SERVING THE CREATIVE AUDIO AND MUSIC ELECTRONICS INDUSTRY

SOUND ARTS

MERCHANDISING JOURNAL

$2.00

VOL. 3 NO. 9
OCTOBER 1980

ACOUSTIC DESIGN FOR ALL BUDGETS

PRO SOUND DEALE
THE GOOD, THE
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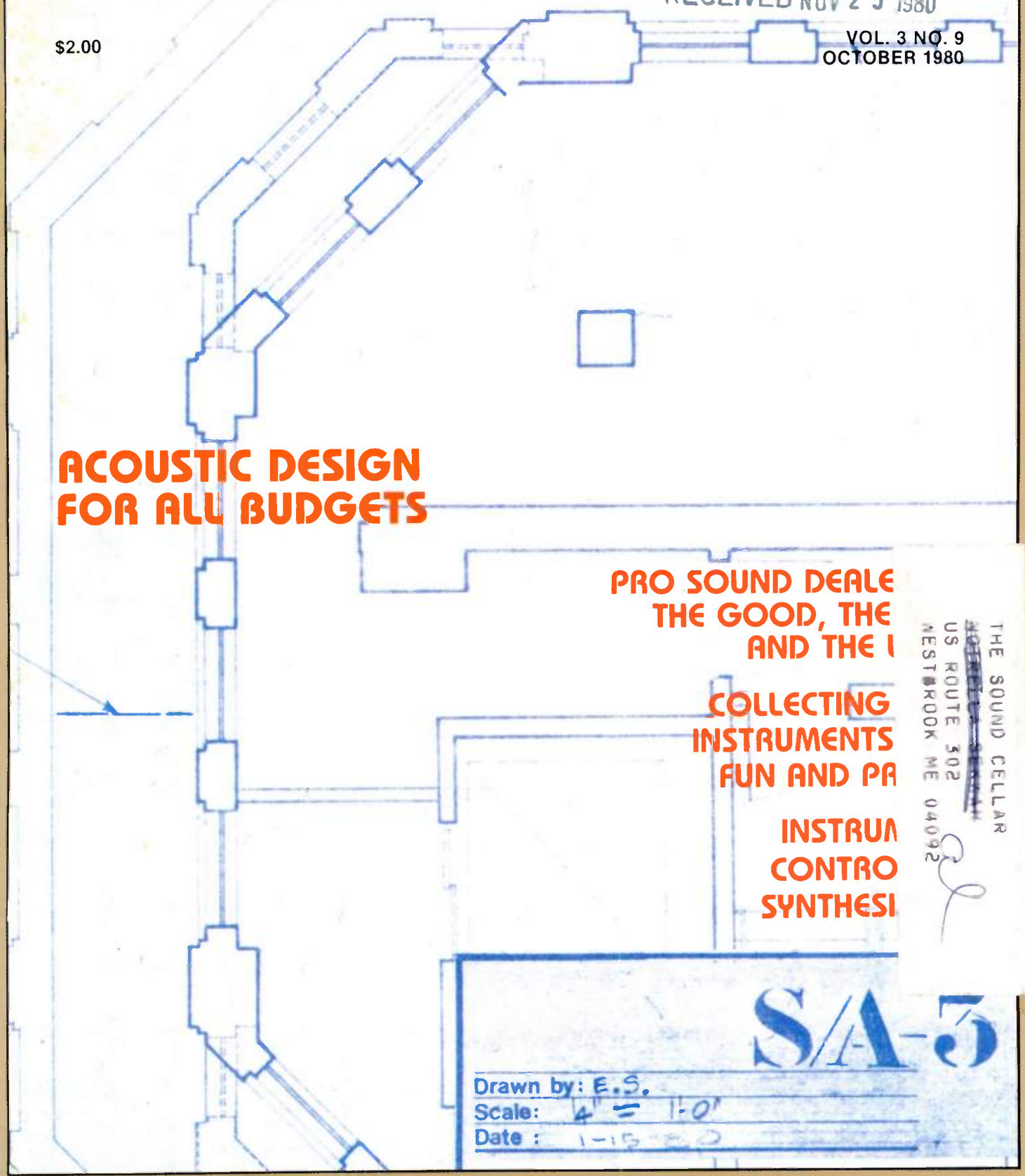

EXPRESSION

MXR Innovations, Inc., 740 Driving Park Avenue, Rochester, New York 14613. (716) 254-2910

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Mike Smith is an aggressive and successful young retailer who's eager to try promising new approaches to building his business. When we showed him the Bose® Wall concept in the fall of 1979, he thought it was worth a try. Now that he's used the Bose Wall for over a year, listen to what he says about it.

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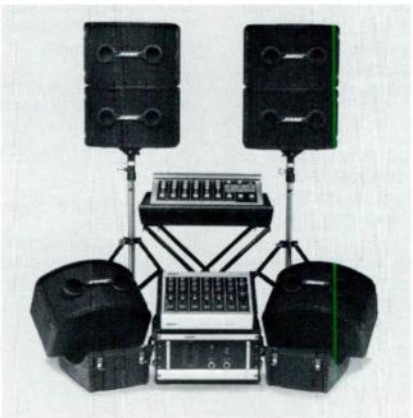

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JBL 4313 Studio Monitor.
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Introducing the 4313.

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This new, compact professional monitor produces deep, distortion-free bass. And does it with a newly developed 10" driver. Its massive magnet structure and voice coil are equivalent to most 12" or 15" speakers. Yet it delivers heavy-duty power handling and a smoother transition to the midrange than most larger-cone speakers.

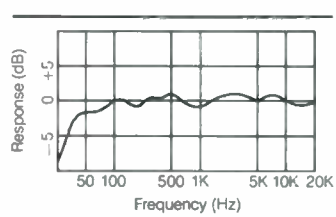
The 4313's edge-wound voice coil midrange accurately reproduces strong, natural vocals and powerful transients.

Up top, a dome radiator provides high acoustic output with extreme clarity and wide dispersion. A large 1" voice coil gives it the ruggedness needed in professional use.

Working together, these precision matched speakers offer superb stereo imaging, powerful sound levels and wide dynamic range.

Audition the 4313 soon.

We think you'll agree that its combination of flat response, power and moderate size flattens the competition.



On-axis frequency response, 4313 monitor.

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JBL First with the pros.

CIRCLE 65 ON READER SERVICE CARD

SERVING THE CREATIVE AUDIO AND MUSIC ELECTRONICS INDUSTRY

VOL. 3 NO. 9

SOUND ARTS

MERCHANDISING JOURNAL

OCTOBER 1980

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Instrument Controlled Synthesizers, Part 2

Cover art by Fran Vitrano

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SOUND ARTS
MERCHANDISING JOURNAL

JUDITH MORRISON LIPTON
Editor/Associate Publisher

CRAIG ANDERTON
MIKE BEIGEL
LARRY BLAKELY
JOHN CAREY
WAYNE HOWE
ROY KOMACK
CHARLIE LAWING
GLEN E. MEYER
GINA M. STUCKI
Contributors

FRAN VITRANO
Art/Production Manager

ALAN DIPERNA
Editorial Assistant

CANDACE CLAVIN
Editorial Production Assistant

HAROLD PERRY
Artist

BARRY SIMON
Artist

SUSAN ALDRICH
Artist

DOUG HANEWINCKEL
Photographer

MARGARET P. LANE
Circulation Manager

VINCENT P. TESTA
Publisher

Editorial and Executive Offices
Sound Arts Merchandising Journal
220 Westbury Avenue
Carle Place, NY 11514
516-334-7880

Editorial contributions should be addressed to The Editor, Sound Arts, 220 Westbury Avenue, Carle Place, NY 11514. Unsolicited manuscripts will be treated with care and must be accompanied by return postage.

A LETTER FROM THE EDITOR

Howdy. An astute studio supplier in Nashville steered our group to Cactus Jack's cowboy bar—which was quite hilarious, since we were variously overdressed in Yankee finery and ultimate preppy. We milked the situation by doing the fox-trot to the Texas two-step while the preppy among us rode the mechanical bull, and we all made suitable spectacles of ourselves. But we knew what we were doing. We had positioned ourselves as tourists and were conforming to that position.

We were in Nashville to attend the formal opening of the new plant of Studer Revox America and, as was pointed out by the company, old Studer Revox gear have become collector's items in some quarters.

Some merchandisers, in love with the product they sell, have always collected antique equipment. Charlie Lawing writes, in this issue, on using your collection to bring in sales. It's the appreciation of the positioning of that collection and its place in the milieu that adds to merchandising power.

Just as our appreciation of our positioning at Cactus Jack's enhanced our enjoyment and the showmanship of the event, knowing what you have and the fun and/or history involved can make philosophical points to your customers—and maybe even sales.

Obviously, there are other facets to intelligent sales and Roy Komack makes a case for them in Pro Sound Dealers—The Good, the Bad and the Ugly, delving into some of the whys of success in the field.

Once you've positioned the customer and sold him, you may find him in need of related information. John Carey writes in this issue on Acoustic Design for all Budgets. You may have sold the customer studio equipment to fit his budget. But where does he go from there? Knowledge of the environment to be used, the dispensible expenses along with the sensible even if necessary ones can add to your usefulness. If you don't do studio design, you can give him some tips and steer him on.

Whether you're dealing with collector's items, solid new equipment, or the environment for that equipment, positioning your customer and enhancing that position is as important as it was for us in the cowboy bar. Adios.

Regards,

Judith Morrison Lipton

PERFECT HARMONY!

Peavey Electronics' transducer technology, in conjunction with our CS Series power amp program, has created what we consider the finest portable monitor package available to keep your onstage sound clean (and closer together).

The "heart" of the system features Peavey's new EQ-27 graphic equalizer combined with the field proven CS-400 stereo power amp to provide a system producing 400 watts RMS with twenty-seven bands of equalization. This combination of power and EQ enables intense sound pressure levels on stage while virtually eliminating feedback.

Add to this the M-400's special DDT® compression to maximize apparent headroom, transformer balanced inputs, electronic crossover, and bi-amp capability. The result is a highly versatile package with more than enough punch to get your vocals above even the loudest stage situations.

To deliver the M-400's punch, our engineers have designed a new series of enclosures with bi-amp capabilities built around our Black Widow speaker and the advanced 22A high frequency driver/horn combination.

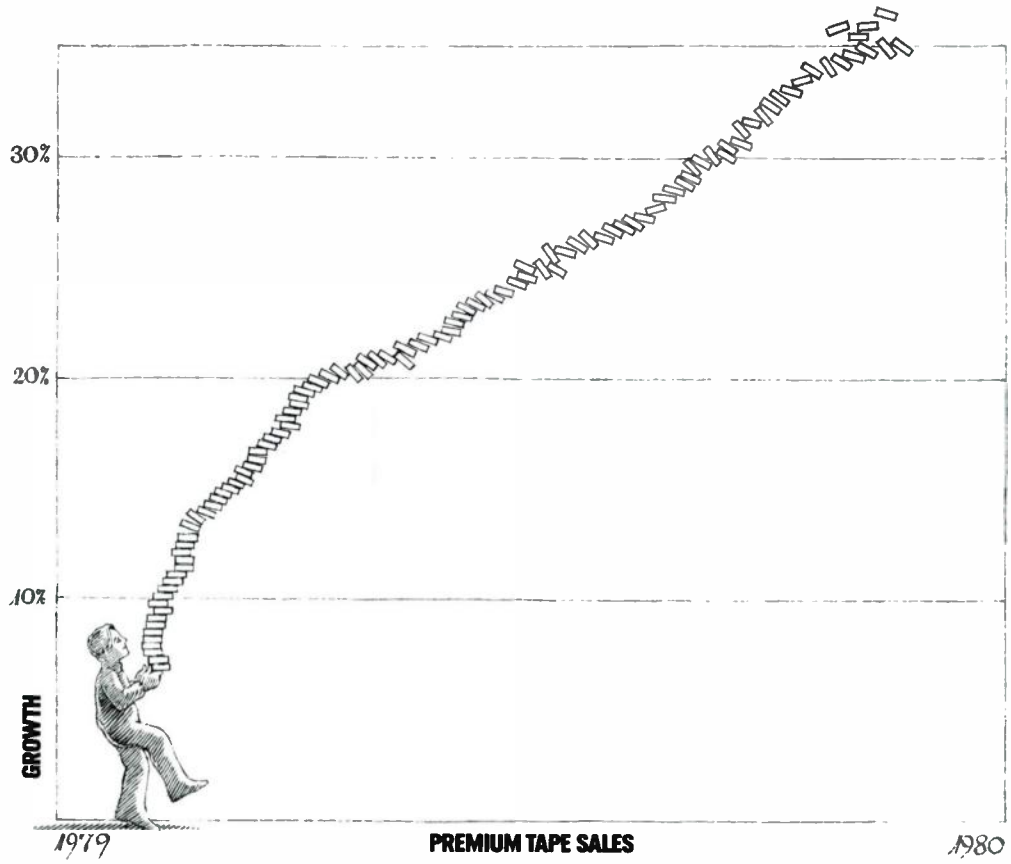
The 1245 and 2445 monitor enclosures were created for optimum onstage monitoring, producing tremendous clarity, projection, and wide frequency response. Kick-proof grills and flite case type covers protect the units from damage and road abuse.

See the system at selected Peavey Dealers in your area or write us for more detailed information. You'll see one more reason why Peavey is ahead of its time,....and the competition.

PEAVEY®

CIRCLE 81 ON READER SERVICE CARD

THE ECONOMY MAY BE IN REVERSE, BUT TAPE SALES ARE STILL IN FAST FORWARD.



Blank audio cassette sales are getting to be very predictable. Every year, regardless of economic trends, it's the same old thing. Another record-breaking year.

One thing is changing though. Consumers are shifting from "cheapie" cassettes to premium. In fact, premium cassette sales enjoyed their biggest year ever in 1979 with sales of over $350 million.

As you might imagine, 1979 was also a good year for Maxell. Even in a soft economy, people will spend a little extra for a quality product.

Projected sales for 1980 indicate it'll be an even better year. Your customers will be putting even more of their money into premium cassettes like Maxell.

Maybe you should too.

IT'S WORTH IT.

Maxell Corporation of America 60 Oxford Drive Moonachie N J 07074

CIRCLE 99 ON READER SERVICE CARD

TERMS:

OCT. 1980

A CONTINUING INDUSTRY GLOSSARY

TEAR HERE

RECORDING

By Larry Blakely

Concentric Pot: A dual potentiometer that has two shafts, one outer shaft and an inner one. This allows each of these pots (sections) to be rotated independently of the other. These types of pots are commonly used on much of today's professional audio equipment. They are commonly used on sweepable equalizers where, typically, the inner knob will adjust the frequency and the outer knob will adjust the amount of boost or cut.

VSO (Variable Speed Oscillator): A system made up of an oscillator and a special type of large power amplifier that is used to supply AC power to a professional tape recorder capstan motor. Hysteresis sunchronous motors are often used for the capstan drive motors in many models of professional tape recorders. If one wanted to vary the capstan speed to bring the musical pitch of what is being recorded slightly up or down, it would be necessary to change the frequency of the AC power line, which could not be easily done. However, a solution is to connect the output of a VSO directly to the capstan motor via a specail connector on the tape recorder. Now the VSO is supplying the AC to the capstan motor and the speed is changed by adjusting the frequency of the oscillator for approximately 50 to 70 Hz which will vary the speed of the capstan ± 20%.

D.C. Motors: Often used in the newer types of turntables and tape recorders. These motors operate on direct current (DC) rather than the alternating current (AC) that the four-pole and hysteresis synchronous types run on. A high degree of speed accuracy can be obtained from these motors by various methods of precisely regulating the voltage that feeds them. When DC motors are used in applications where it is desirable to increase or decrese the speed, it can be done easily by increasing or decreasing the voltage to the DC motor.

ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES

By Wayne Howe

Envelope Generators: A type of circuit that, when triggered, produces a varying DC output voltage whose parameters can be determined in advance. This varying DC output voltage can be used as a control voltage to control voltage-controlled oscillators, filters and amplifiers. These voltage/time functions are one-shot events and once triggered do not repeat unless the envelope generator is triggered again.

Transient Generator: Another name for envelope generator.

Initial Decay Time or First Fall Time (T_2): This initial decay occurs as soon as T_1 has reached its peak. It can be set to be short or long. Figure 6 shows a short decay and Figure 7 shows a long decay.

FIGURE 6

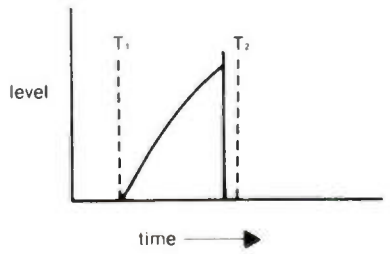
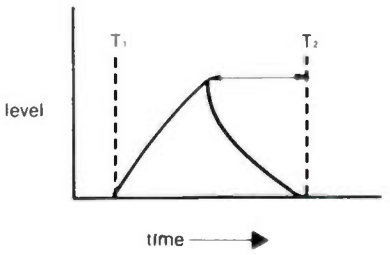


FIGURE 7



Sustain Voltage or Sustain Level (E_{svs}): This sustain level is the voltage level that T_2 falls to. (See Figure 8.) It can be set very high or very low. At its maximum setting, E_{svs} effectively eliminates T_2. This occurs because T_2 is the time of the fall between T_1 and E_{svs}. Since E_{svs} is already at its maximum, there is no T_2 fall. (See Figure 9.) If E_{svs} is set at zero, T_2 will fall all the way to

SOUND REINFORCEMENT

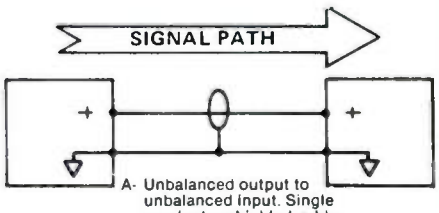
By Glen E. Meyer

Line Level Connections (continued): Don't try to drive a device with an input impedance of 600 ohms with a unit that has a Hi-Z output impedance. You can go one way but not the other.

