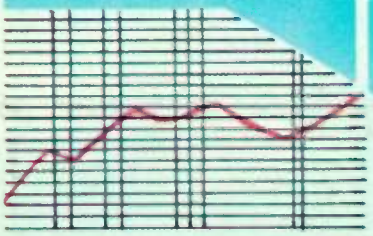
SERVING THE CREATIVE AUDIO AND MUSIC ELECTRONICS INDUSTRY

SOUND ARTS

MERCHANDISING JOURNAL

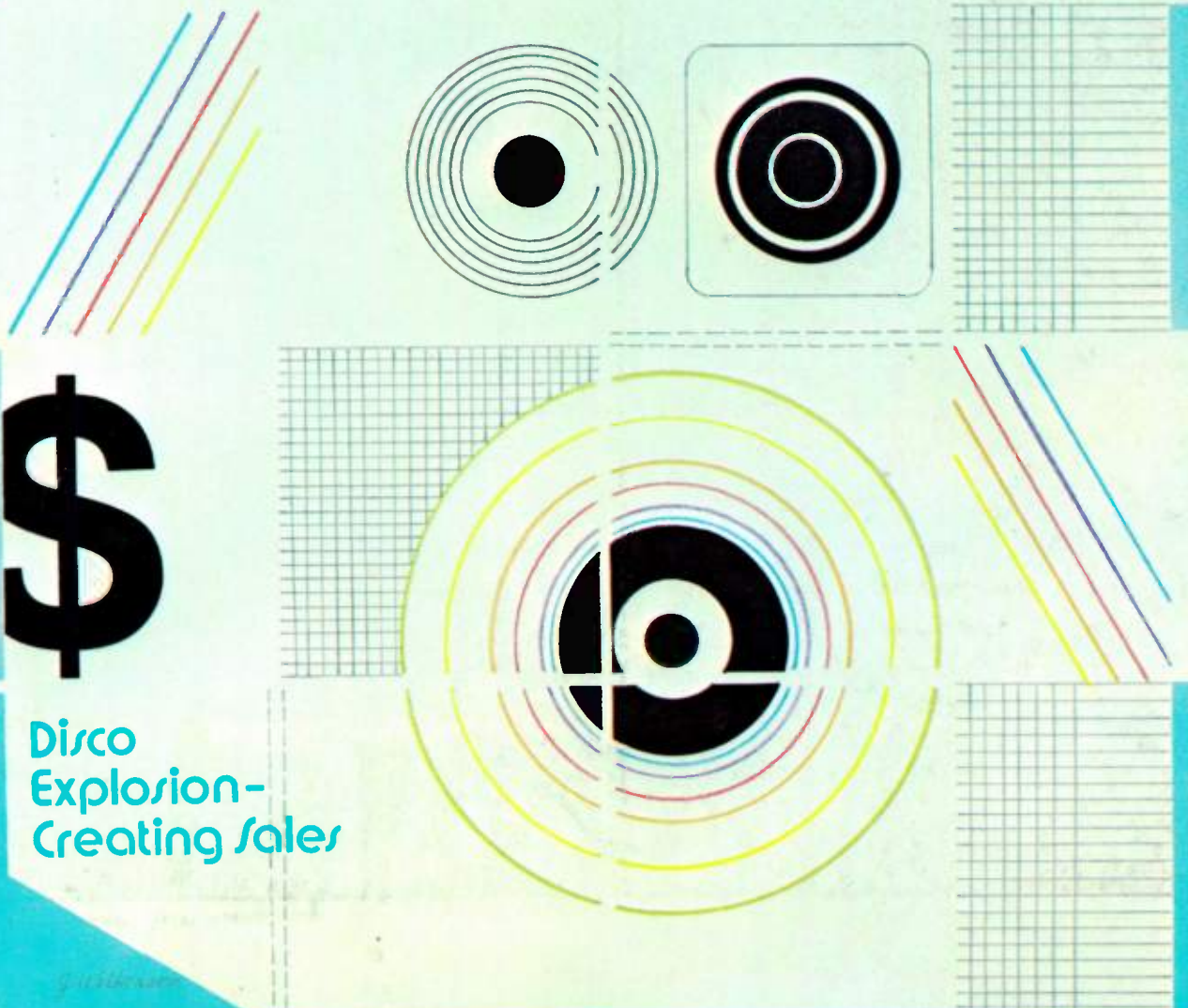
VOL.1 NO. 11
DECEMBER 1978

Selling Studio Monitors



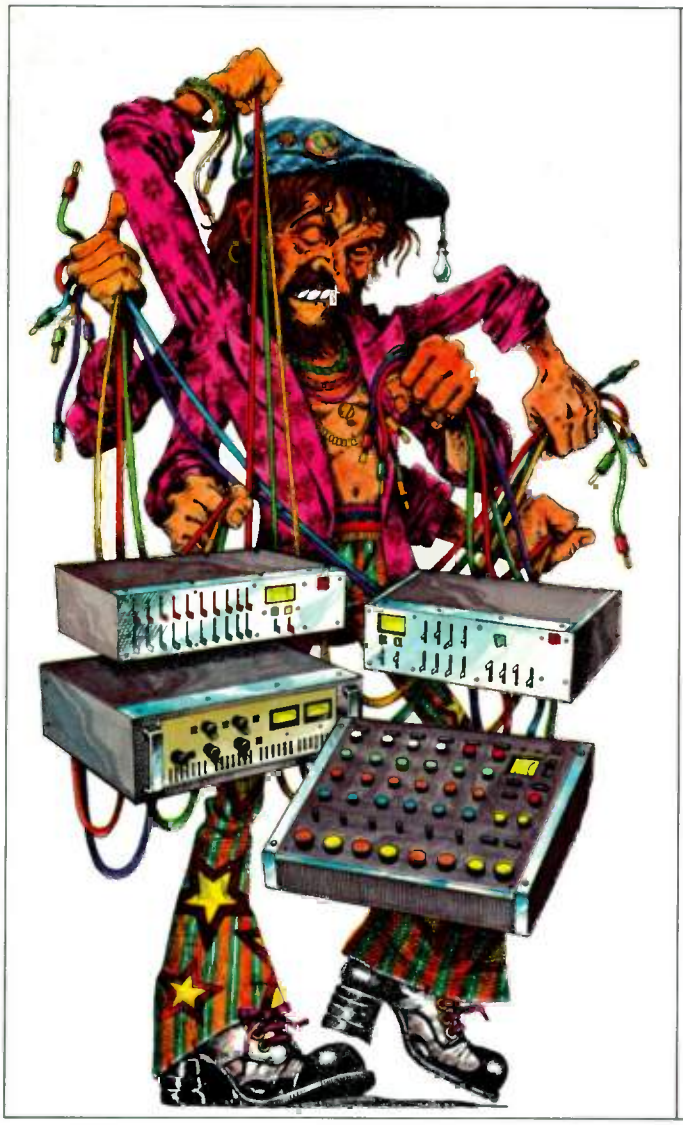
Consumer Problem-
The Loud in Loudspeaker

The Service Department-
Part 2



Disco
Explosion-
Creating Sales

THE LONG AND THE SHORT OF SOUND REINFORCEMENT.



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The bar or cafe owner can attract lots of new business by simply adding a pair of GLI Dwarfs to an existing audio system. These outstanding compact loudspeakers are extraordinarily efficient. Their sound is so impressive that your first-time buyer will undoubtedly become a permanent big sound customer.

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

CIRCLE 92 ON READER SERVICE CARD

VOL. 1 NO. 11

SERVING THE CREATIVE AUDIO AND MUSIC ELECTRONICS INDUSTRY

SOUND ARTS

MERCHANDISING JOURNAL

DEC. 1978

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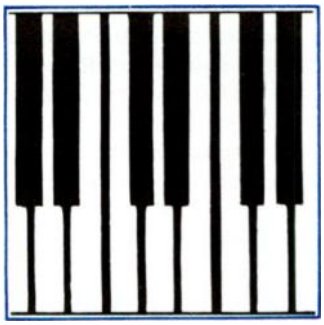

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Cover Art by Jill Wilkerson

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A LETTER FROM THE EDITOR

Don't try to check out Disco Balalaika. As our wire services reported it, the Tass reporter for Moscow's Literary Gazette didn't quite approve of the decadent capitalistic milieu of our disco scene. Well, socialist realism never was much fun. But, interestingly enough, Genrikh Borovik, that selfsame reporter, found room to praise the disco audio system (specifically that of Studio 54). "First class," said our man in Moscow per our man at the A.P. Art of course crosses ideological lines, and so it seems does audio appreciation.

Gary Margolis of JBL recently completed a tour of Eastern Europe where he found a "rabid audiophile" population in Moscow, despite a scarcity of equipment. There is a Russian compression driver and some imported professional equipment, but the retail business is government run and there is not much available to the public. So with scarcity and official condemnation, forget about the Volga Boatman Hustle.

Meanwhile, back at home, disco hustles on free from ideological constraints, and Stuart Rock, in this issue of SOUND ARTS, points out some aids to getting a share of that market — one that is far from a fad, according to Stuart.

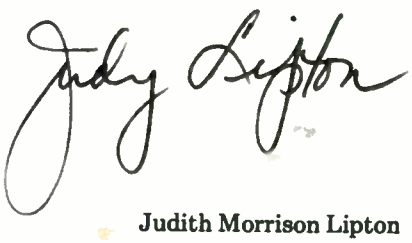
Relatively non-faddist and certainly a staple is the studio monitor, without which recording becomes a non-feedback enterprise carried to absurdity. The question of definition of the monitor and who records best with what is a subject devoutly discussed. While we are not, right now, going to get into definitive statements on discrimination among monitors, we do solicit readers' opinions on how they sell what for the monitoring of studio sounds. What variety of monitors do you advise? How many? What are the biases of your customers and how do you deal with them?

In this very issue of SOUND ARTS you will find Tim Rooney's view of the selling scene of studio monitors, with appropriate attention paid to merchandising. Ralph Morris continues his series on Solving the Customer's Sound Problems—this month concentrating on loudspeakers. And John Gatts continues his story on the retailer's service department, now focusing on layout and equipment.

The Audio Engineering Society Convention in early November was filled, as is its wont, with heady theory and product derived from that theory to give us a taste of what's down the pike (sometimes very far down) in the way of product. Mike Beigel reports in our next issue on what was seen at that show in the way of new technology.

It all adds up to better sound — disco, studio, live and well, admirable aims even Back in the U.S.S.R.

Regards,



Judith Morrison Lipton

HUSH MONEY.

In the not-so-distant past, when the topic of tape noise reduction came up, the small studio operator thought of his bank account, wiped a tear from his eye, and murmured, "Someday..."

Well, cheer up—dbx has some good news for you. It's called the RM-155, and it gives you eight tracks of dbx professional tape noise reduction for about $1100.*

Here's what you get for your hard-earned money: 2 dbx Model 155s in a 3¾" rack-mount package. That means 30 dB of tape noise reduction, so you can bounce tracks to your heart's content. Plus 10 dB of headroom improvement, so you can get the most out of your equipment. Each channel is switchable to record, play or bypass and is contained on a user-changeable modular circuit board.

The RM-155 is a breeze to install and operate. It interfaces with phono plugs. No pilot tones or critical level match adjustments are necessary. It is fully compatible with all dbx professional tape noise reduction so you can play your tapes in a state-of-the-art studio. And as you expand your facility, dbx grows with you—easily and inexpensively.

So why make demos when you can make master-quality tapes? Why try to sell your rough ideas when you can wow them with finished product?

If you own a small studio, or you're planning to build one, remember: dbx tape noise reduction is a necessity, not an accessory.

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

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The RM-155. 8 tracks of professional noise reduction for about $1100.*

FORUM

The May, 1978 issue of SOUND ARTS (Vol. 1 No. 4, pages 34 to 38) contains an article entitled Cables and Connectors by Michael and Bonnie Laiacona. On page 38 of that article is a picture showing different types of connectors. Could you supply me with the name and address of a dealer or a supplier that handles the twist lock heavy duty industrial speaker connectors? I need big connectors that will handle 12 and 14 gauge speaker wire. Also, I need a dual banana plug that will fit a Peavey CS 800 amplifier binding post and which will handle 12 and 14 gauge wire. Enclosed is a drawing of my proposed speaker wire hook-up. Thank you.

Larry G. Hettsley
Larry's P.A. Rental
Herrin, Illinois

Bob Morasse of Whirlwind Music replies: We have two dealers in your area who will be able to supply the connectors you require. Give either a call, and they can order these items for you. The dealers are: Golden Frets, Carbondale, Illinois and Martin Sound Service, DuQuoin, Illinois.

I first ran into your publication at the 1978 C.E.S., and after reading your magazine, I was glad that I'd signed up for a subscription. I'd also be delighted to receive any back issues you have. I'm not sure how common our situation is, but I and two of my co-workers are musicians. I'm bringing this point up because I feel that your magazine is one of a very few that relates to both worlds. Thank you for such a fine magazine!

Michael Maloney
Fort Wayne Electronics
Fort Wayne, Indiana

In response to the article on running a repair station, Vol. 1 No. 9, p. 40:

I feel obligated to voice my feelings about the article, particuarly since I was in the interview. I am that part-time technician who puts out approximately 80 percent of the repairs at Nolde's Music Box. Clearly this dealer's view is one of cutting costs, but the printed word tends to become truth if it is left unaltered. Here is the other side of the coin.

Out of all the occupations and professions that exist today in the music business, there is emerging something I call the "musical electronics technician." He, or she, works very closely with music dealers, musicians, manufacturers, and production companies. We are concerned here with the dealer. Mr. Beigel's interview-article pointed out the various ways that technical skills are acquired, for there is no formal training. Dominant in most technicians is the music background.

So far so good; we have someone providing a very important service, much like a plumber or a doctor. How much should such a person earn? Here is where points-of-view diverge. At the time of the interview, Mr. Nolde took the bottom price approach, and understandably so, since his service department has been an expense and a necessary distraction from sales. By asking around, he found a figure, 15K, as a salary. Where does that leave someone who possesses the experience and ability to bridge the gap between science and art, and feels he is worth more?

Part of the answer can be found in the economy of the technician-dealer relationship. After-sales profits have been seen by both the manufacturer and the dealer; the buck stops at the technician. I think it would be embarrassing to the manufacturers if I listed what labor reimbursements are. In an effort to recover some of the deficits created by warranty service, the bench rate goes up on nonwarranty items and the customer winds up paying for some of it. Its a vicious circle, providing a scaled down model of our national economy—inflation and a scenario for the classic labor versus management confrontation.

One solution for this situation is to run the service department like a business. Admittedly both Nolde and Siebel did not know how much time was spent on the bench on warranty service and on paperwork, but I do because I keep records, and we are in the process now of monitoring our time and income. It makes sense and gives us something with which to make decisions.

A look at warranty programs is in order. I don't feel they are realistic, particularly in regard to some products that are susceptible to catastrophic failures, as in DC coupled amplifiers. This is assuming, of course, that the product itself has been improved to the maximum for reliability.

I guess what I am trying to say is that in a young industry where roles are not clearly defined, coupled with growing pains of a "medium size" dealership, what one can earn should not be limited, but rather should reflect the capabilities of not only technical skills but administrative and analytical ones as well. Too many times it is easy to call the shop technician the "service manager," but how many actually manage? I look at being a "musical electronic technician" as a professional bridging the gap between art, science and business.

Richard Chorné
Nolde's Music Box
Flemington, New Jersey

I have started to receive my subscription to SOUND ARTS, and am very pleased to see a publication such as yours finally available to the industry. My subscription started with issue number 9. I feel the reference value of this magazine is also worth a great deal. Therefore, I am asking you to send me the first eight issues, if possible. Thank you for your cooperation, and keep up the fine work!

Respectfully,
H. Cohen
Magnacoustics Sound Corp.
Monticello, New York

TEAR HERE

TERMS:

A CONTINUING INDUSTRY GLOSSARY

RECORDING

By Larry Blakely

Cue Send: This control adjusts the amount of signal from a particular console input position that is sent to the headphones (normally used in the studio when overdubbing). On most all recording consoles with this cue send feature, there will be a cue send control on each input position.

Output Selector Switches (Buss Selector Switches): Will assign any input position to a given console output buss that would be connected to a given channel on a tape recorder. For example: If you had a 4-output buss console, buss 1 would be connected to track one of the tape recorder, buss two would be connected to track two of the tape recorder, buss three to track three, and buss four to track four. This selector switch method makes it easy to assign any input position to any track on the tape recorder. Additionally, two or more input positions can be assigned to the same buss and be combined together and be recorded on one tape recorder track.

Straight Line Fader: A pot or control that works in a straight line fashion. There is a knob that travels in a slot with markings (usually in dB) on one or both sides of the slot. This may also be called a straight line pot or straight line control.

Rotary Fader: This pot or control works in a rotary fashion, typically a 320 degree travel from stop to stop. A straight line pot (fader) cannot be considered technically superior to a rotary pot (fader) simply because of its configuration. The items that make any pot (fader) superior or inferior is the quality of the resistive element, wiper, mechanical assembly and feel. Depending upon the quality of the above listed items, certain rotary pots (faders) are superior to certain straight line pots (faders) and vice-versa. It is how the pot is made and what is inside that makes the difference in quality and not whether it is of rotary or straight line action.

ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES

By Mike Beigel

Synthesizer Terms (Continued):

Percussion Synthesizer: A synthesizer designed to be played as a percussion instrument, and to extend the range of sounds available to the drummer or percussionist. With actuators resembling drum heads or foam pads, and controls similar to many conventional synthesizers, the percussion synthesizer allows for "melodic" percussion effects, ring-modulated "gong" sounds, and many noise-based drum and cymbal simulations. Some units also feature a sequencer.

"Guitar" Synthesizer: A number of different methods are used to interface a guitar with a synthesizer, with varying degrees of complexity and versatility. Both single-voice and polyphonic versions exist. The most versatile interface method is a special six-string pickup, with circuitry that analyzes the guitar signal and sends control voltages to a single-voiced synthesizer. Another method uses a "wired up" guitar in which the frets are sensors for the interface. Most available models involve some compromises in the guitarist's playing technique.

Wind Instrument Synthesizers: Interface devices based on wind instrument controllers exist, either as control devices or as complete synthesis systems. One controller is based on the Bohm system saxophone or flute mechanisms, and includes a woodwind mouthpiece which senses wind pressure and lip pressure independently. Another system is based on trumpet fingering, and has a wind pressure sensor and a special octave controller. Both devices are purely electronic, and must be used with appropriate synthesis equipment.

Instrument-Controlled Synthesizer: A device which transforms any musical signal (usually single-voiced) into synthesizer pitch and envelope control voltages. At present, no devices of this type are on the market, but an instrument-controlled synthesizer can be

SOUND REINFORCEMENT

By Glen E. Meyer

Reverberation: Reverberation is the persistence of sound within an enclosure, such as a room, after the original sound has ceased. Reverberation may also be considered as a series of multiple echoes, decreasing in intensity, so closely spaced in time as to merge into a single continuous sound and eventually be completely absorbed by the room itself. Outdoors is considered to be a "non" reverberant environment.

Reverberation Time: The time required for a sound in a room to decrease 60 dB. Also known as RT_{60}, it may be calculated by using the following formula:

$$RT_{60} = 0.049\ V / S\bar{a}$$

Where: RT_{60} is reverberation time in seconds
V is the volume of the room in cubic feet
S is the total surface area in square feet
$\bar{a}$ is the average absorption coefficient of the enclosure

Echo: An echo is the repetition of a sound caused by reflection from a surface. The reflected sound must have a delay of at least 1/20th of a second behind the original sound to be an echo.

Anechoic: Having negligible echoes.

Anechoic Chamber: A room in which the reflected sound is negligible. It is used to measure the characteristic of microphones, loudspeakers, horns and drivers.

Level Variations with Distance, Non-Reverberant Environments: In a non-reverberant environment, such as outdoors or in an anechoic chamber, sound pressure level will be cut in half (drop 6 dB) every time the distance from the speaker is doubled (inverse square law). A handy formula to use is:

Change in dB = 20 log (distance from speaker divided by reference distance)

TERMS: (CONTINUED)

A CONTINUING INDUSTRY GLOSSARY

RECORDING

Input Position: A strip or area relating to a single input on a recording console. This position or area is comprised of all available functions for any given input. Generally, these are the input fader, cue send, echo send, equalizer, input pad, mike pre gain trim, solo button, pan pot, and output selection switches.

