SERVING THE CREATIVE AUDIO AND MUSIC ELECTRO[NICS] INDUSTRY

SOUND AR[TS]

MERCHANDISING JOURNAL

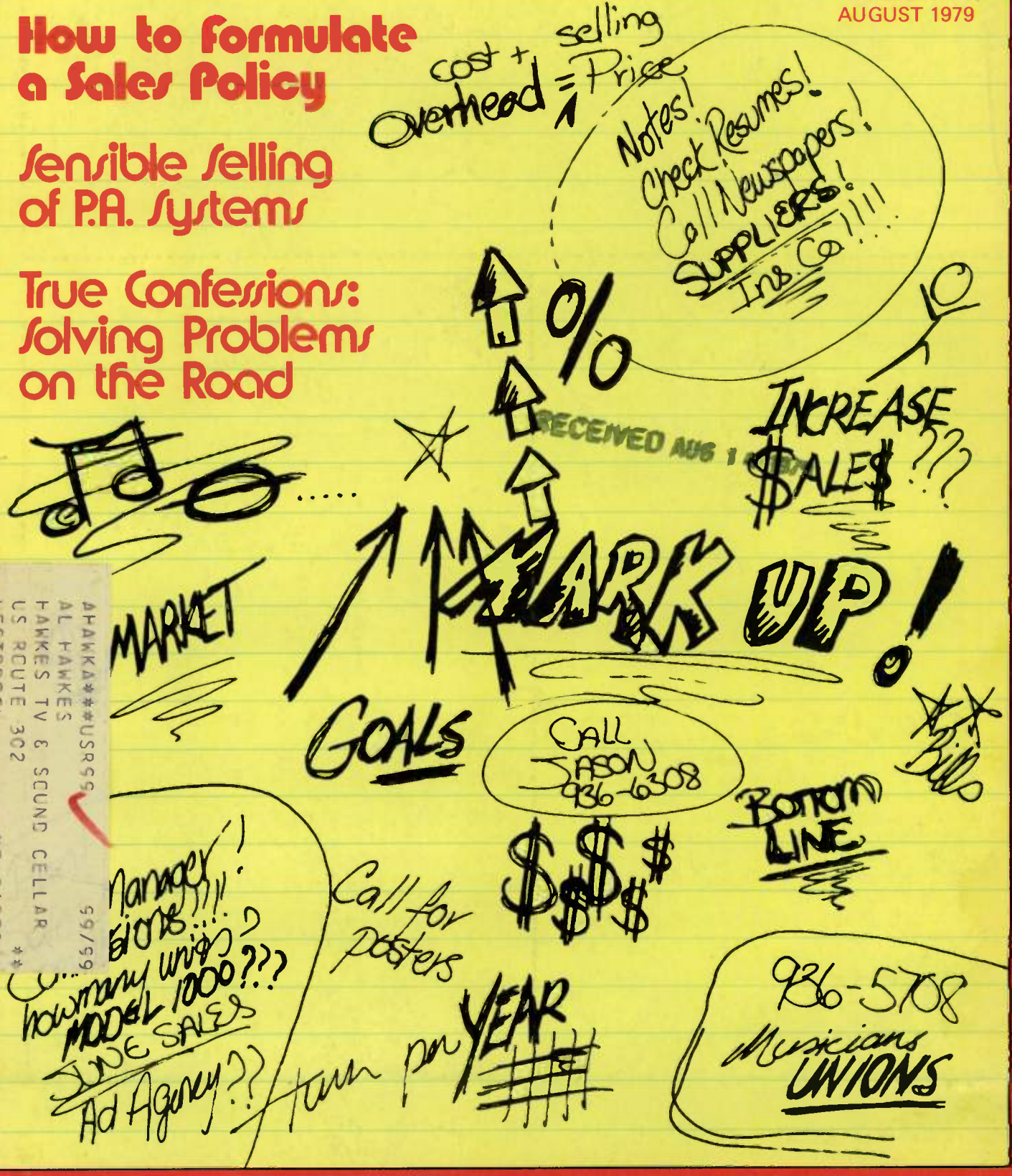
VOL. 2 NO. 7
AUGUST 1979

Special: DEALER DATA FILE

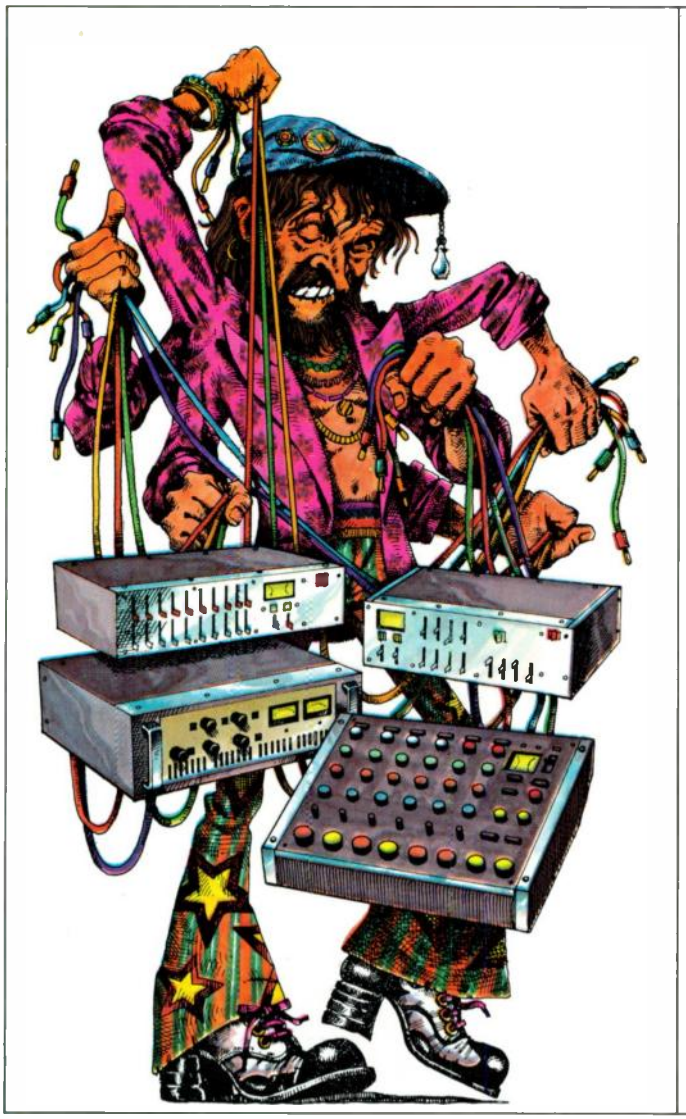
How to Formulate a Sales Policy

Sensible Selling of P.A. Systems

True Confessions: Solving Problems on the Road



THE LONG AND THE SHORT OF SOUND REINFORCEMENT.



You know about the long part. Separate components can keep your hands full, what with the extra help and time needed to get your sound reinforcement act together.

Now for the short part. The Yamaha EM-200 and EM-300 stereo output integrated mixers. They leave you free to concentrate on the creativity of your job, not the mechanics of it.

You get the mixer, power amplifier, 9-band graphic equalizer, echo and reverb control **all in one unit**—great flexibility with options to expand and enlarge.

The EM-200 and EM-300 are ideal for small to medium size reinforcement applications, wherever you need a precisely placed, superbly clean and well-defined sound from a compact source that is easy to set up and operate.

The EM-200 has eight input channels and 120-watt speaker output. The EM-300 has 12 input channels and 200-watt speaker output. For increased flexibility, both the EM-200 and EM-300 have hi and lo impedance monitor output levels (+4dB into 10K ohms, and 0dB into 600 ohms). Additionally, eight patch points allow you to connect accessories directly to the mixer's power amp for dramatically lower noise levels.

The EM-200 and EM-300 give you the short-cut to reinforcement that won't short-change the quality of your sound. They're convenient to set up, operate and locate...at your Yamaha dealer now.

YAMAHA

P.O. Box 6600, Buena Park, CA 90622

CIRCLE 96 ON READER SERVICE CARD

TDK SA

Number 1 selling high bias cassette in America.

TDK

World Leader in Recording Tape Technology.
TDK Electronics Corp., Garden City, New York 11530

CIRCLE 76 ON READER SERVICE CARD

WRH

For some professionals, precision is not enough.

We've created the Peavey T-40 for the musician who requires much more from his instrument. We began with a lean and contoured body design for maximum playing comfort and beauty. We used only the finest select ash hardwoods to provide a high density body that is as durable as it is graceful.

We spent years developing designs and methods that have resulted in what has been described as "the finest neck and fret job available on any production guitar,...regardless of price." The T-40's neck has a feel and playability that makes fingering almost effortless.

Still, even with the finest materials and methods, we realize that an instrument is only as good as it sounds. This is where the T-40 really shines.

The T-40's special dual pickup circuit design produces a range of tonal variations never before available from a bass guitar, without the "crutch" of preamps and batteries. Deep, powerful lows, punching mids, and crisp highs; the T-40 has it all with a minimum of complicated controls and switches.

We added to this special die-cast, chrome plated hardware, precision tuning machines, and a form fitting, high quality case as standard equipment.

Finally, we gave the T-40 something no other bass guitar has ever had: the Peavey reputation for excellence.

The Peavey T-40 Bass and T-60 Guitar are now available with Rosewood necks and Southern Tobacco sunburst finish options. Soon at selected Peavey dealers in your area.

PEAVEY

PEAVEY ELECTRONICS CORP. 711 A Street/Meridian MS. 39301

CIRCLE 91 ON READER SERVICE CARD

SERVING THE CREATIVE AUDIO AND MUSIC ELECTRONICS INDUSTRY

VOL. 2 NO. 7

SOUND ARTS

MERCHANDISING JOURNAL

AUGUST 1979

CONTENTS

THE FEATURES

THE STAPLES

COMING NEXT ISSUE!

Disco Roundup
Recording Roots
Loudspeaker Esoterica

Cover art by Karen Jensen

Sound Arts Merchandising Journal (USPS 410-410) is published monthly by Cowan Publishing Corp., 14 Vanderventer Ave., Port Washington, N.Y. 11050. Controlled circulation postage paid at Hanover, New Hampshire 03755. Subscription rates for other than qualified individuals or companies: $18.00 for 12 issues; $26.00 for 24 issues. Add $7.00 per year for subscriptions outside of U.S. Subscriptions must be paid in American currency. Postmaster: Send Form 3579 to Sound Arts Merchandising Journal, 14 Vanderventer Ave., Port Washington, N.Y. 11050.

SERVING THE CREATIVE AUDIO AND MUSIC ELECTRONICS INDUSTRY
SOUND ARTS
MERCHANDISING JOURNAL

Editorial and Executive Offices
Sound Arts Merchandising Journal
14 Vanderventer Ave.
Port Washington, N.Y. 11050
516-883-5705

COWAN PUBLISHING CORPORATION
Richard A. Cowan, Chairman of the Board & President; Cary L. Cowan, Vice President; Jack N. Schneider, Vice President, Marketing; Richard A. Ross, Vice President, General Manager; Marc L. Gilman, Credit Manager; Amy C. Gilman, Secretary/Treasurer; Sanford R. Cowan, Founder & President Emeritus.

Editorial contributions should be addressed to The Editor, Sound Arts, 14 Vanderventer Ave., Port Washington, N.Y. 11050. Unsolicited manuscripts will be treated with care and must be accompanied by return postage.

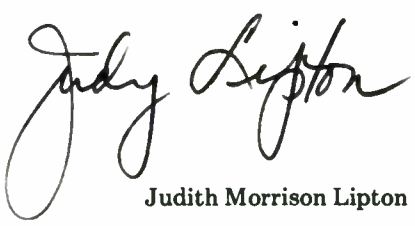
A LETTER FROM THE EDITOR

This is the month for true confessions. Ralph Morris gives us, in this issue, his true confessions of the worst sound problems he ever encountered, ending our coverage for the time on this aspect of the industry. And I think I will indulge myself by making a true confession of my own—specifically concerning our SOUND ARTS covers and the unusual opportunity they give us to be less than serious about serious subjects. We've done gold mines, dollar signs, diaries, and diagrams on our covers. This month, doodles take center stage. It's a participatory cover in that several staff members donated their doodles to the cause. And I think it serves its purpose by graphically illustrating the infinite inputs that go into formulating business policy.

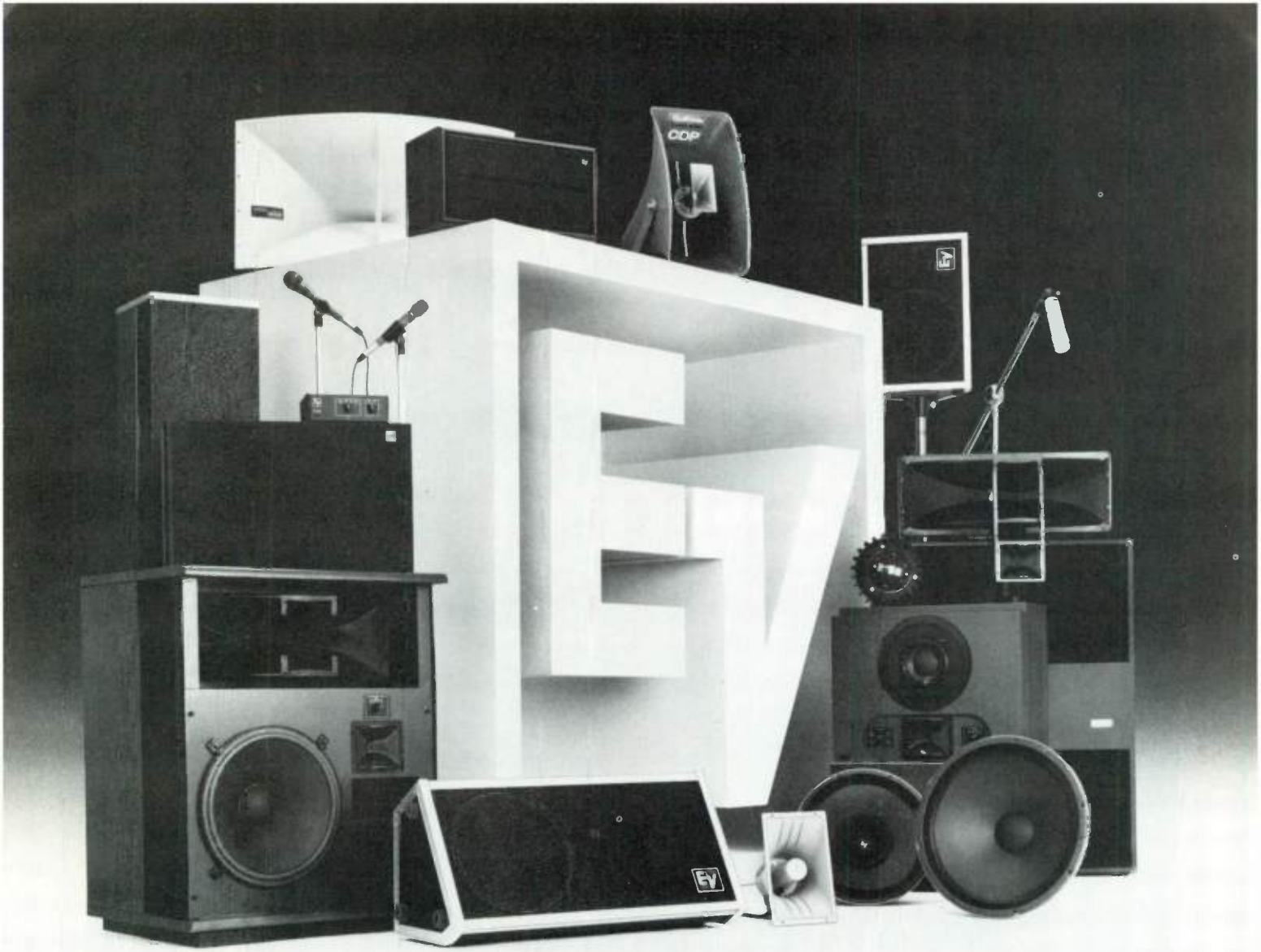
Our June cover, for example, allowed us the perverse delight of creating the ultimate impossible nightmare. You may remember that the photograph illustrated our writer's worst sound problem ever by carrying it to absurdity—a nightclub, a mixer, a blaze and an aura of smoky catastrophe. We carefully avoided identification of the equipment—partly because the article referred to a *custom-made* mixer that malfunctioned, but mostly because we couldn't find a mixer unreliable enough to go up in flame or personnel careless enough to precipitate that flame. In other words, the stunt was staged for effect to illustrate the substance. The equipment photographed was dummied up to be nonspecific and caught in a situation impossible in the real world. I think it worked because those of our readers sophisticated enough to spot the origins of the equipment are also sophisticated enough to know the reliability of that equipment. Our cover was Theater of the Absurd and it was fun to do.

Similarly, this month we staged our cover doodles. They're a composite of thoughts that should be basic to the formulation of a sales policy. And those thoughts are formless until they're coalesced into rational goals and procedures. We are thus beginning an intermittent series, by several writers, on the formation of policies by which to run an organization. We're starting off with general concepts—or prime movers—and will get more specific in the coming months. Policy formation, as in magazine cover production, and as in music itself, is where staging and effect have to coalesce into rational substance. Staging is essential, stunts are fun, but the goals must be pure.

Regards,



Judith Morrison Lipton



Listen to the Electro-Voice story. Your customers are.

As a dealer, you should be interested in the Electro-Voice story, because whether you are selling to the music market, the high fidelity market, the commercial market or the professional market, Electro-Voice is the leader.