The internal impedance of an active device is not necessarily related to its load. It is that value which we would "see" looking back into the output terminals of that device. Internal impedance tells us, among other things, how much the gain will vary with changes in the external load.

Unbalanced vs. Balanced Lines: Another important consideration when interconnecting electronic equipment is whether the inputs and outputs are balanced or unbalanced with respect to ground. A balanced system is usually preferred, particularly in more complex and sophisticated systems, due primarily to its superior freedom from interference and avoidance of ground loops. This is achieved by separating the signal and its return from the ground and shielding both paths.

Unbalanced systems utilize the ground for a signal return and require only two terminals, referred to as "hot" and "ground," "high" and "low," or "plus" and "minus." Balanced connections require three terminals with ground being separate from the high and the low. The positive and negative terminology often used on balanced units refers to the polarity of a signal at any instance, allowing the user to tell if a signal is being reversed in phase in the equipment. This becomes important in multiple channel systems where the same phasing between reproducers must be maintained.

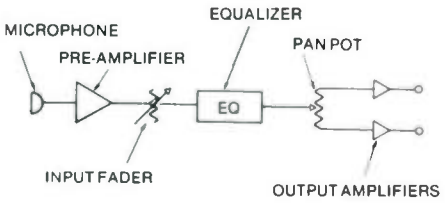


A- Unbalanced output to unbalanced input. Single conductor shielded cable.

A CONTINUING INDUSTRY GLOSSARY

RECORDING

Signal flow: The path that the electrons will take as they go from an input to the output of an audio device or system. When operating such devices as a mixing console or other complex audio system, the knowledge of the signal flow will greatly aid your ability to understand and operate the device or system. The signal flow can best be visualized by looking at a "block diagram" which will show all the basic functions of the system as blocks with a single line going from block to block to indicate the flow of the signal (signal flow). When looking at such a drawing the signal will typically be from the left to the right of the page in the same way that you would read. A simple block diagram is illustrated below to show the signal flow of one input on a mixing console.



BLOCK DIAGRAM TO INDICATE SIGNAL FLOW

Signal Path – see signal flow.

Signal Routing: Often used to mean the same thing as "signal path" or "signal flow." However, signal path or signal flow is the process of following the direction of the path that has already been designed into the equipment or system in which the signal will flow. Signal routing can also be the "active" in as it can be the process employed when designing a piece of audio equipment or system when you determine the direction or route the signal will take. Connecting a microphone to a "Y" connector and sending the same signal to two different points in an audio system can also be called signal routing, etc.

Split Feed: When the same signal is routed to different places. For example: The *same* output signal from a mixing console can be fed through two different wires or cables to two tape recorders. This is called a "split feed."

ELECTRONIC MUSICAL INSTRUMENTS & ACCESSORIES

zero. (See Figure 10.) On most synthesizers, E_{SVS} level is held until the keyboard note is released.

FIGURE 8

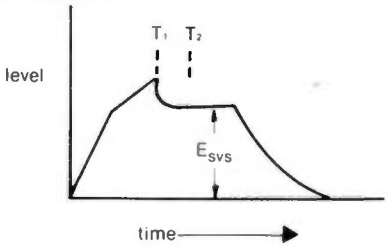


FIGURE 9

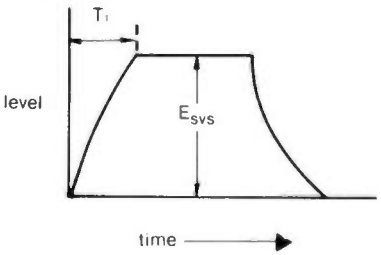
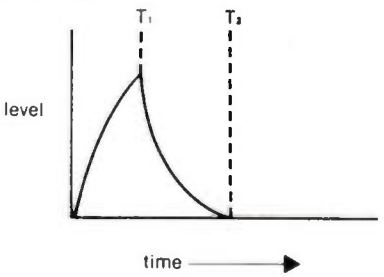


FIGURE 10



Final Decay or Last Fall Time (T_3): This is the final decay of the envelope generator's voltage level. It is usually caused by the release of the trigger or keyboard. T_3 begins at the level of E_{SVS} and falls to zero. If T_3 is very short, there is effectively no decay. (See Figure 12.) If T_3 is set long, a long decay results. (See Figure 11.)

FIGURE 11

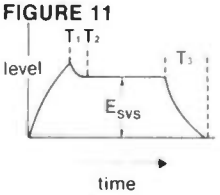
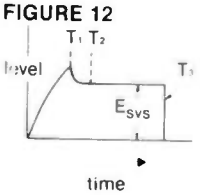
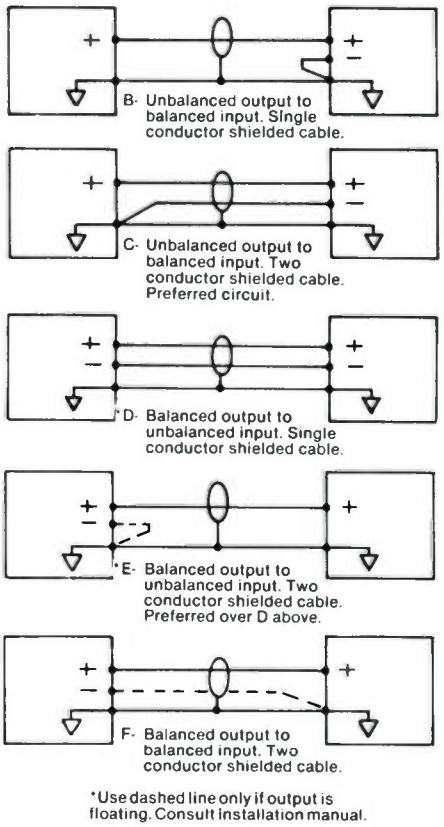


FIGURE 12



SOUND REINFORCEMENT



*Use dashed line only if output is floating. Consult installation manual.

Some equipment is designed to allow either balanced or unbalanced operation. In other instances transformers may be added as an outboard module or as a plug-in option. If hum is introduced using Circuit B and the pieces of equipment are separated by a long distance, Circuit C can be used to avoid noise from ground currents in the shield. Similarly, Circuit E may be used to advantage, but only if the output is not referenced to ground. Note that in Circuit C and E, the "low" signal wire and the shield braid must be tied together only at one end, as shown. Otherwise, ground and signal currents will be combined and the signal path returned, defeating the advantage of the circuits.

Circuit F, showing a completely balanced input and output, provides the best interconnection and should always be selected, if compatible with the equipment involved.

TEAR HERE

Eight good reasons to be a Beyer Buyer.

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

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

three Beyer headphones. A full range of high quality professional models for critical monitoring and reliable communication. DT 109 combines stereo headphones and boom-mounted microphone, ideal for on-air use and disco deejays. DT 444S wireless headphone receives sound from an infra-red LED transmitter up to

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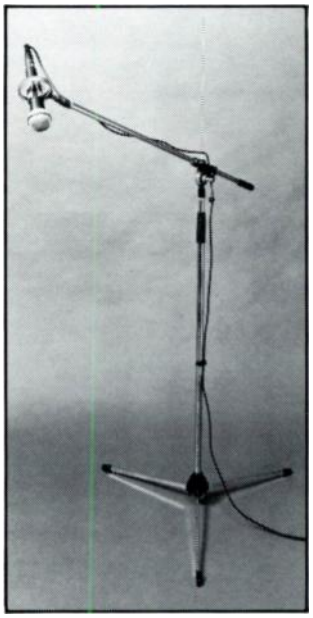
four The new M 400. A great performer's mic. Supercardioid pick-up pattern to minimize feedback. Rugged design for long life. Tapered frequency response with rising high end and rolled off lows, plus midrange presence boost. Built-in humbucking coil and pop filter. Dynamic design is unaffected by heat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

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



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

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

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

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

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TROUBLESHOOTERS' BULLETIN

LOCATING FAILURE

(1)

Many times when an amplifier using I.C.'s in its pre-amp stages fails, the trouble is in one of the I.C.'s themselves. A method that I have found to be somewhat helpful in locating the problem when a schematic wasn't handy is to spray a small amount of freon-type circuit cooler on the I.C.'s. Often the bad one is running warmer

(2)

than the rest of the I.C.'s in the circuit and will melt the frost much faster than those which are functioning normally. This is not a perfect type of test and is problably useful in about half of the I.C. failure types of repairs that we see in our service lab.

MARK W. ROGERS
Daddy's Junky Music Store

(3)

POINTS TO REMEMBER ON GUITAR MAINTENANCE

Keep your guitar in a room with even temperature, when storing. Clean your guitar often; use good quality strings and polish. When not in use, keep your guitar in a case to protect it. Don't leave your guitar stored in the trunk of a car in winter or summer. (Extreme heat or cold will damage the instrument.) Don't store your guitar in hot, damp or cold places. Don't leave your guitar laying around

out of the case when not in use. Don't bring your guitar to the beach or loan it to anyone.

All strings stretch and require tuning several times, especially nylon. When strings are in tune, cut off excess close to the tuning post. When changing to light gauge strings for the first time, a bridge, neck, or nut adjustment may be needed. Perspiration, humidity, age of strings, and amount of playing are just some of the variables that affect string life. Under normal conditions, a string changed at least once a month will keep the instrument playing in tune with good response. Wiping strings with a lint-free cloth after playing will prolong string life.

Never use steel wool on any guitar or stringed instrument that has magnetic pickups. The steel wool particles will be attracted to the pickup due to its magnetic influences.

Never attempt to make neck adjustments yourself. Intonation adjustments need to be made from time to time; this is normal. From time to time, screws loosen on your instrument. When changing strings, check that screws are tight.

PHILLIP J. PETILLO
Petillo Masterpiece Strings

What are the advantages of y-ing several microphones into a single channel of a PA or recording studio mixing board? What are the disadvantages? What are the best methods for y-ing?

One of the more obvious advantages of y-ing is that it enables you to use a greater number of microphones than the inputs on your board. If you run out of inputs, you almost have no choice but to y. You should, however, always ask yourself: Are that many microphones necessary? Can the job be done with less? If you cannot use fewer microphones it may be to your advantage to use y connectors.

Another advantage might be a slight simplification in mixing. By y-ing, you effectively create a very crude mixing sub-group. That could be an advantage if you are doing a large string section, for example, with one microphone for every two violin players. Having some y boxes available could save you a lot of inputs. In cases like that, you're generally more interested in the balance and blend of the entire string section than in individual instrument tone. Of course, if you have a featured player, you could put up a solo mic for that player and bring that mic up through its own input.

A major disadvantage is lack of flexibility in case something on stage changes unexpectedly—and it always does. A good example of that would be a soloist grabbing one of the microphones that have been y-ed. If you try to push the soloist's mic up, of course the rest of the mics come up with it.

Another disadvantage is interaction between microphones, which can be detrimental to overall sound quality. For this reason, microphones that are y-ed together should be identical—same make, same model.

There is some controversy as to the best way to y microphones together. Most people just use a simple parallel connection. For example, three y connectors with pin 1 tied together, pin 2 tied together, and pin 3 tied together on all three connectors. That is for three-into-one. For myself, I don't think I'd do more than two into one. A number of people advocate a series connection. That is, pin 1 is tied to pin 1 on all connectors, but pin 2 on the output connector would tie to pin 2 on one of the connectors, and pin 3 on the output connector would tie to the other microphone connector. Then, pins 2 and 3 (that are remaining on the two microphone connectors which do not have anything else tied to them) would be connected together. That would put the microphone cartridges practically in series. Advocates of this method infer that the interaction between the two microphones is less. I would tend to believe that.

A unique use of y-ing is putting two microphones out of phase to create a differential microphone. You would do that in order to create an extremely close talking microphone out of two ordinary microphones. It's a real good solution to the problems created by a singing drummer. What you do is put the two microphones out of phase and tape them together onto the same stand. There are two techniques for doing that. One is to put the heads of the microphones as close together as possible with one slightly behind the other and to instruct the singer to sing into only one of them. The other method is to place the microphones with heads opposing.

There are cases in which y-ing can result in a loss of sound quality. It depends on what your source is. There are numerous instances—tom toms and bass drums, for example—in which there is no noticeable deterioration of sound quality. In situations where you are confronted with a choice between y-ing and using fewer microphones you should use your own discretion. The bottom line is: If you can get away with it, why not do it?

Rick Chinn
Tapco

What are the advantages of brass guitar hardware?

Most people feel that brass guitar hardware gives you better sustain. Because it provides a more solid anchoring for the strings, they will ring a little bit longer than they would otherwise. Apart from esthetic considerations (brass makes for handsome hardware), this is why guitarists use brass hardware.

Matt Cremers
Manny's Music

What is a bus and how many do I need?

Consider a very simple monaural mixer that you plug three microphones into and feed into a monaural tape recorder. The wire in the mixer which connects the signals from the three microphones together is called the bus. In a stereo mixer, each microphone can go to either the left channel or the right channel and there are two buses or one stereo bus. Basically, the number of buses is equal to the number of individual mixes that you can produce. There are also power, ground, and a variety of other buses.

If you will be mixing in stereo, a stereo mix bus (one volume control and a balance control) is much more convenient than two monaural mix buses (two volume controls) and will allow adjustments in loudness without affecting the left-right balance. If you want a mixer for PA or sound reinforcement work, you will need a stereo or monaural mix bus for the PA speakers, one monaural mix bus for each different stage monitor mixer, and one monaural mix for each different electronic effect or set of effects (echo, reverb, harmonize, etc.). If you can afford an extra mix bus or solo bus, you can listen to each input without affecting any mix, and be sure it sounds good.

The cost of building in additional buses is relatively low, but purchasing an excessive number of buses may mean that the manufacturer spent money on those extra buses that could have been used to improve the quality of the remaining buses.

Stephen R.W. Neal
Bill Graham Audio
San Francisco, CA

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CIRCLE 90 ON READER SERVICE CARD

So... u want to know about Pickups, Part 2

By Craig Anderton

Last month, we started investigating the subject of pickups by talking about pole piece adjustments, pickup angle adjustments, and the difference between double and single coil pickups. Before we move on to the subject of pickup phase and how pickups are wired, we need to consider a new trend in pole piece design.

As noted last month, many newer pickups do not include any type of pole pieces at all, due to the assumption that a large number of players use extensive amounts of string-bending while playing. Referring to figure 1, a string normally lies directly over its associated pole piece. When the string is bent, however, it may no longer lie over the pole piece but instead vibrate in between the pole pieces. This is more of a problem with the bass pickup than the treble pickup, since the treble pickup is closer to the end of the string and therefore there is less string motion.

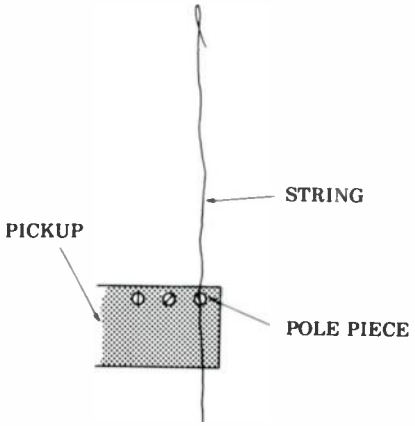

Figure 1

When the string vibrates in between pole pieces, there is less output than if the string vibrates directly over the pole piece. So, using a single bar to sense all six strings gives (theoretically) uniform response whether a string is being bent or not. However, we then have the problem of uneven response between *different* strings, even though the response for any individual string may remain consistent.

A possible solution to this dilemma is to use a pickup without pole pieces in the bass pickup position, since this is where bending problems tend to be most severe. The treble pickup, on the other hand, might sound better if it does have adjustable pole pieces; as mentioned earlier, string bending does not affect this pickup as much, and it also seems to me that any variations between strings show up more with the treble pickup anyway.

PICKUP PHASE

Many of the new sounds involving guitar rewirings take advantage of *phase reversal* and *phase cancellation* properties. Phase is a difficult concept to discuss, since the ear is not sensitive to phase changes. However, there is an experiment that you can do to understand the basic principle behind phase variations.

Connect a mono speaker up to an amplifier and listen to it for a while, then reverse the leads going to the speaker. The sound will remain essentially unchanged, even though we have reversed the phase of the speaker. How have we reversed the phase? Well, with the leads connected one way, a *positive* going output signal will push the cone *outward* while a *negative* going output signal will pull the cone *inward*. With the phase reversed, a positive going output signal will pull the cone inward, and a negative going output signal will push the cone outward. However, since the amount of air being moved is identical in both cases, we don't notice any difference in the sound.

Now, take a stereo system, set the amp's mono/stereo switch on mono, and listen carefully to the sound. Move around in the room a bit; although you'll hear dips and peaks in response caused by room acoustics, these variations won't be excessive (assuming that your system is properly phased in the first place, which it may not be). Now, reverse the leads going to one of the speakers so that one speaker is out of phase with respect to the other speaker. Now, when one speaker is pulling in the cone, the other speaker will be pushing it out—and the net result is a partial cancellation of sound. Move around the room again, and you'll note severe response aberrations. So, although you may not be able to hear a phase variation in an individual signal source, when an in-phase signal source combines with a similar but out-of-phase signal source, you'll hear some definite changes in the sound.

How does this relate to pickups? If you simply reverse the phase of one pickup by reversing its two leads in a similar manner the way we reversed the loudspeaker leads and listen to the output of that pickup, you won't hear any substantial change—if, in fact, you hear any change at all. However, with a two-pickup guitar, if you reverse the phase

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of one pickup and listen to both pickups, then you will hear a difference. It doesn't matter whether you reverse the phase of the treble pickup or the phase of the bass pickup, the important point is that one pickup is out of phase with respect to the other one.

