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RECORDING engineer/producer

relating recording science • to recording art • to recording equipment

HOW WOULD AN INDEPENDENT PRODUCER SELL A MASTER TO YOUR COMPANY? . . . WHAT INTERESTS YOU, WHAT DO YOU WANT TO HEAR? . . . .

What JAC HOLZMAN, PRESIDENT, ELEKTRA RECORDS, JOE SMITH, PRESIDENT, WARNER BROS. RECORDS and DAVID GEFFEN, PRESIDENT, ASYLUM RECORDS told me when I asked these and other questions . . .

by ERROL CARMEL • INDEPENDENT PRODUCER

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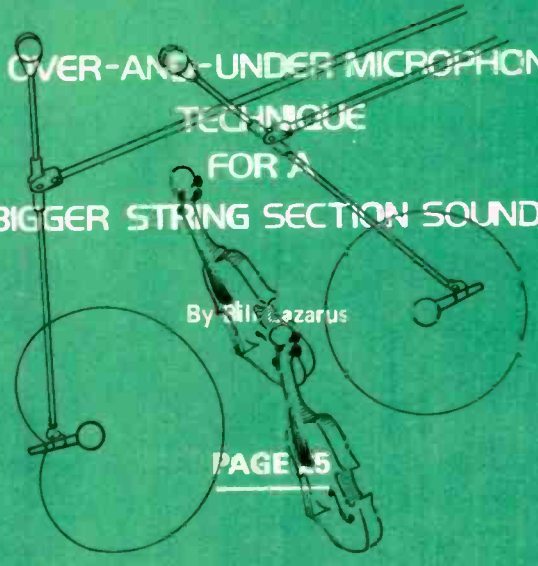
AN OVER-AND-UNDER MICROPHONE TECHNIQUE FOR A BIGGER STRING SECTION SOUND.



By Bill Lazarus

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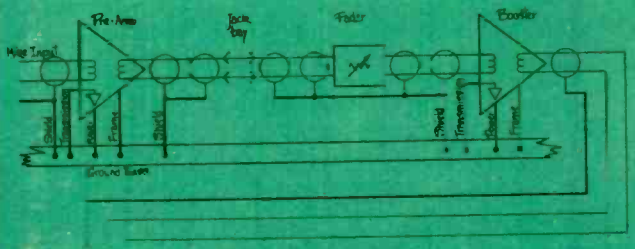

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GROUNDING!

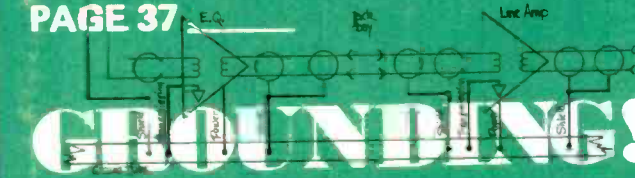
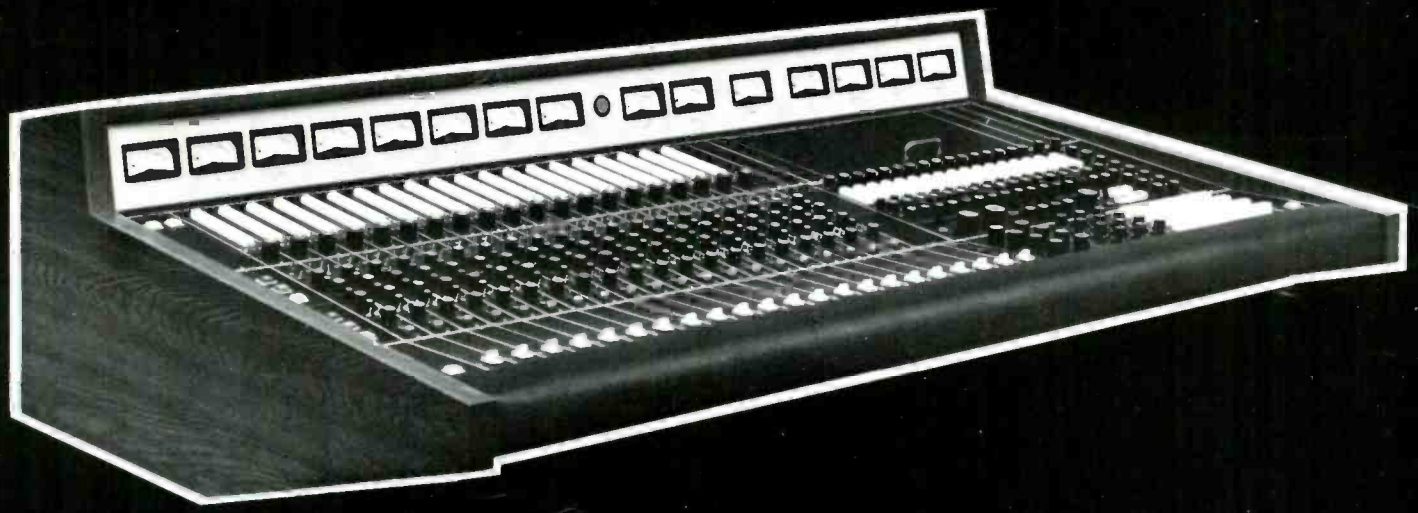


