amplifier: An electronic device that will increase a signal level (amplitude or magnitude) by an increase of either voltage or current.

Amplifier, Balanced: An amplifier with high (+) and low (−) signal connections and a separate ground (shield) connection. This balanced (3-wire) signal connection approach can be accomplished by means of a transformer or special electronic circuits. Amplifiers may have a balanced input, a balanced output, or both.

Amplifier, Unbalanced: An amplifier with a high (+) and combined low (−) and ground (⏚) connections. Here the low (−) side of the signal and the

ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES

By Wayne Howe

The sixth harmonic is the note G_3 at two octaves and a fifth above the fundamental. Notice that all of the overtones up to this point have been part of the C major chord. Hence, the first six overtones sound harmonious to the fundamental note. However, the seventh harmonic is between the notes B_3 and $B^{\flat}_3$ which is not in the C chord and not even in the C scale. Above the sixth harmonic, some overtones are in the fundamental major chord and sound consonant; some overtones are in the fundamental major or minor scale and sound somewhat consonant; and some overtones are not in the scale or chord and sound dissonant.

Even Harmonics: The harmonics (f_2, f_4, f_6, . . .) of even-order which constitute the major triad through the twelfth harmonic. Consequently, when many even-harmonics are present, the fundamental continues to sound harmonious.

Odd Harmonics: The harmonics (f_3, f_5, f_7, . . .) of odd-order which contain the major triad up through the fifth harmonic. Above the fifth harmonic the overtones are not in the major triad of the fundamental and create a dissonant sound when present.

Distortion: The result of nonlinearity in a signal processing device whereby the output waveform is altered from the input waveform. This alteration results in the addition of harmonics not originally present in the waveform.

Clipping Distortion: A type of distortion where the amplifying device is overloaded. This overloading results in the tops of the waveforms being "clipped" off. Also called overload distortion.

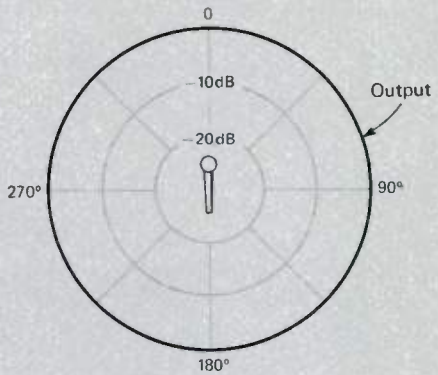
Vacuum Tube Overload Distortion: Vacuum tubes tend to generate even-ordered harmonic distortion when overloaded, resulting in a pleasing sound.

Transistor Clipping Distortion: Transistors tend to generate more odd-ordered harmonics when overloaded.

SOUND REINFORCEMENT

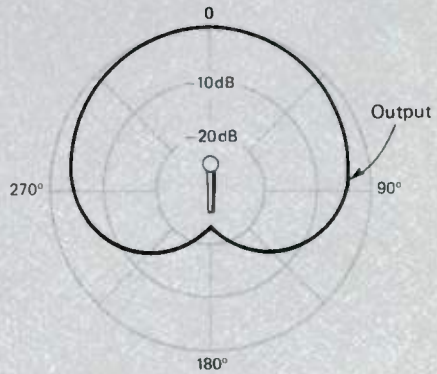
By Glen E. Meyer

The pickup pattern of an omnidirectional microphone is shown in the illustration below.



Omnidirectional polar pattern

Unidirectional Pickup Pattern: The most common unidirectional microphone is called a cardioid, with a heart-shaped polar pattern (hence, the term "cardioid"). Side pickup is moderately reduced in a cardioid microphone and dramatically reduced at its rear. An apple might be a good three-dimensional model of the cardioid pattern, with the stem representing the microphone. The polar pattern of a cardioid microphone is shown below.



Cardioid polar pattern

Finding the Polar Response of a Microphone: The polar response curve of a microphone is done either in an anechoic sound chamber or outdoors under free field conditions. The microphone (A on the block diagram below) to be tested is mounted on a revolving floor stand (B) which is electrically interfaced to move in step with the

TERMS (CONTINUED)

A CONTINUING INDUSTRY GLOSSARY

RECORDING | ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES | SOUND REINFORCEMENT

ground (shield) occupy the same wire. This unbalanced (2-wire) signal connection is very common.

Amplifier, Isolation: An amplifier that is connected between two electrical circuits to prevent an interaction between the two electrical circuits.

Amplifier, Buffer: Another term used to identify an isolation amplifier.

Amplifier, Line: An amplifier whose output feeds an audio system or long cable run, usually at a specified level (typically between −10 and +4 dBm).

Preamplifier: An amplifier that is used to increase very low signal levels. In audio such a preamplifier is used to increase a microphone signal (very low level) to a line level signal. The term microphone preamplifier is very commonly used.

Amplifier, Power: An amplifier that is designed and built to drive loudspeakers. Such an amplifier has a much higher output capability than a preamplifier or line amplifier.

Amplifier, Monitor: A power amplifier that is used primarily to drive loudspeakers utilized for the audible evaluation of a program or signal.

Attenuator: A device that reduces the voltage or power level of a signal. An attenuator may be a variable resistor, a voltage controlled amplifier, etc.

Audio Frequency Oscillator: An electronic device used for producing audio frequency tones or signals. These are usually in the form of pure tones (sine waves), but can also be in the form of square waves, triangle waves, sawtooth waves, etc. The most common type of audio oscillator that is utilized for testing and alignment purposes of audio equipment produces only sine waves. However, other very popular types will produce either sine waves or square waves.

Audio Frequency: Refers to any frequency that is within the range of human hearing. This range of normally audible sounds is from 20 Hz to 20,000 Hz. Hertz (Hz) is a term that is used to indicate cycles per second.

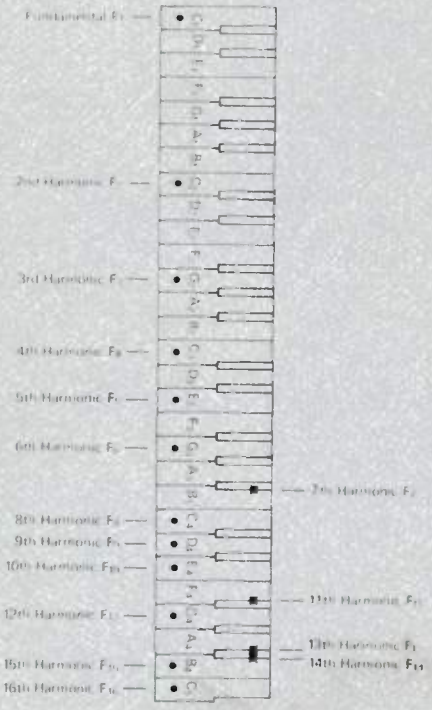
This results in a harsher, less pleasing sound.

FET Overload Distortion: An FET is a transistor that overloads similarly to a vacuum tube. This results in a more pleasing even-ordered harmonic distortion.

Fuzz Box: An electronic device that uses overload distortion to generate harmonics of the input musical waveform.

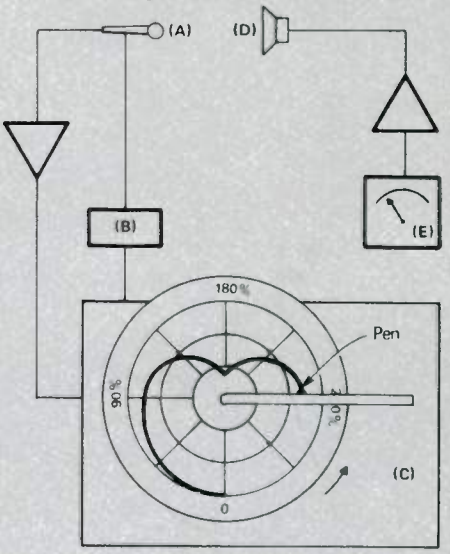
We have discussed harmonics (overtones) and how they would be perceived mathematically by the engineer as well as how they would affect the quality, timbre, or tone of the note played. Now let's look at the same overtone series from the standpoint of the musician.

Harmonic Series: If we look at the overtone series on a piano keyboard, we can see what the harmonics look like (figure 1).



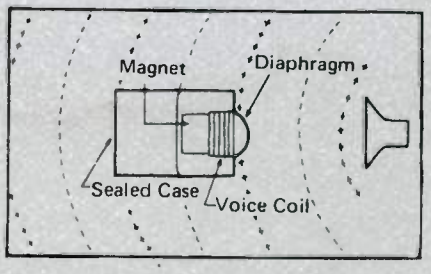
We will continue this discussion of harmonic overtones in next month's column.

chart recorder (C). At a given distance away from the microphone is a speaker source (D) fed by an audio oscillator (E) through an amplifier set at a high enough level to overcome any background noise. With the chart recorder and the microphone turntable set at 0°, they are started and rotated through 360°. As the recorder rotates in step with the microphone, it records on the chart paper (F) the level variations of the microphone output as it is rotated 360° with respect to the source. The process is now repeated at as many frequencies as desired.



You will note that the curve on the illustration is the common heart shape cardioid pattern.

Physical Characteristics of Omnidirectional Microphones: The shell or case of an omnidirectional microphone is totally sealed so that sound pressure can strike only the front part of the diaphragm.



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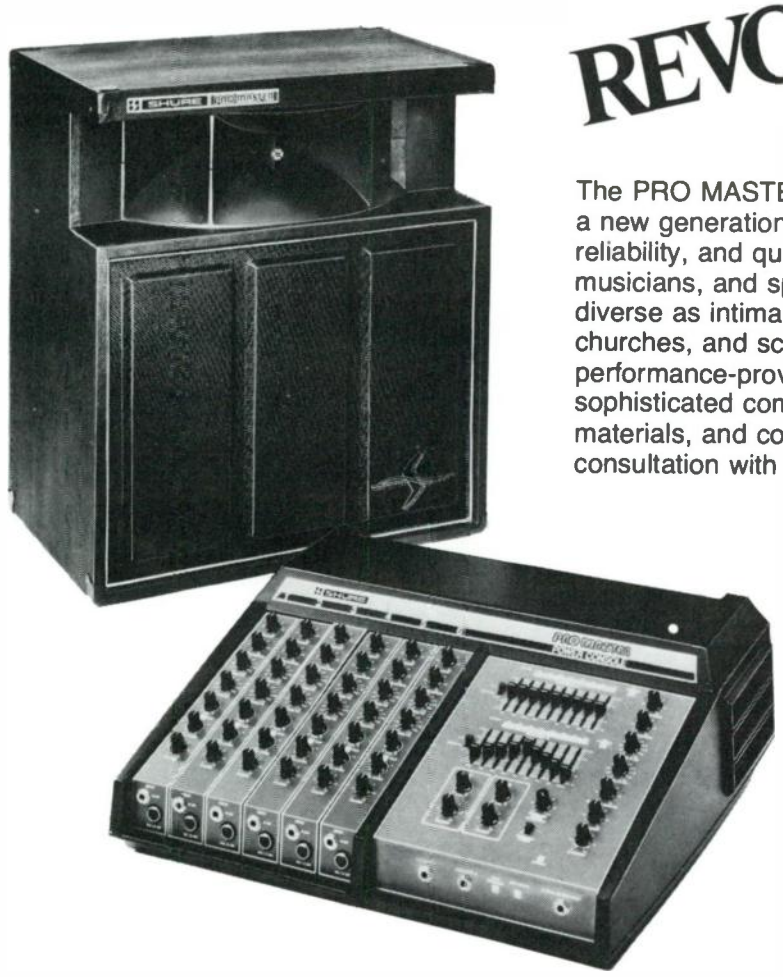

The PRO MASTER modular sound system ushers in a new generation of sound system versatility, reliability, and quality for today's entertainers, musicians, and speakers — for use in settings as diverse as intimate clubs, lounges, large auditoriums, churches, and schools. Its multitude of performance-proven features is the result of sophisticated computer design techniques, advanced materials, and countless hours of personal consultation with performers and sound technicians.

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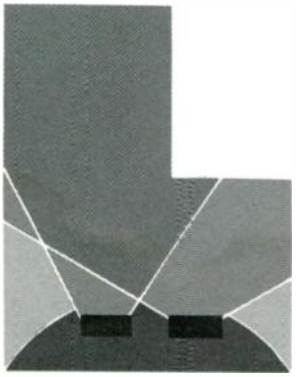
Finally! The best of *both* worlds. A console so easy to use that it won't overwhelm the beginning group, yet with the advanced features and capabilities required by experienced professional performers — such as pre-fader monitor mixing, effects and/or built-in reverb, with their own tone controls, LED clipping indicators with attenuators on each input, and full patching facilities for every system component. Super power: *twin 200-watt solid-state power amplifiers!* Doubles as a stereo recording console for groups that want to "lay down a few tracks" without paying for studio time, or can be used as an ultra-sophisticated keyboard mixer with power. Unitized ARMO-DUR™ structural foam combination case and chassis makes it more durable than steel. Ultra-light: only 47 pounds.

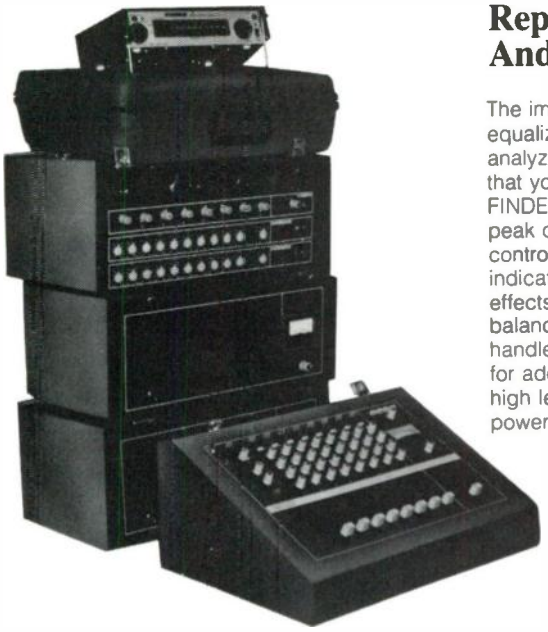
Revolutionary: Variable Dispersion Sound System



Advanced new variable dispersion high-frequency horn system projects your sound — everywhere in the house, giving you a choice of 60° long-throw, or 120° wide-angle dispersion with the twist of a knob. Tailors the sound to the room — even L-shaped rooms.

Revolutionary New Loudspeaker

Every extra ounce — every unnecessary cubic inch — has been computer designed OUT of the PRO MASTER loudspeaker. Modern materials and molding techniques accommodate a high-performance 15-inch woofer and a high-frequency horn and compression driver in a startlingly small, efficient enclosure. Less than 28 inches high, 23 inches wide, 16 inches deep. Weighs an easy-to-handle 58 pounds. Yet, the power handling capacity is a remarkable 150 watts, and the frequency response is 50 to 15 kHz.

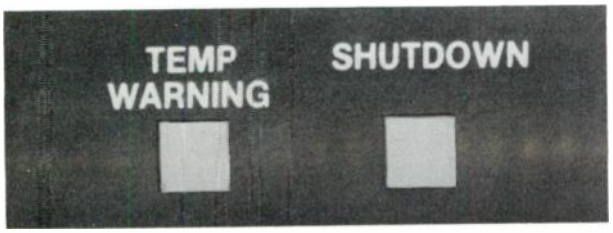


Replaces All This Equipment... And Does More!

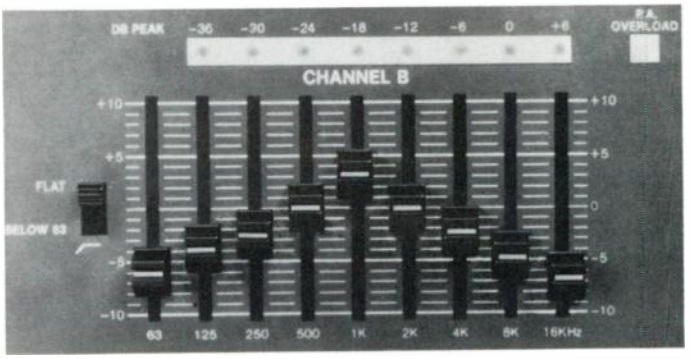
The impressive array at left includes a mixing console, two graphic equalizers, a pair of 200-watt power amps, a monitor mixer and an octave analyzer. The PRO MASTER gives you all these capabilities — plus features that you can't find in any other console, at any price: Unique FEEDBACK FINDER™ circuit, exclusive PATCH BLOCK™ patch panel, wide-range LED peak output and input clipping indicators. Plus pre-fader monitor send controls, LED power amp overload, temperature warning and shutdown indicators, 0 to 30 dB input attenuators, full stereo features, simultaneous effects and reverb on each channel. What's more, you have Hi-Z *and* Lo-Z balanced transformer-coupled mic inputs on all six mic channels, (can handle 12 mics simultaneously), plus two additional auxiliary input channels for adding synthesizers, tape players, tuners, sub mixers or any other high level output components. And each Lo-Z input features built-in simplex powering for condenser microphones.

