JANUARY/FEBRUARY – 1973
VOLUME 4 – NUMBER 1

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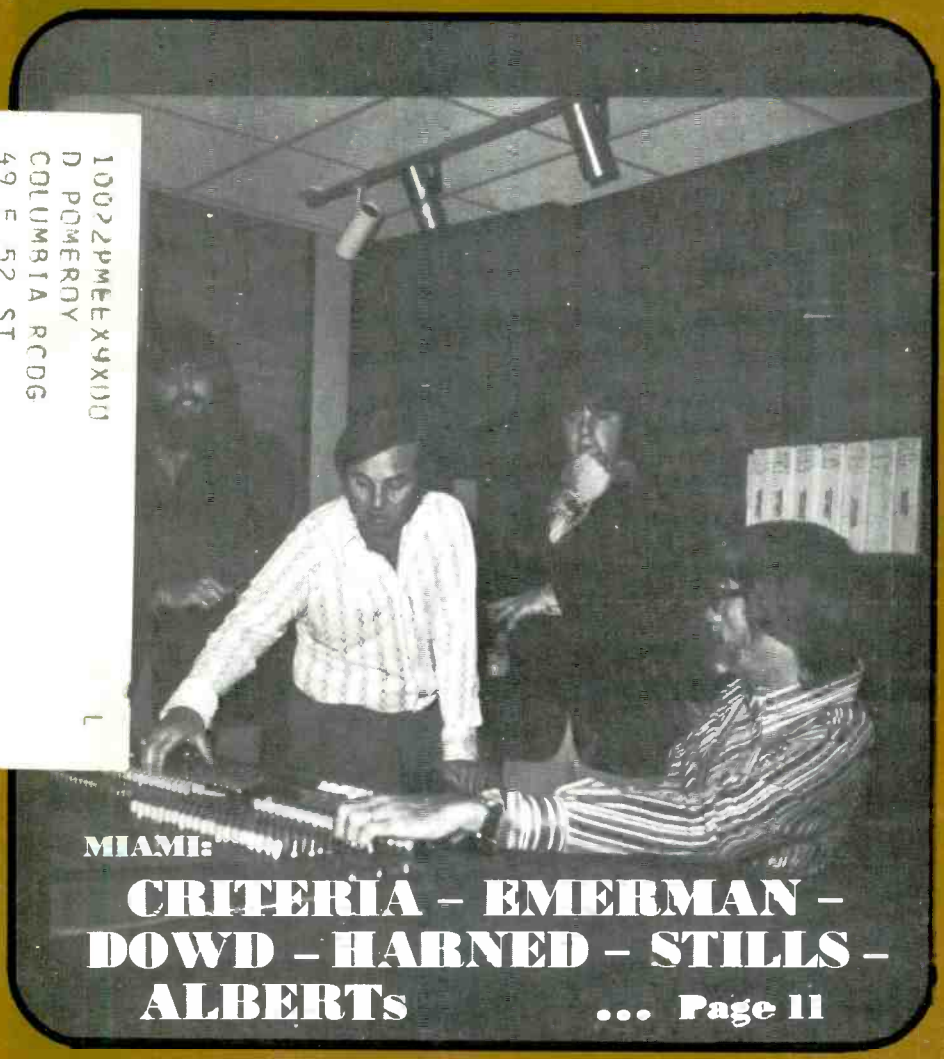

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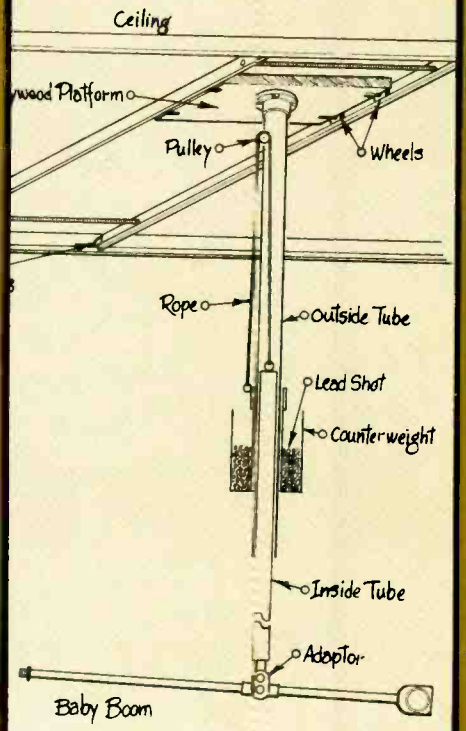

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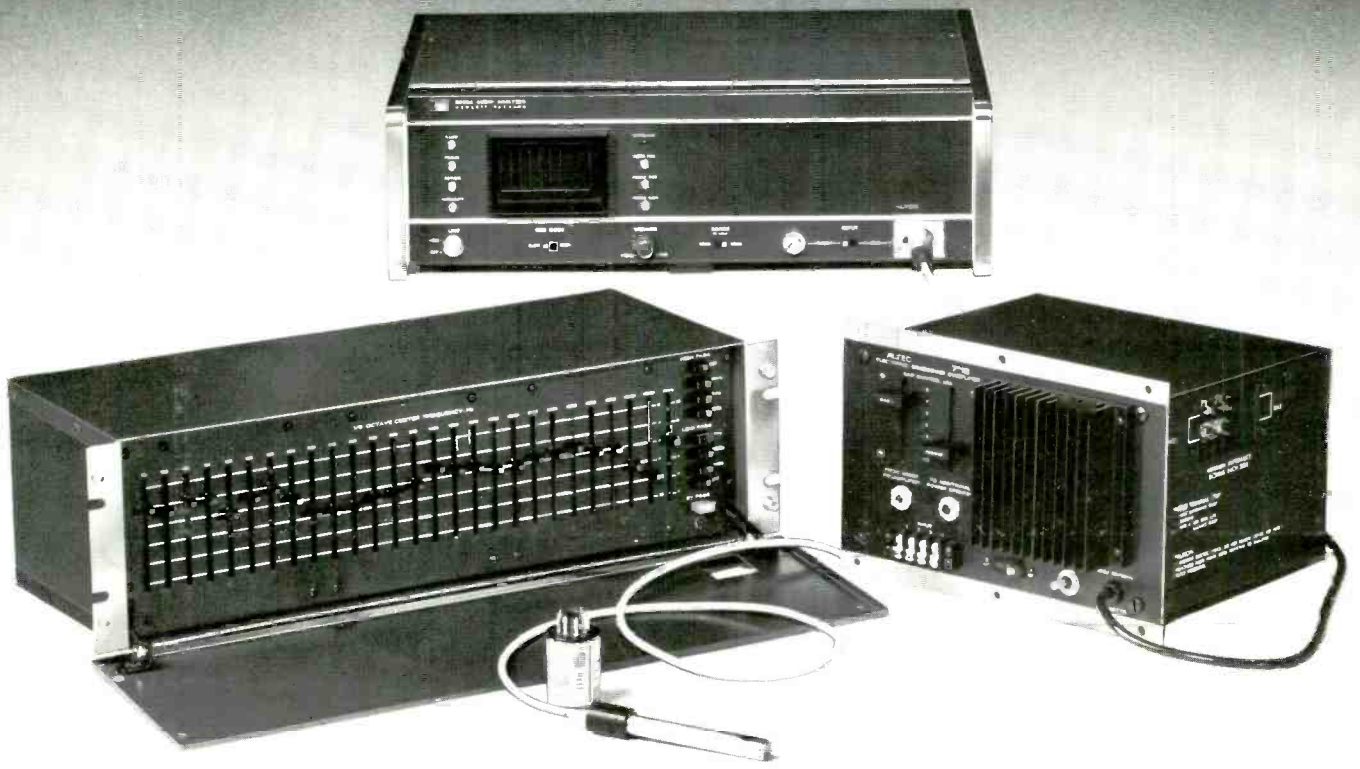
New Tools for Professional Monitoring



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–the magazine produced to relate . . . RECORDING ART to RECORDING SCIENCE . . . to RECORDING EQUIPMENT.

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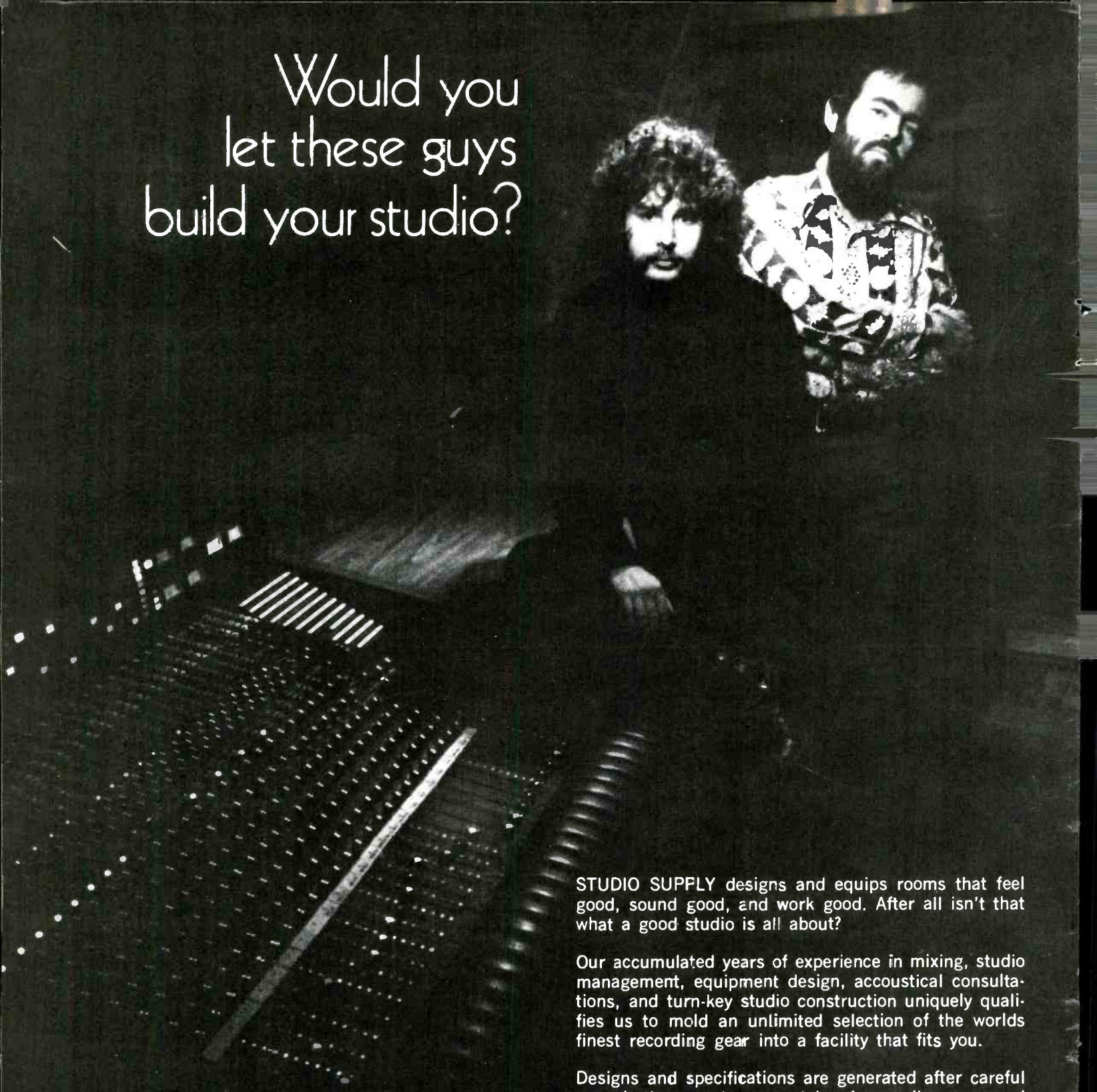

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LATE NEWS

MIDWEST ACOUSTICS CONFERENCE EXPECTED TO RAISE CONTROVERSY

At the seventh annual Midwest Acoustics Conference to be held April 7 at Northwestern University, the loudspeaker experts will square off for what is expected to be a technical battle royal. Presenting varied subjective evaluation techniques are C. G. McProud of Audio Magazine and Julian D. Hirsch of Hirsch-Houck Laboratories, and presenting opposite but differing views on objective measurements are such advocates as Dan Queen, proponent of reverberant field measurement and Ed Long for free field methods. Paul Klipsch will use his great depth of experience to introduce the subject and place it in historical perspective.

To balance the technical presentation, academic viewpoints will be presented by prominent faculty members from two universities, including a session on psycho-acoustics by Dr. Carhart of Northwestern. A panel of these experts will discuss how subjective and objective measurements can be correlated.

An unusual feature of the day-long meeting will be the meet-the-experts noontime sessions where meeting attendees can personally ask questions and challenge the experts. Advance registration fee is $3.00. Write Midwest Acoustics Conference, c/o D. Burkhard, Industrial Research Products, Inc., 321 Bond Street, Elk Grove Village, IL 60007. (Phone: 312/439-3600)

1972 'MAKER OF THE MICROPHONE AWARD' HONORS DR. RAY DOLBY

During a recent presentation Morley Kahn, Dolby Labs' United States manager is shown accepting the 1972 "Maker of the Microphone Award" on behalf of Dr. Ray Dolby, from Oliver Berliner, grandson of Emile Berliner inventor of the microphone and the disc record.

The 1972 award was given for Dr. Dolby's research and development of noise reduction systems for magnetic tape recording and broadcasting.