Reversing pickup phase is easier said than done with most older pickups. These older pickups generally have a shielded cable coming out of from the coil; the ground lead connects to the metal pickup case and one end of the coil, while the hot lead connects to the other end of the coil. (See figure 2). The normal way of reversing phase is to reverse these two leads. However, if we try that, then the ground lead—which connects to the case—becomes the hot lead, which means that the case itself becomes hot. This leads to problems with excessive hum pickup.

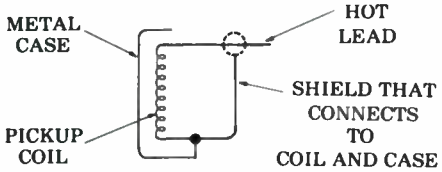


Figure 2

Therefore, when attempting to reverse pickup leads with pickups wired in this fashion, it's best to disconnect the case from the ground lead, replace the shielded cable with two separate leads, and ground the case separately to a ground point on the guitar (such as the output jack ground). This gives a grounded case for minimum hum pickup, but also allows access to both ends of the coil in order to reverse the pickup phase. (See figure 3.)

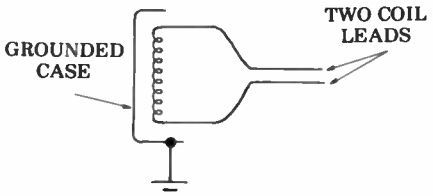


Figure 3

Luckily for those of us who like to experiment with different pickup sounds, some newer pickups come with both leads available in order to eliminate the need for removing the traditional shielded cable and figuring out how to ground the case.

The easiest way to reverse pickup phase with one of these pickups uses a DPDT toggle switch, as shown in figure 4. In one position of the switch, the end of the coil marked (+) is the hot lead while the end marked (−) goes to ground; in the other switch position, the end of the coil marked (−) is the hot lead with the end marked (+) going to ground. Several new guitars include phase reverse switches as standard equipment. When you consider that for the cost of a DPDT toggle switch you can add another type of sound, this has got to be one of the more cost-effective guitar modifications around. It's nice to see manufacturers including phase reverse options.

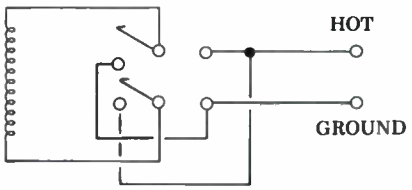


Figure 4

The kind of sound associated with phase reversal is a thinner one, since any signals that the two pickups have in common tend to cancel. This is useful for getting a brighter rhythm tone with less overall level; it also gives an interesting lead effect when used with devices like fuzzes.

PICKUP WIRING

With all these basics out of the way, it's time to remember that pickups do not exist in a vacuum. They have to be wired into the guitar, matched with volume and tone controls, and so forth. Wiring pickups used to be pretty simple; they all had two output wires, one of which connected to ground, and one of which connected to the pickup switch.

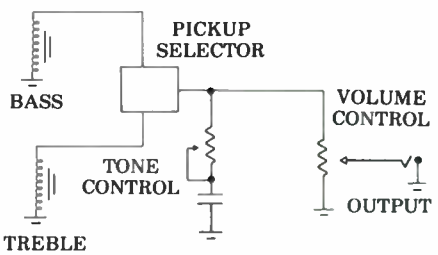
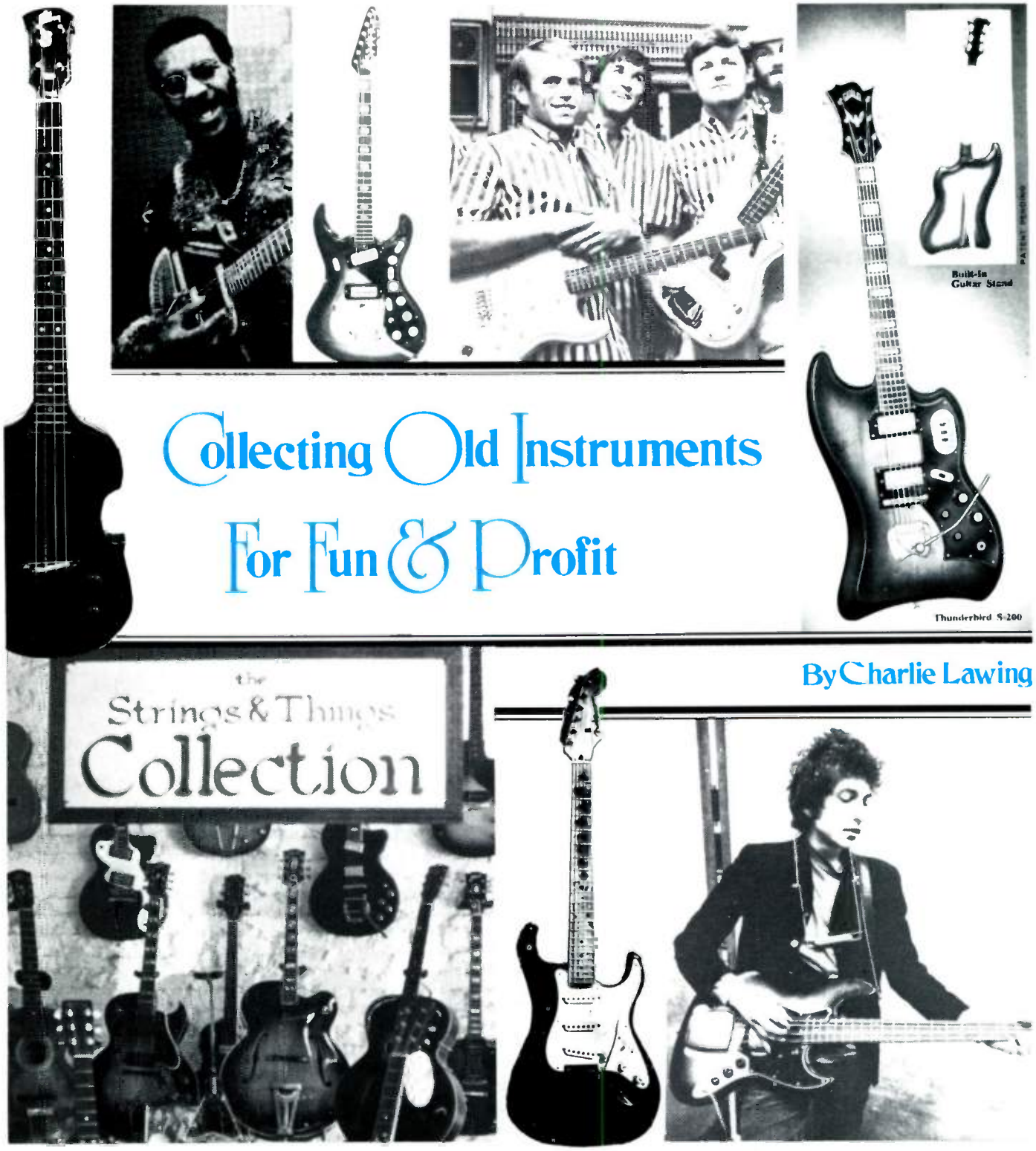


Figure 5

Figure 5 shows a typical guitar wiring scheme based around two pickups with two output leads. The control after the pickup selector adjusts the tone, while the remaining control adjusts the volume; these are included mostly for reference, and may be ignored in our discussion of pickup wiring.

Nowadays, however, pickups often don't stop at just two output terminals, but can have three and even four terminals. What are all these wires for? Well, we're out of space for this month -so tune in again next time.



Collecting Old Instruments For Fun & Profit

By Charlie Lawing

People like to collect things. Old coins, stamps, paintings, photographs, guns, records, books, magazines—you name it, and somewhere there are collectors who thrive on a particular item. As often as not, these collectors form some kind of organization to promote their hobby, whether it is butterfly-chasing, knife-swapping or collecting beer cans.

To a casual observer, it might seem a bit superfluous, if not downright crazy, to go to all that trouble for seemingly useless old junk. After all, what can a person do with three thousand pocketknives? However, to a person who appreciates collectibles, a good collection is a joy to behold, because collections not only provide a link with the past, they earn money every day.

A music retailer need only open his or her eyes and look around to see the advantage of an antique instrument collection. While virtually every new product on the market depreciates, collections do just the opposite: they *appreciate* on a daily basis. Nowhere is this more evident than in the guitar market, which is full of new instruments, both foreign and domestically made, most of which decrease rapidly in value as soon as they are sold. But old guitars, especially certain desirable

models, have risen dramatically in price over the last five years. Prices that once seemed absurd are now commonplace.

For example, the 1960-66 Fender Stratocaster guitars were being sold five years ago for $300, sometimes even less, depending on the condition. At Strings and Things in Memphis, I sold one last week for *$1,200* to a man who was thrilled to find such a good deal! Even though that particular guitar has quadrupled in price in only five years, it will continue to be worth more money, at who knows what rate of increase. For my customer, it was a solid investment, even though the price seems high.

A person can build a good guitar and amp collection if he or she knows how to anticipate the ebb and flow of popularity. For instance, if you had invested in old Les Paul Sunbursts fifteen years ago, when they hung in pawn shops because nobody thought they were cool, you could realize some huge profits today. The same thing holds true of Martin acoustic guitars, old Fender amps, and much more. The current *new wave* music may create a renewed interest in the Fender Jazzmaster or the Fender Jaguar, the Vox amps, portable organs, or Hagstrom guitars. Who knows? One thing is certain, though: the second-class citizens of yesterday can become royalty overnight, and it is never wise to throw away any instrument that can be salvaged and used.

A music store owner may not agree with the outrageous price tags that these collectors' items bring, but he or she must be aware of the potential benefits of a collection. Not only do collections offer the music retailer a solid hedge against inflation, collections are a great way to build floor traffic in a music store. Many people who would not otherwise be interested in anything new on your sales floor will drive all day just to look at a bunch of old guitars. A collection is both a good investment and a good drawing card; it gives the store some prestige among musicians and will eventually attract some famous guitar player who is searching for old instruments. So, have him pose for a snapshot, sign an autograph or two, and you are on your way to building a reputation for your store.

One thing that makes a musical instrument collection particularly interesting is that there is plenty of room for the obsolete and the useless item right alongside the priceless vintage guitar. Many young guitar shoppers have never seen some of the products that were in demand 20 years ago. Imagine what a 14-year-old thinks about a blue-sparkle tuck-and-roll Kustom guitar amp, or a set of Trixon egg-shaped drums. The creators of "Star Wars" couldn't come up with anything more outlandish. What music store owners have to remember is that what seems ordinary to them may be fascinating to the younger generation of musicians.

Any music retailer is in a good position to accumulate a collection, at a minimum cost, because many old desirable items come in on trade, and sometimes people bring old guitars in to sell. A lot of times, these old guitars are of no value to the owner, who has long since lost interest in the instrument. Sometimes, relatives inherit old instuments and want to get rid of them. But one man's junk is another man's antique, and music store owners have ample opportunity to take advantage of this.

Of course, everyone who collects guitars dreams of finding a rare item in a pawn shop or a basement, and from time to time this will happen. But a retailer need not worry too much about finding the rarest guitars in the world; a small collection of oddities is a great traffic-builder, and can be put together with a minimum of time, floor space, and money.

Take old guitar strings, for example. Years ago, they were packaged in little cardboard boxes. Many companies had a wood and glass display case that contained a dozen or so shelves for displaying strings. The packaging and graphic design of these old, now defunct brands were quite colorful, and such a display can add a touch of nostalgia to your store. Old strings can be found in used guitar cases that come in on trade. If a retailer carefully checks out these old cases that come through the store, a collection of old strings can be put together quickly and easily.

Old microphones are another category of low-cost collectibles. Since most of them are useless by today's audio standards, they do not bring a high dollar in trade. But they are fun to have around because they bring back memories of earlier times. And who knows, someone from the local playhouse or drama school may want to rent them from you to use as props in a stage production. Or a studio owner may want to try one for a certain old-fashioned sound that connot be duplicated by newer, more sophisticated mics. It is easy to find old microphones if you know where to look. Start with the church pulpits and school lecterns in your area. Look around backstage in high-school auditoriums, VFW clubs, radio stations and recording studios. You will soon find some old ribbon mic that looks like it could have been used to broadcast the 1936 World Series.

Take a few of these mics, some old guitar strings, a couple of old acoustic guitars, a tweed-covered Fender or Gibson amp and you've got the beginnings of a collection. Set aside a small area in your store, buy a couple of old nail kegs, maybe a worn-out saddle or an old radio console and start collecting.

You will be surprised at how many customers will follow your lead. They will bring in old tape recorders, echo units, reverb units, amps, mics and guitars to show off and compare to your collection. Some people will let you take their instument and display it in your collection. And don't be surprised if someone walks in and says, "Here, I thought you might like to have this for your collection," and hands you something old, absolutely free.

If you are like me, you grew up in a world of Vox, Gretsch, Dan Armstrong, Harmony and Silvertone guitars. Gibson amps were big in those days, too, as well as Farfisa, Duo-Compact portable organs, Gibson "Trini Lopez" guitars, and Coral Electric Sitars. No matter what your age, you haven't played electric guitar until you crank up a Guild Starfire through a Baldwin Eliminator amp with the stereo tremolo wide open. And who can forget the "electric razor" sound of a Kalamazoo Sax-Tone, one of the first distortion boxes? Or how about the Maestro Fuzz Tone? Not many young Jeff Beck fans have ever heard such a sound. If your customers think that today's guitars are outlandish, they should see something like a Vox Invader, complete with on-board E-tuner, distortion booster, repeat and wah-wah *all* built into the guitar body.

To sum up, it doesn't take a lot of time, floor space or money to start a collection in a music store. Your older customers will appreciate it, and you will get a tremendous kick out of showing young musicians how things were made in the old days. A collection draws a crowd and stimulates sales activity. But best of all, a collection is a good investment. As the economic situation fluctuates, the old guitars just keep getting older and more valuable. If you ever need quick cash, you can always sell a collector's item to keep the front doors open and the lights on for one more month.

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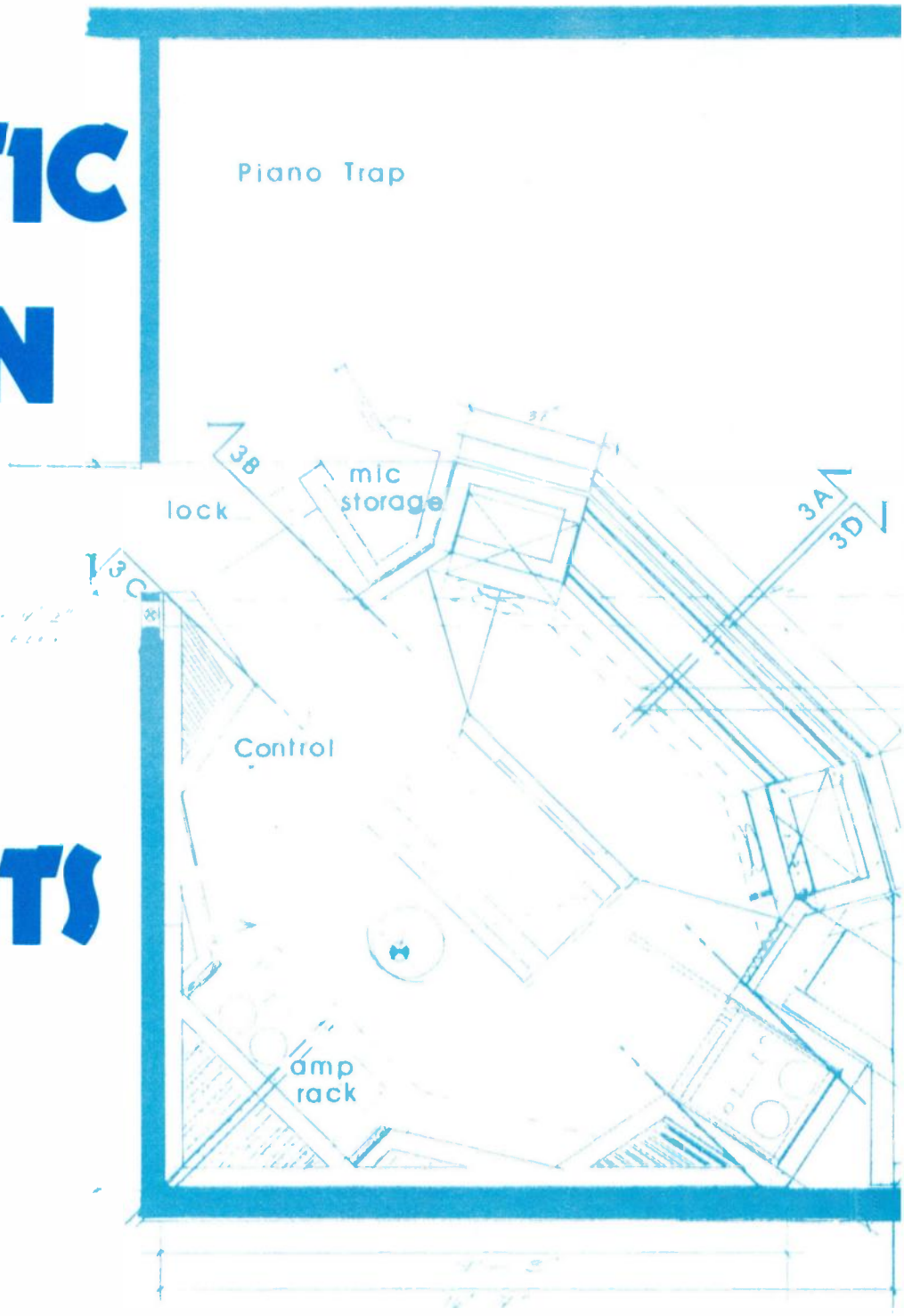
CIRCLE 66 ON READER SERVICE CARD