Input Fader: Sometimes referred to as position fader, position slider, input pot, input level control. The most proper and common terminology is *input fader* or *position fader*. This is the control or pot that controls the amount of signal level on an input position of a console.

Equalizers: A common tool in a recording console. An equalizer is simply a sophisticated tone control for altering the spectral (or frequency) balance. Typically, different portions of the audible frequency spectrum can be selected and the level of signals at that frequency (and those near to it) can be increased or decreased in level at the option of the operator. There are different basic types of equalizers, different types of features, and yet another variety of terms.

Fixed Frequency Equalizers: Will operate in only one fixed frequency range. A common treble control on most hi-fi amplifiers is a fixed frequency equalizer. Most equalizers of this type will increase or decrease the level of all frequencies in the 10 kHz to 20 kHz frequency range.

Selectable Frequency Equalizers: Will provide the flexibility of selecting different frequency fixed ranges which can then be increased or decreased in level.

Frequency Select Knob or Control: The control utilized to select the different frequency ranges for the equalizer.

Boost: The term used for increasing the level of an equalizer. When a portion of the frequency spectrum has been *increased* in level with an equalizer, it has been boosted.

Equalize: Also sometimes used as a term meaning the same thing as boost.

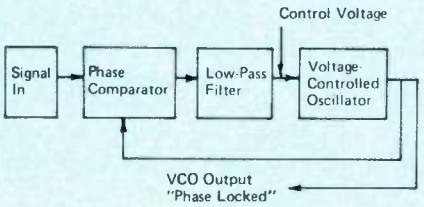
ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES

constructed using a pitch-to-voltage converter and an envelope sensing system. A product of this type, complete with synthesis hardware, is presently being developed for marketing.

Pitch-to-Voltage Converter: For a musical input consisting of a single "voice," a pitch-to-voltage converter senses the fundamental frequency of the signal and puts out a voltage proportional to this frequency. Usually this will be an exponential voltage suitable for directly controlling a synthesizer oscillator or filter. Also called *frequency-to-voltage converter.*

Frequency Shifter: An uncommon device used in some synthesis systems, the frequency shifter moves the whole harmonic spectrum of the input signal either up or down in frequency, while preserving the original spacing in the input signal's frequency components. In addition to shifting the perceived "pitch" of the original signal, this device produces strange tone colorings, since the signal's shifted overtone series usually becomes non-harmonic.

Phase-Locked Loop: A sophisticated method for synchronizing an oscillator to another oscillator. The phase-locked loop employs a voltage controlled oscillator, low-pass filter and "phase-comparator" in a closed feedback system.



The feedback system operates to minimize the "phase difference" between the input signal and the voltage controlled oscillator signal, providing a control voltage to adjust the VCO to the exact frequency (or a harmonic multiple) of the input signal. Phase-locked loops can also function as frequency-to-voltage convertors.

SOUND REINFORCEMENT

Examples:

(1) A speaker will produce a sound pressure level of 100 dB at four feet. The sound pressure level at 8 feet would therefore be 100 dB minus 6 dB or 94 dB.

(2) The SPL at 80 feet could be calculated as follows:

Change in dB = 20 log (60 divided by 4) or 23.5 dB.
100 dB − 23.5 dB = 76.5 dB

Level Variations with Power: Each time the power delivered to the speaker is halved, a level drop of 3 dB occurs in any type of environment. Each time the power is doubled, a level increase of 3 dB occurs. A handy formula to use is:

Change in dB (power) = 10 log (new power divided by reference or old power)

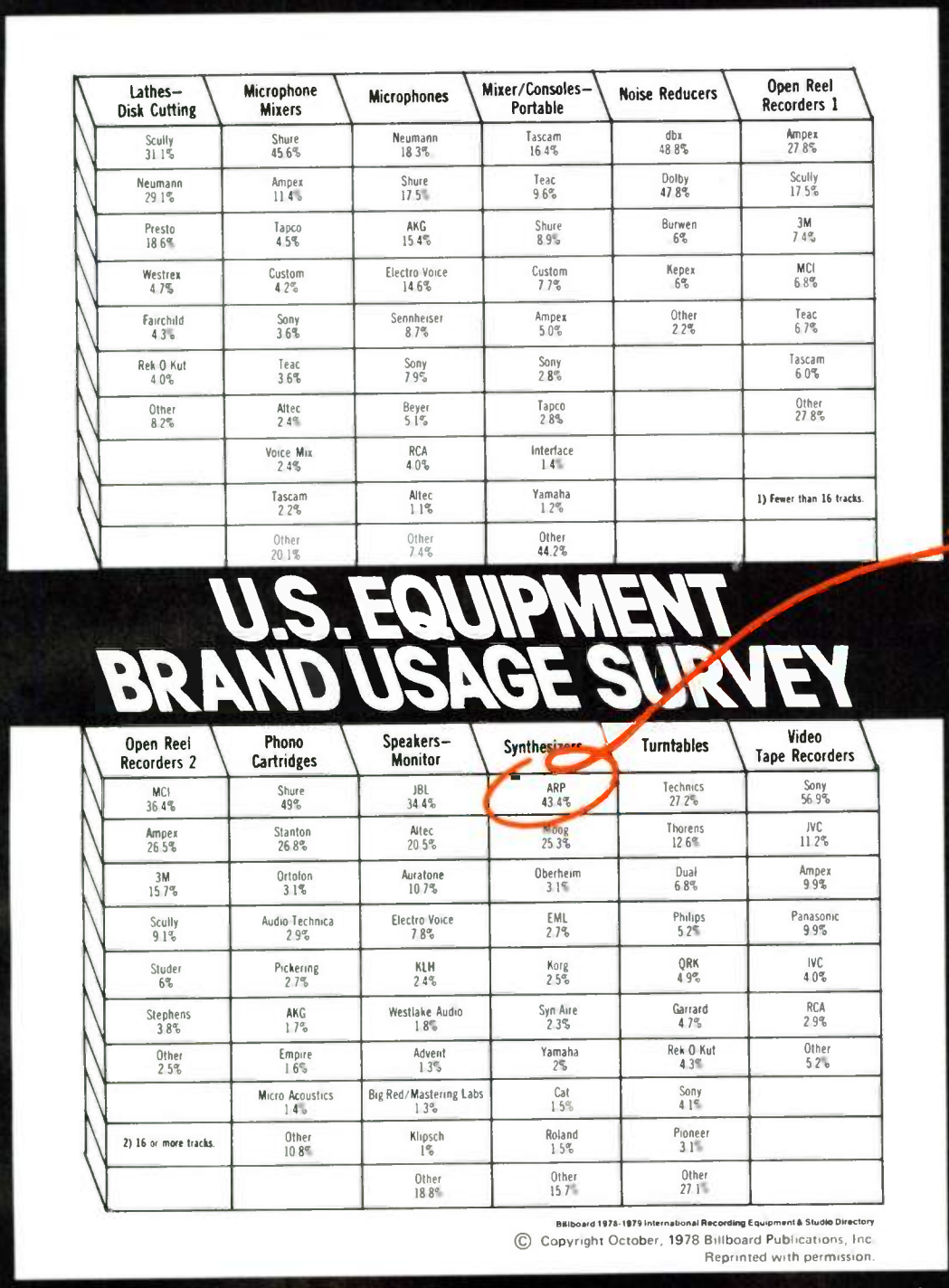
Examples:

(1) A speaker will produce 100 dB with 50 watts of power. The SPL would be reduced by 3 dB or would be 97 dB if the power going to the speaker were reduced to 25 watts.

(2) A speaker produces 95 dB with 1 watt. If one were to put 50 watts into the speaker, the output, according to our formula, would be increased 10 log (50 ÷ 1) or 17 dB. 95 dB + 17 dB = 112 dB.

EIA Sensitivity: EIA sensitivity, as generally used in speaker specifications, is the SPL produced by that speaker at a distance of 30 feet with one milliwatt of power going into the speaker measured in an anechoic environment. Instead of using this rating, it is becoming popular to rate the speakers using one watt at 1 meter, 4 feet, or 10 feet. Any of the ratings may be easily calculated using the previously given formulas if only one of the ratings are known. One has to be very careful that similar ratings are used when one is comparing speaker parameters.

Hot sound vs. hot air.



Lathes–Disk Cutting	Microphone Mixers	Microphones	Mixer/Consoles–Portable	Noise Reducers	Open Reel Recorders 1
Scully 31.1%	Shure 45.6%	Neumann 18.3%	Tascam 16.4%	dbx 48.8%	Ampex 27.8%
Neumann 29.1%	Ampex 11.4%	Shure 17.5%	Teac 9.6%	Dolby 47.8%	Scully 17.5%
Presto 18.6%	Tapco 4.5%	AKG 15.4%	Shure 8.9%	Burwen 6%	3M 7.4%
Westrex 4.7%	Custom 4.2%	Electro Voice 14.6%	Custom 7.7%	Kepex 6%	MCI 6.8%
Fairchild 4.3%	Sony 3.6%	Sennheiser 8.7%	Ampex 5.0%	Other 2.2%	Teac 6.7%
Rek-O-Kut 4.0%	Teac 3.6%	Sony 7.9%	Sony 2.8%		Tascam 6.0%
Other 8.2%	Altec 2.4%	Beyer 5.1%	Tapco 2.8%		Other 27.8%
	Voice Mix 2.4%	RCA 4.0%	Interface 1.4%		
	Tascam 2.2%	Altec 1.1%	Yamaha 1.2%		1) Fewer than 16 tracks.
	Other 20.1%	Other 7.4%	Other 44.2%		

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U.S. EQUIPMENT BRAND USAGE SURVEY

Open Reel Recorders 2	Phono Cartridges	Speakers–Monitor	Synthesizers	Turntables	Video Tape Recorders
MCI 36.4%	Shure 49%	JBL 34.4%	ARP 43.4%	Technics 27.2%	Sony 56.9%
Ampex 26.5%	Stanton 26.8%	Altec 20.5%	Moog 25.3%	Thorens 12.6%	JVC 11.2%
3M 15.7%	Ortofon 3.1%	Auratone 10.7%	Oberheim 3.1%	Dual 6.8%	Ampex 9.9%
Scully 9.1%	Audio Technica 2.9%	Electro Voice 7.8%	EML 2.7%	Philips 5.2%	Panasonic 9.9%
Studer 6%	Pickering 2.7%	KLH 2.4%	Korg 2.5%	QRK 4.9%	JVC 4.0%
Stephens 3.8%	AKG 1.7%	Westlake Audio 1.8%	Syn-Aire 2.3%	Garrard 4.7%	RCA 2.9%
Other 2.5%	Empire 1.6%	Advent 1.3%	Yamaha 2%	Rek-O-Kut 4.3%	Other 5.2%
	Micro Acoustics 1.4%	Big Red/Mastering Labs 1.3%	Cat 1.5%	Sony 4.1%	
2) 16 or more tracks.	Other 10.8%	Klipsch 1%	Roland 1.5%	Pioneer 3.1%	
		Other 18.8%	Other 15.7%	Other 27.1%	

Billboard 1978-1979 International Recording Equipment & Studio Directory

Recording studios choose a synthesizer because it has the best sound, not the lowest price. And in *Billboard's International Recording Equipment and Studio Directory 1978-79*, their choice is clear. If you want great sound, the choice is ARP.

ARP

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CIRCLE 89 ON READER SERVICE CARD

TROUBLESHOOTERS' BULLETIN

MISUSE OF CROSSOVER LEVEL CONTROLS

(1)

Your customer has just purchased an electronic crossover with a variable frequency control and separate level controls. He returns and contends that he can't get the sound he wants from the crossover.

The two-way electronic crossover is designed to electrically divide the full range signal and assign the low end signal to the low end power amplifier and bass speaker and assign the high end signal to the high end amplifier and the horn and/or tweeter bank. The individual level controls for the high and low frequencies are provided to adjust for the inherent differences in efficiency that may exist between the bass bin and the midrange horn-driver assembly. Some users may mistake them for tone controls or utilize them to suppress acoustical feedback. Such use may negate the very reason for utilizing a multiple amplifier system with electronic crossovers. That is, to achieve more acoustical output, with less distortion.

(2)

(3)

Once the proper balance is achieved between the bass bin and the horn-driver assembly, acoustical feedback and tonal character should be achieved by means of a quality graphic or parametric equalizer.

CONRAD SUNDHOLM
BIAMP SYSTEMS

BEFORE YOUR CUSTOMERS LEAVE WITH THEIR NEW LOUDSPEAKERS, REMIND THEM:

1. Always use a power amplifier with protection (electronic) against DC voltage at the outputs. Dead output transistors can plop the full ± Big Volts DC power supply voltage through your woofer (or tweeter) voice coil. Typically ±70 v for a 200 watt per channel, the power supply can deliver a lot of current,

and it can do it fast. A fuse (fastblo) takes half a second to quit, yet a speaker is designed to respond to transients of one millisecond, or less. Which means you can be wearing your voice coil before a fuse blows.

2. Do not run power amplifiers into clipping, as this will reduce both amplifier and speaker life expectancy. A steep wavefront,

such as that of a "clipped," square wave, has an effect similar to that of hitting the speaker cone with a hammer. Also, high frequency "spikes," common with clipped waves, destroy high frequency drivers.

BARRY McKINNON
ACOUSTEC SOUND PRODUCTS
CALGARY, ALBERTA

What does "hex fuzz" mean?

The term "hex fuzz" was introduced with the coming of guitar synthesis and is important to understand. The hexaphonic pickups which are used for guitar synthesizers are unique in that they respond to each of the six strings in an isolated fashion; there is no cross-talk amongst the six poles on the hex pickup. Therefore, when you play in the distortion mode, you get a "clean fuzz" with no intermodulation distortion and this enables you to play *any* chord [G#7#9] or whatever) without losing the harmonic texture of the chord. For a comparison, try voicing a big juicy jazz chord through your standard fuzz box: the result is a disaster. So "hex fuzz" is a big point in a guitar synthesizer's favor, and although it is one of the more basic sounds available on these units, it is without question one of the most popular. I have seen the response to "hex fuzz" on customers' faces—they love the sound of it.

Charlie Lawing
Strings and Things
Memphis, TN

How do the common connectors differ and what makes each most suitable to particular applications?

One of the most common connectors, usually found on guitar and organ amplifiers, is the standard phone plug (see figure 1). It is simple to use: It is pushed or pulled to make or break the circuit, and it is large enough (about ¼" diameter and 1¼" long) to be handled easily, and to carry a fair amount of power. The phone plug is easy to connect to the cable; usually there are two solder lugs; and it is relatively inexpensive.

Two other connectors, the miniature phone plug and subminiature phone plug, have the same basic design, but they are much smaller. These have about 1/8" and 1/16" diameters. Both have the advantages of the same simple operation—push or pull, and require much less space than the standard phone plug. However, being smaller, the solder lugs are smaller and these plugs can be easily broken.

The phono plug (see figure 2) is designed for use with coaxial cables, since it maintains the shielding, even where the plug and jack contact each other. Maintaining the shielding keeps the connector from defeating the purpose of using coaxial cable in the first place: for reduction or elimination of hum and noise pickup. These connectors take longer to attach to a cable, since the center conductor of the cable must be passed through and soldered to the center post of the connector. Phono plugs are also easily bent out of shape. This type of connector is often found on audio amplifiers, turntables, and tape decks.

The XLR connector (figure 3) has three contacts, or pins, encased in a large metal shell. This shell protects the contacts from being damaged if the connector is dropped or stepped on. This connector also has a small locking assembly. Unlike the previously mentioned connectors, the XLR type will not pull out of its socket unless the small release tab on the side of the shell is pressed. This reduces the possibility of someone or something pulling on a cable and causing the connector to be pulled apart, disconnecting that circuit. XLR connectors are often used on mixing consoles.

The microphone connector (figure 4) is often used to allow a variety of microphones and/or cables to be attached to each other. A freely rotating ring on top of this connector has threads on its interior surface which are screwed onto the threads on the base of a microphone. One lead of the cable is soldered into a small ball in the center of the connector. The other lead is connected to the shell assembly, usually pressed between a spring, which covers the cable, and the connector's shell.

Neil Lewbel
Consultant, Technical Writer
Kew Gardens, NY

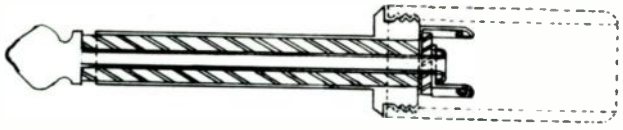


FIGURE 1

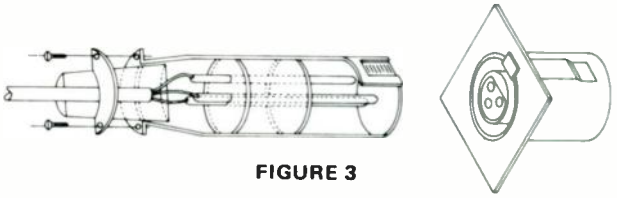


FIGURE 3

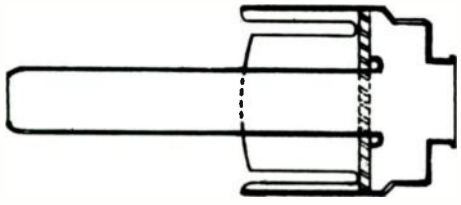


FIGURE 2

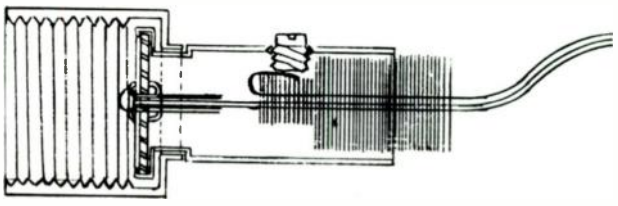


FIGURE 4

To an extent that no other stereo power amp in its price range can equal, the Peavey CS-400 is a totally versatile amplifier.

The CS-400 offers many features in terms of operation, engineering, and concept never before available.

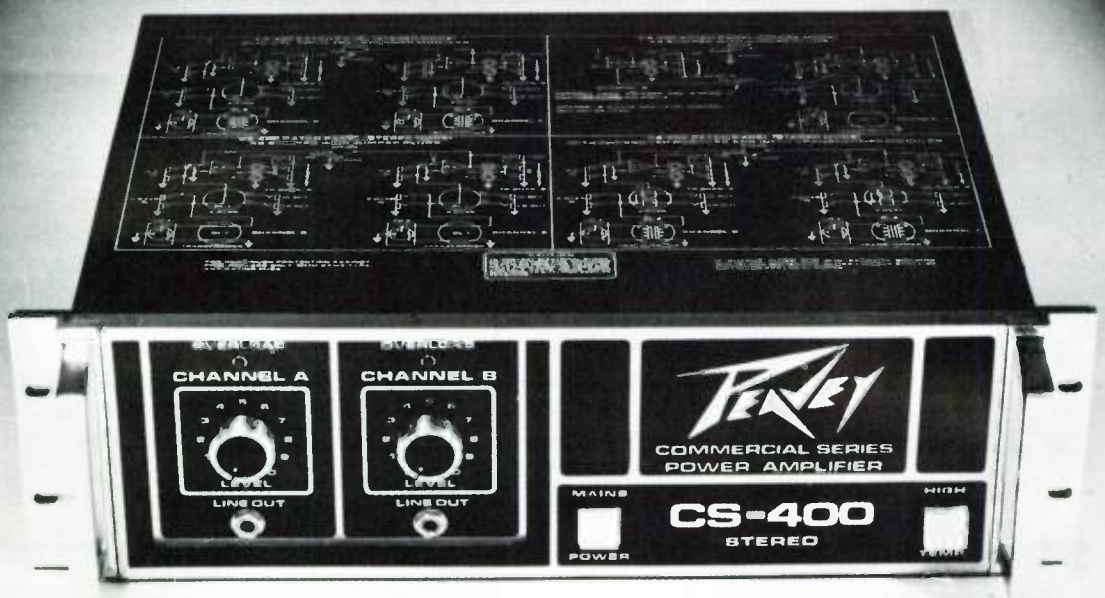
Up front, the CS-400 features a rugged 5.25" x 19" rack mountable chassis with a steel reinforced, die cast panel for beauty and protection. LED overload indicators, level controls, line outputs, high temperature indicator, and lighted mains switch add to the amp's clean, functional design.