Revolutionary: LED Status Indicators

Alerts you to developing trouble *before* it gets serious! You have time to correct the problem before it interrupts the performance. Temperature warning LED warns you if amplifier is overheating. Shutdown LED indicates power amplifier and speaker protection system activation. Only the power amplifiers are shut down until the internal cooling fan lowers the temperature.



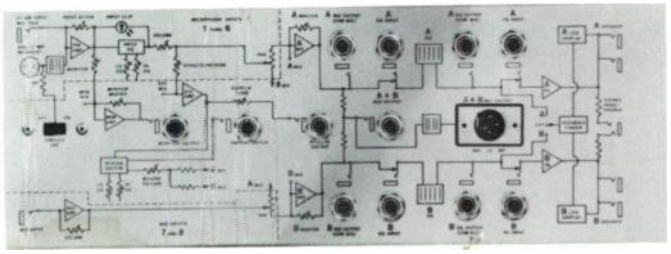
LED peak indicators virtually obsolete VU meters. They respond to short transients that wouldn't budge a needle, and cover 42 dB without range switching. PA overload LEDs light at full power and also warn you of distortion-causing problems such as bad speaker cables or too many speakers.



Revolutionary: FEEDBACK FINDER™/ Equalizer

Controls feedback — the number one enemy of a successful performance. FEEDBACK FINDER visually indicates the troublesome frequencies for precise adjustment of the twin 10-band equalizers. Enables you to equalize for maximum gain on the house and/or monitor system. Nothing else like it!

Revolutionary: PATCH BLOCK™ Patch Panel



The back panel is a unique combination block diagram and patch panel with 12 patching jacks located at appropriate points on the block diagram. For the beginner who is taking his act on the road for the first time, the PRO MASTER works "as is," with no special connections. But with the PATCH BLOCK, the professional can create a wide variety of setups and add auxiliary equipment without makeshift connections. And you can change setups at a moment's notice without confusion. Simplicity and versatility, the PRO MASTER has them both!

Hear the Revolutionary New Sound!

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PRO MASTER™ sound system

Ask for Brochure AL581A

Shure Brothers Inc., 222 Hartrey Ave., Evanston, IL 60204, In Canada: A.C. Simmonds & Sons Limited
Manufacturers of high fidelity components, microphones, sound systems and related circuitry.

CIRCLE 66 ON READER SERVICE CARD

TROUBLESHOOTERS' BULLETIN

EMERGENCY REPAIRS

(1)

Minor speaker disasters plague the on-the-road band. Ripped cones, dented dust domes, dented HF diaphragms, loose glue joints, etc. are all problems that arise occasionally. The following are some tips and procedures for salvaging speakers and drivers so they can finish the gig.

Dented dust domes can cause alignment problems or other spurious noises,

(2)

especially if they are dented far enough to touch the pole piece on substantial excursions. Most aluminum domes can be pulled out by sticking a piece of masking tape to the center of the dent, rubbing lightly with the end of your fingernail to ensure that it is reasonably well stuck, and pulling on the tape with a sharp movement. (If you pull slowly you will likely only peel the tape off.) The tape should come off the dome and the dent should be reduced.

(3)

If the dome is badly dented or creased, this method may not help. It may be necessary to pierce the dome with a piece of wire bent at the end and cautiously lift the dent out from the inside surface. This method works well with paper dust domes, most of which will pop back to their original shape without stretching.

Once you have put all the holes you need in the dome, place a tiny dot of glue

over each hole to avoid the possibility of "whistles," etc. Some domes may simply be beyond repair. In this case, the only answer is to replace the dome.

(4)

If the dome is held on with a resin type of glue (semi-transparent, full of tiny bubbles, hard and shiny surface), use a heat gun on the center of the aluminum dome (of the type used for heat-shrink tubing) until the glue starts to bubble and crackle. Then stick a knife or stiff wire through the dome and lift

(5)

it off. While you are doing this, make sure you haven't left the heat gun pointed at the speaker cone. (Don't laugh; it's been done.) The glue may harden before you have the dome completely removed, so keep the heat gun ready for any spot softening you may need. Don't heat the dome beyond the point where the glue starts to soften or you may soften all the other glue joints that hold the cone together.

Now, more than likely, there will be glue residue left in the area you want to put the new dome on. This can be removed carefully with a knife or a soldering pencil or gun. Carefully is the key word here. The new dome can then have a bead of glue placed on the underside of it. Position it on the voice coil tube. Then run another bead around the outside of the dome. (To be continued.)

(6)

BARRY MCKINNON

In Memoriam

Tom S. Koneski

1939-1979

What special things should I remember about the miking of overdubs?

Microphone placement for recording overdubs is no different than microphone placement in any other recording situation. The problem lies in the actual techniques used in making the overdubs. Even if the recordist were to solicit all the pertinent information on overdubbing techniques prior to making a recording, he/she needs to become familiar, through practice, with all facets of the procedure.

For simplicity, let us assume that the average overdubber owns a simul-sync, 4-track tape machine. Also he/she has several mics, but probably no mixer or any other electronic equipment to aid in the recording. Typically, overdubbing requires one of the four tracks to be vacant, let's say track 4. Therefore, tracks 1, 2 and 3 are available for use. Simply stated, there will more than likely be more instruments and vocals to be recorded than there are available tracks. For instance, track 1 may be for background vocals, track 2 may be for bass, and track 3 may be for drums. Now more room is needed for guitar and lead vocal, so tracks 1, 2 and 3 are combined on track 4 which was previously vacant. Now tracks 1, 2 and 3 are vacant and the lead vocal is recorded on track 1 and guitar on track 3. If a keyboard needs to be added, tracks 1 and 4 are combined on track 2 and the keyboard added to track 1 or 3 and so on. This whole over-dubbing process is called "ping-ponging."

As previously mentioned, the problem in overdubbing is one of technique and giving due consideration to all facets of the process.

Two of the most important things to consider are level loss and high frequency loss.

Depending upon the machine being used, loss of level experienced when overdubbing, ping-ponging, etc., could be as much as 3 dB, which would be obviously noticeable. In this case, the level of the recorded track must be increased each time before combining and/or switching tracks is accomplished. Only familiarity with the machine being used can provide the proper compensation.

High-frequency loss is also a function of the number of generations (number of times the recording is switched or ping-ponged from track to track). The higher the number of generations, the greater the degradation. If the degradation is readily apparent, consideration should be given to equalizing the high end by an equalizer, mixer, expander, etc.

Keep in mind that this article barely scratches the surface. Many other facets should be considered that we did not discuss. Another important one might be how to obtain a stereo center position for a lead vocal or particular instrument. Perhaps this can be explored in another article.

Bob Herrold
Product Manager—Microphones
Audio-Technica U.S., Inc.
Fairlawn, OH

How does the "Leslie" speaker compare to other electronic effects?

First of all, the term "Leslie" is trademarked and refers to a specific brand of rotating speaker systems. There are several ways to implement rotating speaker systems, but most commonly, the signal from an audio power amplifier splits into two channels (one containing high frequencies, the other low frequencies). The high frequencies feed a pair of back-to-back horn speakers that rotate in a full 360-degree circle; the low frequencies feed a woofer whose sound is mechanically filtered by rotating baffles. The period of rotation is variable over the same approximate range as the LFO in a typical synthesizer. As a result, the rotating speaker effect is more mechanical in nature than electronic. The various motions described above contribute several effects to the audio signal: volume variation, phase variation, pitch change (from the Doppler effect), time delay, frequency response changes, and more. Additionally, these changes are all related in a cyclic way due to the periodic rotation of the horn speakers and woofer baffles.

There are several electronic boxes that claim to simulate the sound of rotating speakers, but I have yet to hear one that duplicates, rather than mimics, the rotating speaker sound. However, since rotating speaker systems are typically heavy in terms of weight, and like all mechanical systems, not exactly trouble-free, many musicians find that the convenience and lower cost of electronic substitutes often justifies the somewhat less interesting tonal characteristics.

Craig Anderton
Clayton, CA

What is acoustic masking and how does it affect recording?

When you record a music program including both loud passages and quiet passages on magnetic tape, you will be bothered by tape noise (tape hiss) in the quiet passage. But you will hardly hear or listen to the hiss in the loud passage. This comes from a property of the ear that one hardly hears the quieter sound when two sounds of quite different levels exist at the same time. We call this phenomenon *acoustic masking* or *masking effect*. The ear also has an afterimage-like effect regarding sound, so that one can scarcely hear or notice a quiet sound closely following a loud sound. So it is often experienced that rhythmical music masks tape hiss when it is recorded on tape. For example, rhythmical instruments such as percussion instruments play a roll of loud sound. If you record this kind of music on relatively high noise tape, the hiss may not bother you. Higher frequency sound is more apt to be masked due to the ear's capabilities.

Michael Takizawa
Technical Specialist
TDK Electronics Corp.
Garden City, NY

So... u want to know about Synthesizers Part V

By Craig Anderton

As pointed out in the first and second installments of this series, a keyboard delivers a series of voltages to a voltage controlled oscillator (VCO) to produce a series of musical notes. For example, once you strike the "A" 440 key on a synthesizer keyboard, the VCO will start putting out an "A" 440, *and keep putting out that "A" 440 until you hit another note.* Technically this makes sense, but musically, a continuous tone is a drag; after all, music is about *spaces* between notes as well as the notes themselves. So, we need to devise some way to gate the tone on and off . . . and that's what this month's column is all about.

One way to do this, although not a very good way, is to include some type of audio "gate" after the VCO that ties in with the keyboard (see figure 1). Let's assume this gate responds in such a way so that when a key is pressed *down*, the gate is *open* and lets the signal through. Then, *releasing* the

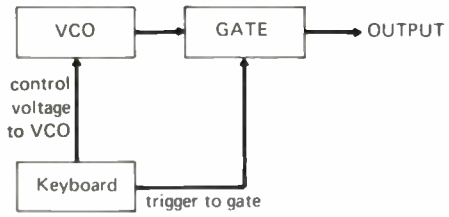

Figure 1

key *closes* the gate—and although the VCO is still generating a tone, we don't hear it because the closed gate is blocking that sound. When we press another key, the VCO changes its pitch and the gate opens up at the same time . . . so we hear the next note. Again, releasing the key closes the gate.

We now have a very limited type of control over the dynamics of the synthesizer, and this is certainly an improvement over our continuous tone generator! But when I say very limited, I *mean* very limited . . . which brings us to our next subject.

ATTACK AND DECAY

When you pluck a guitar string, the note doesn't just come on full blast and remain there until it stops. Rather, there is an instantaneous jump in volume (*attack*) as soon as the string is plucked, and then the signal level starts to drop in a relatively predictable fashion until the string stops vibrating and there is no more sound.

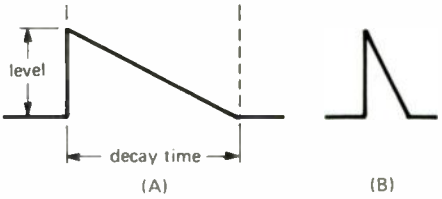

Figure 2

This is called the *decay* time of the guitar note, and represented graphically, looks like figure 2a.

A drum sound exhibits a similar decay pattern, but it decays much faster, as shown in figure 2b.

On the other hand, some instruments take a bit of time to get from "no sound" to "full sound." Take a flute, for instance. There is a finite amount of time between the moment the player first starts breathing into the instrument, and the moment that an actual note comes out. There is also a very small amount of decay time after the player stops blowing. This results in a graph as in figure 3.

So, if we want to synthesize real-world instrument sounds with our synthesizer, we need to be able to turn our gate into something that can give attack, sustain, and decay times instead of the simple on/off control talked about earlier. To do this, though, we need to investigate two more modules—the voltage controlled amplifier (VCA) and the envelope generator (EG).

The VCA is an amplifier whose gain depends on a control voltage. Low control voltages mean low gain, high control voltages mean higher amounts of gain. In-between voltages give in-between amounts of gain. No control voltage means no gain (that all seems pretty logical).

So, it follows that if we could hook up some magic device to control the VCA in whatever way we wanted, we could create specific attack and decay times. For example, if we had a circuit that started out by feeding a high voltage into the VCA which then gradually dropped down to a lower voltage, we could synthesize a percussive type of sound. If we could control the time it took for our voltage generator to go

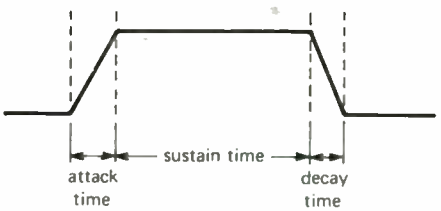

Figure 3

In the real world of 1% speaker efficiency, 10% sounds unreal.

Most speakers are less than 1% efficient. To compensate for this inefficiency and meet today's sound levels, you need an arsenal of power amps. Because every time you want to increase sound pressure 3 dB, you have to double your power.

Until now.

Fender introduces Concert Speaker Enclosures, the 2-15 R and 1-15 HLR. Each is virtually 10% efficient.

Efficiency, Part I: Theory. If it takes 1,000 watts to achieve a desired sound pressure level through a speaker with 1% efficiency, it takes only 100 watts to achieve that level through a speaker with 10% efficiency.

So the more efficient the speaker, the less power and fewer amps you need.

Efficiency, Part II: Performance. The Fender 2-15 R delivers a sound pressure level of 107 dB at 1 watt/1 meter (pink noise) and handles 400 watts RMS continuous. The 1-15 HLR delivers 105 dB at 1 watt/1 meter (pink noise) and handles 200 watts RMS continuous. That's near 10% efficiency!

Both feature EV15L computer-optimized woofers with edge-wound aluminum voice coils that minimize heat failure. Flush-mounted compression horn/drivers that yield flat response without equalization.

Internal ground lift switches to keep power amps from grounding when the unit is biamped (which, incidentally, lets you separate horn and bass functions). Structural grade aluminum diaphragms that prevent fatigue. And sophisticated crossover using a maximally flat response 18 dB/octave filter.

Thiele-aligned cabinetry. Most important, both Fender cabinets are Thiele-aligned for maximum bandwidth and sound pressure level per cubic foot.

What have you got to lose? Verify the specs and the performance at your authorized Fender dealer.

The only thing you've got to lose is a lot of excess equipment.

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from no voltage to full voltage, we could control the attack time, and so on. Luckily, such a magic device exists—the EG.

The envelope generator hooks up to the keyboard in order to receive a trigger pulse whenever a key is pushed. As soon as the EG receives a trigger pulse, it starts generating a voltage that rises from 0 volts to the maximum possible control voltage (full gain from the VCA). The EG will have a control labelled "attack" that determines how long this rise will take; you can make the attack instantaneous for

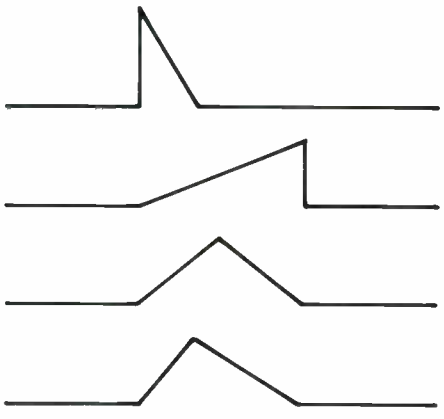


Figure 4

percussive sounds, or longer for sounds that require a long attack time.

What happens next depends upon what type of envelope generator we're using. In the simplest types, as soon as the control voltage hits maximum, it starts falling towards minimum gain to give a decay time. This type of EG has two knobs, one for attack and one for decay. Figure 4 shows some of the possible envelopes you could obtain with this circuit.

A more complex EG with a *sustain* function would act a little differently. Pressing a key would start the attack time as in our previous example; then, holding the key down would give a sustaining maximum control voltage for as long as you held the key down. Once the key is released, then the decay section starts. (Now it should be clear why we want the VCO to continue putting out a tone even after the key is up—we need that tone to continue while the decay cycle does its thing.) This envelope generator still only has two knobs, but gives more flexibility than the first type of envelope generator we talked about.

