SERVING THE CREATIVE AUDIO AND MUSIC ELECTRONICS INDUSTRY

SOUND ARTS

MERCHANDISING JOURNAL

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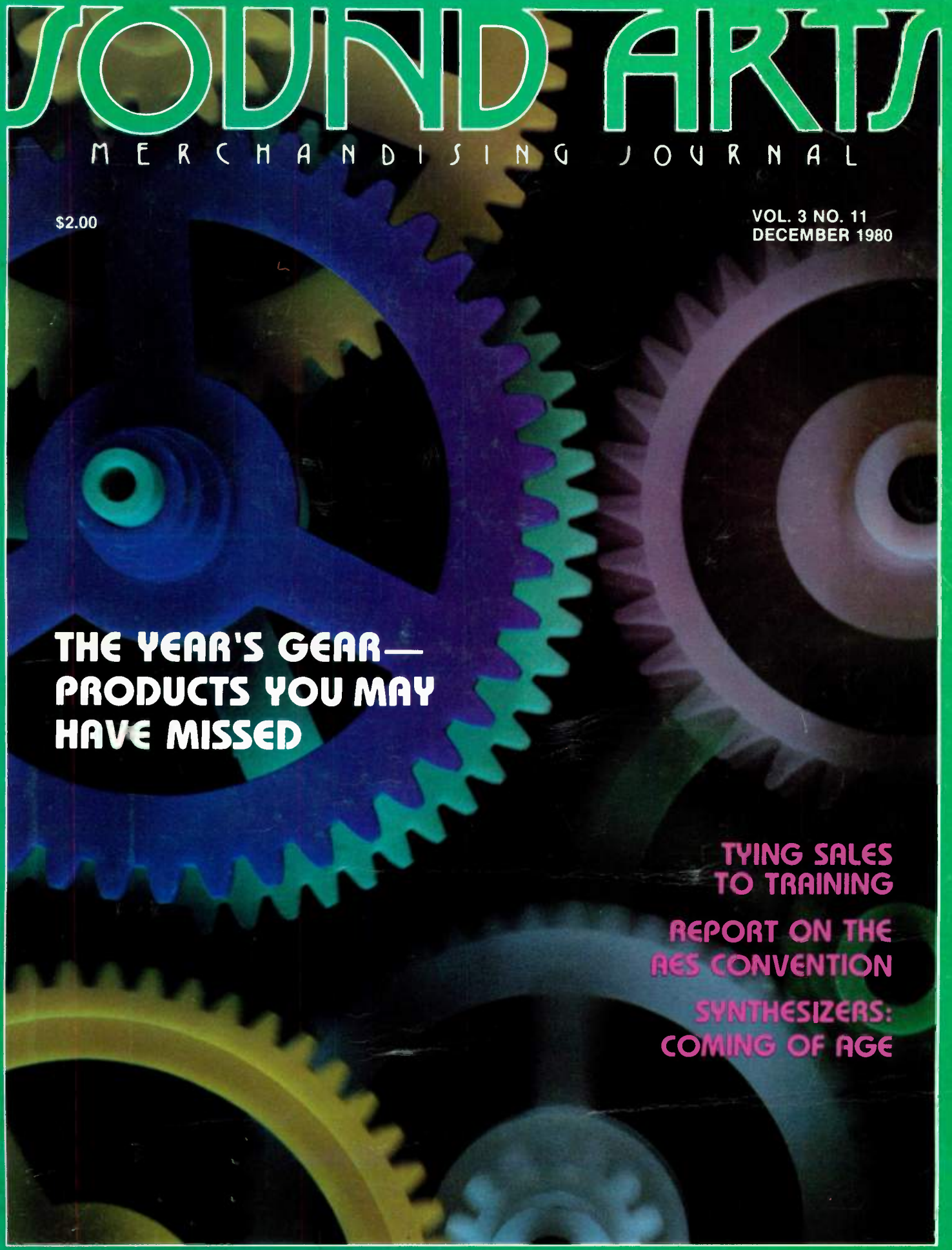

THE YEAR'S GEAR— PRODUCTS YOU MAY HAVE MISSED

TYING SALES TO TRAINING

REPORT ON THE AES CONVENTION

SYNTHESIZERS: COMING OF AGE

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VOL. 3 NO. 11

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SOUND ARTS

MERCHANDISING JOURNAL

DEC. 1980

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Cover photo by Doug Hanewinckel

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A LETTER FROM THE EDITOR

We're reviewing the year's gear this issue, taking note of some products we've omitted and some that we've already mentioned in the past 12 months. We make no claim to its being the definitive product list; the last 12 months, despite kvetching over the economy, has nonetheless produced a plethora of product too numerous to be listed.

There is, however, one product which we haven't yet presented, and about which we definitely make a value judgement, and that product, lo and behold, is our own. Many of you have already seen the premier issue of *Music and Sound Output*, a new consumer magazine for musicians and soundmixers, published by the same people who provide you with *Pro Sound News* and *Sound Arts Merchandising Journal*. It's hip and it's colorful and it's informative. It's also profitable if you're a retailer and want to sell *Music and Sound Output* in your store. Elsewhere in this issue you'll find all the pertinent information and an order form. Check it out. I think our company is justifiably proud of its latest endeavor. And I'm glad to be plugging it in this column.

The A.E.S. show in November seems long past by now, but the products shown there were in many cases future oriented. J.D. Sharp writes in this issue on his eyewitness report of products and trends noted at the convention. Our own observations of that convention, with which J.D. might or might not xgree, are that there was more music involvement, with some of the busiest booths being those of such companies as Con Brio, RolandCorp, Fairlight and Music Technology. Star Instruments exhibited at AES for the first time. Someone suggested having badges printed for "Nammsters," those who attend both conventions and who seem to be a growing group—and who testify once again to the cross-referencing of high tech audio and high tech music.

The synthesizer stands as the prime and most familiar example of that crossover and will go down in history as the cause of the day the music changed. But understanding of that technology or being hip to it doesn't really tell the consumer where it's at. Shelley Palmer writes in this issue about the background of synthesizers in general, their foreground in music today and the future ground in which we'll find them. Shelly's article can be used to explain to consumers how to use these instruments that are so common to those in the music field that we may lose sight of the fact that consumers may not always understand their place in music and where they are going.

In this last issue of 1980 we can look back at some interesting product introductions. Despite a sense of unsureness in industry and finance, there was a sense of optimism and innovation among those thinking new things. Onward to 1981.

Regards,

Judith Morrison Lipton

Try our hand-held money machine!

The Model AT814 Dynamic Vocal Microphone. Your best capital investment!

Music may be mostly art. And sound may be based on engineering. But together they're a business. The music business. And the AT814 is a tool. A *music business* microphone.

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Maxell, Booth #501, Consumer Electronics Show

maxell
IT'S WORTH IT.

TERMS:

DEC. 1980

A CONTINUING INDUSTRY GLOSSARY

RECORDING

By Larry Blakely

Shield: The material that is used to reduce unwanted electrical signals or magnetic fields. *Electrical shield* can be a copper screen, wire braid, spiral wire wrap or any electrical conductor surrounding a circuit or wire in an effort to reduce hum buzzes or pops, and radio frequency interference or noises. *Magnetic shield* can be iron, steel, nickel, mu-metal or any other magnetic or anti-magnetic material that is used to surround circuits, transformers or conductors (wire) in an effort to reduce unwanted electromagenetic fields.

Shielding The process of using materials to reduce unwanted interference or signals from electronic equipment, cables or circuits. There are two types: electrical and magnetic.

Electrical Shielding: A commonly used type of electrical shielding is the wire braid or wrap around the inner conductor or conductors of a microphone cable. This is a wire shield that is used to prevent unwanted hums, buzzes, and radio frequency interference from entering the audio system. Often times metal cans are placed over electrical circuits to reduce the same types of unwanted interference.

Magnetic Shielding: Perhaps the most common type of magnetic shielding that is used in recording is a mu-metal can or box that is placed around tape recorder heads. This is used to reduce hum that would be caused by stray magnetic fields that are given off by the motors on the tape transport as well as any other stray magnetic fields. Mu-metal cans are also often placed around microphone input transformers to prevent them from picking up unwanted hums or buzzes that would be caused by stray magnetic fields.

Hum: A low frequency tone that is usually a multiple of the AC power mains frequency. In the United States, the power mains frequency is 60 Hz. Hum would be a tone of 60 Hz, 120 Hz, 180 Hz, etc. Other countries sometimes

ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES

By Wayne Howe

Clear Switch: A clear switch resets the counter on the sequencer back to the beginning, step number one.

Multi-Channel Sequencer: A multi-channel sequencer is a sequencer that has more than one step-voltage for each step position. With this type of sequencer, you can generate two or more voltages to simultaneously control two or more different events. You can also expand the number of steps the sequencer will perform by having it start the next channel when one channel has finished instead of having the first channel immediately repeat itself. Multi-channel sequencers are set up to go through channel A, then on to channel B, then either back to channel A or on to channel C. Figure 2 is a three channel eight-step sequencer.

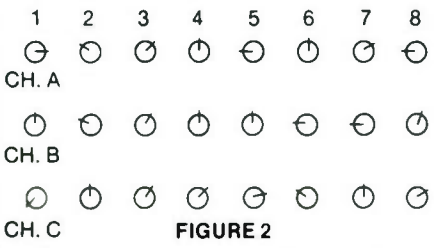

FIGURE 2

Independent Trigger Outs: Independent trigger output jacks enable the sequencer programmer to program less than the maximum number of steps that the sequencer has. For example, if you wanted to program a seven step sequence on an eight step sequencer, you would patch the trigger output of step seven into the reset trigger input. When the sequencer got to step seven, it would reset the counter to step one and skip step eight. Independent trigger outputs also let you use each step to trigger a different event on a different synth.

Reset Trigger Input: This resets the counter to step one whenever a trigger pulse is fed into it. It acts the same as a remote triggerable clear switch.

Waveform Synthesis: A sequencer can be used as a waveform synthesizer

SOUND REINFORCEMENT

By Mark Gander

Diaphragm Polarity: When more than one loudspeaker is used to reproduce a given frequency range, the polarity of all the diaphragms must be the same so that the motion of the diaphragms is in the same direction and coordinated, moving in and out at the same time. If two diaphragms are wired with opposite polarity, one will produce an air compression while the other produces an opposite air rarefaction with the same input signal. This will cause a complex interference pattern in the mid-range frequencies, and at low frequencies will cause a complete cancellation of acoustic output. These effects are most pronounced when the diaphragms are mounted in the same vertical plane, with the sound propagation originating at the same position and time.

Standard Polarity Conventions: Most manufacturers assemble their loudspeakers so that a positive voltage on the red or "+" terminal causes a positive pressure wave or forward diaphragm motion. There are exceptions however, notably JBL which uses the opposite convention, and when dealing wth enclosures with unknown internal connections all bets are off. It is always best to check separately all individual components in a system, with a flashlight battery or polarity tester [see "Troubleshooters' Bulletin," SOUND ARTS, June 1979] to insure that all transducers within a given bandwidth are wired with the same polarity.

Acoustic Center: The apparent point of origin of the sound wave. The position of the acoustic center depends on both the effective shape of the diaphragm and the response bandwidth of the device. High frequency direct radiators and compression drivers typically have their acoustic centers located at the position of the diaphragm, while cone-type midrange drivers and woofers will usually have their acoustic center located somewhat behind the center of the voice coil and magnetic gap.

TEAR HERE

A CONTINUING INDUSTRY GLOSSARY

RECORDING

use 50 Hz power main frequency. Hum from this frequency would be 50 Hz, 100 Hz, 150 Hz, etc.

Buzzes: Any type of electrical interference that will sound just like a type of buzz! This type of interference is often caused by certain types of electric motors, light dimmers, etc. Shielding and proper ground procedures of audio circuits are the best defense against this type of interference.

Clicks: Most often caused by something connected to the electrical system of a house, studio, neighborhood, etc. When certain types of equipment are turned on or off (usually smaller motors, appliances, thermostats, etc.), they will cause a small instantaneous voltage surge (sometimes called a spike or switching transient) in the power mains which will often be picked up by some audio circuits or equipment. These sounds are a sudden, instantaneous burst of mid or high frequency. Clicks can also be caused by switches on some types of poorly designed audio equipment.

Popcorn Noise: A type of noise that sounds just like the sound of popcorn popping. This is a constant and changing mixture of mid and high frequency clicks and pops. This type of noise is sometimes found in tape recorders that are not working properly.

RFI (Radio Frequency Interference): Any type of interference that is in the radio range of frequencies. RFI is usually caused by some portion of an audio system actually picking up radio station signals. It seems that sometimes audio equipment make better radio receivers than audio gear. RFI can usually be reduced or eliminated by proper shielding, grounding or both. Some types of poorly designed equipment will be very susceptible to RFI and it can seem nearly impossible to remove the problem. If audio equipment is located too close to a radio or television station, it can become nearly impossible to remove the RFI from any type of audio equipment.

ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES

by turning up the clock speed very high. In this way, a step-waveform is formed which can be smoothed out by a low-pass filter. If an eight-step sequencer were used, the fundamental frequency of the step-waveform would be one-eighth the frequency of the clock generator. So, the fundamental frequency of A—440 Hertz would require a frequency of 3.52 KiloHertz. A fundamental frequency of 1000 Hertz would require a clock frequency of 8 KiloHertz. Figure 3 shows an 8-step sequencer generating a step function approximating a sawtooth waveform. A low-pass filter would eliminate most of the irregularities of the steps. Figure 4 shows an approximation of a sine wave on a 12-step sequencer.

FIGURE 3

FIGURE 4

Skip Switch: Some sequencers have a skip switch instead of independent external trigger outputs for each step. With these, you can skip a step by throwing the skip switch at this step. However, this method of skipping will not allow each step to control a different event on a different synth unless independent trigger outputs are also included.

Mode: Some synthesizers feature separate modes, *i.e.*, they will have several different methods of step progression. Some different modes are: The straightforward repetitive mode, 1 through 8 and back to 1. The cross-channel mode, 1 through 8 on channel A, then 1 through 8 on channel B, then back to A. The backwards mode, 1 through 8 on channel A, then 8 through 1 on channel B, etc.

SOUND REINFORCEMENT

Phase: Phase is a mathematical term used to keep track of the relative time difference between two signals. It is measured in degrees, relating a full 360° cycle to a complete sinusoidal wavelength. Polarity is a special case of phase, with the same polarity being in phase or 0° phase difference, and opposite polarity being out of phase or 180° phase difference.

Phase Shift: A difference in phase between two signals.

System Phasing: Crossover networks create transitions between drivers which are usually accompanied by phase shifts across the reproduced bandwidth. In the practical acoustics of sound reinforcement we have the additional problem that often the acoustic centers of the transducers are not aligned in the same plane. When the acoustic centers are displaced by some physical distance, that distance corresponds to some portion of a wavelength at the crossover frequency and therefore also corresponds to some number of degrees of phase shift at crossover. For instance, if a horn loudspeaker has its acoustic center located 0.3 m (1 foot) behind the acoustic center of the low frequency woofer, and the crossover transition is to be made between the two units at 800 Hz, a wavelength at 800 Hz

$$\lambda = \frac{c}{f} = \frac{345\text{m/sec}}{800\text{Hz (1/sec)}} = 0.43\text{m (1.4 ft.)}$$

and the phase shift introduced at crossover by the misalignment of the drivers is

$$(360°)\ \frac{0.30\text{m}}{0.43\text{m}} = 250°$$

This phase shift will combine with any phase shift introduced by the crossover network slopes and acoustic responses of the drivers, and may cause peaks, dips, or uneveness in the response, as well as a time delay between the arrival at your ears of the low frequency and high frequency signals. This time delay corresponds to the displacement of the acoustic centers, and the speed of sound.

(Continued next month)

TEAR HERE

'58 was a very good year...

The '80's will be even better!

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To learn how the PL80 can add to your bottom line, contact your Electro-Voice sales representative today. You won't be ready for the profitable '80's without a stock of the profitable 80's.

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CIRCLE 90 ON READER SERVICE CARD

TROUBLESHOOTERS' BULLETIN

KEY CONTACTS

In a well-designed system, the actual process of playing should keep the contacts relatively clean. However, there will be times when the actual point of contact will require cleaning.

If using sprays, avoid those with silicones-they leave residues. Plain rubbing alcohol without additives is excellent. If cotton swab applicators are used for solvents, be sure all traces of lint and/or fuzz are removed. The sponge-like applicators now used in videotape head cleaning would be safer. Do not burnish gold or other precious metal contact surfaces, as you will eventually remove too much metal. Instead, use a strip of white bond paper pulled between the contacts under light pressure.

Contact adjustment may vary by manufacturer. The RMI/Allen Organ philosophy has always been to provide adjustments for accommodating aging. These adjustments should be set to allow point-of-contact to occur at approximately half-travel of the key. Adjusting for early contact or "hair-trigger" for fast playing only invites sticking notes or cyphers. Conversely, late contacts will cause a feeling of sluggishness in the hands of a musician, and missed or dead notes may occur.

CLARK FERGUSON
RMI/ALLEN ORGAN

LOCATING NOISE FROM UNSHIELDED INPUTS

Disconnect all musical instruments, microphones, turntables, and tape decks at the pre-amplifier. It is especially important that no wires ever connected to the preamplifier that do not have a source instrument attached. Such an "open input" acts as a beautiful radio antenna. At this point, with the pre-amplifier and the power amplifier running, there should be no noise coming out of the speakers.

Next, plug in one source instrument at a time and listen for hum or buzz. When you plug in a microphone and a buzzing suddenly begins, it is being picked up by that particular instrument. Check the wires inside the connectors. The wires must be properly soldered and the shielding braid must not be frayed or broken loose. The solder must provide a smooth semi-shiny connection between wire and connector. A dull, crinkly, rough or stray-strands "cold solder" connection must be reheated.

Lastly, one of the wires inside the cable may have broken, although it is not visible from the outside. Try replacing the cable entirely.