Inside, the CS-400 is an uncompromising fusion of modern, solid-state technology and quality components. 200 Watts per channel into 4 Ohms, less than 0.1% total harmonic distortion, with an extremely wide frequency response (+0, -1 dB 5 Hz to 40 kHz @ 1w, 4 Ohms) make some pretty impressive specs.

But there's a lot more to the CS-400 than raw power and impressive specs. What really makes the CS-400 so special is its versatile back panel and patching system that enable such accessories as input transformers, crossover networks, and bi-amping possibilities using small interchangeable plug-in modules. With the CS-400's plug-in module system, our engineers have created a method to *fully utilize* all the performance capability of the amplifier.

Without this unique patch panel, our CS-400 would just be another great amplifier. With it, it'll be another standard for power amplifiers.

Get all the details at one of our selected audio dealers. He'll show you why incredible values are *still* a reality at Peavey.



The Peavey CS-400

Power @ Clipping:
(1.0% THD, 1.0 kHz, 120 VAC Line)
260 Watts RMS into 4 Ohms

Total Harmonic Distortion:
Less than 0.1% from 20 mW to 200 Watts RMS
20 Hz to 20 kHz into 4 Ohms

Intermodulation Distortion:
Less than 0.1% from 10 mW to 200 Watts RMS into 4 Ohms, typically below .05%

Frequency Response:
+0, -1 dB, 5 Hz to 40 kHz (1 Watt, 4 Ohms)

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So... u want to know about Effects Part II

By Craig Anderton

Within the past few years, a whole new family of time-altering effects that can create time delays, echoes, flanging, automatic harmony lines, and more, has come into being. At first these effects were very high in price, and therefore more or less limited to high-ticket recording studios and touring bands. However, as these sounds showed up on more and more hit records, there was great pressure from musicians to have inexpensive time-altering effects available for on-stage use. Now there are many of these types of effects available on the market . . . to the joy of many, but also to the great confusion of some.

Next month we'll look at some of the more exotic devices that are available, but this month, let's examine the grand-dad of time-altering effects: the tape echo unit. In a way, the limitations of the tape echo unit were instrumental in creating a demand for the other types of time-altering effects, but the echo unit can still perform many tricks that are just not possible with any other type of effect. As a result, the musician who comes in and thinks he or she would like a "digital delay line" may actually find that the tape echo unit does more of what's needed, and at a (possibly) lower price.

First we need to discuss what a tape echo unit is designed to do. Simply stated, it takes a given musical signal, stores it for a small but noticeable period of time, and then plays it back. Additionally, after playing back the signal, it can re-store the signal and play it back *again* to create multiple, repeating echoes.

A tape echo unit is simply a special purpose tape recorder. Instead of storing the tape on reels, however, the tape is stored in an endless-loop type of cartridge (similar to an 8-track automotive tape player cartridge). The tape passes over a record and playback head, and is then pinched between the capstan/pinch roller combination; as the capstan rotates, it draws tape out of one end of the cartridge and feeds it back into the other end of the cartridge. (See figure 1.)

When a musical signal enters the tape echo unit, several events occur. First, the signal is sent directly to an output mixer (integral to the recorder) whose output is, in turn, the output of the echo unit. This direct feed allows you to hear the unmodified instrument sound along with the various echoes we'll create. Simultaneously, the signal hits the record head and is recorded on to the tape. The tape then takes a finite amount of time to travel to the playback head, where the signal is picked up. Here, two events occur: the delayed signal is sent to the output mixer, creating a delayed echo. If desired, this signal may also be re-circulated to the record head, where it is re-recorded along with whatever other signals are entering the echo unit at this time. The unit will have some type of control to regulate the intensity of the signal fed back to the record head. A low signal intensity means that the signal will be re-recorded at progressively lower volume levels, resulting in a number of echoes that die away in time. However, note that sending a signal that's *higher* in level than the original signal to the record head will result in echoes that gradually get louder and louder, until the limit of the system is reached and internal feedback occurs. This produces a rhythmic, white noise-like signal that was a staple of 50's science fiction movies.

However, there's still more to an echo unit than these basics. A couple of paragraphs ago, we mentioned that after being recorded at the record head, a sound takes a "finite" amount

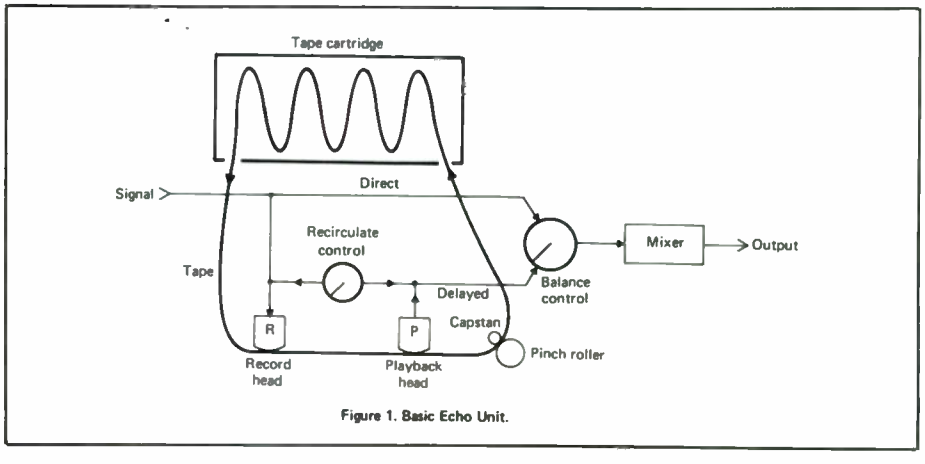

Figure 1. Basic Echo Unit.

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of time to be received by the playback head. Since this "finite" amount of time may not be the time period desired by the musician, the echo unit will have some means of varying the speed of the tape travel. Faster tape speeds mean that it takes a shorter time for the signal to travel from record head to playback head, thus resulting in more closely-spaced echoes; slower tape speeds result in echoes spaced further apart in time. However, there is a limit to how fast you can make a motor run without overheating, and how slow you can make it run without stalling ... so echo units, while versatile, cannot get sounds shorter than a specific time or longer than a specific time (the exact limits depend on the model).

Another solution to the "finite time" problem involves not moving the tape at varying speeds, but rather adding more heads. More expensive echo units will often have another playback head, or sometimes a number of playback heads, to allow repeating echoes without having to feed signals back to the record head (see figure 2). Also, these heads can sometimes be moved to give non-rhythmic echoes. If the tape moves at a constant speed with a multi-playback head machine, then listening to head #1 will give a short delay, and playback head #3 will give a long delay. Sometimes, you may encounter an echo unit that has only one extra playback head, but one that is moveable; sometimes a unit will give a combination of multiple heads, variable tape speed, and movable heads to give maximum flexibility.

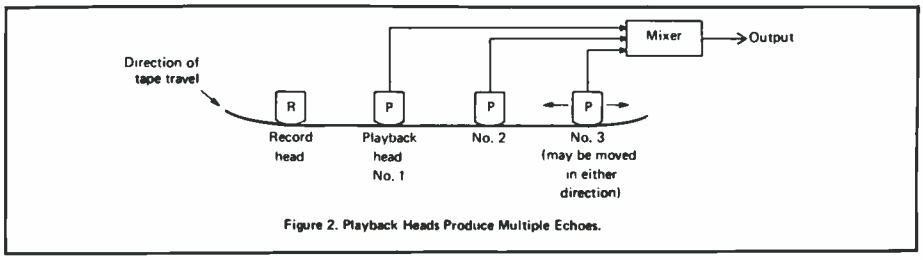


Figure 2. Playback Heads Produce Multiple Echoes.

ADDING REFINEMENTS

Since the echo unit is a miniature tape recorder, cautions applying to tape recorders in general also apply to the echo unit. For example, if too much level is recorded on to the record head, the sound will be muddy and distorted; if there's too little level, there will be noise problems. As a result, echo units will often incorporate LED level indicators or meters to aid in proper signal setting. Other refinements include balance controls to balance the amount of direct and delayed sound, mechanical devices for changing the position of the playback head, and so on. Some echo units also include other, non-tape oriented reverberation devices to offer more sonic flexibility; other echo units are based on rotating electrostatic or electromagnetic drums, which store signals much in the same way as tape but require less maintenance. Generally, however, the musician couldn't care less about the technical means used to create echo.

COMMON COMPLAINTS, AND HOW TO SOLVE THEM

From time to time, the owner of an echo unit will run into problems ... problems that an alert and sympathetic retailer can help the musician to overcome. For example, I've seen cases of a musician walking happily out of the store with a brand-new echo unit, and then returning a month later claiming that the thing has "no highs" and "sounds muddy." In the vast majority of these cases, this is due to simple ignorance of the fact that an echo unit *must be periodically maintained.* Just like a tape recorder, the heads can get dirty from oxide shedded off the tape; and this same oxide can build up around the capstan, pinch roller, and tape guides. The solution is to use some commercial head cleaner fluid to clean the capstan and heads thoroughly. Since this fluid may cause the pinch roller rubber to crack, your best bet for pinch roller cleaning is to use warm water. Q-tips are just fine for these cleaning operations; no special technique is required, except that it's a good idea to be as gentle as possible when cleaning the heads. (Avoid forceful scrubbing; let the fluid, not the Q-tip, do the work, as some of the dirt may scratch the surface of the head.) Sometimes, you'll get an echo unit back for "repair" that requires several Q-tips before you get the heads clean—but you'll have a happy musician if you show him or her what to do to keep the thing maintained in the future. If there are any kinds of guide posts for the tape, make sure these are cleaned too.

Also, like a tape recorder, the heads in an echo unit can build up residual magnetism after many hours of use, resulting in a tendency towards self-erasure that dulls the high end and contributes noise. Here, you need to demagnetize the heads. I don't want to devote the space to explaining the process here, since it's a little involved; for details, either check out my "Home Recording for Musicians" book, or check with the manufacturer.

Another problem: Since the same piece of tape keeps getting used over and over again, in time it's going to wear out. This is something the musician should also realize; when you sell an echo unit, make sure you have some replacement cartridges available. When the sound quality falls off substantially (and cleaning/demagnetizing won't help), or when the tape has parts of its brownish oxide flaked off, it's time for replacement.

A common complaint about tape echo units is that they are noisy. Well, no one has figured out how to produce noise-free recording tape yet, so this is a fact of life. However—adding a noise reduction system to the tape recorder will help tremendously towards solving this problem (see figure 3). Granted this is a somewhat expensive solution to the problem, but it does the job ... and many musicians are willing to pay the price for a quiet echo unit. If noise reduction is not affordable, at least make sure the musician understands to use the highest recording level possible consistent with undistorted sound, as this will help keep the noise under control. A compressed signal presented to the echo unit's input also helps.

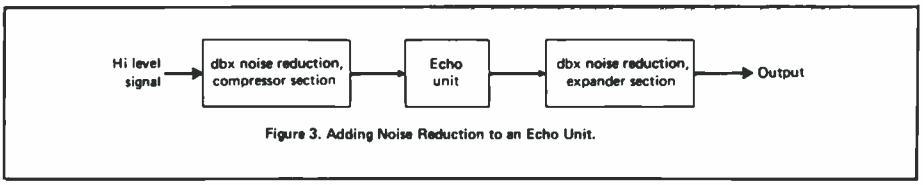
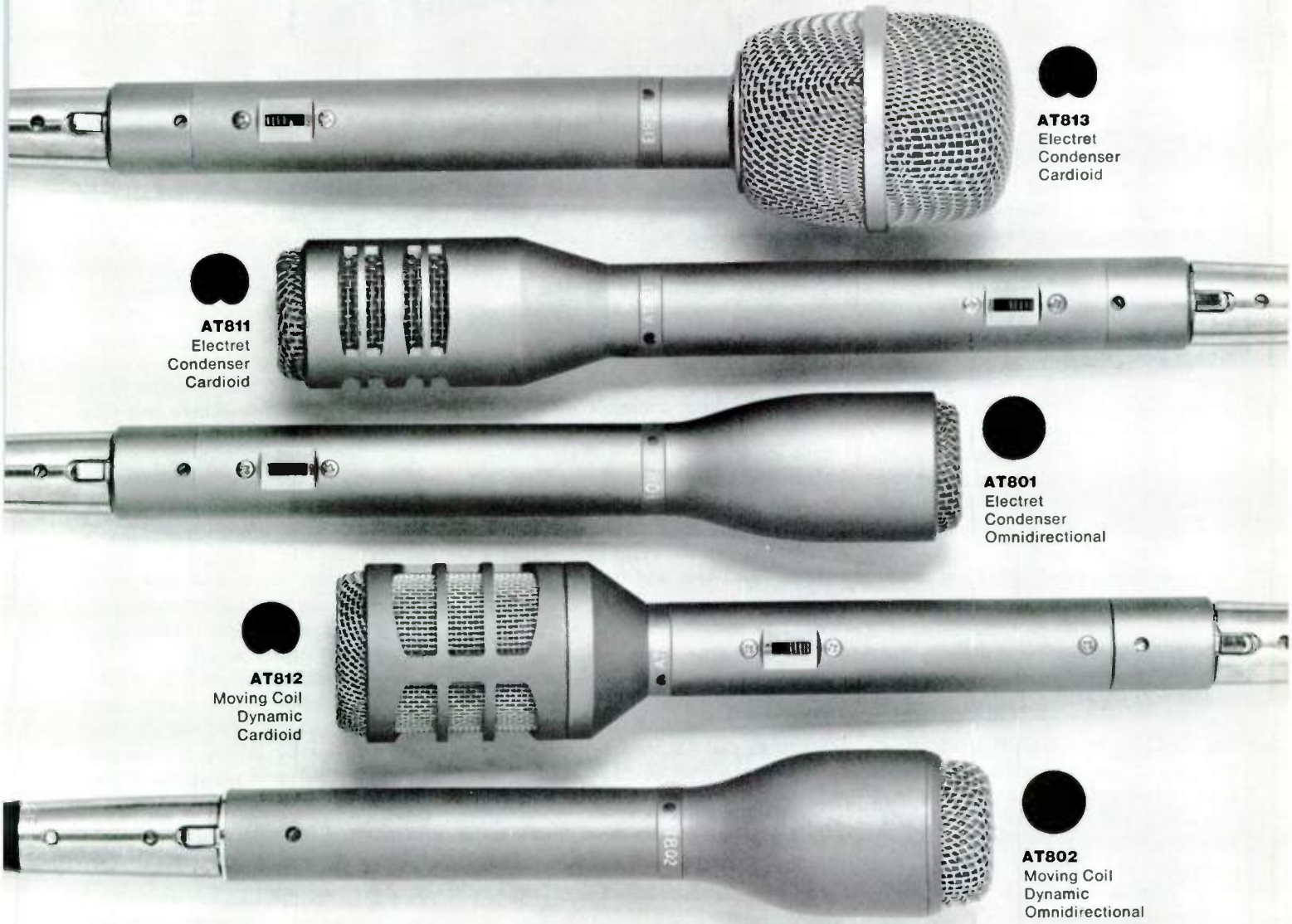


Figure 3. Adding Noise Reduction to an Echo Unit.

Hopefully this column has helped give some insight into what makes a happy echo unit (and echo unit owner). Next month, we'll look over the new solid-state echo units—what they can, and cannot, do.

Audio-Technica introduces five new microphones... and a pleasant surprise.



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Take a close look at these new Audio-Technica microphones. Three electret condensers and two dynamics. Plus two clip-on miniature electrets (not shown). All are superbly finished. Carefully thought out in every detail. With the right "heft" and feel. Professional A3M Switchcraft output connectors, of course.

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Now for the surprise. The price. Both omnis are nationally advertised at just $60, for either dynamic or electret condenser element. The two basic cardioids are just $80, while the AT813 electret condenser with integral windscreen is pegged at $95. All complete with full one-year warranty.

Once you've seen and tried these new Audio-Technica microphones we think you'll welcome them. Not just because they cost so little...but because they do so much. Available now from your Audio-Technica Professional Products dealer.

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DISCO EXPLOSION SALES EXPLOSION

By Stuart Rock

The disco explosion can be seen in every newspaper, on television, radio, and probably down almost every big city street. Perhaps it never occurred to you that the basis of the disco revolution is *sound*! That is the business that we are all in, whether as a manufacturer, like GLI, a retail outlet, installer, or distributor. We all know that sound is big business both in hi-fi and in professional applications, for p.a., broadcasting, recording studios. But there are many people who haven't yet made the connection between high performance disco sound and their own operation.

By way of history, the engineers and marketing staff of GLI singled out and identified the disco market five years ago when disco was often thought of as just another fad like the hoola hoop. We analyzed the meaning of disco from both economic and social implications and concluded that the disco phenomenon was an idea whose time had come. The reasons are quite simple when you think about it. Before disco, entertainment for dancing and listening was almost totally dependent on live performances in clubs, ballrooms, high school gyms, and the like. Until the early 1970's the live phenomenon had a major advantage over prerecorded sound; performers could create a realistic sound of incredibly high volume and low distortion which was not easily matched from records or tapes. The juke box was a poor substitute and, even at its best, was far from the experience created by a high-level live performance. Technically, the reason the live sound sounded better than prerecorded was the equipment available—consoles as well as speakers and amplifiers. All this has changed, and now playback of prerecorded material can consistently sound better with less distortion than live performances. The levels can go even higher because the feedback created by stage mikes just isn't there. And a stereo mix of a 24-track tape will consistently sound better than even a live performance.

If you go deeper, the economics of live performances will show that for all but the biggest night clubs and casinos, the profit margin of a club owner diminishes every day as the union wages get higher and higher. And, of course, you can't expect a band to play 12 hours straight without interruption. Finally, there are a limited number of top acts available for performance; and as affluent Americans have more leisure time and want more high-class, high-quality entertainment, there just aren't enough top performers to go around. So the die was really cast for the disco explosion five or six years ago, and only now is the full impact being felt by the public, club owners, pro audio retailers, and manufacturers.

Disco is very different from stage performance. In a typical stage setting, the lights are turned forward on the stage and the speakers are typically across the front of the room. Disco is a total personal involvement in the light and sound experience; therefore, sound must originate from all areas of the room at high levels and with low distortion. As a further example, the lighting in a disco plays on the dancers, not on the stage.

It has been stated that the disco market in all aspects accounted for *$5 billion* last year. When you consider that the entire record industry is only about *$2.5 billion*, it certainly seems worthwhile to enter this lucrative market. But it is a very special market with very special requirements for equipment, installation, and backup. Many people think you can take a hi-fi amplifier and a few large hi-fi speakers, two turntables and some sort of mixer and you are in the disco business. That just isn't so. Discotheques earn their revenue from the people who frequent their premises. They only stay in business when the customers keep coming back. It's a matter of satisfying the customer and giving him his money's worth, and then some. That makes the difference between a highly profitable venture and a failure. If the equipment fails to perform to the highest standards, the customers won't come back, and another disco will bite the dust. All of this leads us to where *you*—the pro sound dealer—come in.

You have probably already had a number of people come to your establishment saying they were going to open a disco and needed a sound system. If you did, you have probably already found out that hi-fi equipment and even some "pro audio" equipment just won't hold up under the demands and rigors of disco operation. The key to a successful installation is *reliability* and *redundancy*. The system must keep on working day in and day out under the worst conditions of temperature, overload, and just plain abuse. The redundancy suggests that a system should be capable of operating at partial level, even if one or more elements in the system fails. This suggests that an installation with eight speakers and four 125-watt amplifiers is a lot better than a system with two speakers and one 250-watt stereo amplifier. In the first case, if you lose one amplifier, you are only down 12 percent, while in the other case, one-half of your sound would be gone.

THE EQUIPMENT

The basic elements of any sound system for a discotheque are the mixing console and its associated equipment, such as turntables, tape decks, and the

Mick's Mike

A microphone is known by the company it keeps, and the Rolling Stones are *some* company — as millions of fans throughout the world will attest! As a matter of fact, our Unidyne and Unisphere microphones keep regular company with just about everybody else who's somebody on the entertainment scene: Led Zeppelin, Sha-Na-Na, The Association, The Faces, The Who, The 5th Dimension, Carpenters, Sergio Mendes & Brasil '77, The Beach Boys, Paul Anka, Lainie Kazan, John Gary, David Cassidy, The Dells, Tommy James, and so many others that we can't list them all. Need we say more?

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like, and the power amplifiers and speakers which deliver the sound at breathtakingly high levels of 110-130 dB SPL.