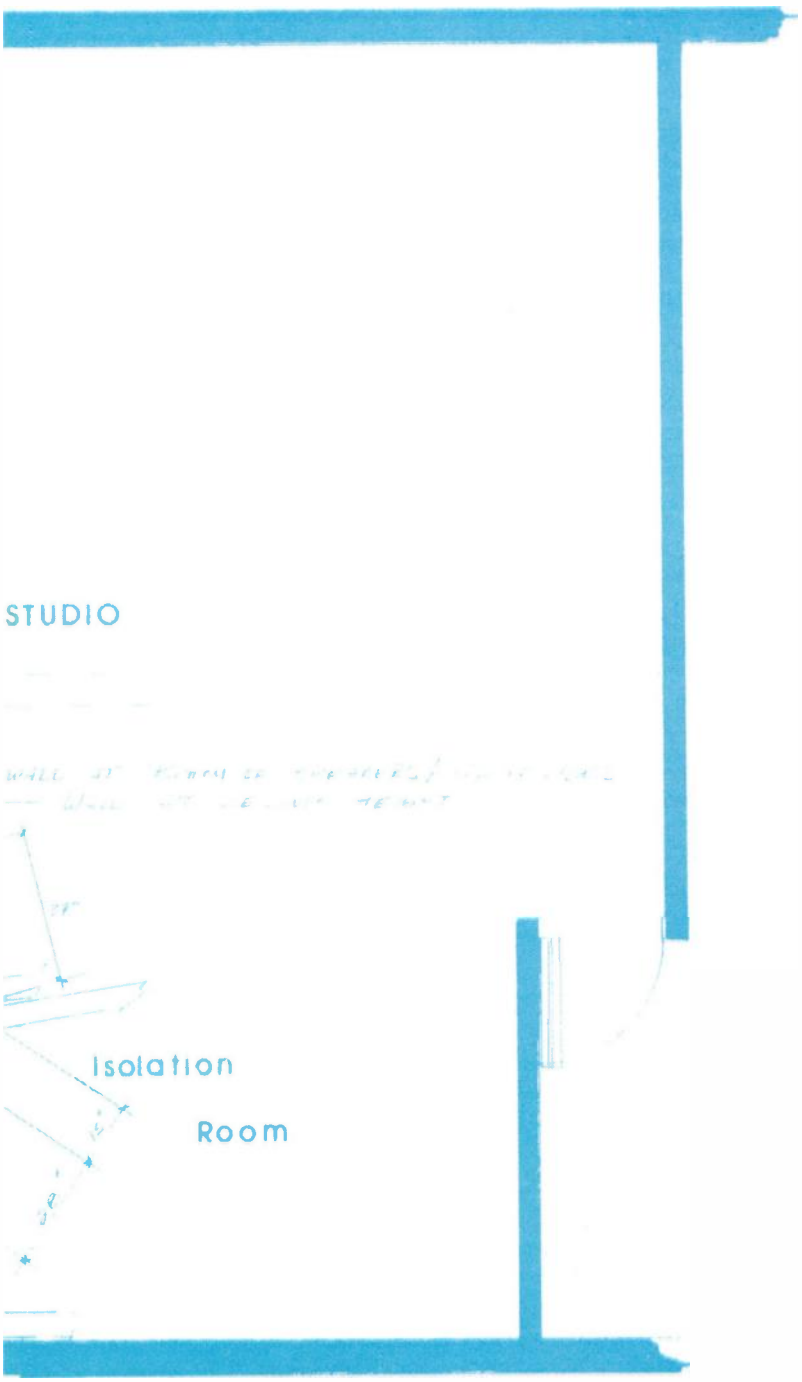
WRH

ACOUSTIC DESIGN FOR ALL BUDGETS

BY JOHN CAREY



MAXWELL MUSIC STUDIO



As the technology of multitrack recording equipment is becoming more affordable, many dealers are beginning to package the small recording studio system. One important area in this type of package is acoustic design. It may involve as little as keeping the neighbors from calling the police or as much as complete isolation and interior design. The principles of any acoustic/isolation design are the same. They vary only by the extent to which you can afford or need to implement them.

The key to understanding the following three example packages, each with different budgets and different results, is basic recording studio design. Here are four main areas of design to review:

- Isolation technique for vibration and airborne sound.
- Room proportions with resulting resonance modes.
- Geometry—the shape of interior walls.
- Absorption of the interior finish treatments.

ISOLATION TECHNIQUES

Two main types of isolation must be accomplished in any studio design. First, vibrations from the outside must be eliminated in order to provide a quiet environment in which to record. The opposite also holds true, in order to provide your neighbors with a quiet environment in which to live and sleep. An obvious method of vibration isolation is to eliminate direct contact of any kind between the studio and the outside shell. This can usually be done with walls and ceilings, but floors cannot be isolated this way. Floating floors can be constructed by placing resilient material under two 2x4 frames. (This can be smaller where height is at a premium. See figure 1.)

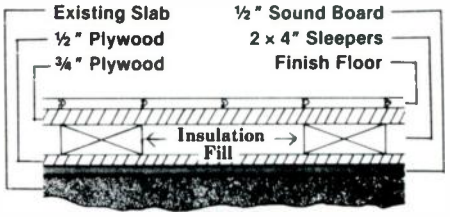


Figure 1. Floating Floor Detail

This material can be machine rubber, sound deadening board or heavy carpet padding. Any cavities formed by the wood framing should be filled with sand, insulation or any sound deaden-

ing material. The subfloor sheeting, 3/4" plywood for example, should be secured tightly, checking for any loose spots. This type of floor provides the base for building a room within a room, a base from which to float the rest of the room. (See figure 2.)

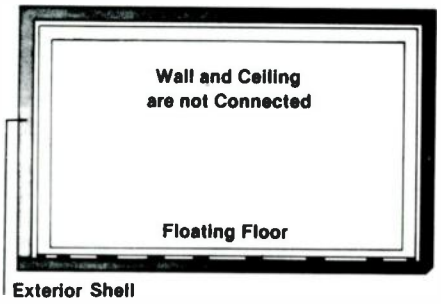


Figure 2. Room within a Room

Second, the airborne sound must be isolated. The key to isolating this type of sound is to make any retaining boundaries air tight. The first concern is the shell as it exists. Many people ask, "How can I soundproof my garage?", so for an example we'll use a garage as the shell. The door presents a problem; therefore, it must be replaced by a 2x4 stud wall; matching the exterior to the rest of the garage would be nice. All air gaps inside the shell must be sealed. This can be accomplished with a caulk which remains pliable and will not shrink when dry. Pay special attention to window frames and door frames, adding weather seal to any moving joints. Once you're satisfied with the seal, fill the wall and ceiling air space with R-19 pink insulation. (See figure 3.) Seal with a layer of dry wall (5/8" is optimum). Tape and seal all corners and joints—*air-tight.* If this step of sealing the shell is done carefully, you can gain a substantial amount of sound insolation.

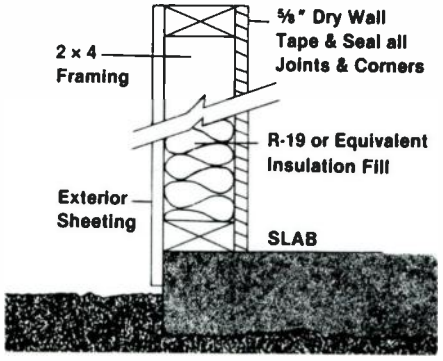


Figure 3. Exterior Shell Seal

The next step is to build the interior walls upon the floating floor system, thereby floating the interior walls as well. The interior ceiling joists rest on these walls, completing the room within a room. The actual dimensions of this room must be carefully chosen. (This will be explained in the next section.) Once the basic 2x4 frame of the interior shell is completed, it is filled with R-19 insulation and covered with a layer of dry wall (5/8").

Depending upon the budget and/or the amount of isolation desired, extra layers may be added, creating a sandwich layer. This consists of 5/8" dry wall, 1/2" sound deadening board and 5/8" dry wall. (See figure 4.) Other options to provide additional isolation include resilient channel with 5/8" drywall over it or two layers of 5/8" drywall alone. This area is relatively flexible, according to the given budget.

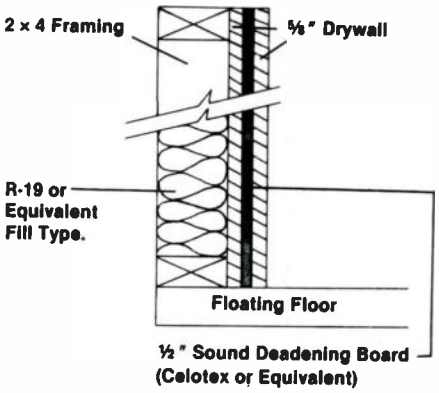


Figure 4. Sandwich Wall

The last step of the interior shell is to complete the sound lock by building an additional door other than the existing one. This is the reason you see double doors in many studios. This door is typically a solid core door to minimize leakage. An alternative is one solid core door with a layer of 1/2" sound deadening board and a layer of 5/8" drywall on both sides. This will complete the sound and vibration isolation necessary to rehearse or record at any hour in a residential garage.

ROOM PROPORTIONS

The three dimensions of any enclosure exhibit a resonance known as the axial resonance modes. This refers to the axis of the room. There have been many studies done to determine optimum proportions for the room dimensions. One of the most renowned studies was done by Richard H. Bolt, which pointed out that there are no absolute proportions, only a range of acceptable ratios. A more detailed study was done later by Ludwig W. Sepmeyer, circa 1965, utilizing computer assistance. The results of this study pointed to a few superior ratios of height to width to length. These are:

- 1:1.6:2.33;
- 1:1.4:1.39;
- 1:1.28:1.54;
- 1:1.59:1.25.

These ratios are superior because the resonances of the three main axes are distributed evenly with respect to frequency and angular distribution (diffusion). With the aid of these proportional guides, we can select a room size which will yield good results.

Actual dimensions can be verified by performing an axial mode study. The formula for this is:

$$Fo = \frac{565}{d}$$

Fo = frequency of resonance, 565 = 1/2 the speed of sound, d = room dimension. The calculations are done for all three axes. The result of this calculation is the fundamental of that axis, and all harmonics of this frequency are considered up to approximately 300 Hz. After this point, the resonances are so closely spaced that they can be ignored for these purposes. Once the size of the interior shell walls have been determined, their placement must be determined.

Walls which are placed parallel to each other will support standing waves between them. Standing waves are those which continuously reinforce themselves by their own reflections between the parallel walls. The interior shell forms the low frequency boundary of the studio or control room and should be placed out of parallel in order to avoid this situation. Diffusers and absorptive finish materials cannot completely dissipate the standing wave energy. Additional absorption for the low frequency resonances must be provided. (This will be explained further.)

GEOMETRY—THE SHAPE OF THE INTERIOR

It is in the interior that the individual design takes shape. Each situation is its own creation and any particular requirements of the studio and/or its owner must be incorporated at this point. The monitors for the control room are flush mounted in this interior "geometric shape wall." This type of mounting provides for a much "tighter" sound, particularly in the low frequency range. The scientific reasons are due to the fact that the speakers' effective radiating surface is halved. Therefore, the speaker/room interface is much more efficient. Any reflections from rear radiated sounds and the accompanying phase cancellations are

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CIRCLE 54 ON READER SERVICE CARD

eliminated by flush mounting. In light of the stereo nature of program formats, symmetry must be provided with respect to left and right in the control room. (See figure 5.)

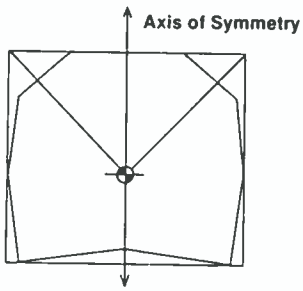

Figure 5. Symmetry of Control Room

One rule of the stereo control room is: Anything you do to one side, you must do to the other. A sheer surface in the front of the room, free from protrusions, will provide a smooth wave plane to the listener. Interior finish treatments must also be symmetrical with respect to left and right. The geometry also provides for the housing of tape machines and other equipment necessary for the recording studio.

ABSORPTION—INTERIOR FINISH

What we are actually trying to accomplish here is a controlled reverberant field within the studio or control room. Reverberation time of a room is defined as the time required for the mean-square sound pressure level therein, orgininally in a steady state, to decrease 60 dB after the source is stopped. (See figure 6.) Reverb time should increase with enclosed volume.

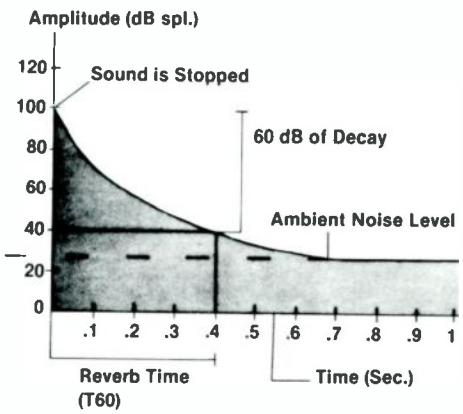

Figure 6.

The reverb time for recording studios should be constant with respect to frequency at about .4 seconds for enclosures of about 4.000 cu. feet. Absorption allows some control over the amount of energy reflected back into the room from any boundary. When sound strikes any material, some of the sound is reflected off its surface, some is converted into heat by causing the material to vibrate, and some is transmitted through to the material's other side. Sound energy is also absorbed when a material vibrates as it is struck by sound waves. This is known as diaphragmatic absorption. This type of absorption is used in panel absorbers. These consist of a panel mounted some distance from a hard backing surface. They are useful as low frequency traps.

Any material will exhibit some absorption and some reflection. The amount of absorption can be measured and varies with frequency. Absorption information is published on a wide range of building materials. This data is known as the absorption coefficient of the material. By using this data combined with formulae for computing the reverb time (T60), the proper materials in their necessary amounts can be specified to provide smooth decay response. One very specialized area of absorption is the bass trap. This device can be constructed by using diaphram or panel absorbers; Helmholtz absorbers and slot-perforated panel types. The panel absorbers require less floor space for low frequencies than Helmholtz types and, therefore, are more useful in small studios.

As the novice will soon discover, the art of studio/control room design is the art of incorporating the acoustical and ergonomic factors into a beautiful and useful tool. With this basic outline of studio design, the three budget examples can be analyzed.

LOW BUDGET

Project Description: A band with a minimum budget would like to create a studio for rehearsal and demo recording. The site is usually a garage in a residential area. The facility will be four to eight tracks, with the possibility of expansion in the future.

There are three main questions a customer will ask of the dealer when any package is being put together:

Do I need acoustic design? Yes, because this type of installation will require complete isolation designs to allow freedom in rehearsal and recording. Interior shell proportions should be calculated to provide for good resonance mode distribution. Geometry and absorption can be constructed on a budget basis with expansion in mind. As the group grows or as the facility begins to generate cash, the interior can be modified to provide more esthetic surroundings and acoustic accuracy, providing the foundation (shell) is done to non-compromised specifications.

Can I do it myself? The answer here depends largely on the particular client. A certain level of competency in construction technique would be necessary in order to assure design performance. A shell that cost the customer $500 in materials would be a total waste if there was that missing link. Many of my clients want to do it themselves and I find it helpful if I can visit the site to advise—which usually saves dollars, which are all too scarce in this budget level. If the client has no aptitude for construction, the best advice to give would be to get help. This can range from hiring a contractor to getting the help of an experienced friend.

How much will it cost? The overall budget will be divided into two parts: design/construction and equipment. The price of equipment can vary due to the amount of equipment on hand to be incorporated into the recording system. These figures are representative of packages I have assembled. Construction materials include rough frame lumber, sheeting, finish materials, electrical and carpeting. Air conditioning and furniture are not included in material costs, but they should be included in the total project budget. Assuming the average dimensions of a residential garage, the construction costs would break down as follows:

Design consultation	$500.00
Construction materials @ 500 sq. ft.	$5,000.00
½" 8-track equipment	$35,000.00
Total Package	$45,500.00

MEDIUM PACKAGE

Project Description: A young engineer and his or her friend desire to open a 16-track studio to complete commercially for higher budget demo work. Assume, for this equipment package, lease financing is available (which is a subject for another complete article). Investment capital from the principals can be used to construct the facility and initiate the lease contract. This size budget would not allow for "build to suit" property, but a popular alternative is an industrial complex suite. These provide an outer shell with one or two offices and rest rooms. Expansion to 24-track is a definite possibility and must be allowed for.

Do I need acoustic design? Yes, because this type of project represents a future state-of-the-art 24-track room;

in order to fully realize the potential of the studio it must be acoustically sound. At this budget level, it makes more dollar sense to allocate more funds to design and construction than to equipment, because the studio will be complete and ready for equipment expansion as the budget and cash flow will allow. However, the opposite is not true. Imagine tearing up the floors and walls of the studio to finish the job at some future date. The redundancy of this type of expansion is definitely *not* cost effective. Used construction materials have little or no resale value, but used equipment can be sold to step up into new gear. Therefore, this package should have a complete design including isolation, proportions, geometry and absorption.

Can I do it myself? Again, this is largely dependent on experience of the people involved. Considering that this studio will be marketing itself based upon an acoustic design, the construction crew must execute the design exactly in order to insure its performance. I would recommend at the very least a qualified foreman or supervisor because of the demands of state-of-the-art studio construction techniques. This person is often provided by the design firm, since a familiarity with studio construction technique is essential.

Any person with these qualifications can be used, although I suggest thorough screening of any applicants. If the prospective studio staff can't be used as laborers and carpenters, etc., a qualified contractor is the best choice. Although this is more expensive, the time saved by an experienced crew will often offset the additional cost. The time involved is important here, as most clients commit to unrealistic opening dates. The preliminary planning through completed design will take approximately three to six months. With experienced personnel construction of inside shell and interiors is two to four months to completion, and with inexperienced people, can range from four to eight months. A session before the studio is ready can do more damage to the young business than negative cash flow for another month.