DR. RICHARD IACOBUCCI
ROCTRONICS

Is it advisable for me to rewind my own pickups? What results can I gain by doing so?

In almost all cases, I would not advise a person to try to rewind his/her pickups. A person extremely handy with power tools could perhaps work it out, but the average person could not and would be better off getting a professional to do it. One thing that makes it very difficult is the fineness of the wire used in pickups.

One can alter the tone quality and output of a pickup quite a bit by rewinding. It is therefore better to know in advance what kind of sound you are trying to achieve and how to do so than it is to just experiment. One thing that is crucial is having the correct gauge of wire. A person who wants simply to repair a broken coil must know the gauge of the wire that was originally used as well as how many turns there were originally. That information is also necessary if you want to change the coil so as to obtain a specific difference in the sound.

Generally, larger diameter, (*i.e.*, thicker) wire should be employed for lower impedance pickups. (The way wire is gauged, incidentally: the higher the number, the finer the wire.) On the whole, a cleaner sound can be obtained by using a larger diameter wire with fewer turns. To get more output voltage and a fatter sound, use thinner wire, which allows one to get more wire on the pickup. However, too much wire of a thinner gauge on a pickup will result in a loss of treble response.

My attitude is that it is best to get the wire as tight and neat as possible. This is because, if the wire is loose, it tends to vibrate and produce microphonic feedback. But there are problems with excessive tightness too. If the winding machine winds the coil too fast or too tightly, the friction could possibly burn off the outer insulation on the wire and the pickup will short out as a result. In order to avoid this, a lot of people will wind a little bit slower and little bit looser and, to avoid the problem of microphonic feedback, they usually dip the pickup in some kind of liquid or compound that dries and more or less cements the coil in place.

Steven Blucher
DiMarzio Musical Instrument Pickups, Inc.

I notice that some guitar manufacturers use three bolts to attach the neck of the guitar to the body while others use four. What are the advantages and disadvantages?

The advantage of the four-bolt method is that it is more stable. It prevents side to side motion, so that you can't pull the neck out of line with the strings. The advantage of the three-bolt method is that you can change the angle of the neck relative to the body more easily. You can bring the neck up for lower action very quickly. With a four-bolt neck you have to wedge something under the neck to bring it up. This means that you must remove the entire neck.

Matt Cremers
Manny's Music

What is the best method of hooking up outboard effects (phase shifter, echo, etc.) to my multiple keyboard setup?

There are four basic connection points for adding effects devices to a multikeyboard setup. Usually a combination of these is needed and some methodical experimentation is necessary to achieve the best signal-to-noise ratio, sound levels and actual sounds.

The first connection point places an effect between an instrument and its amp or mixer channel, the simplest choice for using an effect on a single instrument. The major drawback of this approach is the modification of the instrument's signal level, noise level and sound content before it reaches the preamp of the mixer or amp. A second option places the the effect in the individual channel effect loop available on some mixers, allowing single instrument effects without altering the signal before it is presented to the pre-amp stage of amplification. This usually results in a cleaner, quieter signal.

A third option places effects in the Master Effect send and return loop of the keyboard mixer, allowing the effect to be applied in various amounts to each instrument as needed. This option is commonly used for effects such as reverb, chorus and echo which will be used on more than one instrument at a time.

The fourth option uses an effect loop within a combo amp or rack pre-amp. These effect loops are placed after the pre-amp either pre- or post- tone control, in both positions or selectable between the two. These options allow you to place an effect where it sounds the best for low noise operation and distinct differences in the sound of the instrument/effect/amp combination.

If more than one effect is to be used in a chain at any one connection point, a basic order will usually give best results: First, place level boosting devices such as distortion first to avoid boosting any noise from pedals before it in the chain. Second, level-dependent devices such as an envelope follower for filter or amplitude control should be placed next where they have the greatest signal fluctuation to act upon. Place compressing and limiting devices next to provide more uniform signal levels for other effects and the pre-amp section of your amplification. Next, insert phase or flange style devices—anything that affects different frequency bands in different amounts. Then, add any delay effects such as tape echo, analog delay or digital delay. Finish with any noise control devices such as a noise gate or volume pedal and, lastly, any equalization devices for final tone control before amplification.

For best results use short low-noise cables, pay close attention to signal levels throughout your system, be careful to avoid ground loops in your system, and invest some time to find the best arrangement for your instruments, effects and amplification.

Charles L. Vandeman
Rolandcorp US

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CIRCLE 81 ON READER SERVICE CARD

By Craig Anderton

There has been a recent emphasis towards adding active, on-board electronic circuitry to electric guitars in order to improve the instrument's overall performance. Cited benefits of adding on-board electronics include greater output strength, less susceptibility to loading by guitar cords and subsequent electronic stages, and improvement of the pickup's tonal qualities. Disadvantages include the need for battery power, the possibility of adding noise or distortion to the guitar signal, and the fact that a guitar has to be modified in some way to make room for the extra circuitry and battery(s).

A LITTLE BACKGROUND THEORY: PICKUP PROBLEMS

Guitar pickups are usually thought of as low level devices. Actually, that's not their only drawback; most pickups have an output impedance that increases with frequency. Therefore, although the output impedance is relatively low at low frequencies, at high frequencies it becomes so high that these high frequencies have a difficult time driving subsequent electronic stages. A general rule of thumb is that the output impedance of a stage should be 1/10th of the input impedance of the stage that it feeds. As a result, pickups need to be followed by an extremely high impedance stage in order to best preserve the high frequency response, and in fact, most guitar amps do have very high input impedances.

Unfortunately, high input impedance circuitry is susceptible to hum, loading, and radio-frequency interference. This is one reason why short guitar cords are preferred when feeding high impedance input amplifiers: the cord acts as an antenna, and the longer the cord, the greater the chances of having this "antenna" pick up spurious signals. Professional studios make sure that all stages have low impedance inputs that are fed by even lower impedance outputs. These low impedance lines are quieter and much less prone to picking up interference. Driving a high impedance input from a very low impedance output improves the situation.

Guitar cords affect a pickup because any piece of shielded cable includes a certain amount of capacitance between the hot lead and ground. Since the way that you control tone in a guitar is by installing a capacitor between the hot and ground lines, the cord acts as a sort of "involuntary tone control" that partially reduces high frequencies. This effect is more pronounced when the cord is fed from a high output impedance source, such as a stock pickup.

A final problem occurs when feeding multiple effects systems. Since in many cases these multiple effect inputs present a low impedance to the guitar, they can also reduce the stock guitar's level and frequency response, thereby creating a "thin" or muddy sound. Again, the quality of sound improves considerably if the effects are fed by a low impedance source.

"OFF-BOARD" ELECTRONICS

It is simple matter to add a preamp in the signal line between guitar and guitar amplifier to minimize the abovementioned problems. However, you still have a cord between the guitar output and preamp input, and since the preamp should have a relatively high input impedance, the input cord can still act as an antenna for unwanted signals.

"ON-BOARD" ELECTRONICS

By mounting a preamp *inside* the guitar, the connecting wire between the pickup outputs and preamp input is kept to an absolute minimum length. Additionally, the output impedance of the preamp is very low; this low impedance output is ideal for driving long cords, just about any type of amplifier, and can often overcome the problems associated with multiple effects systems.

There are several other advantages claimed for on-board electronic devices. Since preamps boost volume to a greater or lesser degree, it is possible for the preamplified guitar signal to overload its associated guitar amp. This overloading produces a smooth kind of distortion that is used by many professional guitarists to give a more sustained sound.

The most important characteristic of an on-board preamp is the amount of gain. With too much gain, the guitar pickup can overload the preamp, thus producing a distorted sound that cannot be "cleaned up" when a clean sound is required. On-board preamps are more likely to be overloaded when fed by high output (hot rod) pickups.

With too little gain, the preamp may not give the desired amount of boost. However, too little gain is almost always preferable to too much gain.

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CIRCLE 66 ON READER SERVICE CARD

Because of the importance of choosing the proper amount of gain, preamps should include some kind of gain altering control or trimpot. This allows the user to adjust for a clean or overloaded type of sound. Other preamps have a fixed amount of gain; while there's nothing wrong with this, it is important to know the exact amount of gain in order to match the preamps to a specific guitar's pickups. If the preamp uses a single battery, and the guitar feeding it has hot rod pickups, then you really can't have much more than a gain of 6 dB or so if you want to retain a clean sound. Weaker pickups can be amplified by about 10 dB before overloading occurs. With dual battery preamps, 10 or 11 dB of gain will still give a clean sound with hot rod pickups, and gain can be as high as 15 dB when the preamp is used with stock pickups.

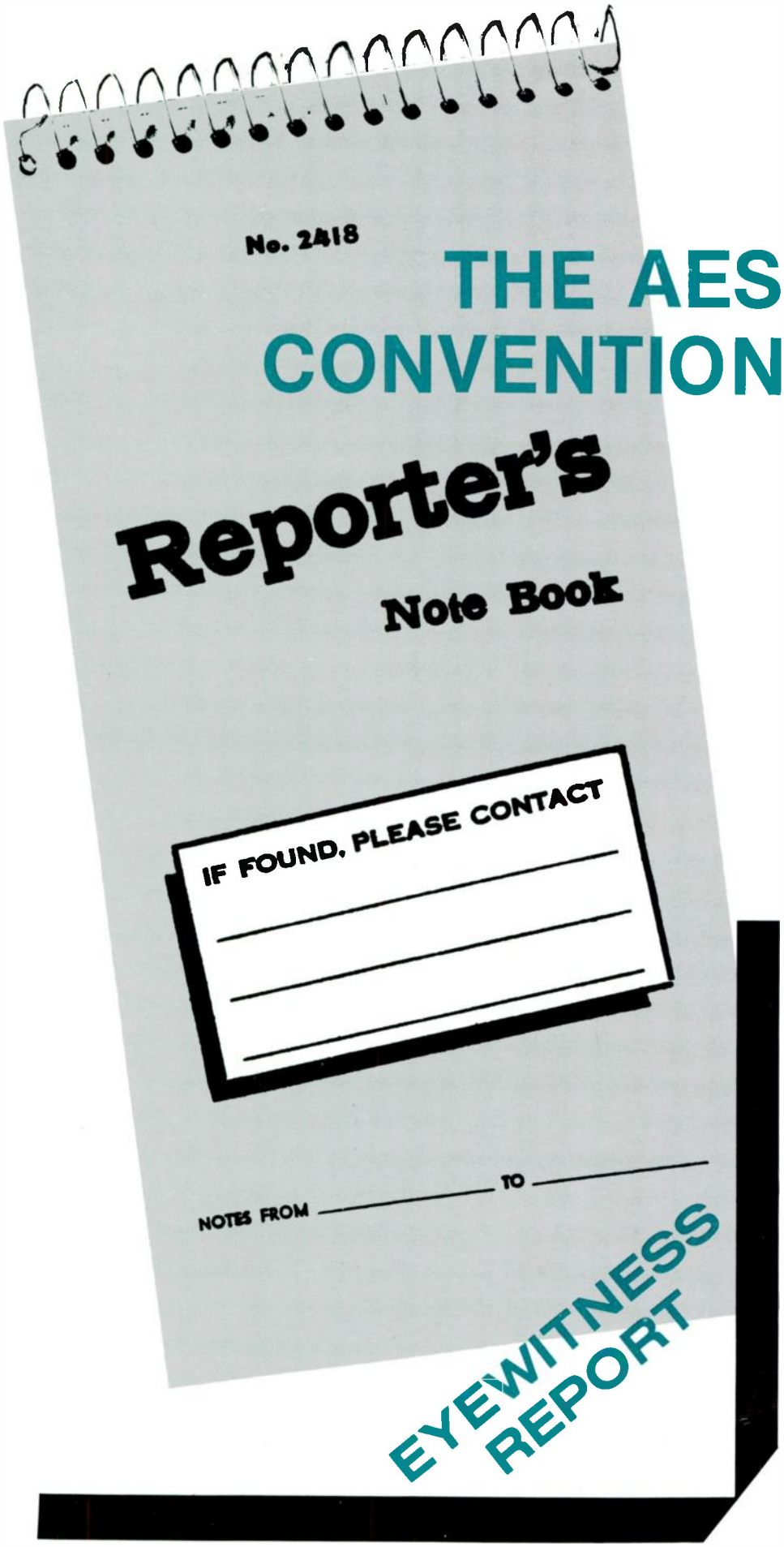
At this point you may wonder why it is important to get a clean sound coming out of the preamp if you plan to use the preamp principally for distortion effects. As it so happens, the preamp will distort in a different way from an overloaded guitar amp. I think that most guitarists prefer the sound of an overloaded tube guitar amp over the sound of the semiconductor distortion associated with on-board preamps, and if the two types of distortion are mixed, the overall effect may not be as pure sounding as the effect derived by simply overloading the amp.

The main problem with on-board electronics is that it is necessary to connect some kind of power source to the electronics. While it is possible to use phantom powering (where power connects to the preamp through the same wire that carries the audio), or use a multi-conductor cable to feed power into the guitar, it is usually more convenient to put a battery inside the guitar. However, unless the on-board device draws very little power, it becomes a real bother to change batteries on a regular basis. Another potential problem can occur if the battery goes dead in the middle of a performance.

Any electronic circuit generates noise; an on-board preamp or tone control circuit is no exception. While this may not bother guitarists who simply plug their axes into an amp, feeding a high gain device such as a compressor or fuzz may greatly emphasize any noise generated by the guitar electronics. As a result, it is very important to investigate the noise characteristics of any on-board unit. Since specs can be used to deceive, don't put too much faith in these figures; use your ears to carefully compare units.

There are other types of on-board units that are popular for guitarists, such as tone controls and equalizers. There are even guitars that have on-board phase shifters, compressors, and the like; however, I question whether extensive on-board electronics installations are musically valid (and practical), or whether they are instead simply a case of technological one-upsmanship. Also, the "novelty factor" must be taken into account. For example, phase shifters may be popular right now, but will they be as popular 20 years from now? Or will they have been supplanted by other types of effects? A good guitar is forever, but electronic units are being constantly improved and upgraded. While a basic preamp design isn't going to become hopelessly obsolete inside a few years, not all electronic devices are as universally applicable. So, while on-board electronics can often improve the tonal qualities of a guitar, there is definitely a limit beyond which the addition of more electronic goodies causes problems rather than offering solutions.

These past few columns on pickups and on-board preamps should help dealers to better understand the world of hot rod guitars and pickups. One reader mentioned in passing that the information presented seemed to go into more detail than would be required by the typical dealer; yet, guitarists are familiar with many of these concepts, and will be asking you for advice on the subject of pickups and add-on electronics. If you make a sincere effort to understand these new devices, and can answer any questions intelligently, the result will be additional sales. In these days of tightening money, the idea of upgrading a guitar is more attractive to many musicians than laying out the bucks for a new guitar. Your repair shop can take care of re-fretting and refinishing; by providing some beefier pickups, and perhaps some on-board electronics, your clients can have a state of the art guitar without having to pay state of the art prices. Maybe you'd rather sell a guitar than a bunch of accessories, but try to be realistic. . . it's better to have a piece of the action than no action at all. If you can help your customers get a better sound, they will no doubt reward you.



The most upbeat booths at the Audio Engineering Society's 67th Convention seemed to be those which offered either new technology, cost-effective technology, or equipment useful to several different categories of users, with a special emphasis on the emerging presence of broadcast engineers, who seemed to be present in larger numbers at this meeting.

This was far from being a standstill event. This meeting saw the introduction of a number of products which are significant not only because of what they do, but also because they are the harbingers of the audio decade to come. The products fall into completely different areas, but each offers a primary thread from which the fabric of the new audio will be woven.

Panasonic underlined its intentions in the professional market by bringing out a totally new type of signal processor: a sound-localization controller. The device uses four-channel pan pots and complex phase modification to create a stereo field which curves around the listener to form a stereo image which is perceived as both wider and deeper than conventional stereo. The controller was demonstrated using a Lexicon 224 digital reverb and an Eventide digital delay line. It processed eight channels of information, four of which were "preset," the other four of which came up to what appeared at first to just be a mixing board. The controls on the unit had a "space" (reverb) and "depth" control (delay) for each input, both of these being linear faders; above these was a joystick for image placement. The apparent feeling was that the user could move the signal in or out of the background, as well as wrap around the sound to either side, even though the monitors were conventionally located in front of the listener. The value of the device is that it can be used in mixdown, and the information becomes part of the mix, to be heard on any conventional set of speakers. Aside from the merits of the particular product, which were many, the technique suggests that the ambition of "quad" may yet be achieved by devices of this type which add localization information which "tricks" the brain into hearing it where it ain't! This type of product is the outgrowth of the large body of research which has been done in the last few years into how the brain actually tells where the sounds are coming from . . . and the surface has just been scratched in terms of signal processing devices to this end.

The manufacturers of digital audio equipment have been insisting for a while that the market for such equipment is not in a far-off future, but rather in the here and now. "The artists demand it. . . producers won't work without it," one representative was heard to say. But the current economic climate and limited recording budgets place constraints on all but the artists at the pinnacle of the industry. The key to making digital recorders a necessity rather than a luxury to the industry as a whole lies in having a broad-based market for digital product. It is really quite unnecessary to invest in new master-level equipment when the phonograph or cassette deck is the principal playback medium, since current state-of-the-art analog equipment far exceeds the limitations of even the most carefully pressed and recorded records, or scrupulously-duplicated cassettes. It was therefore of great interest to see Sony, JVC, and Pioneer all displaying versions of the compact digital audio disc, a metallized, 45-sized "record" which spins at 1800 rpm, and which was producing some of the clearest and cleanest sound ever. All three manufacturers had recordings which were mastered digitally, so that the wide dynamic range and negligible distortion came across vividly, not having to undergo digital-to-analog conversion until playback, unlike today's digital record. There was no particular talk of immediate marketing, but these units, which looked like oversized cassette players, may be the key to unlocking the era of digital audio in a big way. Other important digital product at the show included a new 32-track PCM recorder from Mitsubishi, the industrial giant, and digital audio editors from both Sony and JVC which tackle the task of making it a natural and creative process to edit in this manner.