First, let's look at the mixer. The person who will use it is the disc jockey. He is probably not very technically oriented, so the mixer must be logically designed for easy and foolproof operation. The disc jockey is more of a performer than an engineer and usually has more concern with what record to play next and which pot to fade up or what level his talk-over mike is set at. If the mixer was intended for other applications, the d.j. may have a hard time cross-fading and balancing the records and tapes he plays along with his voice-overs.

There are inexpensive mixers on the market which purport to be disco mixers. You may think you are doing your customer a favor by saving him money and selling him one of these units, but it is false economy. You will never hear a disco owner complaining about the fact that the equipment you sold him was too good and worked too well. A mixer designed specifically for disco use, in our opinion, has total cueing capability, a three-band equalizer, cross fader for changing selections from one turntable to another, a signal process loop, and meters for watching power output level and for cue level matching.

Turntables must be high torque for fast starts and slip cueing. They should have a variable speed adjustment to match record tempos and should be well-isolated to prevent acoustic feedback. Your average hi-fi record changer or turntable just won't make it in this environment.

The amplifier is probably the place more inexperienced people get into trouble in the disco business than any other component. You can't go by power rating alone. The amplifier must run cool under prolonged periods of high output and must be able to operate through some of the nastiest loads imaginable. In addition, the amplifier must have a high-peak power capability, properly designed protection circuits, and fast recovery time if the amplifier is overloaded. From our experience, we have found that 125 watts/channel is a good place to start. The amplifier should have a continuous running fan for cool operation and a resettable thermal breaker just in case you exceed the amplifier's limits. A dealer should be very careful to pick a manufacturer of power amplifiers who has had in-field experience.

Speakers are also often misunderstood as to their requirements. In order to create such immense sound pressure levels, a disco speaker must be highly efficient in the order of 95-105 dB SPL/1 w/1 meter. The speakers must have the appropriate dispersion, be it wide or narrow, so that the entire dance floor is engulfed in uniform, clean and clear sound at just the right levels.

How many speakers and how many amplifiers you need is often a source of mystery, and more often, a source of trouble. Every installation is different, depending on the number of square feet of the dance floor, ceiling height, architectural acoustics, and others. As a rule of thumb, the more speakers and the more amplifiers you have in the system, the better off you will be from an operational efficiency and reliability standpoint. In future articles, we will tell you how to analyze a club situation and determine the absolute requirements.

Let's not forget tape machines, both open reel and cassette. These can provide a fill-in source of music when the disc jockey takes his break or on his night off. These units must also stand up to high abuse and must show exemplary reliability. As an installation becomes more sophisticated, you will want to suggest adding accessories, such as pop and click filters, expanders, multi-band equalizers, etc. This offers the disc jockey a chance to be even more creative by altering the sounds that reach the audience. Don't let your customer get trapped into too much sophistication if he is dealing with inexperienced disc jockeys. All the knobs and buttons are definite sources of trouble. You might suggest that these accessories be added after the primary installation is up and running. Another suggestion might be to install all audio components not directly essential for daily disco operation in a locked rack or cabinet. This will keep curious hands away from carefully made adjustments and alignments.

WHERE IS THE MARKET FOR DISCO SOUND SYSTEMS?

If you think that only big clubs are candidates for disco sound installa-

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Stuart Rock is vice president and general manager of GLI Division of VSC Corporation.

tions, you are very wrong. While every major city has two or three famous and highly publicized discos, the real bulk of the business lies in the smaller installations. Where, you might ask, are these smaller discos? You will find them at high schools and colleges, private clubs, bars, taverns, lodges, roller rinks, ice skating rinks, ski resorts, golf clubs, halls—any place where people gather together to have a good time. Many of these locations are virtually untapped by the disco sound dealer. Our experience at GLI, after selling over 3,000 disco systems, proves that almost any place with a dance floor is a good candidate for a disco system.

Don't think that you have to be an installer or an acoustic engineer to sell these systems. It just isn't so. Our experience shows that any semi-pro or pro-audio dealer can sell disco equipment. We have engineered pre-packaged systems which go together in a short time. For instance, you can buy a GLI console already loaded with the 3880/1000 mixer and rack space for turntables, open-reel and cassette decks, graphic equalizers and the like. It is almost a turn-key d. j. booth.

For the speaker and amplifier requirements, we have developed charts which help you correlate sound requirements with equipment needed. Installation may be nothing more than having the speakers hung in the right location and wiring to the power amplifier rack. It is an installation that almost anybody knowledgeable in audio can do successfully and quickly.

HOW DO YOU GET INTO THIS $5 BILLION MARKET?

If you agree with us so far, that prerecorded music playback of high-fidelity quality is a viable business unto itself, and if you agree that it requires specialized equipment and understanding, let's look at how you can get into selling products. You've got to demonstrate disco equipment to sell it! If you put a mixer in your glass showcase, it will stay right there. You have to set it up where club owners and disc jockeys can play with it in real operation, even if only through head-phones. You need a showroom area devoted to selling this kind of equipment, and you need to stock all the products required for a full installation. New club owners are very naive when it comes to sound systems. They may think they can get away with a cheap system which just barely does the job. *Don't sell it to them!* If the system isn't right, it will come back to haunt you for years and years. If the owner doesn't have enough money for a proper installation, don't make due with a half-way solution. The club owner will lose because he won't get the performance or the crowd he expects, and he will continually have maintenance and repair problems. You'll lose, because the reputation of the club quickly reverts back to the person who sold or installed the sound system. Don't be afraid to overbuild a system. The more redundancy you have, and the further away from the limits the system operates, the better it will sound, and the happier your customer will be.

The overall price for disco systems starts at about $3000 and can go well up over $100,000 for a sophisticated installation. You'll need knowledgeable and sophisticated salesmen to sell this gear. Most hi-fi salesmen don't understand the pro audio market and won't know how to specify the proper system. It is not hopeless, however, since a few companies in the disco field offer a variety of services and literature to a prospective dealer. Cerwin-Vega, for instance, offers a disco manual which gives some helpful tips on how to specify and set up a system. GLI has a special consulting service free of charge to any disco dealer. If you send a copy of the blueprints of a proposed job to GLI, they will spec out the required equipment and give you a proposed layout for the speakers and the d. j. booth. The best education, however, will come from visiting and observing successful discos in your area. You can also learn from those not-so-successful discos whose sound system doesn't fill the bill.

CONCLUSION

To sum up, selling disco equipment is a big business with big profits and big potentials. We have seen dozens of semi-pro and pro audio dealers take on disco lines and successfully expand their business in a very short time. But remember, if you want to be successful in disco, you have to think disco every inch of the way—disco equipment, disco installation, disco reliability, the whole disco experience. If you have any specific questions about disco or the equipment connected to it, write to SOUND ARTS, and we will answer your inquiries.

SOUND REPORT

Solving The Customer's Sound Problems - Loudspeakers

By Ralph Morris

Many popular music groups nowadays provide their own P.A. system when they perform in night clubs or concert halls. Too often the "house P.A." is sorely inadequate for the sound level required. The required sound level, of course, is for the vocals to be heard along with electric guitars, organ, etc.

In response to the growing interest in P.A. hardware, most music dealers now handle one or more lines of modular P.A. equipment. These sound systems usually consist of only three components, besides the microphones. There is a mixer/amplifier, or "head," and two column-type loudspeakers. These systems are fairly easy to set up, requiring only the microphone cables to be plugged into the mixer, and one cable to each of the loudspeakers. Plug in one AC cord to any wall socket: an instant P.A.!

Wouldn't you know that someone would make a simple thing like that more complicated? Every time. What about the guy who just happens to have a couple of loudspeakers from his old P.A., and a spare amplifier, and could he just patch in this equalizer, please?

Some dealers have responded to the growing P.A. market by opening a new store. Two major dealers in the Hollywood area were able to acquire the building next door for the "P.A. annex." If you are involved with homegrown, or custom designed P.A., for portable use by popular music groups, you will know that of all the complex electronic equipment involved in sound systems, the element that requires the most careful attention, in designing a custom system (or using what happens to be at hand), is the loudspeaker. Most often misused, if not abused, the loudspeaker deserves more attention, and will reward us for our efforts with more fidelity, than any equalizer, or other piece of electronic equipment. Why is this so? Because the loudspeaker is the *worst* element in the sound system. It is the weakest link in the quest for fidelity. And often the least comprehended subject in the communication between the retailer and the consumer. There are some basic concepts of loudspeakers of which the retailer may find it necessary to inform the customer. This discussion concerns itself with those concepts—presented of course with the author's own opinions.

GETTING CLOSE TO THE REAL SOUND

Almost every piece of electronic audio equipment will have among its specifications a figure for distortion, which is usually less than one percent of its normal dynamic range. Loudspeakers don't have a figure for distortion in their specifications. The reason for this is that loudspeakers have very high distortion figures, compared to electronic equipment. Unlike electronics, loudspeakers are electromechanical devices, and they suffer from such distortion-producing elements as mass and inertia, which hardly exist in the realm of electronics. So the best we can expect from any loudspeaker is only a reasonable facsimile of the the original sound. Close enough to sound *like* the live sound, but not exactly. The difference is distortion.

Given the physical limitations inherent in electro-mechanical audio transducers (loudspeakers), the best we can do to get as close as possible to the *real* sound is to divide the whole range of the human ear, the audio spectrum, into low, midrange, and high frequencies, and provide the type of transducer which can best produce these quite different sounds. Large cone-type speakers produce low (bass) notes pretty well, since those notes don't require the radiating surface to move very fast, but need the relatively large area to excite, or vibrate, a volume of air sufficient to establish the long wave lengths required. The big cone speaker doesn't do so well with higher frequencies, however, because they require a much faster vibration. The cone speaker is simply too heavy to move that fast, so it starts to lag behind where it ought to be in order to faithfully make the sound it's supposed to. The result is one kind of distortion.

So, for higher frequencies, a smaller cone speaker is more suitable, since it has less weight and can follow the higher frequencies' faster motion, and besides, the larger cone area is not required for the shorter wavelengths of the high notes. For very high notes, the cone part of the speaker can be eliminated altogether, and what remains is a dome tweeter, or further still, if you eliminate the dome, what you have left is a ring radiator, the ultimate tweeter!

THE MIDRANGE

Simple enough? Too simple, I'm afraid, because we passed right over the midrange, while arranging our cone-type woofers and our dome-type tweeters, neither one of which can produce very well certain sounds in the middle frequencies, say, 500 to 2,500 cycles per second, which is also written 0.5 to 2.5 kHz (kilo Hertz), which is French for 1,000 cycles per second. (Why we have to abandon such nice English terms as "cycles per second," which is so self-explanatory, for foreign sounding terms which have no apparent meaning, such as kilo Hertz, I wonder!) However, since we're dealing with these audio frequencies by ear, as well as by number, examine the piano keyboard in Figure 1. You will notice the familiar "Middle C." When the "A" above "Middle C" is tuned to 440 Hz, "Middle C" vibrates 261.6 times every second, and we say it has a frequency of 261.6 Hz. Notice that more than half (the lower half) of all the keys on the piano have frequencies below 1,000 cycles per second, or 1 kHz.

Also notice that the notes in the range of 3,000, 5,000 and 7,000 cycles per second (3, 5, and 7 kHz) all occur in the highest two octaves of the piano keyboard. This fact will be important to our discussion about tweeters, coming up, and you'll also develop an "ear" for those frequency numbers on an equalizer. For instance, what does 1 kHz sound like? Well, if you have a real piano handy, play "C" two octaves above "Middle C." At 1046 Hz, it's very close to the familiar "At the tone, the time is . . . Beeeeeeeeeeee . . ." Find 500 Hz, which is close to "C" one octave above "Middle "C." What, you thought everything below 500 Hz was in the bass range? Try to hum it. Use the chart in Figure 1 with a real piano whenever you can, to accustom your ear to the logarithmic arrangement of the frequencies, which may seem strange at first, since the number of cycles between, say, eight whole notes (an octave) will not be the same in the lower tones as it is in the higher frequencies. In fact, you will notice that the frequency precisely doubles between octaves.

Now, what about the midrange? For sharp-edged midrange sounds so important to drums and vocals at high levels, you need a compression driver and midrange horn. If you were only going to play this sound system at a moderate level, the loudspeaker distortion would remain at an acceptable level of less than ten percent even if only full range cone-type loudspeakers were used. However, when the customer says he wants to make it loud (I mean *really* loud) and the loudspeaker distortion gets up around 40 or 50 percent (yes, it does) then he—and you—have a problem.

THE HORN

Well, generally speaking, horns don't sound as good as direct radiating loudspeakers, because a horn is sort of like speaking through a tube. You know, the slightly nasal sound caused by standing waves in the horn (or nose). What a horn does, however, that is desirable, is couple the radiated energy to the atmosphere with a gain in efficiency. It is important to remember that a properly designed horn can *double* the effective energy transfer from mechanical motion to sound waves. Doubling the energy doesn't make it loud, by the way, but it does make it louder, to be sure. A key phrase here is *properly designed* horn, with a correctly matched compression driver. The plastic "horn" that is sometimes molded into the grill of loudspeakers, or the curved flare on the front of some "professional" loudspeakers is just for decoration, and has no relationship, or effect on the cone-type loudspeaker behind it, in most cases. Well, a properly designed horn appears to be a wonderful thing, for our needs. If it will double the gain between the transducer and the air, how about a horn for the bass notes, or the highs, as well as the midrange? First of all, the highs get connected to the atmosphere with reasonable efficiency anyway, due to their shorter wavelengths. Also, the length of a horn required to work properly gets *shorter* for high notes, and *longer* for low notes. As a rule of thumb, a horn should be at least as long, from throat to mouth (the little end to the big end), as one-half the length of the lowest fundamental wavelength it is intended to produce. This would be 14 feet for the lowest note "E" on bass guitar, and a room-size horn over thirty feet in length for the lowest pedal tone on our keyboard chart (Figure 1). Well, the significance of this fact may disappoint a lot of people who think otherwise, but it remains a fact that a lot of the so-called bass horn enclosures with a flare along the sides of the cabinet have an effective length of about one and a half feet, which would be effective for notes above 400 Hz. You can see the disadvantage of using real bass horns for portable sound systems. Now, there are such things as folded horns, which literally fold up an eight- or ten-foot horn into a reasonable size and shape for making out of a wooden box. These sound like speaking into a tube that's folded up. Even so, an eight- or ten-foot horn will only be effective above 100 Hz, so in fact any bass horn that you can carry around is really useless, for bass notes.

Where did this bass horn fallacy originate, and why does it still prevail? Well, in the dim past of audio, when vacuum tubes were used instead of

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Ralph Morris is former vice president of Tycobrahe Sound Company. He has acted as sound engineer on tour with such artists as Frank Zappa, Stevie Wonder, Fleetwood Mac and Boston.

transistors, power was hard to come by. The most powerful tube amps produced only 100 watts or so, and bass notes require lots of power (four or five times as much as high notes, for example). In those days, like 1935, the only way to get bass notes loud (for motion picture theater systems) was with a real bass horn, 12 or more feet long, with a mouth big enough to walk into. Since these horns were installed behind or above a large motion picture screen, and didn't have to be moved, ever, they were suitable for the application. Nowadays, however, power is available, if not cheap—400, 500, even 1,000 watts per amplifier. So who needs bass horns? All you need is lots of cone area, and lotsa watts. Put the cones in boxes you can move around easily, and leave the bass horns in the museum along with the wind-up victrolas, whose horns were also effective down to three or four hundred Hertz.

So much for bass horns. With the foregoing in mind, I wonder why anyone who is engaged in portable sound reinforcement would want to carry three- or four-hundred-pound bass horns around. Aside from simple ignorance of the facts, there is the argument that it just doesn't look right without those big bass bins. Well, which would you rather carry around, more watts, or more wood? Another argument I've heard is that horns "direct" or "project" the sound. Again, as with the length of the horn, this "projection" characteristic varies with frequency. Mid- and high frequencies are somewhat more directional (again, due to their shorter wave lengths) and a midrange horn can restrict the angular dispersion somewhat, and thereby concentrate, or focus the energy in a slightly narrower pattern than would occur with a direct radiator. Low notes, however, with their longer wave lengths. tend to become omni-directional as soon as they leave the horn, so they don't "point" very well. Another misconception about bass horns revealed.

Meanwhile, back in the midrange department, the same difficulties occur with a midrange horn, as a bass horn, only on a smaller scale. First of all, the horn for a typical midrange compression driver need only be about eighteen inches long, with a mouth of only a square foot or so, so it's not too large or too heavy to pick up and take along. However, the midrange horn, like the bass horn, just doesn't have as smooth a response as a direct radiator. Now smooth response doesn't mean the absence of a raspy sound, it means that some notes are louder than others when they should all be the same. This is due to resonant characteristics of the horn, which is particularly disturbing in bass horns, which always seem to resonate in the 100 Hz range, as though the sides of the horn were flapping at that frequency, which is exactly what's happening, I suspect.

THE EAR

Well, you say, why don't we dispense with horns altogether, since they are such abominations in the pursuit of high fidelity? With what we learned about bass horns we could simply substitute a number of smaller cone-type speakers for the midrange, instead of horns. With watts so available, and the fact that it doesn't require so much power for midrange as it does for bass.... Well, it's been done. In fact, I suppose that just about everything possible in audio has been done already, sometimes more than once. I remember the first P.A. I ever saw with 48 five-inch speakers on each side for midrange. Actually, it

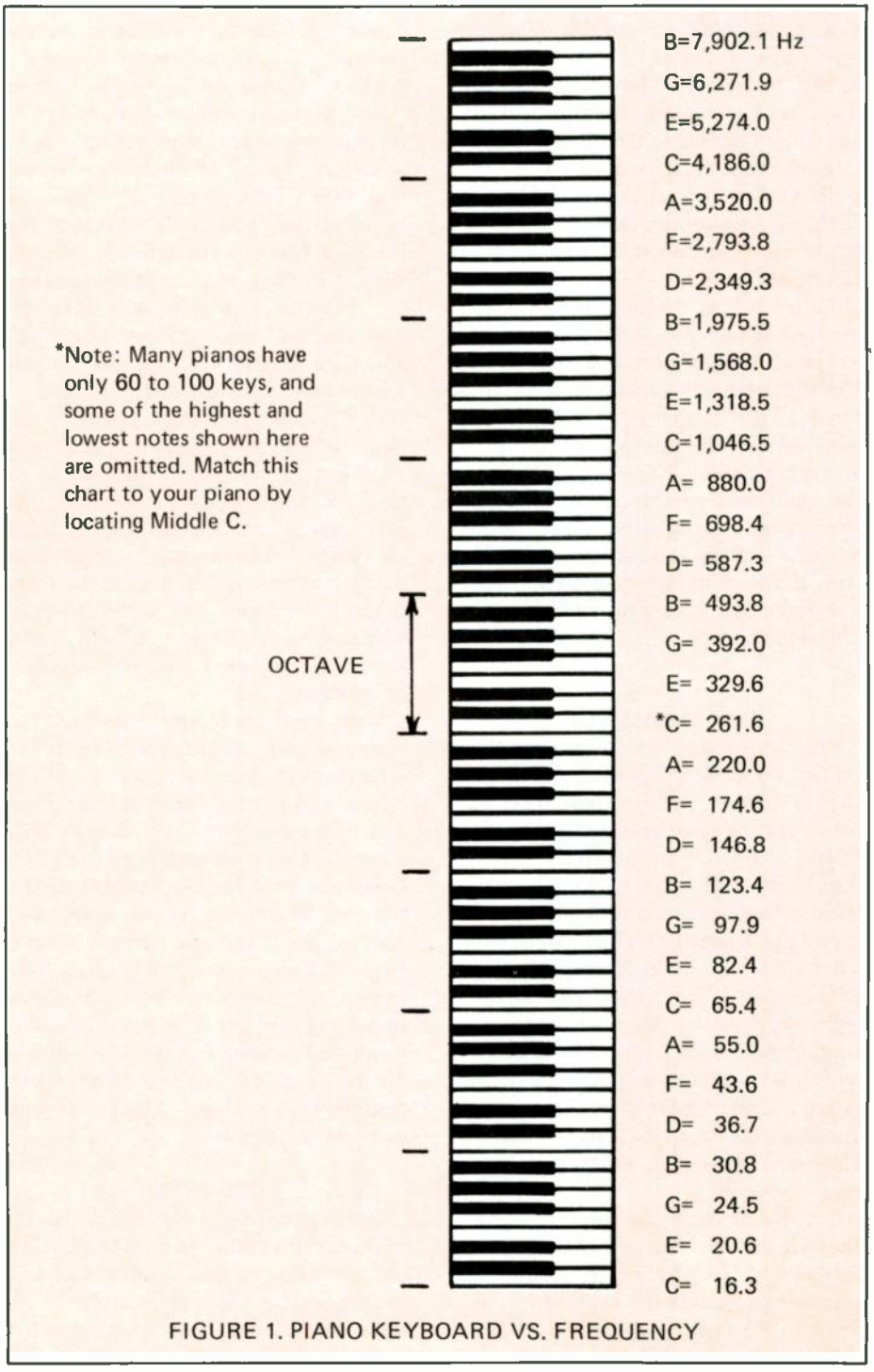

FIGURE 1. PIANO KEYBOARD VS. FREQUENCY

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CIRCLE 88 ON READER SERVICE CARD

WRH

sounded pretty good, with a tape on. The problem was, it wasn't loud enough, when the band started to play. You couldn't hear any of the smooth midrange, because there were two guitars in the background with six amplifiers each, all set on 10. Well, a P.A. might as well not be on if it isn't loud enough to come up to the level of the electric instruments. No doubt the drums and vocals were smooth as silk coming out of all those five-inch speakers, but you couldn't hear them. This problem is caused by some peculiarities of acoustics and the human ear. The acoustics problem is that in order to make the sound appreciably louder, you must *double* the power, or double the number of loudspeakers. To make it sound twice as loud, you need *ten times* as many. Instead of 48 five-inch midrange speakers in the example above, they needed about 200. That would have made the midrange 6 dB louder, which might not have been enough, as I recall. The ear problem is that our ears hear the loudest sounds at the expense of softer sounds, so to speak, so that we don't hear sounds that are much quieter than the loudest sound around, even though they are still "there" to a sensitive microphone. Our ears are very sensitive to differences in frequency, or pitch, such as whether two notes sounded together are harmonious or dissonant, but they are rather insensitive to different levels of sound. This is why it is so important for the mix, or the various level of the instruments and vocals to be correct in relation to each other.