Next step up in complexity, and the EG that is most popular for synthesis

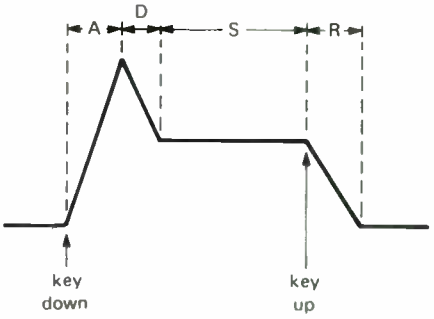


Figure 5

use, is the ADSR generator. This can produce envelopes with quite a lot of complexity. Referring to figure 5, here's the sequence of events . . .

Pressing the key starts the attack cycle (the *A* in *A*DSR), just as before. But now we have an extra control called initial decay (the *D* in A*D*SR). If you continue holding the key down, the control voltage will decay downwards until it hits the level specified by the sustain control (the *S* in AD*S*R). Note that this control doesn't specify an amount of time, but rather, specifies a voltage level that the EG is to maintain for as long as the key is down. Once the key is released, then the final decay, or release (the *R* in ADS*R*) comes into play. So, the ADSR envelope generator has four controls, one for each of the above mentioned parameters. It is clearly the most versatile of any of the EGs discussed so far, because it can simulate the performance of all the other types. For example, to simulate a simple attack/decay generator, you'd set the attack time and decay time of an ADSR, while leaving the sustain and release controls at minimum.

Now, I don't mean to imply that envelope generators are only supposed to be used with VCAs; far from it! Applying the envelope generator output to a VCF control input sweeps the filter in a way specified by the controls, thereby modifying a signal's harmonic content in a predictable way. You can feed the EG into a VCO to change the pitch, too. In fact, any voltage controlled module is eligible for control by an envelope generator.

In closing, I should add that, as in most other aspects of synthesis, not every company uses the same terms. For example, some manufacturers prefer the term *transient* generator to *envelope* generator. Also, sometimes the words *decay* and *release* are used interchangeably.

THE ARP STORY: 10 YEARS, OVER 35,000 SYNTHESIZERS, AND IT'S ONLY THE BEGINNING.

An ARPography: 1969–1979

1969: Under the name Tonus, Inc., the ARP *2500* is introduced. It is the first synthesizer designed for live performance use, featuring slider-controlled matrix patching and rock-stable oscillators and filters.

1970: ARP introduces the world's first portable synthesizer, the *2600*, also known as "The Blue Meanie." The 2600 is discovered by Stevie Wonder and Pete Townshend, and becomes the most popular studio synthesizer of the 70's.

1972: The ARP *Odyssey* is introduced. Through many years and many design updates, it sets the standard for rugged, compact, versatile synthesizers, becoming "the most copied synthesizer in music" according to *Rolling Stone*.

1974: The ARP *String Ensemble* is introduced. The addition of "systems interface" jacks to the String Ensemble allows it to be used as a polyphonic synthesizer, more than two years before a self-contained polyphonic synthesizer is built.

1975: The *Axxe*, the first synthesizer under $1,000, is introduced. The Axxe opens up the amateur and educational market with its low price and high performance features.

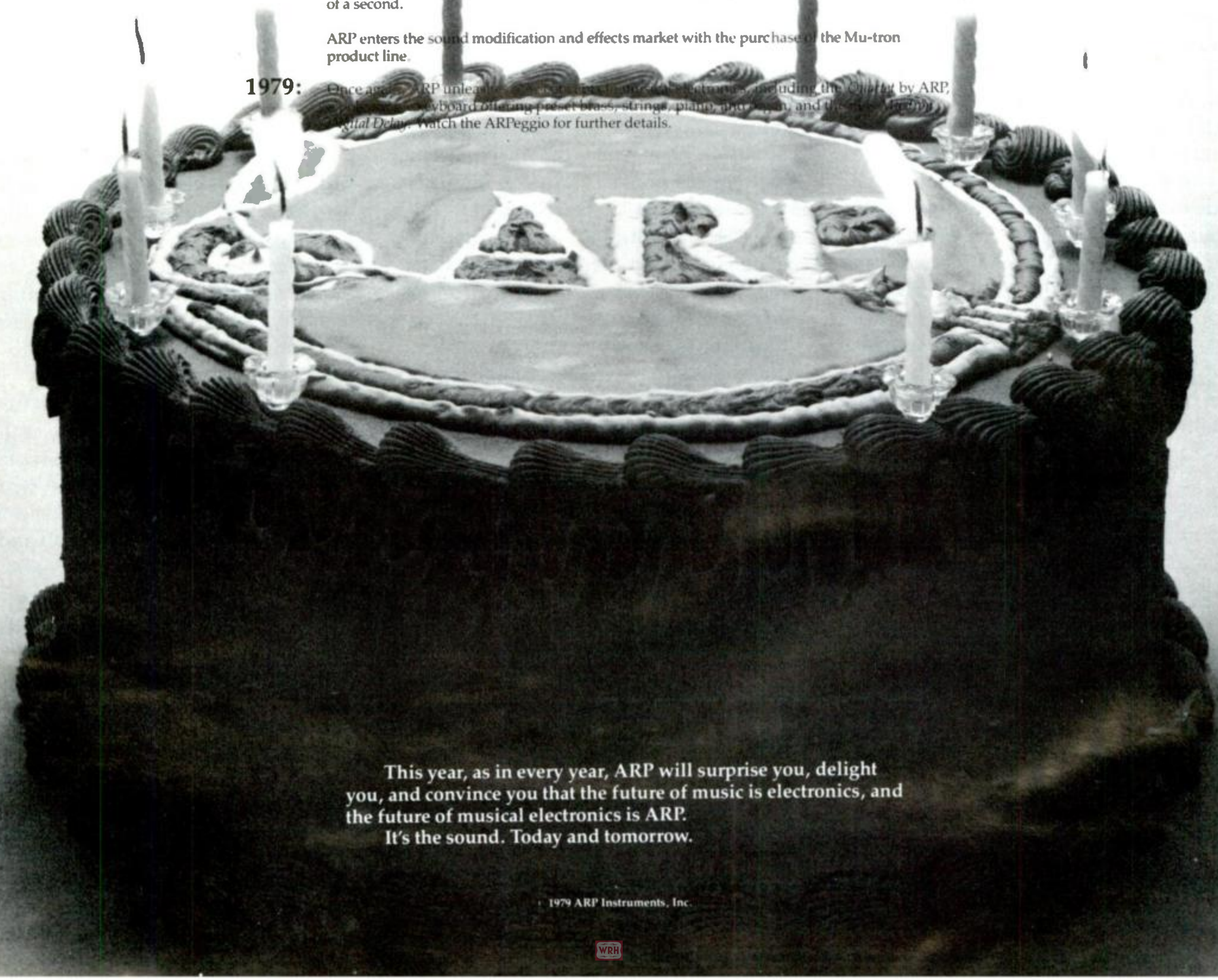
1976: The polyphonic wave begins with ARP's introduction of the *Omni*, a symphonic electronic instrument that produces strings, polyphonic keyboard effects, and bass synthesizer *simultaneously*. The Omni sets the music world on fire, outselling every other synthesizer on the market.

1977: In one revolutionary stroke, ARP opens up the incredible sound possibilities of synthesizers to electric guitarists. The ARP *Avatar* boggles the mind and creates a brand new market.

1978: Technology continues to change rapidly, and ARP takes the lead by introducing the ARP *Quadra*, a micro-processor controlled keyboard instrument with four synthesizers under one roof. Now musicians can write, edit, store, and recall programmed sounds in a fraction of a second.

ARP enters the sound modification and effects market with the purchase of the Mu-tron product line.

1979: Once ag[illegible] ARP unlea[illegible], including the [illegible] by ARP, [illegible] keyboard offering preset brass, strings, piano, [illegible], and the [illegible] *Digital Delay*. Watch the ARPeggio for further details.



This year, as in every year, ARP will surprise you, delight you, and convince you that the future of music is electronics, and the future of musical electronics is ARP.
It's the sound. Today and tomorrow.

By Larry Blakely

I have had the privilege of attending the conventions of the Audio Engineering Society (AES) since 1966. Over those thirteen years I have seen a number of new innovations introduced to the professional recording industry at these conventions. Some of the more memorable innovations were the Dolby "A" tape noise reduction system, the eight-track multi-channel tape recorder, then the sixteen-track tape recorder, and more recently, the twenty-four track tape recorder. Each of these pieces of equipment have made major changes in the way professional tape recordings are made. Of course there have also been many other pieces of new and innovative equipment that have made their mark on the professional recording industry. Automated mixdown equipment has been introduced in various forms, from add-on systems for existing recording consoles to elaborate and sophisticated automated recording consoles. Unique signal processing devices such as compressor/limiters, equalizers, sibilance removers, and many other different types of equipment have been introduced at the AES conventions over the years.

The professional recording industry is one that has always been in a state of change and will continue to be so. This is always true of any growing industry that is based upon new technology. As technology progresses, newer and better ways are found to record and reproduce sound. New ways are discovered to do things better, easier, and even at less expense. Not only does the equipment used by the recording industry change; the recording industry itself changes and progresses as it becomes more sophisticated and mature.

The Audio Engineering Society, a professional society of recording and audio engineers, has two conventions in the United States each year, and an annual convention in Europe that is usually in the month of March. Technical papers presented to the industry at these conventions relate new discoveries, inventions, and suggested changes or improvements in existing technology. In an effort to let the recording industry see the latest developments in available recording equipment, there is an exhibition of audio equipment manufacturers.

Historically, the professional recording industry has been made up of a number of expensive and elaborate recording facilities. In the early 1960's there may only have been around a hundred such operations. But the introduction and adoption of multitrack tape recording by the recording industry encouraged additional recording facilities. Most of these multitrack recording studios cost between hundreds of thousands and millions of dollars. However, in the last few years the production of lower cost multitrack tape recorders and recording consoles has brought about yet another major change in the professional recording industry. Many hundreds of new recording facilities are being built each year utilizing this less expensive recording equipment. The availability of this economy recording equipment allows recording studios to be built at a cost of a few thousand dollars. This new segment of the recording industry is exploding.

At the most recent AES convention—in Los Angeles this spring—observers detected a much larger number of manufacturers who were displaying audio equipment for the economy recording studios. A number of new companies were showing economy (semi-pro) and/or stage sound gear. An even more significant indication of the growth of the economy recording equipment market was seen when manufacturers of expensive equipment privately—and off the record—displayed substantially lower priced equipment, apparently designed to capture a share of this expanding new market. The economy recording studio movement is making its mark very visible on the professional recording industry, and I feel that we have only seen the tip of the iceberg.

AES exhibitors brought to mind by these thoughts include Eastern Audio Acoustics, Crest Audio, Audio Arts, Ursa Major and TOA Electronics. Unicord, who has not traditionally exhibited at AES, was there this spring, after its initial exhibit last fall. The cross-pollination of the musical instrument business and recording industry was also apparent in the high visibility of Peavey's exhibit and of Roland Corp., which was showing accessory gear for recording sessions. Sansui, often thought of as a consumer product manufacturer was again showing recording accessories and equipment.

Apart from the growth that is taking place in the economy (semi-pro) segment of the market, the most significant thing to be talked about with regard to the 63rd AES Convention in Los Angeles this May is digital audio.

Without question, digital audio will change the entire face of the professional recording industry in the coming years. Everyone is very excited over the prospects and potential of this new method of recording sound. But everyone is so excited that they have not stopped jumping up and down long enough to look at some important facts. The largest brick wall is that of an industry standard for digital tape recording. Digital tape recording

cannot realize its full potential or even have a real good start until there is an industry standard format established. No such standard exists at this time. In fact, standardization efforts that were made by the AES and cooperating manufacturers were abruptly stopped by the threat of an anti-trust suit. Standardization of a digital tape recording format is mandatory for the interchangeability of tapes from one recording studio to another. For example, if one manufacturer made a 32-track on one-inch tape digital format, another had 24 tracks on one-inch tape, and yet another had 16 tracks on half-inch tape, not to mention the variety of recording and playback heads utilized, the number of bits used, and the clock rate, all of these machines would be incompatible with each other. The professional recording industry must have standard recording formats for the interchangeability of tapes.

The lack of a digital standard is a major road block, and many of the larger recording studios will not purchase digital tape recorders until this obstacle is removed. Many studio owners fear the obsolescence of their analog tape recorders this year or even next year because of the introduction of digital audio tape recorders. I say again that digital will change the face of the professional recording industry. However, this can not happen overnight and digital tape recording certainly can make no major move forward until there is a standard digital tape recording format.

There were a number of new digital devices shown at the AES convention. One of the most startling was the demonstration of a digital reverberation system by Lexicon, Inc., of Waltham, Massachusetts. Soundstream of Salt Lake City, Utah, was playing digital master tapes which they recorded for numerous audiophile record labels. 3-M was showing their newly available digital multitrack tape recorder; three such machines are currently in service in the field. Other types of digital hardware shown included digital delay lines and digitally controlled accessory hardware. Ampex Corporation of Redwood City, California, showed a high quality audio digital delay line that will provide up to five seconds of straight delay that is to be used for delaying the entire audio signal for disc mastering. Such a device could be a great help in direct-to-disc recording if the recording industry finds the quality acceptable for its very strict standards. This device is also proposed for an alternative to tape recorder preview heads and preview signal channels that are normally required for disc mastering from stereo master tapes. A ballpark price of around $15,000 was quoted by Ampex for this digital delay system.

Some companies showed up with digital audio hardware to exhibit but with no sales prices or delivery dates. My feeling is that the water is muddy enough at this time for the future of digital audio without manufacturers sounding false alarms which bring about even additional confusion.

On the analog side there were some interesting products that may be looked into. Although there was no single item that I felt was a real earth shaker for the creative audio marketplace, there were some items that I would like to mention. Crest Audio, AB Systems, and Uni-Sync showed some new power amplifiers. Mic-Mix Audio and Sound Workshop showed new reverberation systems that were self-contained in a 3½" x 19" rack mount package. Brenell and Soundcraft showed new one-inch eight-track tape recorders. Altec-Lansing showed an interesting new line of stage sound speaker systems, called the Stanley Screamers, that is a joint effort between Altec and Stanal Sound. Eastern Audio Acoustics also showed new stage sound speaker systems and recording studio monitor systems.

There were a number of new and interesting things to see, but nothing earth shattering. I have mentioned a few of the devices that caught my eye. As I mentioned earlier, the AES convention showed the evolution of the recording industry in two directions. There are strong movements forward on two fronts: one is digital audio and the other is a confirmation of the rapid growth of the economy recording studio equipment and the stage sound equipment markets.

By Len Feldman

Yet another Summer CES wrapup? Don't despair! When the editor of SOUND ARTS asked me to prepare a summary of all the good things I saw at the recently concluded Summer CES, I promised that this would not be the usual catalog-listing of new products. I dare say you'll be reading about all the new products in other places or, if you don't, the manufacturers who dream them up will have their salespeople knocking at your door or bombarding you with tantalizing ads soon enough.

I thought it might be more useful, this time, if I examined some of the trends that were evident at SCES. From what I saw, there were trends aplenty—and most of them concerned technology rather than product.

TAPE HEADROOM

The headline suggests that I'm going to go another round about metal particle tape, right? Well, I'm not. Of course, every tape deck manufacturer worth talking about had one or more cassette decks that can, ostensibly, handle the new harder-to-record-and-erase tape. Some even broke the $200 price barrier with metal-capable tapes at $189.50, but these will have to prove their worth in my lab before I go along with the idea that you can record on metal tape *and* derive its benefits from such a machine. What was far more interesting to me was a pair of technology breakthroughs that seemed significant regardless of which tape you use in your recorder. The first of these was by Dolby Laboratories and they've dubbed the new process HX. As everyone who has read any of the publicity associated with metal tape introductions knows, the big problem with cassette tapes and decks is high-frequency tape saturation. At the slow speed of the cassette tape, so much record equalization of treble frequencies has to be applied that signals at high frequencies must be recorded at much lower levels than can signals at mid or low frequencies. High frequency tape roll-off is also a function of bias. In Dolby's HX system, which was successfully demonstrated at the CES, they use the same control signal which normally is derived for Dolby B noise reduction to control two other recording parameters. If highs predominate in the music signals, bias is automatically and continuously altered downward, thereby upping high end response. And, to compensate for the change in overall response that then takes place, record equalization is also altered, using the same control signal. Dolby claims an increase in headroom of a full 10 dB—actually more headroom gain at high frequencies than the makers of metal tape are claiming.