How much will it cost?

Design cost: complete isolation, proportional, geometry and absorption designs; working drawings and details provided.	$ 10,000.00
Construction costs: all materials and labor necessary to complete the designs as specified; not including air conditioning or furniture; approximately 2,000 sq. ft.	$200,000.00
Equipment costs: a complete gear package, installed, using state-of-the-art equipment for 16-track recording facility.	$ 90,000.00
Total Package	$300,000.00

HIGH BUDGET

Project Description: An established company with a successful record wishes to diversify or expand. The studio will be a state-of-the-art 24-track multitrack recording facility with capabilities for video post production, voice-over, radio jingle production and film scoring. This is the complete multimedia recording facility. The site is a "build to suit" property with size being limited only by the size of the lot. Typically, it is more than sufficient.

Do I need acoustic design? Yes. As any successful businessman knows, he can't be all things to all people; therefore, these professionals must seek out assistance in those areas that are not their specialty. Professional design assistance is a valuable asset to a studio and in order to compete for the level of clientele this facility should attract, an acoustical design is a must. The specialized needs of the multi-media nature of this facility will require special attention. Any studio project under way should feel as though it was the only intended purpose of that room. The placement of equipment is critical for ease of operation yet accuracy of acoustic performance. The studio should be flexible acoustically to more readily adapt to the different uses proposed. This kind of facility requires complete isolation, proportional, geometric and absorption designs as well as additional features for flexibility and multi-purpose usage.

Can I do it myself? This project would not be profitable to "do it yourself." The construction should be implemented by an experienced crew with supervision provided by the designer. Design performance will be assured by this method of construction.

How much will it cost? Any project of this nature will benefit greatly from a comprehensive business projection. Cost analysis and projected profits will become a guide for the business.

Design costs: Including full architectural documents and drawings necessary. On site supervision to provide design performance and verification of design as built.	$ 25,000.00
Construction costs: Including all materials and labor; not including air conditioning or furniture; assume 5,000 sq. ft.	$500,000.00
Equipment costs: Including a complete 24 track audio recording system with syncronizing systems for video and film post production.	$500,000.00
Total Costs:	$1,025,000.00

SUMMARY

The three examples showed how the design parameters changed for the required result and dollars available. The low budget requires solid basic isolation and proportional designs. From this foundation, the studio acoustics can be expanded to any level desired without redundant improvement costs. The equipment package was simple yet quality gear for demo and rehearsal work. The medium budget required a complete design yet was still basic in its function. Dollars spent on acoustic design and construction will be an investment in the future for expansion and growth. The equipment is as close as possible to a complete 24-track operation minus the machine. The high budget design was essentially the same as the medium with additional features to allow variable delay time for different types of recording, such as film and video post-production. The construction is implemented by experienced people and supervised by the designer.

The dealers who do not provide any studio installation or design service may say, "How do I advise the customer who buys the equipment from me?" The best advice, in my opinion, is to recommend a reading list for the customer and to recommend that they contact a professional who can help them with their acoustic design needs. (Recommended reading for additional information on acoustic design.)

John Carey, formerly with Express Sound, is now associated with Westlake Audio.

THE MACHINE THAT HOLDS THE WORLD TRACK RECORD.

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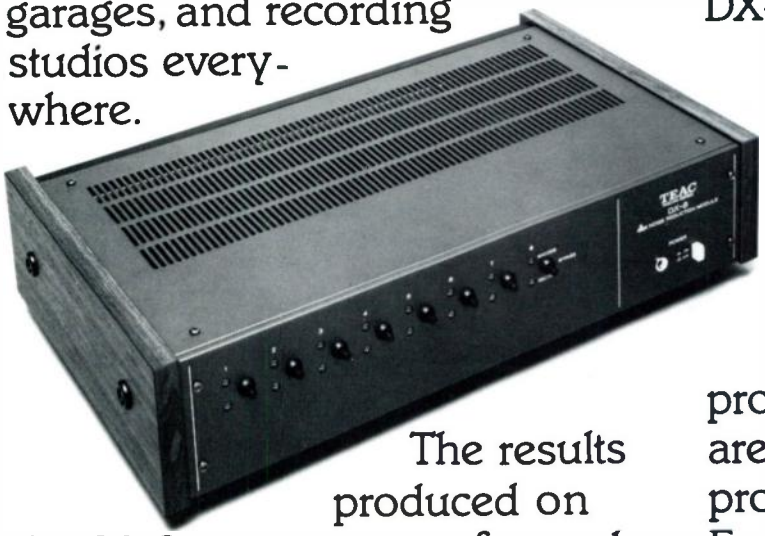

The results produced on the 80-8 are a matter of record. Sometimes gold.

The 80-8 proved a new standard was needed. Eight tracks on half-inch tape. 15 ips only. This new format allowed us to create a combined record/reproduce head, with full frequency response in the sync mode.

The 80-8 proved multichannel recorders could be relatively easy to operate. Our Function Select buttons determine the record, monitoring and dbx* status. One button for each track.

The 80-8 proved that performance and versatility could be affordable. Signal-to-noise is better than 95 dB (weighted) with our integral dbx unit (Model DX-8). Once installed, it's totally automatic. And our new Variable Speed Control**lets you adjust 15 ips ±20% to solve tough cueing and timing problems or add creative effects.

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TASCAM SERIES
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PRO SOUND DEALERS

THE GOOD, THE BAD & THE UGLY

By ROY KOMACK

How do you look to a pro sound manufacturer? The question is not as odd as it sounds. Meeting hundreds of dealers and seeing countless operations gives us a good perspective on what builds solid businesses and what brings some dealers down. Something as simple as sales technique or basic knowledge of the market can mean the difference between fortune or failure as a pro dealer.

The most important thing a dealer can have is a serious commitment to selling professional sound equipment. Of course, that seems obvious, but all too often professional sound products are a small part of a big musical intrument of high fidelity business. The hi-fi dealer with a small stake in a few mics and mixers is fooling himself into thinking he's a pro sound dealer. Unable to attract the pro customer, such a narrow product assortment will often do nothing more than collect dust.

When a high fidelity dealer wants to carry the Bose pro line, we actually try to discourage him—until we find out why. Often he'll say he wants the pro line because one of his salesmen is a musician, knows some performers, and thinks he can sell some pro sound. Or he may have a good hi-fi store, but is trying to fill in some gaps in a slow period. Another common answer is: "I get some calls for it."

In contrast, we know that dealers with a serious commitment to professional sound will consistently attract customers, represent our products best, and stay in the business for the long term. And we make a commitment to these dealers—to provide the product, promotion and marketing support they need.

Successful retailers know that a store needs to look inviting from the outside. Although it's not as important to have casual traffic as in a consumer products business, you've got to look good enough so that when people drive up, they won't want to turn around. Your sign should not be older than your customer.

Once he's inside, you want to keep the customer there for a while—and you will if the product looks good, and can be shown and played with. Spacious, uncluttered, functional display areas can do a lot of selling on their own. At Bose, we've developed a merchandising concept known as the Bose Wall. In eight feet of wall space, the dealer displays four major products, a few accessories and product literature; our logo spans the entire display. The equipment is connected and plugged in, and

we urge the dealer to have mics available.

A large, neat and functional presentation of equipment really takes care of the opening for you. Instead of slipping into, "What can I do for you," the salesman can move right into: "Hey listen to this."

We ask our dealers if they demo for every prospect. Too often the answer is, "Oh, it's too much trouble to hook everything up every time."

The answer to this is simple: "Leave it hooked up."

What do you use for a demonstration? We recommend that you make your own demo tape, one that you know fits the kind of customer you're looking for. The demo should be exciting! Play it loudly and clearly, and make sure that your demonstration room is acoustically good. Don't deaden everything! In that demo room, you must have a mixture of live surface and absorptive material. You can do it without a lot of space and it doesn't have to be expensive. For example, in our own sound rooms here at Bose, to break up "slap" echoes and disperse sound evenly, we bought some plastic snow coasters and fastened a number of them to the walls.

If you're an installer or if you work with one, you have the opportunity to demo the product for the prospective customer in his own room. Some dealers are reluctant to go to the extra effort of an on-site demonstration, but those who do it and do it well find that it pays off for them. Often, the customer is very reluctant to see the system go back to the shop. The likelihood of closing the sale is so much greater that you should take every opportunity to demonstrate the system where it will eventually be used. You'll also wind up knowing better what the customer needs.

Oddly enough, even some dealers who are good enough merchandisers to put together a great display and demo defeat the impact by redistributing equipment to other dealers. Their rationale is often that the few points of margin available in this way are 'better than no sale at all." This type of business is self-defeating in more ways than many dealers realize.

First, you can't make a normal margin on it. But you've had to stock the item and pay for it, just like something you made a full margin on. Worse than that, it can come right back into your own back yard. It really happens that a piece of merchandise goes through several steps and is finally resold to somebody only three miles away.

Another way it's harmful is that the secondary dealer often wants the product to establish a credibility that is not deserved. They "nail it to the floor," demonstrate it improperly, and then *you* get the customer back in *your* shop, looking at what you recommend and saying, "Oh no, I heard that over at __; it's awful!"

These are disadvantages from the dealer's point of view. From the manufacturer's frame of reference, if dealers want to redistribute that merchandise for resale, they're trying to do the manufacturer's job. So, we simply ask that they do it the way we would. Make regular follow-up visits to the accounts, train the sales staff, supply literature, give us information on any complaints or problems, and so forth. They may find that they can't afford to distribute for only a few percent markup.

You can see the harm to the customer that comes from buying a product that may come without the proper manuals, warranty card, and instruction in use.

So this strange business of redistributing is harmful to everybody. It hurts the selling dealer, the buying dealer, the manufacturer, and the customer.

You can have the best-looking store in the business, but if there's not enough bottom line, you won't be there next year. The reasons for low profitability in this business are many. Some dealers aren't assertive enough; they're too quick to believe what the buyer says he can get it for across town. The dealer meets the crosstown price and wonders at the end of the year why he doesn't earn more.

Suppose what the buyer tells you is true: that he can get it cheaper. Why not let him go and get it? Sure, you're going to lose a few sales, but you'll also make some that you wouldn't expect. If your business looks organized and your staff is knowledgeable, your customers will know that they can rely on service from you. If you are confident in your approach, you'll make a good share of those sales and earn enough margin to develop your business.

There's another cause of low profitability in the pro sound business. Many dealers got into this business in the first place because they were musicians or sound people. They get turned on by the gear and they find the technical aspects fascinating. But as a dealer, you need to stock product lines and individual products that sell, that turn.

That fancy 24 channel mixer that you bought three years ago, the one that's sitting on the back shelf—don't buy it again! If your business is primarily with clubs and lounges and the groups that play there, you don't have to invest much in gigantic double 15″ bass bins. Keep a record of product movement; if your inventory equals one year's cost of goods sold, that's one turn per year, and that's not good enough. You won't be around for your second year. A dealer's inventory should turn three or four times per year. If you're really aggressive, five or six turns is not out of the realm of possibility.

A two-to-three-month inventory should be the goal. No matter how much in love with it you are, you really shouldn't buy something that will sit around for eight or ten months. Be careful what you take in trade. How long since it was built? Every once in a while, take a look at what's sitting in the back and has been there for a long time, and run a sale. If it's turning into a collector's item, you probably can't afford to be the collector.

What can a manufacturer do to help you achieve higher profitability, besides ship you the product? Give lots of support and not push you to overextend yourself.

Manufacturers can—and should—provide marketing support in a variety of areas including:

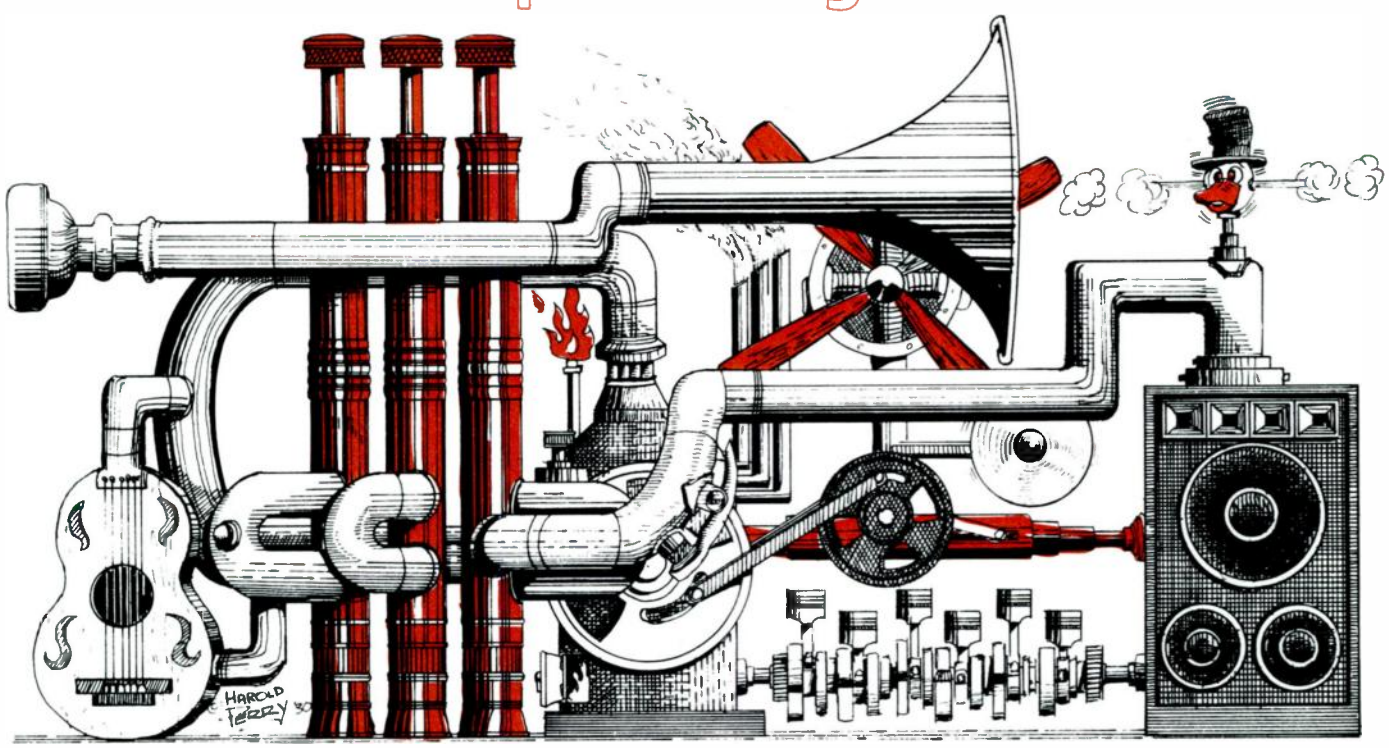
- National advertising to make customers aware of their products.
- Sales literature that is really informative, not just hype.
- Making dealer lists available to customers who inquire, so that people know how to find you.
- Assisting in preparation of installation proposals.
- Merchandising and display aids.
- Advice on application and service problems.
- Prompt service, including providing parts and reimbursement for your labor.
- Products that provide lasting value to you and your customers, not just yearly face-lifts.
- Sales representatives who really know their products *and* your business.

A two-way line of frequent and worthwhile communication between you and your suppliers will surely lead to more profits for everyone. And that's the bottom line.

Roy Komack is Product Manager, Professional Products Division, Bose Corporation.

INSTRUMENT CONTROLLED SYNTHESIZERS: Technology, Technique & Music

By Mike Beigel



AN INSTRUMENT YOU PLAY WITH AN INSTRUMENT

The relationship between a musician and a musical instrument is beautiful and subtle. Years are spent to learn musical techniques and musical material. In the best musicians, the instrument becomes an exension of the body's capacity for expression. Now that electronic modification of musical sound has become commonplace, it is time to look at musical electronics as an extension of musical instruments.

The newest additions to the musical electronic "arsenal," Instrument Controlled Synthesizers, merit special attention and an expansion of our concepts of musical expression. Instrument-controlled synthesizers are musical instruments that are activated by other musical instruments. In the same way that a guitar is the link between a musician's body and the outside world, an instrument-controlled synthesizer is "played" by the output of a musical instrument. This concept is vitally important if you wish to extract the maximum musical potential from these new instruments, or to effectively market them.

Many people think of musical effects as pushbutton boxes that simply "work" when used with a musical instrument. This conception, which is weak even when applied to musical effects, breaks down when applied to instrument-controlled synthesizers. It is almost like expecting a saxophone to just "work" the first time you pick it up. Even a kazoo is not that accommodating. A musician who understands that the instrument-controlled synthesizer is itself a musical instrument, with all the subtleties of any other musical instrument, will be willing to devote the time and attention to perfect a new technique in his musical language.

Much of the initial confusion about (and hence, resistance to) instrument-controlled synthesizers centers around the notion that you have to "play into" them. But you even have to "play into" a fuzz-tone, and you certainly have to "play into" your native musical instrument. That is one of the beautiful aspects of making music: the musician's skill in controlling the instrument, or basic musicianship. So I would ask you, if you have a notion that "playing into" any musical device is a drawback, alter your thinking into the much more useful notion of simply "playing" the device. As with other musical instru-

ments, the identity and charm of instrument-controlled synthesizers will derive as much from their peculiarities and limitations as from their inherent virtues.

EXTRACTING CONTROL SIGNALS FROM MUSICAL SOUNDS

If you've read this far, you are probably curious about how one musical instrument can "play" another. It's a fascinating subject. The human ear can discern the many aspects and subtleties of musical sounds with great precision and in many dimensions. But how does an electronic "box" decipher the complex information in a musical signal, and turn it into control voltages and parameters for a synthesizer? Moreover, what kinds of control information can we hope to derive from a musical signal?