BUBBERS NEW ACOUSTIC RESEARCH ENGINEERING DIRECTOR

Victor Amador, President of Acoustic Research, Cambridge, Massachusetts, announces the appointment of John J. Bubbers to the position of Director of Engineering.

Mr. Bubbers replaces Roy Allison, who is leaving to continue his research in the field of room acoustics.

Mr. Bubbers was previously associated with Stanton Magnetics, Inc., where he was Vice President of Field Engineering and Professional Products Manager.

His prior experience includes ownership of B&C Recording where he was instrumental in the introduction of stereophonic recording and the manufacture of stereo records.

Mr. Bubbers is a Fellow of the Audio Engineering Society (AES) and its present Executive Vice President. He is also a member of the IEEE, a member of the IEEE Professional Group on Audio, and the Professional Group on Automatic Controls.

From the READERS

An editorial material rating of the most useful feature article, as gathered from the Reader Service Cards received prior to press time.

NOV/DEC 1972 ISSUE:

STEINER	40.1 %
EQUALIZATION	56.3 %
RECORDING 1976	--.- %
AUTOMATION GLOSSARY .	03.3 %

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MIAMI:

CRITERIA – EMERMAN – DOWD – HARNED – STILLS – ALBERTs...an R-e/p interview

The editors of R-e/p recently traveled to Miami's CRITERIA RECORDING STUDIOS with the singular purpose of doing a session report on the STEPHEN STILLS albums which were done there.

It didn't quite work out that way as the interviews developed.

In part the article does cover how CRITERIA engineers Howard and Ron Albert did the Stills records, but more than just that the article contains the significant and far ranging comments of Atlantic Records executive producer TOM DOWD, Criteria's president and founder 'MACK' EMERMAN, and equipment designer and manufacturer 'JEEP' HARNED, president of M.C.I.

DOWD: "I don't think you realize it but there are only a handful of really, really good studios in the country. I mean studios with a good sound, and equipment that is well maintained and works consistantly, and is compatible with the equipment in other good studios, and with proficient people who intelligently know how to record.

"And I'll say you are sitting here in one of only two or three or four that is the best. I know."

R-e/p: You use a lot of studios?

DOWD: "Circumstances require it . . .

"I was pretty stationary in New York, sitting there plugging away in the same studio for 13 or 14 years making some great records. That was when there wasn't much happening outside of New York

RECORDING STEPHEN STILLS AT CRITERIA RECORDING STUDIOS MIAMI, FLORIDA
by HOWARD and RON ALBERT

The Stephen Stills sessions were probably some of the most interesting that we have ever done . . . not to mention the longest. He is one of the few artists we have worked with who can do a hundred and four hours in the studio, straight, and still walk out with somewhat of a head.

Stephen's sessions are really unique, but they are hard to describe, because each song is so completely different, and he attacks every song as a completely different entity. On MANASSAS the basic tracks went down very quickly. Almost 20 tracks were completed for the double album in just two weeks. As far as we were concerned this was phenominal because of the nature of the tracks. Each one consisted of almost an entirely different set-up. Stephen's basic set-up consists of two electric guitars, bass, drums, percussion and keyboard. However the set-up was drastically changed, often, to include acoustic guitars, pedal steel guitar, electric piano, clavichord, 'tack' piano, electric slide guitar, mandolin, fiddle, etc., etc., etc.

Consider, too, that Stephen Stills brings about 25 guitars with him when he comes into the studio. He has just about the greatest collection of fine and vintage guitars we have ever seen. At first it was hard for us to understand why anyone would possibly need that many instruments. We very soon learned that Stephen is gifted enough to hear a particular sound texture from each guitar in the collection. He very often used several of them on a particular song. It is something like an organist adding stops to build the sound he ultimately wants for a certain musical passage. Stephen uses each instrument for a different coloration to build a complete voicing of tonal characteristics. It might take 20 overdubs to reach the goal, but if you removed just one the total picture in the end would not be complete.

It is amazing, he has the fantastic ability to invision a particular complex sound, or group of sounds. And then note by note, and sound by sound we will achieve that vision. He doesn't just go out into the studio grab a guitar, the organ, sit down at the piano (he plays everything) and put something down to see what it sounds like. He knows ahead what he wants to add to create the complete tonal picture. That is an incredible talent.

Another thing. Stephen changes his guitar strings almost every time before he will play the instrument on a session. It is doubtful that he will use the same strings more than two days. He wants the bright edge that new strings give. This fact alone has a lot to do with the guitar sound we are able to record for him.

The country portion of the album was recorded a little differently, with everybody sitting around Stephen, in a circle, with everything including the voices done live. Just like an old time hoe-down (see: session diagram). This differed from the most often used 'electric' set-up, not only in the actual placement of the instruments, but also in some of the microphone selections. For example, we switched to Shure 546's, extremely close miked, on the piano. The bass becomes electric and is taken direct using equalization and compression. Things like that.

Our basic problem, though, is the incredible amount of sound we have to cope with in the room. Both Stephen and Chris Hillman use two amps each. Stephen's are two Fender Bassman, cranked pretty near wide open. As shown we pick these up with multed

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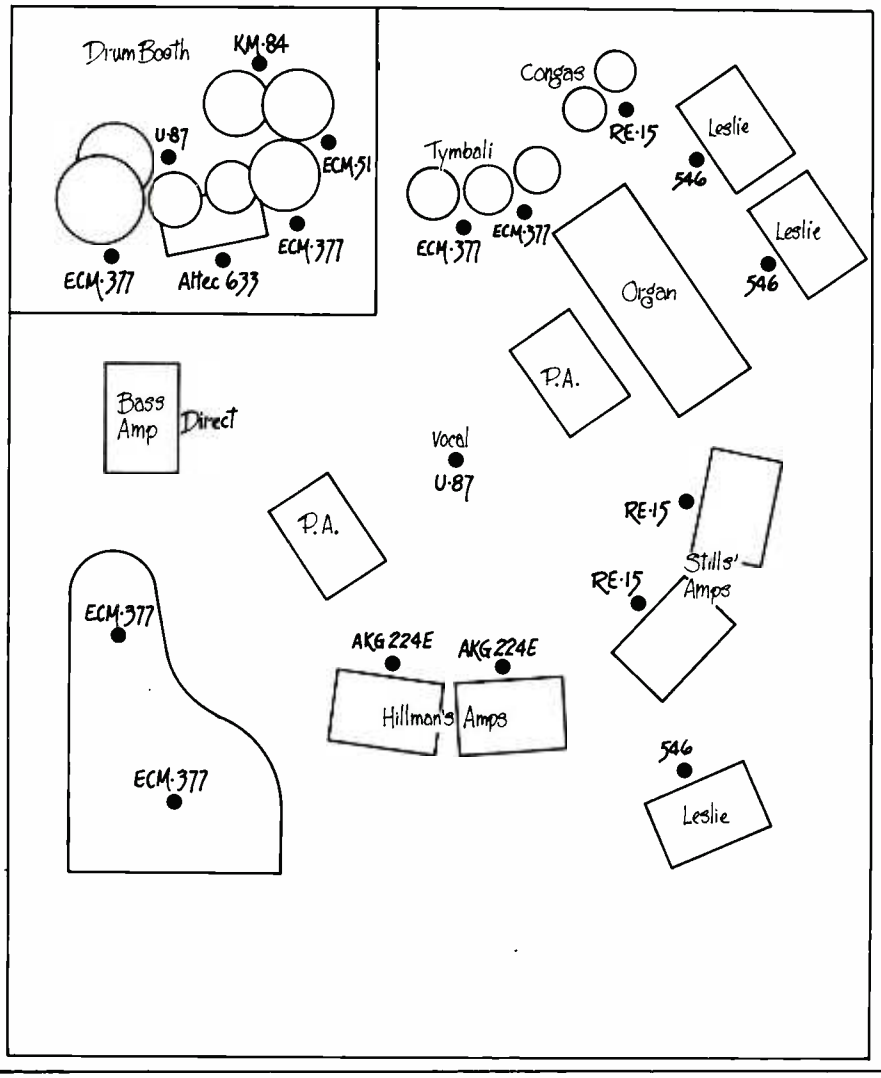
As if that, plus the Leslie, plus all of the other instruments in the room wasn't enough sound to be concerned with, Stephen likes to use a P.A. system right out in the studio; a speaker on either side of him, shooting into each ear, so that he can hear himself singing live. You can imagine the problems that causes, and explains our use of a U-87 in the bi-directional position for the maximum rejection of the P.A. speakers on each side for his vocals.

Quite often after he has started out with an acoustic guitar as he begins to work on a song we have a good deal of trouble keeping the acoustic sound from dropping too far into the mix after he goes to an electric, and with all of that tremendous amount of sound in the room. We have worked out a bizarre way that we use a Pultech equalizer and an 1176 limiter off of his U-87 to give his acoustic guitar an ultra-bright, jumping out sound. Without giving away the numbers it is one extreme to the other, a very limited and a very compressed and a very EQ'd kind of sound. This technique helps Stephen a great deal to hear what he is playing in the studio as it comes back to him through the P.A. Then, too, when we play the mix back on small speakers it enables the acoustic to have a little more distinction than it would have had if it hadn't been helped.

This is about the only thing that we do that is drastic. To sum it up. Stephen is the finest finger picking type guitar player we have ever heard, and we feel it would be a great shame if we lost any part of his genius on the way to making his record.



and L.A. Then we began to hear an occasional record come out of Memphis, or New Orleans, whatever, and we would say, hey that's a pretty good sound. They must have a good studio down there. Listen to what they did.

"And off we would go on the next plane to look at some of these places. So, yes, I started traveling to make records."

R-e/p: Are you saying that different studios have their own sounds?

DOWD: "Their own sounds? Are you kidding? What is their sound?"

R-e/p: Wasn't it the sound that you heard on a record that made you want to go down there and record?

DOWD: Exactly! But I wish it was that simple. You went wherever it was and then had to determine whether it was really the studio's sound, or was it somebody else; a producer, more than likely, who knew what he was doing, and went in there and got the best out of the place he could. You could almost hear him saying I don't like this, or I don't like that, give me more bass here, that sort of thing. More and more it became apparent that the sound you heard on the record was really a producer who knew what he wanted his record to sound like, and forced the studio to give it to him."

R-e/p: Does that mean you were often disappointed with these studios?

DOWD: "Hey, if you go in with the assumption that these people who ran these various studios know what they are doing, so all you have to do to make a record is show up with the musicians, the artist, imprint your own personality on the tune, the tempo and so on; forget it. All of a sudden you find out that's not going to be the case.

"You're there to get the best you can out of a studio, but first you have to find out what is their best. I always take one of my own tapes with me and put it on their machines, and listen to it on their monitor system to determine what they are monitoring by. How accurate their machines are for running to speed – all those things. Understand, I am not coming in and saying, before I record here I want to see how good your equipment is. What I am saying is let me hear what my tape sounds like on your system because I know what it sounds like on my system. Now I'm adjusting my head for what their studio has to offer me in the way of acoustics, of monitors and recording equipment. Once I've got my head on then I don't sound completely ridiculous when I start to record and I have to ask their engineer for more bass, say, regardless of what I hear on their monitors. Now I can look at the VU and say there is enough bass on the tape no matter what it sounds like.

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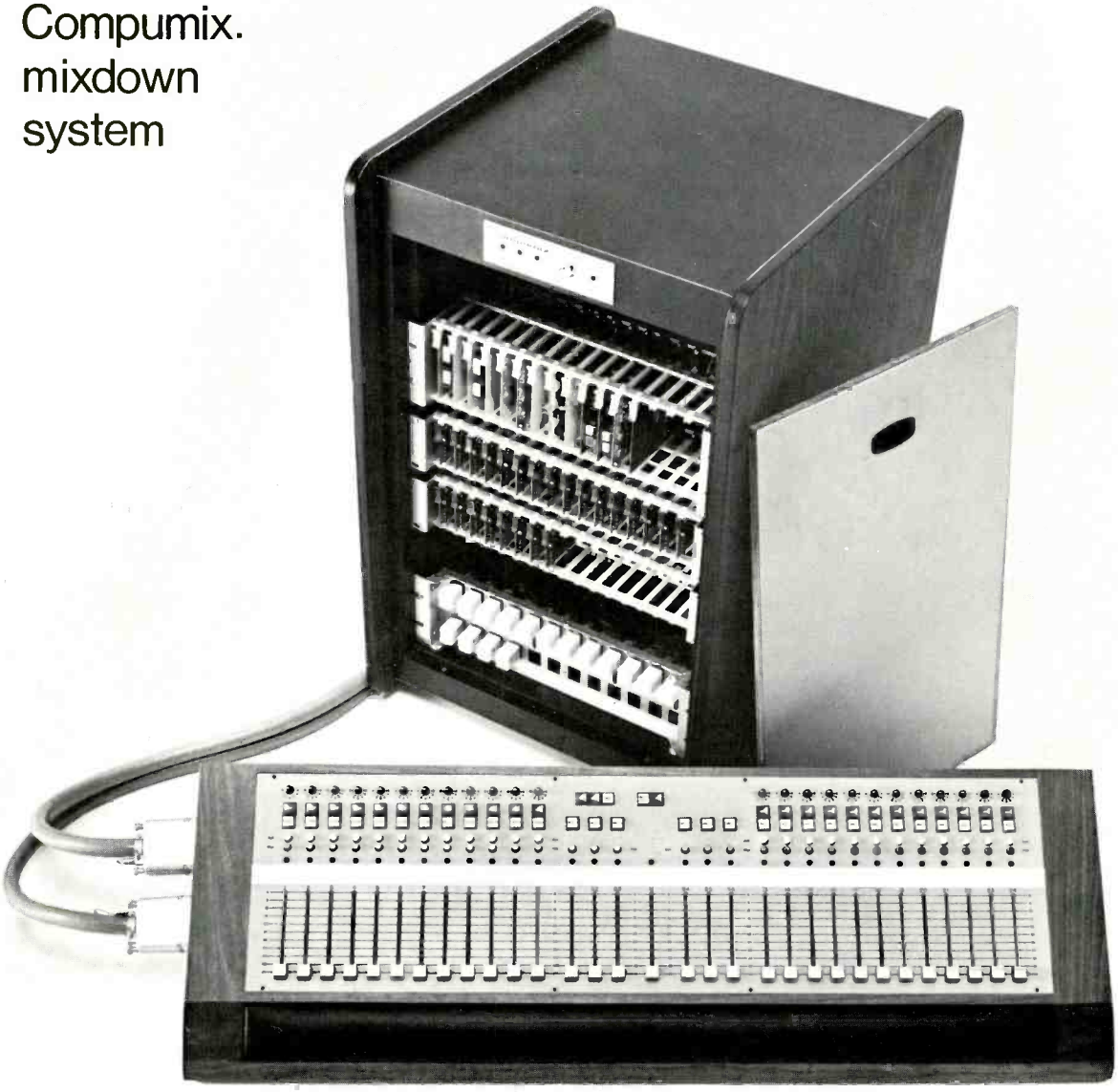

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"There is another way to listen, too. You can take a pair of Koss phones and put them on for a while. They will tell you the truth too."