Figure 4

by DON FOSTER

ULTIMATE



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THE 771B BIAMPLIFIER has a switchable 12 dB/octave crossover at 500, 800, and 1500 Hz. Can be adapted to most studio monitoring systems and coaxial speakers. Acoustical balances can be exactly controlled by separate HF and LF gain controls. The LF section delivers 60 Watts and the HF section 30 Watts continuous sine wave power.

For more detailed data and specs write Altec, Professional Studio Products, 1515 S. Manchester Ave., Anaheim, Calif. 92803.

ALTEC

Circle No. 101

LETTERS and LATE NEWS

From: *Mel Sprinkle*
SPRINKLE & ASSOCIATES
Kensington, Md.

The Chart of Octaves & Frequencies which appeared on page 19 of the November/December issue of Recording Engineer is quite interesting but slightly antiquated.

As you probably know, the musical scale and pitch used by musicians is called the "Equal Tempered Chromatic Scale" and was invented about the time of Bach, since I believe he wrote a composition called the Well Tempered Clavier to "show off" the new scale. As you so correctly identified, it is based upon the standard pitch of 440.000Hz as "middle A" and this frequency is broadcast by the National Bureau of Standards on radio station WWV (on short wave bands). Each note's frequency differs from the preceding by the ratio of the twelfth root of 2, which is 1.05946. Thus 'A' sharp which follows middle 'A' has a frequency of 440 x 1.05946 = 466.16376Hz. After 12 notes, one begins the next octave at 880Hz etc. Other octaves begin at 220, 1760Hz etc. With the exception of these octave frequencies of note "A," none of the other frequencies are an integral or whole number, and none of these are in the octaves listed in the chart.

The frequencies listed on the chart are the ones which were in vogue for acoustical and scientific measurements back in the thirties (40 years ago or so). They were used in Knudson's first Acoustics text published in 1932 or so. They are still listed in the Handbook of Chemistry & Physics as the "Scientific or

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.

JANUARY / FEBRUARY ISSUE

CRITERIA/STILLS . .	49.41%
OVERLOAD INDICATOR	13.37%
TAX PLANNING . . .	8.72%
GAIN REDUCTION/ EXPANSION	20.35%
OVERHEAD MIKE SYSTEM	8.14%

Just" scale. I know of no one in the acoustics field who uses them – and certainly the musicians don't. For example, the musicians use 440Hz as Middle A. In the Just Scale this same note (A4) has a frequency of 426.67Hz; the note which has a frequency of 256Hz is C4 in the Just Scale!

Shortly after World War II, acoustical scientists began using octave bands for measurement. One system which was widely used in the United States was: 37.5 to 75; 75 to 150; 150 to 300; 300 to 600; 600 to 1200, etc. These frequency bands are used in Dr. Leo Beranek's early acoustic texts (ACOUSTICS, McGraw-Hill, 1954).

In 1960 the United States adopted a new set of "preferred number" octave bands for the measurement of acoustical sounds. This was American Standard S1.6-1960, which was revised in 1967. It has since been adopted by the International Standards Organization, so that it is truly a world wide Standard.

The new standard established octave bands in terms of their center frequency rather than the band limits. These new center frequencies are: 16; 31.5; 63; 125; 250; 500; 1000; 2000; 4000; 8000; 16,000.

Since octaves encompass a 2:1 frequency range, the band edges of the octaves may be determined by multiplying or dividing the center frequency by the square root of two. Thus the octave band centered at 1000Hz has edges of 707 and 1414Hz. In practice, however, the band edge frequencies are not used – just the center frequency.

Since these numbers and octaves have become an international standard in the engineering community, it would behoove you to change the chart to agree with the new international standards and get rid of the antique numbers. Besides, the change isn't that great: from 512 to 500Hz; or from 256 to 250, etc.