The people at Tandberg take issue with the Dolby approach, claiming that altering bias continuously can have disastrous results on distortion and pointing out that at best, the system would work well only for a very specific tape type for which the complex series of variables has been carefully calibrated. They've come up with a headroom-increasing approach of their own which they call DynEQ. In this system, tape saturation is sensed by a circuit which simply reduces record EQ proportionately so that instead of running into tape saturation at high-frequency, high recording levels, along with actually *decreasing* output with increased input, removal of treble record EQ permits a linearly rising output versus input even up to "0 dB" record levels of 200 to 250 nWb/m. Says the man from Tandberg, "The new TCD 440A (which employs the DynEQ principle) is the first cassette deck in the industry without 'cassette sound' ".

THE NOISELESS DISC WITH 90 dB DYNAMIC RANGE!

I'll bet the headline fools you again. No, there are no readily available digital audio discs other than the increasing number of prototypes which were shown at CES. The latest of these was shown by JVC as a companion to their capacitance-traced video disc, both of which don't require laser optics but use a simple, easily replaced sapphire stylus that rides atop a grooveless vinyl disc. No, if the video disc is really here (and Magnavox's Magnavision demonstrations at the CES certainly suggest that it is), the digital audio disc is still a ways off in the future. Yet I and several of my foot-weary colleagues *did* hear a noiseless disc that offered up to 90 dB of dynamic range and was played with a garden variety phono pickup and a conventional turntable. Furthermore, the disc system we heard was not new. We had heard it as long as three years ago. dbx, Inc. has finally launched their dbx-echoed disc project, in which super-quality master recordings on tape are encoded by two-to-one compression before mastering onto discs. In so doing, 90 dB of loud-to-soft dynamics can be compressed down to 45 dB—a range easily contained in present day groove-type vinyl discs. The full dynamic range is recovered via a new low-cost decoder which dbx will offer for around $108. They hope to have over 100 titles out there by year's end. By purchasing quantities of discs from record companies with whom they have been working, and distributing the discs through their own dealers, dbx takes the risk factor out of the system which might otherwise discourage record companies from embarking upon the project. As for the noise reduction aspects of the system, during decoding, noise is expanded downward by some 30 dB, making it truly inaudible. Could this turn out to be a step above direct-to-disc? Only time will tell. Meanwhile, there are some 20,000 to 30,000 dbx equipment owners out there who, up to now, have only been able to employ dbx companding on tape who will now be able to push the "disc" button on their machines—a button which up to now has been idly standing by. That, plus the availability of a play-only low-cost decoder may just put the new/old idea across.

MORE BASS IN LESS SPACE

You've probably heard claims of incredibly big bass from incredibly small speaker enclosures. More often than not, the big bass sounds that emanate from such mini-enclosures are harmonics of the fundamental frequencies contained in the program source instead of the fundamental low tones themselves. The human ear is all too easily fooled. That is *not* true of KLH's remarkable new "Computer Controlled" speaker systems, the smallest of which is only ¼ of a cubic foot in enclosure volume but manages to pump out solid fundamental bass down to 40 Hz. A larger model, at 1.25 cubic feet, goes down to 32 Hz and can deliver SPL levels of 105 dB. The trick is an electronic module dubbed an Analog Bass Computer which monitors cone motion by reading the output level of the amplifier and controlling cone excursion, protecting speakers against bass overload. By eliminating the constraints formerly placed upon bass drivers to protect them mechanically against break-up, the drivers and system design can be optimized so as to produce bass levels that would normally require enclosures four times the size of these new ones from KLH.

CLASS A AMPS WITH CLASS B COOL

Class A amplifiers, the kind that have output transistors that conduct all the time, have long been recognized as providing the lowest distortion into complex speakers. The trouble with them in the past has been their low efficiency and the high heat dissipation involved in their design. At least two companies, one off-shore, the other based in the U.S., have come up with variations on the Class A theme which provide the efficiency of Class B amplification while retaining the advantages of true Class A amps. SAE, in this country, has developed what they call a Hypersonic power stage which employs an extensive

number of output devices and has a combined power capability of over ten times the rated power output.

Almost telepathically, clear around on the other side of the world, JVC has come up with what they call their "Super-A" circuit, the key to which is a complex monitoring circuit that adjusts output stage bias current so that neither half of the output transistor pair ever turns off. The result: no measurable notch or crossover distortion, just as is true of Class A circuitry, but much higher efficiency and lower heat dissipation. Another thing the two companies have in common is that neither one of them is ready to disclose how their circuits work in full detail, but proof that they do work was verified by noting the high levels of power output which each attained relative to its small size and cooler-than-expected operation when compared with conventional Class A amplifiers of similar ratings.

THEN THERE WERE THREE ...

Speeds, that is, for cassette decks. Last year, when B.I.C./Avnet introduced their two-speed cassette decks which operated at the faster 3¾ ips speed for improved frequency response, S/N and lower distortion, a representative from Tandberg said that if a second speed was required at all, it should be a slower rather than a faster one, what with all the progress that had been made in tape formulations and tape transports. The slower speed, said this expert, would make tape usage more economical and could now provide the kind of performance that the 1⅞ ips speed did just a few years ago.

Well, this didn't convince B.I.C./Avnet, who continue merrily along with their standard and high speed cassette formats. In fact, going every one a bit better, they will now be delivering their Model T-4 which not only can operate at 3¾ but handles metal tape at the high speed as well. All of that adds up to around $20 for 90 minutes worth of recording with unbelievable headroom and frequency response. (B.I.C./Avnet claimed all along that even a good quality oxide tape operating at 3¾ would beat out metal tape at the slower speed and they are probably right. Just imagine, then, what high speed transport plus metal can do!)

Whether Tandberg's comment was sour grapes or not, it wasn't they who finally introduced a slow-speed format (15/16 ips), but Nakamichi, of all people, who showed a prototype of their soon-to-be available Model 680, a $1350.00 deck which will also incorporate the Hi-Com II noise reduction system. This last named feature provides 20 dB of noise reduction at high frequencies, as opposed to the universally used Dolby B which affords only 10 dB. Put it all together with metal tape capability, and you come up with a machine that can record for three hours on a C-90 metal cassette and offers response out to 15 kHz even at the barely moving speed of 15/16 ips. Talk about deviation from world-recognized "standards" though! Here's a deck with a *new* noise reduction system plus a slower speed.

SEE YOUR ROOM ACOUSTICS NOW

With all the mis-used graphic and parametric multi-band equalizers now in the hands of the listening public, it was high time that someone came along and provided a means whereby those unsuspecting EQ users could get some idea of how to set up their tone controlling add-ons. At least three companies that we saw at SCES have done so. Audio Control showed the least expensive do-everything equalization system. At well under $300, here was a ten-band equalizer with a built-in pink noise generator, an LED octave-by-octave display and even a calibrated microphone. Set up the mic, feed the pink noise into your hi-fi system and watch the overall response on the LED's as you vary each control lever to bring frequency response of the entire system (including room acoustics) into line.

Scott's real-time analyzer is a home test instrument and nothing more, but besides enabling you to measure system response, it can also be used as an accurate sound pressure level meter.

Not to be outdone, JVC who has probably been incorporating graphic equalization in home audio products longer than anyone (but had the misfortune of originally calling their device S.E.A. for "sound effects amplification" instead of the more sophisticated term "graphic equalizer") now offers their SEA-80, a ten-octave two-channel equalizer with a built-in spectrum analyzer display of the new fluorescent bar-graph type as well as a built-in pink noise generator. The user has to supply the microphone.

VIDEO GALORE

Although my primary field of interest at SCES was audio, I could not help but notice the incredible advances in video technology that were all around me at the show. And, since everyone talks about the ultimate unification of video and audio into a grand and glorious home entertainment complex, let me dwell for a moment on some of the video spectaculars that I saw.

Henry Kloss, of Kloss Video Corporation and formerly with Advent Corp., showed all the purveyors of projection TV that he was still a step or two ahead of them with his incredible Novabeam Model 1, a two-piece projection TV that utilizes a 6½ foot washable screen. I've never seen a clearer big-screen TV image anywhere. We viewed pictures in a normally illuminated room and edge focus was perfect. No more having to position yourself dead-center in front of the viewing screen, either, and of course there is a hi-fi output jack for connection to one's stereo system. Listening to and watching one of the many simulcasts which now take place around the country would, I think, be quite an experience with this system.

NO MORE STATIC!

And finally, since most of the attention at the show was directed to audio hardware, new phono pickup technology and the usual plethora of new speaker breakthroughs, I was pleased to see that someone had paid a bit of attention to that much abused piece of software source material, the lowly phonograph disc. Stanton Magnetics, whose world-renowned professional cartridges need no introduction here, have begun to distribute a product called Permostat which, as its name implies, reduces static charge buildup on records to zero for the normal life of a disc with just one application.

And, for correct interface between your phono pickup and your record grooves (a much neglected subject), DB Systems has come up with a devilishly simple phono-cartridge/stylus alignment protractor which permits anyone to check and adjust correct overhang of any cartridge/tonearm combination insuring minimal distortion during playback of all records. We sometimes find, of course, that it's the little things that make the big difference in the continuing quest for better quality sound.

By Allen Hester

What's this? Mary Faith Rhoads on the hammered dulcimer. Accompanied by . . . can't read his name tag; it's behind the Martin guitar he's playing. "Wildwood Flower." Fairly uninteresting until I notice that Mary Faith is hammering with the conviction of John Henry himself, and it sounds real fine, even in this constant rumble.

Can't listen for long, though; gotta keep moving. Say, what's that? "Rack and Roll." Is it a misspelling, a rushed printing job, or what? Aha, it's Tapco! Better stop in and check this out. Say, good idea, component system P.A. packages. Keeps a sound system flexible, easy to assemble and operate. The very thing that solo performers, small combos, churches and schools seek.

But what was *I* looking for? Carry on then, straight to . . . TEAC. The sign says "every musician should play this keyboard," but it isn't a keyboard, it's a new cassette deck that has overdub capabilities. The Syncaset Model 124. Also at the TEAC booth is the new Tascam 85-16 recorder/reproducer—a 16-track unit retailing for around $10,500. Here comes a sales rep; he'll tell me all about it. Whoops! there go the house lights; it must be five o'clock.

Wonder what's going on in Atlanta, anyway It's the NAMM International Music and Sound Expo. The NAMM exposition two years ago in Atlanta was a huge success. Choosing Atlanta over the usual site in Chicago was a welcome change of pace, and the response to the 1977 trade show was tremendous. Anticipation of another blockbuster show this year was inevitable and widespread.

Perhaps that is why, for some, this year's NAMM expo lacked the excitement of two years ago. Despite the fact that business was *good*, the general sentiment seemed to be that it wasn't *as good*. Depending on who you talked to, the show was either fantastic or a bit lackluster.

Some exhibitors observed that floor traffic at the show was not as heavy as the 1978 trade show in Chicago. On one hand exhibitors bemoaned the traffic flow, but others were happy with it.

Jim Webb of Peavey had this to say: "For the first two days of this show, I didn't have time to eat or visit any other booth. I just talked. One person right after another, all day long. I would say we are having a great show this year."

Likewise, Jerry Brown at MXR felt that this year's NAMM expo was "just phenomenal for MXR. We are introducing two new products, the Stereo Chorus and the Micro Amp, and the response has been fantastic."

Brown attributes the success of MXR to the quality of the product, more so than its price. A NAMM show special discount was not offered by MXR because, Brown says, "Usually those show discounts are small ones—two to five percent. Retailers buy above and beyond that anyway; therefore they don't need the discount. Another reason is that many retailers come to the show to *look*, not to buy. They wait and buy after the show. So where does your show special begin and end, in all fairness to those dealers who wait before buying? We just don't offer a special."

And yet, again, there are two sides to the coin. Over at the JBL booth, Todd White indicated that JBL's discount special was a success. White also reported that JBL's Cabaret Series sound systems were well-received. The Cabaret is designed with the small combo or club in mind: the quality is there, but so is the simplicity and the modest price that many people want. JBL was not the only company with an eye on the market's low end.

Take Fender guitars, for example. They introduced two new guitars this year, the Lead I and Lead II solid body electrics. Priced below the traditional Telly and Strat, these instruments are designed to compete with the import guitars.

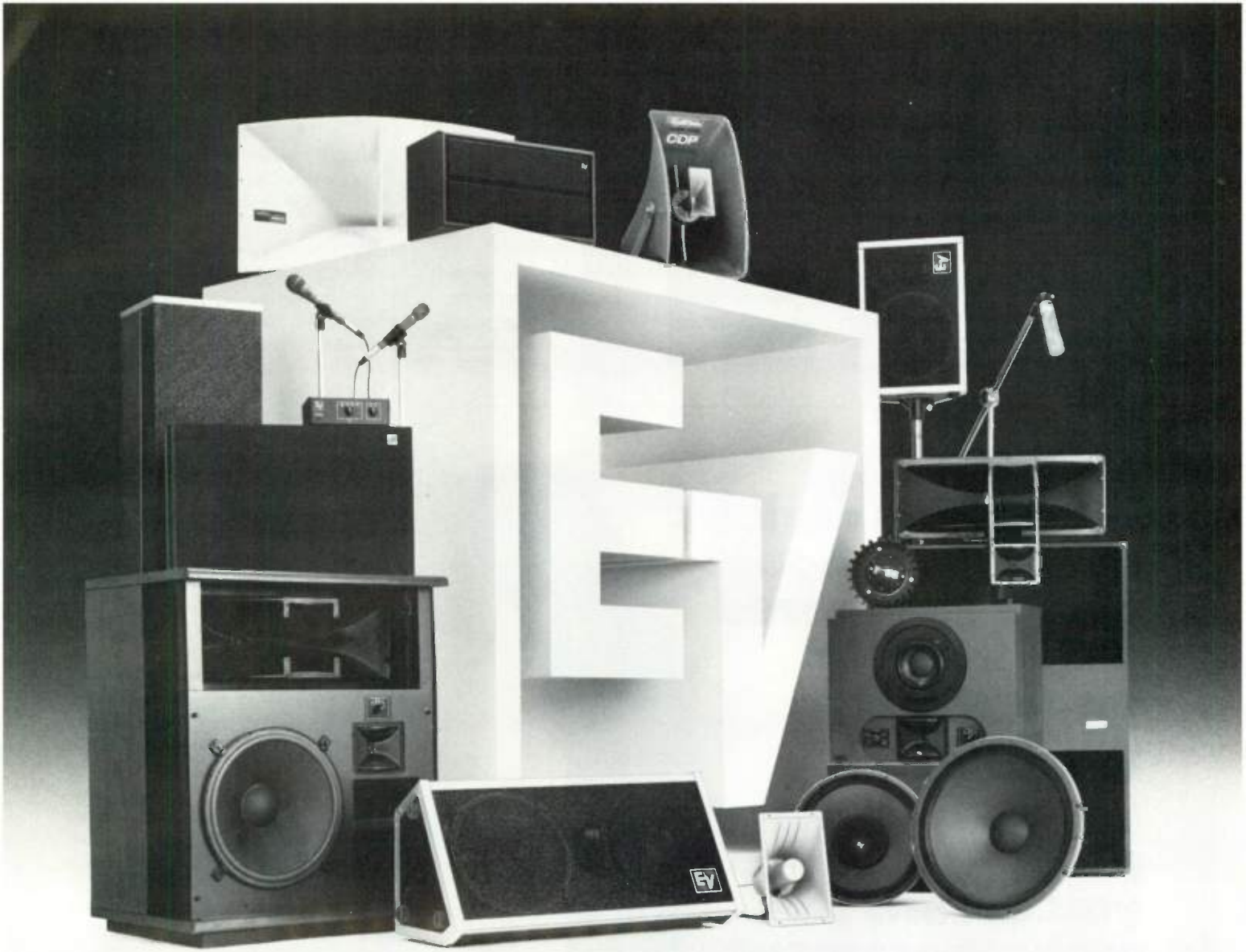
Norlin likewise has a new entry in the low-end guitar market. The Genesis, by Epiphone, is Norlin's low-cost counterpart to the Lead II by Fender and other similarly priced guitars. According to Jim Broadus of Norlin, dealer response to the Genesis was outstanding.

Ibanez also has a new low-priced line of electrics—the Roadrunner series. And of course, there's the Peavey guitar—functional and phenomenally cheap, complete with flight case! Gibson, Fender, Gretsch and Guild have all taken the design innovations of the last few years to heart. Gibson's new ES Artist features active equalization, and Fender now sells brass hardware for Tellys, Strats and Basses! Lo and Behold!