R-e/p: Do you monitor on phones?

DOWD: "I would not sit and do a whole session on phones, no. That would drive me completely batty. But the phones will give me a good relative to where their monitors are at.

"I am spoiled rotten by Mack's (Criteria's) monitors in any of the 3 studios. They are so good and so well matched, exactly duplicated, but I could not honestly say, if I have been away a week, that I can walk in here, as often as I have mixed here, and sit down and be mixing in 5 minutes. It takes a half hour, maybe an hour to review the program and get accustomed to the speakers again. Again the quickest way I can do it is if I clap on the Koss ESP-9 Electrostatic phones, turn the speakers off, sit down and make a decent mix. Then I can take the phones off, run the speakers up and be comfortable with the system.

R-e/p: Mack what monitor speakers do you use?

EMERMAN: "Quite honestly one of the biggest things we have to sell here are the monitors. They are 9844's. They have been bi-amped, real time analyzed, broad banded to what we call a house curve. The honest to goodness truth about our monitors is that we had one studio that we had tremendous success with. The other two studios didn't sound anything like it. Let's say we lucked into one room. We came back and measured that room up — down — from side to side — from corner to corner and worked for days until the other two rooms exactly imitated it."

R-e/p: Is the curve flat?

EMERMAN: "It's not that flat. Its down, I would say, 6dB at 15kHz. But everybody tells us the rooms make so much sense — the product off of these systems really holds up great."

R-e/p: Mack, getting back to the problems of visiting producers and engineers, do you have the same problems with people coming in here as Tom does when he goes out?

EMERMAN: "The best way to operate, in my opinion, the most reasonable thing when an outside engineer or producer comes in here, or anyplace, he should come in with an open mind. Give us a little time. Let us position the stuff in the studio, mike it the way we mike it. Even let us get a preliminary sound, and then let us sit right next to him for the first couple of hours, if need be, to show him how to get what he wants — or get it for him to begin with. It doesn't take long, maybe a couple of hours, until he is comfortable with where he is and then our people can move over and let him take over completely.

"But very frankly there is an ego problem among engineers."

R-e/p: Just engineers, or engineers and producers?

EMERMAN: "Well, we see it in both of them. We have more problems, really, with engineers. My own people have told me, when they go into a strange facility, 'I don't know how they operate that way,' or something like that. Now if my guys had let their people sit down with them and get them started how do we know, for example, that a '47 over the drums won't sound good in that particular acoustical environment. Even though we may never do it that way here."

DOWD: "Mack, wasn't Stephen Stills a good case in point? Wasn't he recording in California for a couple of years with an engineer/producer, and then he decided he wanted a change of environment for one shot when he came down here to record; without the people who had been doing his engineering.

Dowd, Albert, Emerman

EMERMAN: "Yes, it seemed to me Stephen came in here and worked with our people for a couple of days. He didn't seem to be relating to what he wanted to hear, so then he sent for his own man to come in from California."

DOWD: "The fellow came in here and he said, if I remember right, 'oh, we don't do it that way . . . . can you set it up this way . . . like this or that.' That kind of thing. Then he and Stephen recorded for two or three days solid, his way, until, I think, they were saturated, and decided to take a week off.

"When they came back into the studio a week later Stephen wanted to listen to all the material he had done with your people and also the stuff he did with his own engineer."

EMERMAN: "I guess after he listened to all the material he decided that what he had done with Ron and Howie, (Albert), was the kind of change he was looking for when he came in here. I don't know exactly why, but the other engineer departed and Stephen has been working here with Howie and Ron for the past two years."

R-e/p: Do you think there is such a thing as "a Criteria sound?"

EMERMAN: "Yes and no. We have been told that there is. But personally I don't think it's a function of anything technical. If it's anything it's the feeling of the conception of the people who are involved in the studio. The thing that Tom was talking about finding when he went into other studios."

DOWD: "Let's say I could mike here the same way as is necessary to mike at Heider's in L.A., and simulate the sound out there. But you know it would not be the sound that is best obtained here because you are defeating this room which has a little something else to offer; which is inherently different acoustically from the other room. So what I am saying is, if I want a Heider sound what the hell am I doing trying to screw up this facility to try to get a Heider sound."

R-e/p: So, Tom, are you inferring that there is a Criteria sound, or a Heider sound?

DOWD: "Maybe not identifiable as such. But rooms definately have different sounds and they should be used for their strengths."

EMERMAN: "I think it is the way the bass and drums go together here — Their particular relationship. I have been told there is a sound."

HARNED: "Guys have been asking me for five years how you got that bass sound."

EMERMAN: "It has a lot to do with the equipment, because the equipment you have built for me is extremely stable in the low end. Since way back in the vacuum tube days we have been very, very stability concious, and that may be our identity.

"What I personally wanted from a recording, right from the beginning, is a sense of airiness and transparancy. I wanted to get the kind of feeling from a recording that we used to get when you listened to the big bands, live. But we weren't able to do it years ago because everything was so muddled sounding on the low end.

"Very early in the game we found it wasn't all distortion, and it wasn't all flat frequency response, or the way the

equipment passed square waves. I don't remember how long ago it was, Jeep, but I think we were among the first to find out that the difference was how the equipment handled transients. Being able to handle transients is what I mean by stability."

HARNED: "Stability, today with solid state, it's no big deal because the bandwidth of transisters is so wide compared to tubes.

"I think when tone burst generators came along five years or so ago a lot of guys . . . who was it Otto Popelka, who owns Magnatech, said he had to redesign all of his electronics when he bought a tone burst generator. We began understanding the transient problems sometime before that.

"In very simple terms if you take a sine wave oscillator and you switch it on and off, with just a mechanical switch, and observe through an amplifier what the amplifier does when the oscillator is turned off, the base line of your scope would fall right down dead, and not move. That's the ideal. If it moves a little bit you have some low end instability. This is a modulation thing that creates IM whenever you have a bass or something running through it. In the tube days you do that and you would hope the scope line would settle out after maybe 3 or 4 bounces — then you were pretty good. But with solid state it has ceased to be much of a problem, unless the gear is very badly designed. If you keep the time constants out of the feedback loops you have got it made."

DOWD: "I'd like to say this about the clean sound he gets. Look at the flow diagrams of these consoles and you see how unbelievably simple it is. I mean the input side where you are putting things on the tape. It is Mack's philosophy to have as pure an input chain to the multi-track recorder as possible; an amplifier, an ACN, and as few transformers in between as you possibly need. So you are not going through a bunch of garbage: EQ, echo, panning, and a whole bunch of switches on the way to the tape machine."

EMERMAN: "We build our consoles in two sections, on 3/4" centers. We have the 24 inputs on the left half to feed the tape recorders, and this is as straight through as we can make it, as Tom says. However, recently we have had to change a bit to add EQ to the inputs for those people who came in . . . a lot of them from England and the Continent who are used to putting a mix right on the multi-track. Perhaps we were a little too purist to start with. Admittedly there are times when you need to use a little EQ on the tracks, and so now we have that capability.

"Anyway, then we have the elaborate monitor/mix section on the right half . . . all the flexibility in the world . . . *and all of this in a console that isn't more than four feet long.*

"We have several philosophies we are accommodating here. The main thing we have done here at Criteria is to try to keep the end product, the finished record in perspective at all times. We believe very much in trying to get as close to a finished mix at all times, even when you are just running down sessions, or doing an overdub or anything . . . *the only thing is we don't believe in putting the mix on the multi-track tape.*

"To do this we believe in using the multi track recorder as a storage medium. You store the information on it in pretty much the purest form you can . . . at full level.

"We try to correct most of the problems in the studio by means of our choice of mikes, position of mikes and so on. When we get that settled we try to store that on the tape at full input level through the input chain on the left side of the console. Then we bridge off what we feed to the tape machine to the very elaborate monitor/mix section which, of course, will feed the monitors and a two track on quad machine. So we have a system where we can play all kinds of games with the thing, all the time. You can try changing just about everything, every conceivable kind of mix, the panning, or the echo relationships, EQ, anything . . . *but without locking yourself into any rigid situation on the 2" tape."*

HARNED: "I think there is a big difference between the recording that goes on down here and the rest of the world, California particularly. It seems to me that out there they try to put a mix on the 16 track tape — or something approaching a mix. Whereas Mark and Tom and most of the people around here make no attempt to create a mix. The big thing they do here is they make sure they are getting the full capability out of the equipment by putting all the tracks on at full level. When you mix-down one of Tom's tapes, say, and you pull a track down 20dB you are subtracting the noise of that channel by 20dB. Contrast that with putting the track on the 2 inch at 20dB down to begin with because that's where you guessed it ought to be in the mix and then having to pull it back up 5dB in the mix because it was a little light. You can see that you have taken a very poor signal to noise situation and made it worse. That's how the noise reduction people have gotten rich."

DOWD: "Another thing, putting the tracks on at full level is pretty important when you have engineers recording tracks who are not necessarily going to do the mix-down. The guy who is going to do the final mix-down wants the multi-track tape to come into the mix-down area unaltered . . . a tape they don't have to play games with, or take things off of; de-equalize someone else's genius, or hide the too-much echo. Believe me, that's a whole other story itself. The way tapes come in. Good luck, good luck with some of them."

EMERMAN: "We have tried for another thing in the design of our boards and equipment; one man operation. With a console only 4 feet across the mixer doesn't have to be an acrobat. It's an intangible, but I think it's a great contribution to the session when one man can control all of the functions from one central sitting position, and all movement is natural from that position."

R-e/p: "Do you see controls mounted on 3/4 inch centers, rather than the 1-1/2 inch wide centers, becoming some sort of a standard?

HARNED: "Not at this time. The cost of manufacturing is too high."

R-e/p: Tom, would you like to see 3/4" center construction become standard?

DOWD: "I'll say this, I don't see the need for consoles that have to be delivered with a set of roller skates for the engineer to use getting from one end to the other.

"Another thing, physical movement of any kind is a potential disaster in a session. Any movement, even seen through the control room window; anything that breaks the spell, that breaks the rhythm, the psych the performer has gotten into is disaster; positive disaster.

"Hey, it's been my observation, for whatever it's worth, that when performers come into a studio they think of themselves as professionals, and what they are doing is the way they are accustomed to doing it. Right? That means, to me anyway, that when they come into a facility that facility is supposed to capture them; what they have to offer. Not, as I have heard happen so often, they get a critique of how they should play or sing so that the studio can record whatever it is easier.

"No group, no singer, no player should ever have to change their way of performing to satisfy the studio or the facility they are in.

"Any move, anything that is over aggressive, belligerant or ungracefully quick that's done in the studio; Wow! That's it; that's what costs us time in a

studio, getting everything settled down again."

R-e/p: How about the engineer's relationship to the producer and the gorup in the studio. Can he be critical?

DOWD: "I enjoy it. Remember, I still have to engineer from time to time, and I am not afraid to say, hey, there's a wrong chord there, or this was wrong, that was wrong. If they turn around and say, yes, but it 'feels' good, I am not going to argue about 'feeling.' But I do feel compelled to tell them there is a glaring error someplace.

EMERMAN: We can be of great help to a client. All of our people here, we have a very musical staff. Everyone of them is harmonically sensitive, and everyone of them is aware of what is happening today in music; what the hit records are. It goes without saying that as much as possible, you give him all the help you can.

"Still there are always the unknowns, strange situations that we have to be able to work out with the client, new instruments, for example, where everybody has to be patient."

HOWARD ALBERT: "I think Mack is referring to a great big guitar the group down stairs (JOE WALSH – BARNSTORM) brought in. It's a great big acoustic 4 string guitar with a deep, deep body, 5 or 6 inches, and about 12 inches longer than the normal acoustic guitar. It almost sounds like a bass. A very soft instrument with almost no top end."

DOWD: "Does it have almost a heavy piano 'A' string, a heavy wire wound string for the 'E' string?"

ALBERT: "Yes."

R-e/p: That sounds like an instrument called a GUITARONE.

DOWD: "Yes I think that's it. BLACK OAK has one too."