From: *Leo de Gar Kulka,*
President
GOLDEN STATE RECORDERS, INC., San Francisco, CA.

Dear Mr. Sprinkle:

Your letter and comments directed to the Recording Engineer/Producer Magazine has been forwarded to me, and I agree with you as to the specific points you made, with some exceptions.

The scale I used is based on middle A = 440Hz has been used for simplification, though the middle A as tuned on the concert Grand, Hammond Organ and other instruments in use for recording is always tuned to 442Hz. . . . .

You are right. But so am I.

From: *BILL EVANS, Owner*
STUDIO IN THE COUNTRY
Bogalusa, Louisiana

In an era when it is difficult to find a manufacturer or dealer willing to stand behind his product or service, I would like to bring to your attention a recent experience with a professional audio dealer.

Last summer, after months of planning and designing our new studio with Westlake Audio in Los Angeles, we started construction in Louisiana and simultaneously ordered all the recording equipment from Westlake. The console we selected was an Olive 2500 with a number of elaborate accessories. An initial deposit and a later progress payment were paid to Westlake Audio who, in turn, forwarded these payments to Olive in Montreal.

Months went by with Olive trying to complete their research and development and get into production. Delivery dates were promised but no product was shipped. In early January finish materials were going on the walls of the studio, all the other equipment was arriving on schedule but we still had no firm delivery date on the console.

On January 25th, I received a 'phone call from Tom Hidley, president of Westlake Audio, informing me that Olive was declaring bankruptcy and closing

Continued . . .

their doors. This left us with a nearly completed studio, over twenty-five albums booked to start in less than three weeks and no console!

Tom then went on to tell me that Westlake Audio had purchased an Auditronics console that morning which would be delivered to our studio within a week. In addition, a rebate was in the mail to us for our entire deposit and progress payment minus the cost of the Auditronics. As a result of Westlake's actions, our studio opened on time and is a huge success.

I have subsequently learned that Westlake Audio did the same thing for a studio in Mexico and another in Los Angeles. All told, they reimbursed monies or supplied alternate equipment totalling over the cost of an entire studio with little hope of receiving more than five or ten cents on the dollar from Olive.

It's a pleasure doing business with a company which not only builds great studios but which stands behind its clients and I feel our industry should be made aware of this.

MCI, INC. OPENS NEW FACILITIES, ANNOUNCES CLAUDE J. HILL, JR. V.P. MARKETING

G. C. (Jeep) Harned, President of MCI, Inc. announced the opening of new, expanded manufacturing facilities for the audio industries only manufacturer of both professional multi-track recorders and recording consoles. MCI's new 20,000 square foot plant is located at 4007 N.E. 6th Avenue, Fort Lauderdale, Florida 33308. (305) 566-2853.

The new plant consolidates MCI's administrative, engineering, electronic manufacturing, and precision machine shop facilities which were located separately, and expands manufacturing facilities for the JH-16 and JH-24 multi-track recorders, as well as the JH-416 stock console.

Claude J. Hill, Jr. has been named Vice President of Marketing for MCI, Inc. of Fort Lauderdale, Florida. The announcement was made by G.C. (Jeep) Harned the company President.

Hill will supervise the company's sales, customer and dealer service, and new product development efforts. Claude studied electrical engineering at Florida Southern College and was a field service engineer and later central regional sales engineer for the 3M Company's Mincom Division working in audio, instrumentation, and video recording equipment. As chief engineer of Glaser Sound Studios in Nashville Claude gained experience in studio practice and operations. Claude is a member of AES, NARAS, and the American Federation of Musicians.

WARNERS-ELEKTRA-ATLANTIC ANNOUNCE THEY WILL RELEASE QUADRAPHONIC DISCS UTILIZING THE JVD CD-4 SYSTEM

Jac Holzman, President of Elektra Records and Chairman of the Joint Engineering Committee of Warners, Elektra and Atlantic Records, today announced that each of the three companies would begin limited releases of quadraphonically encoded discs utilizing the JVC CD-4 discrete system.

This joint decision is based upon a one and one-half year A&R and Engineering evaluation of Warners-Elektra-Atlantic music as encoded and reproduced by all the principal quadraphonic disc systems.

The people who participated in these evaluations on behalf of the W-E-A companies include: Tom Dowd, Vice President and Chief Engineer of Atlantic; Clair Krepps of Atlantic; Jac Holzman,

Bruce Morgan, Keith Holzman and Michael Kapp of Elektra; and Lee Herschberg with Alan McPherson of Warners.