Over on the other side of this particular battlefield, the companies that started all the fuss about guitar replacement parts in the first place are becoming so solidly established that they are now beginning to offer complete guitars, and not just parts.

Shel Horlick of Schecter Guitar Research couldn't be happier with the trend. "All this does," Shel said, "is call more attention to the things that we have accomplished at Schecter. We are very flattered by all the activity in this direction."

DiMarzio Pickups now has expanded its line to include hardware and wood bodies as well as various pickups. Mighty Mite, Stars Guitars,



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Bill Lawrence—all are expanding. The big guitar manufacturers have modified their thinking to compensate for the changes brought on by custom replacement parts. As was mentioned earlier, the major manufacturers have turned their eyes toward the $500 and under price range.

Guitar manufacturers are not alone in this trend. Electronic keyboard manufacturers are introducing lower-priced synthesizers, pianos, and string synthesizers. Arp Instruments debuted the new Quartet, a four-mode multi-keyboard which retails for about half the price of the popular Omni-2. Yamaha's contribution to the low-end keyboard market is a scaled-down version of the CP-30 electronic piano—the CP-20. Yamaha also introduced a new monophonic synthesizer, the C-5.

The trend in both guitars and keyboards seemed to be toward a more affordable unit. Of course, there were exceptions to this. There were plenty of high-ticket instruments at NAMM, even up to and including the $1100 electric mandolins by Stars Guitars. However, the general flow seemed to be toward renewed low-end awareness on the part of the manufacturers.

As far as special effects go, the momentum seems to be going toward the rack-mounted modular approach. Multivox displayed a new rack-mounted analog delay; MXR had several products racked at the show; parametrics, preamps and crossovers were abundant—all in rack-mount packages. Due to this trend toward rack-mounting, there is an upswing in the demand for road cases of every description. Calzone's case display featured a disco console road case, designed to house a complete disco setup, including albums, in road cases.

As far as instrument amps go, the trend is toward smaller, more efficient amps. Guitarists are trading off their big amps for smaller units and investing in effects and sound reinforcement devices. The entire market has become more aware of good quality sound gear. Music Man, Lab, Peavey, Roland and even Marshall all have a small but stout amp that can be handled by one person in a small car. Keyboard and bass amp systems are quickly moving toward the full modular approach. E-V is offering both a keyboard and a bass speaker enclosure that are indicative of the trend toward small, efficient amp systems.

Compactness, flexibility, simplicity and affordability—these characteristics kept popping up in product after product. This is not to say that everything was cheap; obviously there were some monster products unveiled (at least as far as price goes!), but there definitely was a concentration, by American manufacturers especially on the low-end market.

By and large, the majority of exhibitors seemed to be pleased with the show, but only a few were elated with the way things were going.

Official NAMM attendance figures confirm that attendance this summer was down from last year's show in Chicago (17,131 versus 19,335 total; 9,385 versus 10,956 buyers). However, attendance was up when compared with the 1977 show in Atlanta (13,113 total; 8,342 buyers.)

Location presumably was a factor. NAMM personnel claim attendance always declines when the show is moved out of Chicago. After-the-fact critics are also claiming shortage of hotel rooms and airline seats.

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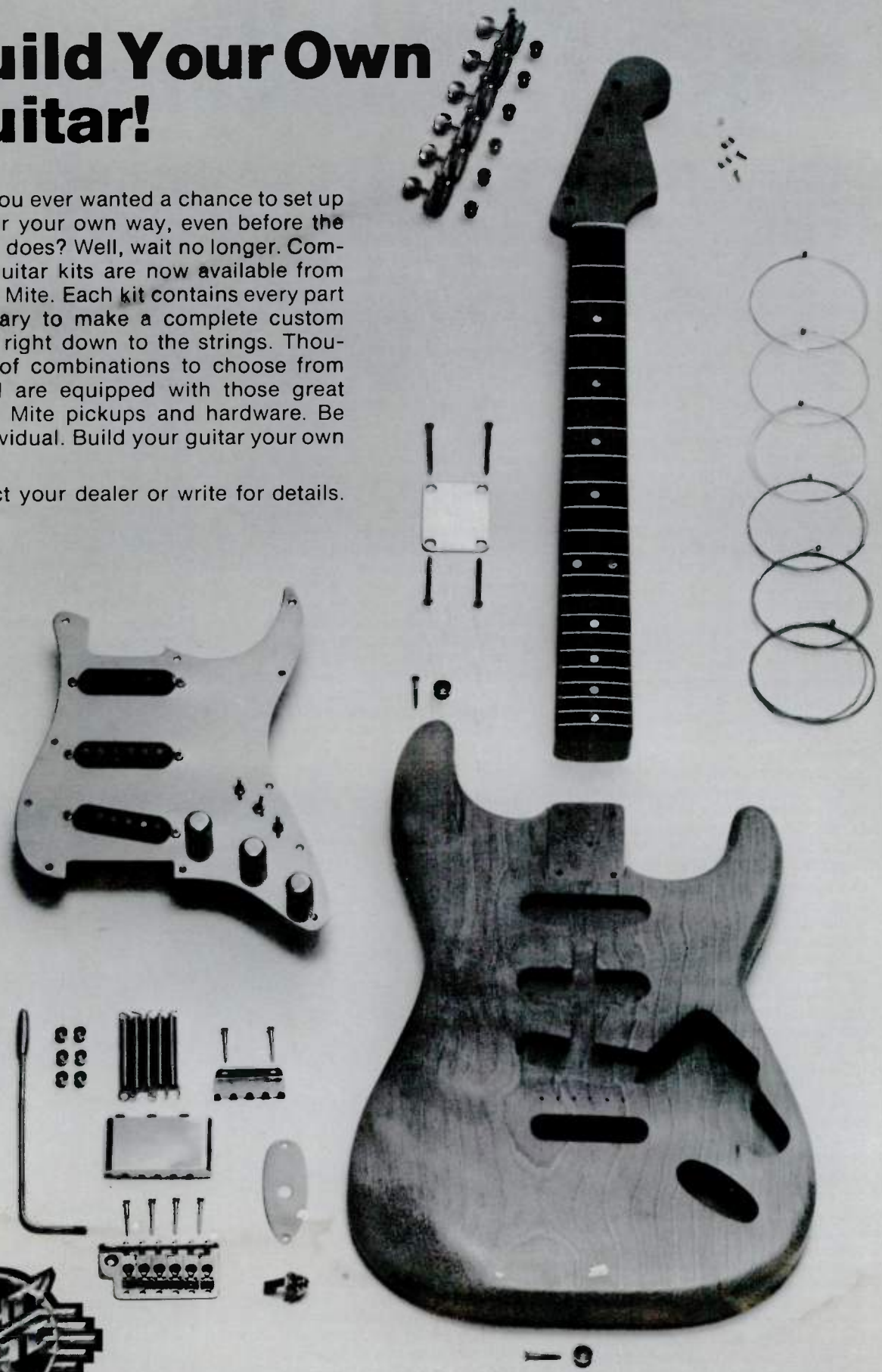

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MXR on the use of multiple effects.

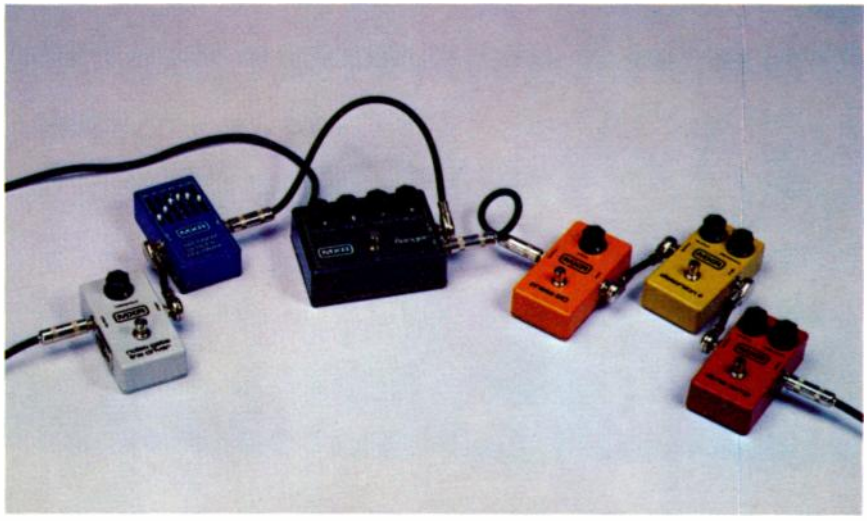
The use of special effects has become a major part of today's music. Contemporary musicians are able to reach new levels of self-expression by combining instrument and effect in the development of their technique. If multiple effects are used, not only is this expression enhanced, but a new world of totally unique sounds is provided.

Although many of today's knowledgeable musicians use multiple effects, this technique has not been exploited to its fullest. One reason for this is that the artist usually has a musical rather than technical background, and is more familiar with artistic expression than the concepts of signal processing. At MXR we feel that our knowledge as designers may be very useful to the artist. The information here has been gathered by our engineering and marketing staffs through customer feedback, research, and personal use.

The purpose of this paper is to be a comprehensive yet understandable guide for the musician who is using or planning to use effects devices. We feel that MXR products provide well designed, legitimate effects that easily interface between your musical instrument and amplifier, whether employed singularly or in multiples. The following information, however, applies to any device of the same generic type. These devices are organized into groups according to their effect on the signal.

In a hypothetical situation, where all types of devices are used simultaneously, the following groups may be distinguished. Note that the order given is for the general case. Later we will discuss some alternatives and specific applications which you can try. The first group is composed of level boosting devices and includes preamps and distortion units. They are generally placed in the front of the effects chain because they are capable of providing a higher signal level for the successive devices to work with. The second group, the dynamics dependent devices, vary their effect in relation to the level dynamics of the incoming signal. This group includes envelope filters and envelope generators. Next are compressors and limiting devices which provide a more uniform signal level. Next are phase shifters and flangers which alter different frequencies in differing amounts. Delay lines, including tape delays, analog delays, digital delays, and doublers, are the next group. Noise control devices such as noise gates and noise filters would be next and would help to decrease the overall system noise. Equalizers belong in the last group and help to tailor the entire tonal character of the signal.

Let's examine a typical situation in more detail. It is beneficial to use a preamp or compression device such as our Dyna Comp first. The compression device sets up a more constant level for the next device, which might be a distortion device. Many additional harmonics are provided by the distortion device for later stages. Next a phase shifter would produce its characteristic frequency cancellation notches. If desired, a flanger would be used next to generate many more notches, especially at higher frequencies. Use a wah-wah pedal towards the end of the effects chain since it has the capabilities (in certain frequency ranges) of overdriving devices placed after it. If you are using a delay line, it should also appear near the end, regardless of what type it is (tape, analog, or digital), since it could potentially add noise to the signal. Use a volume pedal next. It can serve as a manual noise gate, a dynamics controller, or an envelope control. A Noise Gate/Line Driver, used at the end of the chain, can create a threshold between unwanted noise and the musical signal. It can also serve as a signal splitting device for remote recording or P.A. amplification. The last device is usually an equalizer. This contours the sound or may be used to compensate for the acoustical response problems at a club, auditorium, or studio.



The goal is to achieve a desired effect, impression, or sound, without losing control and without introducing unnecessary noise. An important idea to keep in mind is to make connections as short as practical, in the interest of a cleaner signal as well as neater physical organization. For instance, if you are using four different devices simultaneously, chances are it would be to your advantage to have them relatively close together. More noise can be introduced by the cables than by the circuitry within the devices. Most MXR effects devices have been designed so that when they are switched "out" the input and output jacks are effectively tied together to help maintain a clean signal when bypassed. The exceptions are our graphic equalizer pedals which are always "in" and our Noise Gate/Line Driver whose line driver function is always "in."

Buffering devices (preamps, compressors, etc.) establish a strong or uniform driving signal. In the beginning of a long chain (more than four devices), they can prevent the effects of "loading." The symptoms of loading are loss of highs and lows and the lowering of the "signal to noise ratio." The resulting sound is one of lost crispness. All MXR products have a relatively high input impedance so that more of them can be used with less loading effects.

Whether on stage or in a recording studio, a proper arrangement of signal levels must be set at all places along the signal path. In order for any electronic device to operate at its optimum it must be used within the specific level range for which it was designed. MXR devices have been designed to accept a wide variety of

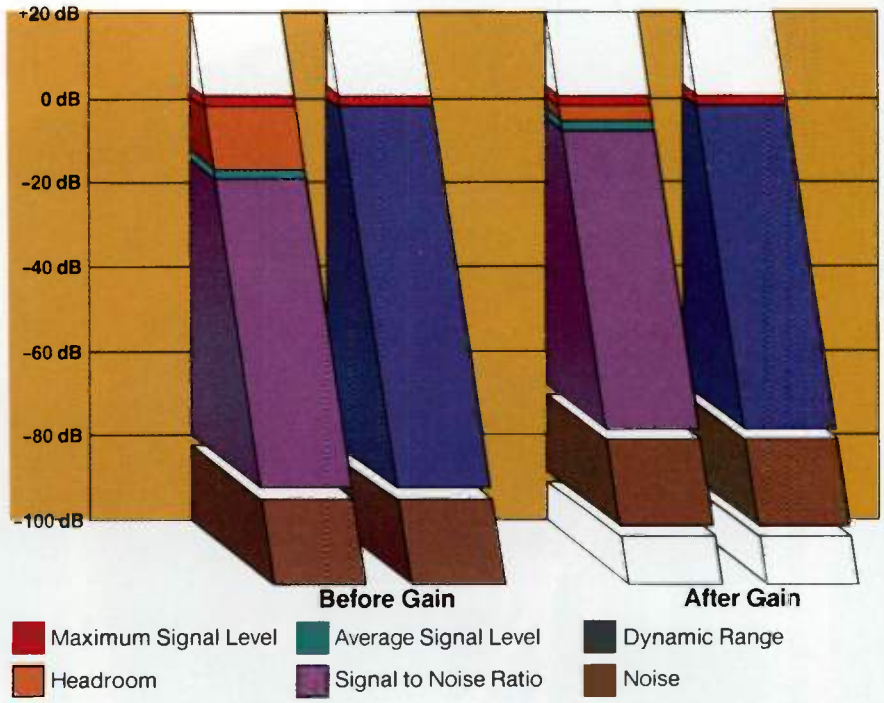
input levels. These levels must be considered, however, since they can vary greatly, depending on where the signal is coming from. Keep the signal, at all points, below the clipping level and above the noise floor. Maintaining adequate "headroom" refers to having enough room at the signal peaks to ensure that they are not clipped or distorted by the unit. Maintaining a high "signal to noise ratio" refers to having enough signal level to prevent unwanted noise from being heard.

Until now we have been primarily concerned with dynamics and level, but frequency response is also important. It is generally not advised to limit the frequency response in the beginning of the effects chain. An exception to this is the use of an equalizer at the beginning in order to purposely alter the apparent tonality of a particular instrument. An example of this is a guitarist who wants to make his guitar with humbucking pickups sound as if it had single coil pickups. Equalizers can also be used at the end of the chain to filter out unwanted high and low frequency noise.

Something to consider when using several devices is the level difference which can result from the device being switched in and out. Usually there will be a gain or output level control on the unit which enables adjustment of the modified signal's level in relation to the original or dry signal. A recommended method for achieving uniformity between signals is to play a note or chord with the device "out" then switch it "in" and play the same note again. Rotate the output control to the place where the signals are in their proper relationship according to your needs. Remember that the first devices have the potential of overloading all the rest, so be aware.

Another factor to consider is the harmonic character of the material and how it affects subsequent signal processing. To illustrate a point, consider a situation in which we can use either a compressor or a distortion device to feed a flanger or phase shifter. Theoretically, a compressor should not change the harmonic character of the signal, while the distortion unit adds many harmonics. The thickened frequency spectrum of the distortion unit offers more signal for the flanger or phase shifter to act on. The result is a more intense sound.

A compressor or limiter should generally not be used at the end of a signal chain. By definition, a



compressor brings up the lower level signal to a predetermined level. If that signal is the noise floor, then that is what will be amplified. What will result is a high concentration of circuit noise. Even though most of the higher quality units have been designed for low noise, it is still in your best interest to keep this in mind. By using a compressor or limiter before a volume pedal an interesting technique can be developed. This technique is particularly appropriate for steel guitar and electric piano. The compressor boosts the softer notes, giving the instrument greater sustain, and the volume pedal permits the artist to fade the music in and out smoothly for a fluid and gliding sound. The artist is also afforded the benefit of always knowing what level the signal is at before going into the volume pedal.