ALBERT: "We have been having a devil of a time with it trying to get it to record. So far we've tried just about everything on it. All kinds of mikes, a Barkus Berry pick-up, a Frap. We have spent the last 2 or 3 hours trying to get a sound out of the thing. I've never had any other instrument that took that long to make sound right on tape."

DOWD: "It really mumbles, doesn't it? It's incredible how soft the instrument is. But I have a hunch we are heading into more of the Mexician guitar kind of thing. It seems like there is a trend toward a Spanish, Mexican Rock thing, where they might be using this underneath for bass, and then other Mexican things like it right up the range to mandolin and tipple."

ALBERT: "This one has got to be down at 27-28 cycles. Hardly reproduces on the speakers. I think we finally ended up miking it with a 337 over the hole. We have the mike up so high, to get so much gain that we were getting a ferocious amount of hiss. So we are EQ'ing the hell out of it.

R-e/p: Tom, you must audition an enormous amount of music and talent every year. What turns you on?

DOWD: "Basically there are just a few kinds of hits. One is the instantaneous hit. Based on the timeliness of the topic, the lyric. Then there is the 'evergreen' hit which will be a perennial, a song which will be timely no matter when it is done. The other ingredient that can make a hit is the communicant. An artist or group of musicians or singers, who have the facilit to make even mediocre materiat compulsive to the listener. So it's either the song or an artist. That's what we are all always looking for.

"Occasionally you may have a great communicator but mediocre material, or the reverse. You can still have a hit record out of that situation; that is, a good

record, but it will never be an 'evergreen.'

"But really there is nothing like having a hit artist – pop – classical – rock, I don't care. A Horiwitz is a Horiwitz, a Roberta Flack is a Roberta Flack, A Mick Jagger is a Mick Jagger; what is a producer going to with them? Each is a unique communicant. These people don't need producers. When talent gets to that level of communication all you can do is encourage them . . . bring them into a magnificent studio like Criteria, here, and let them do their thing."

END

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The 1973 BYU Workshop will offer six semester hours of university credit and will be designed primarily this year for those who want an intensive course in sound reinforcement systems, their operation and management.

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Walter Sear is a performing musician who has served on the faculty of the City University of New York and the Mannes College of Music. He has degrees from the Curtis Institute of Music, George Washington University and The Catholic University of America. He has been instrumental in the development of various synthesizers and he currently operates Sear Sound, an extensive recording and electronic music studio in New York City.

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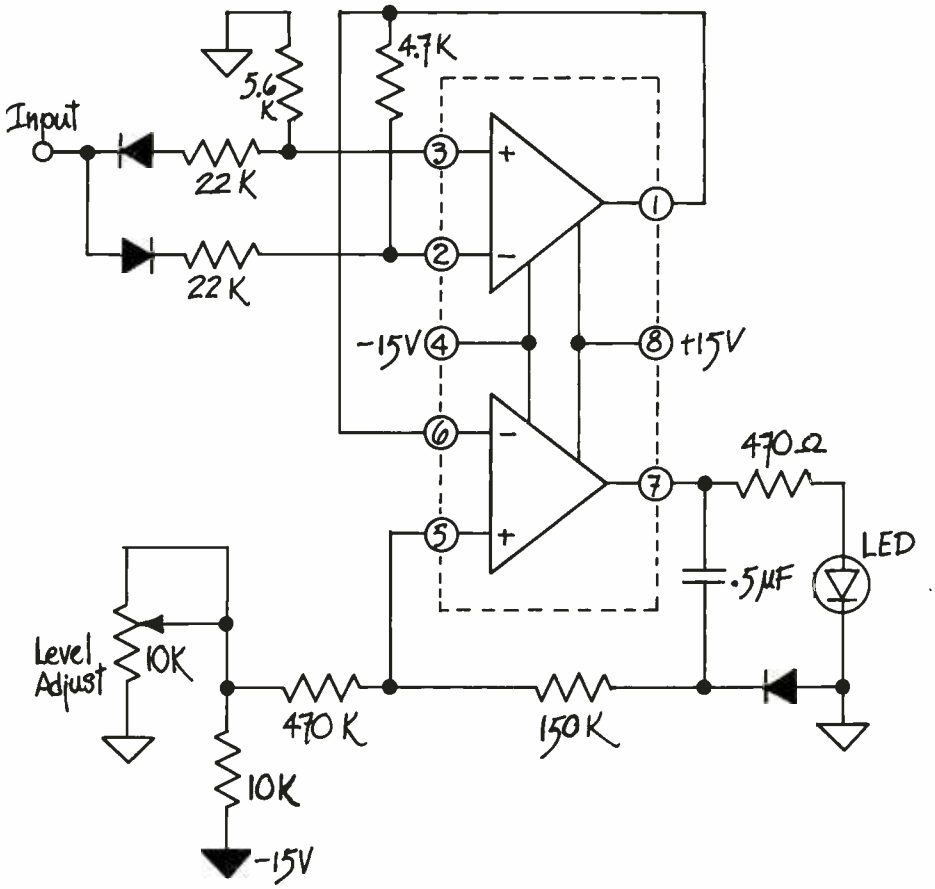

A PEAK OVERLOAD INDICATOR

By Wayne Yentis
Rainbow Recording
Santa Barbara

The design described here is a simple, inexpensive, and easily adjustable circuit to indicate when a signal level exceeds a pre-set threshold. It is obviously well suited to function as a "Peak Overload Indicator" (a terrible misnomer, the idea is to monitor overdriving, not overloading). Working alongside a conventional VU meter, the device serves as a HEADROOM monitor indicating the optimum operating levels (maximum VU without peak overloads) for different kinds of program materials.

The circuit contains a full wave rectifier to sense both positive and negative signal peaks, and an LED indicator driven by a fast recovery one-shot multivibrator, which causes the LED to remain lit for about a quarter of a second when triggered by short transients (the very ones we don't want to miss!).

The level adjust potentiometer varies the threshold level from +20dBm to about +3dBm.

The power supply voltage influences the threshold level, and the values mentioned above are for a ±15 volt supply.

The IC used here is a dual 741 op-amp in a Mini-Dip package, and is available for around a dollar under the following numbers: Motorola MC 1458, National Semiconductor LM 1458, etc. Any op-amp stabilized for unity gain may be used.

The input impedance is bridging and it draws about 3mA idling, and about 20mA when cycling.

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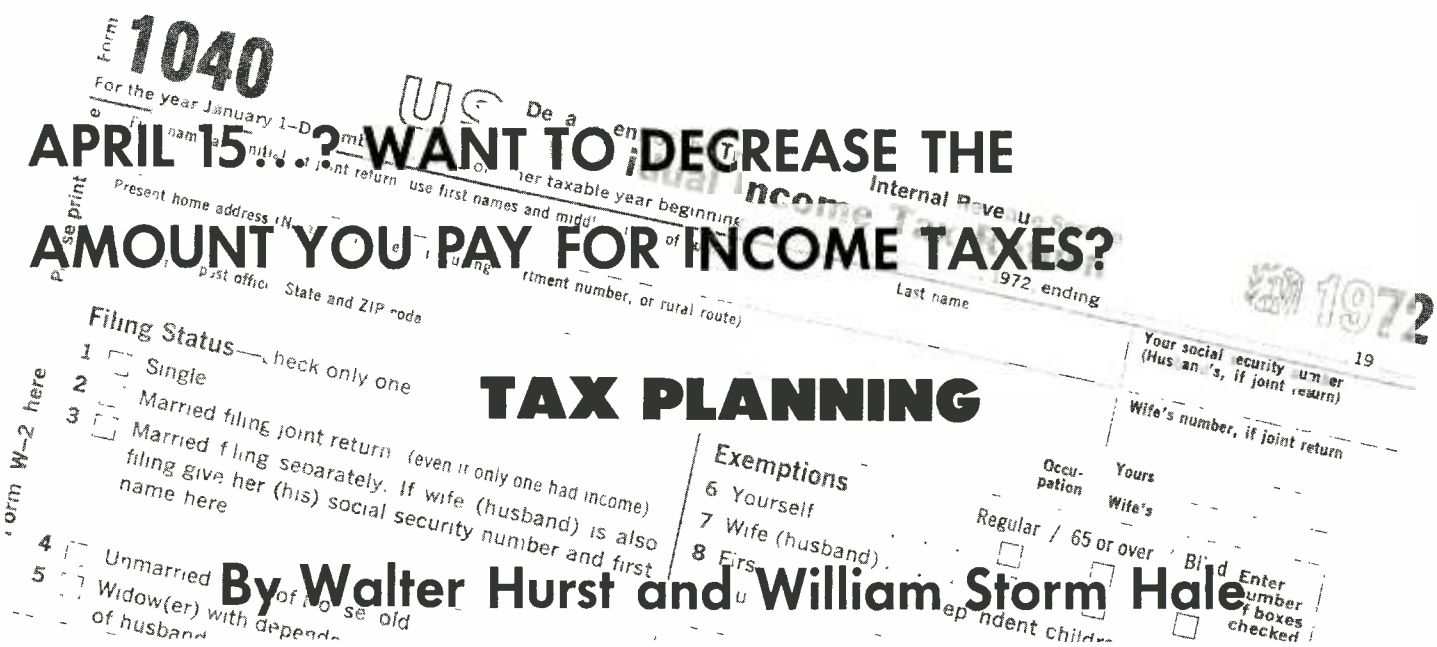


By Walter Hurst and William Storm Hale

Here are three approaches.

Approach Number 1 – **Reduce your taxable income.**

Approach Number 2 – **Transform your normal cash outflow into deductible expenses.**

Approach Number 3 – **Try the fancy stuff and hope for the best.**

APPROACH NO. 1
REDUCE YOUR TAXABLE INCOME

Let's get something straight fast. Tax planning is complicated. An idea which may be brilliant for one taxpayer may be ridiculous for another. When you read something that may seem just right for you, give it some thought and discuss it with others; you may learn disadvantages which we don't have the space or thought to point out to you.

One academic approach is – *reduce your income.*

TALENT AND PARENT AS PARTNERS STORY NO. 1

One teenage master producer was financed by a parent until the producer was successful; thereafter money paid to the producer was turned over by the producer to the parent. As a matter of fact, they were two parties who were in business together to make a profit – they were a partnership. The producer and parent filed a partnership return, and thus were able to *deduct many expenses of the parent and the child.* Only the child's 50% share of the net income of the partnership was then reported by the child. This amount was much less than the amount the child would have had to report if the child had been able to deduct only his expenses. This illustrates the tax planning approach of *reduce your income.*

TALENT AND PARENT AS CO-WRITERS STORY NO. 2

A songwriter and his child worked together on a song. The songwriter – as a matter of power rather than as a matter of right – could easily have claimed all songwriting credit and royalties for himself. Instead, the songwriter decided that he and the child would share songwriting credit and royalties equally. The child was able to use the money as the child saw fit (to buy a car), and therefore did not have to nag the songwriter to use his earnings-after-tax to buy that car. The songwriter received, and included on his tax return, only his 50% of songwriter's royalties. This illustrates the tax planning approach of *reduce your income.*

MOVING SAVINGS AROUND STORY NO. 3

The income of the whole rock group as a group was one thing – the income of each individual was another. The formula was (a) Total rock group partnership gross income, (b) minus expenses, (c) equal partnership net income, (d) divide by the 4 members of the group, (e) equal income of the individual from the partnership.

Each individual then paid his own taxes and invested any individual savings.

The group decided to shift these savings into *step (b):"minus expenses."* This was done by setting up a sub-chapter S corporation, setting up a qualified pension and profit sharing fund, which fund gulped up a portion of the income, which portion was treated as an *expense* on the corporation income tax return. This reduced the net income from the corporation which each member received, and reduced each member's income taxes payable to the United States.

SCHEDULING FISCAL YEARS + ROYALTY STEPS

One talented person had the major releasing company pay combined master lease and publishing royalties into the talented person's Corporation No. which had a fiscal year from Aug. 1 to July 30. Corporation No. 1 received money August 15 of the FIRST YEAR and paid the following March 30 of the SECOND YEAR: (a) Corporation No. 2 which owned the publishing, (b) the talented person in his capacity as Artist, (c) a qualified pension and profit sharing plan fund. Corporation No. 2, which had a fiscal year from March 1 to February 28, paid money into (d) another qualified pension and profit sharing plan fund, and paid annual songwriter royalties on February 15 of the THIRD YEAR to (e) the talented person in his capacity as songwriter.

Thus money from a single hit's royalty payment paid out by the major releasing company was spendable by the taxpayer during the FIRST YEAR, the SECOND YEAR, and the THIRD YEAR. The keys behind this plan include the different fiscal years of the talented person (January-December), Corporation No. 1 (August - July), Corporation No. 2 (March – February), and the timing of the payments in and out of the corporations.

The money saved in the qualified pension and profit sharing fund in turn grew through receipts of interest and dividends. These are not taxed. Interest and dividends received by individuals are taxed. Because of this discrimination, the money in a pension and profit sharing fund can grow more quickly than can money in the hands of an individual (assuming everything else is alike).

EMPLOYER REQUIRED EXPENSES

Frequently recording studio personnel and producers are employed by a company and receive salaries. The employer *orally* requires such an employee to entertain and mix with customers and potential customers, but the employer, not wanting to be gypped by a gyp sheet, refuses to reimburse entertainment expenses. The employee should ask his employer to *write and sign* an agreement with the employee setting forth that the employee's value to the employer includes such entertainment at the employee's expense, that the gross salary paid to the employee is an amount considered adequate to pay for work on the employer's premises, off the employer's premises (including the employee's home) while entertaining, and all of the employee's entertainment expenses. Since such an agreement may have non-tax consequences, the employer might want to wait until the tax year is over, and to limit the agreement to the period of the past tax year.