TABER OPENS SOUTHERN CALIFORNIA SALES AND SERVICE OFFICE

Northern California (Oakland) based Taber Manufacturing and Engineering Co. through president William (Bud) Taber has announced the opening of its full service Southern California branch located at 1227 N. Vine Street, Hollywood, Ca 90028. Telephone: (213) 464-5108.

The new office, serving the recording, broadcasting and motion picture industries, is staffed by audio sales specialist Bryant Ellis, and audio equipment service specialist Douglas Oliver.

GOTHAM AUDIO IN NEW HEADQUARTERS BUILDING

Located at 741 Washington Street, New York, N.Y. 10014, (212) 741-7411, Telex: 12-9269 GOTHAM NYK, Cables: TELAUDIO NEWYORK. The facility has a total floor area of more than 8000 square feet including a studio/auditorium which will serve as a display room and lecture hall for engineering seminars and many other programs.

GOTHAM anticipates expansion of its staff by some 50% to meet the increased demands of the recording, broadcasting, public address and related industries.

NEVE MERGES WITH BONOCHORD

Neve Electronic Holdings Ltd., the parent company of Rupert Neve Incorporated, Bethel, Connecticut — a privately held company — announces its merger with Bonochord Ltd., a public corporation listed on the London stock exchange. The stockholders of Bonochord have approved the merger and final transactions were completed between principals at a ceremony in London on February 19.

Neve, well-known throughout the world for its quality Professional Sound Control Consoles, has experienced a tremendous rate of growth over the past seven years, and views the merger favorably since the support of the larger publicly owned company will allow continued growth.

The management of Neve will continue in present capacities except for Mr. Rupert Neve, who becomes vice-chairman of the Neve Group. Mr. Robin Rigby, Chairman of Bonochord, becomes Neve chairman.

Can a tough, little, low-priced microphone make the big time?

(A success story.)

A good little microphone, the E-V 635A. But just how good? After all, it was intended to replace the "workhorse" Model 635... a dynamic microphone that had earned its title under fire in studios and on remotes all around the world.

So when we introduced the 635A we put it to a critical test. A major recording studio was loaned a dozen 635A's and asked to test them. The engineers weren't told the price, but they got the idea that it was somewhere near $300.00.

They were so delighted with the sound that they cut several big band recordings with nothing but 635A's. "Best $300.00 microphone we've got." Then we told them the price. They were shocked. They couldn't believe their ears.

Meanwhile, 635A's were beginning to appear in force on music and variety shows on every TV network. Mostly hand held. Something to do with ruggedness and good balance... but mostly because of the sound. Especially during ultra-close miking.

The rest is history. Radio and TV newsmen quickly adopted the 635A as their new "workhorse". After all, news only happens once, and the 635A was their best insurance against bad sound.

To most professional sound engineers, the E-V 635A is already an old friend, although it's only been around since 1965.

At the price, they can afford to use it almost everywhere. And they do. (We told you it was a success story.)

MODEL 635A Omnidirectional dynamic. Response 80—13,000 Hz. Output—55db. Balanced low impedance. Includes Model 310A stand clamp and lavalier neck cord. Fawn beige Micomatte finish.
$56.70 professional net.
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In Canada: EV of Canada, Ltd., Gananoque, Ontario

Electro-Voice®

Circle No. 108

HOW WOULD AN INDEPENDENT PRODUCER SELL A MASTER TO YOUR COMPANY? . . . WHAT INTERESTS YOU, WHAT DO YOU WANT TO HEAR? . . . .

What JAC HOLZMAN, PRESIDENT, ELEKTRA RECORDS, JOE SMITH, PRESIDENT, WARNER BROS. RECORDS and DAVID GEFFEN, PRESIDENT, ASYLUM RECORDS told me when I asked these and other questions...

*by ERROL CARMEL **
INDEPENDENT PRODUCER

GEFFEN: We're just interested in talented people, talented artists. We've never bought a master, actually. We've only signed artists, and then made records. We've never bought a finished record – not that we're opposed to it – it's just nobody's ever come in with a record that's worth buying. I think the most important thing is to be a good artist – good artist, good producer, good material.

EC: You seem to place a lot of emphasis on the artist. I can remember talking with Jackson Brown about mixing down "Doctor My Eyes." He pointed out how, after he really blew it in the beginning of that record, you gave him a chance to get it together.

GEFFEN: Well, that's the way we operate our record company. We never want an artist to put out a record that he's not totally satisfied with. If we believe in an artist, then the expense that we're putting into it is academic because we believe they're going to earn it back – that they're going to recoupe. If we don't believe in an artist, we won't sign him under any circumstances. There's nobody here that's a "maybe" for us. We believe in them all. That doesn't mean they'll all sell, but we believe in them all, and we feel eventually they'll make it because talented people will eventually sell.