Many of the attendees at the convention may not have been aware of it, but they were present for the birth of a new type of instrument: the percussion sequencer, or rhythm synthesizer. These terms are unfortunately ambiguous, since there have been various "synthetic drums" on the market for a while, and an electronic "Tympani" was exhibited at the show by Star Instruments. Two new instruments, one by Linn Electronics, the other by Roland, allow the composition of a complete rhythm track. Both units allow the user to write lines or patterns, and then to sequence and chain the patterns together, with control of the number of times any one pattern plays, and which patterns follow each other. From this point the two units diverge. The Linn unit, at $5,500, uses digitally-reproduced waveforms which are samples taken from actual drums. Sequences are loaded in real time by tapping out the desired pattern on a large button. An ingenious program has been included to correct for taps which are slightly off the mark, by "quantizing" them. This is similar to synthesizer units which will only tune to chromatic intervals, and translate in-between values either up or down to the nearest note. The result of the program is absolutely perfect, symmetrical patterns. That's where the fun begins, since various degrees of "slop" can then be added to give the patterns a far more lively, syncopated feeling. The unit also stores two levels of intensity, so that accents can be stored as well as beats. A number of voices are combined through the built-in mixer to create a stereo output, but each voice has an insertion point for signal processing, which can also be used as a direct out for discrete recording of each voice. The Linn unit also generates a sync signal, so that overdubbing can be locked into previously recorded tracks, permitting tremendously dense tracks to be created.

The Roland unit takes a different approach. It combines elements of previous Roland products, such as the MicroComposer, which allows polyphonic synthesizer compositions, and Doctor Rhythm, a small, hand-held device which allows the programming of simple, four-voice rhythm patterns. Their Rhythm Synthesizer has eight voices, all of which are synthesized, and which sounded markedly better than anythig previously produced by rhythm machines. The Roland is programmed by "writing," composing one measure at a time. The user has the option of subdividing the measure as finely as desired, although sixteenth notes work fine for most common rhythms. A series of LED's show the beats selected for each voice. The individual lines can then be chained together to form a composition. The price was an astounding $995. These two instruments can be expected to have a noticeable impact both in popular music (the Linn Electronic device has already been used on a number of albums) and in production situations.

So much for the fringe technology. Analog is not dead, at least not in the estimation of Panasonic, Otari, and Studer-Revox, all of whom brought new or revised machines to the show. The most dramatic efforts in this respect were those of Otari, who introduced two new members of their MTR family of tape recorders, the MTR-10 2-track and 4-track. These machines, while not offering any radically new features, seemed to combine desireable aspects into an attractive, clean package offering easy access for adjustment and service. Tape control was of the full servo type, and a slide control offered full bi-directional search capability at any speed from a crawl to full winding speed. Quoted prices were only preliminary, with the two-track model falling into the vicinity of $5000-$6000; the units are designed to take on MCI head-on, especially in the broadcast area, so it will be interesting to see just how they do. Otari also updated their quarter-inch four track, now dubbed the 5050-BQ-II, into a package which retained such Otari characteristics as switchable levels 10 or +4 dBm operation), XLR-type imputs and outputs, and so on. What they did add is single-button operation, with one switch enabling/disabling record as well as controlling sync and tape/source at the same time. A simple headphone monitor is also built in, so the machine can be used quickly for basic production without a mixing board or monitor set up.

Both Panasonic (Technics division this time) and Studer-Revox seemed to sense the ongoing need for moderate cost half-track machines, so both repackaged existing units to reflect this application. Revox offered an upgraded B-77 package called a PR-99. It is basically a B-77, but with balanced inputs and outputs, and a sel-sync function. Many case parts are metal instead of plastic, including the front panel. Technics did much the same with their RS-10-A-02 recorder, which took the previous RS-1520 model one step further by moving all record and playback adjustments up front. The electronics have also been optimized for their new head, which is a long-life Sendust formula. The transport is the now-familiar isolated loop which is common to all the Technics reel-to-reel machines. So the death of analog recorders was postponed once again. This was further underlined by the presence of 24-track machines in both the Soundcraft and Trident booths, as both English manufacturers strive to offer a total multitrack recording system.

Power amplifiers were one area that saw a lot of activity, both among some

old-line manufacturers as well as some new ones. UREI jumped headlong into this area with not one but four amplifiers, which are scheduled for marketting early in '81. Most notable among these is the Model 6500, which delivers over 275 watts per channel; more importantly, it includes extra connectors which interface to the speaker terminals, and include the speaker wire and voice coil in the feedback loop of the amplifier. This allows all sorts of compensation for non-linearities in the load, and results in a more accurate delivery of the output signal to the speaker. This type of sensing is also part of the amp-speaker package offered by Meyer Sound Labs, although they go even further in integrating the amplifier and speaker into one system.

Other manufacturers exhibiting significant amplifier products included BGW, whose Model 1250 uses a mere 48 two-hundred watt devices in the output, to achieve a conservative rating of 400 watts per channel into 8 ohms. This was topped by the prototype P-500 offerd by SAE, who also were giving the P-250 a solid work-out. These amps are characterized by driving loads down to two ohms in relative happiness, when coupled with the multiple-fan ventilation package that SAE was promoting for use with multi-amp setups within one rack.

Those who were in search of cabinets to hook up to these super amps were not disappointed. Community Light and Sound was nearly crowded out of its own suite by its system based around a new bass bin, the Boxer. This unit features a new profile for a super-low box, only 30 inches wide; it aslo can be retuned for optimization with a wide range of components. It will probably find a home in medium-to-huge three-, four-, and five-way systems. Midrange units got attention from both Klipsch and Eastern Acoustic Works, with the former showing the compact K-400-1.9 midrange horn, and the latter exhibiting a horn-loaded "upper bass reproducer" called the MR-102. The RAMSA booth featured an absolutely huge bass cabinet, but there were no immediate plans for marketing in the U.S., since cabinetry would have to be built here to make the price anywhere near palatable. RAMSA (Panasonic Reinforcement) did show a very viable stage monitor, which featured a new component, a 15-inch speaker with a synthetic cone made from Olefin polymer. This was coupled in a two-way system to their titanium-diaphragm driver, which also uses ferrofluid in the magnet gap. The preliminary price was about $800, which didn't seem out of line with the 150-watt continuous power handling capacity. Technical Audio Devices (TAD) had the TM-1201 mid-bass loudspeaker on hand, with a polymer graphite cone; the specifications looked altogether impressive. Yamaha had a new cabinet to show, a three-way compact box, loaded with their new series of components. Their separates were also on display, including a double fifteen bass bin, and three-tweeter high frequency array.

The show had much to offer to engineers in search of mixing consoles and reinforcement boards; in fact they might be excused for coming away from the show dazed and confused by the plethora of boards making their first appearance. Audioarts, previously known as a manufacturer of high-grade equalizers, compressors, and notch filters, brought out three series of boards, which cover the range from junior four-track recording systems through monitor boards and eight-buss systems right on up to their Wheatstone Series, which offers 16-track monitoring in the recording version, eight separate monitor mixes in the Stage Monitor version, and a Reinforcement version with 8 subgroups plus direct assignment to Left and Right for a total of 10 working subgroups or outputs. An optional matrix mixing section offers a separate 14 by 8 remix, so a total of 24 separate outputs are available in a board so configured. Audioarts also introduced the Series 44 and Series 8000 console families, and there are a wide variety of options in each series, allowing configuration for P.A., recording, or stage monitoring.

The Audioarts consoles shared a feature with two new boards from Panasonic: the input module is common to two (or more) different versions of their boards. In the case of RAMSA, it is the WR-8716 and the WR-8816 which share a module. The 8716 is a sixteen by four reinforcement board, offering conductive plastic faders and modular construction, along with flexible equalization (midband sweep, high and low switchable 3-frequency) and a stereo effects send in addition to two mono sends. The 8816 is the recording version, which includes complete facilities for 8-track monitoring and recording, as well as a master module which includes all the niceties for control room and studio outs. Both boards will retail at about $5,000 when they hit the market late next spring. RAMSA also showed a remarkable $1,750 recording board that should be a hit: it offers 10 inputs; four outputs, and an eight-by-two submix which switches between cue usage in recording, and effects-send in mixdown.

Sound Workshop seemed to be enjoying themselves at the show, with most activity centered around their successful Series 30 console. They have elected to drop the "stripped" version of the unit (the "a" version), and have instead introduced the Series 20. This board neatly bridges the gap between the Model 1280-B on the low end, and the Series 30 on the top. It is compatible with systems operating at +4 dBm, and can be adjusted for use with any recorder. It is fully modular, and features three-band EQ with sweep mids. Complete facilities are included for control room monitoring, as well as an additional studio-speaker output which follows the control room selector. A twelve-in, eight-out version retails for $5,495, and Sound Workshop has hinted that a larger mainframe (20 inputs) will become available in the spring of next year.

The orgy of new console introductions was kept up by Allen and Heath, who revealed a feature-laden 16 by 4 by 2 unit appropriately named the 16-4-2, which carried a price tag of $2,300.

Yamaha was also heard from, as they showed the latest and largest member of the new M series of mixers, the M-1516, which essentially replaces the PM-1000. It features 16 inputs, four program busses, two "foldback" busses, two echo sends, and a four by four matrix.

Audio Processing Systems (APSI) brought a full-blown version of their Model 3000 console to the show, a unit which offers many features in a relatively cost-efficient package, including full logic control of the input modules, four-band sweep EQ, complete patch bay, multiple effects returns, and 24 subgroups. Around the corner, Soundcraft was showing the Series 800 consoles, and like Sound Workshop there was a hum of activity around the 8-bus console, which offers monitoring capability for 16-track work. If I overlooked any others, I apologize in advance.

Signal processing was not ignored either. Audio Design and Recording continued to flesh out the diverse SCAMP system with a de-essing module. They were challenged by dbx, who displayed the 900 Series Rack with

two new additions, a Parametric EQ module (905) and a Flanger (906), which joined the Compressor, Noise Gate, and De-Esser modules in the system. The rack also accommodates noise reduction modules, so a great deal of power can be concentrated in one small area.

Digital reverberation received attention from both Ursa Major and Quad Eight. The Ursa Major 8X32 is a complete digital reverberation unit retailing at $6,000, and scheduled for delivery about February. It is programmable, and offers control of all "room" parameters including depth, size, and decay; a number of "plate" presets were also included. The unit was impressively compact, fitting into just two rack spaces. Quad-Eight also offered an up-market unit, the System 5 Digital Reverberation Processor, with 4 presets, 5 programs, and 16 EQ settings. Frequency response is claimed to be 20-14 kHz, and the price is $8,950, including a remote which is immune to spilled drinks and the like. Advanced Music Systems, a British outfit, displayed perhaps the ultimate digital delay line, a dual-delay, dual-pitch-change stereo unit, which will have a digital reverberation card available in the near future. It offered extremely high bandwidth, and a storage function for different delay and pitch change settings. Publison, of France, displayed their pitch change/delay units once again, and like French cars, more people seem to take notice each year of these outstanding products.

Analog effects were hanging right in there, with Marshall Electronics displaying the production versions of the 5402 Time Modulator and the Mini-Modulator. The show saw the introduction of several cost-effective limiter/compressors, by Audioarts, Furman Sound, and MXR. The MXR unit is a dual compressor in a single rack-space package, offering two compression ratios, either 4:1 or infinity:1, but the ultimate selected ratio is approached gradually, which is known as a "soft-knee" approach. The two limiters can be strapped for stereo operation. Furman's unit was laden with features, including a built-in de-ess function, as well as a front-panel switch to select "side-chain" operation, which employs an equalizer or other device in the detector circuit of the compressor. Both units were quite low priced. There were few details available on the Audioarts units at the show. Dbx also sprung a nice surprise upon an unsuspecting world: a $325 stereo encode/decode noise reduction unit, called the 150, represents a breakthrough in low-cost noise reduction. This device was paralleled by the introduction of the Model 140, which is a broadcast version employing dbx-II characteristics.

There were a few surprises in the microphone area. AKG Acoustics had a beautifully finished black version of the C-414 microphone called the C-414P. It is said to have been created to meet the demands of digital recording; in other words, after all that tape noise was silenced, and the potential for dynamics increased, the shortcomings of the microphones became evident. AKG's engineers have done a real number on increasing the dynamic range of the microphone electronics, and have lowered the noise floor to a remarkable 15 dB SPL ("A" weighted).

Sony introduced the ECM-989 three-element microphone. This mic is designed for M-S (mid-side) recording, and uses three identical cardioid capsules. The elements and preamps can be separated, making remote operation possible, and it is easy to vary the stereo field from mono (center only) to 150 degrees by adjusting the mix of the middle and side capsules. The suggested retail was quoted as $435, which puts it in a category without competition. Sony also had a miniature M-S microphone, configured for use with portable cassette units. Apparently this unit has been on the market in Japan for a while, and will be introduced here shortly. It is about the size of a large pocket knife, and incorporates three separate miniature electret elements as well as built-in matrixing for M-S stereo! Audio-Technica was also busy upgrading most of their electret microphones for phantom power, which has improved their signal-to-noise performance as well as headroom. They also showed a cardioid lavalier microphone, the first of its type, which they figure will find a number of applications in instrument and drum miking situations; it was shown with a special clip to mount it to acoustic instruments. Crown displayed several versions of the PZM™ microphone, using the pressure-zone principle.

There were relatively few innovations in studio monitors; UREI has made a number of improvements to the 811, 813, and 815 monitors, which will show up early next year; a company called Lockwood showed some nicely crafted cabinets containing Tannoy components; Eastern Acoustics Works had its small unit on hand, which is excellent for near-field applications; and Technics had the entire honeycomb/aluminum SB speaker series pumping away. Other honeycomb units were in use at Pioneer and Sony, and it is likely that the use of synthetics and metal in speakers will grow.

Finally, we come to the great idea of the eighties section; we have two entries here, the first from Empirical Audio of Ossining, N.Y., called the "Sleepy Hollow Headroom Horseman." This is a universal interface between the world of +4 dBm (called the "real world" on the device graphics) and "−10 dBm land," where I suppose all good Tascamers dwell. It offers excellent specs, and cures a great deal of interface problems caused when some of that attractively priced audio equipment gets used in a previously fully balanced, high-level situation.

The second great idea comes from Sounder Electronics, who previously gave us another great product, a Phase Checker which shows whether speakers are hooked up backwards to each other. Their latest is the FX-1000, a portable effects switching system in a Zero Halliburton case, which controls up to eight effects and footpedals for the performing musician, and routes the signals to any of three amps (or direct feeds).

A final couple of mini-trends: more test equipment was displayed than at any previous meeting, with units from Hewlett-Packard, Ivie, Sound Technology, Inovonics, Acoustilog, Crown (Barclay), Klark-Teknik, and a Swedish outfit called Consilium Industri AB all gracing the floor of the convention. And in a small booth, Convergence Corporation, a name known to video people for a while, was displaying its ECS-103 "superstick" tape editing system, which controls editing from any combination of three audio and/or video tape recorders onto either an audio or video deck.

In all, it was an appropriate show to start the new decade in New York. Products were introduced which open doors to the ideas coming to dominate this time in audio; analog recording continued to be refined, refusing to die prematurely; and manufacturers reiterated their commitment to the audio market, a commitment which ultimately overshadows the doldrums which some segments of the industry currently find themselves in. It should be an exciting time in which to keep an ear to audio.

THE 'OVER EASY' COMPRESSOR/LIMITER.

YOU'LL SWEAR IT ISN'T THERE.

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

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

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

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

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

dbx, Incorporated, 71 Chapel Street.
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dbx

Making Good Sound Better

CIRCLE 92 ON READER SERVICE CARD

THE YEAR'S GEAR:

THINGS WE'VE HIT AND THINGS WE'VE MISSED

The past year defies generalization. The product news crowding our desk never faltered and enthusiasm over product remained high, despite talk of the ups and downs of an uncertain economy, a decline in trade-show attendance, some retail difficulties, and fear in the hearts of many.

Throughout the year, we try to bring an assortment of product information to you in *Sound Shoppe* but, inevitably, we miss products you might like to read about. So here are some of our inadvertent misses along with some of our hits, wrapping up roughly the last 12 months.

We make no value judgments nor any claim to all-inclusiveness. These are assorted products shown or introduced during the past year, described here to put the marketplace in perspective—a fitting function at the end of the year. Since we don't do any formal product testing, all specs quoted are supplied by the manufacturer.

Up New England way, Lexicon replaced its Model 102 series of digital delay systems with the Model 122, which features 14 bit floating point digital encoding with 6 dB gain steps and 9-pole Butterworth anti-aliasing filters on all inputs and outputs. The Model 122 is available in mono or stereo. Both models are modular. Lexicon has a special program through dealers allowing customers to upgrade their Model 102 Series to Model 122 performance.

An accessory line developed by MXR Innovations consists of a power converter, a new footswitch (Model 121), a Pro Products Road Case (Model 122), a tamper-proof cover for sound installations (Model 135), and rack ears (Model 141) for consumer group products. The power converter powers any device requiring a 9 volt supply, can simultaneously convert all MXR battery-operated power products, and comes equipped with a Model 138 back plate adapter. (Back plate adapters must be used for all MXR pedal products in conjunction with the power converter.) The footswitch is a simple SPST on-off switch used with a repeat hold switch and with a flanger/doubler as a bypass switch for any products which require an SPST switch. The road case can be used with any MXR Professional Product Group signal processor or other 3-1/2" rack-mountable unit with a depth no greater than 6-3/4".

Even if you don't have "master blowing techniques," according to Keltronics Electro-Mechanical-Assembly Ltd., you can still play the bagpipes. Touted as the "first electronic bagpipes," the Keltic Pipes are recommended for teaching, practice or group playing, with pitch, volume and tuning controlled electronically, and consisting of an electronic changer, an amplifier and a sound box. Carrying case and headphones are optional and a console model is available.