If you are using a dynamics dependent device you would not want to preceed it with a limiter. These devices are dependent upon the unaltered level dynamics of the incoming signal to control their effect and therefore will seem more subdued if preceeded by any device which alters the dynamics of the signal.

One interesting thing to try with multiple effects would be splitting the signal and processing it through different effects chains and monitoring amplifiers. Another thing to try, which is especially effective with keyboards, is to have a phase shifter sweeping with a narrow width and fast speed, running into a flanger, sweeping with a wide width and slow speed.

Once again the general rule is to run gain devices ahead of effects devices. However, always consider what the desired effect is to be. Combining knowledge and imagination can certainly help musicians (and engineers) to get more out of their art and the most from their electronics.

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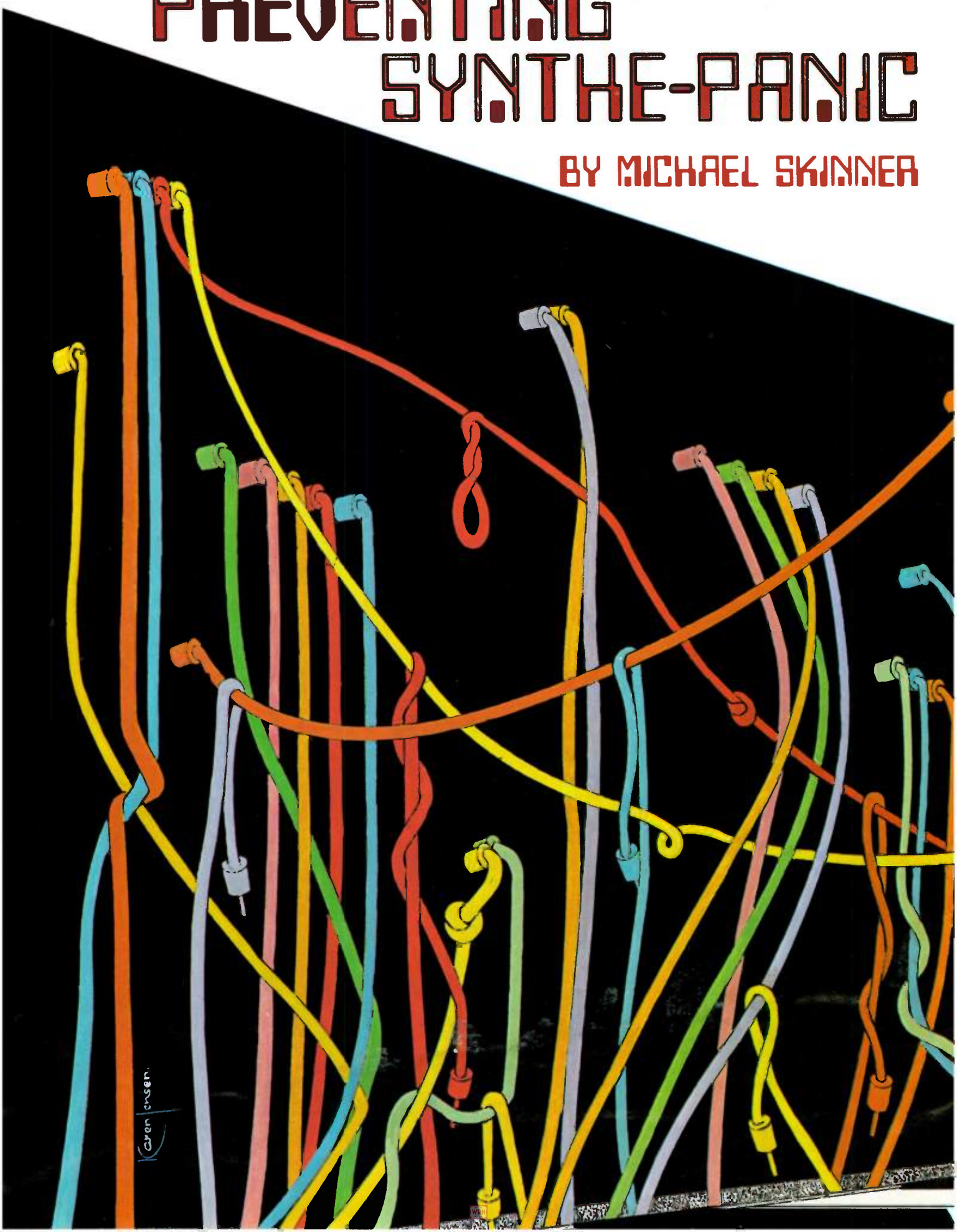
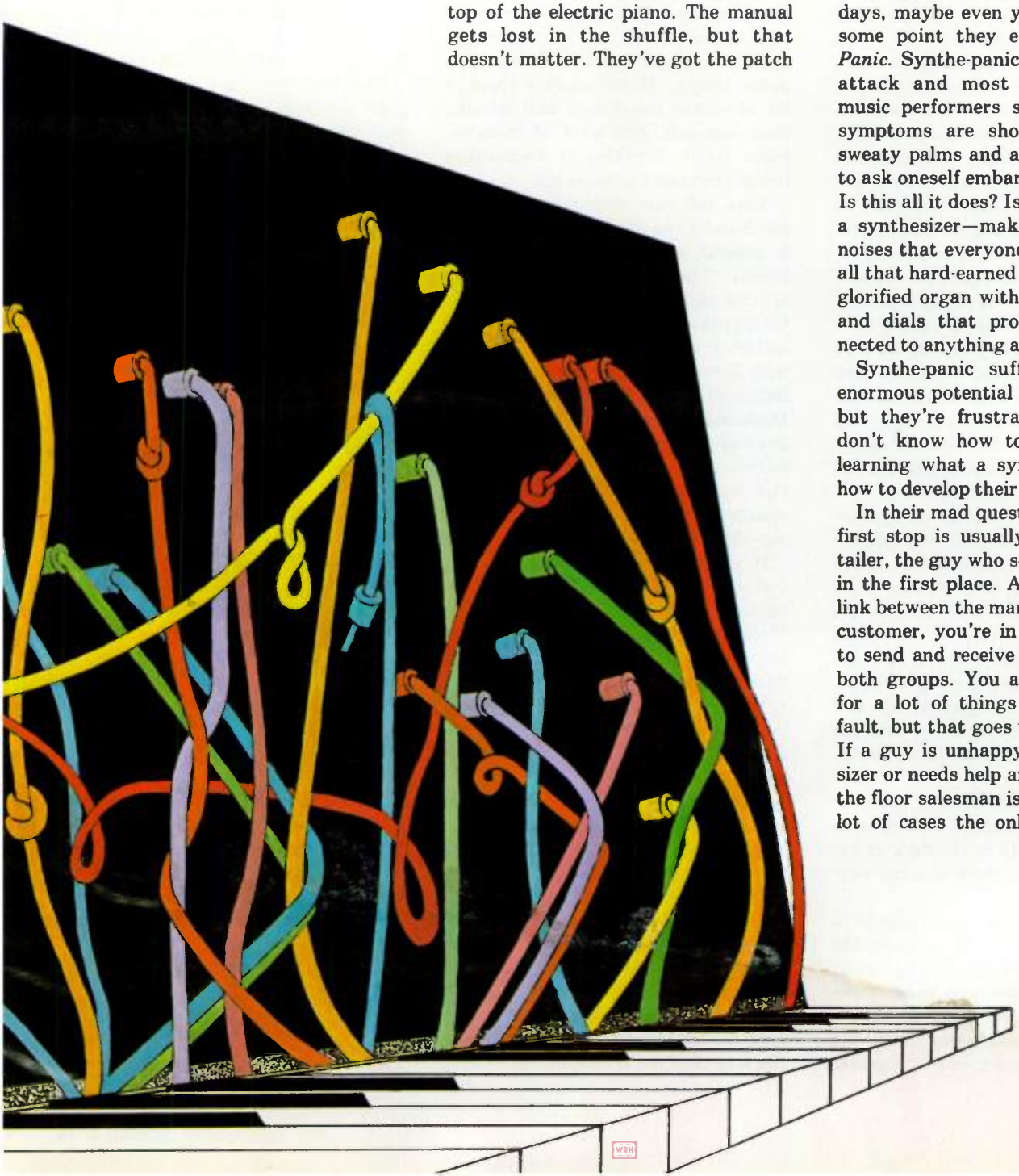
PREVENTING SYNTHE-PANIC

BY MICHAEL SKINNER



Most synthesizer customers have a perfect love/hate relationship with their instrument. It begins when they finally scrape the bucks together and take the instrument home from the music store. With trembling fingers they tear at the carton, dying to get at the thing. They can almost hear music oozing from the box, potential cellos, horns and guitars leaking out the corners. They see themselves on stage, circled in lights, ringed by adoring fans and envious guitar players. At last they're going to get even. They're going to be stars.

Finally, the synthesizer is out of the box and in its long-reserved place on top of the electric piano. The manual gets lost in the shuffle, but that doesn't matter. They've got the patch charts the manufacturer thoughtfully provided, and soon they're playing synthesizer like everyone else. The bass growl, the click twitter, the solo line doubled on the fifth—all those sounds they've heard on records and in clubs are now at their command.



But the euphoria doesn't last. At some point—maybe hours, maybe days, maybe even years later—but at some point they experience *Synthe-Panic*. Synthe-panic is a huge anxiety attack and most virgin electronic music performers suffer from it. Its symptoms are shortness of breath, sweaty palms and a horrible tendency to ask oneself embarrassing questions: Is this all it does? Is this all there is to a synthesizer—making squeaky little noises that everyone else makes? Was all that hard-earned money blown on a glorified organ with a bunch of knobs and dials that probably aren't connected to anything anyway?

Synthe-panic sufferers realize the enormous potential of the instrument, but they're frustrated because they don't know how to go about really learning what a synthesizer does, or how to develop their own style.

In their mad quest for guidance, the first stop is usually you, Mister Retailer, the guy who sold them the thing in the first place. As the only logical link between the manufacturer and the customer, you're in the best position to send and receive feedback between both groups. You also get the blame for a lot of things that aren't your fault, but that goes with the territory. If a guy is unhappy with his synthesizer or needs help and understanding, the floor salesman is the first, and in a lot of cases the only, person he can

turn to for assistance.

Unfortunately, a lot of retailers aren't equipped to treat synthe-panic victims. Quite a few know less about the instruments than do their customers. Some care only about selling and are not concerned with the slightest bit of instruction—a short-sighted approach that will only lead to fewer sales, or less profit, when price becomes the only variable in the bargain.

Most salespeople, however, know their instruments pretty well, and could help synthesizer customers, and themselves, by taking a little time with some very basic instructions and advice. It's worth it—returns are cut down drastically, and sales go up, as the customer gains confidence and respect for the salesperson.

If synthe-panic is so easy to cure, and the rewards for the retailer are so great, why, then, doesn't everybody do it? A lot of stores do, of course, setting up clinics, and hiring well-qualified sales staff. But a lot of salespeople just don't know how to teach. They may be good musicians, and know the instruments inside and out, but teaching requries a different set of values. Patience and understanding are what counts. Good chops are just gravy.

Salespeople don't have the time to take customers by the hand and lead them through the Wonderful World of Synthesizers. But at least they can point the way. Synthe-panic disappears when the three magic words are spoken: head, hands and heart.

In order to fully relate to the synthesizer, to make it talk and sing and express the player's feelings, it takes three things: You have to use your head to understand how the instrument works; you have to use your hands to play exactly what you want to play; and you have to use your heart to have anything to play at all. It's possible to skimp by on one or two, but the best players use all three—head, hands and heart.

You may know all about it, but your poor customer, stricken with synthe-panic, is completely in the dark and is counting on you to show him the way. Here's how:

Let's start with the head. In order to get the most out of a synthesizer, the player must know something about how it works. There's no need to get down to the electron level, but unless your customer has a basic knowledge of how the instrument is put together and what its capabilities are, his results will always be random and unsatisfactory. That little bit of showing off in the showroom that you did in your sales pitch was impressive and good for showing him the synthesizer's potential, but unless you're going to go to the gig with him every night and tweak the knobs, he's got to understand the beast too.

The first place to send your customer for information on his particular instrument is his owner's manual. Some manuals are better than others, but they all contain enough facts to give him a fundamental education on the potentials and limitations of his synthesizer. Tell him to read it cover to cover. If he has any questions after that, then you can help, but most of the answers can be found in the manual if people would just read the damn things. Manufacturers spend a lot of money developing and refining their manuals, and a lot of them explain basic synthesizer techniques better than most salespeople.

Next, tell your customer to read as much as he can about electronic music in general, and his synthesizer in particular. There are lots of magazine articles and books on the subject now. Unfortunately, some instructional material is simplistically cute (Fun with Doctor Synthesizer!) or tediously technical (Third Harmonic Amplitude Modulation—Is It Valid?), but read it anyway. This type of research is cumulative—the more your customer reads, the more he'll understand. Other synthesizer manuals are generally a big educational help, too.

If your customer asks a question you can't answer, don't give him a snow job. Ask the guy who made it. Most manufacturers have representatives who are experts on their company's instruments. They can be surprisingly helpful to someone who bought one of their synthesizers—even if it isn't broken. And your customer appreciates the effort.

You might want to introduce your new synthesizer customer to some of your other, more experienced customers. The new guys can pick up some valuable tips that way, and the old pros like to be deferred to as experts.

As your customer is doing his reading and research, encourage him to experiment with his instrument. Tell him to set up some random patches and then try to figure out why they sound the way they do. If he finds something good, he should write it down and attempt to isolate which qualities of that particular patch appeal to him. Later on, he probably won't have to write it down, but right now it's important to keep a record. It's a good idea to start a notebook.

Now tell him to think of a specific sound he wants—a violin, for example. After he draws the patch, he should take it over to the synthesizer and try it out. Refine it. If something doesn't sound right, take it out. It takes time and practice to develop an educated ear, but it's worth it.

Help your customer understand how the patches work, and what makes each one unique. Once he understands the basic steps of building sounds he's almost completely cured of synthe-panic. But he's got to use his head: understand, understand, understand.

Now the hands get to play. Every good musician needs chops, and the only way to get them is practice. The customer will have to devote some time to practicing on his new synthesizer. Practicing synthesizer licks on his piano won't do—that's like practicing banjo for guitar.

A lot of people, especially rookie synthesizer customers, think of their instrument as a one-note organ. They set up a patch from the book and play it one-handed, never touching the controls or varying the expression on the keyboard.

But a synthesizer is not like an organ or piano or any other keyboard. It's more like a saxophone—that different and that expressive.

One of the biggest differences is the synthesizer's ability to bend notes. In every other keyboard, the steps between notes are rigid and inflexible. But with a synthesizer, your customer can bend notes like a guitar player, he can sweep up to them like a violinist, he can add subtle vibrato like a sax man—once he learns how.

There are almost as many pitch-bend devices as there are manufacturers (wheels, knobs, flippers, ribbons, pads), and everyone thinks his is the best. They all have their advantages and disadvantages. The important thing is to find the one your customer is most comfortable with and tell him to stick with it.

Synthesizers are not magic, and good synthesizer players are made, not born. If your customer wants to be electronic music's answer to Charlie Parker, he's going to have to work at

it. There are no short cuts. He'll have to work with his pitch-bend mechanism until it becomes part of his left hand. Finding exactly the right note at the right time takes a steady hand and a lot of practice. But if your customer ever comes to you and says it's impossible or not worth it, play him a Jan Hammer record. Then tell him to go back and work some more on his pitch-bending.

It's also important that your customer know his synthesizer panel layout by memory. He can't go searching for, say, the LFO rate control in the middle of a solo—what happens if he doesn't find it? He should at least familiarize himself to the point where he doesn't need to read the panel graphics. (If he always has to make sure he's got the right knob, he'll be behind the music; he came to play, not read.) Ideally, he should get to the point where his hand naturally falls on the right control. Again, this is hard and takes a lot of practice. It's your job to convince him it's worth it.

Encourage your customer to try new licks all the time. Tell him to try different expressions (legato, staccato) and experiment with his synthesizer's trigger modes and note priority systems. The important thing is to make your customer understand that the synthesizer is no magical music machine that will play itself. Like any sophisticated musical instrument, the synthesizer takes patience and practice to play. He's got to use his hands: practice, practice, practice.