EC: Aside from Jackson Brown, can you give me an example of how you back an artist you believe in?

Continued on Page 15

HOLZMAN: We listen to everything that anybody wants to bring in. I don't listen to it personally, but somebody listens to it, and if it's at all interesting, it gets to me. Companies who don't listen to stuff on the outside are making a mistake. It's true that it is so rare for an unsolicited tape to be meaningful. But just once you're liable to miss one that could be important.

We are open to tapes, as long as people who bring them in are willing to be patient, and don't expect an answer the next day. They are going to have to give us four or five days. There are certain ground rules:

1. Don't bring the only tape or acetate you've got. It can get lost, and the company is not going to take any responsibility for it.
2. Be willing to give the company time.
3. Don't bring us a poor tape and expect us to accept a lot of excuses for it, because we're used to listening to better things. The better a tape is, the fairer a hearing it is going to get.
4. If you get it turned down, don't try to cause problems by asking for somebody else to hear it. It doesn't work out that way.
5. Make sure the tape is properly labeled.

EC: How would you like an artist to be presented to you?

HOLZMAN: Photographs, a brief, accurate description of what the artist is,

Continued on Page 17

SMITH: We found that the thing to bet your money on is the talent, and everything that surrounds an act, rather than betting just on a song. During the first few years I worked in the record business, and all the years I was in radio (I used to be a disc jockey) – A guy brought in a hit single record: You liked it, and you felt it could make it, and you bought it. You never investigated the other possibilities of the record, and some of the questions that surrounded your decision. For example, is the talent managed well?

Now, when we have an act presented to us, the hit record is almost secondary. Some of the biggest acts we have – "Black Sabbath," "Jimmy Hendrix," "Deep Purple," "Joni Mitchell" – never had a hit single record. A single record is a great spur, a great shill, a great door opener for an album. More important than the hit record is the longevity of an act. How well do they write songs? Are they prolific writers? Are they good writers?

The producer who comes in with a record, as such, doesn't have much of a chance anymore. I would not buy a master, even if I thought it was a hit, unless I was convinced that the act had some kind of potential. We make very little money on singles: Our profit margin is very low. However, our profit margin on albums is large.

EC: You not only answered my question about masters, you brought up

Continued on Page 21

**in collaboration with writer Gary Davis*

MCI means business. So lower your hands and relax. When we say we can deliver our stock JH-416 console in 10 days, we mean it.

Now that we've nearly quadrupled our working space, to 20,000 square feet, MCI has improved production capability with continued uncompromising quality.

MCI's JH-416 mixing console is a phenomenal bargain at $19,500 for the 16-track model ($13,900 for the 8-track version, $25,100 for the 24-). And when you consider how fast we can deliver, it makes the bargain even better.

Stop throwing up your hands at unnecessary delays of professional recording equipment.
MCI has a stock answer that makes a lot of sense.

HANDS DOWN!

this is a stock-up.