The music that your customers listen to at home was probably recorded using Electro-Voice professional microphones and mixed using E-V Sentry® studio monitors. Is it any wonder that E-V Interface® high fidelity speaker systems are rated among the finest for home systems?

If music is your business, it's good to know that the famous EVM loudspeakers are not only standard in many manufacturers' "premier" lines of enclosures, but are the replacement speakers of choice by many concert sound men. These same speakers are standard in *every* Electro-Voice music speaker product. And E-V microphones are seen being used by more vocalists and instrumentalists on stage than ever before.

Commercial Sound? Think of installations like the Pontiac Silverdome, Yankee Stadium and the Las Vegas Convention Center. They're all Electro-Voice. No wonder so many contractors turn to Electro-Voice sound systems for their church, gymnasium and office building contract-sound installations.

If your business is selling sound, Electro-Voice has a story to tell! A story your customers will want to hear. A story that will make a lot of profitable sales for you. To hear the Electro-Voice sales story in person, contact Dave Rothfeld, General Sales Manager, Electro-Voice, Inc., 600 Cecil Street, Buchanan, MI 49107. Phone 616/695-6831.

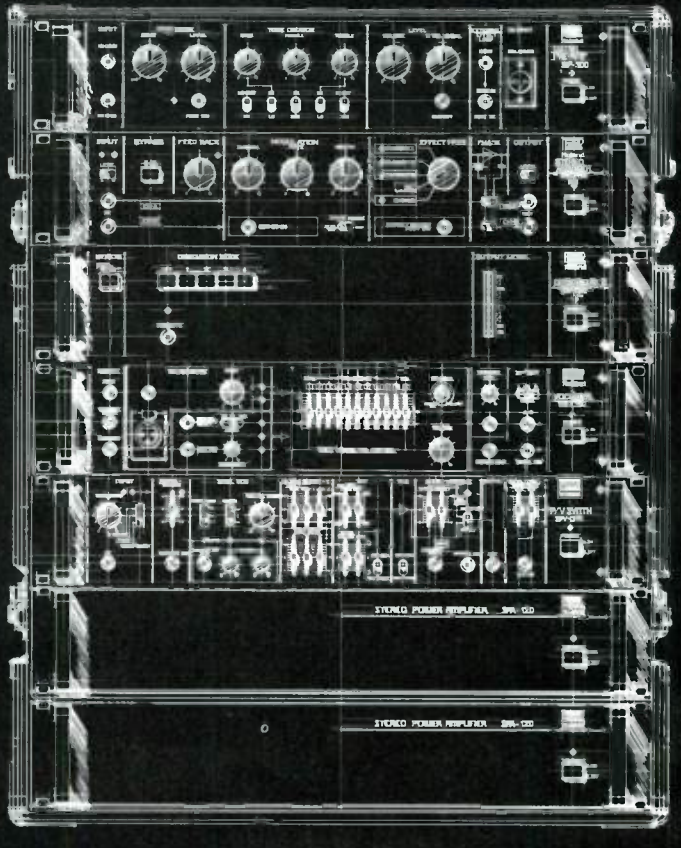
Electro-Voice®
a gulton company
600 Cecil Street, Buchanan, Michigan 49107

CIRCLE 90 ON READER SERVICE CARD

Some people imagine the future.

We design it.

The Roland Rack



Roland

We design the future.

RolandCorp US
2401 Saybrook Avenue
Los Angeles, CA 90040
(213) 685-5141

CIRCLE 81 ON READER SERVICE CARD

TERMS:

A CONTINUING INDUSTRY GLOSSARY

RECORDING | ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES | SOUND REINFORCEMENT

By Larry Blakely

In an earlier Terms column [June 1979], *VU meter* and *Peak Program Meter* were defined. Within those definitions it was stated that there are two types of VU meters: peak responding and average responding. However, readers must be cautioned that in reference to the classical definition of a VU meter, this statement is incorrect. A VU meter is an *average reading meter* that consists of a 200 microampere D.C. D'Arsonval meter movement fed from a full wave, copper-oxide rectifier that is usually mounted within the meter case. VU meters are calibrated so "0" VU indicates one milliwatt of power into 600 ohms. This is the definition of a true VU meter.

However, over the years the audio industry has adopted the VU meter and has used it for many applications in various types of equipment. Technology has also progressed a great deal since the development of the classical VU meter. There are often volume indication type meters used on today's equipment which use a VU meter type of scale, although they are not VU meters within the classical definition. But to most of us who use audio equipment, if it has a scale like a VU meter, if it looks like a VU meter, and if it is used to indicate level like a VU meter, it must indeed be a VU meter. Unfortunately this is not so.

These other types of meters that are used for the same purpose as a VU meter but have slightly different electrical characteristics exist, apparently, as "bastard" devices without a name. There are meters that use a standard VU meter scale but are peak responsive. This meter cannot be defined as a peak responsive meter, because there is no such thing according to the technical definitions of accepted devices and standards in the audio industry. On the other hand, such volume indicating devices exist and are used on today's audio equipment.

This all reminds me of a Bible scripture that talked of a great church that

By Wayne Howe

Harmonic Series (cont):

This same overtone series, when notated on a musical staff looks like figure 2.

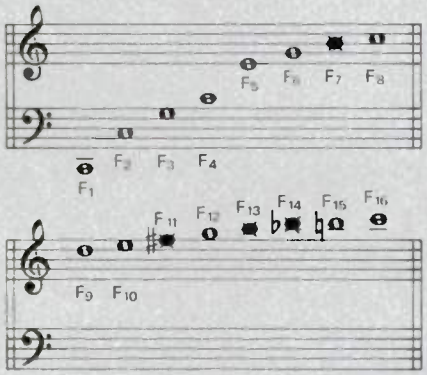


Figure 2

Notice that harmonics F7, F11, F13, and F14 have an X mark over them. This indicates that these harmonics do not occur in the scale on the keyboard. As a result, these harmonics sound very discordant when emphasized.

Notice that the rest of the harmonics all occur as notes in the C Major scale. Consequently they all sound relatively harmonious.

Notice that harmonics F1, F2, F3, F4, F5, F6, F8, F10, F12, and F16 are all notes in the C Major Triad (C,E,G). These harmonics tend to sound quite euphonious.

If we look at the even harmonics vs. the odd harmonics, we see that the even harmonics are all members of the C Major Triad until we get to the top of the fourth octave above the fundamental (the fourteenth harmonic).

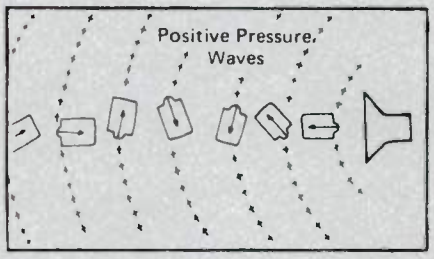
On the other hand, the odd harmonics are only members of the C Major Triad up to the top of the third octave (seventh harmonic). This is a whole octave lower than any dissonant members of the even harmonics.

The volume level of the dissonant harmonics determines the "musicality" or "listenability" of electronic devices, since some devices tend to emphasize certain harmonics over others.

By Glen E. Meyer

Omnidirectional Microphones (cont):

No matter how the diaphragm is oriented with respect to the sound source, positive pressure still pushes the diaphragm in and output results as indicated in the following illustration.



Omnidirectional Microphone at Various Angles

Actually, any real mic can only be omnidirectional at *most* frequencies. Very high frequencies, with wavelengths that are small compared to the dimensions of the microphone case, are reflected and diffracted by the case so that output is reduced at the sides and rear. The better standard measuring microphones generally have small diameter heads to avoid this problem.

Lower frequencies, with wavelengths many times the microphone's dimensions, don't even know the microphone is there. Turning an omnidirectional microphone away from the source might make a good poor man's high frequency equalization control.

Physical Characteristics of Unidirectional Microphones: The construction of a unidirectional or directional microphone is similar to that of an omni except that the case is not sealed. The sound pressure is permitted to contact the diaphragm from the rear as well as from the front. The rear contact occurs through a port or hole which is at a precise distance ("D") from the front opening. This is why a unidirectional mic is sometimes referred to as a "Single-D" microphone.

A Single-D or cardioid microphone is shown with the sound source at its rear. The hold or port which is normally at the side of the microphone is shown at the rear of the microphone to.

TERMS (CONTINUED)

A CONTINUING INDUSTRY GLOSSARY

RECORDING | ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES | SOUND REINFORCEMENT

was, but was not, and yet is. It is my feeling that some new industry standards need to be established to shed new light on areas like volume indicating devices.

The same type of situation applies to the PPM (peak program meter), which is a peak responding meter used to indicate volume levels for audio purposes. The PPM, like the VU meter, has its own set of technical specifications. But does this mean that a peak responding volume indicating meter that does not have the specifications of a PPM is not a peak reading volume indicating meter? No!! It is simply not a peak program meter.

Some fine peak reading meters are utilized in the audio industry and are commonly referred to as PPM's. Likewise, there are meters that appear to be VU meters, that are used for the same purpose, but in the electrical sense are not VU meters. As I have stated earlier, it is time for new audio industry standards to be established to cover areas like this that are running away from us. This area of volume indicating devices is by no means the only area in which this problem of standards is happening.

Another one of the many such areas suffering from actual "mis-definition" is that of the overload indicator. Overload indicators should be labeled as "overload." Overload indicators on some types of equipment are labeled "clip" (which is certainly a type of overload). There are also overload indicators labeled "peak," which may make the user feel that the indicator is indicating the peak value of the actual signal and may not give him any particular notion that when the indicator is flashing he is nearing trouble or already in trouble from an equipment overload condition.

I will try to point out such troubled areas that are suffering from "mis-definition" as those particular terms are defined in this column.

A fuzz box that sounds very raggedy and harsh is emphasizing the discordant overtones which are not in the triad. As you listen to other fuzz boxes, you may notice that they sound smoother and less harsh. These devices are emphasizing the harmonics which are in the major triad of the fundamental note.

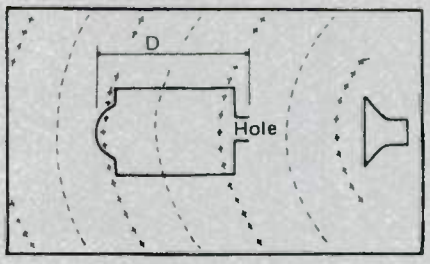
When the harmonious overtones that are in the major triad are emphasized, large amounts of distortion can be tolerated without listener annoyance or notice. However, when the non-harmonious overtones that are not in the major triad are emphasized, very minute amounts of distortion can be perceived and objected to by the listener.

Harmonic Distortion: Any non-linearity of an electronics device, when passing a single tone, will generate harmonic distortion which follows the harmonic series as described. Thus a fuzzbox will generate overtones or harmonics above the fundamental in a pattern as shown in figures 1 and 2.

Sustain: An active electronic circuit or device that varies its output waveform as an inverse function of its input waveform. In other words, as the input waveform from an instrument (such as a guitar) decreases, the sustain circuit increases the gain of the device so that the output waveform maintains the same volume level over a relatively long time period.

The only problem with this kind of device is that as the input waveform gets weaker, the sustain device boosts not only the input waveform, but also amplifies the instrument's output noise level and the sustain device's input noise level.

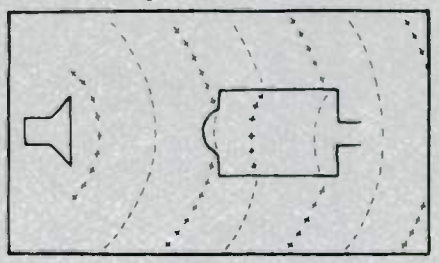
The result is that although the output waveform stays at the same level, the noise background builds up until either the noise level is louder than the output waveform, or the sustain device can boost no more and the output waveform sputters and dies until a new note is played.



Single-D Cardioid Microphone with Source at Rear

With sound originating from the rear of the microphone, diaphragm motion is neutralized by opposing sound pressures on both sides simultaneously. (Note the "plus" sound pressure on both sides of the diaphgram.)

With the microphone towards the source, pressure variations enter the rear hole which has been so placed and treated that a negative pressure reaches the rear of the diaphragm at the same time a positive pressure hits the front. The positive pressure pushes in, the negative pulls in, and the diaphragm moves in—which ultimately results in output.



Single-D "Cardioid" Microphone with Source at Front

Knowing how an omnidirectional microphone differs from a directional microphone, by just looking at the microphone it should be pretty easy to determine whether it is an omni or directional. If there appears to be only a single hole at the front of the microphone, it is probably an omnidirectional microphone. If there seems to be a hole at the front and a port on the side a given distance from the hole in the front, the microphone would probably be unidirectional.

Today's hottest recording group.

Latest sales figures show that Maxell is the fastest-growing brand of recording tape in the country today.

It's not surprising.

Maxell cassettes are used by more people who own the finest tape equipment than any other brand.

Our open-reel and eight-track tapes have been accumulating some great performance records of their own.

Call your Maxell representative for an audition.

You'll find he, like our tape, is really worth listening to.

maxell

CIRCLE 70 ON READER SERVICE CARD

Maxell Corporation of America, 60 Oxford Drive, Moonachie, N.J. 07074

PATCHWORK PAYS OFF.

When you start working with an 8-track recorder, there's a great temptation to rush out and buy a so-called "8-track" board. Forget it. You don't need the fat price tag. Because what you're really looking for is 8-buss operation.

That's why we've put together a systematic approach to 8-buss operation built around our new Model 5B. You get control over all your tracks. Total access to the signal flow. The ability to adapt quickly to each new session. And a rather large savings in cash outlay.

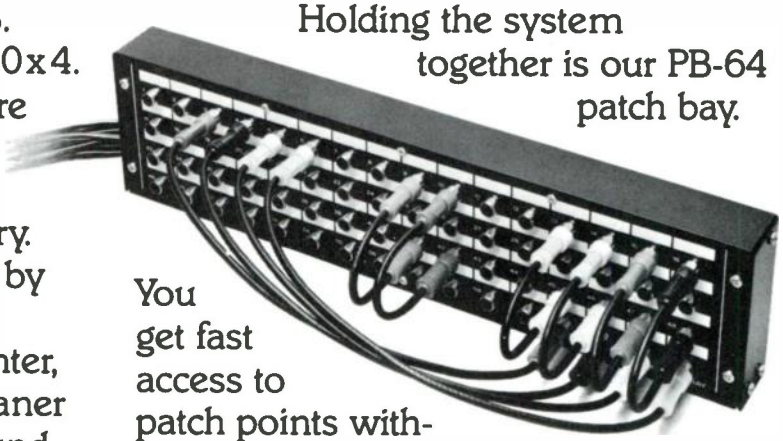
It starts with our new Model 5B. Eight-in/four-out. Expandable to 20x4. Color-coded controls get you where you're going faster, with fewer miscues. And new ICs have been incorporated throughout its circuitry. The slew rate has been improved by a factor of four. The result: better transient response. Tighter, sharper, cleaner sound.

Now add the Model 1. It gives you an independent 8x2 mix anywhere, anytime you need it. During basic tracks and overdubs, it's your monitor mixer. During final mixdown, it's ready for stereo echo. Any time you need another 8x2 mix, it's right there.

Our MB-20 lets you meter any line level signal you want. That's handy when you're using one mic or one instrument per track and driving your 8-track with the Model 5B's direct outputs.

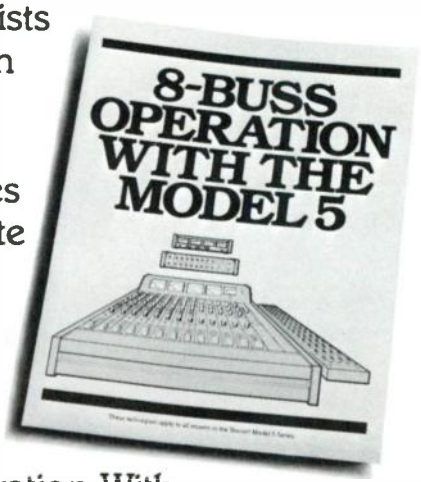
There's also some extra mixing flexibility in the MB-20. You get Buss/Tape selectors and an independent 4x2 monitor mixer.

Holding the system together is our PB-64 patch bay.



You get fast access to patch points without crawling behind and under your rig. You use jumper cables like push-buttons to route signals. And you don't get trapped into one hard-wired configuration. You can grow, change or completely re-arrange your set-up without throwing out the gear you've already invested in.

That's the Tascam concept of modularity. One that's paid off for recording artists for more than seven years.



See your Tascam Series dealer or write us for a free copy of our operations/hook-up bulletin, "8-Buss Operation With The Model 5." You'll see the functions you need. At a price you can afford.

Because patchwork does pay off.

TASCAM SERIES

TEAC Professional Products Group

TROUBLESHOOTERS' BULLETIN

MORE EMERGENCY REPAIRS

(1)

Last month we discussed emergency repairs of dented domes. If you're too rushed to use the method described then, there is a second method of dome removal. Simply cut the old dome with a very sharp knife around the inside of the voice coil tube. Then clean the edge remaining on the tube so that it is fairly even. Take the new dome and flare the outside edge slightly (if

(2)

it has an outside edge), so that it will sit flat on the old bead of glue. Then apply a fairly heavy bead of glue around the interior edge of the dome and position it over the old glue bead. Proceed to add another bead around the outside edge of the dome for good measure. It should be noted that this method will definitely result in some loss of high frequency response due to an increase of mass due to the glue. The first method of dome replacement

(3)

is definitely recommended if you have the time.