Now comes the hard part. It takes a lot of heart to really get the most out of the synthesizer. It's the hardest characteristic to develop, but it's probably the most important. Call it heart, intuition or soul, it's what separates the few very good synthesizer players from the thousands of mediocre synthesizer owners.

Unfortunately, heart can't be taught. Your customer either has it, or he doesn't have it. But nothing is more satisfying to the salesperson than to couple a natural synthesizer player to his first instrument. These guys don't need to be coaxed to practice; you can hardly drag them away from the keyboard to eat or sleep. And you don't have to read the manual to them either. They can recite it to you verbatim, page by page.

The best synthesizer players modulate constantly, switching from sound to sound, sometimes in the middle of a solo. Those controls aren't welded up there—any change is valid. The synthesizer has no fixed tone, envelope or pitch. That scares people, when it should excite them.

All those changes need to be made in real time. So your customer needs to know what he's doing—head; and how to do it—hands; but it takes heart to know why.

No matter what anybody says, the synthesizer is the hardest instrument to master because of the enormous choices involved, and no one's done it yet. Who knows? Maybe the next customer that walks through your door could be destined to become the first synthesizer superstar.

At any rate, if he really works at it and takes care of his synthesizer karma, your customer will have an exciting, almost limitless instrument, capable of expressing his most subtle feelings and ideas to the world through his music. And in the final analysis, that's what it's all about.

But you have to help him. You're the doctor that's going to cure him of synthe-panic. And the prescription is head, hands and heart.

GETTING ALONG WITH YOUR REP

By Tony Vespoli

In today's music and sound industry the successful relationship between retailers and sales reps is often seriously undermined by misunderstandings each party maintains about the other. Too many dealers believe that most of their reps are incompetent and deficient in product knowledge. Similarly, among sales reps, a general belief persists that many retailers are poor managers and chronic complainers.

There are legitimate reasons for these gripes. Incompetency, for example, does exist and rears its ugly head all too often throughout our society. Nevertheless, it is disturbing that between retailers and reps, negative feelings seem to outweigh the positive.

In this article I hope to reverse this trend by creating a higher level of understanding based on a clear representation of the true role of a sales rep. Before this can be attempted, however, it is necessary to define just what is a sales rep.

I am often amused at the various titles found on reps' business cards: Sales Manager, Regional Manager, District Manager, Marketing Manager, Sales Consultant, and Sales Representative. These lofty epithets can be mistaken for a coverup of what a rep

really is—a salesman or saleswoman. Perhaps they are used to circumvent the negative connotation our society holds for the occupation of sales. Actually, a salesman is a person who determines and satisfies human needs by offering a tangible or intangible product for a fee. Another description is that salespersons are managers of a business who, through utilizing talent, ability, and experience, can improve the lives of themselves and their customers through the sale of a product or service. Although this may be an oversimplification, an interesting point can be drawn—this is the same basic definition of a retailer. The similarities between the two positions are striking and will be discussed above.

What types of reps function in our business? There are two: the independent sales representative who is self-employed and functions as an agent for multiple concerns, and the company sales representative who is employed by an individual firm. For both, the objective is the same as described above.

Whether an individual wants to work for himself or someone else is a personal decision based on an evaluation of the advantages and disadvantages of each position. For example, the independent rep can usually determine what sales territory to work in and which products to sell from available lines. Earnings are unlimited and commission rates are sometimes higher than those paid to company reps. Unfortunately this individual has no protection from being cut-off and replaced by a company employee. Therefore, long term job security is doubtful. Also, for the independent rep, benefits such as insurance and pensions are self-funded.

The company rep usually need not worry about the future certainty of employment as long as company objectives and requirements are achieved or exceeded. Some situations exist, however, where quotas can be unreasonable if not impossible to attain. Benefits are often provided along with some training. Earning are usually unlimited but there are instances where territory size is reduced for better coverage, or commission rates are cut because the salesman is "making too much money." As a result, the incentive to sell more is often destroyed and the rep becomes an order taker.

Perhaps this discussion may seem impertinent to those readers who are not sales reps. But reps encounter problems that can easily be understood by all. For example, the majority of a salesman's time is spent on unproductive or non-selling activities. Statistics have shown that an average salesman spends 24 percent of his working time traveling, 20 percent in administrative duties, 16 percent waiting to see a prospect or customer, and 40 percent in actual selling. In the music and sound industry it is more likely that 40 percent is spent waiting and only 16 percent is for selling. This is because many retail businesses are run by one person and this person is constantly occupied or distracted.

Other every day problems of reps include long separations from families, auto breakdowns in remote towns, periods of low commissions due to economic slowdowns or labor strikes, and volumes of paper work and record keeping.

This exhortation is not intended to evoke sympathy, but rather to establish empathy—which is a quality that reps find necessary to employ in their work but often do not receive.

At this time a discussion of an important topic is necessary which will surely cause blood pressures to rise—protected product lines. Every retailer attempts to establish a niche in the market place and considers protection to be essential when making an investment in a line. The problem here is that company-sponsored franchises are rare due to the past repeal of regulations by our consumer-minded government which favors more competition in the marketplace. Another situation which affects protection is the widespread practice of "bootlegging" where a retailer will sell or exchange products with another even though the second party does not or is unable to buy the items from the supplier. This should not be confused with "transshipping" where a retailer will only sell to those who can buy from the company but are out of an item or may be on back order.

Also, it is a common belief that by having exclusivity one is going to "clean up" all the business. This is not always true because every retailer seeks to establish a clientele of satisfied customers who prefer to buy from him with confidence. Having an excellent product line with protection is not always successful in drawing satisfied clients of a competitor. Good service and integrity are more effective in bringing people in.

Another problem concerning protection which often arouses ire among retailers is how this matter is handled by reps. Sometimes promises are broken and retailers find out through a grapevine their competitors have the same products. Assuming the items in question are not bootlegged or used, this predicament is often the most difficult a rep has to handle, to a point where he is "damned if he does, damned if he doesn't."

When a rep enters the world of each retailer, certain principles and methods must be practiced in order to create a harmonious relationship. First, he has to forget any negative comments about the retailer he may have heard in the field and eliminate personal opinions formed on hearsay. Next, the rep must empathize—to put himself in the customer's position and determine which products and services being offered best serve the client's needs. Finally, the rep needs to see the good in that person and not allow apparent deficiencies to cloud his objectivity.

From a rep's point of view the main issue in making a decision about selling to a new customer concerns loyalties. A salesman must be loyal to his company which requires a good performance, loyal to himself so that he and his loved ones will be provided for, and loyal to his customers through respecting their desires and serving their needs. The difficulty lies in maintaining a proper balance among the three. If a rep favors his customers excessively, company objectives will not be met and personal needs may suffer. If he becomes a strict company man, customers may become alienated and personal credibility could be hurt. Concern only for oneself will obviously hurt the relationship with customers and could result in a dismissal by the company. Reps often walk a fine line and are forced into situations where quick decisions are necessary even though others may be negatively affected. It is not easy to be objective while trying to protect the interests of everyone and then have to do something that will turn off your friends.

This is not meant to defend those who mishandle this situation, but it is impossible to please everyone. Similarly, a retailer cannot please or sell to every prospect that enters his store.

As previously mentioned, there are many similarities between the roles of reps and retailers. For example both are basically in business for them-

selves and wish to create a profitable enterprise by developing a successful market area containing satisfied and repeat customers. Another common objective is to maximize the return on capital invested. For the retailer this investment is often the merchandise purchased which he hopes will sell well to afford a greater return on the dollars spent. The investment made by a salesman is the allocation of valuable time to achieve best sales results.

Another similarity involves a territory or location. The primary consideration for a retailer in establishing a business is to choose a location within a geographical area where a share of the market can be attained. Likewise the rep desires to capture a percentage of the business within a given territory even though he travels within it.

Finally, the key to success for the rep and the retailer is the same—to practice sound principles of management which include the setting of objectives, planning, organizing, directing, and controlling. Each area is equally important and must be fully developed, but ironically, this is where major differences exist between the two parties. Specifically, every individual in a business relationship has skills, talents, and abilities which often outshine those of his counterpart. For example a retailer might be a supersalesman but lack sufficient expertise to purchase the right products for his business. Another may be an excellent accountant and financial expert but have difficulty selling. One might have excellent control over a business which may be going bankrupt due to insufficient capital.

Similarly, one rep might possess vast amounts of product knowledge and technical expertise but not be able to turn facts into selling benefits. Another may be an aggressive and motivated salesman but have difficulty analyzing a customer's true needs. And finally a rep might be extremely well organized but have improper direction because of the absence of goals.

Everyone has his own abilities and deficiencies which make that individual unique. The problem encountered in social interaction is that we tend to remember a person's negative qualities and forget the positive.

In a way the relationship between the retailer and a rep is similar to the ancient custom of betrothal at birth, where an engagement between two newborns is arranged by the parents. For example, most reps do not have a choice of the territory they are assigned to work in. Therefore, they have to do business with a majority of the retailers within that region. Likewise the retailers cannot pick and choose their reps if they want to purchase the products being offered by the company who employs the salesman. This association can also be likened to a form of involuntary servitude where one is forced to serve the other. In other words, "it goes with the territory."

To create a successful and satisfying relationship, it is important for reps and retailers to reach a common level of understanding—a meeting of the minds—for the establishment of objectives and a plan of action utilizing the talents of both. Reps can share their technical expertise and product knowledge with customers to arrive at better selling methods. Likewise, the retailers can help by sharing information about personal selling ideas that worked for them. Both parties can exchange information about marketing trends, product developments, competition, advertising and promotion, and training. Thus reps can begin to regard their customers as valuable aids in enhancing their position and the retailer can regard the rep as his eyes and ears as to what is happening in the marketplace.

In any business a few individuals can be considered professionals. Likewise, the number of truly gross incompetents constitute a minority, but they often spoil things for everyone. The majority are honest, hard working people who just want to do their own thing and do it better without stepping on too many toes. So maybe reps and retailers should do as musicians do and "take a break" to observe what is going on around them. The music industry is getting better.

Previously, I stated that we are all in business for ourselves. This is partially true because only one individual pays our bills, feeds our families, shells out money for our vacations, and makes our lives better. That person is the King—the consumer—and is the only reason for our existence.

Let's accentuate the positive and eliminate the negative. Only then can the companies, sales reps, retailers, and consumers begin to make sweet music together.

The SOUND SH

The latest offering from **Oberheim** Electronics, makers of some of the best synthesizers available today, is a massive dual-manual eight-voice polyphonic machine with programmer—definitely *not* for the beginner!

The new behemoth from down Santa Monica way comes packed into two road cases. One houses the eight Synthesizer Expander Modules that create the eight voices. In the other road case are packed the programmer, keyboard controllers, and dual-manual keyboard.

The upper keyboard has four octaves, the lower one five octaves. The upper keyboard has a four-voice configuration, while the lower

one has an eight-voice configuration. By switching off to one of several different modes, the user can select various combinations of voices on both manuals. Mode Four, for instance, puts four voices on each keyboard; Mode Six puts two voices on top and six on the lower manual; Mode Eight puts all eight voices on the lower manual.

The lower keyboard electronics serve as the master control for pitch bend and filter control, but for the most part, the keyboard electronics function independently of each other. This means that the user can use several voices in unison, creating multilayered chords on one keyboard, and still play polyphonically on the other keyboard. And of course, the programmer enables the user to store his favorite patches and recall them at any time with the push of a button. Altogether a monster synthesizer, with monster retail: $12,500.

CIRCLE 1 ON READER SERVICE CARD

Sometimes it's the little things that drive you crazy. Like when you get your new pair of stereo speakers home and settle back to give a listen, and some spurious electronic signal dares to interfere with your party. Then it's out of the easy chair and over to the stereo, jerk everything out of place and track down the faulty connection. What a drag!

Phono plugs are notorious for this sort of thing. They always short out, break, or slip off the terminal at just the wrong time. But no more, gentle reader. Enter Yankee ingenuity with the solution in hand: a new audio cable from **Marshall** Electronics.

Several features serve to distinguish this cable from the kind now in use. The new phono plug is completely shielded and does not have slot openings; instead this cable has a spring-loaded front end that grips onto phono jacks for better connections.

A heavy-duty finger grip on either end of the cable makes it easier to connect the cable, especially when cables are changed around frequently in, say, a home recording situation. Also, built into the fingergrips are ferrite filters which eliminate instability and reduce RF interference in the signal.

The cable uses a high density braided copper shield. This low capacitance cable is available in 3, 6, 12, and 25 foot lengths.

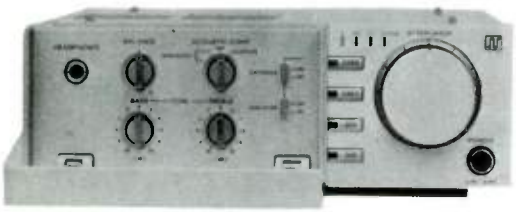
CIRCLE 2 ON READER SERVICE CARD

DOPPE

By Charlie Lawing

Speaking of little things, here's an amplifier from **Sony** Industries that measures 8½"×3¼"×13", and weighs in at a hefty 8 lbs., 3 oz! Not exactly Gargantuan, but this little unit delivers a full 50 watts per channel. The P7F is part of the first microcomponent system in the United States.

By improving the high frequency capabilities of the output transistors, reducing nega-



tive feedback, and improving power supply stability, Sony was able to improve the TIM (transient intermodulation distortion) of the amplifier to the point that the P7F operates virtually distortion free.

In order to improve the frequency response, Sony has developed a new type of power output device called the "High-f_t transistor." It is composed of multiple miniature transistors connected in parallel and offers lower distortion, greater stability and a cutoff frequency of between 50-80 mHz.

The P7F also has a unique cooling system, one that was designed by NASA spacecraft engineers. The system transfers heat generated by the power transistors into a fluid-filled heat pipe which establishes equal temperature along its length. This enables the high-f_t transistors to be mounted directly on the pre-driver circuit board, thus eliminating long connecting wires and their interference problems.

Another unique feature, the Pulse Power Supply (PPS), rectifies the 60 Hz AC directly into 20 kHz DC pulses. The transformer then steps these high frequency pulses into the operating voltages that the amplifier requires. The benefit of all this is superior voltage stability. There is only a seven percent variation in the voltage regulation of the transformer, so power is uniform under various types of speaker loads.

Functions of the amp are governed by logic IC's, which eliminate the need for point-to-point wiring of mechanical circuitry. Again, the result is greater stability of the amp.

Volume attenuator, bass and treble controls, loudness contour switch, and an "acoustic compensator" (which provides two levels of bass boost for use with miniature full range speakers) round out the controls on the front panel of the P7F.

This is a neat little package. Retail price is as yet unestablished.

CIRCLE 3 ON READER SERVICE CARD

Star Instruments' new Synare Sensor clamps directly onto any drum rim to transform it into an electronic synthesizer. The low-cost and compact device picks up the vibrations of the hit through the rim and translates them into a wide variety of popular synthesizer sounds.

The Sensor can be mounted on every drum—be it tom, snare, bass, bongo, or other—in the drummer's kit. It does not touch the drum head, mounts out of the way of the drummer, and according to Star, has no effect on the standard drum sound.

Optionally available is a foot pedal that can control the on/off operation of all Synare Sensors in use. The Sensor operates on a nine-volt battery and plugs into any instrument, P.A., or home hi-fi amplifier.

CIRCLE 4 ON READER SERVICE CARD

"It isn't enough just to have a guitar and an amplifier . . . [but] to have all the elements; tuning guides, noiseless cord, first rate picks—and those items are now in the line for everyone, from professional to beginner." With this announcement, **Fender** Musical Instruments has added four items to its inventory of guitar accessory products, expressing an understanding of the needs of musicians to have "the highest available quality in accessory aids to performance."

The expanded line includes a six-tone pitch pipe of high-impact styrene with brass resonators and a body that can be opened for reed adjustment. The pipe comes with a clear plastic carrying case.

Two tuning forks are also new: one is tuned at "A" 440, the other at "E" 659.25. Though extremely compact, these forks are warranted to be within 5 cycles of designated pitch.

Available either coiled or straight, in 20-foot lengths, a new noiseless power cord with right angled military plugs is the third new item. With its use, the electric guitarist is afforded more consistently noise-free projection through the amplifier.

The final additions are guitar picks, now available in white, as well as shell color. Supplied in six thicknesses, from .46 mm through 1.21 mm, these picks are packed in a six-pocket display kit with six designations for each pocket.