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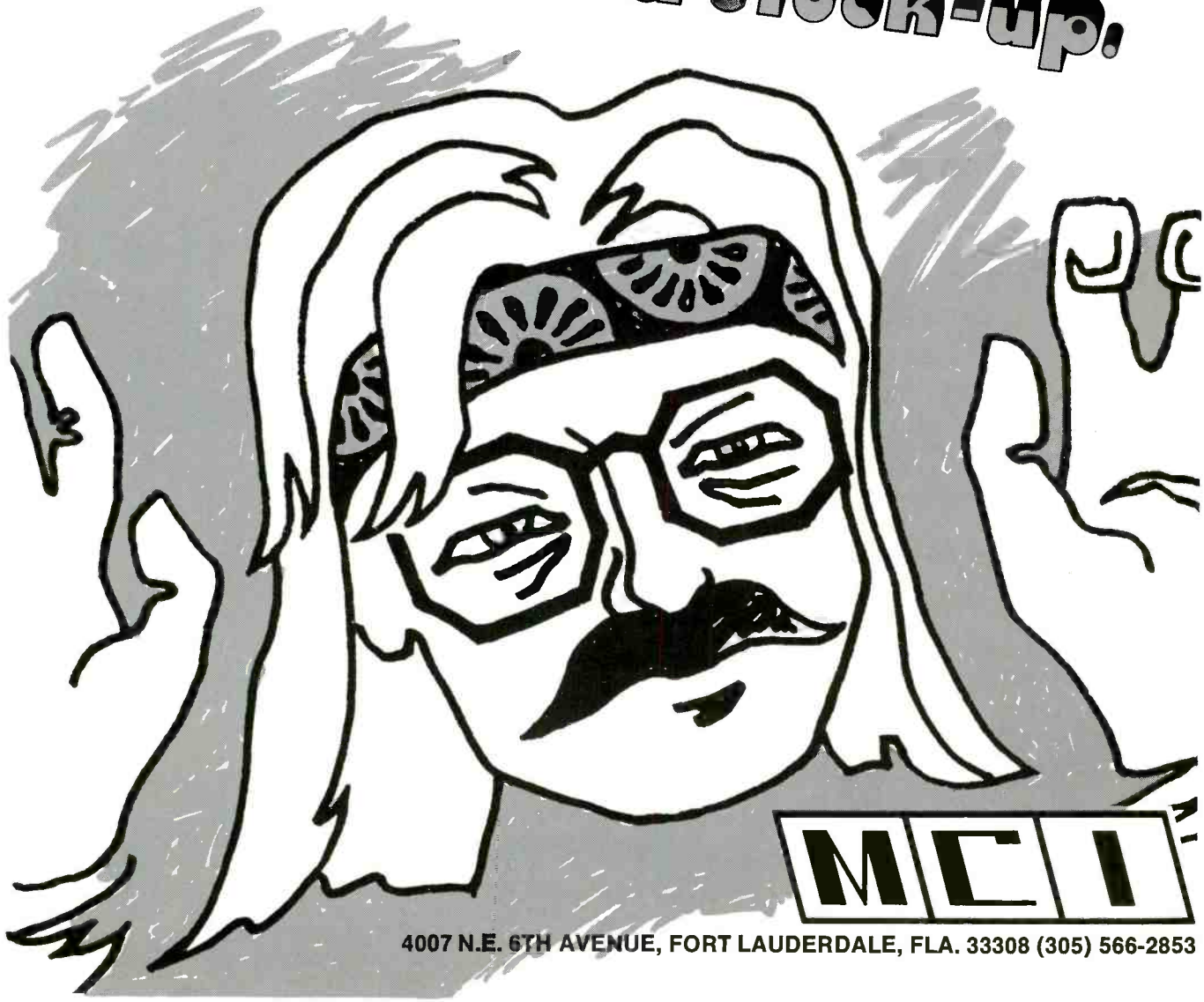
...or call Claude Hill, v.p. marketing and product development, (305) 566-2853



MCI

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Circle No. 109

DAVID GEFFEN

"If you believe in somebody you don't get nervous!"

GEFFEN: David Blue, who records for us, has recorded for three other record companies. He's never sold any records. We signed him. He put out one album that was a beautiful album. It didn't sell. He's just made a second album. It cost $50,000 dollars. It was produced by Graham Nash, and I'm not the slightest bit nervous about it because he's finally made a record that's gonna sell. It's great. It's just a question of time. If you believe in somebody, then you don't get anxious. Do you know what I mean? You just wait until it happens, given that you believe in them, which I do.

EC: It sounds like you have love affairs with the artists.

GEFFEN: In a way, I love all these artists. They love me.

EC: How would you like an artist to be presented to you?

GEFFEN: If he's good, any way it comes — a simple tape of songs that they've written, whatever they do, so that you can hear. Hopefully, if you could see them, that's nice, too. I much prefer to listen to a tape, so I can take it home and hear it. I always feel uncomfortable when I have an artist come in and audition for me because if I don't like it, I have to say "no" right there, and that's kind of hard. If I like the tape, then I try to have the artist perform for me. If that's not possible, I'll make a deal just from the tape.

EC: How about the artist's management? Is that important?

GEFFEN: I hope that everybody we sign has a good manager. I think that's important. We manage some acts. We certainly don't manage all of the acts that we record. We don't manage most of the acts that we record. We do want whoever we record to have a strong, good manager.

EC: In general, do you think an artist gets more attention on a small label than on a large one?

GEFFEN: I can't believe that any record company that has a tremendous number of artists can possibly have any personal contact with the people they record, which I think is so essential. For example, Warner Brothers runs their company more in line with making profits than making records. I would say that our company is more in line with making records then making profits, although I must say that Asylum Records is a very profitable record company. But profit is not the reason we started in the business, and it isn't the reason we continue.

EC: Your point of view seems unique. What happens when you get together with people like Smith, Erdigan, and Holzman?