Never operate a speaker, or for that matter leave it lying about, without something covering the hole left by a missing dome. If you can't get a dome right away, use tape or glue something over it to keep the dust and magnetic particles out of the gap.

High frequency diaphragms are easier to work with; they can be removed

from the driver body. Dents are the least of the problem with high frequency diaphragms. They can be removed by pushing on the inside of the dome until the dent goes away. You will experience "stretch marks" on the aluminum domes and shatter lines on phenolic domes, but these are of little concern to the performance of the device.

More common problems in diaphragms are shattered domes (not repairable) and burnt voice coils (sometimes repairable). Occasionally you may run across a glue joint

that has come adrift, and most defects of this nature are warranty defects. But in an emergency, glue joints between the surround and the dome, or dome and the voice coil form or the voice coil and the form can be repaired and will probably last long enough to get a replacement.

You should keep some fairly quick drying plastic type of glue and a very hard, high temperature epoxy in your toolbox. The plastic glue (such as urethane, or even silicone seal) works well for attaching the

surround to the dome. Use the glue sparingly; large amounts take a long time to set, and you don't want to add much mass to a high frequency diaphragm or it won't be a high frequency diaphragm any more.

The high temperature epoxy is ideal for gluing the form to the dome or the form to the voice coil itself. It is also very useful for gluing the end of a winding down if you are in a position to dewind the coil a turn.

BARRY MCKINNON

What is the difference between acoustic and electronic feedback?

Feedback, whether electronic or acoustic, describes a situation wherein some portion of an output signal is "fed back" to the input of a system, either deliberately or unwittingly. In the case of electronic feedback, the type that generally comes to mind is called *negative* feedback. A portion of the amplified signal, appearing at the output of an amplifier, is fed back to the input terminals of the amplifier in opposite or out-of-phase relationship to that input signal. In other words, when the input signal is going in a positive direction (say, from zero volts to some plus value of voltage), the feedback signal applied at the same point is going *negative*. As might be expected, the application of negative electronic feedback to an amplifier reduces the *gain* or amplification of the amp, since the *net* amplitude of the input signal is less than it would be if feedback were not applied. The main purpose of applying negative feedback in an amp is to reduce distortion. Any distortion appearing at the output of the amp is also part of the fed-back signal, and since the fed-back signal is amplified along with the input signal through the amp and the distortion component is now out-of-phase (or of opposite polarity) with the distortion in the output, the two distortion components tend to cancel each other. A second purpose of negative feedback in an amp is to improve frequency response. As the amp normally tends to roll off in response at high frequencies, the amount of feedback at those frequencies (being a percentage of the output signal) also tends to decrease. That means that *less* feedback is added to the input signal at those frequencies and the net gain of the amp increases, offsetting the tendency for high frequency roll-off. It is possible to apply *positive* feedback to electronic circuits too, in which case the fed-back signal *adds* to the net input signal. In fact, if you add enough positive feedback in an amplifier circuit, a point is reached where the amplifier will simply "take off" and become an oscillator, sustaining a continuous signal even with no external input signal applied.

Positive feedback is the type we normally think of when discussing *acoustic* feedback. For example, if a turntable system is positioned close to a loudspeaker, and a record is played at loud levels, the vibrations emanating from the speaker, whether coupled through the air, or through the floor, table on which the turntable is mounted, its cabinet, etc. can often reach the delicate tone-arm mechanism of the player. If those vibrations arrive in-phase with the signals then being picked up by the phono cartridge (positive feedback), they are amplified along with the signal, causing the speaker to play even louder at the particular frequencies of vibration. This leads to further levels of acoustic feedback at those frequencies and a vicious cycle can result in ever greater vibrations and positive acoustic feedback to the delicate phono pickup system. The end result is a loud and continuous howl, which is often called acoustic feedback.

Len Feldman
Feldman Labs
Great Neck, N.Y.

Why is phase polarity important?

Speakers, microphones and most other pieces of audio equipment are usually "two wire" devices (that is, connected one way *or* the other) which, when mixed out of phase, tend to cancel each other.

All woofers in an array, for instance, must be connected in phase with each other so that together they will create a solid wavefront of sound pressure. If some woofers move in while others move out, the result is unpleasant phase distortion and bass cancellation. This is a function of frequency and geometry—the lower the frequency, the greater the cancellation.

Unfortunately, not all speaker manufacturers and reconers agree that when a positive voltage is applied to the plus terminal the cone will move out. This lack of agreement leads directly to many phasing errors. The standards that do exist for microphones in the United States are reversed from those in Europe.

There are many places in audio systems where mistakes in phase polarity can be made. Wiring may be reversed inside a connector, banana plugs may be in backwards, a transformer may be mislabeled; the internal wiring polarities of mixers, crossovers, microphones, voice coils and other inaccessible equipment are often unknown. At one recording studio session we even found one of four monitor cabinets out of phase because of different wiring logic at the connector inside the cabinet. Everything "seemed" right from the outside, but finding and correcting this mistake made a large improvement in sound quality and probably the entertainer's performance too.

Incorrect phasing in recording studios causes mixing problems that no amount of "EQ" can help. Phase relationships are particularly important in multiple-miking situations (drums usually), monitor speakers, and cable/connector wiring. Sometimes musicians bring incorrectly phased equipment with them.

P.A. sound companies should check phase each time they set up their equipment because of the increased number of connecting and disconnecting errors that can occur. Our company estimates that approximately five percent of hi-fi store systems suffer from phasing problems, which when corrected would probably sell the system. Any audio system using more than one speaker needs to be phased correctly to avoid listener annoyance caused by phase distortion.

Sounder Electronics
Mill Valley, CA

Why is a subsonic filter used in signal processing?

A subsonic filter is a signal processor which removes signals which are too low in frequency to be audible. Hence the name "sub-sonic" (below-sound). It is often important to remove these frequencies, even though they

HOW TO CHOOSE FROM SOME OF THE CHOICEST MICROPHONES WE'VE EVER MADE.

Among recording professionals, Sony is widely recognized as an expert on microphones. That's because we're continually applying new technology to deliver better sound.

Our latest innovation is the exclusive Back Electret condenser microphone capsule, which delivers response truer than ever thought possible.

You can get this capsule in a variety of Sony mikes. And that's a bit of a problem: it's hard to know which mike is appropriate for your recording needs.

Therefore, let us clear up any confusion:

MICROPHONES THAT ARE AT HOME IN YOUR HOME STUDIO.

If you're involved in the music business and have a home studio, you need a microphone as professional as the rest of your equipment.

For all-purpose recording, we recommend the Sony ECM-56F. It's a uni-directional Back Electret condenser mike with excellent transient response, good for close miking of both instruments and voices.

For recording instruments only, the uni-directional Back Electret condenser ECM-33F is ideal. It provides flat frequency response over the entire range, and picks up amplified and non-amplified instruments equally well.

Both of the above plug into mixers for multi-channel recording.

LOCATION MIKES, FOR STUDIO SOUND WITHOUT THE STUDIO.

But suppose you want to record on location. At a rock concert, say, or a performance of your church choir or glee club. Sony has mikes that, combined with your tape recorder, practically make up a portable studio.

Take the ECM-990F, an especially versatile and lightweight stereo Back Electret condenser mike. You can vary its directional quality to adapt for everything from solo voice to small groups to full orchestra.

Or choose an ECM-23F. It runs more than 6,500 hours on a single AA battery, and it's uni-directional. Use a pair when you want to create a stereo effect. The ECM-23F also incorporates Sony Back Electret technology.

RECORD FOR RECREATION AND STILL RECREATE NATURAL SOUND.

Maybe you just need a mike to use at home, to record family sing-alongs. Or someone's performance on guitar or piano, for your own enjoyment.

You can still get a Sony Back Electret mike at a very affordable price. It's the ECM-260F, which plugs into a tape recorder and makes whatever you record—instrumentals, singing or speech—sound true to life.

For greatest versatility, use our ECM-150 omni-directional condenser mike. It's Sony's tiniest mike, smaller than a dime in circumference, and you can clip it to the fingerboard of a guitar or use it as a lapel or tie tack mike. (Incidentally, it's great for business conferences or any occasion when you want the mike to be inconspicuous.)

Whatever you need to record, and wherever you need to record it, there's a choice Sony mike to do the job.

And now that you know which mikes to choose, all you need to do is see your Sony dealer.

SONY.

We've never put our name on anything that wasn't the best.

cannot be heard, because they can have undesirable effects on other, audible frequencies unless they are separated out.

For example, records often contain information in the 2 to 20 Hz range, caused by warps, off-center spindle holes, and turntable rumble. These unwanted signals are exaggerated by the RIAA equalization and the tone-arm mass/stylus compliance resonance to produce large amounts of subsonic energy. If this energy is passed on directly to the loudspeakers, both power amplifier and loudspeakers must supply substantial levels of "sound" which will not be heard in itself, but which can cause intermodulation effects with audible frequencies. The result is audible distortion, as both power amplifier and loudspeakers run out of linear range trying to reproduce the subsonic components. A subsonic (rumble) filter can clean up this distortion while having negligible impact on the signal's audible portion.

In the recording studio, subsonic information is often picked up by microphones. These signals are sometimes caused by musically relevant sources such as kick drums and synthesizers. They are also sometimes caused by less relevant sources such as steam rollers and subways going by outside. These subsonics can cause audible intermodulation distortion in transformers and tape recorders (to mention two prime problem areas). Filtering out (removing) these signals can often substantially clean up the sound.

Proper operation of a noise reduction system requires the use of a subsonic filter to prevent mis-tracking. The reason for this need is that subsonics present in the input will not even be recorded by studio quality analog tape recorders, so the output will not resemble the input when very low frequencies are present. The level detectors in the noise reduction would see one signal on encoding, and another on decoding, preventing accurate tracking. A subsonic filter can prevent inaudibly low frequencies from entering the encoder in the first place, and therefore eliminate the problem of the tape recorder being unable to record these signals. Most professional noise reduction systems (for example, dbx) incorporate subsonic filters to prevent this mistracking.

Leslie B. Tyler
Chief Engineer
dbx, Inc.
Newton, MA

5 reasons why the new Mu-tron can have a profitable effect on your business.

#1 New advertising and promotion:

We're telling your customers about the quality line of Mu-tron effects in magazines like **Guitar Player, Rolling Stone, International Musician & Recording World,** and **down beat.** Thousands of new Mu-tron catalogs have already been distributed — **free** — to musicians all over the United States.

#2 A built-in level of brand name recognition and consumer acceptance:

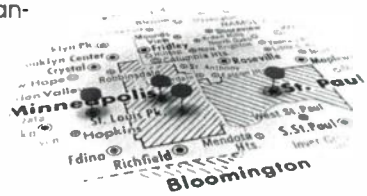
Musicians know all about Mu-tron because all sorts of professional musicians play Mu-tron effects. Artists like Jan Hammer, Larry Coryell, George Duke, Lee Ritenour, Joe Zawinul and Alphonso Johnson are just a few of the many professionals who play Mu-tron, and recommend Mu-tron in interviews and articles in major music magazines.

#3 A new company behind Mu-tron means new products ahead:

Now Mu-tron products have the sophisticated Research and Development Department of ARP Instruments backing them up, which means new and improved Mu-tron products for dealers and customers. For example, Mu-tron's new digital delay line offers tremendous features and value for the same price as analog delay lines, a real price breakthrough. And there's more to come.

#4 Selective distribution and discount structure mean added profits for you:

The Mu-tron franchise is more valuable than ever. Selective dealer appointments and a profit-oriented discount structure stand behind a full product line with proven sales power.



#5 Field sales support keeps you and your salespeople in the know:

ARP's nationwide network of District Sales Managers provides direct contact with factory personnel. You get up-to-date information on new Mu-tron products and programs so you can buy and sell more effectively.

MU-TRON

ATTN: National Sales Manager,
Mu-tron, Inc., 45 Hartwell Ave.,
Lexington, MA 02173.

Sounds like the New Mu-tron Dealer Program is right for my store. Please have a salesman call.

Store Owner _____

Store Name _____

City _____ State _____ Zip _____

Telephone _____

Best Time to Contact: _____

Mu-tron, Inc. is a wholly-owned subsidiary of ARP Instruments, Inc., 45 Hartwell Avenue, Lexington, Massachusetts 02173.

CIRCLE 78 ON READER SERVICE CARD

WRH

By Craig Anderton

I've been carefully watching the reaction to guitar synthesizers since they've been introduced, and I'm afraid that what I've seen is mostly confusion. Some people say that guitarists aren't ready for these devices, others say the technology isn't good enough; still others think that the guitar synthesizer is just not cost-effective. But regardless of your own opinion, the fact remains that these machines are out there, there is interest in guitar synthesis, there are some very proficient guitar synthesizer players out there, and I for one feel that there is a tremendous potential in guitar synthesis. The guitar synthesizer is not a fad, nor will it go away; perhaps it has not broken through to mass acceptance yet, but I think it's just a matter of time before it does. As a result, this column will discuss how guitar synthesizers relate to standard keyboard synthesizers, and some things you will need to know if you wish to effectively sell them.

BASIC PRINCIPLES

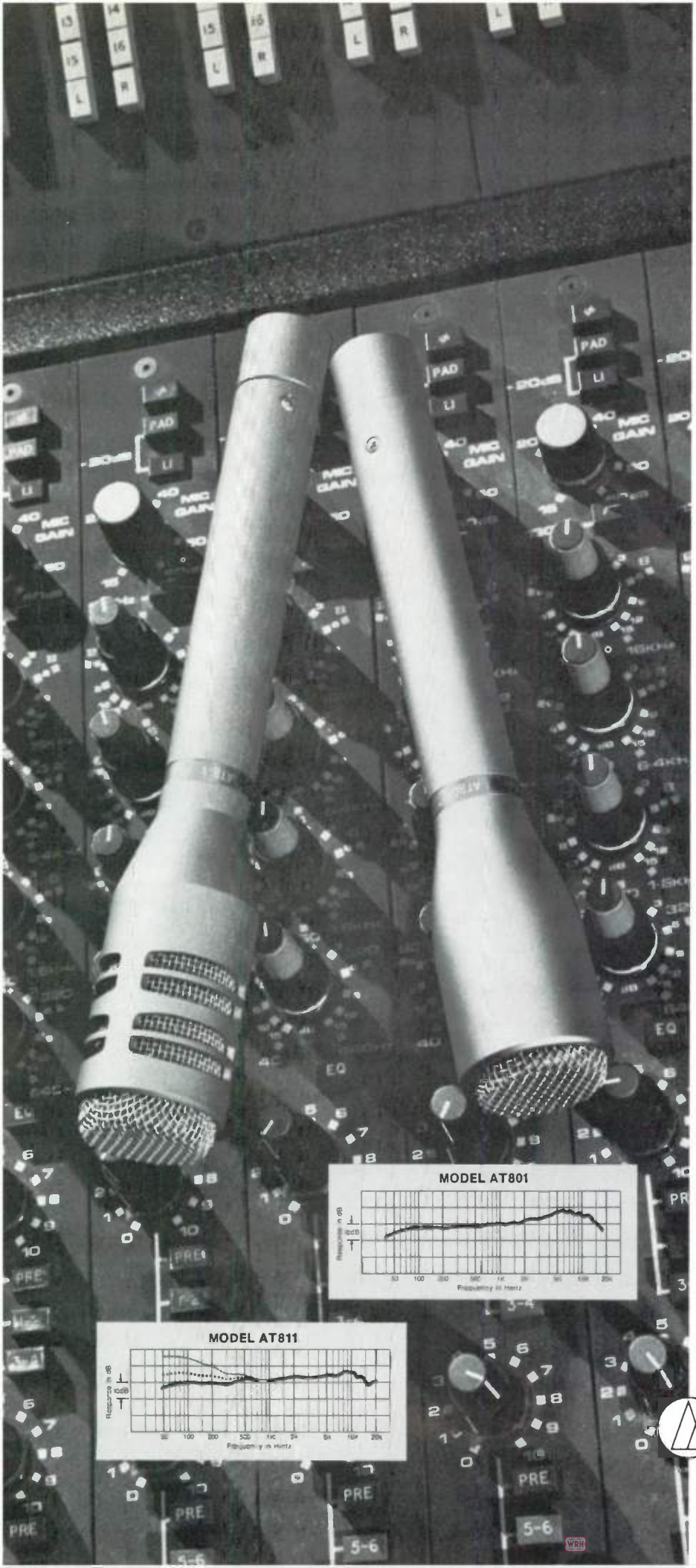
The circuitry of a guitar synthesizer has its precedent in the circuitry used by keyboard synthesizers. In fact, almost all of the modules in a guitar synthesizer are functionally very similar to the modules in a keyboard synthesizer. Many of the terms regarding waveform, filters, and other effects are the same as the terms used with standard synthesizers. Luckily, this simplifies the learning process, since once you've acquired a basic knowledge of synthesized sound you can apply this same knowledge towards *any* device that uses synthesized sound. I'd suggest three sources to increase your understanding of these devices: First, review this column for the past several months to get a basic idea of what's involved in synthesis (by the way, this is not the final installment of the series on synthetic sound, but something to give you all a little breather). Second, study the instruction manuals of any synthesizers you can lay your hands on. I still think the ARP 2600 manual is a pretty good basic text on electronic music, and several other companies also recognize the value of providing good documentation with their equipment. Third, play with as many synthesizers (keyboard and guitar) as you can, whether you're "musical" or not. You can read a million words, but they won't make complete sense until you can get your hands and ears involved.