So, for midrange you need proper horns with compression drivers, preferably the best ones you can get so that they will handle 100 watts or so without blowing up, and the "sharp edges" of the midrange that is so necessary to make the drums sound right will be there. Cone-type speakers are great for bass notes, which look slow and rounded to a loudspeaker (or an oscilloscope, if you would care to see it yourself). For the faster, more jagged look of the midrange, there's nothing like a compression driver. If you want it loud, that is.

The next little problem to consider (they keep popping up) is that compression drivers which will live with over 100 watts not only cost like four cone speakers, they won't say much about five or six kiloHertz. Well, contrary to popular belief, there isn't much sound in the range above six kiloHertz anyway. Only three whole notes on our keyboard chart are higher than six kiloHertz, and they are so high that the sound of the hammer striking the string is much louder than the ring of the note. However, there are harmonics above that, and the "ssss" sound, called sibilance, when you say ess'es, and the "tsss-tsss-tsss" sound of the cymbals, so if you want to hear it all, you'll need some real tweeters.

Now when I say real tweeters I don't mean the kind that cost five dollars, I mean the ones that cost eight-six dollars, apiece, and that is about the difference between hearing it and not hearing it. Lest you think my purpose is to urge you to get your customer to spend a lot of money, unnecessarily, I assure you that it is not, and to prove it I will say that it is possible to go too far with sound system sophistication, because I have seen sound systems that were unnecessarily complicated, and expensive. I would not recommend an $86 tweeter if the $5 one would do the job, and I can assure you that it won't. On the other hand, I would not recommend a four or five-way system, even though with elaborate test equipment you could measure the improvement. The real test is whether the improvement can be measured with the ear, in real life, not in the laboratory with a calibrated microphone. The bottom line has got to be this: If you can't hear the difference, it doesn't mean a thing.

So if he plans to turn it up, start with the best loudspeakers your customer can afford. Since most professional loudspeakers can be installed in more than one type of enclosure, find out what different enclosures are available. Some manufacturers offer plans for the construction of cabinets. If the system is to be moved around in the back of a van or truck, the stock enclosures will have to be strengthened anyway, so they won't fall apart so soon. Midrange horns and tweeters don't require an enclosure, acoustically, but for travelling, or even for setting up, they need to be mounted in a travelling case for convenience and protection. Having selected the best loudspeakers, now we only need to hook up some power amplifiers, crossovers, equalizers, mixers, and microphones, and we'll have our custom made sound system together.

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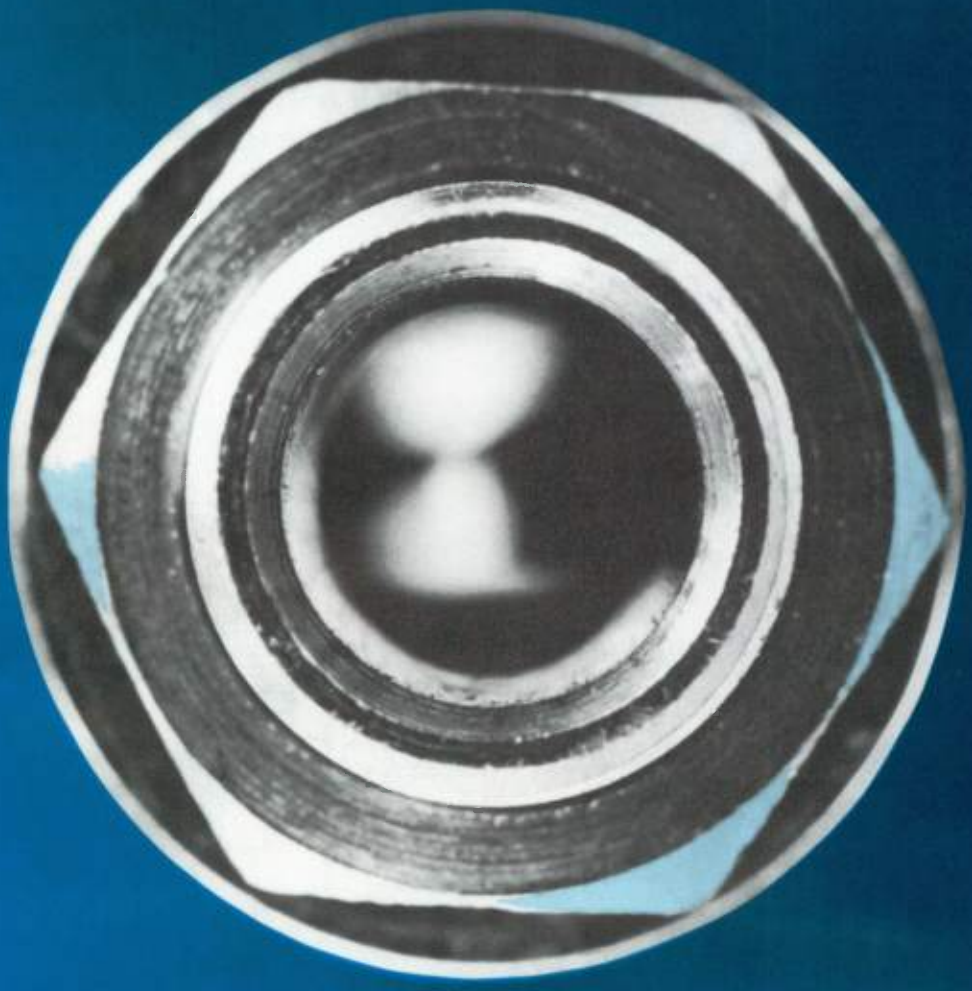

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CIRCLE 94 ON READER SERVICE CARD

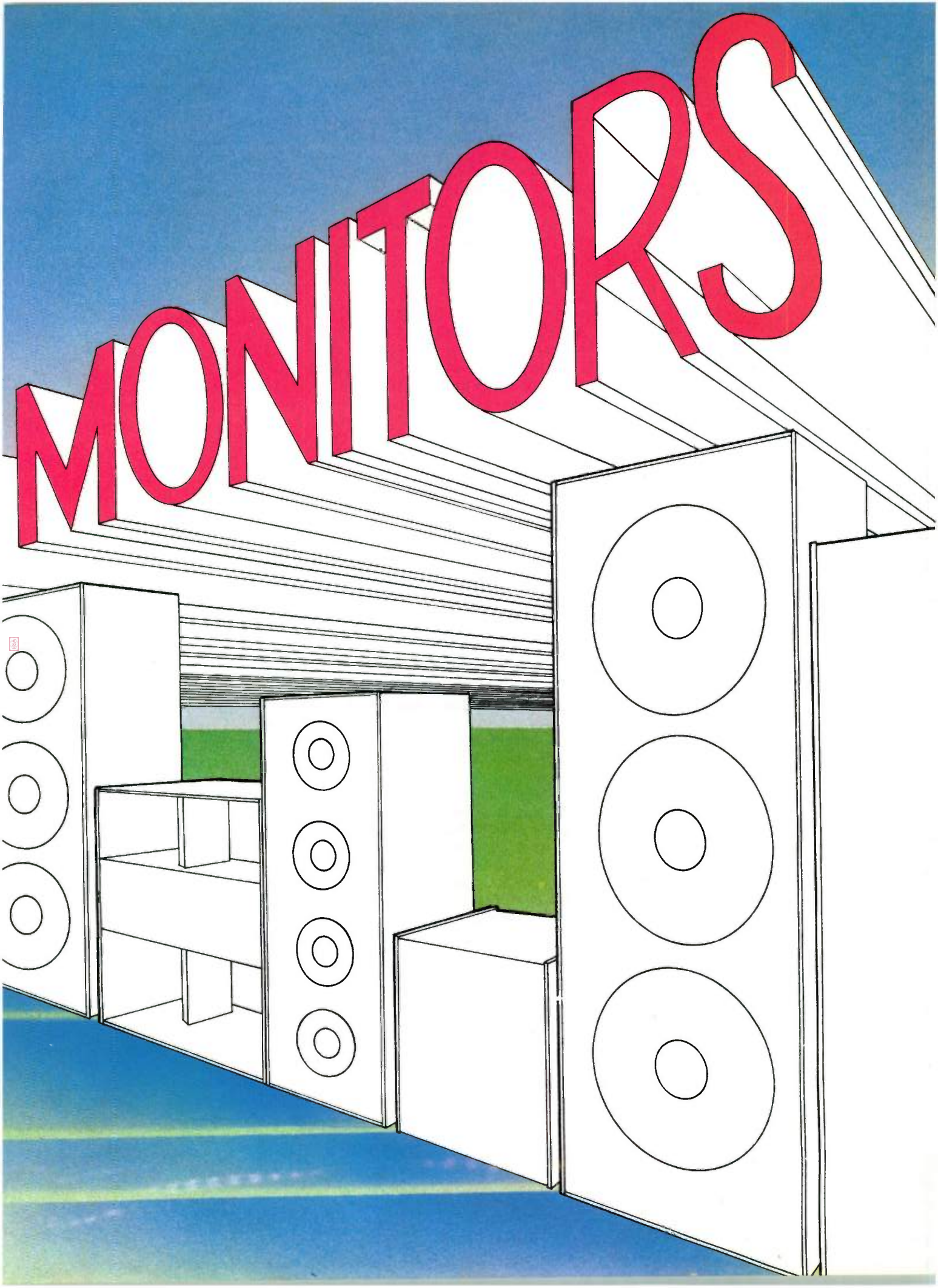
by Tim Rooney

Although the end result is the same, *i.e.*, the reproduction of music, the selling of control room monitors is a totally different animal from the selling of other speaker systems.

DEFINING TERMS

Let us first define terms. A studio monitor acts as the engineer's, the producer's, the mixer's and sometimes the artist's guide for ensuring that the music coming into the mixing board is accurately making it onto tape.

Although the definition of a studio monitor is far from standardized, and is often the subject of dispute, the philosophy at Electro-Voice is to manufacture a monitor that has three features: it must be as accurate (flat frequency response) as possible; it must have excellent dispersion, thus eliminating "dead spots" in the control room; and it must be efficient enough to enable listening at high SPL's without inducing amplifier related distortion (clipping).


MONITORS

Every manufacturer doesn't adhere to these parameters, and what's more there are reasons they don't. First, a studio monitor, especially when compared to a home system, is a technical device used in the creative process. If a mixer, engineer, etc., is aware of the technical deficiencies of his system and is used to hearing them, he can compensate for them in the mix. Or he can *not* compensate for them as the case may be, resulting in an individualistic type of sound.

MONITOR QUALITIES

Accuracy, however, can be a major selling point when discussing a monitor installation with a buyer. It provides one less handicap to overcome when "breaking in" a studio. Quite a few monitor speakers are moving in this direction. Several very well thought of monitors that were known for their "sound" are no longer available, having been replaced by newer monitor models with less of a sound of their own. Is it possible to "sell" up to accuracy? I think so. Many four-and-eight track small studios already are recording with accurate monitors — even when the monitors used are high fidelity loudspeakers that are at least as accurate as the typical monitor loudspeaker. So why doesn't every studio use high fidelity speakers? Because many home systems are missing magical ingredient number two — good dispersion.

What is "good" dispersion? Dispersion of, let's say between 100 degrees and 120 degrees would be considered good if the polar patterns indicated that the dispersion was held for all frequencies. Omnidirectional speakers, although they have excellent dispersion it's hard to beat 360 degrees for all frequencies), normally would not make good monitors because the dispersion cannot be controlled to fit the control room environment. Fortunately, most truly professional monitor equipment will meet the dispersion requirements of most studios.

How big a role does efficiency play? Dealers I have talked to have mixed opinions. Those dealers selling primarily to recording studios say that efficiency seldom enters into the discussion at all. Not only is there normally enough power available to drive the proverbial Mack truck through the wall, but most well thought of monitor speakers are relatively efficient devices already. When setting up a *new* studio, however, it does make sense to bring up the subject of efficiency. After all, the lower the power required to drive a speaker to the desired level, the lower the required investment in power, and thus more dollars available for other, often times more profitable, peripheral equipment.

This additionally brings up another marked quality of the typical monitor. Even if a high fidelity speaker is accurate, has controlled dispersion and is efficient, it also must endure the rigors of continuous high-powered use. Most high fidelity speakers, for example, do not have sufficient long-term, continuous power handling capability to endure for long in a studio. Fifty watts per channel, continuous over the wide frequency range, with the uncompressed dynamic range found on master tapes, would cause most high fidelity speakers to go up in smoke.

In a broadcast studio, however, efficiency plays a greater role. The power available is not nearly as great as what is normally available in a recording studio. Air checks are often made using reasonably low powered receivers or a small monitor amplifier.

MAKING THE SALE

Enough of monitor description and function; what actually goes into the sale?

Can a dealer sell all the brands he carries? Most dealers say yes, *if* the purchaser is making his first or possibly second monitor purchase. The buyer who is redesigning his studio probably will have fairly firm thoughts as to what his monitor requirements are and will go directly to a dealer who carries what he wants.

Still, even if the dealer carries what the buyer wants, it makes good sense to escort the buyer to several installations allowing the buyer to listen to several different monitor systems. Certainly the dealer should do this for the first or second time buyer. Good points are always pointed out in manufacturer's literature. Deficiencies rarely are. The good points and deficiencies may not be readily apparent even in a showroom. Only an informed buyer can make the best decision on his own needs.

What role does cost play? Most dealers say quite a lot. The cost factor is not limited to the first or second time buyer either. The cost and performance of each individual component weighs just as heavily on the purchaser who is investing $10,000 in his first studio as it does on the buyer on a $250,000 budget.

Monitors are of course available in a variety of price ranges, and despite what a manufacturers' literature may say there are trade-offs as the price goes down. Don't try to tell the buyer there aren't; he knows better. A more limited frequency response range, lower power handling capability, higher distortion figures and more prominent response anamolies, *e.g.*, "peaky high end" are several examples. Again, honest information can make a considered decision. A buyer with no information will be back to complain.

How many monitor sales are system purchases? About 95 percent of monitor installations are "out-of-the-box" systems. Five percent or less are custom component installations. One dealer stated that custom installations are usually specified by a buyer who thinks he is an acoustical engineer. When completed, they rarely sound as good as a less expensive package system. This is obviously a generality because some buyers *are* acoustical engineers and their custom monitor systems sound great. Conclusion: If you do not have design capabilities in-store, and if it is possible to sell a packaged system, do so. Very few dealers or studios have the design expertise to put together a system equivalent to what the manufacturers have available "off the shelf."

Where does the monitor fall in a buyer's list of equipment priorities? Quite high according to most dealers. The console is the first selection, followed by the tape equipment, then the monitors. Mikes, accessory electronics and the like come later. When you as a dealer get around to the monitor selection, you are selling the third most important piece of equipment in the studio. All the more reason for you to insure that the buyer has all the information needed to make a valid buying decision.

Do you have to sell the customers the brand he first mentions? One dealer who swore me to secrecy said, "In all honesty, there is sometimes an ego trip on the part of the buyer. He comes into the store and a brand name just rolls out of his mouth." For this dealer it presents no problem because he carries monitors made by five

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Tim Rooney is Director of Advertising and Sales Promotion at Electro-Voice.

manufacturers, including the "automatic."

Does he always sell the "automatic"? No. And it has nothing to do with selling up or switching to a more profitable product. After demonstrations in the showroom, this dealer makes appointments at several studios so the buyer can audition several models while they are being used. About 50 percent of the time the decision remains the same. The other 50 percent of the time it changes. The first choice isn't always what the customer needs.

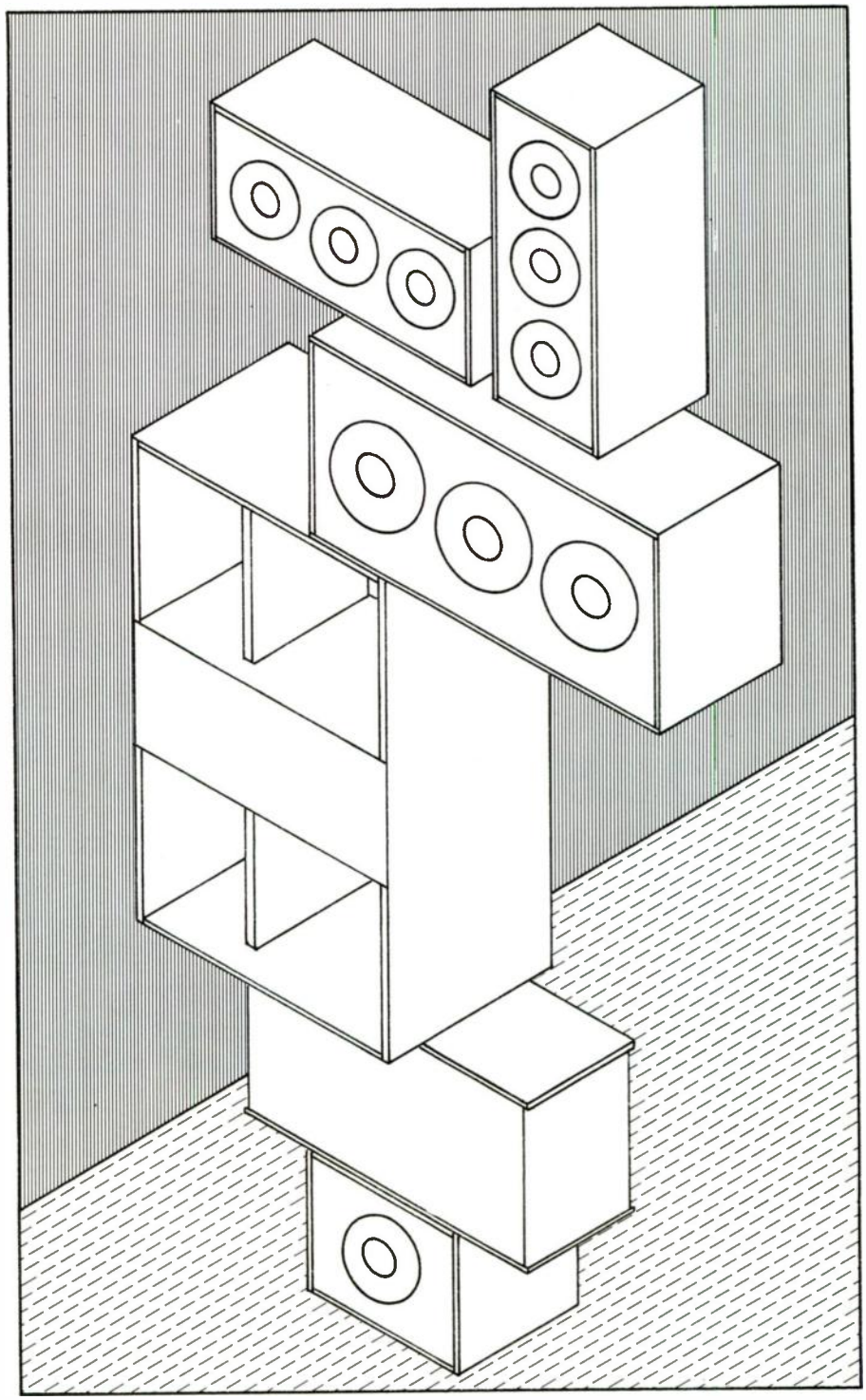
Is it true that engineers can compensate for a less than ideal monitor sound? Yes, it is true. But it is a handicap to be overcome. You can't go wrong by selling good sound at the beginning. Particularly for the first or second time buyer, a monitor that will take "getting used to" is an invitation for disaster. Start your customer off with accurate sound and he will remain your customer.