GEFFEN: We disagree. But they run their companies, each one of them independently, and I run mine. I run mine very successfully, and they run their very successfully, and none of us agree about how to run a record company.

EC: You certainly do differ from many companies. So often they try to change the artist around. They don't trust him.

GEFFEN: If I don't believe in a guy's judgement, what am I signing him for? I don't make records. I distribute records. What I do is I finance artists. I give them the opportunity to make records. I don't make them myself. I don't choose their producers, although I'd like to be consulted if they want to consult me. Most of my artists make their records themselves. Most of them don't use producers.

EC: With the kind of freedom you seem to offer, do you have trouble signing artists from other companies?

GEFFEN: I'm not looking to take away artists from other record companies. Graham Nash was released from Epic Records. David Crosby was thrown out of the Byrds, and released from Columbia Records. These are people who never made records before they make them with me, and I believed in them from the beginning. I'm looking to build artists here. I'm not going to go out and spend $4,000,000 dollars to sign anybody. Anybody who wants a lot of money to make a deal with me can't make it because I'm not in that business. I may as well be in the banking business.

EC: Can you tell me the story behind one of your successful records?

GEFFEN: I received a letter in the mail from Jackson Brown, with a tape and a photograph. I heard the tape: I loved it. I signed him, and supported him for two years before he made his first record. I started the record company to record Jackson Brown and Judy Sills, because nobody wanted them.

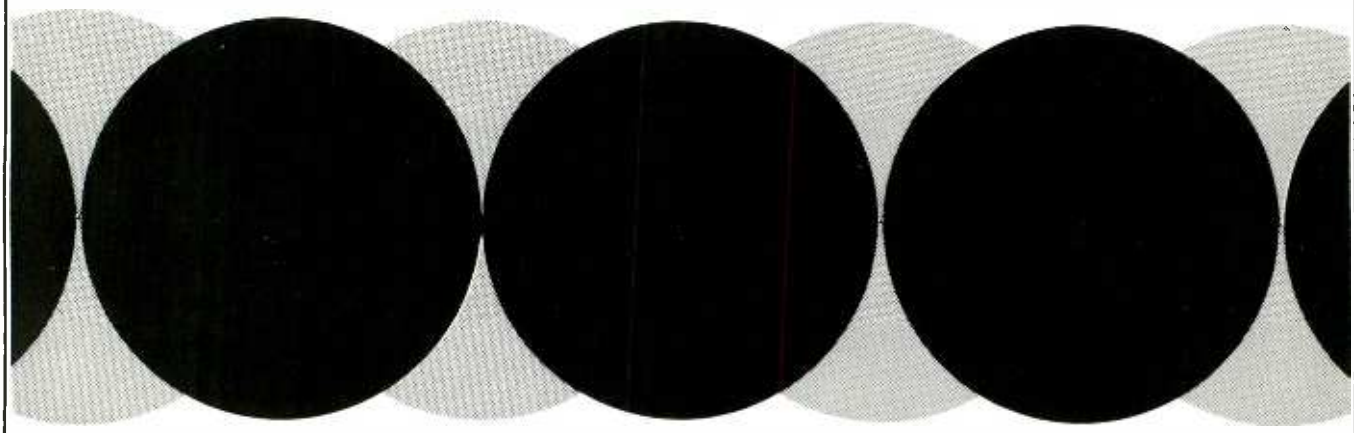
EC: You haven't mentioned any R&B acts. Are there any in Asylum?

GEFFEN: No. None have come up here. R&B records are usually records more than artists. And we're not interested in buying records, so much as in buying artists. I think if someone's got a really good R&B act, they're probably better off on Atlantic, which I think is a great company in the R&B business. We're not in the R&B business. That is not to say that we're not in the business of recording Black artists. Steve Fergussen, who's Black and records for us, is really a brilliant musician and songwriter. But I wouldn't say that his records, because he's Black, are R&B records. R&B is the singles business, and we're in albums.

EC: Given your emphasis on albums, what role does top 40, AM radio exposure play in selling your records?

GEFFEN: KHJ is the most powerful station in L.A. KHJ sells singles and albums. You can get played on all the stations in town with the exception of KHJ, and you're not going to sell nearly the amount of records that you'll sell if you get it on KHJ. All the stations are important, and all of them are helpful in breaking an act. But I don't think that

A PRESSING QUESTION



Q-540 is the most significant advancement in record compounds in many years. Developed for CD-4 (quadraphonic) recording, it has the unique capability to blend 4 discrete channels of sound and reproduce them with greater clarity and brilliance than has ever before been possible.