Such an agreement will also state that the employer required the employee to use the employee's own car to perform job-connected duties, that the employer did not reimburse any car expense, that the employer considered the gross salary adequate to compensate the employee for both his time and his job connected expenses.

Dangers to the employed interest in any such written agreement, which really only states the actual circumstances of the employment, is the increased area of liability, if someone is hurt or dies or something is damaged or destroyed during these employee job connected activities. Also, the agreement should not enable the employee to charge the employer extra salary for working additional hours.

Therefore, *if each rock group member* stays long enough with the group and the pension and profit sharing plan, each member will wind up with more money after taxes than he would have if he had not reduced his income initially. (Eventually, money distributed by the qualified pension and profit sharing plan fund is taxed somewhat.)

This illustrates the tax planning approaches of (1) *reduce your income* and (3) *try the fancy stuff and hope for the best.*

Of course, there are disadvantages . . .

CHEATING JAILWARDS
STORY NO. 4

A free-lance engineer worked both (a) for well-paying employers who withheld taxes out of his salary (net salary after deductions was $12,000), and (b) for peanut paying cash-under-the-table employers ($8,000). The engineer should have reported both types of income on his tax return. He crookedly reported only (a) that income concerning which he received a W-2 form from employers, and did not report (b) under the table income ($8,000).

This illustrates the tax planning approach of (1) *reduce your (reported) income.*

The engineer, being a methodical person, deposited all of his income (salary and under-the-table) into his checking account. The Internal Revenue Service auditor, as a matter of routine, added the engineer's deposits into his bank account ($20,000), noticed they exceeded net income computable from W-2 forms ($12,000 net salary), and asked the engineer to explain why his deposits exceeded his net income by $8,000. The engineer was caught because he deposited his unreported income in his bank account.

UNTAXED INCOME PROBLEMS
STORY NO. 5

One recording studio owner decided to not show all of his income on his tax return, set up a system whereby he netted $25,000 cash which did not show up on his books. He congratulated himself for following tax approach number one — *reduce your taxable income.*

Then he was offered some equipment at a sacrifice price of $25,000. He bought the equipment. But, he did not dare show it on the books of the studio, and thereby lost (a) *depreciation* deductions of $25,000 *plus* (b) *investment credit* deduction from taxes payable of $1750.

He would have been better off showing the income, and enjoying the deductions, which deductions exceeded the income, thus giving him a tax saving.

KEOGH PLAN
STORY NO. 6

The master producer learned about the Keogh Plan, which allowed him to syphon off a portion of his savings into a plan operated by a bank. The syphoned off amount was deducted from gross income, and therefore reduced net taxable income. This illustrates the tax planning approach — *reduce your taxable income.*

ARE YOU A SCHEDULE C CANDIDATE?

A taxpayer may be a *professional* songwriter, publisher, master producer, recording studio operator, even though he failed to receive any income (or received very little income). Such a taxpayer may include a Schedule C with his tax return. The Schedule C will show income $ —. The Schedule C then can show many expenses incurred to create or acquire whatever the business creates or acquires, (songs, copyrights, masters, contract rights), to attempt to commercially exploit the business assets and rights, to administer the business, etc. Expenses include, but are not limited to, recording, transportation, communication, rent, telephone, legal fees, trade publications, entertainment, musicians fees, advances to songwriters or artists, etc.

The Internal Revenue frowns on "hobby" expenses, and wants proof that Schedule C gross income is correct (neither too low to avoid taxes, nor too high to try to change a "hobby" into a "business." It is very important, on an audit, to be able to show every contract and royalty statement received, whether or not royalties were received.

Ask your individual tax consultant whether he wants to show royalty income on Schedule C (Business) or Schedule E (Rents and Royalties).

If during any year you receive royalties and you have done only a little business, you may want to show that income on Schedule C in order to show that your business is profitable during some years. These profitable years (at least 2 out of every 5) would support your theory that you are in business to make money, and therefore your expenses and losses during loss years should be deductible for income tax purposes.

Expenses	Some Of The Business Aspects	Some Of The Wife's Activities
1. Home Rent	1. Artists' rehearsals, office activities	1. Opens door. Serves food.
2. Food and Drink	2. Entertain artists and other business visitors.	2. Shopping. Food Preparation. Food Service. Clean-up.
3. Telephone	3. Telephone conferences. Telephone message service.	3. Actively takes and delivers messages. Keeps telephone conversation records.
4. Car	4. Transportation to buy trade publications, records, offices, studios, concerts, etc. Parking for business reasons. Buying gas. Paying for car repair, car supplies, installments, insurance, annual registration.	4. Keeps daily records of mileage and each stop; nag husband to keep those records, gas receipts, parking recipts. Keep mileage records on Jan. 1 and Dec. 31, and whenever cars are traded in and bought. Keep car purchase bills, checks, other records.
5. Office Supplies, Pens, Pencils, Stamps, etc.	5. To keep files, contracts, recipts. To conduct correspondence, send out records and publicity material.	5. Addressing envelopes. Buying stamps and other supplies. Using car to make those trips to buy supplies, etc.
6. Bank Statements	6. Amount charged by the bank pertaining to business checks.	6. Identifying which checks pertain to business and calculating cost of these checks.
7. Income Taxes	7. Keeping and organizing business bookkeeping and records.	7. Keeping daily mileage records. Collecting receipts. Filling in receipts to show business reason. Organizing receipts. Meeting with tax return preparer.

UNEMPLOYMENT AS UNTAXED INCOME STORY NO. 7

One producer-musician worked on both union and non-union dates. He decided to eliminate non-union dates (*reducing his taxable income*) and to collect unemployment insurance (which is not taxable) for those weeks in which he could not get a union date. Thus he arrived at the same amount of cash disposable income which he had before he gave up his non-union dates.

APPROACH NO. 2 TRANSFORM YOUR NORMAL CASH OUTFLOW INTO DEDUCTIBLE EXPENSES

The approach is to learn what expenses you are incurring anyway – and then to figure out how to deduct them on your tax returns.

THE WIFE AS A PARTNER

A master producer and his lovely wife took many trips to scout for artists and material, to promote records, to make deals. If the only business person of the pair was the master producer, then his wife's expenses on the road could be challenged by the Internal Revenue Service as being non-deductible. If both husband and wife were business persons on the road, then both persons' expenses would be deductible.

Therefore, the tax planning approach is – *treat the wife as a business person.*

If the wife is not a business person now, then let her perform tasks so that she becomes a business person. Also, keep proof that she performs these tasks.

ON THE ROAD

Business tasks on the road include: (a) Booking hotels and making appointments. (b) Arranging transportation. (c) Driving. (d) Being with the husband during the business aspects, as well as the social aspects, of the trip. (e) Maintaining records and proof of expenses, conversations, names and addresses and other information about persons met. (f) Shooting goodwill and potential publicity photographs. (g) Distributing publicity material concerning the husband-wife business activities. (h) Doing some business on her own.

To convince the Internal Revenue Service that the wife is a business person *on the road*, it would be good to have her be (and keep proof she is) a business person while the couple is *in their home town.*

OWNERSHIP RIGHTS AND CREDITS

Another way to convince Internal Revenue that the wife is a business person is to have some ownership rights and credits in her name (or in the names of both husband and wife). If the husband has an ego problem, the solution may be to list the wife as co-owner of one or more of the businesses conducted under a fictitious name. (e.g. "Produced by Johnny Minus for Minus/Plus Productions.)

All this tax planning may not apply to you and your wife (if any). Possibly your wife's last piece of work was conning you to the altar. If so, this planning of "make your wife perform business functions and keep proof" probably won't apply to you.

But, after *planning* may come *acting* in accordance with the plan. By so acting, your wife may become a business person, and her expenses on your joint business trips will become deductible.

HOME-OFFICE-LOCAL EXPENSES

A master producer and his wife, in exploring the second tax planning approach – *increase that portion of your expenditures which are deductible expenses* – listed expenses, the business aspects, and the wife's activities.

DOES A $1 NON-DEDUCTIBLE EXPENSE COST MORE?

A taxpayer who was in the 50% bracket learned that he had to earn 50c to pay for a 50c tax deductible expense, but had to earn $1.00 to pay for a 50c non-deductible expense. Magnifying this, meant that a $100 non-deductible suit required $200 to be earned, and thus really cost $200. A choice between spending $1000 for a business reason, as opposed to paying $500 in income taxes and $500 for some non-deductible frill, may be made either way; but once that choice is mentally understood, it is quite likely that the $100 will be spent for business reasons.

The approach – HOW DO I MAKE THIS EXPENSE DEDUCTIBLE – applies to single people, as well as to married people. Do you plan to go on a vacation? Think what you would be doing if you were really going solely for business reasons. Then, do these business activities.

APPROACH NO. 3 TRY THE FANCY STUFF AND HOPE FOR THE BEST

Story No. 1.

The taxpayer learned that under certain circumstances, some of the people who receive oil royalties don't have to pay income tax on their gross receipts. The taxpayer invested in oil, the well came in. The taxpayer received money. Then the taxpayer learned that under the contract he signed, he had to pay taxes on all of his gross receipts.

Story No. 2-100.

99 taxpayers invested in dry wells and lost all their money. If they had put their money in a bank, they would have kept their capital and received interest. This way they lost more in oil than they would have had to pay in taxes.

Story No. 3-100.

A taxpayer poured money into real estate partnership, syndicates, etc. For a while the taxpayer was very happy to receive partnership statements showing his share of loss. His happiness ended when the partnership informed him that the partnership losses were so heavy that they needed additional cash contribution from all partners.

Story No. 4-100

Ditto above story concerning cattle.

Story No. 5-100

The brilliant and expensive tax consultant told his trusting client that he had a brilliant idea which might or might not work. For 6 years the taxpayer's returns were not audited, and the idea worked. The tax return for the 7th year was audited, and the auditor did not approve of the gimmick. At this point, we cease telling you about taxpayer 5-100.

SUMMARY

Do you want to decrease the amount you pay for income taxes?

Approach No. 1 — *reduce your taxable income.*

Approach No. 2 — *transform your normal expenditures into deductible expenses.*

Approach No. 3 — *try the fancy stuff and hope for the best.*

We downgraded Approach No. 3, perhaps unfairly, mainly to warn you.

It is Approach No. 2 which probably can do the most for you. Since you are going to spend money anyway, try to arrange your circumstances so that the spent money is deductible. That will reduce your income, and your income taxes.

William Storm Hale
Walter E. Hurst

floor rumble a problem?

AN OVERHEAD MICROPHONE MOUNTING SYSTEM

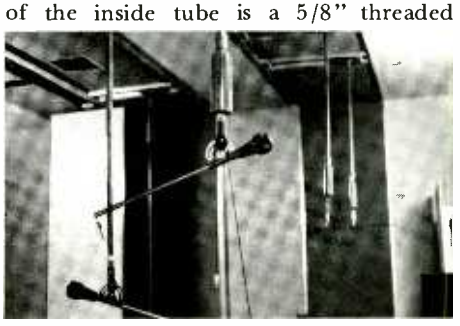
By John Calder
Audiotek Recording, Minneapolis, Mn.

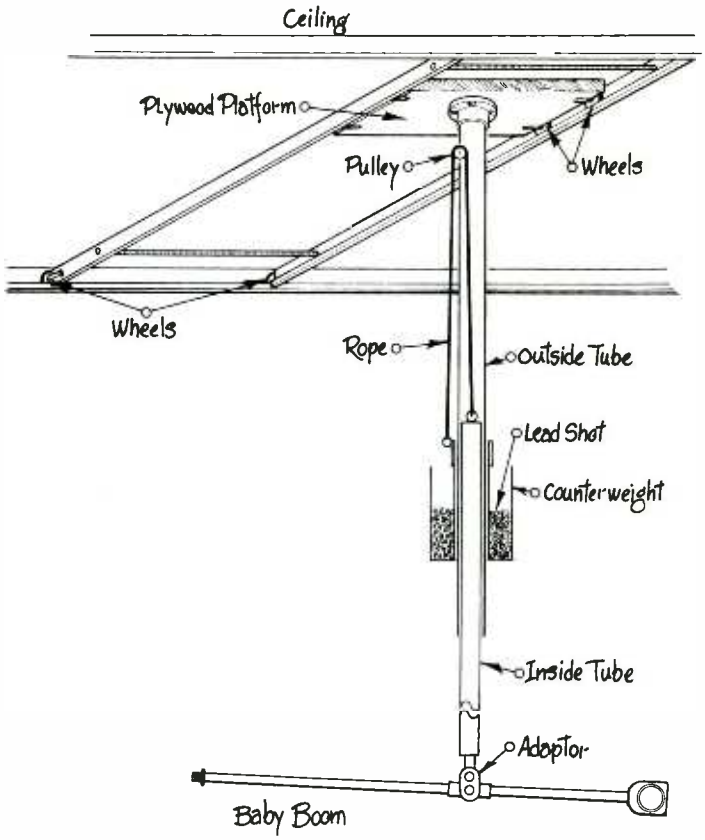
Many engineers have studios with *built-in* problems that they have to work their way around. Our studio has a "floating" wooden floor which used to transmit footsteps and rumble through the microphone stands and onto recorded tracks. Our solution was the strange looking array of the ceiling-mounted mike stands pictured.