Is there any validity to a customer's statement when he says "I can't use that brand of monitor. No other studio will accept my tapes."? Definitely not, as long as the monitor he buys is accurate. Not all monitors sound the same. Even identical monitors will sound slightly different in different control rooms. If the monitor is accurate, and the control room is properly E.Q.'d, there should be no problem. If the customer uses the above mentioned phrase, watch out. He may have other preconceived notions about monitors that are not totally true. He will need more of your time.

BUILDING SALES

How can additional monitors sales be developed? First, so far when we have referred to monitors we were talking about control room monitors. What about the studio itself? The studio monitors should be at least as good, and preferably identical to those used in the control room. Give the artist a chance to hear what the control room is hearing. That's at minimum four speakers now instead of two.

Why at minimum? Because most studios will have five to ten times the volume (space, not dB) of the control room. This will require that a considerably larger amount of sound be pumped into the studio. This means either more power, if the speakers can handle it, or more speakers. "As good as or identical to" is not a hard and fast rule though. A studio using



Sentry III's in the control room might use Sentry IVB's in the studio, sacrificing everything below 40 Hz for an additional 6 dB in efficiency just for the ability to get more sound into the studio.

Secondly, if all other items have been handled properly, there will be repeat business — not only from this customer, but from others he recommends go to you.

It all sounds ridiculously simple. Perhaps it is. The dealer, regardless of the product he is selling, in this case monitor speakers, is a service organization. He is expected to be able to define his client's needs, have the product knowledge to enable him to satisfy his client's needs and ensure that the client actually receives the performance he expects from his purchase. He also should be willing to lend his assistance and expertise readily after the purchase has been made. Satisfy these four points and your customer will be back — for more monitors, mikes, delay lines or whatever, but he will be back.

The Service Department

Part 2

By John Gatts

The first part of this article dealt with the planning and personnel needed for an efficient service department. This month we continue with emphasis on the layout, equipment needed, and the actual running of the service department.

Space in the shop area itself is dependent primarily on the number of technicians employed. A six-by-eight-foot area is usually adequate for each bench. Allow ample space to neatly store incoming and outgoing repairs. Steel shelving is usually the most practical. Carpeting the shelves and benches is a good idea for protection of the units and reassures the customer that you care about his equipment. Floor storage is necessary as well but should be kept to a minimum due to inefficiency of space utilization. Carpeting floor storage is also appropriate. Try and locate storage and repair areas as close to one another as possible in order to minimize handling of repairs.

Parts storage is usually the easiest area to lay out. Fortunately, most of the high failure rate parts are small and can easily be stored in high density bins which can be located almost anywhere. It is wise, but not essential, to store all parts in an organized central location. Whatever location is chosen, be sure the parts are well organized so that a periodic inventory can easily be taken. Speaker parts require more storage space but are not heavy, so storage on top of shelving or other parts bins is not a problem.

How much inventory in parts is required? The answer to this question is two-fold. The volume of repairs will dictate a certain level of inventory of fast moving parts such as transistors, fuses, integrated circuits and speakers. The accessibility of manufacturers' parts depots and distributors will determine the inventory level of many items. If some of the manufacturers you deal with are on the West Coast, and your shop is in New England, you will have to maintain higher inventory levels for those suppliers than for local suppliers in order to prevent excessive shipping delays.

John Gatts is Combo Products Service Manager of Yamaha International Musical Instrument Division. He previously owned and operated his own service business.

Additionally, some suppliers may be very slow in filling and delivering your orders. Take note of this and stock up. Some manufacturers may have recommended parts kits available which may be valuable aids in stocking the fast moving items. Whenever possible, if not always, use the manufacturer's replacement parts. Many times circuitry is designed around specific parts, and substitution may result in performance degradation. On the other hand, a stock of common general replacement parts is essential to repair those units for which no original parts are available or where specific types are not essential. For a one-technician shop, an effective parts inventory could be worth as little as a thousand dollars. For a three technician shop, $2,500 to $3,000 may be necessary in parts. Again, circumstances and availability will dictate these levels.

Test equipment is a necessary expense to be included. The level of sophistication of both product and customer demands reliable high performance test gear. At least one bench in your shop should be "fully equipped." This equipment should include the following pieces:

1. Dual Trace Triggered Oscilloscope
2. Ultra Low Distortion Audio Oscillator
3. Distortion Analyzer
4. Function Generator
5. Digital Voltmeter 4½ Digits
6. AC Line Isolation Transformer and Variac
7. Precision "Dummy" Loads in switchable combinations
8. Ten Band, One Octave, Real Time Spectrum Analyzer

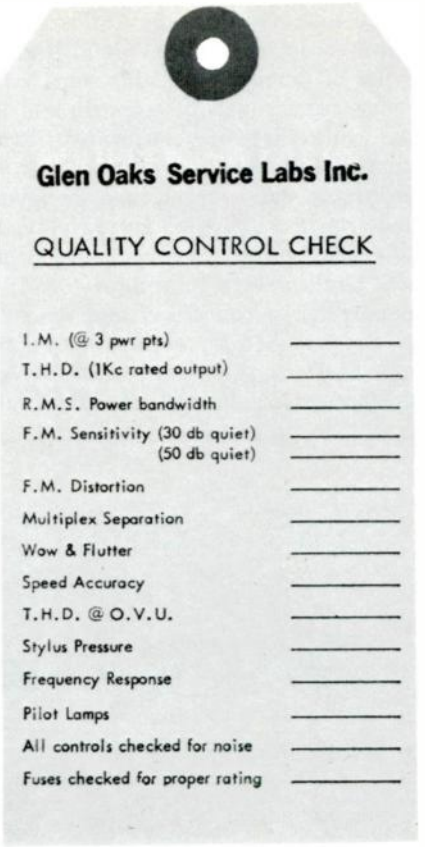
All of this equipment will be required for two reasons: to confirm performance specifications of repaired equipment; and to obtain warranty authorization from some manufacturers. Every bench in the shop need not have such an array of equipment, however, as troubleshooting and repair do not require the accuracy of measurement of performance verification. The purchase price of test equipment can be reduced by careful shopping. Check with distributors for demo units, shop "ham fests," watch for auctions and contact leasing companies for sell-offs. Take into consideration amplifiers and speakers to be used as monitors on each bench. Test and monitoring equipment will be the biggest investment you will make in physical assets for your shop.

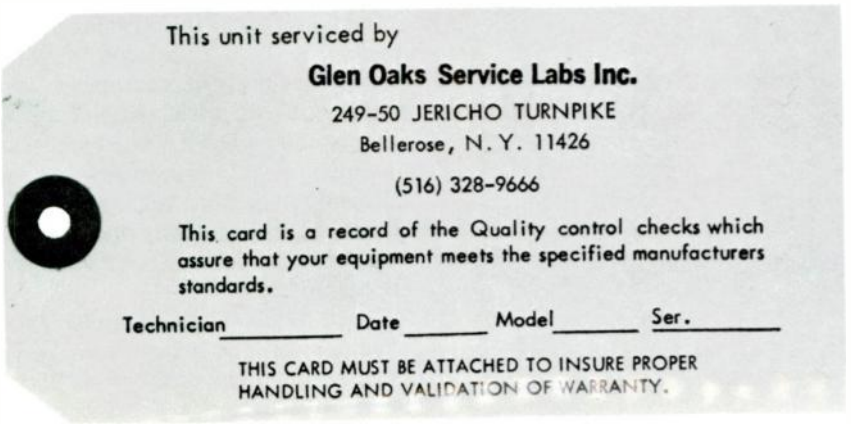
Having acquired the people and equipment for your shop, it is now time to approach the manufacturers for warranty authorization. Make each contact in writing on your letterhead, and give the manufacturer as much information and detail as possible. Send photographs if your shop is complete. Prepare financial data, as some manufacturers will give you a separate account for service warranty claims and parts. Don't hesitate to ask questions. All manufacturers want you to do the best job possible. After all, their name is on the product which you are selling and servicing. Requirements vary greatly for warranty authorization, so don't be disappointed if you can't get every authorization you desire. Review the area of discrepancy and decide whether you can afford or want to change it to obtain the authorization. When authorization is received, be certain to get names and addresses for parts departments, warranty claims, and accounting departments. You'll need them.

RUNNING YOUR NEW PROFIT CENTER

Once the service department is operational, it should become a profit center. In order to accomplish this, apply the same accounting procedures to service as you do to sales. Again, a P&L is essential. Calculate the cost of each repair. Multiply the time spent by the technician by the hourly salary. Add the cost of parts used. Determine an hourly cost of overhead and add it to the total. At the end of each day, week, and month, you will be able to determine service expense. Now what is the income? If the operation is unprofitable, first examine your labor rates. A thirty to forty percent profit margin on out-of-warranty labor should be attainable while still offering a reasonable price to your customers. Parts are typically a fifty percent margin, but generally do not contribute more than twenty-five percent of the gross sales in the long run. Setting shop rates is a decision that must be carefully made. Hourly rates scare some customers, while flat rates can frequently be unprofitable. A solution can be found in a minimum-maximum schedule which gives you the comfort of a range in which to work based on the difficulty of the repair. This also gives the customer the security of knowing that the labor will not exceed a specified figure unless some catastrophic situation is shown to exist.

Warranty service presents an entirely different set of rules, different from one manufacturer to the next.





All photos courtesy Glen Oaks Service Labs, Inc., Bellerose, New York

Some manufacturers have flat rates. Some have schedules for different types of repairs. No doubt some warranty repairs will be unprofitable at the time they are performed. That unprofitable repair may result in a profitable sale in the future, however, and should be handled accordingly. If this situation is a frequent one, contact the service manager of the manufacturer concerned and discuss it. Be prepared to accurately detail your costs on the repairs and discuss alternate solutions. Do not submit falsified or duplicate claims to offset an unprofitable repair, as this will jeopardize your authorization and create an unhealthy climate of distrust. Approach the situation in a business-like and professional manner.

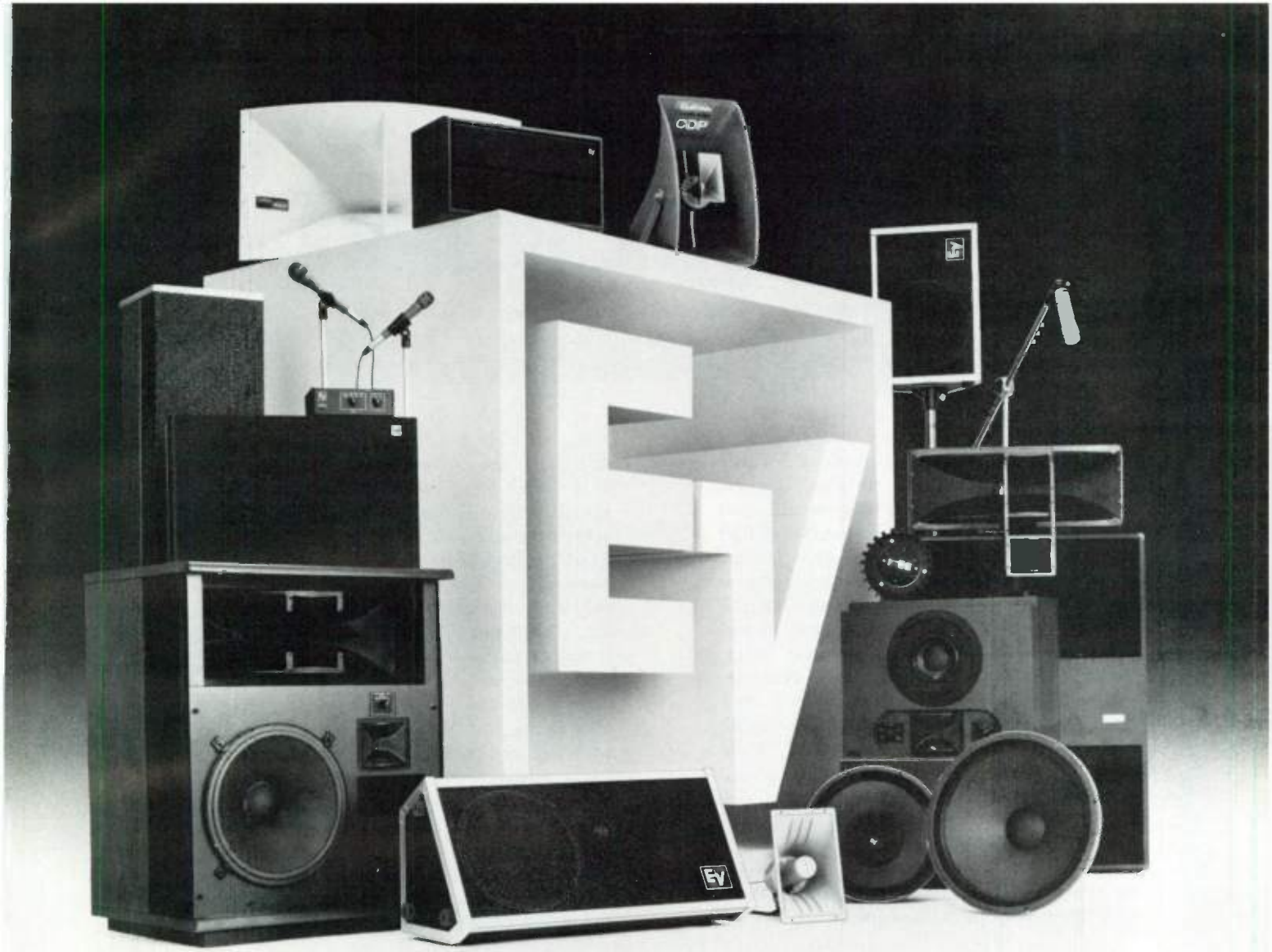
Maintain accurate and up-to-date accounting records for the service department. The biggest single reason for small business failure is poor accounting, and this is also true of the service department in your store. You cannot assess the performance of your service department without data. Accounting will also allow control of the biggest service headache—accounts receivable. Customers and manufacturers frequently are less than punctual in paying for service. Monitor these accounts closely and follow up with statements and reminders. Receivables may never be current enough to satisfy a banker, but close and accurate follow-up will usually result in eventual payment. *Plan* for receivables: They are an unpleasant but inevitable aspect of the service business.

Other problems you can expect to encounter are unaccepted warranty claims, parts back orders, and unclaimed repairs. These seemingly disparate areas have one common denominator which is shared with accounts receivable; that is, follow up is necessary and usually successful. If a warranty claim bounces, find out why, and re-submit it with any necessary supporting information. Parts backorders require frequent follow-up and persistence. Make certain the supplier is aware that a customer's unit depends on receipt of the part, and follow up frequently. Advise the customer that the part is on backorder, and keep him posted on any developments. Be sure to be prepared to supply claim or invoice numbers, dates, and part numbers, in dealing with the manufacturers. This speeds the process of getting answers to your questions.

The unclaimed unit requires follow-up on a very frequent basis. Don't hesitate to call or contact the customer repeatedly: It is his responsibility to promptly pick up and pay for his repair. In stubborn cases, a registered letter will be required for legal reasons, should you decide to sell the unit. Check your state laws concerning this area carefully or you could be placed in the position of buying another unit for the delinquent customer.

In all aspects of the service business, honesty is the most successful policy. Phony excuses to customers eventually catch up with you and quickly destroy the goodwill needed in the service business. Make promises and commitments only when there is adequate reason to believe they can be met. Your professional customers will expect this.

Carefully planned and implemented, a service department will prove a valuable asset to any retail store, both in terms of customer confidence and store profits.



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

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

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

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

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

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

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CIRCLE 98 ON READER SERVICE CARD

The SOUND SH

Looking out over that vast and immeasurable impasse known as My Desk, I am constantly amazed at the number of new products that come out every month, and even more amazed at the good qualities I find in some of them. (Don't ask me what I think about prices these days!) There seems to be no end to what people can produce for the humble musician and audiophile; each morning's mail brings news of yet another "startling, revolutionary, unprecedented, dynamic, state-of-the-art" creation. What can I say? Each month as I ponder my list of possible inclusions in this column I ask myself, "How can I possibly tell the people out there about everything I happen to run across?" and I always end up echoing the title of an old Aretha Franklin tune in answering myself: "Ain't no way." So, I'll just keep on discussing what few items I can each month. Now, with that off my chest, here goes.

In response to the high price of guitar synthesizers, **Electro-Harmonix** has come up with a small and relatively inexpensive floor unit, the Micro-Synthesizer, which is capable of producing a number of synthesizer lead sounds which are in demand among guitarists. The Micro-Synthesizer is operated by a series of slide pots that govern its various functions: octave doubling (both an octave above and an octave below the incoming signal independent of each other), distortion, attack, envelope filter, trigger, and an onboard preamp. Doubling and distortion can be blended in at the desired level in relation to the dry guitar signal. The "attack" is variable, thereby allowing for a "bowed" effect similar to the cello or violin, depending on how the octave doublers are set. The envelope filter is also variable. The rate of the sweep is adjustable, the amount of resonance can be adjusted, and the trigger allows one to adjust the sensitivity of the filter response. This means that it is possible to play a soft series of chords with no filter effect, and kick the filter in by increasing the firmness of the pick stroke for lead work. Finally, the preamp adjusts to match the output of various pickups to insure that the unit is not overdriven by a too-hot signal.

The Micro-Synthesizer is not a miniature Avatar, but it does offer an impressive array of electronic sounds at a reasonable cost.

CIRCLE 1 ON READER SERVICE CARD

Every disco club owner needs a "lease-breaker" of some sort. For the purveyor of pounding platters of hot wax, **dbx** has a new and unique "lease-breaker," and a couple other goodies guaranteed to inspire even the most seasoned Tony Manero clone to new feverish gyrations. Check it out!

Those of you already familiar with the dbx line will recognize the model 162 Compressor/Limiter. It is the only compressor on the market with an infinite compression capability, and as such, it can be set to regulate a disco system's level to a preset maximum based on individual room characteristics or the power-handling capacity of the equipment in use. One particularly outstanding virtue of

DOPPE

By Charlie Lawing

the Model 162 is that it provides overload protection for speakers and amps.

The Model 500 Boom Box is a subharmonic synthesizer which recreates extremely low frequency sound which is often filtered out of music in the recording and disc-mastering stages. dbx says that the unit will generate low frequencies that provide the tactile sensation of low frequency soundwaves to the bodies of listeners. And if that won't sell drinks, I don't know what will!

If the Boom Box alone doesn't do the trick, the hip disco dj simply flips the switch marked "lease-breaker" and on comes the Model 5000 Sub Woofer. This devious device has a power amp and speaker which operate only in the 25 to 100 Hz region of the frequency range. The sinister-looking Lease-Breaker's black cylindrical ported enclosure houses a 15" speaker that points downward for optimum bass response when the unit is positioned on its four 4" legs. Guaranteed to shake the enamel off every exposed toenail on the dance floor!!