If we consider a single note played by a musical instrument, we can characterize it by a few different aspects: time length; loudness; pitch; tone-color. Obviously, there are more aspects than these, and there are subtleties in defining each aspect. We have to come up with working definitions that can be translated into "sense-able" quantities: reduction of a musical quality to a number or a voltage. Let's look at the four aspects just mentioned.

Starting with a note's time length: The basic question is, "Is a note being played or not?" With some instruments, particularly wind instruments, the question is fairly easy. Wind instruments have a limited dynamic range and a fairly quick decay after a note is released. But with a guitar, the note fades gradually into inaudibility. When can we say it is "off"? Let's say if the signal goes below 1 millivolt we will call it "off." Well, wouldn't you just guess that in the process of dying out, the guitar note sometimes gets a little louder before it gets a little softer! So a note *enable* detector, as we call the note "on" or "off" sensing device, must be sophisticated enough to take into account the subtle amplitude variations in a musical signal without producing "false" outputs. To roll this all up into a definition: A *note enable detector* senses the amplitude of a musical signal and produces an *on* output if a note is audible and an *off* output if a note is not audible. This is a "digital" output signal.

The *loudness* of a note is also related to the amplitude of the musical signal. Loudness is a relative or "analog" quantity, and is approximately measured by the musical signal's "amplitude envelope." The "amplitude envelope" is essentially what is read by a VU meter on a mixing console: a continuous indication of the "average" AC signal voltage. Instead of using a meter, we convert the average AC signal into a corresponding DC signal. The *envelope* voltage is then used as a control parameter relating to signal loudness.

There is another way to measure loudness. In a guitar, the loudness is determined by the magnitude with which a note is "struck." All of the information about loudness comes at the *beginning* of the struck note. We need a "transient detector" to determine *when* a note is struck, and something like a "peak follower" to determine how high the *peak value* is before it dies down. So we have two new pieces of information-gathering hardware about the note: the *attack* detector (a digital signal that records the moment of a new note's attack) and the *peak follower* which records the amplitude at the time of attack.

We might also assign the attack detector to the function performed by the *enable* detector, since it tells *when* a new note has been initiated. Actually it does function in conjunction with the *enable* detector. Imagine the case of slurred but accented notes in quick succession. The *enable* detector would indicate that only one note was played, because the signal amplitude never reached the "off" level. But the *attack* detector would record the beginning of each new note. Together, the *attack* and *enable* detectors accurately specify note time-lengths. The *attack detector, peak follower* and *envelope follower* specify the note's loudness dynamics.

Pitch, of course, is simple. You merely have to find the fundamenal frequency of the note being played, and produce a control voltage relating to it. Unfortunately, the fundamental frequency is often masked by other overtones of the musical signal, attack transients, wind noise, or interfering signals from other notes. Other notes!! You mean you can only extract the pitch of one note at a time? Well, yes. With presently available technology, only one "pitch" can be extracted at a time, if a "single input" system is used. A single input system is a system that accepts the musical instrument input—whether the instrument is polyphonic or not—through one input jack. Instrument-controlled synthesizers which are polyphonic must essentially use a separate isolated "pickup" for each voice employed. These concepts and instruments (notably, specialized polyphonic guitar synthesizers) would greatly expand the scope of this article, so I will deal with only the theory and implementation of "single voice" synthesizers. We will define a *pitch follower* as a device which tracks a musical note's fundamental frequency and converts it to an appropriate control voltage. A pitch follower is *not* simple.

An instrument's *tone color* refers mainly to the harmonic overtone structure of each musical note. Tone color or timbre is a complex acoustical phenomenon, and we are limited by present day technology in our ability to sense it or represent it as a control voltage. The closest thing to a "timbre" extractor that we have in present day musical products is a vocoder, which samples the signal's overtone structure in a number of different frequency bands, and converts the output of each frequency band into a control voltage. This would present an information overload in present instrument-controlled synthesizer architectures. A simpler method of approximating a "tone color" parameter makes use of the fact that, in most musical instruments, the overtone structure is "brighter" (contains more harmonics) as the instrument's loudness increases. The relationship between brightness and loudness is not simple, but we can link loudness and timbre together and obtain pleasing results. So the *brightness* parameter is a control voltage derived from the loudness parameters.

In figure 1, the system components for parameter extraction in an instrument-controlled synthesizer are shown. In figure 2, a musical sequence and its associated control parameters are displayed. By studying these diagrams, you will have a good idea of the process of parameter extraction.

ARCHITECTURE OF AN INSTRUMENT-CONTROLLED SYNTHESIZER

In the last section and in figure 1, we constructed a system to derive control parameters from a musical signal input. This system is essentially the front end of an instrument-controlled synthesizer. It functions as the interface between the input signal and the synthesizer guts the same way as the mouthpiece and buttons on a saxophone function as the performer interface. You play the saxophone with your lungs, embouchure and fingers through

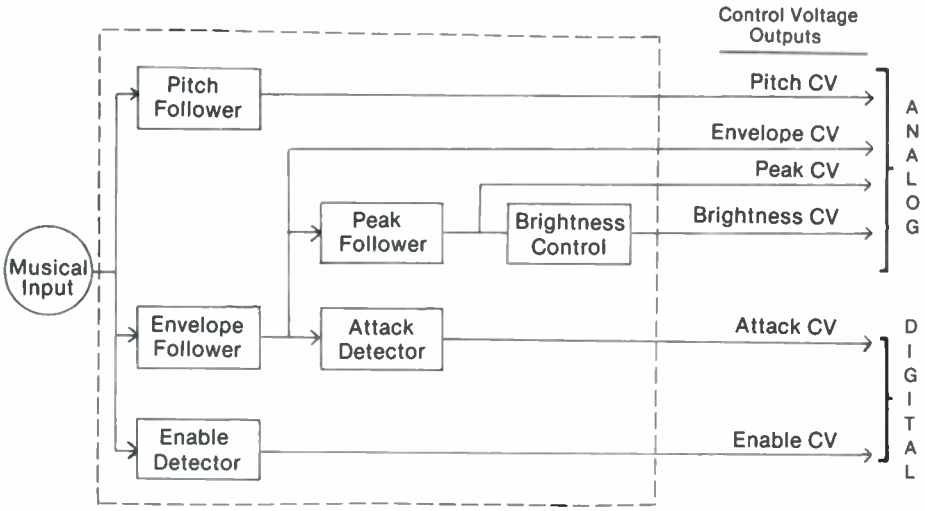


FIGURE 1. Parameter Extraction System, or Control Interface System

the mouthpiece and buttons; and in the same way you play the instrument-controlled synthesizer with the output of your saxophone through the instrument-interface system.

The rest of the instrument-controlled synthesizer is essentially a voltage-controlled synthesizer, similar in many ways to all the synthesizers produced since Moog put out his first one in the 1960's. The available products differ markedly in their approach to synthesis systems, but they all employ adaptations of basic synthesizer elements. (In Part 2 of this article, we will go into specifics.)

The synthesis section connects to the instrument-control interface by means of the control parameters derived from the musical instrument input. Figure 3 shows this basic system, while figure 4 provides a detailed representation of the subsystem components.

The synthesis section consists of one or more voltage controlled oscillators, a voltage-controlled filter, voltage-controlled amplifier, and one or two envelope generators. The interconnection between the synthesis components and the control interface components is dependent on the complexity of the synthesizer. The system of figure 4 represents a complex system which makes full use of all the information we have gathered about the musical sound, as described earlier.

The *voltage-controlled oscillators,* which form the basic tone-generation system for the synthesizer, are controlled by the output of the *pitch follower.* Thus, the synthesizer will provide tones which track the pitch of the input signal, either in unison or at some musical interval selected by the user.

The VCO outputs are filtered by the *voltage-controlled filter* to provide the desired tone color. In a standard synthesizer, the voltage-controlled filter is swept by an *envelope generator* to create a spectral envelope. In the instrument-controlled synthesizer depicted here, we have the option to make the *filter* much more responsive to the musical information we derived from the input signal. By controlling the amplitude of the *filter envelope* with the *brightness* control voltage, we can

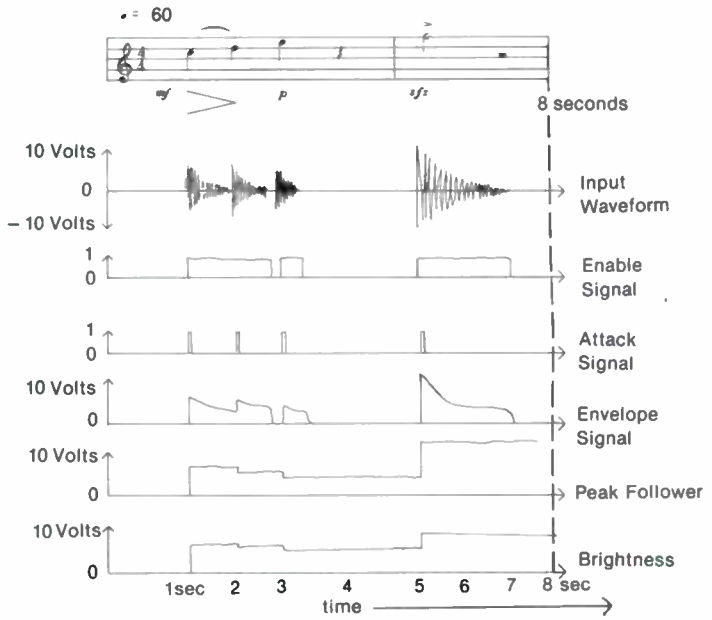


FIGURE 2. Musical Sequence and Control Voltage Outputs

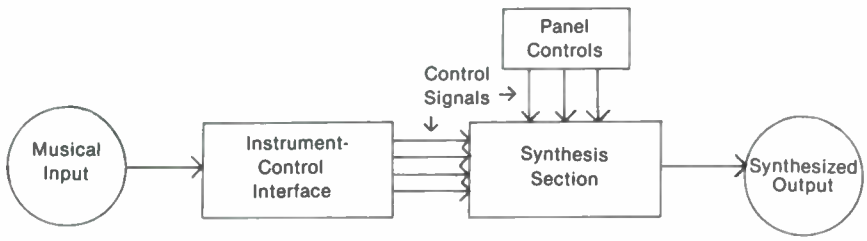


FIGURE 3. Instrument-Controlled Synthesizer System

make the synthesizer's tone-color more life-like, responsive to the musical expression contained in the brightness of the original signal. Alternatively, we can control the *voltage-controlled filter* by the output the *envelope follower*, so that the filter's "contour" exactly duplicates the instrument's loudness envelope. This would simulate the familiar "envelope-controlled filter" musical effect, except that in this case a synthesized signal is filtered instead of the controlling instrument's own signal. Both methods of dynamic filtering are found on currently available instrument-controlled synthesizers.

The *voltage-controlled amplifier*, which provides the amplitude contour of the filtered signal, is driven by a control voltage from the *VCA envelope generator*. Once again, the envelope generator can be controlled by the loudness parameters detected by the instrument parameter extraction system. This kind of control will give the instrument-controlled synthesizer a realistic set of loudness dynamics responsive to the input signal.

Not all instrument-controlled synthesizers have this degree of sophistication and dynamic interaction with the controlling musical instrument.

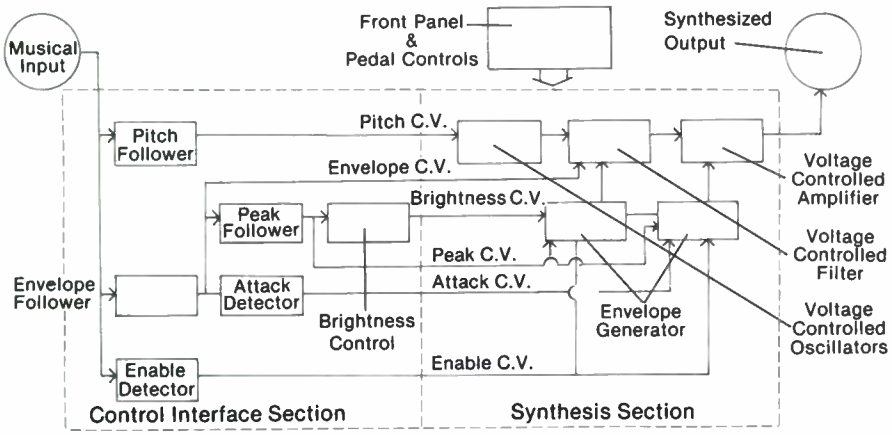


FIGURE 4. Detailed System Diagram of Instrument-Controlled Synthesizer

The essential elements of instrument-controlled synthesis systems, as described, are the basis for all product designs that have appeared.

USING AN INSTRUMENT-CONTROLLED SYNTHESIZER

At a recent NAMM convention, Don Tavel of Musico (makers of the *Resynator* Instrument Controlled Synthesizer) made a comment which sums up the essence of the proper use of instrument-controlled synthesizers. "A guy comes up to play the Resynator, which is set up to sound like a trumpet. He is playing it with the guitar, but instead of playing with trumpet dynamics and trumpet phrasing, he is using guitar dynamics and guitar phrasing. How does he expect it to sound like a trumpet unless he plays it like a trumpet?" That is a very subtle statement, actually. It means that you want to play "through" the whole system with the end product in mind. It implies a knowledge and "pre-visualization" of the final sound and articulation you want to convey. Most important, it calls for a musical technique which encompasses the characteristics and limitations of both your native instrument and your instrument-controlled synthesizer.

Guidelines for playing instrument-controlled synthesizers are very similar to guidelines for playing any musical instrument, once you understand that your musical instrument's output (rather than your fingers) is playing the synthesizer. Playing "clean" and "distinctly" will yield the best results. You really, at first, have to "tell" the instrument exactly what you want. If you are a wind player, remember that breath noise and indistinct note transitions will provide misleading information to the pitch and envelope-follower circuits.

If you are a guitar or keyboard player, remember that you need to play one note at a time. This may seem easy; but you should realize that strings can vibrate from harmonic excitation, or shocks to the musical instrument, or imprecise playing. Any of these additional "noises" will throw off even the best pitch-to-voltage converter. On the guitar, you can learn to "damp" strings with the fleshy parts of either hand, allowing only the melody string to vibrate. Pickups and tone controls on the instrument should be adjusted to provide maximum volume and a strong fundamental. On a guitar, the center pickup is usually best. Sometimes, on an instrument with a low output level, preamplification can help.

Each available instrument-controlled synthesizer has one or more "sensitivity" or input controls. Finding the optimum settings of your instrument's controls and the synthesizer controls will pay for the time spent. Once you master the techniques to make the synthesizer track your instrument optimally, you will be ready to explore the subtleties of the synthesizer.

Many differences exist in the form and layout of the "synthesizer" controls on different instrument-controlled synthesizers. In fact, some notable advancements in synthesis technology have appeared in these products. In the next article, I will discuss some of the commercially available products with the objective of exploring their different approaches to synthesis techniques. I hope your interest in these new products has been stimulated, and that you will help bring them into the musician's repertoire of performing instruments.

Mike Beigel heads up Beigel Sound Lab, manufacturers of an envelope controlled filter.

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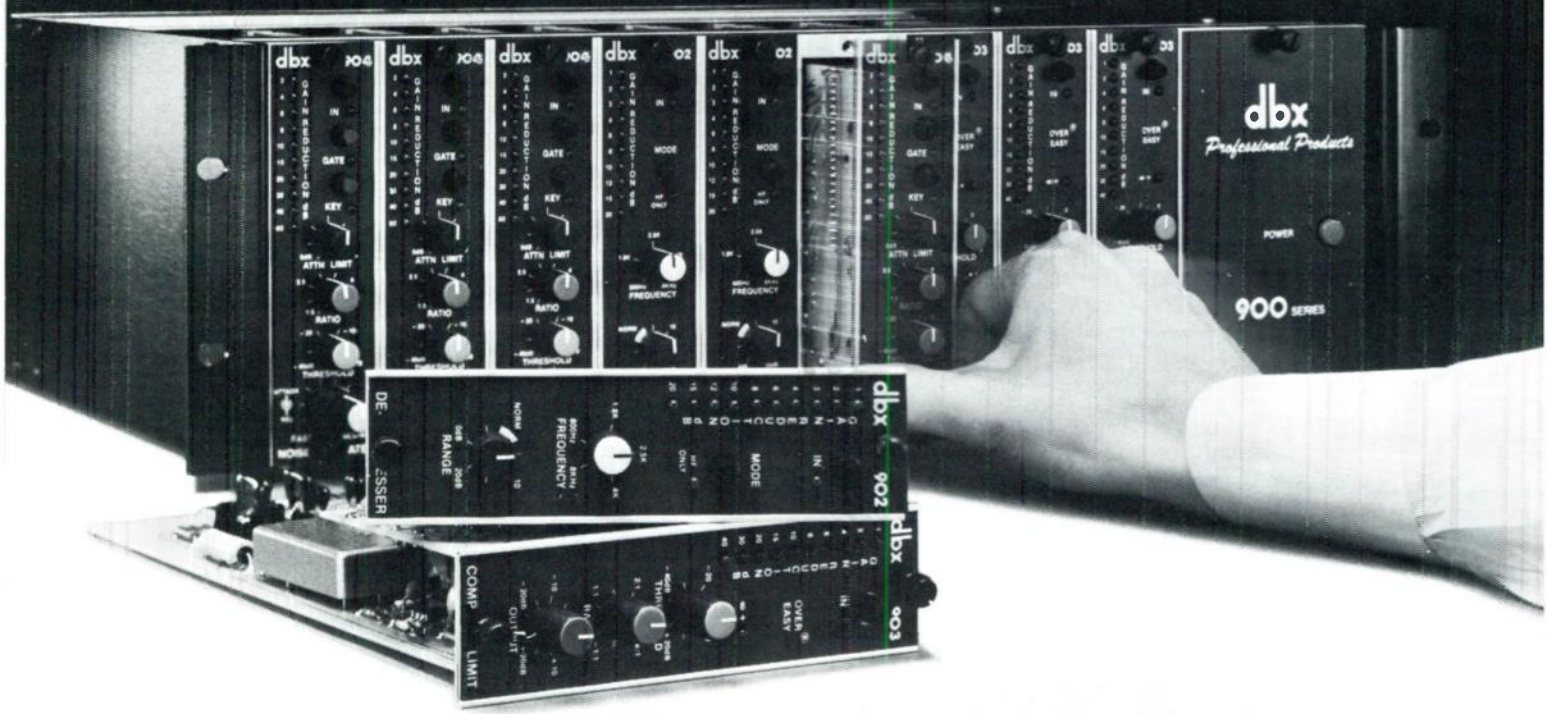

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CIRCLE 92 ON READER SERVICE CARD

WRH

The SOUND SH

Arp Instruments has a new polyphonic synthesizer in the works, the Chroma, which boasts of being the first synthesizer with true polyphonic touch response. The force of the keyboard player's hands is translated into subtle changes in volume, tone, texture and coloration by means of a microcomputer. In addition to providing physical control over the sound of the synthesizer, the Chroma will have a keyboard that can be split at any given point, thus rendering two simultaneous polyphonic keyboard sounds. Add to that the 50 programs that come from the factory,and user-programmable features, and you have the makings of a giant step forward for synthesizers. The Chroma is slated for delivery in early 1981.