The problem, at first, seemed insurmountable. The floor is thick plywood laid down on furring strips which are mounted on a special foam mat. This was done because the studio was built in a second floor auditorium located on a busy street. Truck and air conditioner rumble necessitated the floating floor. Isolation was achieved, but footsteps, stomping, bass drum foot pedal and bass guitar amp vibration leaked into our microphones. First the floor was carpeted and then additional carpet squares were placed under mike stands. This helped somewhat, but not enough. Shock mounts and high pass filters were used, but also fell short of eliminating the noise. It looked as though we were going to have to live with our problem.

Then someone wisecracked that we should "nail the stands to the ceiling." Well, that started the cogs moving, and the result was a ceiling-mounted mike stand system that not only eliminates all floor noise, but is much easier to use than conventional floor stands, especially for large orchestras.

The mike stand system consists of a telescoping microphone support mounted on a moveable carriage which can travel the width of the studio, about forty feet (the length is about fifty feet). The telescoping section is a five-foot length of 1" O.D. PVC (polyvynlchloride) tubing which slides inside a five-and-a-half foot length of 1-1/8" I.D. tubing. On one end of the inside tube is a 5/8" threaded





adaptor for a mike holder or boom. The other end is connected by a nylon cord (through a pulley) to a counter weight on the outside of the larger tube. The counterweight is a one foot length of 1-1/2" I.D. PVC tubing with a concentric piece of 3" I.D. tubing eight inches long, held together with a PVC "floor." The top is left open so that lead buckshot may be poured in to correctly balance the weight of the inside tube and the mike boom. Because of the friction between the tubes, it is not necessary to readjust the weight for different sized microphones. When properly counter-weighted, the mike stand will adjust to any desired height merely by raising or lowering it.

The carriage section of the stand consists of a one foot square piece of 3/4" plywood with four wheels on which the telescoping section is fastened with a PVC pipe flange. This assembly rides inside two, four foot sections of rail, which in turn rides (on four wheels) inside two rails spaced four feet apart, running the width of the studio. By placing five or six stands in each set of main rails, and spacing each set of main rails four feet apart, any location in the studio can be reached with a microphone. The rails and wheels are the type used for sliding garage door installations.

We also have a thirteen-foot high ceiling which allows a six foot man to walk freely under an unextended mike stand. I doubt whether the ceiling mount idea would work with a ceiling height of less than eleven feet.

Our mike stands have been in operation for over a year now, and we have no complaints about them. We don't use floor stands at all, and we plan to add two more ceiling stands to the seventeen we now have. Our initial noise problem is completely solved, we have more flexibility and ease of operation than before, and an eye-catching studio appearance has been added.

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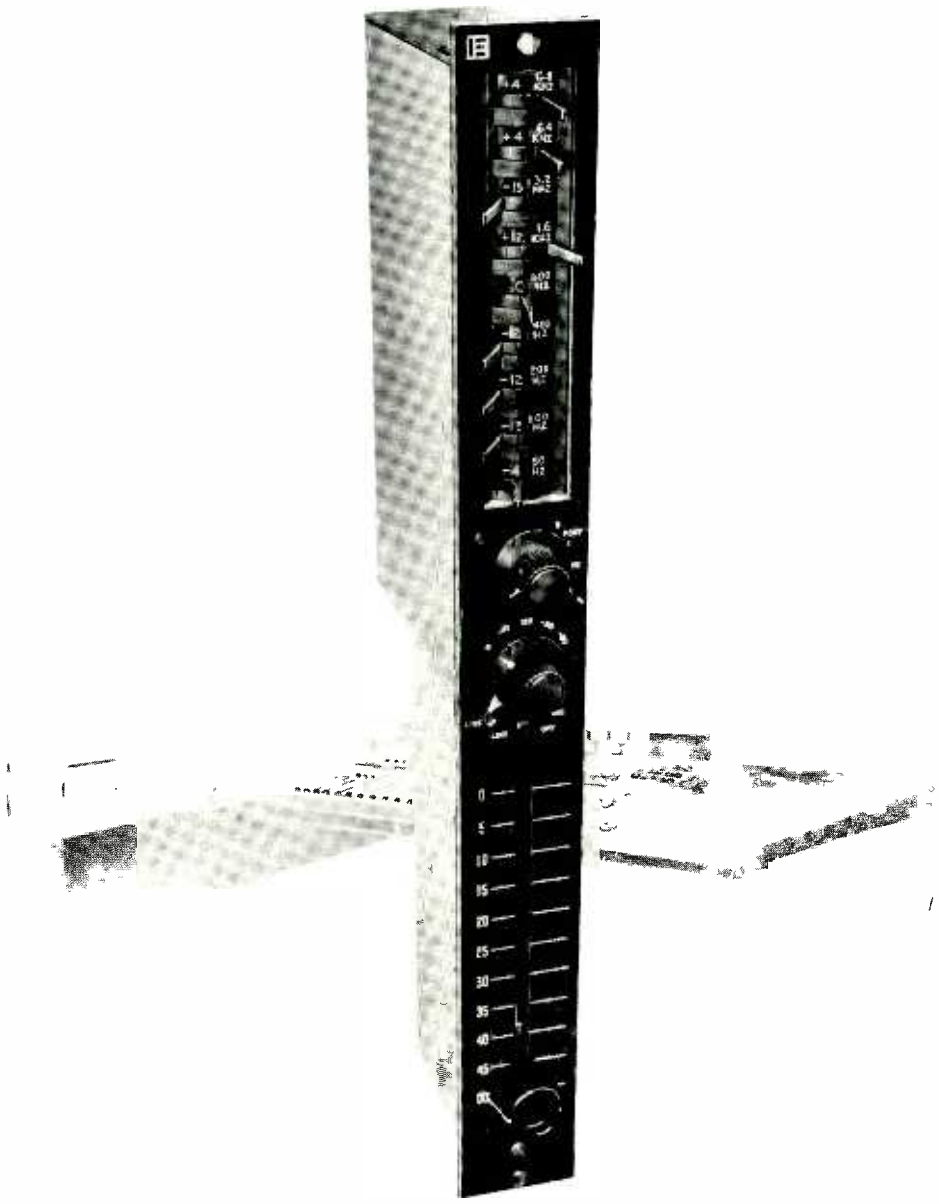

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an updated look at...

GAIN REDUCTION/EXPANSION AMPLIFIERS

by Bob Bushnell
Bushnell Electronics

Our ingenius audio equipment manufacturers have provided us with an amazing selection of audio compressors and limiters, many with delicately tailored performance specifications for a variety of special applications. For example, brand X's compressor, we know, is just the thing for 'Top-40' AM broadcasting, and brand Z's limiter does that certain something to a bass drum track. Then, too, it isn't unheard of for engineers and producers to jealously guard their so called secret combinations of various methods for gain reduction amplifier uses for their special purposes and effects.

Each of these applications, and many more have grown out of the solution to one basic audio problem: that of automatically controlling the dynamic range of a signal so that it will not exceed the dynamic range of the system handling the signal. Thus, the basic solution to the problem, if we eliminate the manual mixing pot techniques of reducing gain, is the Gain Reduction Amplifier; the black box which provides gain which varies inversely with the input signal level.

As seen in the illustration (Fig. 1), input signal levels below a threshold level (variable for pre-setting by the operator) do not trigger gain reduction, and thus, the signal passes with linear gain.

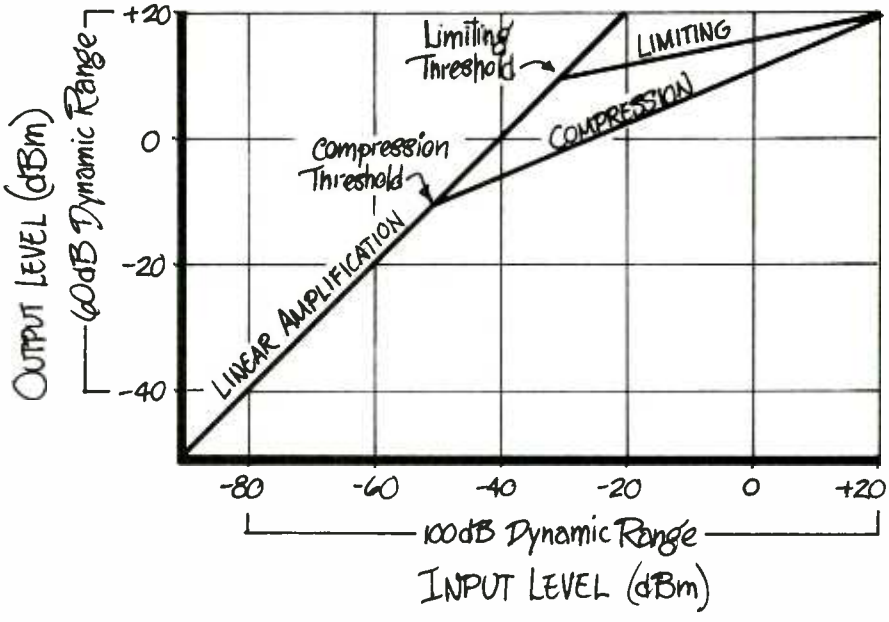
COMPRESSION/LIMITING

Signals above the threshold level activate the gain reduction circuits and cause compression . . . or a restricted output level change for the given increase in input level. A compression ratio of 4:1 for example, signifies that for each 4dB increase in input level the output will increase by only 1dB.

Acute compression ratios of 8:1 or greater are generally associated with limiting; the team and the equipment.

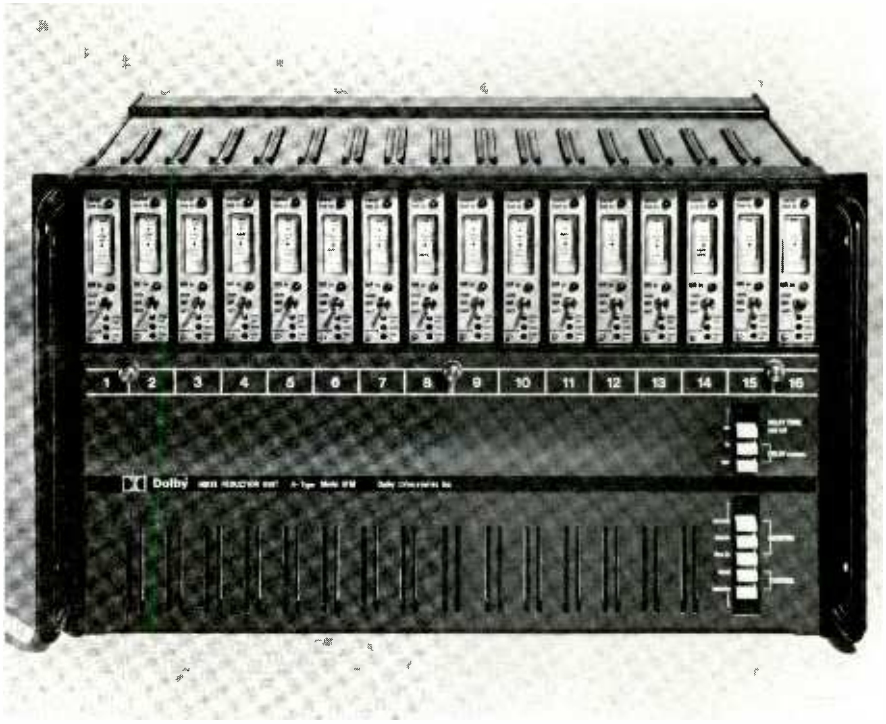
In the search for ideal Gain Reduction performance, design engineers are looking for the electronic means to exert precise control over time response characteristics, gain control linearity and ratio variability. The results have been interesting, useful, and until recently, expensive. Devices have been built which change from gain reduction amplifiers to gain *expansion* amplifiers depending on the level of the input signal, each one doing it in its own special way.

The electronic techniques that have been developed over the years have all fallen somewhat short of the technical



New from Dolby

The M16: a compact sixteen-track noise reduction unit



New monitoring facilities in record, play, and recorder rest modes.

All solid-state control logic and signal switching.

Simple remote operation of all functions from ccnsole and recorder.

Standard Dolby A-type noise reduction characteristics.

New, simplified line-up procedure.

Complete self-contained power supply and interface circuitry.

Add-on M8X provides simple expansion to 24-track operation.

Only $8,000 for full sixteen-track capability.

The Dolby system has become an integral part of modern multi-track professional recording practice. A new unit, the M16, has been developed for these applications and is now in production.

In addition to the obvious economy of space, installation time, and maintenance which the M16 offers, its cost per channel is substantially lower than that of other Dolby noise reduction units.

Full information about the M16, including accessories, auxiliary and independent eight-track units, and prices, available upon request.

Dolby Laboratories Inc

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Telephone (212) 489-6652

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ideal, but the devices that have been built, bought and used have found favor where their own particular performance characteristics suited a particular application. For example, in the past it was difficult to achieve fast changes of gain without some undesireable side effects, so certain models of compressors were built with slow attack times. And they *sounded* good. The effect was to loosely ride the gain, but allow the transients to pass through. These models sounded especially good when used in broadcasting, and there they are today dishing out 'Top-40' commercials, news broadcasts; you name it. These units are invariably followed in the signal chain by a fast attack peak limiter to control the transients, that disturb both the transmission equipment and the FCC.

It is the fast attack peak limiter that is used as a protective device; to keep the peak transients from overdriving subsequent amplifiers, to prevent serious distortions from being recorded on tape, or to keep a disc cutter from blasting grooves on the record that would be impossible to track. The fast attack peak limiter threshold is usually set at the upper limits of acceptable signal level, with the release time adjusted for quick recovery, within 10 to 50 milliseconds. The hope is that the listener will not be aware that the limiter is even in the circuit.