CIRCLE 2 ON READER SERVICE CARD

A new front-loading 2-head cassette deck—the model 580—has been introduced by **Nakamichi** Research (U.S.A.), Inc. The 580 employs Nakamichi's record/play SuperHead, featuring a "specially formed" 0.9 micron gap for flat response to 20,000 Hz "with no sacrifice in recording headroom." The new "Direct Flux" erase head, according to the company, does not depend on flux leakage to penetrate the tape coating, but converts erase current directly to flux at the point of tape contact, and is "equivalent to bulk erasure of the tape." The transport of the 580 ("Diffused Resonance") is of a double-capstan design, with the flywheel, capstan and pressure roller on the take-up side individually different in diameter and mass from their counterparts on the supply side, therefore rotating at different speeds and dispersing of resonances. New non-resonant materials damp vibrations from moving parts, reducing modulation noise.

There are three motors in the transport. A phase-locked-loop DC servomotor system drives the flywheel/capstan assemblies, a second motor is used solely for the fast-wind functions, and a third motor replaces the usual solenoid plunger regulating the head base/pressure roller assembly. Other features include cueing, double negative feedback configuration in the record and playback amplifiers and a DC record circuit. Suggested retail price is $650.

CIRCLE 3 ON READER SERVICE CARD

Electronic piano? Sure, I've got your electronic piano right here: the new **Roland** MP-6000. This unit is a 64-note affair which has a *mechanical* action. So what's so good about a mechanical action? Well, that means it has a touch like an acoustic piano; the harder you hit the keys, the louder the sound, instead of a constant volume situation like you find on most all-elecronic units. Any keyboard player will tell you that this makes all the difference in the world; without a variable touch response, all those little words on the chart like "piano" and "forte" don't get any attention unless you use a foot-controlled volume pedal to soften the sound, and even that is not quite the same thing.

In addition to mechanical action, the MP-6000 has three variable voicing sliders (Piano I, Piano II, and Harpsichord) which can be blended together to taste. A 6-band graphic equalizer further complements the voicing sliders. When you put all of it together, a wide variety of sounds ranging from honky-tonk to mellow can be realized. As if that wasn't enough in itself to send keyboard players to the bank in droves, the MP-6000 also has a variable decay time slider. Various articulations from short popping sounds (a la clavinet) to gradually fading decay are made possible by the decay feature. The MP-6000 has a suggested list of $1195.

By the way, another handy item recently offered up for public consumption by Roland is the TU-120, a stroboscopic 12-note tuner that operates off batteries or AC, and retails for $199.50. The unit has a 16 LED display, a built-in mic, calibrator, and a 5-octave range.

CIRCLE 4 ON READER SERVICE CARD

Sansui has introduced three audio accessory drawers designed to be mounted between components in standard racks. The units are all 19″ wide and 11-5/8″ deep and vary in height to accommodate different audio accessories and to fit in varying spaces. Each

drawer comes with a protective foam liner that can be cut out to hold specific items. Model RX-150 (5-5/16″) carries a suggested retail price of $50; Model RX-100 (3-15/16″) $40; and Model RX-50 (1-15/16″) $33.

CIRCLE 5 ON READER SERVICE CARD

PM Audio is a straight-shootin' outfit out of Garland, Texas, headed up by Mr. Gary Pelfrey. PMA sells speaker enclosures and stage monitors that are suitable for live sound reinforcement or disco use, and they are distinguished by their use of good-quality components throughout. EV speakers, EV drivers, Heil (or a reasonable facsimile thereof) radial horns, and the popular "peizo" tweeters are the basic components used by PMA in their Models 800, 802, and 805.

The model 800 is the slanted floor monitor (the English call it "foldback"; gospel groups in the South call 'em "sleepers") that employs a 15-inch speaker, radial horn and one peizo in an efficient three-way system. The maximum power input is 150 watts continuous program; frequency response is 50 Hz to 20 kHz; maximum sound level is 110 dB. The impedance is 8 ohms; dispersion is 90 degrees; and

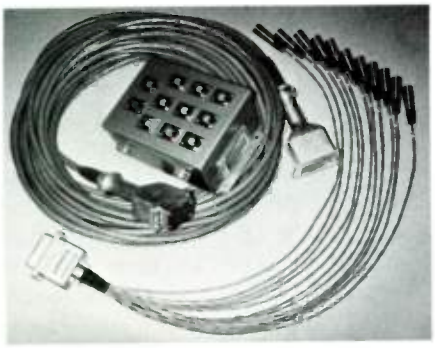
the crossover frequencies are 600 Hz and 35 kHz. The Model 800 is 16″ deep x 25″ wide x 21″ tall, weighs 45 lbs. and is finished in black fiberglass.

The Model 802 measures 20″ deep x 28″ wide x 29½″ tall and weighs 110 lbs. It has the same continuous program wattage, frequently response, dispersion, impedance, and crossover points as the Model 800. The maximum sound level of the 802 is 120 dB, and it is also finished in heavy-duty black fiberglass.

The Model 805 is the twin-15″ version. It has a maximum power input of 200 watts continuous program, maximum sound level of 130 dB, and an impedance of 4 ohms. The Model 805 measures 20″ deep x 28″ wide x 44½″ tall, weighs 125 lbs. and is finished in fiberglass. Give PMA a call; they're ready to talk.

CIRCLE 6 ON READER SERVICE CARD

Concertaudio has introduced its professional MXC-Series Snake Systems. The MXC-Series Professional Multi-Pair Snake Cabling Systems are available as stock off-the-shelf complete units in 9, 11, 12, 15, 17, 19, 27 and 30 pairs. They are available in stock lengths of 125 or 250 feet. Each unit features a removable heavy-gauge steel stage-plugging box and a removable pigtail unit terminated at one end with 3-pin or contact professional audio connectors (Switchcraft QG Series) and at the other end a milspec aerospace multi-pin connector. The opposite end of the cable mates in a similar fashion with the removable stage plugging box. All terminations are balanced and individually shielded.



CIRCLE 7 ON READER SERVICE CARD

The Model 2300 has been added to the line of high end power amplifiers of **Scientific Audio Electronics**, Inc. Company specifications indicate the power amp delivers 150 watts per channel minimum RMS, into 8 ohms from 20 Hz to 20,000 Hz, with no more than 0.05% total harmonic distortion. The 2300 incorporates "full complementary circuits" and a toroid transformer, in addition to "full thermal protection" in case of high temperature conditions, signal relays, and an LED array to monitor the amplifier power output. Suggested retail price of the SAE Model 2300 is $700.

CIRCLE 8 ON READER SERVICE CARD

AB Systems has unveiled its Model 301 Visual Display Output Control Unit, designed to provide a "high resolution" 2-channel visual display of amplifier power output levels. Each three-color readout features 15 LED's closely mounted in a "cube light" lens. The unit features a peak responding 42 dB range and provides pushbutton selection of three stereo speaker systems with indicating LED's and an independent headphone output jack with level control. Eight dual five-way binding posts are located on the rear panel for two amplifier channel outputs and six speaker loads. Independent channel sensitivity controls for the LED display are also provided to allow 0 dB calibration from 2 watts to 500 watts.

CIRCLE 9 ON READER SERVICE CARD

By Phil Missimore

DEALER DOSSIER

Hanich Music
W. Covina, California

Nestled in the suburbs of Los Angeles (Covina, to be exact), Hanich Music has steadily been nurturing its reputation as a retailer both to the general public and the music industry. Artists such as Neil Diamond, Rolls Royce, the Crusaders, producer Norman Whitfield, and The Who have been among the industry figures involved with the store. Nick Hanich, who played as sideman with both Stan Kenton and Woody Herman, among other bands, has been able to translate his musical experience into an ongoing relationship with some of the music industry's giants. At the same time, however, his store retains a decidedly low-key, local atmosphere that continues to draw a steady stream of local musicians. Beginning with a small store specializing in band instruments, Hanich Music has grown into a full-service music store, carrying everything from low-end acoustic guitars to concert-quality p.a. systems. Despite its size, however, the store gives off a friendly, warm atmosphere, due no doubt to the unpretentious, relaxed manner of its owner. Nick Hanich's manner is somewhat deceiving, though, since there is a good deal of solid business sense under his folksy manner.

How did you get started?

I started eight years ago, in a store that was mostly band instrument oriented, about four miles from here. It was about 75 square feet, with old, archaic equipment. I'm sure a lot of stores started out that way. I walked in the door and said, "Gee, I'd sure like to be a Manny's." I had $3,000 of inventory. I'd played on the road with Stan Kenton and Woody Herman, and a lot of people that most people probably never even heard of. But that was my only affiliation with major musical stores. I said to myself, "I'd sure like to start out like one of the giants." But here I was with zero inventory. I'll never forget the first four or five months—I wore a suit and tie. I had the coffee tables out with the instruments on them, just like the old-school music retailers. Well, I had an accident about then, was in the hospital for three weeks, and came out with a beard. And my whole attitude changed. I decided to tell it like it is, and be myself. And I really had no idea that the attitude change was going to be so successful. Fortunately, this was at the time when everybody was starting to do that—you could just let loose; a carefree attitude came into play. Within three years I was going crazy, just going down to the studios. I spent a lot of time in studios with different producers, and became good friends with them, since they were groping for a knowledge of electronic music that would fit in with contemporary styles. Since I had been on the road with a lot of these guys, they had become incredibly successful producers, such as Norman Whitfield. These guys remember that, and that affiliation gets you into it a little bit.

So it became a word-of-mouth thing in the industry, as you kept circulating?

That's exactly right.

Did it then filter down to the local level?

No. What happened was, being outside the mainstream, the record industry mecca of Los Angeles, I brought the studio industry out a little ways. What the producers and musicians realized was that since they were in the studio making records, it didn't matter whether I was coming from 100, 500, or 2 miles away. Their interest was solely in the new sounds they were getting. For example, I can't tell you how many times Wayne Henderson, who's a tremendously successful producer, has called me at 2 or 3 in the

INTRODUCING THE NEW STANDARD IN POLYPHONIC SYNTHESIZERS

There's an incredible sound waiting to amaze you in the new Roland JP-4 Polyphonic Synthesizer. And a new breed of technological advances to make that sound more accessible than ever before. The result—a musical unity between you and your instrument like nothing you've experienced!

FOUR-VOICE POLYPHONIC Play four-voice ensembles in one or two octaves simultaneously. In mono or stereo. And hold the sound while your hand leaves the keyboard to play another instrument.

COMPUTER MEMORY Store your most often-used patches in the JP-4's electronic memory for instant recall while playing. An integral battery back-up system protects the sounds you've programmed. Or, select from ten fantastic, new preset patches at the touch of a button.

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CIRCLE 87 ON READER SERVICE CARD

morning, out of a sound sleep, to tell me the equipment I showed him two or three weeks ago was just the thing he needed. I don't think you could get started in the business today for what I started with eight years ago. You'd need an incredible amount of money to have the inventory I have.

So the climate today is tougher?

Right. I couldn't imagine somebody going into business today. In my keyboard room alone, I've got $150,000 in inventory. I think it would be incredibly difficult to match that up front. At the same time, I think the trend will continue toward the larger stores who provide good customer service becoming even larger, leaving the smaller stores behind.

Have you seen the percentage of local versus industry business increase?

Well, I'm in a good position. Almost all of my Hollywood traffic is babied by me, rather than my sales force. My bread and butter is the local traffic; we get tons of kids, and I'm able to make a profit selling to them. When I deal with the industry types, it's one-to-one, and the deals are very tight; if I had to make my business solely on the basis of industry activity, it would be tough to make a profit. So the industry business is kept separate from the local traffic, although they both feed off each other. I can take care of the industry business, but I've got 10 to 15 guys on the floor, and they take care of the local business. It's almost like a Mom and Pop business.

You mentioned your sales force. How do you select them, train them, and keep them?

From day one, I wanted to have a qualified, professional sales force. By some crazy chance, and I don't know how, I have seven guys in the store with degrees, three of whom were teaching school and quit to come work for me. The guy that just walked into the store, for example, is in charge of our drum and band instrument sales. He was teaching school seven months ago, making $15,000 a year, and just got fed up. You asked how I choose them, and it's something you just learn. I look for qualified, professional sales people, who know their stuff. What's appropriate for band instruments may not be for other areas.

Do you hold regular sales meetings?

Twice a week. Once on Monday mornings before we open, and on Saturday. About once a month we'll have a manufacturer's rep come in and talk about some new products. The other three are more or less my chance to talk to the guys, and get a feel for what's going on.

In terms of products, how do you keep on top of it? Is it through salesman feedback, your customers, or both?

I do all the buying for the store, and sometimes it gets a little crazy. You have to have a feeling for what's going on in the industry, plus your feedback. About 75 percent of it should come from your sales force, and the other 25 percent from customers who come in and say, "Do you have this equipment I saw last month?" or whatever. You depend on that feedback to keep you in touch. You read about new equipment, and you have to make a judgment on it —is it the right thing to buy? That's another thing the sales meetings are great for. The salesman will say to me, "What about that XYZ guitar you were supposed to order three weeks ago?" Then I'll make a note of it, and first thing on Monday I'll put in the order. The salesmen probably think I

order alone, but really, the knowledge used is their knowledge.

Inventory control, though, is the killer. I have two people who work eight hours per day on new inventory, bringing it in, tagging it, putting inventory cards on it, and filing them. That was the toughest thing to do, because going from $40,000 worth of inventory to $600,000 to $800,000 in inventory, you can lose it real fast. Now I don't think I have a real good inventory control, but from talking to other industry people out there, my control is phenomenal. At least I can go back and count how many Odysseys I have, by pulling out the cards, and be correct. I've talked to guys who've said to me, "Excuse me while I go out to the warehouse to count how many I have." When you're talking about Les Pauls or Stratocasters, where you have a very fast turnaround on a lot of items, you're going to "lose" ten of them very quickly. It's a hard thing, inventory control. It's so tedious. Most owners and managers and salesmen just don't want to be bothered by filling out a card when they're making a sale. They want to do it, get it out the door, and get back to selling again.

Do you think you're as on top of that as you could be?

They (the salesmen) have to fill out the forms, or they don't get the commission. I would say that now I never have to make frantic calls to track down serial numbers and stuff. In the beginning, they might have missed a few, but not now.

In terms of how your salesmen work, do you think it's getting easier to sell as customers become more sophisticated? Or is there still an educational aspect to selling?

When a kid who's 14 comes in and blows a salesman away because he knows so much about a particular power amp, then you've got to get working. That's when you realize you have to stay a half-step ahead of the customer, showing him what these things are. It's happened with every product I've sold. I've had some 14-year-old come in and he just buzzes some salesman. That's when the salesman goes back and tries to read up on that product, to know as much about it as he can. I would say, if anything, that it's even harder now, because you have to be constantly on top of your salesmen, making sure that *they're* on top of the newest trends. You have to work to get the reps to spend some time with them. It's a constant effort you have to make. The salesman has to keep on top of the products; sometimes reps don't want to come on a Saturday or whatever. A few of the manufacturers are doing the retailer the favor of holding sales seminars and product seminars. Peavey is doing one that we'll attend; Arp does a lot with their synthesizers, and you have to take advantage of things like that.

Would you like to see a greater input from manufacturers on product data and sales aids? Obviously, it's a sensitive area.

Yes, it really is, because retailers and manufacturers don't know how sidy by side they really are. I feel like I'm always having to defend my position as a retailer. If manufacturers would stay out of the retail end of things, which is selling to customers, and concentrate on producing the best possible product at the most reasonable price, I think business would be improved. The problem is that too many manufacturers think that *they're* the ones selling equipment to the stars, and they become too egoed out. If they would leave retailing to the retailers, things would be much better. They could then come to us and say, "Look, retailers, we've put out this product; we want to get feedback from you on how to improve it, we'll take a conglomerate of ideas, and we'll make products that you can sell." It's been a real bitch of mine for many years, because I think I sell better than any of the manufacturers. I'm among musicians four times a week, in intensive sessions that most manufacturers wouldn't even know about. I'm there, in with the shuck and the jive, retailing my customer. But manufacturers think that they can do that. Still, retailing and manufacturing should work hand in hand. I can't manufacture; I can say what products should be like, but I'm certainly not competent to manufacture. I've talked to retailers who've said, "Manufacturing is nothing at all." Well, I went down to Peavey, and when I saw the boxes and boxes of parts, and the sheer number of things, I knew I didn't want any part of that. Both sides need to be mutually respected. You find manufacturers sending their reps to colleges, for example, when what they should do is send that rep to dealers, and tell that dealer, "You are my 100 percent

authorized dealer for the area." And that should be based on service, attractive displays, a quality sales force. But in order for me to have that edge, in order to pay my people properly, the manufacturer has to produce that product for the least amount of money. It's the same in other areas. Then, the manufacturers expect us to do the discounting. Well, we have to stay trim; I can't pay my guy $40,000 a year, but I think he's really worth that much, and I do pay my people very well. One of my people was with Rolls Royce the other day till three in the morning, just taking care of their needs; the manufacturer isn't aware of how much time and effort that takes.

You mentioned your feeling about manufacturers expecting retailers to do the discounting. Just how competitive is the price situation for you?

Well, everything I'm talking about is the way we see it here. I don't want to sound like a know-it-all, because there are stores that do business very differently from us, and they do incredibly well. So I can only talk for myself and my store. Since the situation is so competitive, I can't understand how the retailer can't make money—and it's the fault of both the retailer and the manufacturer. The manufacturer saturates an area—puts too many dealerships in one general region— and the dealer doesn't know what actual cost is. The retailer, for example, gets an invoice for something that says, $320; and he says to himself, "That's the wholesale price," when actually it isn't. What it really costs him is what it cost to get the guitar there, which might be $10 in freight; so now you're at $330. Now that's wholesale, right? Wrong. Because you've still got to add in overhead—your rent, electricity, phones, salespeople—so say that comes out to $25. Now, that's hypothetical, of course. But that merchandise that was invoiced at $320 is not the retailer wholesale cost. It's really $355. That's the way it is. Now, that's just break even; I can't put any money in my pocket, pay Christmas bonuses, anything else. I can't even really sustain myself, because I can't go back and buy more merchandise. And say the interest rate has gone up since then. So I'm not even staying up with things. So that price that retailers call retailer invoice is really a joke. What retailers don't realize is when they knock 40 percent off the "list price," they're in trouble. Say you've got a list price of $650 on that $320 item; 40 percent off means a *real* profit of $30; most dealers think they would be getting $70.

And that's one way dealers get hurt.

Sure, because they don't understand the concept of wholesale price. I used $35 as an example—it would probably be closer to $60. You're out of business, and you don't even know it. And you're selling at 30 to 40 percent off, and you're out of business. And then you have the question of how professional you want to be. How much do you want to pay that man on the floor? You want to pay him $30,000 per year? Then there's no way you can sell at $375. You have to make your profit, his profit, everybody's profit in the deal. The list price thing is a joke for me, too. A list price of $650 for a $320 item is insane. I don't know how manufacturers arrive at that figure, unless it's through old-time retailing, so the guy can say, "But I'll give it to you for 30 percent off." I can't say for sure, but I think most normal industries would use a 35 percent markup beyond wholesale, so that an item that costs $500 wholesale should list at $665, with no discount. I spend $450 a week on my service department, just to provide service to all my customers —and it's a lifetime warranty. It's an edge that I feel is worth it to me to have. It's my way of keeping ahead of the competition.

Does the same price structure hold true for your P.A. and related equipment sales? Recording equipment, for example, has much narrower and rigid margins.

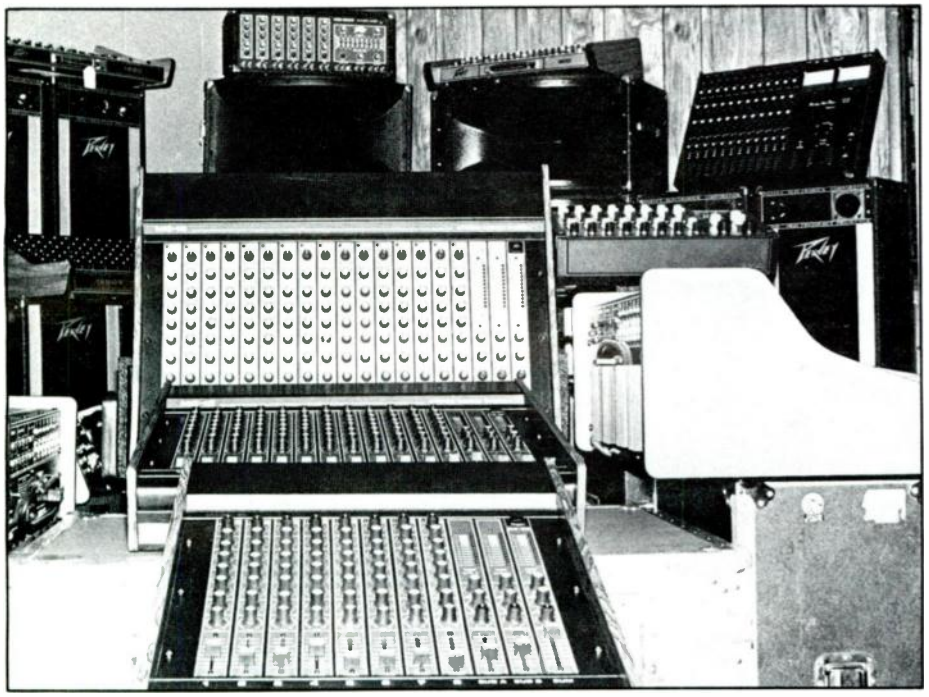
What you're really saying is, how can you professionally sell and service p.a.'s, without discounting, while at the same time schlocking guitars and amps. And I think there really isn't any difference between the two—or at least there shouldn't be. You should be after the same kind of margins in p.a.'s as you are in guitars and amps. The problem is that manufacturers overdistribute.