RolandCorp. tried its hardest to information-overload the industry with a slew of product introductions. The Boss division showed products such as Dr. Rhythm, Slow Gear, PD-1 Rocker Distortion, RX-100 Reverb Box, DM-100 Analog Delay, PV-1 Rocker Volume pedal, and BF-2 Fanger.

Roland expanded into powered PA mixers with the introduction of the Roland PA 80 and PA 150. The PA 80 is a 6-input/2-output delivering 40 watts rms per channel into 4 ohms. The PA 150 is an 8 input/2 output unit supplying 75 watts rms per channel into 4 ohms.

In keyboards the company introduced the Jupiter 8 polyphonic synthesizer, an 8-voice, 16 oscillator with 64 user-programmable memories.

Fender/Rogers/Rhodes made music with the Rhodes Mark III EK-10 electric piano with two new electronic voices and with mechanical touch dynamics, percussion, decay and sustain pedal control. Fender stage monitors have been added to the Fender Professional Sound Product line, with tilt angle design, a two-way speaker system with crossover and high frequency level control and 16 ohm load impedance.

Panasonic has a line of single-octave, modular keyboards for electronic organs. The ESK Series has gold-plated contacts, and small size (about seven inches).

The Moog Opus 3 (billed as the Musician's Keyboard) is a 49-note polyphonic synthesizer creating strings, organ and brass voices either individually or in combination. The string voice has a separate equalization section. The organ voice provides a mix of five footages. The brass voice is switchable over a three-octave range. Strings and organ may be routed individually or in any combination.

If you thought technology was be-

coming too inhuman, Computone named its new instrument the Humanizer. Giving the synthesist simultaneous control over timbre, pitch and dynamics with lip and wind pressure sensors, the Humanizer is synthesizer-interfaceable.

The Oberheim OB-SX (6) and OB-SX (4) are six- and four-voice polyphonic synthesizers using the same circuitry as the OB-X, but are smaller and easier to use: User programmability is not necessary. The company makes the distinction that the OB-SX is a polyphonic synthesizer for the keyboard player, whereas the OB-X is primarily for the synthesist.

The Synton company in Holland is now directly distributing its products in the United States. Products include the Syntovox 202 vocoder system with a transient synthesis circuit which generates digital high frequency noise, feeding it to the synthesis filter bank when unvoiced sounds in speech are detected. Other products include other vocoder models, the Series 3000 modular synthesizer, cabinet systems and the College Multi-Level Instructional Synthesizer.

The DeltaLab Memory Module is designed to interface with the company's DL-2 "Acousticomputer" and the DL-4 "Time Line," expanding the total memory capacity of either unit to over two seconds of delay without reducing bandwidth.

Music Technology Incorporated, which distributes Vantage guitars and basses, introduced the "N" Series of acoustic guitars. The neck is designed of three piece maple, with a hardwood Bubinga fingerboard.

The Crumar Roady weighs in at 30 pounds, has five octaves of piano, vibes and bass with additional sustain that can be coupled with the vibes. The Roady has three output channels.

Multivox's line of lightweight Contender amps includes the P66 Contender guitar amp with reverb and distortion controls as well as treble, midrange, bass, volume and master volume. The P64 bass amp features treble, midrange, bass, volume and master volume controls.

The Korg DL-50 Delta polyphonic synthesizer has strings capability with two octaves of mixable voices, variable attack and release plus bass and treble EQ section. The variable synthesizer section can be programmed for sounds such as brass, flutes, electric piano, lead synthesizer. The two sections can be played separately or together.

The DOD R-831 is a solid state 31 band graphic equalizer designed for mounting in a standard 19" rack. The R-831 is mounted in an extruded aluminum case with heavy top and end panels, has 31 separate bands on 1/3 ISO centers with 12 dB of boost or cut, 1/4" balanced and unbalanced input and output jacks, and illuminated power rocker switch.

Headgear headphones, from The Music People, contain a built-in battery powered amplifier operated through integrated circuits, which can be plugged into standard instrument jacks. The nine volt battery is accessible behind two button snaps. With the amp switch in the off position, Headgear can be used as stereo headphones. The product can be used for demos in stores and is mounted for sale on a cardboard face for display.

Biamp's MR/140 professional reverberation system features transformerless balanced inputs, an EQ blend control system, automatic limiting, drive set indicator and high slew rate.

Half and Half bass strings from Dean Markley are made from an alloy steel and are wound with a process which enables the outer wrap to be wound tight. The finished bass string is put through a burnishing process and the metal from the nut through the fourteenth fret is pressed flat for less fret wear.

Lectrosonics followed its Mouse amp with the Moose, a portable rechargeable, battery-operated amplifier for bass guitars. Like the Mouse, the Moose is powered by either AC current or an internal rechargeable power pack; it weighs 29 pounds.

The Clap Trap is a hand clap synthesizer, available through Sano Corporation, which simulates hand claps from a single person to "a whole stadium" to any desired tempo.

The Model 2058 Polyphonic Keyboard synthesizer controller from Polyfusion was originally designed to control synthesizer voices in Polyfusion's larger modular systems; the 2058 can control from one to eight synthesizers or expander modules of any type through use of the 2068 interface.

Electro-Voice's PL80 dynamic vocal microphone was designed with the use of the "fast Fourier transform" computerized microphone design. Features include a shock mount plus a built-in Acoustifoam blast filter. The PL76A, PL77A and PL91A represent refinements to already established microphones, allowing use of 1.5 volt batteries and other flexibility. The RC40, RC60, RC90 and RC120 are roadable versions of E-V's HR series of horns. Each RC horn includes the DH1506 high frequency driver with field replaceable element, a fiberglass case and rubber feet. The EVM-12S Series II features a shorter frame and lighter cone structure than the EVM-12L and is recommended by E-V for the lead instrument.

Shure's SM63-CN is a dynamic, omnidirectional mic less than six inches long, weighs 2.8 oz., and features a humbucking coil, a mechanical-elastomer isolation system, built-in breath and pop filter and external windscreen accessory.

AKG's C-414EB/P48 has been designed, according to the company, with digital technology recording in mind. The maximum sound pressure level at 1,000 Hz for 0.5% total harmonic distortion from the electronics (for all polar patterns with zero attenuation and flat response) is 142 dB. With maximum attenuation selected, the figure is 162 dB.

Eastern Acoustic Works' VB series of vented box cabinets with interchangable tuning assembly allows a single cabinet to be used with most of the commercially available bass drivers while, according to the company, providing optimum performance which will satisfy over 90 percent of the potential vented box applications.

The Model SRS 115 stage monitor from the Vortec division of Integrated Sound Systems includes a 15" 1560 woofer and an HF 3000 magnetic fluid-cooled ring radiator super-tweeter. The unit weighs 35 pounds, efficiency is 102 dB at 1 watt/1 meter; power handling is 200 watts rms and 350 watts program; the full extended response is from 50 Hz to 15 kHz ±3 dB.

James B. Lansing Sound added to its Professional Series the 4690 and 4695 Extended Range Playback Systems.

Maybe you're ready for Ramsa.

You get to the point where professional equipment makes a serious difference. Where anything less holds you back. And when that day comes, you're ready for Ramsa – the new sound reinforcement equipment from Panasonic Professional Audio Division.

With Ramsa, you can choose the system that works best for you with mixer-amps, mixers and line array speakers, all designed for fast setup, with a minimum of lines and clutter.

Take our extremely versatile mixer-amp (WA-140). In addition to its two 60-watt channels (from 20Hz to 20kHz into 8 ohms with 0.3% THD), the WA-140 gives you a 4 mike mixer, 5 point equalizer, 2 phono and 2 aux inputs. Add the Ramsa line array speakers (WS-130 or135) which resist burnout even when you're really cooking.

There are also Ramsa line array speakers with built-in amps (WS-160 or165). When hooked up to our portable mixer (WR-130), this system is versatile enough for both sound reinforcement and recording. And both speakers employ horn drivers for wide dispersion and extended high frequency response.

Add Ramsa hand-calibrated unidirectional microphones with floating suspension and double windscreens to produce a sound that won't let you down.

So when you think you're ready for Ramsa, call 800-447-4700 (in Illinois, 800-322-4400) and audition the new name in sound reinforcement.

Panasonic
PROFESSIONAL AUDIO DIVISION

The 4690 is a compact, two-way system. Componentry consists of the E140 15-inch low frequency loudspeaker, 2306 high frequency exponential horn, 2410 high frequency compression driver and 3101A dividing network. The 4690 can be used in conjunction with the 4695 subwoofer. The 4695, featuring the E155 18-inch loudspeaker housed in an optimally tuned reflex enclosure, can handle 600 watts continuous program down to 30 Hz.

Audio-Technica acquired the assets of Design Acoustics. Top of the line is the D-12A 12-sided loudspeaker with ten drivers arranged on the surfaces to radiate sound throughout the listening area. Power response is 30-18,000 Hz±2 dB.

Atlas Sound's Model BIA-100 Biaxial sound projector and gimbal mount allows focusing of the sound horizontally or vertically. The complete projector horn consists of two symmetrical halves, each molded from structural foam. There are two distinct air columns. The sound from the compression driver travels down the center, reflexes down either side, and forms the outer horn on both sides. The projector weighs 10 pounds.

The Polytone Little Box attaches to the Polytone Mini-Brute or any amplifier with an extension speaker outlet, and produces a flat frequency response up to 20,000 Hz.

The Panasonic Professional Audio Division was formed this year, and eleven new products were introduced at the fall AES Convention alone, in both the Ramsa and R&B (recording and broadcast) lines. Products included a three-way, front-loading horn speaker system employing Twin Bessel horns; a reinforcement mixing console, two recording/mixing consoles, an open reel tape deck, a Class A stereo DC power amplifier and companion stereo control amp; and a back electret condenser microphone with a push-pull type electret transducer. A "sound localization processor" has also been shown to the trade, which controls sound source location and depth for recording.

Dbx's 900 Series Modular Signal Processing System now includes five modules: three-band parametric equalizer; flanger +; noise gate; compressor; and de-esser. All the modules have been designed to fit the F900 frame. Up to eight modules of the 900 series will fit into a rackmount unit measuring 5-1/4" high.

Quad Eight's System 5 is a digital electronic reverberation system incorporating a full 15 bit digital design with a 14 kHz bandwidth. Dynamic range is 103 dB and signal-to-noise is 83 dBv. Four individual reverb programs are included: one that is similar to a plate; a medium density reverb; a low density; and straight echo.

Tangent Systems' Talkback Module, for use with Series 4 and Ax Series mixing boards, includes a +24 volt phantom power supply which will power up to four Clear-Com remote units. The system allows the use of several functions via one mic and one set of headphones for intercom, talkback and PFL (solos).

The Tangent Series 16 Recording Console is billed as the "in between" console "filling the void between the Series 4 and the Model 3216". The Series 16 is a fully modular console for 4, 8, 16 and 24 track recording, and is available in two mainframe sizes and four configurations.

QSC's "Generation Five" features three power amps and two electronic crossovers. The A3.7 mono power amplifier has 150 watts rms at 4 ohms, 20-20 kHz, and is recommended by the company for PA sound reinforcement applications. For musical instrument and stage monitoring purposes, it features balanced/unbalanced phone jack inputs, rack mounting gain control, output averaging, short circuit protection, thermal cut-out overtemp protection, and complementary output circuit.

Studer Revox previewed its first cassette deck. The B710 cassette deck is a dual-capstan system direct-driven by two separate magnetic disc drive motors, slaved to a common quartz-crystal reference frequency. Separate record and playback heads are mounted on a common alignment plate and all transport functions are electronically governed by a microprocessor.

The first in Otari's line of Series II recorders is the Model 5050BQ-Series II, a quarter-inch, four channel recorder the predecessor of which was the model 5050QXD. New features include proprietary microprocessor to govern transport; electronic real-time counter with LED display; automatic monitor switching; selectable 20 dB microphone input attenuator; selectable track headphone monitoring; peak reading indicators on each channel; separate mic/line mixing on each channel. Initial deliveries are expected to start in February.

The Tascam Creative Series 22-4 and 22-2 recorder/reproducers are three-motor, three-head transports with precision molded reel tables and spring-loaded reel holders. The 22-4 is a compact four-track 15 ips multichannel recorder with sinc, featuring function and output select, headphone monitor select, pitch control, optional dbx interface and optional remote pause controls. The 22-2 is a 15 ips half-track recorder featuring expanded scale VU meters, independent monitor and record ready controls, detachable head housing and optional remote pause control. They feature a high speed 7 inch transport, according to the company "to make these machines cost effective."

Soundcraftsmen's "Scan-Alyzer" Model AE2420 has "differential/Comparator" circuitry which eliminates, according to the company, the need for a precisely calibrated pink noise generator. The complete analyzer/equalizer includes pink noise generator, pink noise test record, computone charts, analyzer, equalizer and cabinet.

Akai America entered the graphic equalizer market with two models, the EA-G80 and the EA-G40. The EA-G80 offers ten bands of separate equalization controls for each stereo channel.

Toshiba's PCM-D1 is a pulse code modulation-video cassette recorder which converts an analog signal to a digital code signal and records it. It is a combination unit processor and recorder using a Beta system, which meets EIJA's (Electronic Industry Association of Japan) home-use PCM standard, and uses 44.056 kHz sampling frequency and 14 bit linear quantizing.

Nakamichi's 1000ZXL is a "computing" cassette deck which tests any tape the consumer desires and manipulates recording characteristics. According to the company, response is flat within ±0.5 dB from 20 Hz to 20 kHz. The unit features a random access Music Memory and accepts up to 30 commands, has self-contained Double Dolby, and can be used with external noise-reduction systems while still affording the user use of the Tri-Microphone,

Dual-Line input mixer and 50-dB-range, dual-ballistic, FL display.

Included in Sunn Musical Equipment Company's announcement of 30 new products were the 400w professional loudspeaker series, fan cooled quick switch bridging dual and mono power amplifiers, a line of 19" racks, two musical instrument preamps, a three-way passive crossover network and a digital electronic crossover.

The BGW Models 320 and 620 power amplifiers are specifically designed for the commercial sound market. The new amps are two-channel, fully modular with front-panel 22-position step-attenuator gain controls for each channel. The Model 320 features 100 watts minimum sine wave continuous average power per channel. The Model 620 offers 200 watts per channel. BGW, distributing Tannoy Professional audio products, showed four studio monitors and the Model XO5000 low level time compensated stereo crossover with built-in parametric equalizer, subsonic filter and plug-in module tailored to the user-specified monitor.

Aiwa America added the High-Com noise reduction system to its line, produced under license from AEG-Telefunken. The system may be used with any cassette or open reel deck using RCA connectors. The model is HR-50U and features a subsonic filter and MPX filter, front panel controls, 12-step LED display and a pass switch.

Sony's PCM-10 Digital Audio Processor conforms with the EIAJ format and can be used with any home-use VTR for recording and playback, allowing the user to make digital audio recordings. The Sony TC-K77R stereo tape cassette deck features Sony's Roto-Bilateral head system. When the tape reverses, the entire head assembly rotates, using the same gaps of the same heads for erase, record and playback in both directions. Reversing is triggered by an infrared sensor reading the tape leader.

Tapco's Panjo Series 74 Subgroup Mixing Consoles, the 7408, 7416 and 7424 are available in 8, 16 and 24 channels and have 4-channel subgroup capabilities with stereo and mono outputs. Features include channel patching, mic/line switching, gain trim controls, a talkback system with independent mains, 24 V phantom power, and an internal headphone amp with stereo/mono switching. The company recommends them for both sound reinforcement and recording.

TDK replaced its Audua and Superior Series of open reel tapes with the GX Studio Mastering and LX Professional Studio open reel series, available in lengths from 1200 to 3600 feet, in tape thicknesses of either 35 microns or 50 microns, and in running times ranging from 60 to 180 minutes. The LX series is part of the TDK premium series of ¼-inch audio tapes and is designed for use in professional broadcast recordings or for semi-professionals. The GX tapes are designed for studio mastering use in live recordings.

Maxell introduced two new top of the line cassettes, XL I-S and XL II-S featuring a new Epitaxial formulation. The new shell has been refined to reduce azimuth loss and prevent decrease in output in the high frequency range. The company added two new demagnetizers to its line of accessories, a head demagnetization cassette and a hand-held tape head demagnetizer.

Fuji upgraded its entire product line, including cassette tapes using a newly developed binder, and new cassette package design.

3M improved its Master I, II and III cassette line with a new bowed shim, a felt pressure pad, guide posts and a corrosion-resistant hum shield for a smoother tape pack.

Certron Corp. introduced its first premium ferric oxide audio cassette, Ferex I, in C-60 and C-90 minute configurations.

Ampex's new extra low noise ELN series is available in cassette, 8-track and open reel formats.

The Ivie Series 5000 modular system offers a variety of signal processing plug-ins from mixer/preamplifiers to equalizers, crossovers, notch filters and amplifier combinations ranging from low impedance to high impedance, which can be plugged into the 9 inch Series 5000 mainframe. Nine universal sockets within the mainframe allow an Ivie module to be placed in any position. External components can be coupled into the mainframe.

Ace Audio's Model 6500-DSB active electronic crossover allows connection of stereo subwoofers and crosses over at 100 Hz at 12 dB per octave. Optional crossover frequencies can be supplied from 40 to 200 Hz. The crossover features a plug-in frequency module assembly.

NEI's 821 stereo mixing console is recommended by the company as a multipurpose mixing console. Features include built-in reverb with master level and pan control, separate input preamp input/output jacks, and master monitor control. The unit is rack mountable in an equipment rack or top-mount road case.

As is it's wont, Peavey has shown a slew of products too numerous to be detailed in depth. The Mark III Series is a new line of sound reinforcement mixing consoles in 12, 16 and 24 channel versions, featuring, on each channel, balanced input circuitry, switchable 48 volt phantom power, two independent pre monitor sends, four band EQ, two post effect sends. It is available in a flight case or in a new polyester/fiberglass end panel construction.