CIRCLE 1 ON READER SERVICE CARD

The Tapco company has three new stereo mixing consoles, the 7212, 7216, and 7224 in 12, 16 and 24 channel formats, respectively. Each unit has stereo and mono capabilities, and can be used for sound reinforcement or recording applications. Features include channel patching, mic/line switching, gain trim controls, an auxiliary bus, monitor bus, effects bus (all with separate master level controls, the effects bus with two pannable return controls), an effects-to-monitor level control, and much more. Three way EQ, rotary pan pots, solo switching, and 24 V Phantom Power are some of the other outstanding features offered in the new 72 Series from Tapco. These boards are modular, meaning that a bad channel can be removed and repaired without affecting the performance of the rest of the board. Tapco started out small but good, and things have only gotten better as the company has grown and merged with E-V. This is good stuff, folks.

One night I played a gig in Marianna, Arkansas, at which the good folks who were throwing the party that night had graciously provided the band with a washtub of cheap beer and a flatbed trailer, in spite of which we were expected to perform. However well-intentioned (indeed, some thought downright *clever*) all this may have been, the old trailer wasn't anchored very well, the bed was flimsy, and every kick of the bass drum resounded through the mics like the mating cry of the bull moose. It was on that memorable evening that I came to fully understand and appreciate the beauty of a good solid floor.

All musicians, but *especially* drummers, who have ever worked one-nighters know the horrors of makeshift staging. One never knows what to expect, but it is usually flimsy and falling apart, with latches that have long since broken. But given the choice between standing down on the floor level or erecting one of these stages that is predestined to failure, most musicians will take a chance on a flimsy riser rather than play at eye level with the audience. After all, what can be worse than players without a stage?

CIRCLE 2 ON READER SERVICE CARD

The Model 525 electronic crossover from **UREI** operates in four panel-selectable modes, stereo two-way and three-way, or mono four-way and five-way. The crossover frequencies are continuously adjustable from 50 to 10 kHz, with the frequency measured and displayed on a digital frequency counter. Resolution is 1 Hz. Front panel screwdriver slot adjustments of the mode select and crossover frequency controls provide greater security, by making an accidental adjustment of the unit almost impossible. Besides, just putting a screwdriver between the potentially meddlesome person and the crossover's vital adjustment eliminates hundreds of thousands of people who can't use a screwdriver.

OPPE

By Charlie Lawing

The model 525 has a subsonic filter that rolls off frequencies below 30 Hz, which prevents the low frequency transducers from being blown by a thundering bass guitar or synthesizer. The filter can be activated by a switch on a rear panel, so those who prefer ultra-low frequency response (scientists say it is soothing to the whales) can have it if they want it. All the inputs and outputs are XLR/QG connectors or terminal strips. UREI also offers a security cover for the Model 525, to further insure the safe and trouble-free operation of the unit.

CIRCLE 3 ON READER SERVICE CARD

The A-30 power amplifier from **Phase Linear** is a 3½"-high rack-mountable unit, capable of delivering 120 watts per channel into 8 ohms. The A-30 can handle over 1600 watts of output power. Stepped input attenuators, DC and subsonic sensing output relays, fault indicators, and thermal overload protection circuits keep the A-30 from blowing speakers. Furthermore, the A-30 is equipped with electronic limiters and power supply fuses that prevent excursions into unsafe areas, regardless of the load impedance. The speaker impedance is greater than 4 ohms in stereo, and greater than 8 ohms in mono. Signal to noise ratio is 100 dB, and distortion is almost non-existent in the A-30. Phase Linear notes that the new amplifier was designed specifically for professional use, as opposed to most of their earlier models, which were for consumer use, but which, by the way, were used successfully in professional applications.

CIRCLE 4 ON READER SERVICE CARD

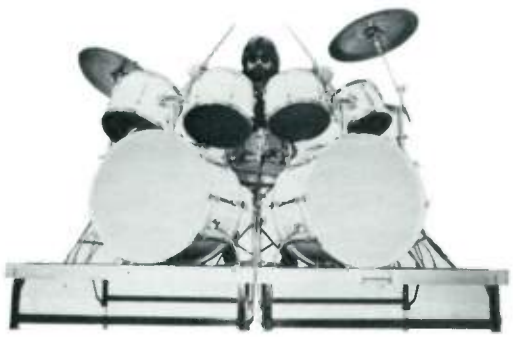
The Series 4 mixing consoles by **Tangent Systems** are equipped with four output buses, and are offered in either 12- or 20-input fully modularized mainframes. The Series 4 mixers feature transformerless circuitry, three band continuously variable EQ in each channel and a 20 dB pad with peak LED indicators on each channel. These mixers have three independent monitor sends, eight independent returns and six output buses, which can be assigned through four submasters and R/L stereo buses.

Full provision for multitrack monitoring and channel assignment are offered on the Series 4 consoles, as well as muting, and phantom mic power. The faders are 100 mm, and the unit has an external power supply. Several options are available at an extra cost, including reverb and expander modules. The Series 4 consoles are suitable for live sound reinforcement, 4-track or 8-track recording.

CIRCLE 5 ON READER SERVICE CARD

Well, finally someone has gotten around to building a good portable riser: **Pro-Line** Risers out of Ann Arbor, Michigan has a 6'×7' riser that folds up for travel and can be elevated to a full 19 inches above floor level. These risers come with carpeted surface, lockable wheels, adjustable legs, and non-skid adjustable feet. Pro-Line has a dolly for moving the risers, a tie-down kit for drummers, and a flame retardant polyester skirt that covers the front of the riser by means of a Velcro attachment. Frames are made of aluminum angle, the legs are made of steel, and

3/4-inch exterior grade plywood is used for the surface. These risers carry a one-year warranty, and custom sizes can be made to order.



CIRCLE 6 ON READER SERVICE CARD

Micmix's new Master-Room XL-210 provides, according to the company, "the highest quality reverberation at an affordable price." The XL-210 is a self-contained 3½ inch rack mount unit, featuring two independent stereo channels switchable to monaural. Input and output connections are via ¼-inch phone jacks located on both the front and rear panels, allowing break-in patching at the front panel without disturbing the permanent rear panel connections. Active balanced inputs allow feeding by either balanced or unbalanced lines. The unbalanced outputs will readily drive a 600 ohm load.

The unit can be used with the echo or effects send/return function of most consoles or can be placed in the main signal path. Both channels of the XL-210 feature an equalization section, allowing the user to simulate the reverberant sounds of a live chamber, plate or concert hall. The system operates on either 120 or 240 volts, and according to Micmix, is built to "withstand the rigors of road use." Suggested user price is $950.

CIRCLE 7 ON READER SERVICE CARD

RG Dynamics' new X-15 dynamic processor is a low-cost unit designed for those who want to restore the live impact and musical detail to discs, tapes and FM broadcasts with a minimum of adjustments. The X-15 has a harmonic analyzer for each stereo channel that automatically and accurately guides dynamic range expansion. The RG X-15 connects to most home stereo systems, and offers a minimum of 15 decibels of total dynamic processing at full setting.

Also new from RG Dynamics is the Pro-20, a top of the line model that offers 20 decibels of dynamic processing at full setting. The Pro-20 has a feature called "programmed attack," which is a multi-logic circuit that programs the amount of dynamic range expansion to preserve and enhance the delicate dynamic shadings that characterize the best recordings. Programmed attack provides a variety of automatically selected expansion curves to provide expansion that is closer to a mirror image of the recording studio compression applied during the production of discs and tapes.

CIRCLE 8 ON READER SERVICE CARD

Integrated Sound Systems has a new series of speakers, drivers and high-frequency horns, the **Vortec** Series, which are designed to give cool operation and high definition at very high output levels. Which is to say, the Vortec Series is a challenge to rock and roll musicians, who have already managed to destroy any and every piece of sound gear ever built. To say that these Vortec speakers and components can't be blown would be stretching the truth, but there is also convincing evidence that the Vortec designers took on the challenge of high-volume rock with a determination to make speaker-blowing harder to do.

The Vortec Model 1560 can handle up to 240 watts without distortion. The speaker cone is made by a pulp-treating process which renders a cone that is durable yet responsive. The cone is capable of withstanding long linear excursions and transient peaks. The strength of the cone is augmented by a heavy 14 lb. magnetic structure made of ferromagnetic materials and complemented by a 3.2" diameter voice coil.

The SOUND SHOPPE
REAR ENTRANCE

Forced air cooling is created by a vented pole piece, which aids in rapid heat dissipation.

The Vortec Model MF 2000 mid/high frequency compression driver has a copper-clad voice coil and a 1.6" diameter aluminum alloy diaphragm. The single layer, low-mass, low-inductance voice coil allows an extension of the frequency response with a minimum amount of impedance. The driver can withstand lengthy excursions of the diaphragm, without fatigue, for extended periods of strenuous performance. The unit employs a ceramic magnet with a gap field strength of 16,000 Gauss. The unit features a self-aligning field-replaceable coil-diaphragm assembly and a standard 3-bolt mount. The driver is recommended for a number of uses, including stage and studio monitoring, theaters, playhouses, and with musical instruments.

The Vortec HF 3000 is the only liquid-cooled high frequency power tweeter available. The voice coil is immersed in a magnetic fluid for rapid heat dissipation, high power capacity and consistent response. The tweeter works best when crossed over at frequencies greater than 5 kHz. Mathematically determined bullet/horn geometrics provide optimum horn loading, eliminate phase cancellations and minimize distortion.

Vortec offers a one-year parts guarantee on all the above mentioned products.

CIRCLE 9 ON READER SERVICE CARD

The new GS1 electronic keyboard from **Yamaha** is much more than a digital synthesizer: it is a full 88-key unit that is housed in an attractive wooden cabinet. The GS1 looks at first glance like a super-compact spinet, complete with heavy wooden legs, three expression pedals and an attractive natural wood finish.

But inside the wooden cabinet is a digital synthesizer, with 16 voices, equalizer, master volume, pitch and detune controls, vibrato, tremolo and ensemble controls. The accessories package includes a headphone jack, a foot controller jack, and a line output. Channel one and channel two outputs can be combined in either balanced or unbalanced form.

The GS1 is a great idea because it is a highly sophisticated piece of electronic equipment housed in a very subdued and tradition-oriented cabinet. Too often, salesmen find it hard to sell synthesizers because they look so formidable, with all their knobs, switches and unfamiliar terminology. But the GS1, while it has the necessary controls at hand on the front panel, looks first of all like an acoustic piano; that is, something that any keyboardist can immediately grasp. The GS1 should have tremendous appeal to churches and other institutions where fixed installations are called for. But on the other hand, Yamaha has the same digital synthesizer available in a collapsible road case, built with the traveling musician in mind. Now, that doesn't mean that the GS2 has a map of the U.S. engraved in the top, nor does the GS2 make instant coffee and read road signs, but the GS2 can effectively replace several keyboards in the player's existing arsenal, since the GS2 can faithfully reproduce the sounds of electric piano, electronic piano, organ, and brass instruments. So, Yamaha has one for the road and one for the sanctuary, whichever seems more appropriate for the customer.

CIRCLE 10 ON READER SERVICE CARD

By Gina M. Stucki

DEALER DOSSIER

Progressive Music
Salt Lake City, Utah

Progressive Music Supply, Inc. is one of the oldest and largest stores of its kind in the West. Accordion teacher Don Penman started the business in 1947. What began as teaching studio became, a fewer years later, one of the first retail outlets to exclusively carry a new line of instruments designed by Leo Fender. In the 30 years since, Progressive Music has grown to its current position as a major retailer of electronic instruments and equipment. Sound Arts discussed that transition with Karl Penman, who now runs the family business.

Why did Fender approach your store?

Penman: Back in the early '50's, we were the only store in the area of any size. And because Fender was really pioneering, he followed the successful accordion stores. There was nothing in the electric guitar industry at that time. We were known as a Fender store because that was all you could buy here was just Fender.

What kind of inventory do you have today?

Penman: We have in stock a little over a million dollars in inventory, primarily in the MI and keyboard field.

What lines do you carry?

Penman: We have 87 franchise lines. Those that we stock in depth are the quality lines such as Peavey, JBL, Biamp, Acoustic, BGW, and Music Man.

Are your customers mostly performers interested in top-quality instruments?

Penman: Our customers will range anywhere from a student that is starting to play the guitar, trumpet or flute all the way through Journey, one of the larger touring groups in the nation.

Who are some of your more prominent customers and why are they coming to Progressive?

Penman: Well, we advertise the largest selection in Utah and Idaho. And I think that, particularly when they are doing a concert in the area and need an instrument or service, they would probably come to us because they feel that we have it. Who are some of the top people we have dealt with? There are a large number of them, most recently Eddie Rabbit—here at the State Fair—Bad Company, Les Paul—who's come in and done a concert or clinic for us—and a number of others.

What sets Progressive apart from its competitors?

Penman: I think one of our biggest advantages is our professional people. Our salespeople here have a daily training program. We have a sales meeting every single morning, as well as continual, ongoing training while working with customers. Customers can ask some of the most interesting questions. And one of the key things, I feel, is that if you don't know the answer, to say "I don't know, but I'll find out."

Our people are listeners. They listen to what the customer needs, what he wants, what he's looking for, what his budget is, what kind of music he does, where he's going to use an instrument. And so they take their expertise in product knowledge and help determine what will be the best product for that customer. I think our people are the key.

What kind of background do your employees have? And how do you find salespeople?

Penman: When I look for a salesperson, I look for an equal blend of two things, really three things. I look for a blend of empathy and drive in a person. It's also critical that that person have a good background in product knowledge. Our industry is very technical and our buyers are becoming much more discriminating every day. They're much more educated. As inflation takes a bigger chunk out of the dollar, people are becoming more value-conscious.

What kinds of things are they looking

for, what questions are they asking?

Penman: I would say the customers today are looking a lot at specs. They're looking at what is the total harmonic distortion much more so than they were a year ago. A year ago, they were asking, "How many microphones can I plug in?" Today, they're looking for quality.

What's responsible for that change?

Penman: I think they feel they'd like the best sound for them. And that this product they're potentially going to buy is going to improve that sound.

How do you recruit new customers? Through advertising or word-of-mouth, or both?

Penman: Probably our biggest form of advertising, if you can call it that, is a monthly newsletter we send to about 2,900 people in the states of Utah, Idaho and Wyoming. It not only announces specials in advance, but it has articles in it that we call Sound Thinking. It takes a problem that may exist in an area, such as feedback, and discusses what causes it and how to eliminate it. And it has new product ideas, that sort of thing. This is one of our best forms of advertising, just direct mail. Also, we rely a lot on word-of-mouth.

Do you find that mailings or newsletters are something that really sets you apart from music stores in this area? Is that a viable tool?

Penman: It's been a very successful tool. When we initially put it out, we didn't get the response that we're getting today. Now we're getting a great deal of response. In fact, if someone is taken off the mailing list, as they would be periodically if they hadn't made a purchase during a certain amount of time, they'll inquire and say, "Hey, how can I get back on?" It's being read and it's being used. We're continually trying to upgrade its quality.

When you speak of carrying high-

quality products and of people being very intersted in good sound, are they having problems financing what are going to be expensive purchases? Or do you help them with financing?

Penman: We've always done all of our own financing. That probably is one of our biggest advantages. We carry our own contracts, we don't sell them to an outside source. That means a musician can come in, select a product, usually be financed and on his way in 10 to 15 minutes. This is something that we've done for years. We've learned how to do it and we've been successful at it. And I think it's something that's been a real big advantage to the musician.

Is there an economic advantage in it for you too?

Penman: We're in business to make a profit. We don't make an exorbitant profit. We make a finance charge on our products we finance to people. We also give them an option of 90 days interest-free, or in some cases, an option of up to six months interest-free. So, in those cases, we're not really making any money.

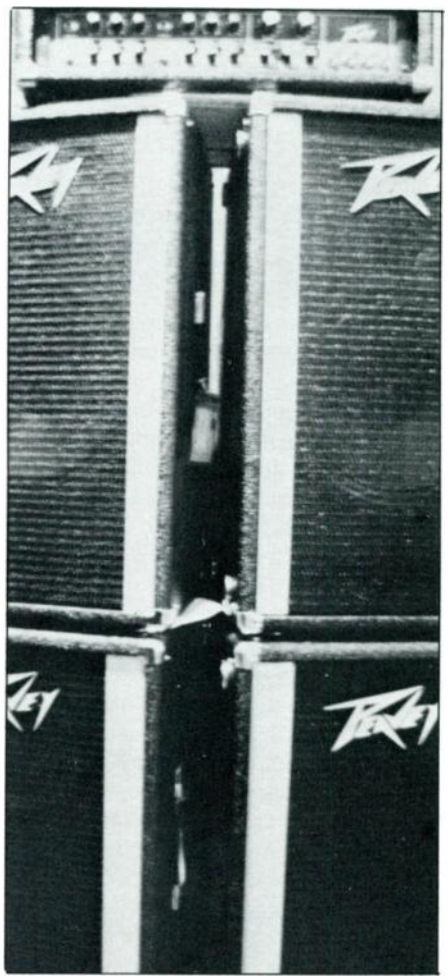
Do you discount?