But despite the similarities, there is one very important way in which a guitar synthesizer differs from a keyboard synthesizer. With a keyboard, as we discussed in a previous column, you send out discrete *voltages* that control an oscillator, and that oscillator produces your sound. Unfortunately, a guitar doesn't put out voltages like a keyboard does—it puts out a vibrating string, which is sensed by the pickup and turned into an audio signal. So, we are faced with a real problem: How to use a vibrating string to control a voltage-controlled oscillator. There is an alternative, which is to avoid using a voltage-controlled oscillator at all. One way to do this is to take an approach where touching a guitar string to a fret enables a tone via some kind of mechanical switching. This approach is taken in quite a few models of guitar synthesizers and guitar-organs. However, the true power of synthesis lies in voltage control, and for that reason a lot of developmental work has gone into generating a true control voltage from a vibrating string.

PITCH-TO-VOLTAGE CONVERTERS

The devices responsible for the process of translating audio signals to control voltages are called *pitch-to-voltage converters*. These are available as separate units to adapt instruments like guitars to standard synthesizer modules, or are built in as a part of the complete guitar synthesizer system. Unfortunately, it is very difficult at the present time to accomplish the pitch-to-voltage conversion process with unerring accuracy. With a keyboard synthesizer, there is a totally unambiguous connection between the keyboard and oscillators; with the guitar synthesizer, there is a great deal of analyzing circuitry that's constantly trying to make sense out of the guitar string's vibration and turn it into a voltage. This results in a few problems, such as possible delay (where the converter isn't fast enough to follow a fast player's playing style) or generation of false notes (which might happen, say, upon hitting a harmonic or holding a string for too long).

Nonetheless, many of these problems can be overcome if musicians are willing to adapt their technique to the machine, and are willing to cooperate



The Audio-Technica philosophy:

EQ should be used to improve the sound... not to fix the mike!

Introducing affordable smooth sound. The remarkable AT801 and AT811 Electret Condensers. With curves so smooth it would take a bundle to match them anywhere else.

Response like this has a number of benefits. First, mixer EQ is used only to touch up the sound, not to correct built-in errors of the microphone. Which leaves more leeway to control the overall sound.

And without unwanted peaks there's more usable headroom. That's vital when working near the dynamic limit of a preamp or line amp. Sound stays clean and sharp. Compressors or limiters sound less forced, because they are controlling peaks in the *sound,* not peaks in the *mike!*

But perhaps the biggest advantage is the versatility of these A-T condensers. Because they have just the right amount of presence for today's recordings, they're not limited to just one kind of instrument...just one type of voice. Put them *anywhere* in the mix: brass, reeds, percussion, chorus, or strings. Then listen. What you hear in the studio you'll hear at the console. Which is a great place to start in miking any session.

At their highly affordable prices, these are two of the best bargains you can offer your customers. Reliable, clean-sounding, and the most predictable microphones they can use. Your Audio-Technica rep has all the details. Call or write today.

Model AT801 Omnidirectional Electret Condenser

Model AT811 Unidirectional Electret Condenser

Great sound, right from the start!

audio-technica®

INNOVATION □ PRECISION □ INTEGRITY

AUDIO-TECHNICA U.S., INC., Dept. 89SA
33 Shiawassee Avenue, Fairlawn, Ohio 44313
216/836-0246

CIRCLE 98 ON READER SERVICE CARD

with the technology. They need to understand that by playing with a guitar synthesizer, they have entered into a partnership with another piece of equipment and must occasionally do things specifically designed to please the partner. However, the manufacturer and dealer must also understand that not every musician is willing to enter into a partnership with a piece of equipment; it's true that a standard guitar is capable of many more subtleties than what you can expect to get from completely synthesized sound. So, the guitar synthesizer is clearly not for everybody. (What is?) Because of this, the retailer must walk a very careful line. You can't overhype the guitar synthesizer as being the ultimate technological achievement of this or any other civilization in our galactic system, because a lot of musicians will regard this hype as essentially dishonest. But you also need to encourage someone who is fascinated by the idea of guitar synthesis (but just can't seem to get the "hang" of it) by letting him know that practice does indeed make perfect. After one minute with a guitar synthesizer, many players are going to think that it doesn't work right. But after 30 minutes with a guitar synthesizer, and after some adapting has taken place, the musician will be a *lot* happier.

PATCHES

Synthesizer players refer to the individual sounds obtainable with synthesizers as "patches," even with synthesizers that don't use patch cords. It's very important when working with a guitar synthesizer to develop patches which you can rely on when demonstrating the instrument. For example, if someone knowledgeable in guitar synthesizers tries one out and gets a neat sound, write down the positions of the knobs so you can set this patch up when demonstrating to customers. Because synthesizers can make so many sounds, it takes some knob-twiddling to come up with those real "killer" sounds. Organize these patches in some form, and you'll be able to demonstrate the guitar much more effectively. Some popular patches might include an oscillator tracking along an octave lower, tracking an octave above, two oscillators tuned to intervals, experiments with filter effects, and so on.

WHAT'S IN THE FUTURE?

One of the complaints about guitar synthesizers in general is that they're hard to use live, but preset memories that store patches are now prevalent among keyboards and will no doubt show up soon in guitar boxes (although their appearance is long overdue). As to whether there will ever be a great deal of enthusiasm in guitar synthesis, I'm pretty sure there will be, and it will start in the recording studio. Guitarists with synthesis capabilities will be called more often to sessions because, in addition to getting standard guitar sounds, they will also be able to get synthesized sounds . . . thus saving the producer many bucks compared to hiring both a guitarist and synthesist. Also, a guitar synthesizer trading off licks with a keyboard synthesizer can be quite dramatic because of the different inflections associated with each instrument. At first, the public may not recognize the guitar synthesis sounds as being produced by a guitar, since they are similar to traditional keyboard synthesizer sounds; but the awareness of musicians, and therefore usage of the guitar synthesizer, will increase as a result. This has happened before; all it took was a few hit singles, and drum synthesizers (which have been around for years) finally started to get the recognition they deserve. Eventually, when polyphonic guitar synthesizers become economically feasible, then guitar and keyboard synthesis will sound distinctly different and the guitar synthesizer will really come into its own.

HUSH MONEY.

The dbx 208 tape noise reduction system is a new product that will impress both your engineering staff and your accountant. The 208 features 8 channels of simultaneous noise reduction on plug-in modules, plus a spare, all in a compact 5¼" rack mount package.

dbx noise reduction is rapidly becoming the new industry standard because it provides 30 dB noise reduction and 10 dB headroom improvement, from 20 Hz to 20 kHz, without the problems of other systems. The dbx system does not require critical and time-consuming level-match adjustments. Its true RMS detectors are not sensitive to tape recorder phase shift. Its voltage-controlled amplifiers (VCAs) operate over a 100 dB range. Overall the dbx system provides a level of performance and a simplicity of operation that is unsurpassed.

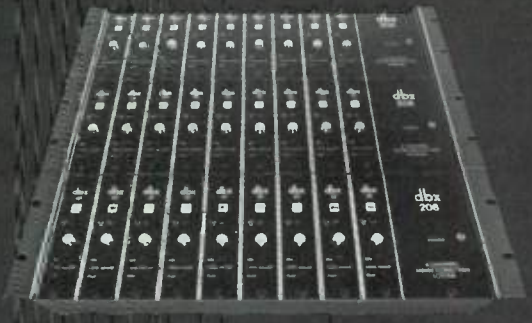
But the 208 is also a great value. It is priced at $3300. That's $6600 for your 16-track and $9900 for your 24-track.* And no matter how complex the future becomes, the 208 system expands simply and economically.

The dbx 208. The easy solution to your noise problems, today and in the future.

dbx, Incorporated,
71 Chapel Street
Newton MA 02195
617-964-3210

dbx

UNLOCK YOUR EARS



*Nationally advertised value. Actual prices are set by dbx dealers.

sensible sound selling???

By Robert E. Morasse

As we all know, this industry has moved towards higher and higher levels of quality and sophistication in the sound reinforcement systems used by semi-professional and professional groups.

This trend started quite awhile ago as the music industry, with the help of rock and roll, grew like a jack-in-the-beanstalk into the multi-billion dollar business it now is.

Since the time of Elvis and Buddy Holly, the music has become louder and the crowds and performance halls larger. Big rock stars find that in order to play for the huge crowds of fans, a stadium seating 60,000 to 100,000 people is often necessary. Couple this with the number of special effects and the quality of sound coming out of recording studios these days, and you can see the kinds of demands are placed on a group to reproduce their music live for an audience.

It became clear in the late sixties that the in-house P.A.'s that bands were using were simply not enough. Up to that point, these P.A.s were used just for vocals and were passable. Then the situation changed drastically. Bands like The Who, Blue Cheer and Hendrix started using big guitar and bass amps and the music started to get really loud. Hard rock was born and has become heavier ever since. Those old sound systems instantly became obsolete. Drums and vocals now had to be raised to the thunderous levels of the other instruments.

This is where a lot of sound companies got started. They custom built systems that could begin coping with the music. From that point on, the demands have been greater and greater and the industry has grown with the demand. Bigger and more efficient speaker systems, more powerful amps, bigger and more flexible mixing boards, special effects gear, heavy-duty wiring systems, three and four-way crossovers in mono and stereo and every conceivable accessory are available from a variety of manufacturers.

Because the equipment has become available, it is now possible to have the sound system do the majority of the work in delivering music to the listener. By doing this, the overall sound can be better controlled as far as tone, balance of instruments and vocals, and special effects such as

echo, phasing, flanging, reverb and harmonizing electronically. Studio sound is approached by controlling everything the audience hears with the sound system. This concept has gradually filtered down to the semi-professional local acts. They have competition at their level also, and good sound is what everyone wants to hear. These acts are looking more and more at pro sound gear and how to use it like the pro's do and for the same reasons. They are, for the most part, unsure of how to do this. Most don't know how to plan out and set up a workable system for their needs and how to get the most use out of it.

Selling sophisticated sound gear is big business, and it means a lot of repeat business if you satisfy the customer. Set him up initially with gear he can grow with and expand on. But first, educate him by explaining the advantages and limitations of the equipment he will be using. Let him know how sound gets from the mic through the system to the audience. After working through a system within the customer's budget, give him an idea of the additional equipment available that will interphase with his gear at a later time. As his budget and sound needs expand, he'll be back for that additional power amp, speaker system or delay unit. Sell him what he needs, not what he thinks he wants, even if there's less money in the initial deal. If you've helped him plan for the future right from the start and you've made him aware that high quality controlled sound can be obtained from a properly designed and operated sound system, then he will probably be spending anywhere from $8,000 to $25,000 in your store over a period of time.

A basic argument in favor of high quality sound can be presented to the musician who may not understand his own needs. The advantages and proper uses of a high quality sound reinforcement system should be discussed, with the purpose of explaining to the musician what he can expect to get out of such a system. This article, hopefully, will give you some ideas on how to go about convincing the customer to invest in a pro sound system and expand upon it as time goes by. With this goal in mind, both you and your customer will have an investment in a growing and profitable future.

Bob Morasse is sales manager of Whirlwind Audio.

What can he expect from his sound system? (Or, ask not what you can do for your P.A., ask what your P.A. can do for you.)

First off, I'd like to dedicate this section to all those poor frustrated sound men standing behind their mixing boards in countless smoke-filled bars across the world watching hopelessly as the VU meters go beyond the red till they start bending backwards, and the L.E.D. indicators go from red to brilliant orange, then explode. Right about this time some drunken boogier comes up, taps him on the shoulder and says, "Hey buddy, can you get the sound a little louder? I can't hear the singers." Or worse yet, "the drums." If you yourself are a sound man, does this sound familiar to you? If you're a musician in a rock band, ask your sound man. He may say "Hey man, how did you know?"

What does all this mean? First of all, it means that the system is incapable of producing the sound pressure level required while still sounding clean—with all instruments and vocals audible and understandable to the audience. And of course, the next question is, "What can be done about it?"

Well, the popular idea is to run down to the local music store and look at all kinds of expensive equipment with the hope that the more money spent, the bigger the cabs and power amps bought, the better the sound. Sometimes this is the best course of action as long as the purchaser has an idea of what he wants, why he wants it, knows exactly what this equipment will do for his sound, and last but not least, has the money to pay for it all.

He could conceivably spend several tens of thousands of dollars, get a huge system that would be capable of providing good sound for a small auditorium, bring all of this to the local corner bar and start blasting. Now the sound man is back behind the board, the meters are looking fine, no L.E.D.'s blinking red, and boy those drums and vocals are coming out fine with the guitars and keyboards. But he looks out and the bar is empty, nobody left but the bartenders who are holding their hands over their ears as tight as they can, and the club owner who is red in the face trying to get the sound down long enough to throw the band out of the club. Your ex-customer says, "Why is everybody so bummed out? After all, we must have a good clean sound." Well it's true, he probably does have a good clean sound, but it's 135 dB at the back of the bar and the guys can't ever attempt to sweet talk.

What are you going to do now? (Because it does become the retailer's problem in the end.) Why don't we talk about the underlying problem? Ask the customer: "What do you want from your sound system? If you're like most musicians and sound people, you probably want a clean sound where every instrument is clear and distinct, with the ability to use some special effects such as reverb, echo or flanging to enhance certain passages. Quite simply, you want the ability to mix or blend your overall sound and you want to give your sound man a free hand to do so. The advantages of attaining this goal are obvious. From the vantage point of listening environment, the sound man, given the freedom, can adjust the mix of instruments, vocals and special effects to optimize the total impact of the band's sound, but at the same time keep up the sound pressure level agreeable to the listeners. If this isn't your goal, stop here and go back to whatever you were doing. Don't be surprised if this business doesn't work out for you."

Now to the point. Why all this noise in the first place? Is is necessary to beat the audience into submission? First of all, the P.A. is competing with the band's stage equipment, such as guitar amps, bass amps and keyboard amps. In order for the drums, vocals and any other non-electric sounds to be heard, they must be raised to the level of guitars, basses, keyboards or whatever else the band has that plugs into a stage amp. If these electric instruments are already operating at a high S.P.L. in excess of 95 dB, there must be a sound system capable of bringing drums and vocals out to the audience at this level. In order to effectively mix all the sound produced by the band, we must mic the guitars, basses and keyboards and bring them through the P.A. Channeling these instruments through the sound system will again raise the total S.P.L. somewhat, depending on how prominently they are desired in the mix. Guitar or keyboard solos are a good example. You want solo instruments to come through loud and clear and often you may desire echo, reverb or flanging.

Why can't the musician adjust the volumes to blend the sound on stage? This can work in some cases. However, it is very difficult for a musician to hear a true mix accurately from where he stands. More often you'll hear a gui-

tar player say that he can't hear the other guitar player on the opposite side of the stage or something of this nature. Of course, each individual must adjust his volume to suit the dynamics of an arrangement and, in the case of guitar players, the type of tone and distortion they desire. If the sound system is correctly set up, the sound man can adjust the relative levels of all the instruments and vocals while the musicians concentrate on whatever tones and dynamics they wish to convey to the audience. One other point: Special effects from the P.A. would be near impossible in a situation where the band has total control of the mix from the stage.

If it is desirable to mic all instruments and vocals in the P.A. to achieve a controllable mix, then how can we avoid having a monstrous sound system with an overall S.P.L. much too high to be enjoyable to the majority of the audience? The obvious solution to this problem is to bring down the initial level coming off the stage from amplified instruments. By reducing the sound coming from the stage, we allow the P.A. to take the brunt of the sound distribution for the room. The lower the stage volume, the more prominent the controlled sound from the P.A. is to the listener. As this control becomes greater, we can actually approach a studio-type sound through the use of special effects, equalization and panning. There are other advantages to low stage volume. First, the musicians will have an easier time hearing one another and their vocal monitors. Second, there is a lot less leakage of sound from one mic to another. This reduced leakage provides less interaction of instruments in the mix and affords increased control and an all around cleaner sound.

Now let's talk about how the musician is going to get a lower stage volume and still sound the way he wants. First, the guitar. This is usually the hardest instrument to control and still allow it to produce the tones and distortion that make guitarists in a rock band happy. If the guitar player in the band is using an amp consisting of four cabinets and three or four hundred watts of power, you'll have to sit him down and have a little talk. He may lay this rap on you, "But man, I gotta crank to get my sound." Cranking usually entails turning that skyscraper of an amp up to full and letting loose. The result is a raunchy sound which is the trademark of contemporary rock. The guitarist is in seventh heaven. However, he alone is producing enough S.P.L. to empty the bar. One solution to this problem is to trade all those stacks in on a nice small amp that can be turned all the way up till it screams but is still relatively quiet. There are a variety of small amps now on the market that are designed just for this purpose. Playing through a smaller amp takes some getting used to, but with practice it can do almost anything the big amp can do expect knock walls down. Once you've got the guitarist down, the bass player and keyboard players find they don't have to blast out to be heard anymore. In fact, they may be able to cut their stage equipment in half. To put this whole idea a different way, we can say that the stage equipment is being used as monitors for the instruments and not as a source of sound for the audience.

The next topic is the P.A. itself. The customer asks, "What should I buy?" Answer him honestly: "This is a tender and very subjective area. I won't attempt to tell you what in particular to buy. That would be unfair and in all probability quite biased. I will suggest some basic guidelines. Obviously, you want the best possible sound for your money. Remember, the bigger the better, or the more expensive the better, doesn't always apply. Things to look for are efficiency, not necessarily size." A pro audio dealer who knows the band's budget can suggest some possible combinations. Remember, the money saved by using less stage gear can be applied to building a professional sounding P.A. system. Make sure the equipment selected is designed for the road and is thus capable of sustaining repeated set ups and set downs and a lot of travel. Some components will sound great and work fine at home or in the studio but will last no more than a week on the road. You can well imagine the hassle you'll go through if the power amps and board are in for repairs on a regular basis. The music industry is a business and musical equipment the tools of the trade. They must perform as such or you and your customer are both out of business.