The medium speed compressor generally is used to reduce overall dynamic range. In this way wide range material can be squeezed into a limited range system. Such as a portable transistor radio, a cassette player, motion picture sound track or even the professional studio recording machine.

Because most gain controlling elements have a noticeable time constant the tendency is for the threshold to be sensitive to average levels rather than peak levels. The human ear also senses loudness as a function of average audio level rather than peak load, and the ability of a Gain Reduction amplifier's detector circuit to stimulate the response of human hearing is a measure of its usefulness in many applications.

Gain reduction amplifiers which use light dependent resisters (LDR's) as gain control elements have the time constant of the LDR to deal with, besides the power averaging characteristics of the lamp which drives the LDR.

Many modern circuit designs are FET's as variable resistances to implement gain control. FET's have almost no time constant of their own, thus some circuits have network built into the detector to simulate average level detection.

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As the equipment becomes more versatile so too does the application of the equipment become more critical. There are several points to be kept in mind when using Gain Reduction Amplifiers, otherwise the attempt at level smoothing may result in curious whooshes, crackles and fuzzy guzzes.

Using fast attack and release times may cause noticeable distortion when low frequency waveforms are present. Fast time constants permit the gain to fluctuate with the waveform itself rather than with its level. Increasing the release time will usually correct this phenomena. Increasing the attack time is another possible remedy.

Using compression on an entire mix is a great deal different than using compression on selected tracks. The loudest instruments may cause *pumping*, or noticeable changes of level following loud transients. The solution is again to adjust attack and release times to reduce the amount of compression or limiting, if necessary.

When compressing or limiting stereo material two gain reduction amplifiers must be used, and it is advisable that their gain control circuits be coupled together in such manner that whichever channel is undergoing greatest gain reduction it is assured that the other channel will be driven to a similar amount. This will maintain normal stereo placement. Otherwise the apparent source of sound will drfit from one side to the other depending on which side is being affected by the heaviest amount of gain reduction.

The intercouple provides a point to patch in some useful effects. For instance, a narration track may be fed to a gain reduction amplifier, and its intercouple is then connected to the

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intercouple of a second gain reduction amplifier which is controlling a music track. With suitable adjustments the narration track can easily be made to fade down the music track. Makes mixing almost automatic.

Even without using an intercouple, interesting stereo effects can be created using standard gain reduction amplifiers. For example a piano track could be patched directly to the left channel in a stereo mixdown, and also through a gain reduction amplifier to the right channel. The piano's position in time and space then becomes a function of how it is played.

There are certain gain reduction amplifiers which are equipped with a feature commonly called a "de-esser." This feature causes compression to be greater in the "S" range of frequencies. The effect is to surpress loud sibilant sounds without reliance on the use of equalization. The "de-esser" operates by emphasizing high frequencies in the detector circuit of the gain controller. Essentially the same result can be relieved using a normal gain reduction amplifier and a pair of matched equalizers. One equalizer is used to boost the high frequencies going into the gain reduction amplifier, causing heavy compression for sibilants (or cymbals or violins). The second equalizer is put on the output and is adjusted to de-emphasize high frequencies in a manner complimentary to the equalization of the input. This restores normal frequency balance to the audio signal, but compression is still frequency sensitive.

Most gain reduction amplifiers which are available are designed to operate at a nominal 0dBm line level. However, many control consoles have patch points at -20dBm which may not be sufficient to allow full potential gain reduction. Also, depending on the design of the gain reduction amplifier this could cause noise problems. Thus, it is sometimes necessary to patch in some gain before the gain reduction amplifier to bring the signal back up to 0dBm at the input and then send the output down 20dB when going back into the patch bay.

GAIN EXPANSION AMPLIFIERS

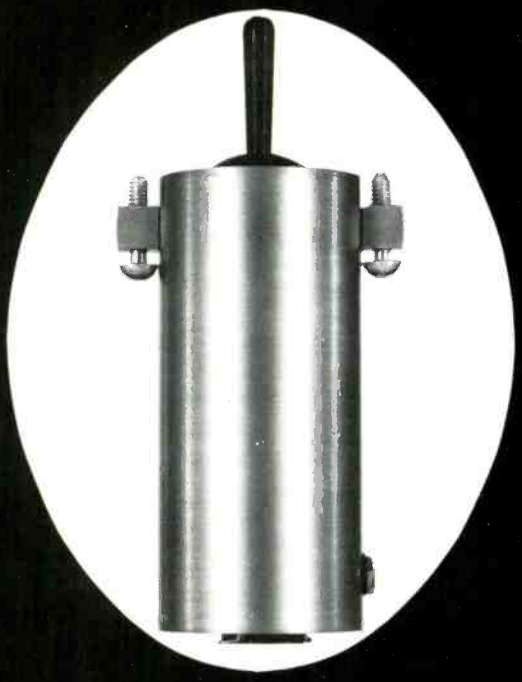
Now a word or two about the gain reduction amplifier's counterpart, the gain expansion amplifier, or expander. This black box provides gain that varies directly with the input signal level. The effect is to pass signals above a threshold level at unity gain, but to cause signal levels below threshold to be attenuated.

Expanders and gain reduction amplifiers work well together, and carefully matched combinations of the two have given us some very useful tools, including several types of well known noise control equipment.

Even un-matched combinations can be used effectively in the control room. An expander following a compressor or limiter can be adjusted to surpress the rush of hiss that comes up as the gain reduction amplifier recovers from a passage of gain reduction. Expander and compressor characteristics (attack, release times, ratio, threshold) should be non-complementary, otherwise the net effect will be as if neither were in the circuit at all.

If in the past we have had to use gain reduction amplifiers which had limited performance capabilities, we have been able to find the applications that best suited the shortcomings of the equipment. The future holds the promise of more versatile gain control techniques and new types of gain reduction amplifiers with more universally applicable characteristics.

FIRST AGAIN!



Model 904P Pan Control features a single "joy stick" to execute the continuously variable panning of a single audio signal to four channels for such uses as: quadraphonic recording or sound reinforcement.

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NEW PRODUCT NEWS

SE30 SHURE GATED COMPRESSOR/MIXER

The new Shure SE30 combines a mixer with 600 ohm line output and 2 "hands free" gain riding compresor in a single unit.

The unit provides a 40dB compression range, adjustable to the input requirements, with a compression ratio of approximately 10 to 1. Once set the SE30 rides gain automatically, increasing or decreasing the system gain to maintain a constant output level.

A unique "gated memory" circuit solves the "pumping" problem normally associated with an audio compressor by noting when the desired signal is not present. It puts a "hold" on the compression level at that point. As soon as the desired program material returns the "hold" is released and the compressor goes back into action.

Features include: feedback-type gain controls that automatically increase the input clipping level as the individual gain controls are turned down; a built-in low distortion 1kHz tone oscillator; three-function VU meter; self contained battery and AC power supply, with automatic switchover to battery in case of AC failure; disable switches for compressor and gated memory that convert the SE30 to a high quality linear mixer.

SHURE BROTHERS INC., 222 HARTREY AVENUE, EVANSTON, IL 60204

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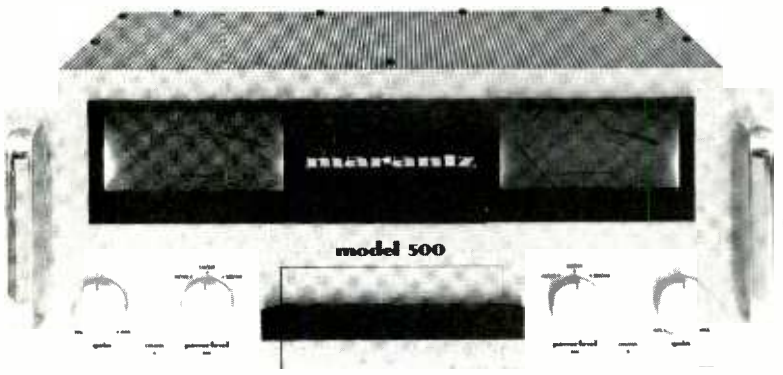

MARANTZ 500, NEW "BRUTE FORCE" STEREO AMPLIFIER

The new Marantz Model 500 is a two-channel basic audio amplifier, conservatively rated at 500 Watts per channel into four ohms. It may also be used as a one kilowatt monaural amplifier! This all solid-state amplifier features forced air cooling and massive heat sinks to assure reliable performance in even the most severe countinuous-duty applications. Sophisticated protective circuits assure safe, stable operation, regardless of conditions at the inputs or outputs (short circuits, open circuits, or highly reactive loads, etc.). These "fail-safe" features make the Marantz 500 perfect for industrial and scientific use or for commercial sound (public address) and recording studio applications.

$1890

You pay for what you need

If you're seriously into music or sound reinforcement you want more than hi-fi products can give you. But full professional studio gear costs an arm and a leg, and you pay for a lot of things you may not really need.

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With the Model 10 you get what you have to have. Without sacrificing a single necessary function.

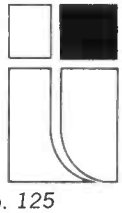
Each input module gives you mic and line attenuation, three bands of peak and dip equalization (two with frequency selection), pre- and post-echo send and receive circuitry, pan function, and a unique straight-line fader.

Each of the four submasters has a meter control switch (line/echo), independent monitor level control, echo receive level control, and a straight-line fader. You also get a master gain module and 4″ VU meters with LED peak indicators. Plus pre-wired facilities for up to four additional input modules and other optional accessories including talkback, remote transport control, quad panner, and headphone monitor.

That's what you need and that's what you pay for. Some things, however, you may or may not need, and we leave that choice up to you. For instance, the basic Model 10 is high impedance in and out, but studio line impedances are available optionally. You'll probably want low impedance mic inputs, but you may not need all low impedance line inputs. So we don't make you pay for them. You can order any combination of high and low input/output impedances according to your application.

Details and specs on the Model 10 are available for the asking. At the same time we'll tell you about our Series 70 Recorder/reproducers, featuring a ½″ machine for just $1770.

We've got what you need.



TASCAM CORPORATION

5440 McConnell Avenue
Los Angeles, California 90066

Circle No. 125

Important specifications include:

Power output: RMS continuous power both channels driven, at rated distortion 20 Hz to 20 kHz.

500 Watts into 8 ohms (250 Watts/Channel).

1000 Watts into 4 ohms (500 Watts/Channel).

250 Watts into 16 ohms (125 Watts/Channel).

Total harmonic distortion: at or below rated power, 20 Hz to 20 kHz. Less than 0.1%.

Intermodulation distortion: at or below rated power with any combination of two frequencies, 20Hz to 20 kHz. Less than 0.1%.

Power bandwidth: 3dB points from rated power at rated distortion. 3 Hz to 60 kHz.

Total noise: better than 110dB below rated power into 8 ohms.

The Model 500 will mount on standard 19" racks without special adapters, and requires only 7 inches of rack space. On the attractive gold-anodized front panel are two large illuminated power monitor meters and power limiter switches. In addition to the usual rear panel connections, a second full set of readily accessible inputs and outputs are concealed behind a removable front panel section.

The amplifier will sell for $1200.00 and caries a comprehensive three-year parts and labor warranty.

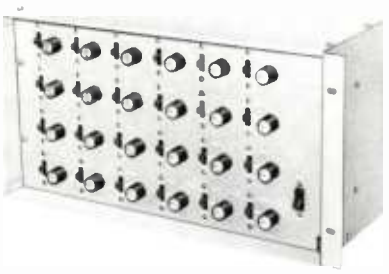
MARANTZ COMPANY, SUBSIDIARY OF SUPERSCOPE, INC., 8150 VINELAND AVE., SUN VALLEY, CA 91352.

Circle No. 126

DUKANE INTRODUCES 1/3-OCTAVE ACTIVE FILTER SET

The Communications Systems Division of Dukane Corporation has developed a 1/3-octave filter set, Model 3A235, that makes it possible to boost as well as attenuate up to ±14dB all the critical 1/3-octave frequencies in a raw room curve. Heretofore, it has been necessary during equalization procedures to establish a reference point for the tailored room curve near the lowest point in the raw room curve, attenuating all peaks to this reference level. This method of controling the electro-acoustic performance of an area frequently introduced excessive loss, and line amplifiers were required to restore signal strength to a usable level. Now the electro-acoustic response can be tailored to an ideal shape almost anywhere between its lowest and highest points.

The active filter set consists of a panel-mounted group of 24 filters each capable of providing up to 14dB boost or cut in any or all 1/3-octave bands. The detented filter control provides cut and boost adjustments of 1, 2, 3, 4, 5, 6, 7, 9, 12, and 14dB. Frequency range is from 63 Hz to 12,500 Hz in 1/3-octave bands. Associated with each filter is a three-position switch designated BOOST, OUT, and CUT.



Performance specifications include distortion of less than 0.1% and a noise level 75dB below operating level.

The unit comes with a blank cover panel to prevent tampering or accidental change of settings after final adjustments. A chart on the inside of the cover panel makes it easy to record filter settings.

Model 3A235 is 8-3/4 inches high, 19 inches wide and 8 inches deep. It weighs 15 pounds and is finished in brushed chrome and black.

COMMUNICATIONS SYSTEMS DIVISION OF DUKANE CORPORATION, 2900 DUKANE DRIVE, ST. CHARLES, ILLINOIS 60174.