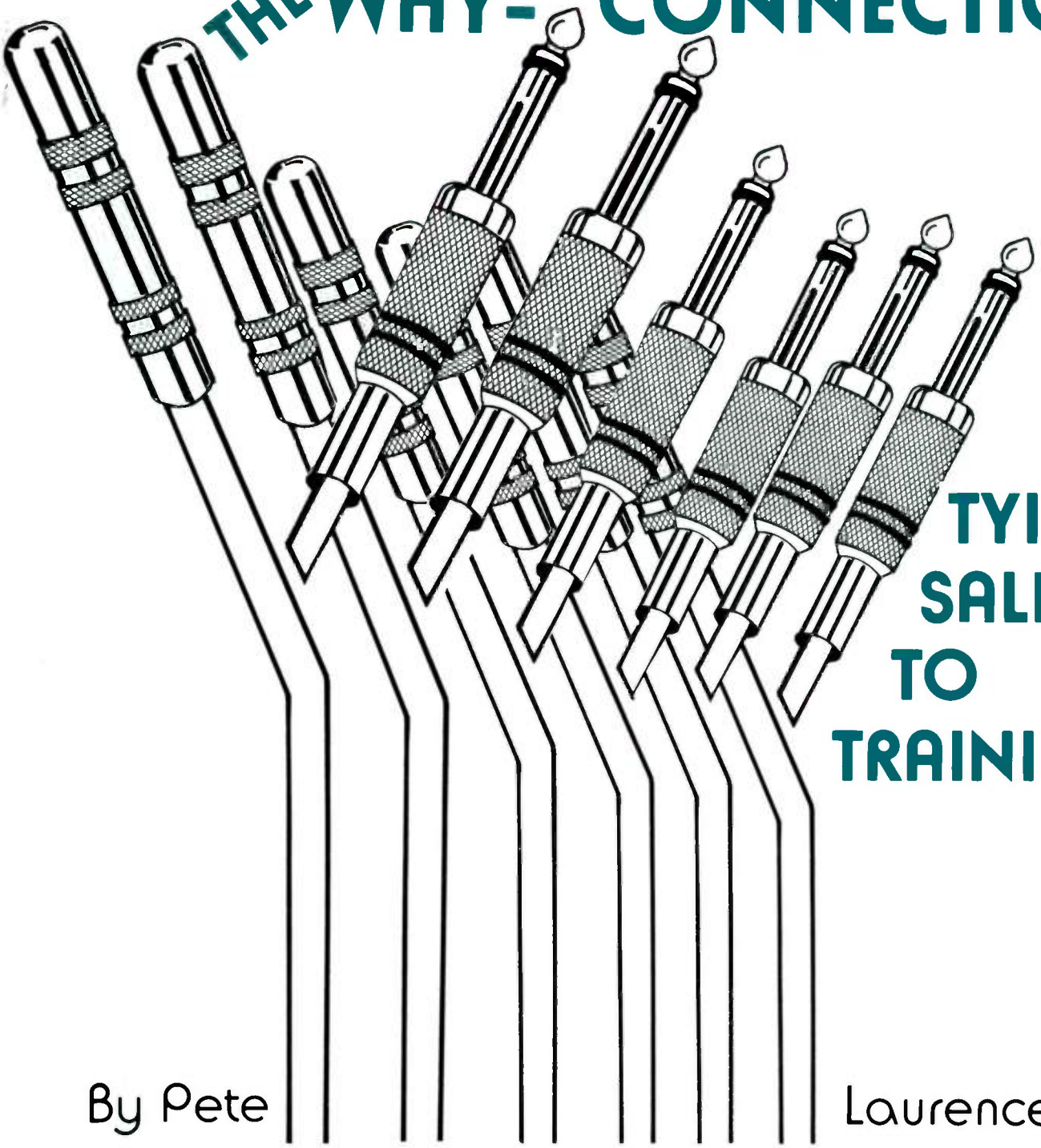
The XR-600B "black box" type PA system is an updated version of the XR-600 and is a six channel mixer amp featuring high and low EQ controls, post effects send, pre monitor send, and level control on each channel.

The Constrictor by Whirlwind Music is an instrument cord combining ten feet of straight cord with a 20-inch coiled, expandable body, providing musicians with the neatness of retractible cords and the freedom of movement offered by straight connecting cords. Fully extended, the Constrictor provides an overall length exceeding 20 feet.

The A/DA Power Plug-5 is a universal battery eliminator designed for the musician who uses 9-volt battery powered sound modifiers and preamps. It is capable of powering up to five devices simultaneously. Two AC outlets with ground terminals are provided on the rear panel.

EAC cases from D'Andrea Manufacturing are "modestly priced" travel cases for electronics accessories, nesting the accessories in layered foam padding which may be custom cut. Features include veneer lock cornered construction and are covered with vinyl. Corners are chrome plated heavy steel; nickel plated steel bumpers offer additional protection. The EAC cases come in three sizes.

THE WHY-CONNECTION



TYING SALES TO TRAINING

By Pete Laurence

The fastest way to affect the profits of a company is to improve the professionalism of salespeople through sales training, sales motivation, and sales management. The biggest profit-maker in your store doesn't have 500 watts or built-in noise reduction. It's the sales force!

Salespeople aren't born. Think of one great salesperson you know. Can you imagine the doctor holding up that newborn baby and saying, "Look, Mrs. Smith, it's a salesperson!" Salespeople aren't born; they are trained. Learning is an everyday, forever affair. We either learn the new or reinforce the old. What is your company doing to help the salespeople become more effective? Training is helping people understand and put into use the ideas, principles, and techniques that bring success.

The number one challenge in sales management seems to be in getting all the great, proven techniques into *use*. No company intentionally hires low achievers. Complacency and negative attitudes are not usually high on management's list of desirable traits. The difference between successful and unsuccessful salespeople is the degree of maintenance of the positive attributes presumably displayed when the person was hired, and the effective dissemination of knowledge. Knowledge + Practice = Ability.

There are very few tangible rewards for ability, but ability plus action equals success, and that is where the rewards are. Later, we will discuss "moti-

vators." For now, it must be remembered that there are many different rewards, and money is often not the primary motivator.)

Salespeople must have the tools at hand and in mind to be productive. Management cannot be responsible for the success of the individual salesperson. Management can only be responsible *to* the salesperson to supply those tools in a usable form. A pleasant working environment, desirable inventory displayed attractively with adequate backup, installment programs, good reputation, product service availability—all are important tools to help build a successful sales organization. Consistent, reliable policies, realistic quotas, reasonable plans of action, and effective training are also tools which will dramatically influence productivity.

Remember, though, that "if it is to be, it's up to me!" You are not responsible for your co-workers' success. You *are* responsible to others to do what you say you will do. The challenge, again, is *how* to do it.

Do you know the difference among *want* to, *have* to, and *choose* to? Many people go around saying, "I want to do . . ." or, "I want to be . . ." or, "I want to get . . ." Yet something is keeping them from doing or being or getting what they say they want. Other people say, "I have to . . ." or "had to do," when, if one really looks closely, no one really *has* to do anything (with debatable exceptions). The recognition that people always do what they *choose* to do is a powerful realization. Those who accept this fact become more comfortable when they choose *not* to do something they "wanted" to do. As they realize they made their own choice, effort can be concentrated on completing the task rather than complaining about having to do something they didn't want to.

To make it easier to choose between trying or not trying ideas, a three-part format can be designed. Future articles will report techniques that have proven to generate positive results in our industry, and suggestions on how to put them to use.

The three parts of the format are: what the idea is; why the individual should care; how it can be done effectively.

It's difficult to achieve results if the why of the task or desired results isn't clearly understood. An example might be: closing ratio, or the number of sales divided by the number of opportunities. Do the people you work with understand what a closing ratio indicates? If not, there is little chance of establishing a valid base to measure the effect of changes.

Your closing ratio shows you the quality and competitiveness of your products and their perceived value (price); the pre-approach created by your advertising and product displays; and the awareness, empathy, and persistence of your sales force.

The *why* is often more difficult to understand than the *what.* The largest room in the world is the "room for improvement." People learn two ways: by impact or by repetition. Each of you is presumably successful. The question is, "successful when compared to what?" Compared to others' standards, or to what each of us individually can conceive and achieve? Someone who is impressed by the volume per square foot of a department store might be awed by the production per square foot of a large specialty store and totally disbelieve the productivity achieved by some of the more creative retailers in this country. Everything is relative. So what? What can *you* do? What can your *company* do? With access to ideas, you can build a foundation for your own plan of action that can be used over and over again. Why you would take the time to try out some sales training ideas is a question that only you can answer. When your associates and employees recognize *their* reasons then they, too, will invest their time and energy to try your ideas.

Here is a sample profit improvement formula to see if there is a reason to invest your time in this area.

Step 1: Number of customers or sales opportunities per day (est.) ____
Step 2: Number of sales made each day (average) ____
Step 3: Average amount of sale $____
Step 4: Average daily gross sales (Step 2 × Step 3) $____
Step 5: Missed sales opportunities per day (Step 1 − Step 2) ____
Step 6: In your opinion, what percent of "missed opportunities" could become satisfied customers (per day) if your sales force was more skillful: 1%, 5%, 10%, 20%, 50%? ____
Multiply your percentage (Step 6) times the number of missed sales (Step 5). Then multiply that figure times the average sales amount (Step 3). Multiply this figure times the number of days you do business each month. The resulting figure represents the monthly increase in gross sales your company could realize. $____

Now, back to the example of the closing ratio. Is money enough of a reason to work on improving your closing ratio? Surely it is for many people, especially where direct commission is involved. Direct commission? Well, all salespeople are paid commission. When it is called a salary, it simply means that the commission is paid in advance and, as long as the salaried salesperson earns that commission during the next pay period, the amount remains the same. When the performance of that person doesn't warrant the commission guaranteed, either the amount is changed, the person improves or goes somewhere else or, if unchecked long enough, the company goes out of business due to lack of profit. Therefore, the difference between commission and non-commission is when the salespeople get what they have earned.

By the way, the fact that good producers are very often given raises, or move on to other positions where the rewards are greater, is further evidence of this seldom-recognized truth. Do the people you work with recognize just how much effect they have? Do they say, "If it is to be, it's up to me!"

Some people really don't react to money as a motivator. They are a positive part of the organization in all ways, and yet do not care about money as a reward. Why, then, should they care about the closing ratio? Maybe their gratification comes from helping the customer really get what is best. No matter what the reason, without a valid measurement, how can anyone know how well his customers respond to what he is offering?

Research shows us why customers don't come back: 1 percent die; 3 percent move away; 5 percent develop other friendships; 9 percent for competitive reasons; 14 percent for product dissatisfaction; 68 percent because of an attitude of indifference toward the customer by some employee.

What's the situation in your store? Why is it important to you? Don't just pass over questions like these lightly! Write down your answers, read them out loud to yourself, and to others whose opinions you respect . . . and see what the response is. Or, accept things as they are and say out loud, "That's the way I like it!"

The how is the easy part. "Whatever we vividly imagine, earnestly desire, sincerely believe, and enthusiastically act upon must inevitably come to

pass." Think about that. Isn't it the imagining, the desiring and the believing that it can be done that is the hard part?

When a man by the name of John Goddard was 15 years old, he made a list of all the things he wanted to do in life. He set down 127 goals, among them: climb Mt. Everest; explore the Nile; study primitive tribes in the Sudan; explore the Great Barrier Reef of Australia; climb Cheop's Pyramid; circumnavigate the globe; run a five-minute mile; dive in a submarine; read the Bible from cover to cover; play "Clair de Lune" on the piano; write a book; read the entire "Encyclopedia Britannica." Idle dreaming? Not to Goddard. Now tough and middle-aged, Goddard has become one of the most famous explorers in the world (he was the first man to explore the entire length of the Nile and Congo rivers). At last count, Goddard had accomplished 105 of his original 127 goals. Still to go: visit all 141 countries of the world (he's only been to 113 so far); explore the entire Yangtze River in China; live to see the 21st century (he'll be 75); and visit the moon.

The old saying, "Give a man a fish, and he'll eat for a day; teach a man to fish, and he'll eat forever," is important to keep in mind. When you do something, do it so that if you enjoy the results, you can do it again. So many times we do something that gets us good results without knowing what effected the outcome. Then it's very difficult to do again. Sometimes we even know what actions caused the results to be positive but, without repetition to create a habit, we revert to less productive actions again.

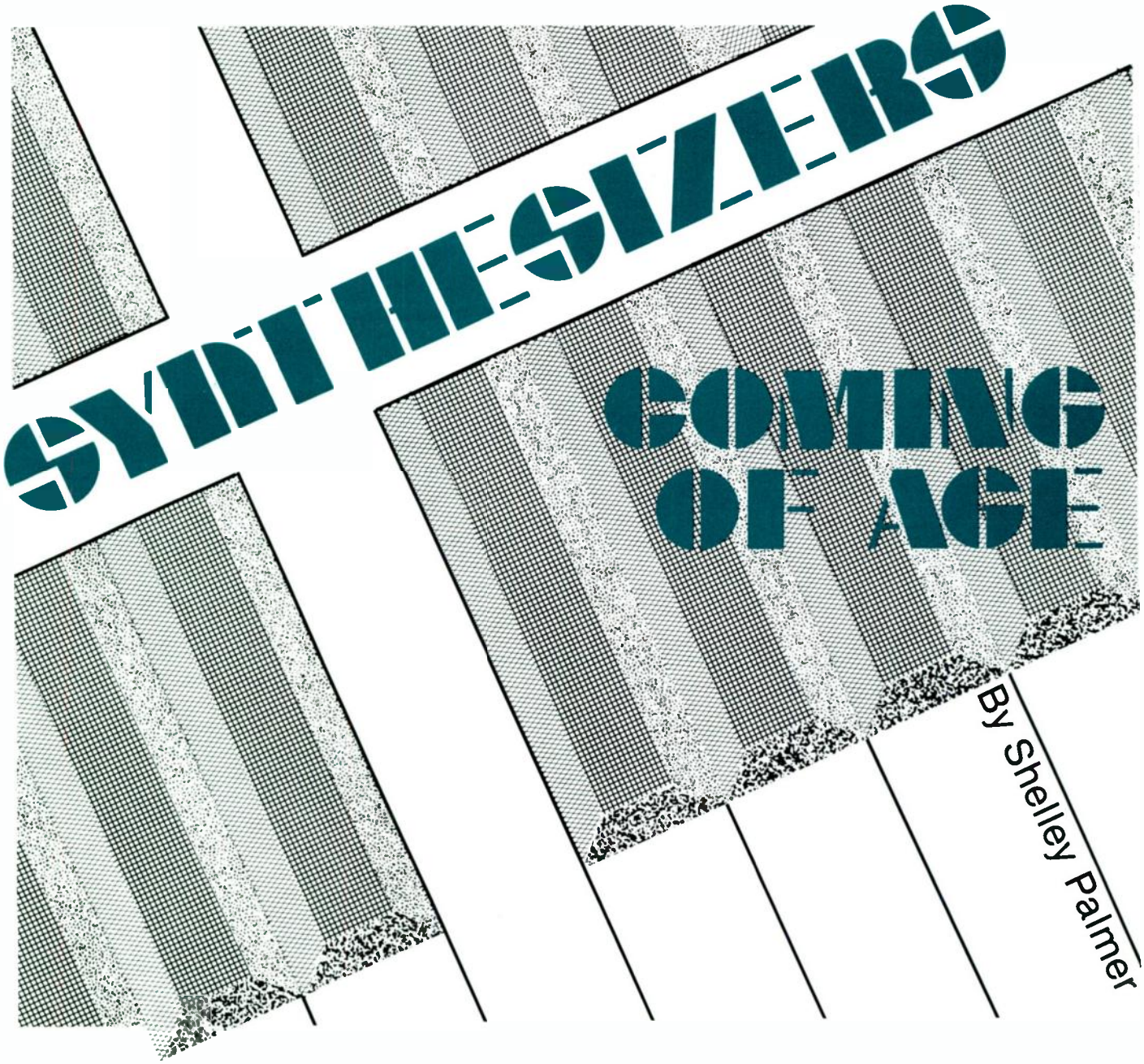
Pick one task or goal—maybe something as simple as keeping the store clean and all the demonstration equipment in good presentation order (speakers connected, etc.) *Write out* a Plan of Action so everyone knows what is expected of him. Have everyone agree that, for a period of time (1 week, 2 weeks, 1 month, etc.), his commitment is to do what he has agreed to do. Keep track of what happens. Imagine what would happen to a salesperson's performance if he learned one new effective technique a day that helped communicate the reasons the customer should invest at this store; with this salesperson; in this product category and this specific item; at this price; now!

Caution! The *good* things in life are the mortal enemies of the *best* things in life! Watch out for complacency. Realize that you have unlimited potential. Governors that limit speed or productivity are installed in us by others. Shatter limits and restrictions that others have placed on your expectations. Think and say "I can," and use your past accomplishments as evidence.

See problems as opportunities, knowing that often succeeding where others have not is very easy because others simply have not tried. Search out and surround yourself with people you respect and admire. Help them by sharing your success and they will help you in return. Make a conscious choice to succeed. Establish a Plan of Action and stick to it. Record your achievements and remember that *repetition* is the key. When you find an idea that works for you, do it again. Give others the opportunity to see how much you care about *what* you do, and *why* you're doing it, and *how* you accomplish your success will be evident.

And remember, the biggest profit-maker in your store is your sales force.

Pete Laurence is President of Visioneering Productions which specializes in retail sales and management training.



It was less than 20 years ago that the synthesizer, as we know it, appeared in music stores as a consumer product. At that time there were fears among musicians that producers would exploit the instrument's ability to imitate the sounds made by other instruments and thereby put people out of work. Some people still think that that's what synthesizers are for. But a synthesizer is not a copy machine. Violins sound like violins, synthesizers like synthesizers. They are both very musically useful instruments. And they both require years of practice to master.

Another popular misconception was that synthesizers are used to make funny noises and other weird sounds. It is true that a synthesizer can do these things. However, so can a hundred other signal processing devices available for guitar, pianos, etc.

What a synthesizer does best is sound like itself, and that's what it's used for in today's music. More importantly, that will be its role in the music to come.