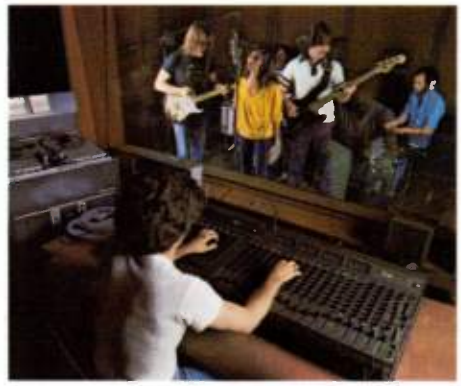
The biggest difference between a $17,000 mixer and our M-12 with Expander is about $12,000.

If you're thinking about 24 channel mixing, you can stop thinking money and start thinking *performance*.

Fender's new 12-Channel Expander—coupled with Fender's M-12 Live Performance Mixer—gives you 24 of the most sophisticated mixing channels in the business with features you'd only expect to find in mixers at two, three or more times the price.

Bring your live concerts to life. With 24 in/4 out capability, the Fender® M-12 with Expander gives you the functions you want for the options you need. And that includes live *recording* as well (plus optional interface with other master mixing modules).

Limiters, cueing-talkback, high-level in/outs that run multiple effects simultaneously and the capability of assigning signals anywhere on the board give you unsurpassed control.



And sophisticated submasters let you mix as many mike or direct inputs on one channel—drums, keyboards or vocals, for example—while you mix the balance of your band and patched-in effects on the other.

A new standard in electronic performance. Any mixer is only as solid as its electronic components. So all Lo-z input and output channels are transformer coupled and floating. High slew rate, low-noise op amps are used throughout. Continuous gain controls allow input impedances to remain unaltered. Equivalent input noise is—128 Dbm.

Built to take life's ups and downs. Rely on the M-12 Expander to perform concert after concert. The rigid extruded front panels and built-in case keep this set mixing *every* set. And modular construction makes a rare servicing a snap.

Let Fender's new 12-Channel Expander expand your band's horizons. Check the specs and get the whole story at your authorized Fender dealer. It could start making a big difference in the cheers you get from your audience.

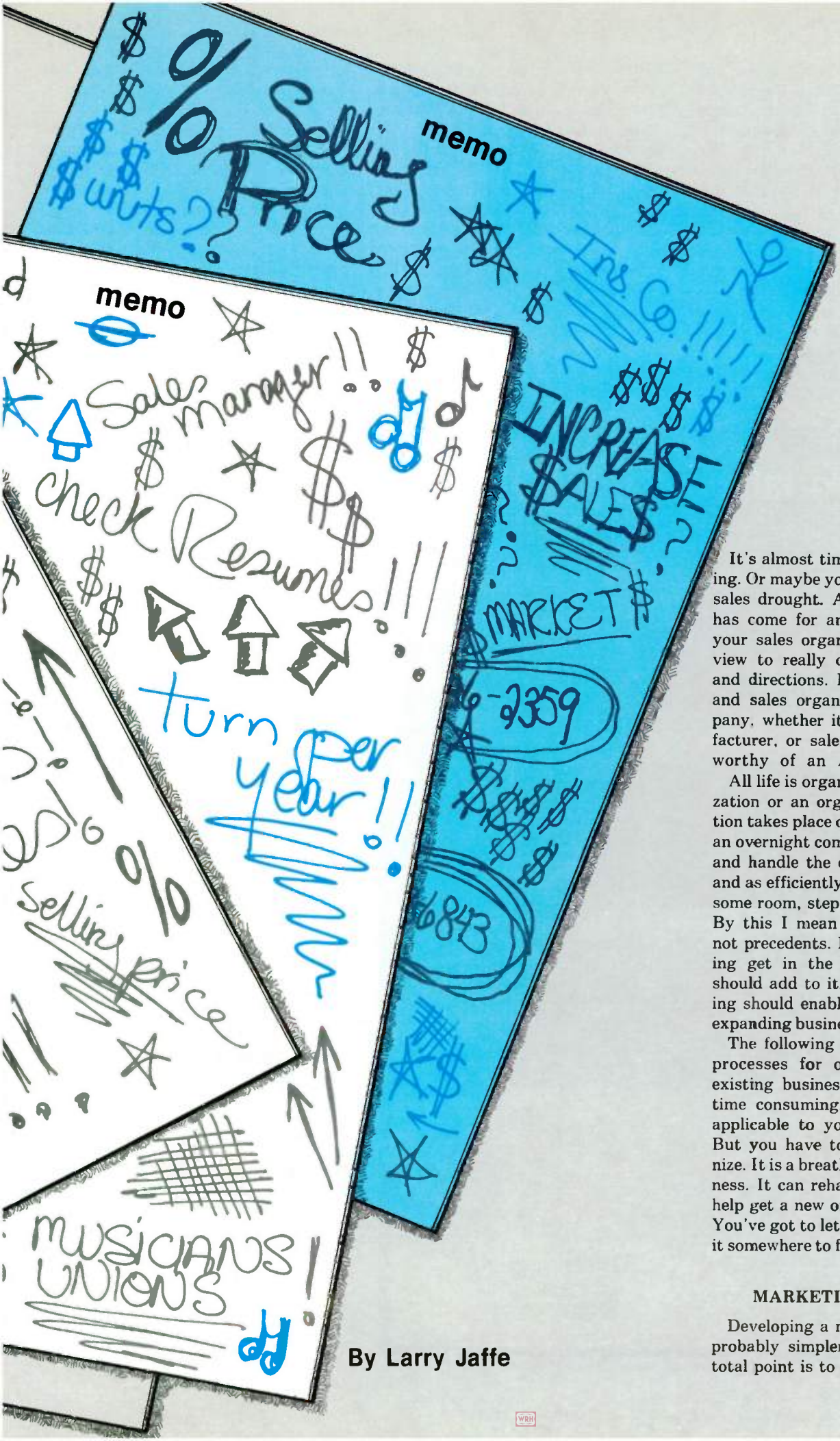
And the smile you get from your accountant.

NEW from Fender®
MADE IN U.S.A.

Professional Sound Products
1300 E. Valencia Drive
Fullerton, CA 92631

CIRCLE 68 ON READER SERVICE CARD

HOW TO FORMULATE A SALES POLICY



By Larry Jaffe

It's almost time for the grand opening. Or maybe you're in the middle of a sales drought. At any rate, the time has come for an honest appraisal of your sales organization and an overview to really determine your goals and directions. Building a marketing and sales organization for any company, whether it be a retailer, manufacturer, or sales rep firm is a chore worthy of an Atlas.

All life is organized—be it an organization or an organism. But organization takes place on a gradual basis, not an overnight command. First you cope and handle the day-to-day as quickly and as efficiently as possible. Then get some room, step back and tighten up. By this I mean *organize*. Set *policy*, not precedents. But don't let organizing get in the way of business. It should add to it, enhance it. Organizing should enable you to handle your expanding business—not stop it.

The following pages contain simple processes for organizing a new or existing business. Some of them are time consuming, others may not be applicable to your type of business. But you have to make time to organize. It is a breath of fresh air to a business. It can rehabilitate old business, help get a new one on the right track. You've got to let it flow as well as give it somewhere to flow to.

MARKETING PROGRAM

Developing a marketing program is probably simpler than it seems. The total point is to go from Point A (the

seller) to Point B (the buyer). The faster and simpler that this occurs with the least amount of extra hands in the way, the more efficient the system. Corporate intention must be maintained and be obvious all the way to the end user. For this reason, the goals set by management must be defined and agreed upon all the way down the line. Disagreements slow down momentum and can destroy the company if allowed to continue. A marketing program must therefore be comprehensive in scope yet of the utmost simplicity in application.

Any marketing program can be broken down by first indicating *goal* (the overall aim or target) and *purpose*—which is different from the goal. The purpose is *why* you are taking an action. It is not the action itself nor the goal, which is simply a major target or objective. The next step from there is to break down, step by step, the plan that will allow the goal to be accomplished. It is more or less a road map of *what actions* are required to be taken and by *whom*. Assigning the task to the appropriate individual along with the time needed to accomplish it is of utmost importance. There are no secrets to accomplishing a goal and in order for an organization to effectively work as a team the members must completely understand their parts in the overall attack. Simple. Yes, very simple. The rough part is getting the completions. This is where management takes over. A top coach is required to push the people through to the desired goal. And that's another subject entirely—motivation.

The goal can be anything from getting to the top of Mt. Everest to a million dollars in sales. A viable goal must be within reality; the organizational members must be able to accomplish it; and it must coincide with the organization's prime objectives.

The purpose is the *why*—why is the action so important, why is it needed—or the motivation. Proper understanding of the purpose enables the group to go forward in completing the necessary steps.

The steps of the plan are simply the breaking down of the whole into easily acceptable bites, and delineating who is responsible for each.

Let's put together a short sample program.

SAMPLE COMPANY MARKETING PROGRAM

Goal: Set up sales organization for new company

Purpose: Sell product from new company lines

Plan:

1. Do research on potential sales managers	Pres.
2. Contact and interview	Pres.
3. Decide on sales manager	Pres.
4. Hire sales administrator	Sls. Mgr.
5. Research for salesmen	Sls. Admin.
6. Contact salesmen	Sls. Mgr.
7. Decide on salesmen	Sls. Mgr.

The plan must be as specific as possible. Even the most obvious tasks should be listed. We might even break down the steps between 6 and 7—such as checking references etc. This would be the responsibility of the sales manager as well. The simpler and more specific, the clearer and easier it will be to carry out. Marketing programs are essence. All complexities must be broken down.

SALES PROJECTION

Projecting of sales is traditionally known as dart throwing. But it should

---

Larry Jaffe is Director of Marketing and Sales, Professional Products Division of dbx, Incorporated.

be an activity based on experience, tradition, and instinct rather than a somewhat nebulous pastime enveloping businesses and organizations worldwide. Critical decisions are based on the results and unfortunately, the results are often inaccurate and indescribably wrong.

I've seen some people just simply tack on a percentage increase all across the board—and not spend another moment on projections.

It's a good idea to do a survey prior to sitting down and figuring. Maneuvering numbers requires current data and that can only be arrived at by surveying your market. You should be able to rely on your reps for some of the data. You need reliable information; whatever you have to do to get it is well worth your while. Survey your customers, prior purchasers, the musicians union. Do your own internal survey. Actually, any rep who cannot predict sales by product is of little use or is totally untrained. He is not creating his territory. Of course, new product lines require a bit more guesswork or hunches, since there is no track record to go on.

Projections should certainly take into account individual products. Their rank and position in your marketplace should be determined. What are the growth potentials? How is it selling? Negative factors include what's the competition (both yours and the product's) up to? We need to know all of this in order to predict accurately the sales of the product. Of course, do not forget previous sales, price increases, and the like.

Sales are broken down by unit and by month giving annual figures, as well as by dollars, by month, quarterly, and annually. Plus a breakout annually for the past two or more pre-

SAMPLE FORM NO. 1

19__ PRODUCT SALES-BOOKINGS FORECAST (UNITS)
(XYZ STORE)
By product and by month

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	TOTAL 1977	1978	1979
PRODUCT CLASSIFICATION A															
MANUFACTURER 1															
MODEL 000															
001															
002															
MANUFACTURER 2															
MODEL 300															
310															
PRODUCT CLASSIFICATION B															
MANUFACTURER 1															

SAMPLE FORM NO. 2

19__ PRODUCT SALES - BOOKINGS FORECAST (DOLLARS)
(XYZ STORE)

	1977	1978	1979
PRODUCT CLASSIFICATION A			
MANUFACTURER 1			
MODEL 000			
001			
002			

ceding years with the percentage of increase (or decrease).

The absolutely worst way to predict sales, in my opinion, is to sit down with your new computer and program your increase. With the huge amount of competition and emotionality of the music, commercial market (it's intensely subjective) you are just dousing your head in the sand.

Forms or exhibits are useful. Complete breakdowns should be made of all equipment sold—in units and in dollars.

SALES AND MARKETING

The basic factor in overseeing or supervising any department is *communication*. Without it you're dead. Things either don't happen or never get completed. But what is this often talked about and just as often hard to understand term—communication?

Communication is basically an exchange of an idea or ideas. The problem arises in the accomplishment of this concept. It takes at least two people. Sometimes they do not get along; more often they don't pay attention to each other. In order to have communication, you have to have the parties concerned paying attention to each other—truly full attention. This holds true no matter who you are trying to communicate with—the sales manager, the salesman—or the customer.

People who pay only part attention to you are not going to hear what you say. Your idea is not going to be received.

What I'm saying is very simple—get someone's attention and hold it. Halfhearted attention gives way to halfhearted sales and is the cause of problems. You've got to get attention and hold it. If you don't you'll lose, whether you're talking to a customer or your boss. Sometimes you've got to do something (at times outlandish) in order to get the attention you need. People live in their own little worlds so much it is tough to break through.

Sometimes the best way to get someone to pay attention to you is to lend him an ear first. Ask him a question and let him play motor mouth for a while. You'll find him willing to listen to you as well. He'll finally realize that there's another person in the room. And believe me, that in itself is a major accomplishment.

You want to get the people interested. From there it is only a couple of steps to enthusiasm and you've got them motivated in the right direction. But the interest has to come first.

A good salesman is an interested salesman. He's not caught up in his own problem, but is a ready and willing listener. He guides the conversation, not forcing the sell but gathering

an agreement that leads to the close.

And this goes for whether he's the boss or a salesman on the floor. He has to communicate an aura of safety—safe to talk, safe to buy. This is trust and trust moves mountains.

Communication is the key to motivation and sales and is integral to a sales policy. The boss motivates his sales manager who motivates his sales people who motivate the customer. There is nothing like a customer selling himself. It starts at the top; you have to be properly motivated yourself to take it on. Caring about your customer is key. And this intention starts at the top and filters all the way down.

ETHICS AND INTEGRITY

This is not a course in philosophy but rather a description of a method of doing business. Certainly, to develop a sales policy, we have to develop a way of doing business—or a business philosophy. Ethics and integrity are certainly the beginnings of this philosophy, simply a way of thinking.

What do ethics and integrity have to do with selling and marketing? It all goes back to the product itself. Who designed it and why? Those initial intentions must be honorable and must be carried forth to the product itself in order to sell it properly. Whatever it may be.

In each and every case, care should be taken to assure yourself and your customer that it works, that it's the best you can do at that price point.

The salesperson should know the advantages of the products he sells as well as the disadvantages. It behooves him to take a vital interest and get his customer the product that will do the best job for his customer's particular application. This way the sale will not haunt him. It is equally important that the product back up the salesman.

Also you have to be careful to sell the right product for the application. Making a quick sale just to move the product when it doesn't meet the need is a crime on the salesperson's part. This will hurt your personal integrity quicker than anything around. Word of mouth travels fast.

DEVELOPING SALES POLICY

What is policy? Speaking simply, policy is a set of managerial guidelines. It is a guideline, not a law. It allows some flexibility, but you had better stick to it.

Policy gives you backup and protection. (You can always blame an unpopular decision on it.) Policy acts as your secret authority and should be used to your advantage. The true professional follows policy to the letter. It is an owner's and operator's manual for the company. It should be specific enough to direct employees, yet flexible enough to let the person be creative.

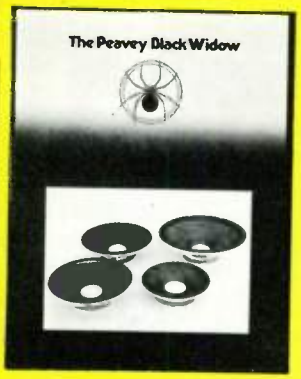
Needless to say it should also be sane. Today that is sometimes asking too much. Sane policy is something you learn through trial and error. Some policies work, others don't. The objective is to find what works and 86 (get rid of) the others. There is nothing worse than obsolete policy hanging around—it drives your people crazy and makes them totally ineffectual.

Of course profitability is the bottom line—you should not give the store away. But contrary to many notions, no matter what you do, this is a service business. Your ads can be bright and witty and have the best sales pitch, but if you don't take good care of your people they will not back you up.

I've been brought up with the attitude that the customer is always right. Perhaps this is a bit antiquated today, but nevertheless a satisfied customer is a repeat customer. You've got him forever.

Any sales policy should have this as a basis. It is a guide to doing business.

DEALER DATA FILE



The Peavey Electronics BlackWidow speaker program has been developed to fill the industry void for a high quality transducer designed for contemporary applications. This brochure illustrates the Black Widow's construction innovations along with functional Thiele/small parameter charts to allow the consumer to utilize all the performance characteristics inherent in each model. Circle 10

Information packet with complete product line spec sheets, brochures and price lists available from Tapco or Tapco manufacturing representatives. Circle 11

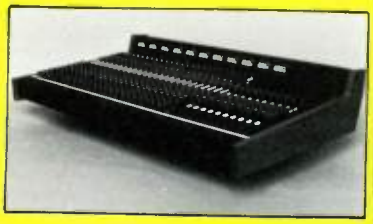
The respected line of Mu-tron signal processors was recently acquired by ARP Instruments. The new Mu-tron catalog features the Vol-Wah, Mu-tron III envelope follower, Micro V envelope follower, Phasor II, Flanger, Octave Divider and Mu-tron Bi-Phase. Catalog includes detailed photos and specifications. Qualified dealers should contact National Sales Manager, Mu-tron Inc., 45 Hartwell Avenue, Lexington, Massachusetts 02173 for complete information on the new Mu-tron Dealer Program. Circle 13

Edcor manufactures the most complete line of wireless microphones in one catalog. Both 30-50 MHz and 150-210 MHz. And a toll free number: 1-800-854-0259. Circle 12

AB Systems recently announced significant additions to its Professional Series. The new look and features of this full line of pro gear are fully described in a new catalog sheet format. Circle 14

TO RECEIVE INFORMATION ABOUT PRODUCTS IN THE DEALER DATA FILE CIRCLE THE APPROPRIATE READER SERVICE NUMBER ON PAGES 51 AND 52.