Penman: By all means. One of the advantages of having a five-store buying power means we can buy the product, in a lot of cases, in quantity. Hence we buy it at a better price. This price difference we like to pass on to the customer in the form of a sale. Or, if the customer is looking for a straight cash discount, we are right in there to the bottom line.

Where are the five stores you mentioned?

Penman: We have one in Ogden, in Bountiful, the Cottonwood Mall (in Holladay), the store here in downtown Salt Lake, and one in Provo, Utah.

Is the Salt Lake headquarters location a help or a hindrance, or is it just where the business started and you took it from there?

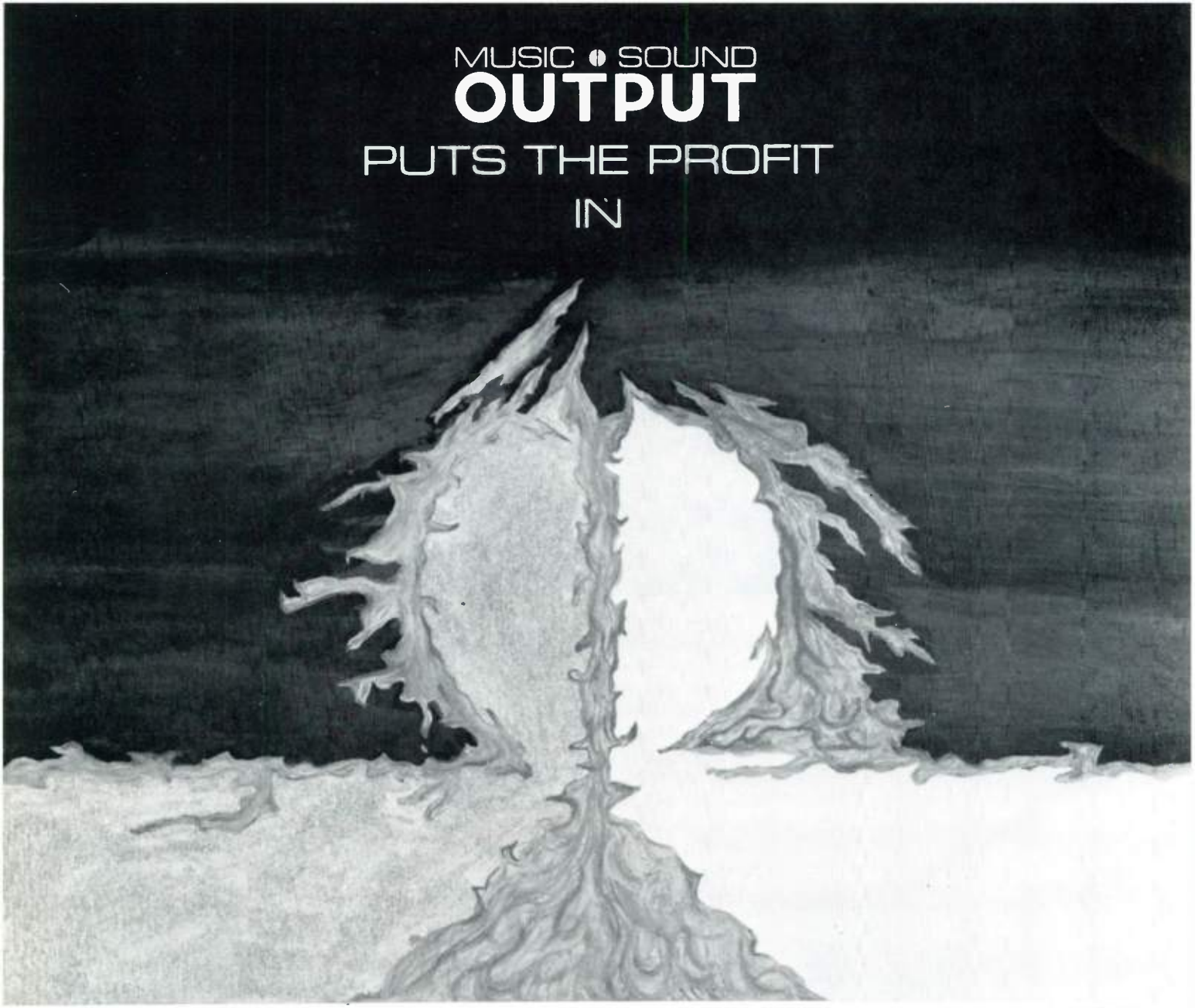


Penman: It's interesting you ask that, because we are in a downtown location. This particular store still does the vast majority of the company's volume. I'd like to pull it up at times and put it in a different location.

Where?

Penman: I'll pass on that.

I'm not asking you to give up trade secrets, just a general area.



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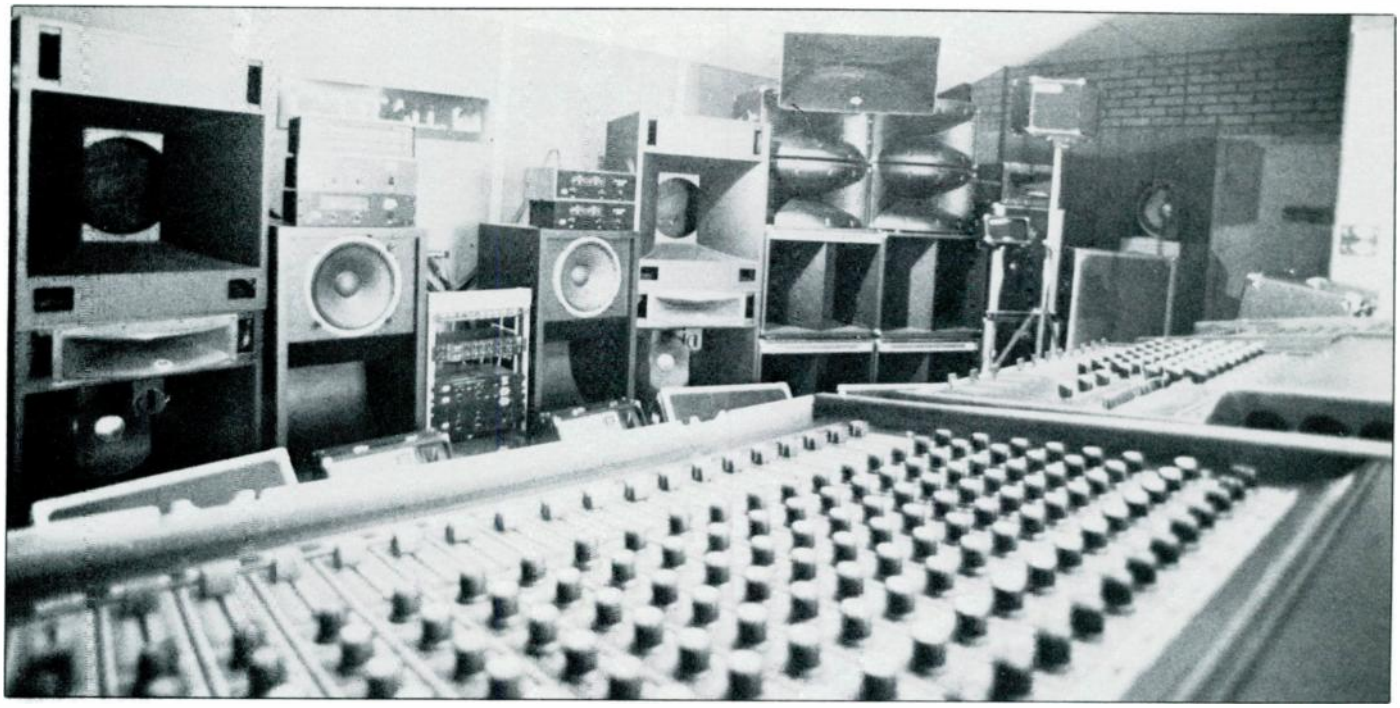

Penman: Well, there are a lot of places in the Salt Lake area that population tends to be spreading to. We see that with our mall operation. And with the type of clientele that goes into the mall. It's usually a younger clientele just starting on the road to being professional, where as downtown we tend to deal a little bit more with the on-the-road professional.

What does that indicate about the importance of the mall location?

Penman: It makes it even more important, because it means we're picking up a customer starting with Progressive who then advances to one of our bigger stores and moves up to his next instrument.

Do you service instruments you sell, or is this strictly a purchase operation?

Penman: We have a full-time service department. What I mean by that is that it's open six days a week. We have three full-time people in our service department and that is one of the keys of our organization. We feel that if you buy something, whether you buy it from us or not, that it should stand up for you. We like to make sure that the customer has a 24-hour turnaround. Most of our customers are professionals, and they're using that instrument. If it malfunctions for some reason, that means lost income to that person. We have to make sure that he's back on the road and performing again.

Is your repair operation profitable on its own, or is it part-and-parcel of what makes progressive music profitable?

Penman: The repair operation loses money every year. Not a lot. I won't let it lose a lot, but it loses money every year. I don't mind seeing that because it means that the customer is getting his product serviced correctly. And the parts that are necessary are being put into it.

What's your involvement with commercial sound?

Penman: This facet of our business relates more to installed systems, anywhere from a church's audio system all the way through a large concert system.

How much of your business is devoted to commercial sound?

Penman: We probably do better than 25 percent of our business in commercial audio. We've been involved in it for a number of years, it's a growing market.

Who are some of your commercial sound clients?

Penman: We do a lot of installed systems for churches. This is one of our bigger areas. We've dealt with the LDS Church [church of the Latter Day Saints] relating to products for some of their installations. We work a lot with some of the high schools, putting in auditorium sound systems.

Do you recommend designs or is it primarily equipment lines that would be useful for that type of set-up?

Penman: We do both. We design a system and let them do their own installation with their own equipment. Or we'll design it from the bottom up, put the equipment in and equalize it. Our commercial sound people are well-trained in that area, as well as having contractors' licenses to do that kind of work.

What kinds of bids are we talking about here?

Penman: Anywhere from a $100 bid for a microphone in a community service project up through a $500,000 bid for a sound system in a civic center.

How many employees do you have?

Penman: Thirty-four. That counts all the branches, as well as the accounting and credit department.

Do you plan to expand beyond the five stores you have now?

Penman: We're at least keeping pace with inflation. That's probably not growth, that's just staying even, which is unusual for this industry and for us. In order to keep even, I think we've got to expand. I don't see a wild expansion. I see a controlled growth such as it's been since 1947, when we started.

How did you become involved in this business?

Penman: I started teaching here when I was in high school. I started as a bass guitar teacher. That was back in 1963. I also taught while I was going to college. When I gradutated, I came to work here in a sales capacity, and then took over the management of the company in 1970.

Do you see your business changing in the next few years? Are you going to be doing more of the same, improving on what you're already doing, or looking at new areas that you might venture into?

Penman: The business is going to change more drastically in the coming years. I would say things are going to change more in the next two years than they've done in the last ten years. Everything, not only the music business, but particularly the music business, will become much more competitive. You have to stay up with trends. You have to stay on your toes and be where the new stuff is. Or you're going to be dead.

What's the new stuff going to be? What are you really keeping an eye on?

Penman: I think we're seeing more trends in electronics today. The consumer has seen it in digital watches and that sort of thing. We see it in the electronic advances that are being made in mixing, we're seeing more advances that are being made in sythesizing, keyboards. What took $7,000 to do six months ago we're seeing done for $500 today. It's an interesting, fun industry. It's something you just never get bored with.

INDUSTRY UPDATE

Ted Uzzle has been appointed Manager, Market Development of Altec Lansing. Prior to joining Altec, Uzzle was an independent theater design and acoustics consultant in Massachusetts. **Harold Laatsch** has joined Altec as District Manager for the mid-west territories. Laatsch previously was Sales Engineer at McKeever Communications, Inc.

Howard Feinstein has been appointed a Senior Vice-President of Manhattan Electronics Corp., and has joined President **David Gilbert** and **Richard Ward**, Vice President, as a principal in the firm.

Ronald Koliha has been named as Marketing Director for Audio Control. Prior to his appointment Mr. Koliha held the position of Advertising Director at Speakerlab, Inc.

RTR Industries has honored DB Sales, Inc. of Ohio with their "Rep of the Year" award. Mark Petty Associates of Illinois received "Most Improved Rep" award and T & A Associates in Missouri received "Rep of the Year" award for the RTR Acculab line.

Richard Frank has joined Carver Corporation as Sales Manager. Frank was formerly National Sales Manager of Dahlquist.

Rotel of America, Inc. has relocated its corporate headquarters to 13528 So. Normandie Avenue, Gardenia, California. **Reiji Hiroshima** has been appointed Vice President and General Manager and has been elected to the Board of Directors.

Magnavox Consumer Electronics Company has completed its move to new headquarters in Knoxville, Tennessee. According to President **Kenneth C. Meinken, Jr.**, "The move was made to consolidate the company's manufacturing groups."

Joseph Cantatorre has been appointed Controller of Le-Bo Products Company, Inc. a division of Shamrock Broadcasting Company, Inc. Prior to joining Le-Bo as Assistant Controller, Cantatorre held the position of Divisional Controller of Warner Communications Corporate Data Center.

J. Douglas Chatburn has been appointed Director of Sales and Marketing for Stermote, Inc. Prior to his appointment, Chatburn was a Vice President and principle of Estersohn Associates.

Robert G. Campbell, President of CBS Musical Instruments, has been re-elected to a second term as Chairman of the American Music Conference.

Jane LeFevre has been appointed Marketing Manager for Nakamichi U.S.A. Corp. Formerly, LeFevre served as Western Advertising Manager for Stereo Review.

Philips Audio Video Systems Corp. has announced that its AKG Division will be known as AKG Acoustics, Inc., effective immediately; and will now be located at 77 Selleck Street, Stamford, CT 06902

Tamotsu Iuchi has been named President of U.S. Pioneer Electronics Corp. Iuchi had been a member of the previous Office of the President and served as executive vice president.

3M's Magnetic Audio/Video Products Division has organized its former retail sales and marketing teams into a new Home Entertainment Products Department. **Donald E. Rushin** has been appointed manager of the department. Rushin has been with 3M for 22 years; most recently serving as retail products manager of the parent division. According to Rushin, no changes are contemplated in the present sales and distribution network.

Sescom, Inc., has named **Robert W. Carr** Vice President of Marketing. Before joining Sescom, Carr worked with Shure Brothers, Inc.

Peter Giddings has joined Clear-Com Intercom Systems as International Sales Manager. Giddings was previously Director of Marketing at Hammond Industries/England; VP of Marketing for Revox Corp/New York/Hollywood/Canada; and co-founder of Beyer Dynamic/England.

Intermagnetics Corp. has signed an international marketing agreement with Cybernetic Data Products. Cybernetic is developing and marketing a series of electronic games, home computers, and electronic machinery for the entertainment industry.

Bob Brennan has been named Sales Manager of Music Technology's Vantage guitar line. His background includes sales and managerial positions at Kustom and Multivox, as well as formerly managing his own music store.

Nikko Audio has relocated to expanded office and warehouse facilities at 320 Oser Avenue, Hauppauge, New York. The new headquarters will serve to centralize the sales and service operation centers.

J. D'Addario & Co., Inc. will sponsor a special concert featuring classical guitarist, Michael Newman, on October 24, at the Town Hall concert hall in New York City.

James S. Twerdahl has been promoted to the newly created position of Group Vice President-Consumer Products of International Jensen Inc., the parent of Jensen Sound Laboratories. As Group Vice President, Twerdahl will assume the responsibilities of Jensen Sound Labs' former President, **Jerry Kalov**.

David F. Sutton, Vice President of Norlin Music Co., has been elected President of the Guitar and Accessory Manufacturers' Association. Sutton's term will run from June 1980 to 1983. He replaces Lee James, President of M. Hohner, Inc.

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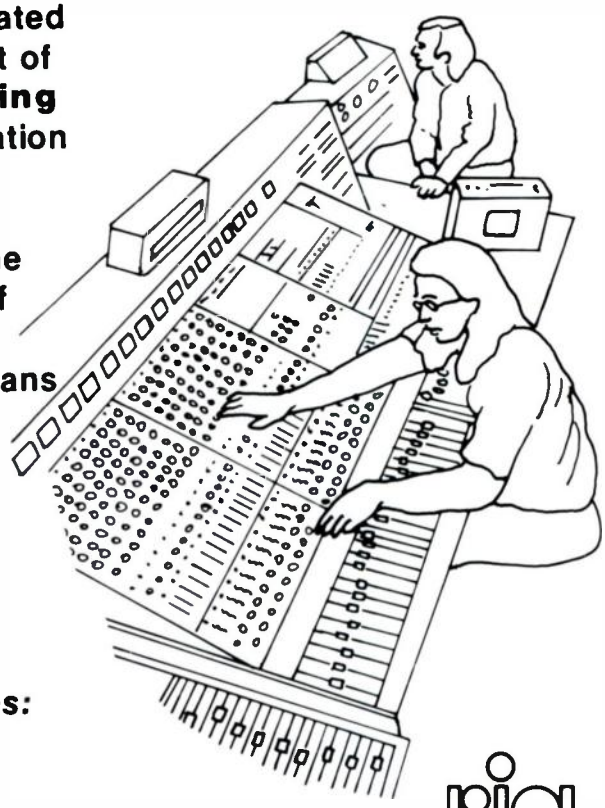

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