Modern music is filled with electronically processed sounds. A good producer could probably duplicate any given sound. But most people would be hard pressed to guess its exact method of production. A Harmonizer can be used as a delay line. A delay line can sound life a reverb (spring or tube), etc. Regarding synthesizers, on most machines there are over 25 different ways to produce a falling voltage (Syndrum effect). Each has its specific use, but for that one effect any one of the 25 patches would be indistinguishable from any other. So music today must be taken at face value. There is no limit to the ways any given sound may be produced. There are, in fact, so many signal processing devices that strange noises and effects once described as "electronic music" are now being accepted as "music." This is the time that all synthesizer players have been awaiting—the day when synthesizers can be treated as legit musical instruments. The day the synthesizer comes of age.

For all practical purposes an ARP 2600, Minimoog and the like are still the right arm of most professional synthesizer players. They are analog devices utilizing voltage control over most or all of their musical parameters.

These synthesizers and others like them have become "classic" synthesizers. They have an easily recognizable characteristic sound. Depending

on who's programming/playing, they can sound like machines or like musical instruments.

These synthesizers have four main features in common. They are keyboard controlled; this tends to make people think that synthesizers are keyboard instruments. Although the human interface to most synthesizers is a piano-style keyboard, the playing technique is completely unrelated to the piano. Each new timbre or sound requires its own playing technique, not always confined to the keys. In fact, most tonalities utilize one hand on the keyboard and the other on the controls.

The second feature is that these units play one (monophonic) or two (duophonic) notes at a time. This is not really a drawback to a synthesizer player. Clarinets, trumpets, flutes, etc. are also monophonic. At least a synthesizer player can talk or sing while he's playing. Any controversy over the viability of monophony is caused only by the psychology of the piano-style keyboard. The Lyricon, for example, is interfaced in the form of a woodwind instrument. So its monophony is not considered a limitation.

The third feature is that sounds are patched together by setting knobs or sliders. The way to recreate a specific sound is to manually log or memorize the control settings and reset them when you want to make that sound. Even with superior musical ability, this is a delicate process.

In my opinon the only serious drawback that has existed in these second generation consumer synthesizers has been the lack of control over musical parameters—the ability to subtly phrase a line or accent a lick. However, with the advent of computer control, this is rapidly changing.

Enter polyphony . . . the ability to play more than one note at a time. The microprocessor has made possible Computer Controlled Analog Electronic Music Synthesis. Now we can take a full function analog synthesizer and have one for each finger. Not fantasies, an Oberheim OB-X or a Sequential Circuits Prophet have become "main" synthesizers for both performers and studio players. Many of these people have at least one of each. Although the Prophet and OB-X each have different characteristics sounds, they are similar in many ways, as are all other polyphonic synthesizers.

These units feature a fully complemented two-voice synthesizer for each key depressed. There is typically only one set of controls for the entire synthesizer, so you set up only one patch for the entire unit, a real time saver. The charm of computer control is memory. These synthesizers have digitized pots. This means that the computer can read and remember where you set the controls and you can call up a patch or switch from sound to sound at the touch of a button.

This is the answer to many musical control problems. For example, by programming the same timbre into five consecutive memory banks and then programming five different filter and loudness envelopes, you can go from long tones with slow releases to short notes with fast releases without changing the timbre or the sound. There is no limit to the number of things you can do with computer control. But there is a limit on how much your customer can spend. For under $10,000, digitized control memory is about as much as he can get.

Computer control for program memory is just the tip of the iceberg. I am now using an Ohio Scientific computer to control all of the musical parameters of two modified Oberheim OB-X's interfaced to an ARP 2600 (also modified) and about 20 other voltage controlled signal processing devices. The computer enables us to do anything to any voltage at any time anywhere in the system. We have a powerful 16 voice polyphonic sequencer/editor program. The computer will sync up with itself, so we can play/program a song with up to 16 different voices and the computer will play it back onto tape. We can repeat the process as many times as we wish. The computer makes an 8 track recorder into a 128 track, if you need it to. The computer will also fade from one patch to another in real time. So a sound can start off as a violin-like sound and turn into bells or bullets in any pre-determined time span. We can sync to SMPTE Time Code or frames per beat for multitrack. And, this is just the beginning.

In the future we plan to computer control other signal processing devices like digital lines, Harmonizers, reverb, EQ and compressors. I feel that this system is the ultimate compromise between analog synthesis and the neophyte digital synthesizers.

To understand what's coming in synthesizers, your customer must first understand the difference between analog synthesis and digital synthesis.

Analog synthesis is also known as subtractive synthesis. You start with a waveform rich in harmonic content. Then you filter it until it sounds the way you want it to. This can be a very fat sound, or subtle or harsh, depending on your initial waveform and filter settings. It is how all analog synthesizers work. Today it is considered state-of-the-art.

Digital synthesis is also known as additive synthesis. You start with a sine wave. To this sine wave you add another wave, etc., etc., until you have built the waveform you desire. There is no voltage controlled filter. The sound is built from scratch. This is an overly simple explanation, but it points out the basic conceptual differences between the two types of machines. Right now analog synthesis is the most common—and the best sounding from my own subjective viewpoint.

Digital is here and in force. There are some *fully* digital synthesizers on the market today. Priced from around $25,000 and up, they are, as you know, not exactly a consumer product. But the first consumer electronic calculator didn't cost $9.95 either.

There is a major musical difference between digital and analog units. A digital synthesizer is a computer. It has no character of its own; it will do exactly what you program it to do. In other words, no one can claim credit for the machine's intrinsic ability to make sounds, because it makes no sound of its own.

A simple way to explain this to a customer is: Let us say that you find the sound of cracking a walnut particularly pleasing to listen to. You simply place the nut in front of the synthesizer's input analyzing microphone and crack it. The computer will analyze the waveform created by the hammer striking the walnut and compute the formula to reproduce it. You now have musical control over this sound over a nine octave range from a piano keyboard. This is available today. Using these synthesizers, you can make some fantastic sounds. But some people feel they have a "digital sound." This is a hardware problem. A practical musically useful version of a digital synthesizer that would stack up to a hybrid analog in both price and sonic quality is still some years away. However, we are already starting to feel its effect.

This technology will change the way we perceive music. People in the creative community are severely limited by their pre-conceived notions about music, especially when approaching the synthesizer. Few composers have

explored the limits of the available analog devices. Most tend to claim credit for applying the sounds the machines make to the music, instead of creating sounds and creating music. To fully appreciate the new technology, it will be necessary for the creative community to unlearn what it has learned, to leave the bounds of conventional instrumentation and orchestration. Any sound that the human ear can hear will be musically applicable. Don't get me wrong. I do not think that the sound of an automobile crashing into a brick wall is music (my apologies to those of you who do). However, I'm sure that Punk Rock or New Wave is *not* the realization of the upper limits of the medium.

What this means to you in the form of synthesizer sales: Obviously, analog synthesizers are still the mainstream. Students and pros alike are going to continue to buy these units for many years.

There are two distinctly different schools of thought in synthesizer playing. First there is the composer/producer type of synthesist, who is looking to explore and expand the craft. These are people who strive to combine art and science. They make up a creative technocracy, rather than mass synthesizer buyers. In fact, most of their gear may be highly modified consumer gear or completely home brew. You don't have to worry about selling to people like them; they always seem to find what they need, whether it's available or not.

On the other hand, there are the people who are content to play a sound without questioning its origin. This category includes most of the working musicians. These people are interested in new sounds that are musically useful. To these players you will sell preset analogs or computer controlled polyphonics. Most of them want to press a button and sound like a trumpet; press another and sound like a freight train, etc. Since the technology is available today for under $5,000, it is an area that most serious keyboard players are leaning toward. Again, this is not necessarily creative synthesis. Most people don't want to be bothered with shaping or changing a sound.

According to Oberheim, almost 90 percent of the OB-X's that come back for service still have all 32 factory preset patches intact. Now I'll tell you that the OB-X, like other available computer controlled poly's, is the state-of-the-art in affordable versatility. Yet most people just want to press a button. This isn't going to change too soon. But, I believe that as more people realize what can be done with these instruments, they will do it. I can't wait.

Use of the synthesizer is ever increasing in music today. We are able to do demos which leave nothing to the musical imagination of the listener, creating the effect of strings or horns quickly and inexpensively. However, that's where the imitation ends for me. When we go into final production, if the score calls for a violin we hire violin players. And, of course when I need a new timbre or an unusual tone color I use the synthesizer.

Though there are many different uses for synthesizers, these instruments, like all good instruments, can be appreciated at every level. I'm optimistic about the future. The techies are a hundred years ahead of the musicians now. If we can just catch up creatively, what we perceive to be music will expand beyond our widest dreams.

Shelley Palmer is President of Shelton Leigh Palmer & Co., a music production house specializing in electronic music.

The SOUND SH

The **Soundcraftsmen** TG2245 is a dual-channel 10-octave-band equalizer, with separate switching facilities for each equalizer section. It is supplied with a frequency spectrum analyzer test record and programmable Computone charts for re-setting of desire curves. The Pro-Equalizer features balanced and unbalanced 600-ohm operation, duplicate front panel line-in line-out 1/4 inch phone jacks, zero-gain LED's for visual balancing to 0.1 dB accuracy, six signal processing pushbuttons on each section providing switching for a subsonic filter, low shelving, high shelving, EQ defect, EQ loop and external loop. The company claims signal-to-noise at 114 dB at full output. The unit has 3-1/2" × 19" rack-mount front panel of black anodized aluminum with 10" deep steel chassis with optional walnut veneer hardwood end panels. Price is $399.

CIRCLE 1 ON READER SERVICE CARD

The **Multivox** MX65 Polyphonic Keyboard allows a choice of strings, brass, piano, organ, clavichord and honky tonk piano and weighs 16 pounds. The four octave keyboard is expandable to six octaves by means of a transpose lever, and a tuning knob can be used as a pitch bend control as well as a tuning control. Features include positive and negative gate outputs for interfacing with other synthesizers; a VCF control-in jack permits a volume pedal to function as a wah-wah or filter pedal when used with an optional mono/stereo cable. The unit has a one year warranty.

CIRCLE 2 ON READER SERVICE CARD

The SM63-CN microphone by **Shure Brothers** Inc. measures under six inches long, weighs 2.8 oz. and is designed for on-camera or on-stage use. The dynamic, omnidirectional mic has a controlled low frequency response and a smooth high frequency response. The unit features a humbucking coil, a mechanical-elastomer isolation system, built-in breath and pop filter, Veraflex polyester grille, and supplied external windscreen accessory. The user net price of $100 includes a swivel adapter windscreen and professional three-pin audio connectors on both ends of the cable.

CIRCLE 3 ON READER SERVICE CARD

DiMarzio has re-introduced its custom bass and guitar replacement necks. All parts are sealed, primed and ready for final sanding and finishing. The company has newly introduced a brass bass bridge (Model FB1201) and a brass deluxe bass bridge (Model FB1203), both with chrome finish and with "massive, sustain-enhancing" string and bridge terminal blocks, recessed screws, and self-aligning tracking saddles as standard features. All bridges are now protected by a new epoxy finish.

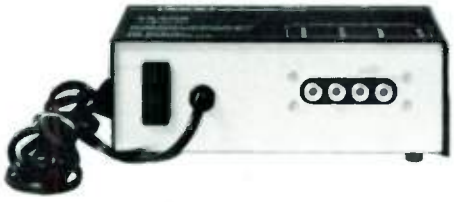
CIRCLE 4 ON READER SERVICE CARD

OPPE

By Charlie Lawing

Warped records? Off-center spindle holes? Turntable rumble? These and other problems that plague the audiophile on a budget can be solved by a new product from **Ace Audio**, the Model 4000-XX24 infrasonic filter. This unit is designed to reduce or eliminate subsonic defects by providing an ultra-sharp cutoff of 24 dB per octave at 20 Hz (-3 dB). This drop in the frequency response is the audio equivalent of a swan dive off the Rockefeller building: drastic.

The 4000-XX24 uses a combination of active Bessel and passive filter sections to remove all subsonic disturbances with a minimum amount of phase shift. Each of these units is hand-made and individually calibrated for the greatest accuracy possible. Distortion is a miniscule 0.002% at a 2-volt output level.



CIRCLE 5 ON READER SERVICE CARD

Question: What weighs 44 pounds, is made in Japan, has an "overdrive" and can easily be detuned? The new Kamikaze Coupe? Wrong. It's the new BX-3 dual manual portable organ from **Korg**! And I must say, this unit sounds as good as any console organ I ever heard.

The BX-3 has two separately-voiced 5-octave manuals, each with a full 9-drawbar complement, electronically switchable presets, and full percussion. Each manual offers two percussion voices with variable decay and volume. In addition, there is a special "overdrive" control which recreates the gritty, distorted sound that the Hammond B-3, has been famous for. The BX-3 has separate bass and treble controls, keyboard detuning for each manual, variable "keyclick," volume and balance controls, and a six-position Chorus/Vibrato selector switch.

The Chorus/Vibrato section is really what makes this unit so realistic in sound. The rotary speaker effect is precisely duplicated by electronically "speeding up" and "slowing down" the upper and lower baffles of the old tone-cabinet sound. Users of these tone cabinets know that the rotating horn in those cabinets sped up and slowed down faster than the speaker baffle, thus creating the classic tone cabinet sound, which was difficult to successfully duplicate. But Korg has done it with the BX-3, a remarkable unit that has everything the keyboard player is looking for in an organ.

CIRCLE 6 ON READER SERVICE CARD

The new 10-band EQ-1500 graphic equalizer from **GLI** offers state-of-the-art gyrator and low-noise Bi-Fet circuitries, as well as a high slew rate and three sets of selectable inputs, complete with tape monitor functions. A circuit bypass mode with LED status indicator and a complement of one-octave-wide filters with center detent make the unit flexible and easy to use. Flat response is easy to locate at any point using the center detent feature.

In addition, the EQ-1500 has a range of ± 12 dB and an output capacity of 10 volts before clip-

ping. A relay circuit mutes the output, thus preventing turn on/off transients from ever reaching the amplifiers and speakers. This unit was designed for professional use, and is packaged in the standard 19-inch rack mount enclosure.

CIRCLE 7 ON READER SERVICE CARD

Owners of **Teac** recording equipment will be happy to know that Teac now has a Punch-In Foot Control device, the FP-70, which is available for shipment. This control is particularly useful to the musician who records alone, because it frees his hands to remain on the instrument while activating the recorder. The FP-70 plugs into any socket which accepts a Teac RC-70 Remote Control unit, and the best thing is, the FP-70 will *not* disable the transport controls: both systems will operate the tape deck. The FR-70 is small, inexpensive, and certainly useful to the recording enthusiast who has too few hands to operate both his instruments and his recording gear at the same time. (The current number of hands needed for this is at least six or seven!)

CIRCLE 8 ON READER SERVICE CARD

Peavey Electronics has a dual-powered mixer, the XR-700, which is a straighforward mixer amplifier with built-in monitor mixing, EQ, and power. Each channel has an independent pre monitor send, three-band EQ, balanced low-and high-Z inputs and in/out patching capabilities. The master section has a control that allows mixing the reverb and effects sends back into the monitor buss.

The XR-700 has separate seven-band graphic equalizers in both the main and monitor outputs. A ten-segment LED VU array provides instantaneous accurate status indication for both of the integrated 100-watt RMS power amps. Each of the internal power amps has the Peavey-designed DDT circuitry, a compression circuit that all but eliminates power amp clipping. The XR-700 is perfect for small combos and club work.

CIRCLE 9 ON READER SERVICE CARD

If Washington Irving were alive and recording today he would no doubt endorse this next product, the Headroom Horseman from **Sleepy Hollow Products.** This discrete IC free line amplifier solves a problem that studio engineers have been aware of for a long time. In typical studio applications, the "semi-pro" levels of -10 are seldom brought up to the +4 level standard. This results in an inability to make adequate A/B's of cassette and ¼-track copies. In production applications, the -10 equipment will not properly drive a 600 ohm load. The Headroom Horseman has padded inputs so that the gear is driven with the impedance levels that it was designed to be interfaced with. A 50-volt power supply is included in the retail price of this unit.

CIRCLE 10 ON READER SERVICE CARD

Eastern Acoustic Works has a new MR Series of direct radiating lower midrange arrays which has the ability to operate down to 200 Hz. This makes the unit especially useful with folded bass horns and scoop-type bass enclosures that usually have poor lower mid-band performance. The

The SOUND SHOPPE
REAR ENTRANCE

lower crossover frequency to the bass enclosure also makes possible a tighter bass response with less vocal band distortion.

The MR Series consists of three units which include a single 12-inch cabinet and arrays for dual 12-inch and dual 10-inch mid-bass drivers. All these units are built of 18-ply-per-inch cross grain laminated birch plywood with a scuff and water resistant exterior coating. Convenience features include recessed handles, steel corners, quick-change driver mounting clamps and perforated steel grills. The MR Series seeks to update existing two-way systems by inserting one of these mid-bass arrays between the bass and high-frequency enclosures of a standard two-way system. This allows higher crossover points for the high compression driver, which reduces the driver excursion, as well as a lower crossover for the bass enclosure. The three-way system provides increased output, lower distortion, and improved vocal definition.

CIRCLE 11 ON READER SERVICE CARD

Another pocket-sized practice amp/pre-amp is now available, this one from **DOD Electronics**. The Mini-Amp 650 measures only 7½ inches long and produces just half of one watt RMS. But even though it produces half a watt, the standby current is only 2 milliamps, and the 650 has two specially-designed 2½-inch ceramic magnet speakers for unusually high volume and clear sound. Three controls are provided on the 650: Gain adjusts the level of the input stage which will overdrive for smooth distortion and sustain; Tone; and a Master Volume control. For fun, the 650 has tilt-back legs like a Twin Reverb, so it looks really cool sitting on your motel dresser when fans drop by to visit.