Do you see the store continuing to expand from band instruments to a full line of musical instruments to recording equipment?

Right now, that's the industry pattern. And it's a decision that I have to make in the next six or seven months. We have sold some tape recorders, and some studio related equipment. I know that it's not too

late to get into it, but I question whether the musician can get the same qualified sales help and advice on recording as he does now on drums. Will that be another room in here, down the road, or will it be an almost independent setup with some guy managing things. That's what's on my mind right now, and I'm being very cautious, because I have to take a real close look at what this recording thing is. I've thought about it a lot, but I've got so much business in musical instruments, p.a.'s and synthesizers, I wonder if it's worth it. That's something I have to decide. The cash outlay to get started is expensive, too.

Plus the need for competent salespeople.



Sure. So is it worth it? It's something I have to look at seriously, because I feel that the musician will feel more comfortable buying recording gear and outboard studio stuff in a music store than a stereo outlet. We have established a rapport with musicians which would carry over into the recording equipment field.

What kinds of advertising and promotion do you find most effective for your store?

We started advertising in national publications. My mind tells me that we haven't realized sales that have matched what we've spent, so I just do it. I don't analyze it or even worry about it. I know I need the advertising to build up credibility and image. There's no way I can tell you the money I've spent each month is returned exactly in sales. But I've committed myself to a three-year program, just like a training program for an athlete. I know that three years down the road it's all going to be of benefit. That's why I did it. And that's what happened—we've built up credibility and our image. We spent money on radio, on KBCA, the Los Angeles jazz station, reaching what I would consider a more sophisticated musician. I concentrated on reaching them, and then sort of funnelling everything through them.

Did you see a direct response?

No, people didn't flock in. But that's not the point—the advertising was part of the overall plan, and overall it worked to build up the store's image and credibility with the industry and the public.

What percentage of your business is in p.a.'s and synthesizers?

Maybe 65 percent.

That's a lot.

Sure, but p.a.'s and synthesizers are big ticket items. We had a $4800 deal yesterday afternoon, and it was two guitars and a bunch of p.a. gear. Maybe that's really telling me that I have to strike out and pump more business in guitars and amplifiers. But p.a.'s and synthesizers are hot right now.

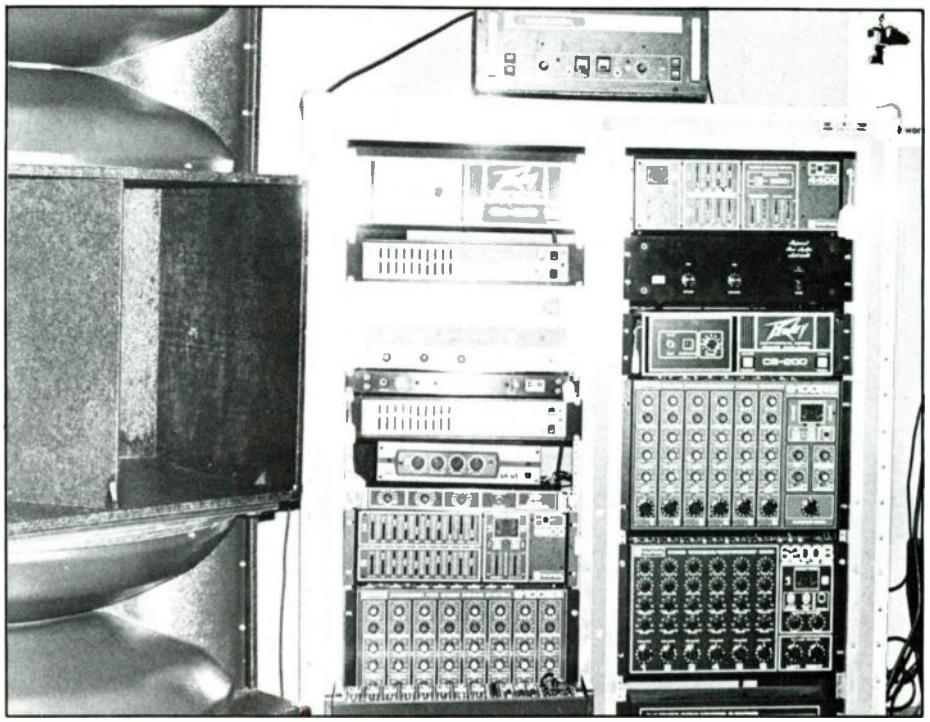
But people can't continue to buy p.a.'s—it's a one-shot deal.

Right, but the key is to get people to come back. I emphasize this at every sales meeting. I tell them, "Let them try out everything, be helpful, but ask them to come back and buy at least

one set of strings in the next couple of months." It's our salesmen's job to help customers pick the right products, help them to finance the deal if necessary; but if the customer doesn't have the money, they should go ahead and make him feel at home, but always ask them to come back to buy some strings when they can. If you do that, you'll have a rapport established so that when the kid comes back to buy a major purchase, you'll have the inside track.

What kind of trends do you see in store for music retailers?

I think disco is going to be a new area. I think it's going to leave more of a mark on the music retailer than we believe right now.



In what way?

Clubs in our town here, where we had 50 with live bands, now maybe half are disco. No bands. So that neighborhood musician isn't going to be buying equipment anymore.

What about disco sound systems?

Well, I don't know if it's disco sound systems. Maybe something different, like tapes. Maybe your neighborhood musician, to cope with things, will go to the studio to cut some disco tapes, for example. It's another thing I have to try and analyze. Is disco going to be around really heavily for a long time? If it is, it's going to have a tremendous impact on the music industry. There will be more disco record contracts, more groups. I think you have to look at disco a little differently. I have to laugh at everybody wanting to brush it off. You're going to have to get into some p.a. business, some speaker business, some power amp business for clubs, maybe even some lighting business. I've even considered putting some disco lights and sound into one of the back rooms, but business has been so good, it's been easy for me to brush it aside. But disco is really changing things. Club owners like it, because it's easy to install, and the costs are lower than hiring a band. That changes the whole concept of a band, which was supposed to be the entertainment—to draw crowds and make the booze flow. Now, a hot disco d.j. can be an mc, introducing the best bands in the world over a super sound system; a band doesn't stand a chance. Now, maybe that will cause bands to sharpen their acts in order to compete. So how can a music store take advantage of that? Maybe some lighting, some tape, some sound systems. Maybe we need to concentrate on the d.j.—servicing his needs. Maybe a cassette to use for his breaks; maybe some lights he can buy. Who knows? I've done about 6 or 7 installations for some clubs—putting in the floors, the sound system, arranging for the lights, etc. I don't like dealing with the club owners, because it's a lot more impersonal than dealing with a musician. There's no rapport. But disco is happening, and dealers should take advantage if they can.

INDUSTRY UPDATE

Jack Berman Company has been named Rep of the Year of Koss Corporation. Berman covers southern California, Arizona and southern Nevada.

Superscope, Inc. has closed its New York sales office and appointed **E. J. Green**, Inc. as sales representative for its Marantz and Superscope product lines the metropolitan New York.

Bertagni Electroacoustic Systems, Inc. has added five new sales rep firms to handle their line of Sound Modules. The firms named are: Market Reps, Inc., Carduner Sales Corp., Vector Sales, Carlos Maymir, and Mike Guilday.

Frank Diener has been named Regional Manager of Paul Hayden Associates of East Point, Georgia. Diener will be headquartered in Greenville, North Carolina.

TDK Electronics Corp. has a new "quality approved" hologram display available to all TDK dealers through their coop allowance program. The hologram is mounted in a smoked plexiglass display module.

Rank Hi Fi, Inc. is running an "April in London" sales promotion offering dealers one week in London. Qualification involves the purchase of a specific amount of either Leak or Wharfedale products.

Optonica High Fidelity Products has appointed **David B. Baker** as Western Regional Sales Manager, to be based at Optonica's Long Beach, California office.

Bruce Larson has been named Senior Engineer for Nortronics' Recorder Care Division. Larson was previously with the OEM Division of Nortronics.

Paul A. McGuire has been promoted to National Sales Manager at Audio-Technica U.S., Inc. He was previously Sales Manager—National Accounts.

The Penril Data Communications Division has appointed sales representative companies to "strengthen the field sales organization." Sales representatives appointed include: Comspec Inc., Crane & Egert Corp., CSS Telecommunications Specialists, First Rep Company, G. Gerhard & Associates, Sierra Financial, Technical Representatives, Inc.

In an internal reorganization, Superscope has made the following staff appointments: **Martin Katz** has been named Vice President of Marketing; **Mort Gleberman**, Vice President/General Manager of the Imperial Division, has been given the additional post of Vice President, Product Development and Planning for all product lines. **Steve Rand** has been named Assistant Vice President, Audio Markets; **Doug Chatburn**, Assistant Vice President, Imperial Sales; **Hal Loman**, Assistant Vice President, Special Markets. **Ken Rottner** remains as Marantz Audio Sales Manager. **Bill Steffen** rejoins the company as Special Markets National Sales Manager. **Archie Stickel** has been named Sales Administrator, Audio Markets; **Bud Gehrke** has been named Sales Administrator, Special Markets. Three new positions of Audio Markets Regional Sales Managers have been created to be filled by **Joseph Deo**, eastern region; **Dick Isola**, midwestern region, **Joseph Sanchez**, western region. **Tom O'Mara** has been named Eastern Regional Sales Manager for the Imperial Division. **Anthony Blazina** has been appointed Vice President of the Pianocorder Division.

Superscope, Inc. and Sony Corporation have concluded an agreement for an accelerated termination of Superscope's exclusive U.S. distribution of certain Sony tape products. A non-exclusive relationship covering the remainder of present inventory and current Sony products to be sold by Superscope will remain in effect through March 31, 1979.

Wayne Freeman, formerly Sales Manager of Uni-Sync, has teamed up with Carlile and Associates, the southern California representative.

The board of directors of CAMEO (Creative Audio and Music Electronics Organization) has formally approved preparation of a complete book on the fundamentals of creative audio and has simultaneously launched a nationwide membership drive. The concept of a booklet of pro audio basics, which will take about six months to produce, was presented by program co-chairman **Larry Jaffe** (Uni-Sync) and **Larry Blakely**.

Chuck Gring has been appointed Music Sales Manager for Electro-Voice, to be responsible for all music speaker and music microphone distributor sales, and for organizing a dealer sales training program. Gring was previously owner and manager of Music Center of Augusta, Georgia and, prior to that, was with Norlin Music.

Shelly J. Bunnett has been named Sales Administrator of Uni-Sync, to handle co-op advertising, dealer and rep communications and assistance in the application of overall marketing and sales programs. Ms. Bunnett was previously with TEAC.

The 1979 Winter CES will be held Saturday, January 6 through Tuesday, January 9 in Las Vegas, utilizing the full exhibit facilities of the Las Vegas Convention Center, the Jockey Club Hotel, and the Las Vegas Hilton. Over 700 exhibitors will utilize more than 450,000 net square feet of exhibit space. More than 40,000 attendees are expected. The schedule of retail oriented product conferences and seminars and retail management workshops will be expanded this year.

The NAMM 1979 Winter Music & Sound Market at Disneyland will open at noon on Friday, January 26 and run through Sunday, January 28.

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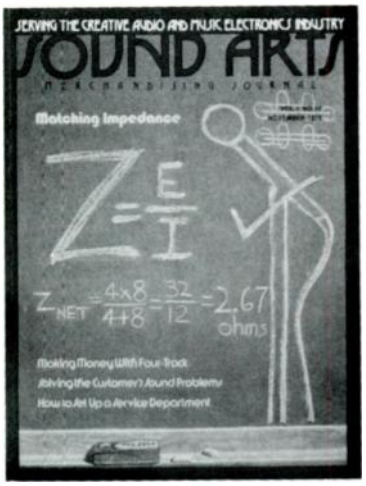

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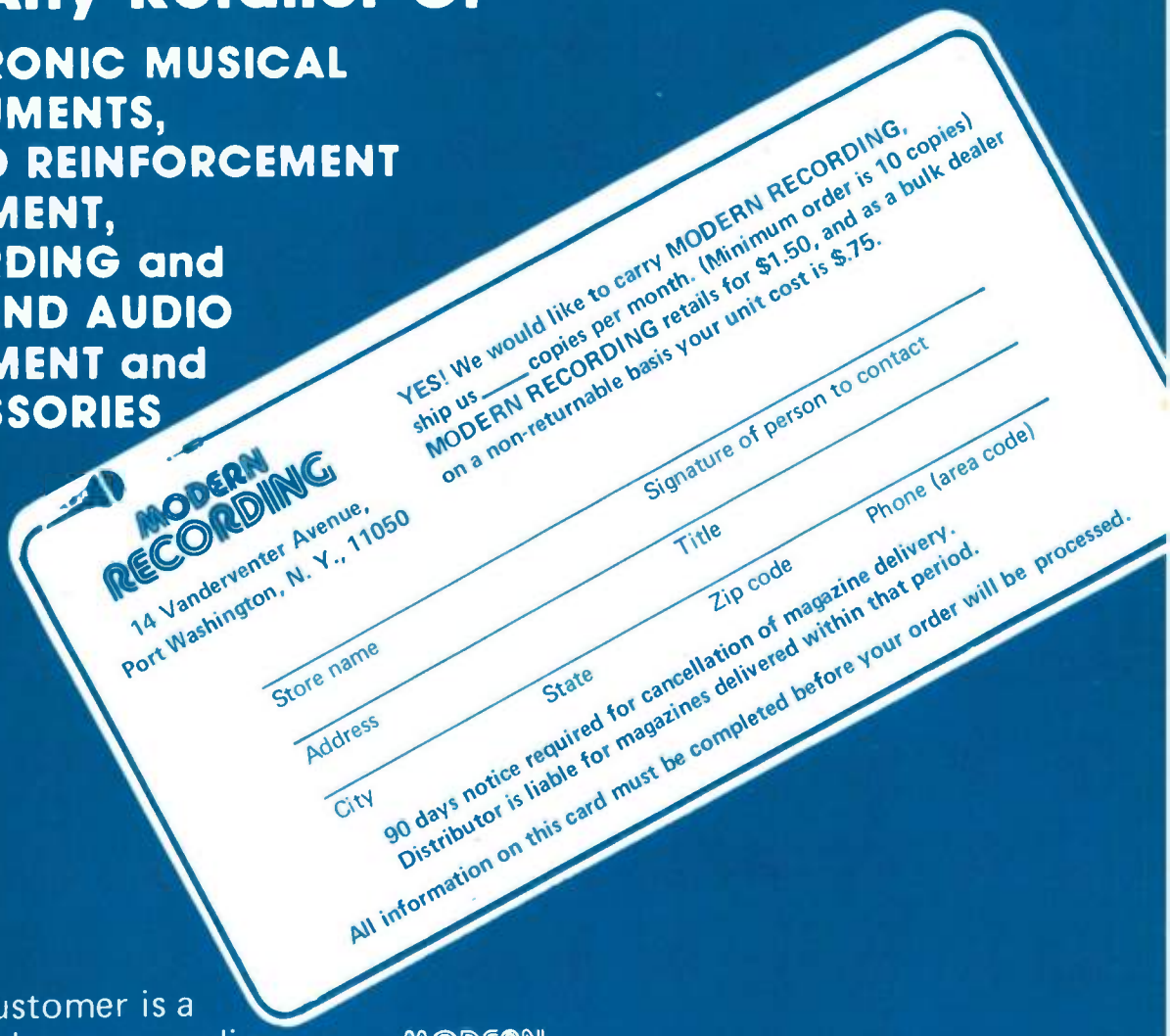

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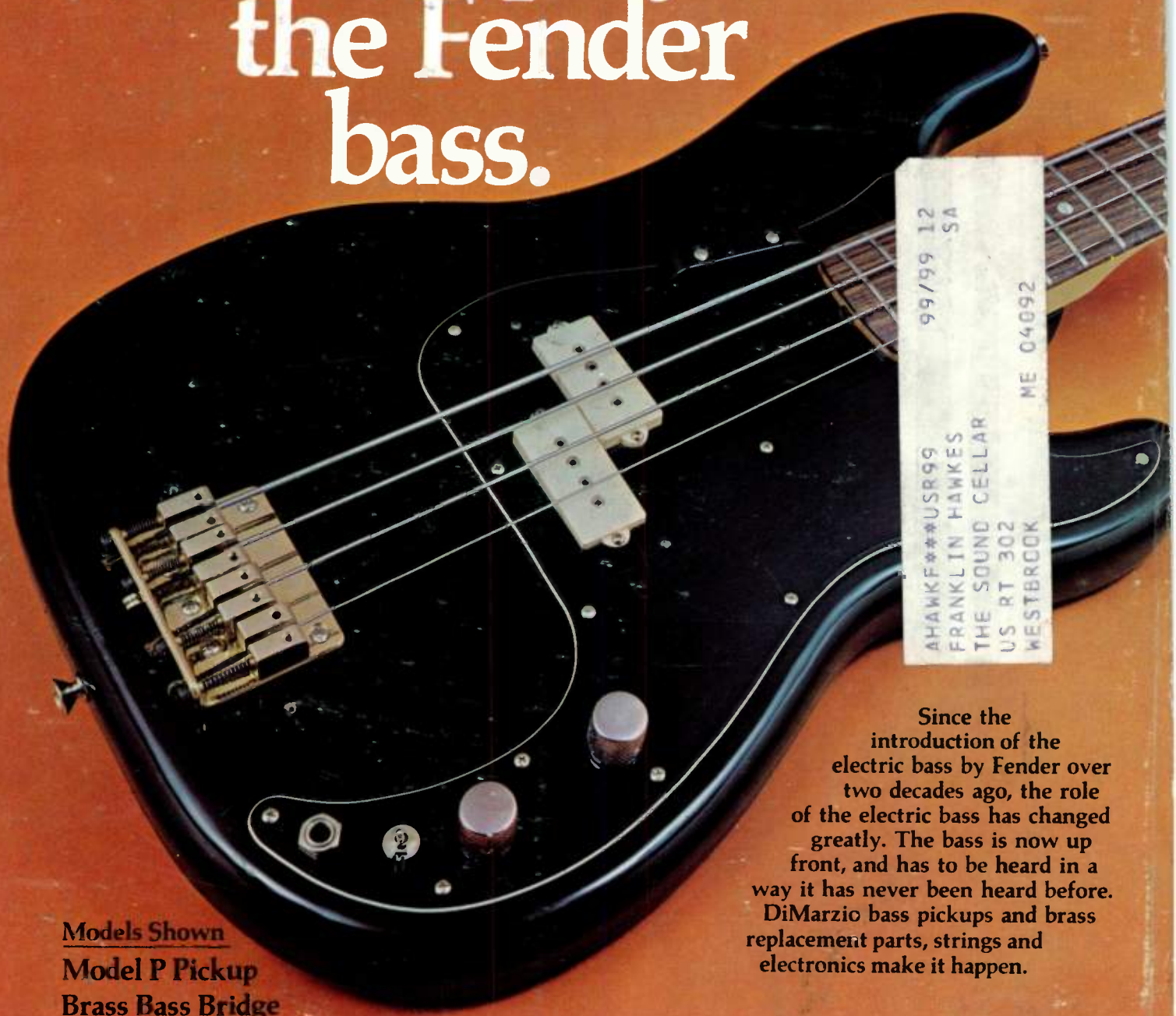

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