Audioarts Engineering manufactures serious professional equipment. Long known for parametric equalizers, feedback suppressors, parametric crossovers and discotheque mixers, Audioarts Engineering has recently introduced a high-end stage monitor mixing system. The company will also be showing a new series of 4 and 8 output consoles at this fall's Audio Engineering Society show in New York City. Circle 15



One of the fastest growing power amp companies, QSC Audio Products has just released a new line of six professional power amps. Circle 16

Roland introduces its Rack System concept with a piece of literature specifically highlighting this area of the Roland product line. Explained is the concept of rack-mounted amplification and effects, and in addition, each product in Roland's system is described in detail. Circle 17

Teatronics, manufacturers of professional lighting control equipment for rock disco and theatrical lighting, is offering an 8-page catalog full of solutions to your lighting problems. Circle 18

Stak-Rak, a modular, traveling system. The only rack system easily adaptable to all types of rack mount equipment, even non-standard heights. Available accessories include: blank panels, fans, mounting hardware. Circle 19

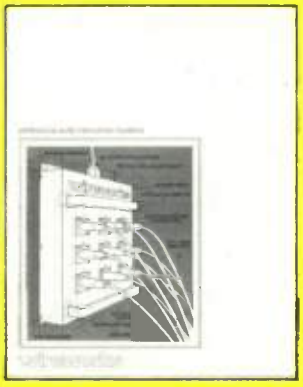
TDK Electronics Corp.: Superior performance and reliability characterize the entire TDK line which includes quality recording tape in the open reel, cassette, and 8-track formats. TDK also offers a host of tape accessory products which facilitate proper maintenance and efficient storage. Circle 22

dbx Incorporated: Recognized worldwide for its studio noise reduction system, dbx, Inc., a BSR subsidiary, offers a gamut of noise reduction systems, compressor/limiters, and accessories for creative audio, professional, broadcast and disco applications. Circle 23

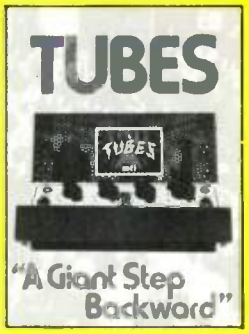
Electro-Voice Pro-Line Microphone Catalog detailing performance, applications and available accessories for the eight microphones designed specially for the performing musician. Circle 24

Sound Transducers Analogous to Lasers. An illustrated booklet highlights the patented principles behind Transylvania Power's unique line of acoustic projectors for studio and reinforcement applications. Circle 20

Whirlwind Music manufactures complete lines of both standard and custom design plugs, cables, connectors and wires for both recording and "live" sound reinforcement applications. Circle 25



Wireworks: Audio cabling systems engineering for the professional, built for performance. Microphone cables, TE-1 cable tester, Hardwired Microphone Multicables (3 to 50 pairs) and the Multicable Components Group (3 to 50 pairs): Multiboxes, Multitrunks, Multitails and the new Multitracks. Circle 29



Music Technology, Inc., distributors of the popular Crumar keyboards, now offers a full line of exciting new accessories, including: Tubes (guarantees authentic tube sound from any amp), MTI's Microphone Stand (a design of the '80s at a price from the '60s), Keyboard Stands (sturdy 3, 2 and 1 tier) and Polypatch (the first affordable amplification system designed exclusively for keyboard players). Circle 21

For information on Sony's full line of consumer microphones, mixers and accessories as well as headphones write to: Professional Audio Products, Sony Industries (Dept. J.A.C.), 9 West 57th Street, New York, New York 10019. Circle 26

DiMarzio's new 24-page, full-color catalog details some innovative new pickup additions, a full line of guitar and bass hardware and bodies (including Fender and Gibson replacement parts), an abundance of replacement electrical parts, and such unique items as the Big Amp. DiMarzio now features everything to achieve the ultimate custom guitar. Circle 27

MXR is a widely respected manufacturer in the field of electronic signal processing. The Professional Products Catalog includes all musical instrument and studio signal processors. The Consumer Products Catalog covers MXR's range of home stereo components. Circle 28

DEALER FILE

Free 1979 Neptune catalog. Complete specs on mixers, equalizers, analyzers, amplifiers and electronic crossover. Many new products. Write Neptune Electronics, 934 N.E. 25th Ave., Portland, OR 97232. Circle 30

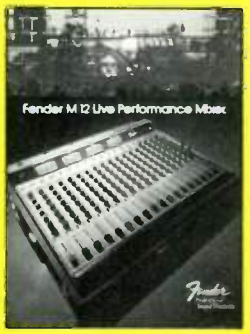
Maxell Corporation manufactures premium quality audio and video magnetic recording tape and accessories. Maxell's exclusive Epitaxial formula is featured in Professional quality open reel, cassettes, and VHS. Ultra-Dynamic and Low-Noise formulas in open reel, cassette, and 8-track formats balance Maxell's full line. Circle 33

TEAC's new 16-page guide helps dealers introduce customers to the equipment and techniques of multitrack recording. Dealers can use the booklets to bring customers in, qualify their needs and plan purchases. Circle 34

Audio-Technica's free 17-x24-inch wall chart, "8 Basic Microphone Terms," provides helpful, unbiased explanations of common microphone engineering terms. Circle 36

Beyer Dynamic is recognized as one of the world's leading manufacturers of condenser, ribbon and dynamic microphones for studios, musicians and broadcasters. Beyer also offers a full line of microphone accessories, microphone stands, professional headphones and high quality input transformers. Circle 31

Ekkor enhances the dance with the sophisticated digital/analog LS/Four system light controller. Additions include the LS/4E expander, LS/4Z zone control, LS/4X matrix and LS/4P power-pak. Circle 37



The newest introduction from Fender Professional Sound Products is the M-12 live performance mixer specifically designed for professional sound reinforcement. Circle 35

Information is available on Yamaha's PM-2000 Mixer. A professional console for sound reinforcement. Designed like a custom console, the Yamaha PM-2000 fills the need for greater performance for a new generation of sound reinforcement engineers. Circle 32

GLi is # 1 in disco throughout the world and the PMX-9000 professional mixer/equalizer is one reason. It costs less, but does a lot more because it comes with a complete range of professional features for the most demanding applications. Circle 38

True Confessions

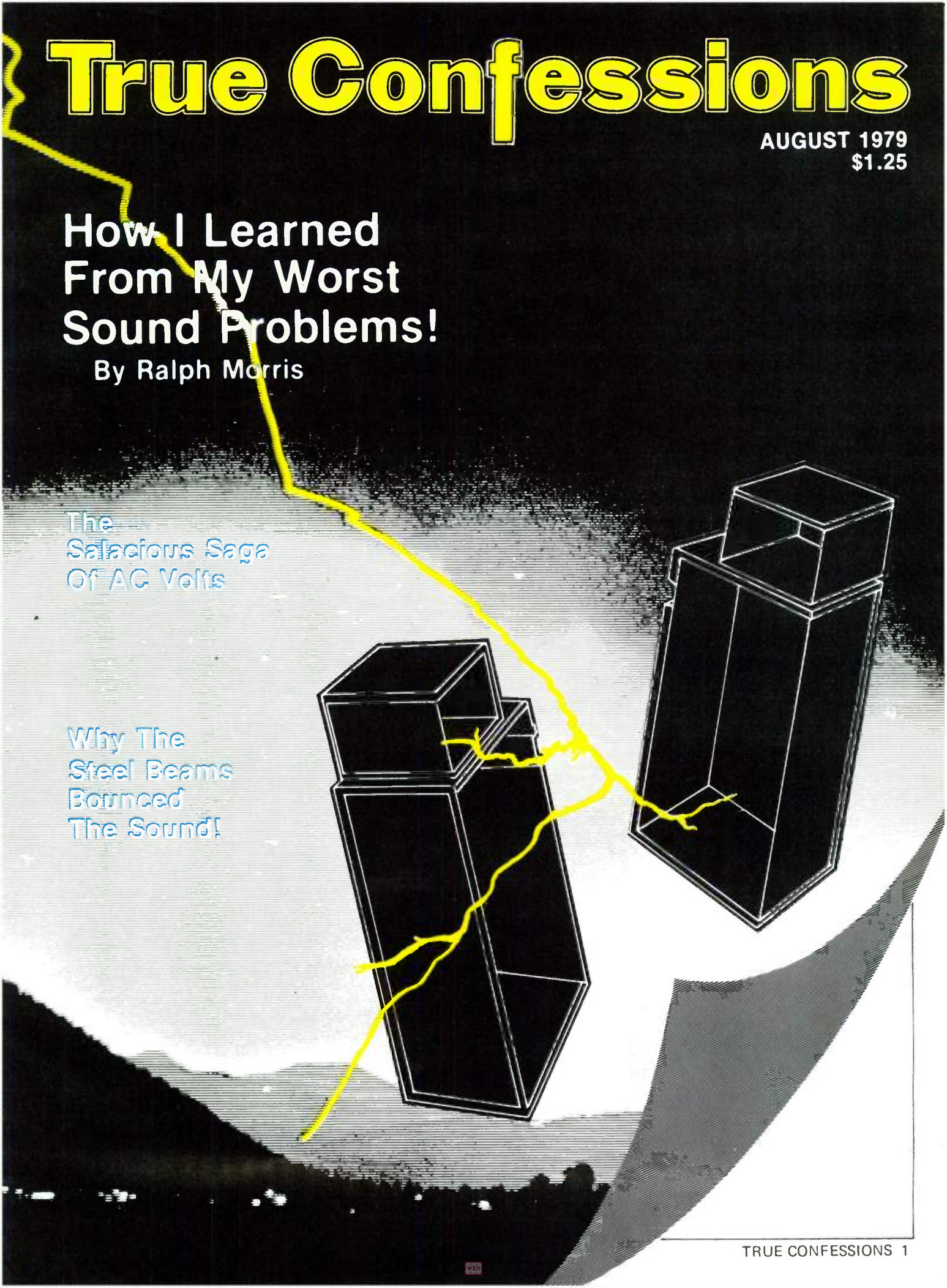
AUGUST 1979
$1.25

How I Learned From My Worst Sound Problems!

By Ralph Morris

The Salacious Saga Of AC Volts

Why The Steel Beams Bounced The Sound!



As a past concert sound engineer, I have had several experiences of sudden unexpected problems arising. In the sixties, our equipment was very limited, hardly even sufficient. But one of the worst problems I ever had involved not the equipment, but the auditorium itself. It's the kind of problem anyone can run into, and my experience might serve as a lesson to pass on to your customers, as it served as a lesson for me.

GYMNASIUM SOUND

We were on tour in the Netherlands with Frank Zappa. When we arrived in The Hague, we found that the auditorium in which we were supposed to play was suddenly closed for repairs. As a result, we played in a gymnasium-type building which had gigantic steel beams across the ceiling, which was only about twelve feet from the floor. These beams were about three feet deep, so when we set up the loudspeakers, they were mostly pointing at the first steel beam in front of the stage. You can imagine what that did for the sound. We reduced the height of the sound wings (speaker platforms) from five to four feet from the floor, for the best compromise, since the speakers need to be above the heads of the audience in the front row. The results were less than perfect, to say the least. The sound hit that first steel beam and bounced right back on the stage.

If you ever have to set up a P.A. in a room with a low ceiling and steel beams, about the only advice I can offer is to try and set up the stage so that the sound is projected parallel to the steel beams, instead of crosswise, as we found in Holland. I tried to effect that solution in this case, but the stage had already been erected on the side close to the power mains and access from the dressing rooms, and it was too late to move it. That night would certainly be a candidate for the worst sound I ever mixed, but it was not the worst problem I ever had.

'PACKING UP'

The most embarrassing problem I ever had was during the filming of an "In Concert" program at Santa Monica Civic Auditorium in California. Several artists were performing during a two day program, the filmed or taped segments to be shown later on television. During Billy Preston's set, the mixing console suddenly "packed up," to use the English roadie's expression. No noise, no warning, just no output. Billy's mouth was still moving, but all we could hear were keyboards. No vocals, no drums. And then the director stopped everything.

In the two or three minutes that had elapsed since the failure, I had determined that I still had AC power to the console, because the VU meter lights were still on. The most common failure mode of all electrically powered equipment is lack of electricity, so the first place to look is to see if someone kicked out the AC plug. Due to this, I always tie or tape the AC cords to the supply box, so this problem was a bit more difficult than reconnecting the power cord.

I also noticed that the VU meters had come to rest when the failure occurred, which indicated that there was no output from the mixer, as opposed to loss of continuity in the feed cables from the console to the power amplifiers, on stage. Having completed this basic analysis in the first minute after the failure, I quickly removed the console output module, and was reconnecting a spare module when Dick Clark, the series producer, casually walked up. "How long will it be?" he asked, adding that the cost of production time was several hundred dollars per minute, with all the artists, technicians, equipment, and services on hourly cost.

By then I had connected the spare output module, and very hopefully said the soundman's prayer ("Test, One Two") into the console mic. Nothing. I felt a tinge of despair.

At the time, however, there was no time for reflection. I figured then that the failure was in the console power supply, which converts the 120 volts AC to plus and minus 15 volts DC required for the console circuits. The AC and DC fuses in the power supply checked out o.k., and we didn't carry a spare power supply, since they are fairly simple devices and are normally very reliable.

I had heard of one console power supply failure before, from a friend of mine on a European tour, in Italy, to be exact, where parts are hard to come by. Not knowing how to say "DC power supply" in Italian, my enterprising friend simply removed two 12 volt batteries from the trucks, which in series provided a little more than plus and minus twelve volts, and went on with the show. I considered that solution, but only for a few seconds, because in this type of situation the best solution is not necessarily the correct one, but the absolutely quickest one. (Remember those production costs of several hundred dollars per minute, and we were already into a few minutes.)

There was no time to haul out the old tool box and try to repair the power supply, so I was just about to execute "Plan C" for console failure, which is to plug the main sound system feed lines into the monitor mixer on stage and do both the main and monitor mixes from that position, when I remembered that we had a small auxiliary console in the truck for occasions when we had more than twenty-four inputs. It only took about two minutes to bring in the auxiliary mixer, and two or three minutes to patch it in. It had only ten channels, but it was a real life saver. By "Y-ing" some of the drum mics and using only one input channel for two vocal mics which were not used at the same time, we were able to finish the set. After the show, was finished, we had time to repair the console properly.

The lesson, in this case, is to have a detailed plan, with several alternates, in case of equipment failure. The multiplicity of sound system equipment makes it possible to substitute one item for another, simply by repatching, so that if you suspect a particular component, one can be substituted in short order. This factor can also be used in troubleshooting. By substituting a part of the system, we can quickly determine that we have isolated a failed part if the substitution restores the operation. If it doesn't, we can conclude that the part replaced was not the cause.

On the second day of the "In Concert" production we had no problems, except that someone walked away with the monitor mixer's headset.

ELECTRICAL DANGER

Perhaps the worst problem I've ever had was not as embarrassing as the previous one, because the audience never knew about it. However, it contained a real danger to life and limb, and that could be more serious than having to delay or cancel a show and refund the audience, although I have been threatened with dire consequence if the sound wasn't fixed immediately.

It was in the Civic Auditorium in San Diego, California, and we set up

the sound system early in the afternoon for a scheduled sound-check at 4 p.m. Our procedure was to connect the AC power and turn on all electronics—mixer, effects, amplifiers, etc.—and then connect the signal conductors, the mic cables, snake, feed lines, etc. The reason for this was that some of the equipment we had would make a loud "thump" (or worse) if it was connected to the signal path when its AC power was turned on. Also, we carried Hubble plug-in type AC circuit testers, which we used to be sure that we had 120 volts AC of correct polarity, and a ground for the mixing console. The ground checked o.k., so I connected the console AC cord, turned on the console power switch, and connected the feed lines to the console output. As I drew the XLR connector close to the console output panel, a faint spark bridged the last quarter-inch before contact. I was standing on the plush carpeting of the balcony aisle, so I supposed it might have been a static charge finding ground at the console, as any random electrical charge which occurs in the shielded cables should do. A later test would show that it was 120 volts AC from a shorted amplifier!

My crew on stage for that tour was Simon S. Simon and "Mad John" Debord. They were working quickly on the sound platforms on both sides of the stage, connecting first the AC power to the power amplifiers and then the signal feed from the console. Mad John had completed these tasks on the stage left platform and was beginning to set up microphones on stage for the short "sound check" rehearsal. Suddenly, a loud foghorn sound came from the speaker stack on stage-left, as if 120 volts AC were finding their way to the speakers! (They were.)

Mad John made a mad dash to disconnect the AC power from the amp racks on stage left, and I quickly removed the feed lines from the console outputs, and one or both actions turned off the foghorn effect.

We had determined that the problem only occurred on one side of the P.A., so we immediately tested the AC circuits on that side, and sure enough, we found one of the quad boxes wired out of phase. That was corrected quickly enough, but the foghorn effect came back as soon as the AC power was reconnected! We were certain that we had some AC power problem, so we ran extension cables from the power mains on the other side of the stage,

where the stage right amplifiers were connected, with no problems. We cautiously plugged it in again: BRRRRRRRAAAAAKKKKK! It was a few minutes past four o'clock by then, and we had less than an hour to "get it right."