CIRCLE 12 ON READER SERVICE CARD

Altec Lansing has two new automatic mic mixers available, the 1674 and 1678, both of which incorporate Altec's patented gain-sharing principle which allows the system to deliver maximum acoustic gain before feedback in multi-mic situations. Analog computer circuits observe the level of each input channel, then compare that level to the total of all inputs and adjust the gain of each of the inputs so that the overall gain is held at a constant level. Also, the mic mixers are designed to compensate for the difference between coherent and non-coherent signals, thus avoiding potential mixing errors.

In addition to that, the mic mixers have a number of other features: balanced mic or line levels, inputs with phantom power for condenser mics, TTL compatible logic outputs for custom applications such as automatic switching of speaker zones, channel line outputs for logging tape recorders, remote muting and priority override control, switchable 200 Hz hi-pass filters and auto/direct bypassing in each channel. Up to 40 channels of automatic mic mix can be achieved by the appropriate linking of these mixers.

CIRCLE 13 ON READER SERVICE CARD

By John Parris Frantz

DEALER DOSSIER

Flanner's Pro Audio Milwaukee, Wisconsin

It all started 89 years ago as Flanner and Hafsoos, when Joseph Flanner, who sold band instruments in Louisiana, began vacationing in Wisconsin. The area impressed him to the point of moving his operation to downtown Milwaukee where he later teamed up with Eric Hafsoos. Eventually they added new dimensions like the Joseph Flanner Publishing Company, which published "On Wisconsin" (the University of Wisconsin fight song).

Evolution was the name of their game. When organs and pianos became marketable, they started selling them. When radios became popular, they sold them. When phonographs became popular, they sold them. They became one of the first dealers for RCA when television emerged into the consumer market. They carried some of Avery Fisher's hi-fi equipment while he was still making it in his basement. As trends began to fade, they also disappeared from Flanner and Hafsoos's showroom. In 1960, the company moved to the Mayfair Mall at Milwaukee's outskirts.

Today, band instruments, pianos and organs have been phased out at this retail outlet in favor of popular hi-fi equipment and accessories. And Flanner's Pro Audio has become a full-fledged entity on its own. John Flanner, President and great-grandson of the company's founder, and Sales Manager John Luper talked to us about Flanner's Pro Audio, which was begun in 1976 as an experimental project of Flanner and Hafsoos.

It's not an experiment anymore. Today, Flanner's Pro Audio serves the needs and applications of the broadcast and recording media. They also serve as consultants in sound and design for their customers.

Why did you switch from the production end to the sales end of the recording industry?

Luper: At the time I was unsure about which way I was going to go. Through my own studio business I was leaning toward recording and through my experience with the Flanners I was also leaning toward the sales end. It was at this time that I realized there was nobody in the Midwest who was really going after the recording studio and broadcast people from the sales point of view.

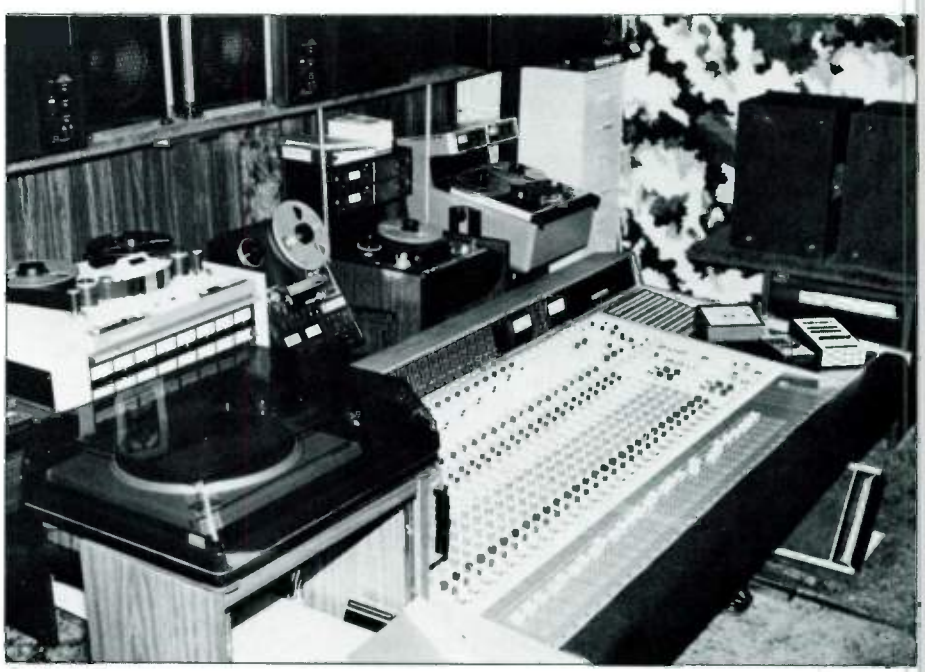
I know this because at my studio I was never contacted by any salespeople the whole time I was there. With this information in mind, I went to the management of Flanner and Hafsoos and drew up a comprehensive proposal for entering into the pro audio business. We all decided it was a good idea and we gradually started to do it.

Once again Flanner and Hafsoos was ripe for evolution?

Luper: Right. That happened in 1976. We started off with nothing but Tascam. We had a great success with Tascam because of the original ground work we laid out for this company's policy—honesty to the customer, which is the most important thing. Plus, we included service and calibration of the equipment before and after the sale into the policy. So, one thing led to another and here we are today—one of eight dealers in the country for the MTR-90, 16 and 24-track, and one of the largest Neotek dealers in the country.

As president of this operation, John, what is your background?

Flanner: Primarily I have a business background. I studied business at the University of Wisconsin. I'm not especially technically oriented, although I have been learning a lot as this company has grown. John is really the heart of this new company, because it's a technically oriented endeavor. You're dealing with a lot of technical equipment and the people.



It must be an advantage for you in sales, since you're dealing with studio owners and you were once on that side of the fence.

Luper: That's right. Since I once owned and operated a studio, I can put myself into these people's shoes. Although I don't have a formal education, I have had a lot of trial and error experience in this business. I can sit down with a customer and explain financial statements or put together a comprehensive list of financial reports for these people to submit to their banks and lending institutions for financing. This is another reason that we've been successful. We've been able to guide these people so the equipment we sell will become profitable for them. The recording industry has its ups and downs, and it's hard to predict. So we provide some financial advice. We can put together a package that will allow the customer enough working capital. No business can survive unless it has sufficient working capital to take care of the slack periods. Studios come and go like flies in this business, because they are undercapitalized.

Although Flanner's Pro Audio and Flanner and Hafsoos are two different companies on paper, they're really part of the same organization. Do you think it's good to be involved in so many areas in this time of specialization?

Flanner: It depends on how you do it. We decided to segregate the operation into two separate entities. We have a separate service technician and sales people. You're right, though, you can't be all things to all people. When you start spreading yourself too thin, you end up doing a mediocre job on everything. The only overlap we have is in the upper management.

Throughout its 89 years, this company has changed and evolved so much. Is it a company policy to get in on the ground floor when a new trend hits the market?

Luper: Not really. It's a standard business practice. You have to change with the times. Wherevvr the buying public goes is where you go in order to survive.

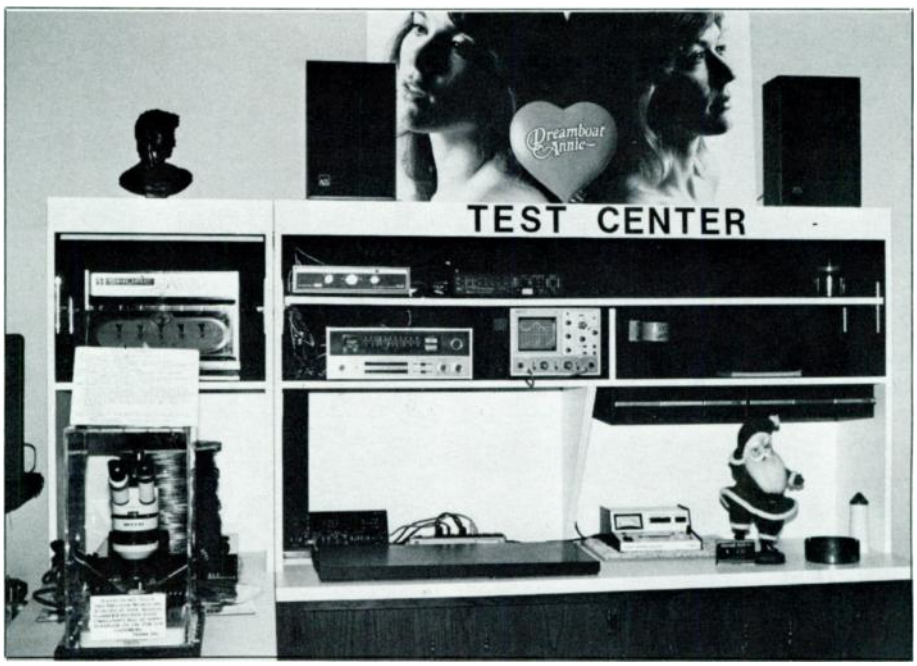
Flanner: We could still be a band instrument dealer, but I think it would have severely limited us. There are other good instrument dealers in this area, but my father saw the potential of the stereo business.

I can see a person opening a pro sound store, but you actually came from a different part of the industry. Why did you move into the pro sound market?

Flanner: Obviously, any business has to grow. At John's urging, we moved into something new. We were already dealing with the hobbyist with 4-track tape recorders and things like that. There was a market here that was not being served at all. That was the main reason we made the move. There are other people in the business, but they didn't have the reputation we had for service to the customer, which Flanner and Hafsoos had already established as a hi-fi dealer.

Luper: Another point is that the customers in the area had seen a lot of dealers come and go. They didn't have anybody they could put 100 percent faith in. They wanted someone to give them an answer, and find inventory and stock for immediate delivery. They also wanted somebody to stand behind the product and to still be around tomorrow.

We got comments from people in the industry that the Midwest was the only untouched part of the pro audio business. When we started to research that, we found a lot of truth in those comments. There were a lot of people in the musical instrument and sound reinforcement business trying to tackle the recording and broadcast market, but who had very little knowledge of it. As a result of that, customers were getting the wrong product for the application, plus poor delivery and other problems. When we researched the market in 1976, there were a lot of people eager for somebody to get something going. It



was at that time that we made our decision to do it. I talked to many engineers at radio stations around the Midwest who had not seen a salesman in 20 years. I've run into recording studios who have done all their buying over the phone or through a catalogue.

How did you research the market to find those voids? What were your methods?

Luper: To be honest, I went out there and pounded on doors. We tried to find out what these people wanted or what they were looking for. I used to call people on the phone and tell them that we were interested in opening a pro audio store.

I would imagine this researching also served as a sales tool later on.

Luper: That's right.

What part of the pro audio market are you after?

Luper: We're interested in anything that deals with pro audio. We have all the lines and expertise that are necessary to handle anything that comes along. Our primary business is the semi-pro recording studio all the way up to 24-track. We're after the broadcast and sound reinforcement parts of the market, too. We don't claim to be experts in sound reinforcement and we make that clear to the customer, but just the same, we're still interested in his business. If someone wants a good sound reinforcement system put together we'll do it. We'll get the answers. If we have any design problems the people from Klipsch, for instance, which is one company we carry, will come out and help us design a system to accommodate the customer.

Can you break down your pro audio customers into percentages?

Luper: I would say we sell 40 percent to broadcast, 40 percent to recording studios, 10 percent to the home hobbyist and 10 percent to sound reinforcement customers.

How many employees do you have and what are their duties?

Luper: We have two administrators, three salesmen and one repair technician.

Do you offer consultation and design?

Luper: On consultation, we rely heavily upon our backgrounds. My background is in recording and Peter Neupert has a good grasp on the broadcast end. We also have Tom Luell who has studied under John Woram in acoustics, studio applications, and speaker design. Neupert has also studied acoustics at the University of Wisconsin-Milwaukee.

As far as design is concerned, we use a countless number of people in the industry that are actually available to anybody. We use outside people because of our honesty to the consumer. If we need help—we go get it.

Can you cite an example of your consultation work?

Luper: The biggest job we have consulted on is Soundtrek Recording Studios in Kansas City. It's a 24-track recording studio with a 4-track production room. We put together the right combination of equipment for them. As far as design goes, we helped at Soundtrek, but it was really a combination of a number of people. We're not that big on design yet, but we are in the process of designing a 24-track studio with two 8-track rooms. We mainly consult on design.

What kind of customer do you attract?

Luper: When we first started, we were attracting the home hobbyist but now we're getting the large companies like Universal Recording in Chicago. We're attracting the large companies now because of our national advertising. People are hearing about us, so word of mouth is helping. We've done work at places like the Boettcher Concert Hall in Denver. Our communication with the manufacturers is important. Input, product availability, and delivery can only be accomplished by communicating with manufacturers. This is something that has not been done by pro au-

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dio dealers in the past. If we tell a customer he'll get the equipment on a certain date—it'll be there.

How do you handle delivery?

Luper: When possible, we try to give personalized service. If it's big equipment, we'll rent a large truck. We've had jobs in Kansas City and Omaha that we have delivered ourselves. The coldest way to deal with someone is to just send him a box. If someone pays $15,000 for something, you should be there to go over the product step-by-step with him.

Do you actually travel those distances to show the customer how the equipment works?

Luper: Yes. After a sale, we'll go out of our way to demonstrate other equipment. Of course if you're dealing with a 24-track mixer, you can't put that under your arm and go somewhere with it. In that case, a client will come here. Mostly though, we try to give personalized service. On the other hand, if you're talking about a $300 piece of signal processing equipment, it doesn't warrant a $400 plane ticket because you'll never get the investment back.

Where do you advertise?

Luper: We advertise in national magazines. We also have an active direct-mailing list. We're still experimenting with advertising. What we spend per month on advertising may vary anywhere from $300 to $1,500. It's hard to determine whether the advertising has helped sales or not. As far as getting our name known, it has paid off.

So now that you've broken the ice with the big companies, what about the little guy who doesn't have the spending capital?

Luper: We're interested in the $1 sale as much as the $15,000 sale. We still want to sell the leader tape and splicing blocks just as much as the expensive equipment. This is important because there have been too many pro audio places in this country that have seen the big dollars on the wall. They've looked at these glorified $100,000 studio systems and have forgotten about the guy who has just started out in the recording business. They lose touch with the little guy and can't understand why he can't spend $10,000 as a minimum purchase.

Now you don't do this to be a nice and friendly company. What's the business philosophy behind it?

Luper: The little guy is a little guy today. Well, five years from now he might be a big guy. If you get him at the ground floor, you'll have him at the top.

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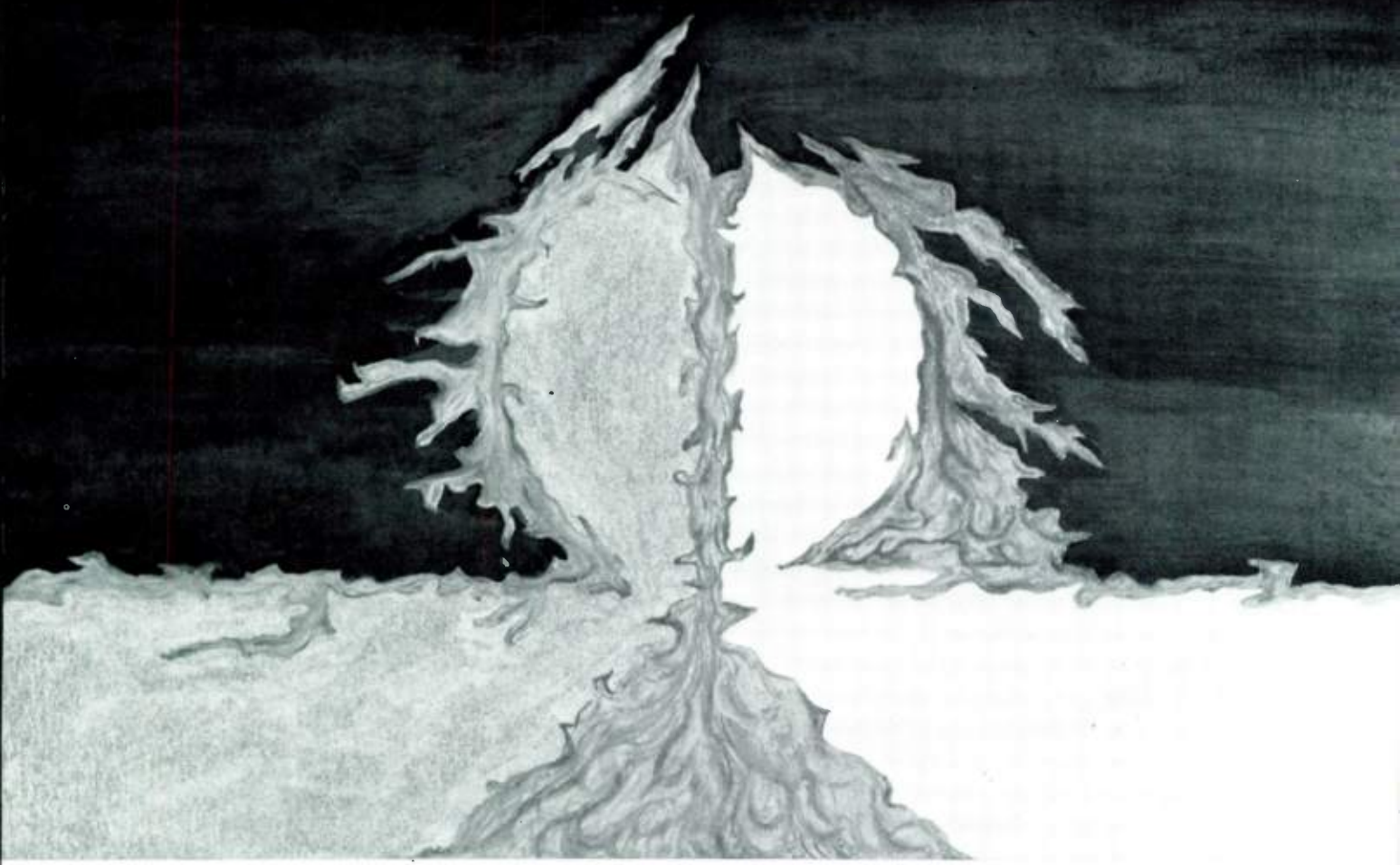

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Some people will argue that the odds are not in the little guy's favor, but all it takes is one or two and you've got some big accounts. That little guy might be the next RCA someday. Anyone who plays the odds is destined to fail. All of our customers get the same service.