CIRCLE 5 ON READER SERVICE CARD

A few years ago, a number of small companies sprang up to produce replacement parts and pickups for those classic American guitars that were of superior quality and design. And by golly, it worked! Who among us today has not heard of **DiMarzio** pickups?

DiMarzio started out by offering a souped-up version of the Gibson humbucker, then went on to replacement pickups for Fender guitars and basses as well, and from there they developed their own designs for both electric and acoustic guitars.

Up to this point, pickups were the primary concern of the DiMarzio people, but the times they are a-changin'. DiMarzio now offers a complete line of hardware and electronic accessories for both guitar and bass.

DiMarzio offers a full complement of brass and chrome parts for Gibsons. Pickup covers, strap buttons, nuts, bridges, tailpieces, and mounting screws are offered. Among other things, there is also a complete Les Paul style hardware kit.

For the Fender guitar player, there is a similar line of parts, including a Bass Hardware Kit for P-Bass and J-Bass players.

Also new from DiMarzio this year are several pickups: a new Super II, a Model G Bass pickup, and a X2-N Power Plus pickup.

CIRCLE 6 ON READER SERVICE CARD

Four new products have been announced by **Tapco**, including the C-12 mixer, which has a 12 x 4 x 2 x 1 format: 12 inputs, 4 subgroup inputs and outputs, 2 main outputs and 1 mono output. Each channel boasts its own mic/line level switch; overload-indicating peak level LED; trim control; monitor send control that is pre-fader, pre-EQ; auxiliary input send that is pre- or post-fader and EQ; effects send that is post-fader and post-EQ; treble EQ (±18 dB at 15 kHz shelving); midrange EQ (±12 dB); low EQ (±18 dB at 50 Hz shelving); frequency sweep control (300 Hz to 6 kHz); channel assign switches for routing each channel's output to either subgroups 1 and 2 or to subgroups 3 and 4; pan pot; solo switch; and slider pot. The C-12 has a built-in headphone amp, as well as balanced and unbalanced inputs, four VU meters, patch bay

the SOUND SHOPPE
REAR ENTRANCE

in the front panel and phantom power supply.

Tapco's new CP-X is a high-performance electronic crossover for use as either a stereo 2-way crossover or as a mono 3-way crossover. It includes true 18 dB/octave Butterworth Filters and a single, continuously variable front panel control for simultaneous tuning of both high and low pass sections over the range of 90 Hz to 16 kHz. The CP-X also incorporates BI-FET technology that provides less than .05 percent distortion over the audio band at any output before clipping.

Both individual high and low level controls are provided as well as an overall gain control, and the crossover has a time delay relay circuit, both unbalanced and AGLC balanced outputs, balanced inputs, peak overload LEDs and a high current output stage capable of +20 dBm into a 600 ohm load.

The third new item is the 8201REB extender, a piece of equipment that provides an additional eight input channels (with identical features) to a Tapco 6201B and 8201B master unit, along with the added feature of built-in reverb. This reverb system provides treble, bass, pan and reverb level controls for flexible mixing of the reverberant signal back onto the stereo bus.

When interpatched, metering and controls of main stereo output, monitor output and external effects return stay with the master (6201B or 8201B), while effects send and internal reverb become the duty of the 8201B extender.

Finally, a 2-channel graphic equalizer offering ten octave bands per channel, the C-201, sports peak sensing LEDs to monitor every circuit stage for possible overload. Relays automatically disconnect the C-201 during turn on/off to eliminate feedthrough thump or pop. Provided are both unbalanced and balanced inputs and a high current output stage capable of delivering 20 dBm into a 600 ohm load to drive both unbalanced and AGLC outputs. (AGLC, Automatic Ground Loop Compensation, senses differences in ground potentials between the C-201 and the next stage, and automatically attenuates any induced hum by typically 40 dB).

All this in addition to the usual front panel channel gain controls, IN/OUT switches and individual slide pots, as well as BI-FET and high-slew Bi-Polar opamps.

CIRCLE 7 ON READER SERVICE CARD

Weighing in at a mere 23 pounds, the Tiny Tiger, model XL 8 from **Barcus-Berry**, is a "midgitized" amplifier designed for professional use.

Utilizing many of the same design features found in the company's 120- and 200-watt XL Series amps, the XL 8 is a "dynamite little practice amp, studio monitor and small-club amplifier."

Average program power delivered is a full 15 watts into 4 ohms, with only one percent total harmonic distortion at full rated output. Coupled with its efficient eight-inch speaker in a reflex enclosure, the XL 8 can deliver sound exceeding that of larger, less efficient instrument amplifiers.

This amp's other specifications include −3 dB at 30 Hz and at 15 kHz for bandwidth, output line impedance of 10,000 ohms, treble tone range 20 dB at 5 kHz, midrange 10 dB at 400 Hz, bass 15 dB at 100 Hz. It measures 15½ inches wide, 10 inches deep, and 15¾ inches (including feet and handle) high.

CIRCLE 8 ON READER SERVICE CARD

By Tom Wuckovich

DEALER DOSSIER

Paragon Music
Tampa, Florida

Paragon. The dictionary defines the word as a model of excellence or perfection. That description is the motivating factor for Paragon Music Stores.

For the past ten years, Dick Rumore and his staff have built Paragon from a tiny one-room store, which initially sold accordions, into a million dollar music palace that showcases the best in music lines and tops in musical talent.

Rumore, a musician himself for 20 years before deciding to sell instead of play, knew exactly what he wanted to do and how he wanted to do it. His store was a success from the beginning and his methods of operation in retailing are admired throughout the Tampa Bay area.

Dick has a staff of highly trained specialists, and he recently opened a store in St. Petersburg under the management of a long-time friend and musician Robin Sibucoa. His brother Randy Rumore has taken an active part in the main store's operation, and the three of them were excited over the growth in the industry.

Dick, Randy, and Robin get together often to discuss the business trends. In a recent interview they talked candidly about their operations.

What was your philosophy upon opening your shop?

Dick: Service. We built the store on service. Over one-third of our facilities are dedicated to service. Also fair price. What we've done is try to give the very best buy at the very best possible price. We're competitive in every respect in the price field.

Has that philosophy changed much?

Dick: Not in the least. We still pride ourselves on our service capabilities. Even in expansion we have allowed for service to continue to grow. We started with one technician and now we have five.

How many different departments do you have in your stores?

Robin: We have a total of seven. One section deals with guitars and amplifiers. It's stocked with electric guitars on one side and acoustics on the other. In between, we have the amplifier combinations mixed together with effects pedals and devices. All the amps are plugged in and ready for trial so the customer does not have to lose his concentration by running wires and can focus directly on the sound and performance.

Have you seen a trend in the purchase of amps, especially in purchases made by working bands?

Robin: Yes. The small amps, two 12- and four 10-inch speaker combinations have become extremely popular because of on-stage mixing and recording. We have geared our major selection of guitar amps in this direction. We still carry some stack combinations for the die-hard rockers, but the bulk of our sales are Fender twin size amplifiers.

What lines do you stock?

Randy: Actually, we stock just about anything: Peavey, Sunn, Vega, TEAC, BGW, Bose, Gollehon, Fender, Ovation, Gibson, Guild, Shure, JBL, ARP, Crumar. The big factor in choosing what to carry is what response it's been getting from musicians, and then if our customers seem interested, we check it out. They're the ones who use it, so they know if it's worth looking at. We then research it thoroughly and test it before deciding to add it to our inventory.

Can you service all the lines without difficulty?

Randy: Certainly. As I said, this is our specialty. Each of our technicians is a specialist and highly qualified. We still have a tube bench for people who still prefer the tube amps, manned by a 75-year-old technician that we nicknamed the "Whip." He loves the tube work. He said his one ambition is to be buried in a 415 Marshall bottom. But this just goes to show you the type of personnel we have. We also have a solid state bench and a digital bench, since music has evolved to that degree.

How have you adapted to the changes?

ROAD TOUGH? PROVE IT.

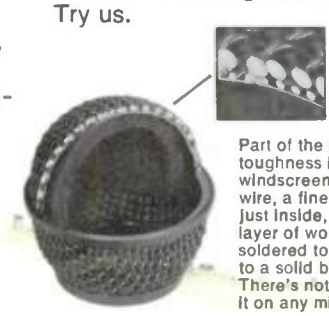
It's six long feet to the floor. What will happen when our great sound hits bottom? How long will it still sound great? We had to find out. So we picked an ATM41 Dynamic and an ATM91 Fixed-Charge Condenser out of stock, tested them, and started in.

Each was dropped seven times on its side from six feet onto the office floor. Nothing much was happening. So we repeated the series, this time dropping each microphone on its nose. Seven times from six feet. Still no problems. They looked good and sounded good, but *we* were getting tired.

So we moved to an unyeilding slate floor. Here it took three more drops on its side from six feet, and three more on its nose from four feet to finally affect the ATM41. A truly remarkable record!

But what about our ATM91 Fixed-Charge Condenser? It should have given up long before a dynamic. But quite the contrary! The ATM91 withstood four side drops onto slate from six feet, three drops right on the nose from four feet, and another six drops on the nose from *six* feet and still tested OK for sound! Granted it looked anything but new, but it *still performed*

Our little test left us arm-weary but convinced that the ATM Series microphones could easily earn their "Road Tough" name in the field. That's the testing which really counts. Try us.



Part of the secret of ATM toughness is this 3-layer windscreen. An outer heavy wire, a finer wire screen just inside, and an inner layer of woven bronze. All soldered to each other and to a solid brass ring. There's nothing else like it on any microphone.

This ATM91 survived 27 drops from as high as 6 feet!

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CIRCLE 98 ON READER SERVICE CARD

Dick: By broadening the base of our stores. Music stores used to be in one room. Now, because of the changes and the competition, the small specialized store is on its way out. More stores are changing to accommodate different sections. More emphasize teaching facilities. The trend is to be bigger and better.

What facilities do you offer to customers?

Randy: We have a performance room for trial, a recording room, a constant stock rotation, large selections of little parts, and of course, service.

Tell me more about your teaching facilities.

Dick: We recently acquired a motel next door to the store and are presently completely renovating it to fit all our teaching needs. There will be individual rooms for each instrument being taught. There will be complete privacy and the teacher can set his or her own schedule without creating problems for other teachers and students. It will be a tremendous boost to our teaching program.

That is important to you, isn't it?

Dick: Absolutely. You know that in Florida, and particularly here in Hillsborough County, band programs have been curtailed or cut back sharply. Instruction has to come from somewhere, and we hope we can fill a part of that void. We are offering an alternative to the decline in the band programs.

Do you also schedule clinics, or don't you use that format?

Randy: Oh no, we hold clinics constantly, as a public service. We get some of the top people in the world of music in here for demonstrations. We've had, in the past, Louie Belsen, Carmen Appice, Billy Cobham, Ramon Lopez, Mike Elliott, and Elliott Randall. We think the customer appreciates this kind of attention and it shows him we care what he thinks about the store and about the personnel that work here.

How do you choose personnel?

Robin: Carefully. Seriously though, we try to find people with a good musical and technical background. We don't go heavy on salesmanship because we feel we can offer so much more just by example. We try never to deal heavy handedly with customers. Our people are out to serve the needs of the customer and, first and foremost, they should be able to ascertain the needs of the individual or group before trying to sell them something.

How is that done?

Robin: By personal interview of course, but we also have a detailed questionnaire that we give the customer to fill out. It even asks him about the size of his automobile. We are not going to sell him an amp that he can't even fit into his vehicle. It's just an example of the details we look for before we try to fit the purchase to the customer.

It sounds like you have a thorough program.

Randy: We feel like we do. All we want our customer to worry about is how he sounds. We can take care of the rest. Actually, we can also help him develop his sound.

How's that?

Randy: We have a performance center which we offer to groups free of charge. It's set up with an eight-track recording system and bands can come in and cut demos or whatever. The set-up has proved very valuable to us in

INDUSTRY UPDATE

Optonica High Fidelity Products has appointed six new sales representative firms: Target Marketing; Consolidated Sales; M. Rothman and Company; CHF Sales Company; Bishop Enterprises; and Larry Sinclair and Associates.

Bill W. Weisman, National Accounts Manager for Ampex consumer magnetic tape products, is leaving the company to form his own manufacturers' representative firm in northern California.

New representatives for Tandberg of America, Inc. are Elliott Sales Company for Iowa, Kansas, Missouri and Nebraska; and Cheshire Marketing for northern California and northern Nevada. Additional territory of Virginia and DC has been assigned to The Elmark Company.

John Phelan has been appointed to the newly created position of General Manager for Filmways Audio Services. Phelan was previously manager, professional sound products with Shure Brothers.

BASF Systems has appointed two additional manufacturers' representative firms for sales of its premium audio and video recording tape lines: Ben Elliott and Associates will service Georgia, Alabama, Tennessee, North and South Carolina; Hutto Hawkins Peregoy Inc. will represent the company in Florida.

C. Victor Campos has been named Director of Member Services of the Consumer Electronics Group of the Electronic Industries Association. An acoustical engineer, Campos was previously with Acoustic Research and KLH.

Joe R. Williams has been named National Sales Manager, Retail Market, for 3M Company's Magnetic Audio/Video Products Division. Williams was formerly international marketing manager for the division.

James D. Dodson has been elected to the newly created position of President and Chief Operating Officer of Koss Corporation. The Koss executive management team will feature an organizational structure known as the "chairman's office," consisting of John C. Koss, Jim Dodson and Executive Vice President Greg Cornehls, who is totally responsible for worldwide sales.

MCI, Inc. has entered into an agreement to purchase for $4.25 million, 23.5 acres, including a 156,000-square-foot building which will eventually serve as corporate headquarters.

U.S. Microfilm Sales Corporation has been merged into Fuji Photo Film U.S.A. Inc., becoming the Micrographic Division of Fuji, responsible for marketing Fuji microfilm products.

Teledyne Acoustic Research has named **Timothy Holl** Vice President of Engineering. Holl has been with AR since 1972.

Soundcraftsmen has appointed Pacific South Coast Marketing as its representative for the state of Arizona, adding to its territory which includes southern California as well as southern Nevada.

Thomas Ventura has been appointed Southern California District Manager for Visonik of America. Ventura was previously with Pacific Stereo, Sound Circuit, Shelley's Audio and University Stereo.

Altair Corporation has appointed three new rep firms: Riley and Petchell Sales for Michigan; Matrix Marketing for western Montana, Washington, Oregon, Idaho, Alaska and Hawaii; and Dobbs and Stanford Corp. for Texas, Louisiana, Oklahoma and Arkansas.

Akai America, Ltd. has named **Ken Emmer** Eastern Regional Sales Manager for the firm's Audio Division.

Westape, an audio cassette production and duplication facility, has opened for business in Campbell, California, serving eleven western states and Hawaii. **Michael Papp** is Sales Manager. The company is a division of Inovonics, Inc.

Celestion Industries, Inc. has appointed The Jerry Kaplan Company its exclusive representative for the New York/New Jersey metropolitan area. **Jerry Kaplan** was previously Vice President and General Manager of Lux Audio of America.

White Instruments Inc. has appointed Audio Marketing Associates as their representative in Ohio, West Virginia and western Pennsylvania.

Audio International (N.J.) has acquired Mastertone Recording Studios. Both firms will remain separate entities, with Audio International providing equipment sales and installation services and on-call maintenance staff for pro and semi-pro facilities, and Mastertone continuing to provide professional recording services.

Evan Struhl has assumed the position of Chief Engineer of Polydax Speaker Corporation, a subsidiary of Audax, France. Struhl was previously with Micro-Acoustics Corporation.

Quad-Eight has appointed **Don Hudson** Vice-President of Operations. Hudson has served as director of operational planning for Altec Lansing Corp.

Rick Belmont has been named Vice President of Marketing and Sales for the ProTech Audio Corporation, which recently acquired the product line of the Robins Broadcast and Sound Equipment Corporation.

Jack Wayman, Senior Vice President of the International Consumer Electronics Shows, was named "1979 Man of the Year" by the National Association of Retail Dealers.

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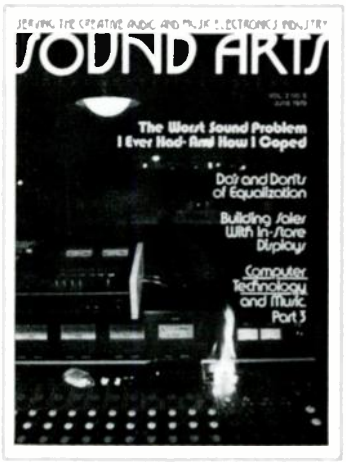

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