All of the above had taken place in a short period, say twenty or thirty minutes. Because of the traveling schedule, we had only that much time to finish the stage setup (microphones and monitors), and no time for a thorough sound system check-out, where you listen to each loudspeaker and check each piece of electronic gear, and every (yes, every) cable for continuity, using a plug-in cable tester, with appropriate connectors for the type of speaker and other cables you use, as well as the XLR-3 mic cable.

At that point I had a moment to reflect, as I prepared to climb the metal scaffold, only about seven feet from the concrete floor of the auditorium, where 120 volts AC was coursing around somewhere it shouldn't be. I remembered the slight spark I saw at the console, too slight to have been the solid, blue bolt of a direct short of thirty amperes 120 volts AC, but maybe it wasn't a static charge. Armed with our trusty multimeters, we approached the scaffold as if it were a monster alien, but a check of the potential between the metal tower and the ground from the AC supply showed zero. Mad John was the first to climb the tower. His multimeter found 120 volts between one of the amplifier racks and the tower. We substituted another amplifier, and the problem was solved. Further examination showed that 120 volts from a shorted amplifier had sought ground through the feed cables when I connected them to the console. The majority of the current never reached the console, though, which accounts for the anemic spark I observed there. The load had burned through at the point where the shield of the feed cable connector was attached to the chassis ground. By turning off the individual amplifiers in the rack, we isolated the one that was shorting, replaced the strap from pin 1 to chassis, and were ready for the start of the show.

A simple problem, but we were led astray by our own imagination. We were so sure that we had a problem with the AC supply, that we didn't check the individual amplifiers to begin with. Of course, once the signal ground was interrupted, that became a separate problem.

In conclusion, I would say that the best way to deal with sound problems is to be prepared by keeping the sound system maintained in the best condition and carrying ample spare components in case of failure. Advice to sound men should be simple: Don't seize on the first possible explanation of the difficulty; it sometimes proves to be incorrect, as the case above indicates. Sometimes, when the pressure is on, it seems better to do something (*anything*) rather than stand there looking dumb, but be sure you have identified the problem correctly before you act. Also, and not the least in importance, observe safety rules. Turn off and disconnect any equipment before you work on it. If you have to troubleshoot with an item turned on, use the one hand rule, to avoid getting a shock across your body, and be sure to stand on a dry wood or rubber surface, so *you* aren't the best path to ground. Always use a meter or circuit tester first.

Eight good reasons to be a Beyer Buyer.

one The first reason is Beyer. We have fifty years experience making the world's finest microphones and headphones. And an unmatched reputation for quality, reliability and innovation. The choice of professionals everywhere.

two M 160. One of the world's best-loved and most versatile microphones. Warm, soft sound favored by vocalists and musicians alike. Dual ribbon design for high strength and fast transient response.

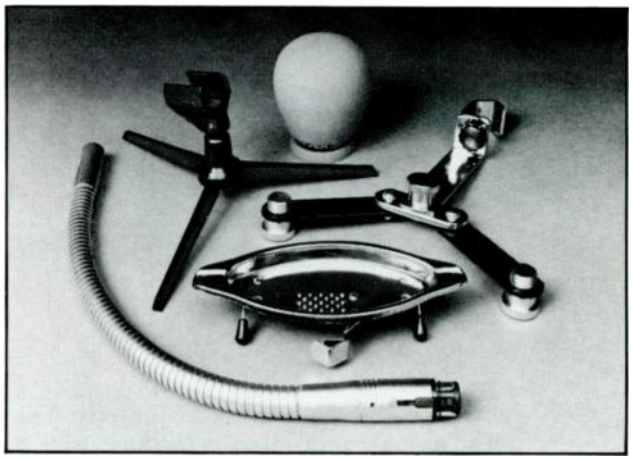
three Beyer headphones. A full range of high quality professional models for critical monitoring and reliable communication. DT 109 combines stereo headphones and boom-mounted microphone, ideal for on-air use and disco deejays. DT 444S wireless headphone receives sound from an infra-red LED transmitter up to 300 feet away. Full 20-20,000Hz frequency response. Six hour stereo operation on rechargeable NiCad batteries.

four The new M 400. A great performer's mic. Supercardioid pick-up pattern to minimize feedback. Rugged design for long life. Tapered frequency response with rising high end and rolled off lows, plus midrange presence boost. Built-in humbucking coil and pop filter. Dynamic design is unaffected by heat and humidity.

We're looking for a few more great dealers to handle the Beyer line. Contact Norm Wieland at Burns Audiotronics.

five Beyer microphone stands and booms. A full range of mic mounts for floor and desk use, with fixed and folding bases. Available with collapsible tubes for easy packing. Also heavy-duty stands for speaker cabinets.

six Beyer microphone accessories. Wind screens, impedance matching transformers, in-line switches, power supplies, wireless transmitters, stereo arms, goosenecks, clamps, thread adapters, anti-shock suspensions, and even a mic stand ashtray! The whole works. If you can use it with a mic, we make it.



seven M 713. One of our unsurpassed studio condenser mics. Modular system; accepts different transducer capsules and power supplies. Gold-vapored mylar diaphragm for high transient response. Mu-metal shield. Temperature and humidity stable.

eight See your dealer or write for information on our product line. You'll have many more reasons to be a Beyer buyer.

Beyer Dynamic

BURNS AUDIOTRONICS, INC.
5-05 Burns Avenue, Hicksville, NY 11801
(516) 935-8000

CIRCLE 77 ON READER SERVICE CARD

the SOUND SH

Combining the advantages of both front-loaded and folded horn cabinet designs, **Road** Electronics has added the SB Series of bass amplifiers to its established line. The SB series is said by the company to be an innovation that offers the realization of the full potential of the bass guitar, affording depth, presence, clarity and tonal precision at all volume levels without distortion.

CIRCLE 1 ON READER SERVICE CARD

Here's a new mic design from **Electro-Voice** that should be of interest to those who sell mics to rock bands on a regular basis. Funny thing is, the RE-18 is not intended primarily for rock bands, but for hand-held broadcast applications. However, a couple of features make this mic worth consideration as a vocal mic for rock musicians.

First of all, this mic is designed to reject ambient noise and isolate handling noise. Thus, when 10,000 screaming fans come to their feet chanting "Give us Barabas!" you won't hear as much of it through the house

system. Nor will it be so evident in the mix when the singer becomes ecstatic and starts banging the mic stand on the stage like a carpenter with caffeine hot-flashes. What I mean is, the mic is quiet.

In addition to being quiet, the RE-18 has a patented feature called Variable-D, which must mean variable distance, because no matter what the mic-to-talent working distance, the frequency response of the RE-18 remains the same. Also, if the singer gets a little off-axis, the mic will maintain frequency response. This is great news for singers whose heads flop uncontrollably from side to side during a performance—like I said, a super mic for rock and roll!

The RE-18 is a redesigned version of the famous RE-15 mic that has seen extensive use in studio and live applications.

CIRCLE 2 ON READER SERVICE CARD

Dual's new cassette deck line is headed by the 839 RC, a front-loading deck whose features include automatic reverse in both record and playback, full metal tape capability, electronic editing, variable speed, a new cassette loading system and provision for wireless remote control. The "direct load and lock sys-

OPPE

By Charlie Lawing

tem" eliminates the conventional hinged door by automatically retracting a protective cover from the tape heads when the power is switched on. The cassette can then be inserted directly, and automatically locks in position. The electronic fade/edit control provides for selective controlled erasure during playback. Other features include a six-position bias/equalization switch, Sendust alloy tape head, Dolby, memory stop operative in both fast wind directions, line/microphone mixing, separate level controls for each channel, level controls for headphones and line output. The optional/ten-function RC 152 wireless remote control also operates the Dual 650 turntable. Delivery is expected in the early fall.

CIRCLE 3 ON READER SERVICE CARD

Believe it or not, a lot of people hear with their eyes. They look at a band up on stage, and they see all the cabinets and speakers and amps and they think, "Wow, they must be good . . . look at all that equipment!" Precisely for ths reason, musicians have been known to stack up empty speaker enclosures just for the visual effect, the sense of enormous power about to be unleashed.

All well and good, but what about the guys who couldn't care less about all those cabinets? What about the guy who is working the lounge circuit, driving a Toyota wagon and trying to save as much money, time, space and back strain as possible. What does he need for speaker cabinets?

Altec Lansing's answer to that question is the new 934 speaker system. A pair of them will fit into the back seat of most any subcompact auto, yet they are strong enough to handle up to a 350 watt power amp.

The 934 is loaded with a 15" bass speaker and a coaxially-mounted high frequency horn and driver. The 934 cabinet is biamp-ready, with a 1500 Hz crossover frequency. The nominal impedance of the 934 is 8 ohms, and the frequency response is 60 Hz to 15 kHz.

At a power level of 120 watts, the 934 will deliver a maximum acoustic output over the long term of 120 dB SPL.

What all this means to the customer is that the Altec 934 will not only be easier to transport than most full-range enclosures, it will probably outperform many systems which are much bigger! The efficiency of the 934 is what makes it so great. Less power is required to achieve adequate sound pressure levels; therefore the customer can save more money on other parts of his sound system. And of course, that means still less equipment to transport.

So far the customers who want a small but super-efficient speaker enclosure, the Altec 934 is certainly one good answer.

CIRCLE 4 ON READER SERVICE CARD

By Tom Morse

DEALER DOSSIER

E.U. Wurlitzer
Boston, Massachusetts

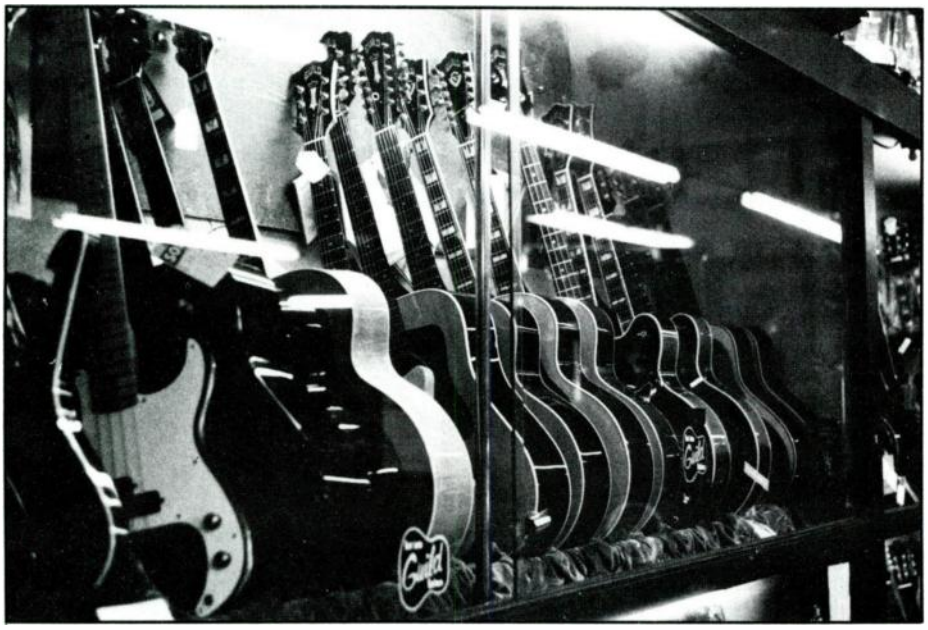
In 1890, E.U. Wurlitzer left his German province, which was renowned for its musical instruments, and arrived in Boston. A fine craftsman, he found work as an instrument repair man, and just after World War I he and his wife opened their own shop which gained a fine reputation among Boston's professionals. Two sons, Ernie and Al, grew to be excellent mechanics and musicians themselves.

Prior to World War II, a young saxophone player, Tim Jachrimo, became good friends with the Wurlitzers, and after the war he joined their small staff, the first non-family and the fifth employee. Today, there are forty-one employees, and Tim Jachrimo is Wurlitzer's number one man.

We talked with Tim, and Dave Roudebush, the young man in charge of the prosound department, in Dave's fourth floor office.

What were some of the first lines that E.U. Wurlitzer carried?

Jachrimo: They had the best of everything. They had Olds trumpets. They had Epiphone guitars—the original Epiphone guitars when they were made in New York. Directly after the war they picked up Gibson. One reason that I liked the store was that they picked up the Cadillacs of the industry. Everything they had was top-grade. Being mechanical people they knew quality, and their repair work was high grade. We had Slingerlands drums, which at that time were the number one drum. When we moved, in 1960 to Bedford Street, it was the first coming of rock and roll, folk music and hootenanny, and we had been heavily into guitars for some time. We were always service oriented—the store started out that way—and we have always been careful about not taking on a line unless some arrangements were made to service it. Either the company had a warranty station or we became the warranty station. This all started between 1950 and 1960, especially in electronics. We became the warranty station for Fender and Ampeg, and it grew. Lord knows we're the warranty station for too many companies.



How many departments make up E.U. Wurlitzer today?

Jachrimo: I broke the store up, with individual buyers. It got to be too much for me to handle. The separate departments include guitars, drums, guitar amplifiers, brass instruments or what we like to call band instruments, or orchestral instruments. Accessories are separate now and we have a guy working in microphones and effects. These people also sell. And now we have audio. This has become a monster in a way, because of the repair work.

How many people in audio repair?

Roudebush: Well, right now we have four full time bench technicians, but we're expanding the department, and doing some shuffling. We've pulled one technician out of repair and now he's full-time on special, customized design projects, say for a particular musician or group. The stock example is Aerosmith. We've built lots of custom stuff for them. This technician is really good with machining and light manufacturing stuff. Which will leave me time to sort through and select the special projects of sketch out the schematics if necessary, and hand them to him and he'll just take it from there. So now there's a hole where I used to have a technician. Another technician is now the shop foreman, and he'll be doing less and less repair. So we're hiring some part-time people to fill in. That will leave someone who's responsible for the shop other than me, so that I can get more of my stuff done.

Are you doing a lot of design?

Roudebush: I don't do a lot of design. I do it for the special projects. If I have a technician who is really hung up on something, I might come in

and work with him on troubleshooting. But I'm counting on that to happen less and less. I'm setting up a similar structure in sound reinforcement sales, to get it more self-operating so that I can start looking for other places for us to go. For instance, do we want to go into rentals or mail-order? We want to keep expanding and setting up more departments that are self-perpetuating. Out here in repairs we also have cable manufacturing, which we're selling faster than we can make, and now we're getting into stage lighting. That's another whole new department.

Jachrimo: We also have a wood shop, which started out merely as a thing for repairing and modifying. We got into early traveling P.A.'s before the Anvil or road-type case was so easy to get. Now that's grown to a point where in today's economy, it's cheaper for us and our customers to make certain speaker cabinets, because the freighting of them is so high, and because they take up so much space. We find that it costs us more because we don't have the volume production, but in the long run, it's cheaper because of the space we save and the flexibility of making changes for our customers.

Now we're doing speaker re-coning, which is a lot of warranty work; we've picked up JBL, Altec, E-V and some others. We're so busy, we hardly have time to tackle ordinary, everyday speakers.

Electric keyboards is also a separate department. That's something new that grew within the past six years. We're very big in that: synthesizers, electronic pianos and organs. Not home organs or pianos. We're Wurlitzer, but we're not that Wurlitzer.

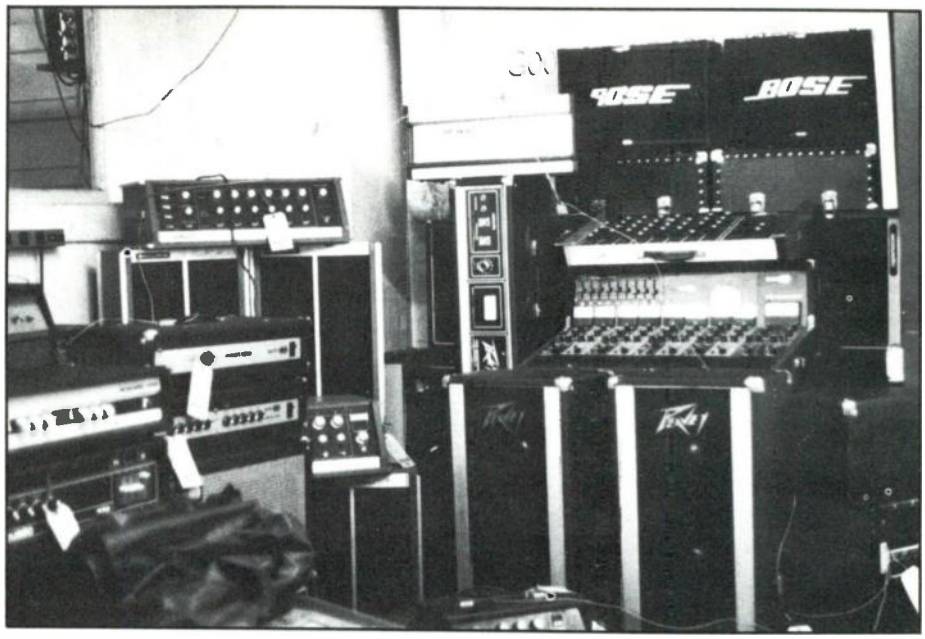
What are your plans for physical expansion?

Jachrimo: We're taking on 12,000 more square feet of retail space. That's a lot of footage for a music store.

Where will this be located?