How does your mall location affect your business?

Luper: It affects us to the extent that some people might get the idea that we're not 100 percent devoted to the pro audio business. Manufacturers have said that to us. I can see their point, but I think it's unfounded.

What is this company's greatest asset?

Luper: We've had the same experiences as our customers. We've been in their shoes. We know exactly what it takes to make a profit and to substantiate a purchase.

Another important item is the transformerless design which we have gotten completely behind. We have backed the transformerless console 100 percent. The feedback from our customers is that it's a transparent sound. It's a quiet sound. Transformers limit the dynamic range of an instrument or anything else and they also take away from the transients, which are lost within the iron of the transformer.

What are some of the future trends in pro audio?

Luper: The days of the $300,000 studio are over. You can't put that much money on the market and make money anymore. If you get down to that $100,000 to $150,000 price range, you can make money. When you're dealing with pro competition, industry is making a turnover every three years in equipment. When you're dealing with a three-year turnover, you have to substantiate the investment, even though you're going to sell it or a leasing company will latch on to it. With today's interest rates and the state of the economy, the expensive studio equipment is not going to make money. This is one of our innovations. We can put together a complete package that is competitive and cost-effective.

Your service department is quite impressive. Do you only repair the equipment that you sell?

Luper: Since we're involved in the pro scene, a lot of studios bring equipment in that we don't carry. We are now in the process of trying to latch onto schematics and other necessary things to maintain that equipment. If a piece of equipment breaks down and we can get the service manual, we have a tech man, Don Willitz, that is good enough to look at the manual and be able to dive into it.

How have you prepared your business to operate through the recession?

Luper: Some people in the industry have reduced their inventory drastically to the point where they don't have anything in stock. But the big thing about the pro audio business is that it is immune, to a certain extent, for the simple reason it's made up of items that a person makes his living with. If he has a tape recorder that breaks, he has to replace it regardless of the economy. To make it through the recession we have diversified ourselves into enough different areas of specialty so that when one area is down in sales, the other areas pick up the slack. If the recording industry is down, that doesn't necessarily mean the broadcast industry is down. There has never been a VHF television station in this country that has gone bankrupt. As long as the advertising sales are there, they have to have equipment that can compete with their competitors. Now that AM stereo has become a reality and audio has become extremely important to video, television and radio stations will be buying all of this new equipment. There isn't much more that video manufacturers can do to make the equipment better unless they go totally digital. Now they are trying to focus on stereo TV and get better quality speakers and receivers. Because TV is FM modulated you should get the same frequency response on a TV as you can on your FM receiver at home.

So if you diversify as we have, you can compensate for whatever happens. We've had some good months this year where we have questioned whether or not there is an economic problem.

What is the future of pro audio?

Luper: It's going to get bigger because of the importance that video is placing on audio. Video is a multi-billion-dollar-a-year business. The industry is going to get bigger as far as availability, but smaller as far as dealers are concerned. The reason is knowledge. The technical end of the audio industry is growing so fast that if you don't have a Master's degree in electrical engineering and go back for extra courses every year, it'll be impossible to compete. There are a lot of people dealing in pro audio who don't know what they're doing. That's the original reason we got into this. We're going to be ready for all

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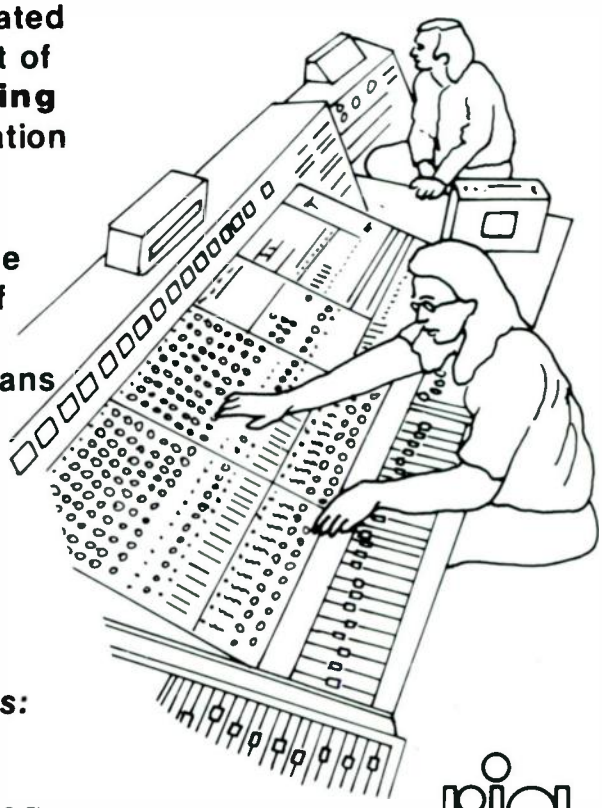

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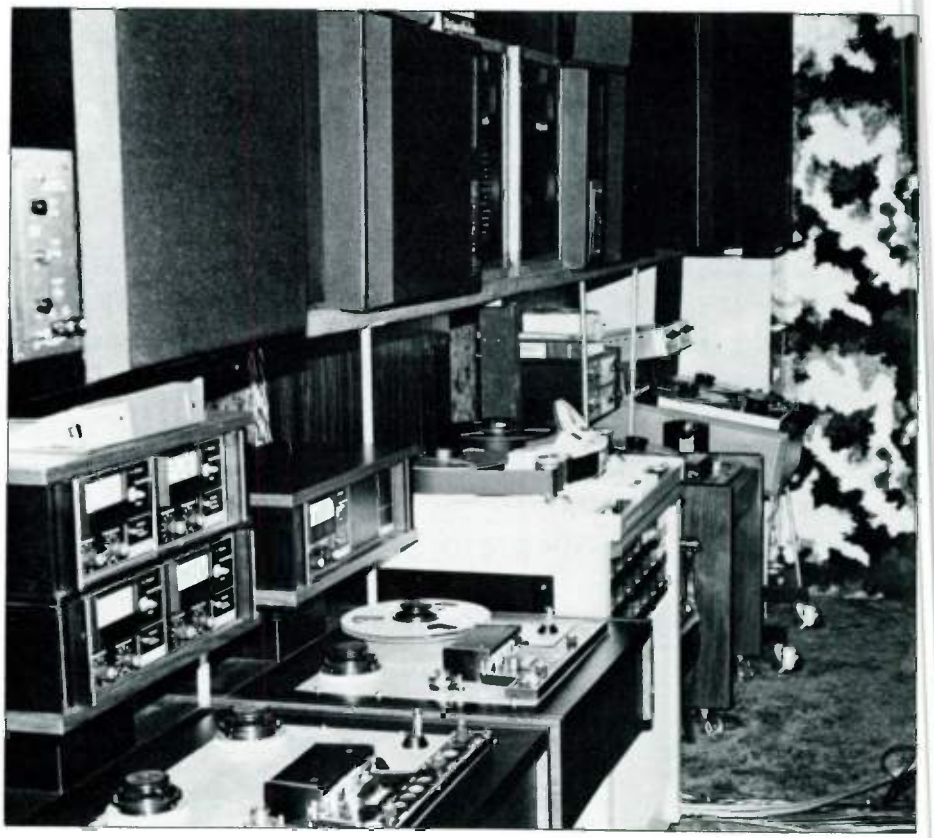
this new technology. We're attending the shows and seminars and keeping abreast of what's happening.

You sell and use test equipment. How do you use it?

Luper: We use it to solve problems for our pro audio customers. For example, a radio station said they were receiving a lot of complaints about their sound being too bassy on the air. The only way to find the problem is to do a real time analysis. With the Ivie equipment we can walk into a station and show them the problem right away. Then we consult with them on how to eliminate the problem, which is either to reconstruct the room or to sell them some type of equipment. So the Ivie is useful in selling products.



Most of your 25,000 square feet here is used by Flanner and Hafsoos. It appears that Flanner's Pro Audio doesn't need much room to operate.

Luper: I've seen a lot of pro audio places devote too much space to demonstration purposes. They'll have one of everything stacked on top of each other. In t_1 is business you're not dealing with that type of client. When someone goes into a store and sees a 10 × 10-foot rack with fifty-billion mixers on it, he gets scared. We have segregated our demonstration room into the first-time buyers side and another side that has very sophisticated equipment. We have a large selection of print media that we suggest a customer read to get familiar with the process.

All of our demo equipment is interfaced. Also, if a customer has impressed us as being serious about a piece of equipment, we'll put it in his facility and let him work with it for a few days. By putting the product in a person's hands, it's a lot easier to make a sale. It also shows the customer that you're interested in him. We have found that in most cases when we go to pick up the equipment, we pick up the check instead.

If someone uses the equipment for a few days and doesn't buy it—isn't that a lot of wear and tear on the equipment?

Luper: Well, we also rent equipment. If a customer needs some signal processing equipment for a one-time application, we'll rent it to him. That way we offset some of the cost of letting someone try that piece of equipment when it doesn't end in a sale. We turn demos over quickly, because a lot of times we give a demo to someone to try and he winds up buying that particular unit. So we then put a new unit on the floor. In the pro business, I think it's good to buy something that's been burned in, especially with mixing consoles. Any professional recorder isn't stable and trouble-free until you have 100 hours of time on it.

INDUSTRY UPDATE

Dimension Five Studios, Inc., has named **David Meyer** Philadelphia area General Manager. Meyer was formerly the Northeast Regional field rep for Bose Corporation's Professional Products Division.

Bertagni Electroacoustic Systems is returning to the U.S. high fidelity market after an eighteen-month absence. BES will be building an entirely new U.S. sales organization, according to **Lynn D. Morrison**, BES' new president.

Jerry Calabrese has been promoted to Sales Manager/VCR of the Magnavox Consumer Electronics Company. Formerly, Calabrese served as Magnavox regional sales manager in the Philadelphia area. The company has also announced the promotion of **Edward Grumbeck** to Sales Manager for the Dallas Division. He will be replacing **Whitson Smith**, who has been appointed Magnavox's division General Manager for Dallas.

Jeff Chateau has been promoted to Director of Purchasing at James B. Lansing Sound, Inc., Chateau has been with JBL for eleven years, most recently as department manager. **Rita Weitzen** has been promoted to Communications Manager at the Company. Weitzen has served as production coordinator and supervisor in the communications department for three years. Before joining JBL, Weitzen held positions as account executive for the Communicorp Advertising Agency, and advertising manager for Postal Instant Press, Inc. The professional division of JBL has added three firms to their marketing organization: Marketration, Maryland; RM Associates Ltd., St. Louis; and Richard Dean and Associates, Inc., of Massachusetts. **Melody Bell** has joined JBL as factory rep for their Southern California Audio Team, where she will be representing the consumer product line in Southern California, Southern Nevada, and Arizona. She most recently served as Product Administration Supervisor at JBL.

Jerry Hutchinson, George Buck, Charles Duncan, and **Bill Denny** have purchased the GRT tape duplicating plant in Nashville and have formed National Tape Corporation, specializing in the duplication of audio cassette and eight-track tapes. Hutchinson has been appointed President; Buck, Vice President; Duncan National Tape Secretary; and Denny, Treasurer.

"Music is for everyone" is the theme of the second series of public service announcements produced by the American Music Conference, released to almost 7,000 U.S. radio stations. The spots, recorded by such celebrities as Stevie Nicks, Chet Atkins, and Chick Corea encourage support of school music programs. The third series, planned for release next spring, will feature both amateur and professional musicians.

James Egan, Vice President of Magnavox, has assumed, on an interim basis, the responsibilities of Senior Vice President, Sales and Marketing. Kenneth L. Ingram resigned from the post on September 30. **John W. Markland,** Manager of Trade Shows for Magnavox, has retired after 44 years with the company, the longest continuous service record in Magnavox history. **Ronald R. Belli** has been named Vice President Sales and Marketing, audio division.

DeltaLab Research, Inc. has bestowed its first "regional dealer award" to **Arnoldt Williams Music,** Michigan for their "support and outstanding sales achievement."

RTR Industries has named **Edward B. Duggan** to the newly created position of Chief Executive Officer. Joe Alinsky, formerly National Marketing Manager at RTR, has left the company.

Timothy Huber has joined the staff of Bose Corporation as Director of Corporate Marketing. Huber was previously director of sales and marketing for Nixdorf Computer.

Joe R. Williams has been appointed Sales and Marketing Manager of the new 3M Home Entertainment Products Department. Williams formerly was national sales manager, retail markets, for the 3M Magnetic Audio/Video Products Division.

Tricia A. Tunney has been appointed Executive Vice President of the Mike Shop in Elmont, New York.

Glen E. Meyer has joined the marketing team at Ivie Electronics in Orem, Utah. Meyer previously worked at Electro-Voice, Inc., as Marketing Manager of Commercial Products.

Studer Revox America has formally opened its new 15,000 foot facility at 1425 Elm Hill Pike, Nashville, Tennessee 37210.

The Filmways Audio Group has appointed **Linda Feldman** to handle marketing for their group. Feldman, formerly a communications journalist and marketing consultant, will be based in the Hollywood office.

Jim Williams has been promoted to Assistant General Manager of Cetec Gauss. Before joining the company, Williams was manager of quality assurance at RCA Records, Indianapolis.

A new program to promote individual and class private music instruction was endorsed by the American Music Conference board of directors at the October 8 meetiing in Chicago. New AMC board members introduced at the meeting were: **Thomas Beckmen,** President, RolandCorp US; **Zeb Billings,** President, Sight & Sound International; Daniel J. Henkin, President, C.G. Conn, Ltd.; **Richard Knaub,** President, Rico Corporation; **Arnold Rosen,** General Manager, SSE Division, Warner Brothers Publications; **David Sutton,** Vice President, Norlin Music Company; **James Taity,** President, William Lewis & Son; and **John Walters,** President, Shattinger Music Company.

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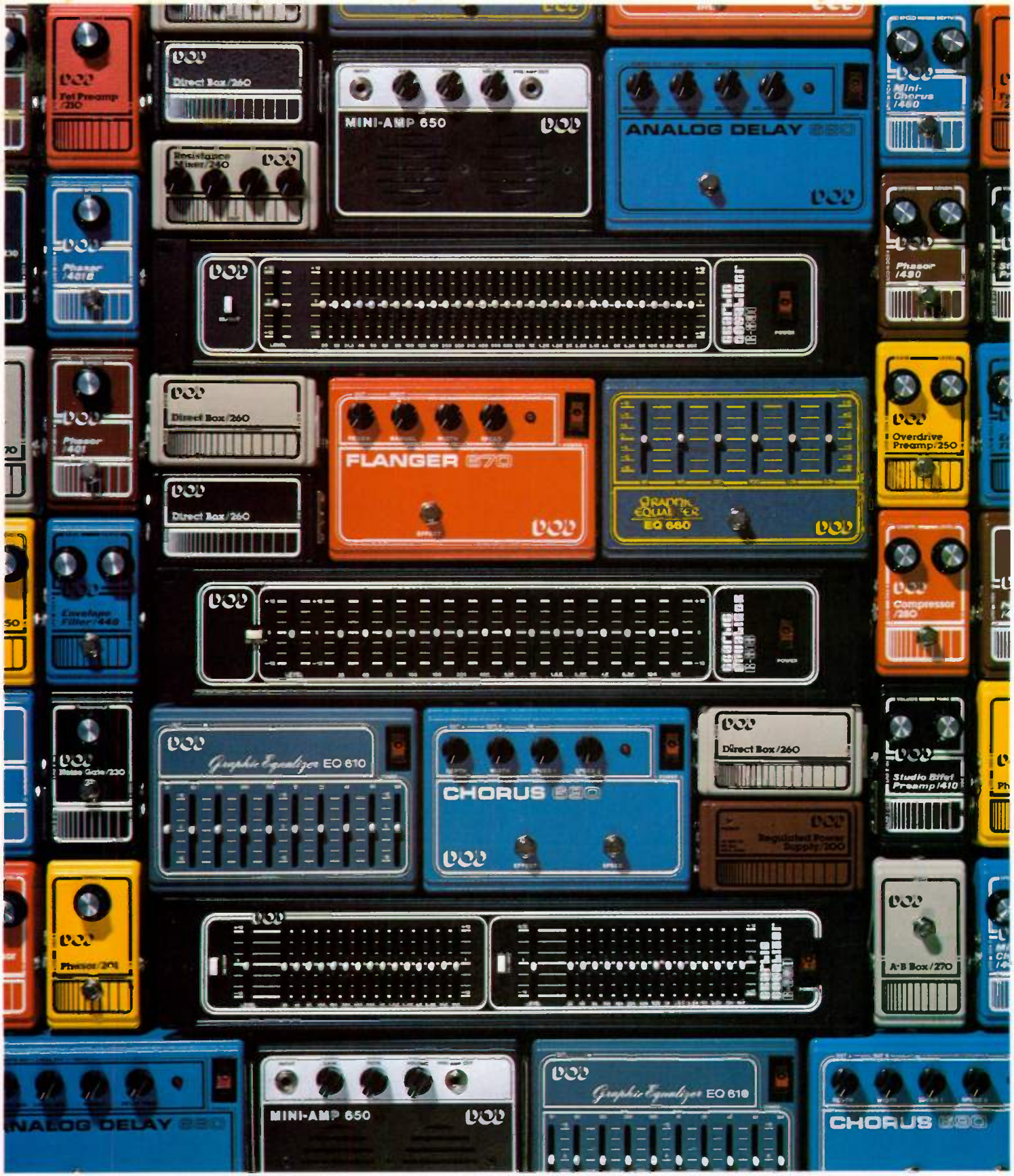

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