Circle No. 127

MULTI-TRACK CO. INTRODUCES VARI-BAND SWEEPING 'EQ' SYSTEM.

This stepless continuously variable band center system allows the user to boost or cut 15dB at any three frequencies in the human hearing spectrum. Each of the three sections has a band-width control to allow the slope of the peak or dip to be adjusted from 2dB per octave to over 16dB per octave.

In application this tool can give the recording engineer precision control of the audio spectrum. Examples of this control are the ability to tune the pitch of cymbals; hidden instruments, or highlight frequencies of instruments may be emphasized; instruments or voices can be 'enveloped' to eliminate studio leakage

Re/p 38 Circle No. 129

and keep the spectrum of instruments from clashing with each other in the final mix. Up to 15dB boost can be applied at the 30-40Hz range to achieve percussion bottom end without muddiness. Phasing effects can be synthesized without tape or additional equipmnet by boost sweeping the ranges. The unit is a noise attack system when used as a triple curve tunable notch filter.

Price: under $350. Dealer inquiries invited.

MULTI-TRACK, P.O. BOX 3187, HOLLYWOOD, CA 90028

Circle No. 130

SUPERSCOPE ANNOUNCES SONY PROFESSIONAL 8-CHANNEL STEREO MIXER.

MX-16 is a versatile mixer with 8 mike/line inputs, plus 4 fixed and 4 variable outputs. The mike and line inputs are equipped with a switchable pad to attenuate the input when recording extremely high sound pressure levels. This produces higher recording accuracy and minimizes the chance for distortion.

An important feature of MX-16 is the "front center" signal distribution capability, which allows a third channel of sound to be added to the stereo mix between outputs 1 and 2. This type of "mixing within the mixer" can make a soloist appear to be performing at front center of an orchestra, with the orchestra behind him in full stereophonic sound.

Each channel features, in addition to the input attenuator pad, a mike/line selector switch and a straight-line gain pot for precise level control. Other features include 4 large illuminated VU meters, master gain control, and headphone output with level control and channel selector.

MX-16 also has input and output facilities for adding a supplemental encoder to produce matrixed four-channel sound.

MX-16 is especially suited to operate with SONY's TC-854-4S professional tape deck for high quality, flexible recording in the studio or in the field.

It is priced at $450.00.

SUPERSCOPE, 8150 VINELAND AVE., SUN VALLEY, CA 91352.

Circle No. 131

INOVONICS DUAL FUNCTION LIMITER: MODEL 200

The Inovonics Model 200 Limiter features separate, simultaneous average- and peak-responding gain control functions. Input Gain, Average Limit, and Peak Ceiling adjustments are calibrated step attenuators. A selectable "Slow A.G.C." mode controls long term

program level variations. An exclusive "Peak Hold" feature samples program level during an initial preview play-through and automatically sets optimum dubbing gain. Other features include simplified Attack and Release controls, instantaneous gain-state indicators, and an optional remote gain reduction meter which may be console-mounted. Size: 1-3/4" x 19" x 6-1/2".

Price: $480.

INOVONICS, INC., 1630 DELL AVE., CAMPBELL, CA 95008.

Circle No. 132

NEW VEGA WIRELESS MICROPHONE

Vega Electronics announces the availability of their new Model 54 ENTERTAINER Wireless Microphone. The Model 54, in the VEGA PROFESSIONAL SERIES is a completely self-contained transmitter/microphone that features the Shure SM-58 cardiod head. The electronics are all crystal controlled in the VHF band and type accepted by the FCC. Features include built-in, hidden antenna, crystal controlled simplicity of operation, and the full fidelity, anti-feedback characteristics of the SM-58

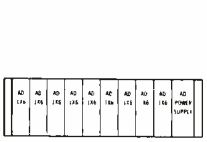
head. A built-in low distortion compressor/limiter offers greater audio dynamic range than previously available in self-contained units. The Model 54 is compatible with the Vega Models 56, 57 and 89 receivers, offering the wireless microphone user a variety of systems to suit their needs.

VEGA ELECTRONICS, 3000 W. WARNER, SANTA ANA, CALIFORNIA 92704.

Circle No. 133

NEW AUDIO DISTRIBUTION AMPLIFIER SERIES FROM SYSTEMS ENGINEERING COMPANY.

Designed for broadcasting and recording studios, the system features 1 transformer balanced input and 6 transformer balanced highly isolated 600 ohm outputs.



It is available in a plug-in modular version for 5-1/4" x 19" rack mounting (rack frame accommodates 9 modules plus power supply) or a 3-1/2" x 19" self-contained rack mount version.

Frequency response ±1dB 20Hz to 20KHz. Distortion less than 0.5% at 18dBm output. Gain from 0 to 22dB. Maximum output level +18dBm. Noise greater than -70dB.

Selectable VU-Metering of input and all six outputs is an option available on the self-contained rack version as well as individual output gain controls.

The AD- 1 x 6 modular DA is $150. 5-1/4" x 19" rack frame for 9 modules and power supply is $150. AD-PS 24 Volt DC power supply $75. The self-contained 3-1/2" x 19" rack mount system including power supply $250.

SYSTEMS ENGINEERING COMPANY, P.O. BOX 49224, ATLANTA, GEORGIA 30329.

Circle No. 134

SUPERSCOPE ANNOUNCES TWO NEW SONY PRO MIKES — ECM-64P/ECM-65P

ECM-65P is a uni-directional microphone ideally suited for use on stage and in radio and TV studios. ECM-64P, the omni-directional model, is designed for interview and general outdoor use.

They feature a newly-developed condenser capsule of the electret design, and a monolithic IC/FET amplifier. These features allow the microphones to accept a maximum sound pressure level of 137 dB with no more than 1% distortion, making them especially suited for use by rock groups.

Both microphones shield the capsule with a unique double windscreen to reduce popping noise when close miking is employed. In addition, they're designed to filter out unwanted extreme low frequencies, all but eliminating the proximity effect that can severely impair the performance of a hand-held microphone.

Handling noise, another troublesome area of hand-held microphones, has been greatly reduced by suspending the capsule in a rubber grommet that isolates and assists in absorbing external vibration.

Both units feature a built-in battery interlock switch in the CANNON receptacle at the end of the microphone sleeve. This discounts the battery circuit when the mic cable is unplugged, greatly extending battery life.

In addition to battery operation, these microphones can be powered by a SONY AC-148A Phantom Power Supply or equivalent.

ECM-64P and ECM-65P are priced at $179.95 each, and come supplied with microphone cable, holder and carrying case.

SUPERSCOPE, 8150 VINELAND AVENUE, SUN VALLEY, CA 91352.

Circle No. 137

CROWN INTRODUCES AURALINEAR SPEAKER LINE

Crown International has moved into the loudspeaker market with the introduction of a line of four models of Auralinear Speaker Systems. The new units unite unique wideband electrostatic radiators with special acoustic suspension woofers. The radically new ultra-wideband electrostatic radiators are a far cry from the timorous, touchy and crackling old electrostatics. Thinner membranes deliver greater efficiency and thus greater acoustic output for realistic sound pressure levels. The sturdy elements are said to take amazing physical and audio punishment. Dispersion difficulties have been substantially improved with multi-element arrays set at precise angles.

Unlike systems with separate tweeter and midrange speakers. there is no high frequency crossover with the Crown extended range electrostatics. For powerful bass, exceptional long-throw low distortion woofers are used over the entire range. Power requirement for all models is 115 volts, 60 hertz, 3 watts. The entire system is protected by Crown's 3-year warranty on parts, labor and round-trip shipping. Handsome enclosures are of genuine oiled walnut matched with rich black grill cloth. A brochure describing the full line of Auralinear Speaker Systems is available free upon request.

FEATURES AND SPECIFICATIONS

MODEL ES 224

two 10" woofers plus 24 electrostatic radiators

bidirectional radiators emmanate sound from all sides of upper cabinet

dimensions: 60"h x 26"w x 16"d, 135 lbs.

maximum room size recommended — 6000 cu. ft.

maximum amplifier power recommended — 150w/ch rms at 8 ohms

usable frequency response under these conditions — 22-30,000Hz

single crossover at 350Hz, ideal for bi-amping using either internal crossover or an electronic crossover.

MODEL ES 212

two 10" woofers plus 12 electrostatic radiators

bidirectional radiators emmanate sound from all sides of upper cabinet

dimensions: 42"h x 26"w x 16"d, 110 lbs.

maximum room size recommended — 4000 cu. ft.

maximum amplifier power recommended — 75w/ch rms at 8 ohms

usable frequency response under these conditions — 22-30,000Hz

single crossover at 375Hz, ideal for bi-amping using either internal crossover or an electronic crossover.

CROWN INTERNATIONAL, 1718 W. MISHAWKA RD., ELKHART, IN. 46514.

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AUDIOTECHNIQUES, INC., 142 Hamilton Avenue, Stamford, Conn. 06902 (203) 359-2312.

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(213) 769-1515

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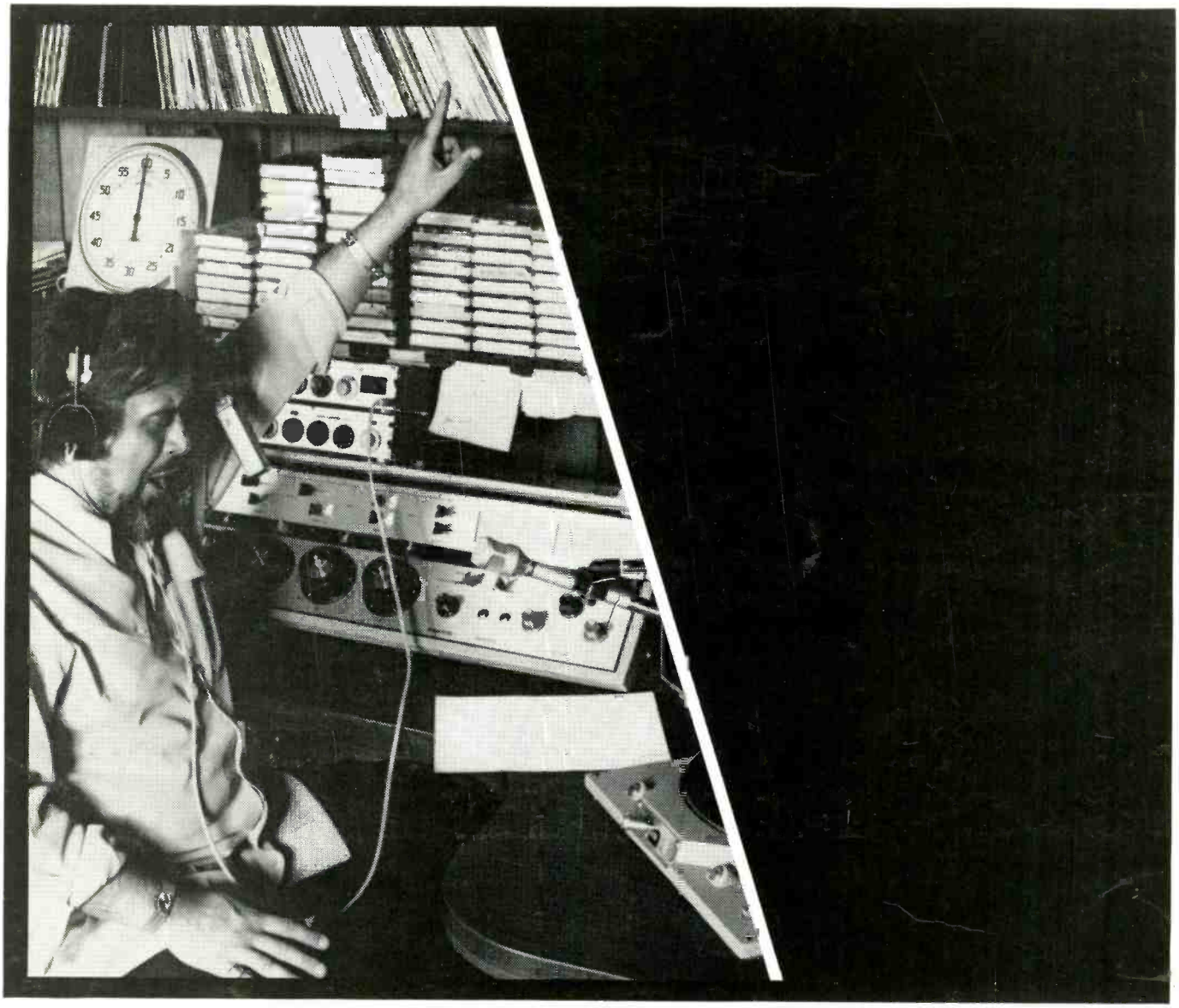

The Wolfman... A howling *success* story.

The hottest radio happening since multiplex! He's Wolfman Jack, a personality extraordinaire and an independent production company. From his home/studio in Beverly Hills, California, Wolfman Jack pre-records his widely syndicated daily radio show almost entirely with Shure audio componentry. For vocal pickup, the Wolfman uses two of the finest Shure studio microphones: the "workhorse" SM53 unidirectional dynamic and the smoother-than-silk SM33 unidirectional ribbon. (His "outrigger" production console is a Shure M675 Broadcast Production Master used in conjunction with a Shure M67 Mixer.) A Shure M688 Stereo Mixer is used for stereo recording. Even in disc playback, Shure plays a vital role with a precision-engineered Shure-M232 professional tone arm and M44E Cartridge. Shure professional products doing their thing help the Wolfman do his thing. For your copy of our Professional Products Catalog, drop us a note — and see what we mean.

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