Jachrimo: These guys in pro audio will be moving down from the fourth to the second floor, because we've outgrown this little area. The customers will be able to walk up via a public stairway. Electronic keyboards are being moved up to a sound isolated room, which is going to be like a large recording studio in visual appeal. Band instruments will be moving up too, so downstairs we will have guitars, drums and congas.

Effects pedals are a big part of our



business. I'm going to make a sound-isolated, a sound-proof, room. I want to rig everything up in advance. If a guy's trying phasers, the salesman will activate the phasers, so all he could do is play the phasers, because with the 130 different effects things that we sell, if you put a guy in there he'd take the biggest trip in town and go out of his mind. By the time he tried everything, he'd be tone-deaf, mentally-deaf and totally frustrated. It's not that they're loud necessarily, but the sound is so penetrating that it goes through everywhere, and everyone starts screaming, "Turn it down." That's not professional.

Would you comment on the expansion of the music industry in the past two decades?

Jachrimo: It has expanded, but I don't know if it's expanding so much now. I just got back from the national trade show in Atlanta, and I think the industry is undergoing a refinement this year. There aren't that many truly wild new products that no one ever thought of before, but there is a refining. The manufacturers have to do that, because they've been turning out the stuff so fast, that now they're taking a long hard look, which makes me happy. I've been hollering at these guys, saying "You've been making these things so fast that they're obsoleting too quick."

Could you elaborate on that?

Jachrimo: Audio is music. I think a lot of people have lost sight of what they're looking at, and no matter whether it's disco, or at home or at a night club, people are out to have a

good time. If they have a bad time, well they ain't going to pay money for a bad time. They can get that for nothing. The ultimate purpose of all this equipment sometimes gets lost. Musicians are out to entertain people. But some companies are equipment crazy. They're out to make something that nobody else has. The fact that nobody needs it never enters their mind. Just to be different. That was great when the oil used to bubble out of the ground. That's gone, in our lifetime at least, unless we get free power. We shouldn't waste materials and we shouldn't waste engineers.

We have a lot of manufacturers who are starting to see that and they're becoming careful, they're teaching and exposing their product in an environment where there's enough knowledge. You or I would get very indignant if we wanted to spend good money on a lawnmower and asked, "Well, what do I do? Where do I use this?" And the guy says "Well I don't know. Read the manual." And unless you hock the lawnmower, you have to find someone who knows. It's curious, how many people are going out and buying things and they don't even know which end to plug in. This is what's happening now, and I think the industry is going to tighten itself up.

Roudebush: That's definitely been reflected here in pro audio. We have had people who have gone out and spent nearly $1,000 for a piece of equipment, and then come over here to Wurlitzer to find out how it works, or I'll find that they really don't know how much they don't know because they've gotten bad information that hasn't yet tripped them up. You're hurt because they're using your time, and they bought it somewhere else, but the second thing is that they really need to know how to use it, and our duty is to serve them. We'll tell them or show them, because ultimately our duty to make it all work for them.

Jachrimo: The hardest thing about being a business person is dealing with the fellow who comes in with something to trade. What happens when a guy spent $4,300 for "the wrong thing," and now he wants "the right thing," so he offers us "the wrong thing"? It's the wrong thing for us and the wrong thing for our customers. But he paid all this money for it. How do you tell a guy like that, "Hey man. I don't want it."? Not that it's a badly made thing; it's "the wrong thing." We have that problem a lot with the

sophisticated equipment, old synthesizers made before programmers were developed. I'd rather see an old Fender, an old Ampeg or an old Kustom with a padded exterior. We don't make that much on used equipment, but it moves and whoever buys it gets some use out of it and they're happy, so a lot of people are happy.

Is there any special training program for your sales people?

Jachrimo: Our sales people are all musicians. That's half of it. That doesn't make them experts. The worst expert is a musician who knows all about everything. Our biggest job with new salespeople is to cool them down, and they don't believe us. They think we're hyping them. We have to sell our own salespeople to be a little more neutral, because they're played this brand all the time or they've heard this and that. Now, oddly enough, six or eight months go by, and they start talking cool. Now they've become, through experience, a compendium of information. There are a lot of earnest people, well meaning people without sufficient practical experience, or without sufficient mental discipline to realize that the factual information that they give the customer will fit that customer, because they don't know the style or don't have the ability of this guy and might think in a different direction.

What about in the pro audio department, especially in repair and troubleshooting? Do you train your own people, or are they very knowledgeable when they come to you?

Roudebush: It's a mix. It depends on what I'm hiring for. I don't have very formalized training procedures. What I am going for more and more is someone who has actually had experience in troubleshooting, because it turns out that troubleshooting is actually a skill independent of technical knowledge. And I'm getting people now with sufficient technical background so that I don't have to train them. What's incredibly important is attitude. I'm really starting to select for self-starters, people who really enjoy their work and contribute to the atmosphere of the place. I can take one of those people and train them faster than I can take a good technical person and make a self-starter. Right now, with the state of the industry as it is, I can get the best of both worlds. There are a lot of people with a fair amount of technical background. Electronics is a very happening thing, and this is a good place to work, if you're into music. But I absolutely want people who can make a good contribution to the environment at Wurlitzer.

With advancements in circuitry and miniaturization, have you found that the pool of good pro audio technicians is getting any shallower?

Roudebush: Yes, that's true. Right now, I'm trying to find one good, top-notch technician who is actually an engineering technician, and that didn't use to be the case. The circuitry is getting very sophisticated, miniaturized, and it's also getting cheaper. And where that's catching us is that it's taking longer and longer to repair cheaper and cheaper stuff, and we have to pay more and more for the test equipment and the technicians to do it. The result is that the customers are paying a significantly higher percentage of their purchase price each time that a piece comes in for repair. And they're upset, and the manufacturers are certainly not alerting them that this is now becoming a definite hidden cost in anything they buy. There is a

cost in making something serviceable. One of the ways you can be price competitive when you sell something is to not make it as serviceable as your competitors do, and that's a hidden cost that doesn't show up until you're down the road.

Jachrimo: All of this is a function of inflation. If you're a manufacturer, and you want this thing to come out and go for $250, it has a mechanical and electronic function. Now if you change it to $350, you've got stability of operation. $350? Nobody would buy it. The price would be too high for what the thing does. You have to say, "What can I take out of this and still keep the thing running? Why not use two screws instead of four screws?" This includes not only the price of the screws but the time it takes to put them in. Other industries are getting away with it. They've been doing it for many, many years in the automobile industry, and our industry is doing the same thing. If they don't do this, we're going to have $5,000 guitars and $8,000 amplifiers, and that's absurd.

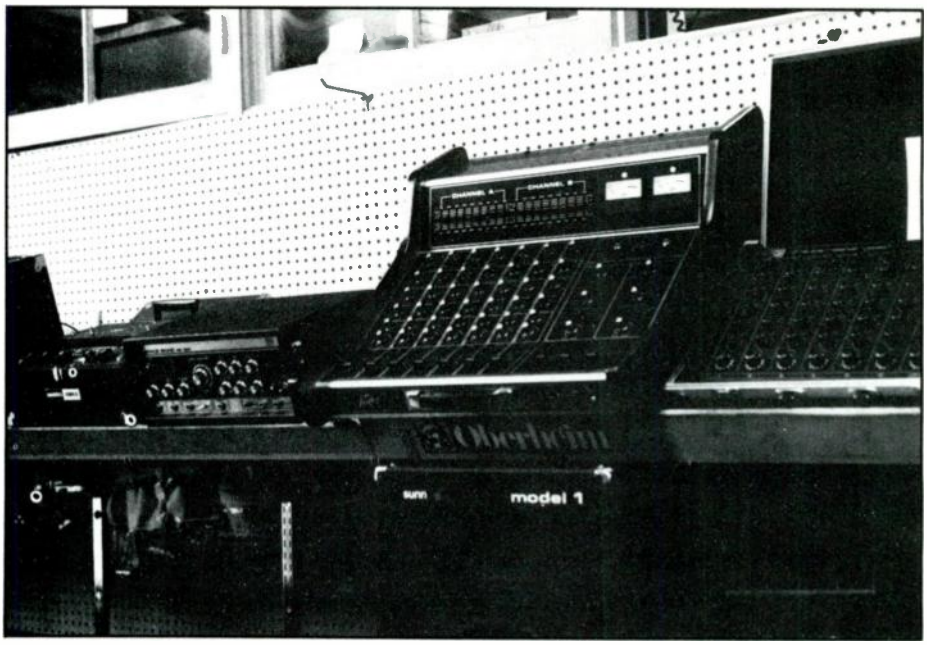
A lot of companies are coming out with products from a more mechanized assembly operation. Peavey comes to mind as an fine example of fast factory production.

Jachrimo: Peavey's a miracle. I give that guy tremendous credit. I use Peavey as an example for my people. They come up with an idea and I say, "Look at them. Why don't you do it their way?" you have to have some luck too, of course. . .Peavey has always struck the right product at the right time. So he had his big ear to the ground, listening to the people instead of trying to tell the buying public what they need. The better attitude is "What do you need? I'll make it." His quality control is pretty good too, isn't it Dave?

Roudebush: Yes. In the last couple of years, it's gotten really refined.

What about some of the other faster made products?

Jachrimo: We get a professional market. Years ago, when everyone was making Les Paul copies, we couldn't sell them. We got two Les Paul copies, nice made copies too, about 5-8 years ago, and they hung around for a year and a half. But in that time we sold 100 Les Pauls. When we moved here in 1970, I ordered three sets of low-priced drums, figuring some kid would want a set of low-priced drums. It took us six years to sell them. Meanwhile we sold a gillion Ludwig sets. We opened up another store, in Framingham, to pick up the suburban, student, beginner market. And all they're doing is selling to professionals in their area.



Your inventory must be staggering. How do you view it?

Jachrimo: We're music merchants. We're stuck. Everyone in the retail industry should carry an inventory, because people don't like to wait. I'd like to have less inventory, but we have such a large one because when we get ten of Amplifier Type A, the next ten are coming Jesus-knows-when. Even the factory doesn't know. So you try to carry a little over, and by the time the others come in you've been wiped out.

How difficult is this to solve?

Jachrimo: If you're making a thousand units a month out of your factory which has X capacity, to make 2000 units, X capacity doesn't do it. You have a time quotient and your costs go up correspondingly. To make 2000 units, you have to have 4X capacity. At 4X capacity it doesn't pay or maybe it's too hard to get parts. You can't just simply expand production. Now a new joker has come into this. There's a shortage of high-grade American instruments, because they're shipping them overseas. And they're getting more money for them which is good for the balance of payments. Meanwhile, back at the ranch, we have to carry a big inventory, because we don't get good delivery.

What about your new customers? Where do these people come from?

Jachrimo: Well of course we advertise and that brings people in, but our best customers come in burnt. We're the corrective surgeons, not because we want to be, but because we ended up that way. Dave mentioned the story about the guy who buys something elsewhere and comes in here for information. We'll have a guy come shop here for 20-25 years, and also his kids and his grand kids, but they come in here burnt. It's rare when we get a beginner. I think they feel we're above them at that moment or they're shy. I love beginners, but I don't see them and it hurts me. I think if a guy came in here and could throw himself on his hands and tell us just what he does, he'd end up with a good sound system, and sometimes at a lower price than he had pegged in his head. Many times we talk people out of buying certain guitars saying, "Buy this. It's $100 less, and for what you want to do, it'd be better for you," which is still good business. Anyone we help to escape the wrong instrument will be in again.

Are there any new products that you're particularly excited about?

Jachrimo: Well, we've done some pioneering with some new companies. Take Biamp. Biamp came from nowhere, and now they're a tremendous force in the industry; beautifully made merchandise, well thought out. We've tried them here and have done really well with them.

Roudebush: It's really true that things change from moment to moment. There are strong sellers, which are always strong because people come here to buy them automatically.

Jachrimo: Products come from young people. Hartley Peavey's a young man, the people at Biamp are young. Crumar has, I would say in the past year or two, had some young thinkers develop the type of product they have; they've come out with something the public needs.

Roudebush: We can pick, to some extent, what we want to sell, based on the volume that we do, and we can really pick based on what works for people. The reason we push so much Biamp stuff, is because enough customers come back just to tell us how nice it sounds. Crumar works like that; Biamp, Peavey, Yamaha electronics and keyboards, and JBL.

Jachrimo: All that stuff just sounds good, and I tell people sometimes, "You just have to forget the damned specs; the ultimate purpose, never forget, is to make sound, to produce sound. Does it sound good?" I had a speaker cabinet that I made years ago. It sounded good. Everyone who heard it who was nontechnical said, "Hey. That sounds good!" One of my electronics people measured it, and he discovered that it was sick. It had a hole at a certain frequency, and it was very uneven in response. Yet, over the years, anyone that owned it or heard it said that it sounded good. Now, who's right and who's wrong?

INDUSTRY UPDATE

Fender has named **Dennis Handa** Product Manager for guitars, amplifiers and professional sound products. Handa has been with the company since 1972 and was previously a professional musician and music retailer.

Gary Rilling has been appointed National Sales Manager for Professional and Musical Sound product lines of Altec Lansing. Rilling was previously district manager, mid-Atlantic region.

Uni-Sync, Inc. has consolidated its manufacturing and sales facilities into dbx Inc. Both companies are subsidiaries of BSR.

In a step to "increase its position in the synthesizer industry," Moog has become a separate division within Norlin. Heading up a new sales force is **James G. Raynor**, Director of Distribution. All prior dealers have been cancelled, and new dealers were authorized effective June 1.

Panasonic Company has appointed three new Vice Presidents: **Jeffrey Berkowitz**, General Manager, Technics and Home Audio Division; **Scott Minakami**, General Manager, Industrial Sales Division; and **Adam Yokoi**, General Manager, Product Planning and Engineering Division.

Crown International has named **Max W. Scholfield** President. The office had been vacant since the death of Clarence C. Moore. Scholfield had been Senior Vice President. Additionally, the company has named **R. David McLaughlin** to the company's Board of Directors. **Ross D. Swinehart** has been named Vice President/Controller. **Dale R. Kauffman** has been named Director of Customer Services.

Paul F. Bugielski has been promoted to the position of Product Manager—Microphones and Circuitry Products of Shure Brothers Incorporated. Bugielski has been with Shure since 1976.

Five directors and two officers of the Institute of High Fidelity have been elected. Elected directors are: **Harold Beveridge**, Harold Beveridge, Inc.; **Solomon Boucai**, H.H. Scott; **John Koss**, Koss Corp.; **Sparky Wren**, U.S. JVC; **Victor Amador**, BSR. In addition, **Bernie Mitchell**, U.S. Pioneer, was elected IHF Vice President, and **Edgar W. Hopper**, Ziff-Davis Publishing, was elected Secretary.

Michael Herrick has been named Buyer for Musician's Supply, Inc.

TDK Electronics Corp. has named **Ann M. Boutcher** to the newly created post of Advertising and Public Relations Manager. Boutcher was previously with Morse Electro Products and Michel Cather Advertising.

Tandberg Industrier A/S has been acquired by Norsk Data A/S. The new owners have announced their intention "to pursue a more aggressive market policy in the U.S." through the privately held distribution company, Tandberg of America, Inc.

Bud Barger has been named Vice President of Sales for the BSR Consumer Products Group. Barger was formerly National Marketing Manager of TDK.

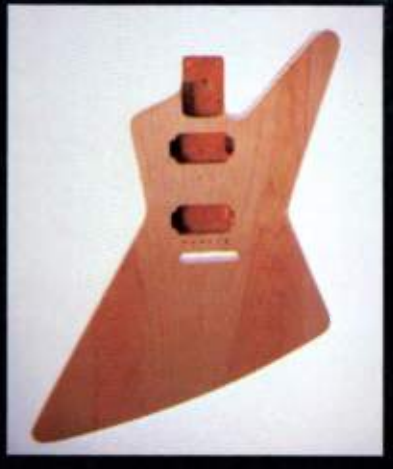
Peter Horsman has been named Vice President, Marketing for BGW Systems. Horsman comes to BGW from James B. Lansing Sound where he was Professional Division Manager.

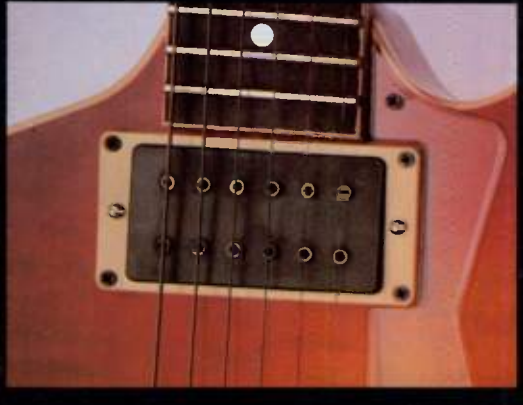
ESS Inc. has acquired Dynaco. Under the new ownership, Dynaco will undergo a reorganization of its marketing staff and manufacturing operation, and will remain on the east coast.

John D. Wood has been named to the newly created position of National Sales Manager—Loudspeakers of Koss Corporation. Wood was previously national sales manager of home audio products at Jensen Sound Labs.

Advertiser's Index

Pickups, Parts, Performance





For a complete listing of all hardware and a catalog, send $1.00 to:

DiMarzio®
Musical Instrument Pickups, Inc.

Dept. MR
1388 Richmond Terrace, Staten Island,
NY 10310 USA (212) 981-9286

CIRCLE 69 ON READER SERVICE CARD

Imagination fuses two powerful illusions.

Experimentation leads to the discovery of new realities.

Introducing the MXR Flanger/Doubler.
For more information see your MXR dealer or write us.

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

MXR Professional Products Group

CIRCLE 92 ON READER SERVICE CARD