It happens that Q-540 is also far superior to ordinary compounds for pressing monaural, stereo, and matrix quad recordings.

Here are the compound benefits:

• GREATER BRILLIANCE	To really appreciate the brilliance and clarity of Q-540 you should compare it to ordinary compounds. Hearing is believing.
• LONGER WEARING	A record pressed with Q-540 will provide over 3 times as many plays as an ordinary compound — with total fidelity! Even in CD-4 discrete channel recordings, the 30,000 cycle carrier channel cannot wear off the way it does on other compounds.
• ANTI-STATIC	Q-540 has necessary anti-static characteristics. The result is less surface noise, less dust attraction, far greater ease in wiping record grooves clean of dirt accumulation and keeping surfaces dust-free and lint-free.
• FAST-FLOWING	Increases your production rate by shortening the pressing cycle. Fills better than ordinary compounds. Less susceptible to warping at faster cycle rate.
• GOVERNMENT APPROVED	Easily surpasses all FDA and Public Health Service standards through 1974.

If you have any pressing questions about Q-540, we'd be more than happy to answer them.

Q-540
Makes the best sounds better.

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Pioneering in record compound production since 1948.

Circle No. 110

you can have a hit single in this city without getting it on the major station.

EC: How do you get records played on the radio?

GEFFEN: We've managed to break most of the singles we've put out this year, and most of the albums – on brand new artists. So I think that it's not that difficult. I think if you have a shitty record, and the greatest promotion man in the world, you're just not going to have a hit. I think radio stations play records that they think are hits.

EC: How important are the charts? What do they mean to you?

GEFFEN: The charts, for us, are just an indication of how the trade magazines are viewing our sales. I know what every one of our records is selling through the Warners Communication Group. If you check the sales against the charts, they're just inaccurate.

EC: When the charts are inaccurate, do you have a hassle getting them to agree with your figures?

GEFFEN: If the charts don't reflect the sales as I know them, I'm not going to call up "Cash Box" and threaten to cancel my advertising. I just don't think it's that important. I think ultimately what's really important is making good records. That's all.

EC: In general, are the trade journals of much value to you?

GEFFEN: I like to read them. They tell me what's going on in the business. They tell me what stations are playing what records, comparatively how those records are selling, and I find them interesting. But I am in the business of finding artists, and you don't find them in "Billboard" or in Bob Hamilton. What you do is see how other stations are doing their programming, and how records are selling.

EC: Do you see any trends in pop music?

GEFFEN: There's always a trend. Every day there's a trend. I just listen to what's good, and if it's good, I think it's worthwhile.

EC: Are you then saying that you start trends?

GEFFEN: I don't know if we start a trend. The only trend that we have is that we record talented people. That's a trend, and we're in it. I remember when "Blood, Sweat & Tears" happened: Everybody wanted a band with horns. I don't know what that all means.

EC: I'm curious about how important graphics are to you?

GEFFEN: Very importnat. A record is a record in a cover. You want that cover to be attractive. We spend a lot of money on that, probably more so than anybody. We generally leave the cover designer up to the artist. We don't deliver them a cover for their album: They're responsible.

EC: We've discussed a lot of aspects of making records. Which producers have your respect, and might be examples for new independents to emulate?

GEFFEN: I like Paul Samwell Smith. I think he's a fantastic producer – very tasteful, very simple, very beautiful. I think Graham Nash is a sensational producer. Lou Adler, I think, is a very good producer. I think Tom Bell is a good producer, although he produces a different kind of record than the kind I put out. He producers the Spinners, and R&B records that are great.

EC: If you could describe the direction of your company, it might be helpful. What do you think is the basis for your company's success?

GEFFEN: The fact that we have talented people recording for us: If Asylum Records is successful, it's successful because we've exercised a certain amount of taste. We've made this company attractive for artists. They feel comfortable here. They know that they're not going to get pushed around. No one is going to tell them how to write their song, how to edit their single, how to make their record) or repackage them, or release things that they didn't want out. We don't do any of those things.

Continued from Page 13

and a good sounding tape: That will give us an indication as to whether we wish to pursue it further. If we wish to pursue it further, there are many factors that will go into the decision as to whether we sign the artist or not – how well they record, which involves so many things like unusual production ideas that they might have, the quality of the voice, or whatever. Then I am concerned about their song sense: Can they write great songs, or do they know how to go about finding good ones, and do they have good instincts for songs? How do they look on a stage? Who is their management? Good management is essential. And, as important as any other factor, do they possess a certain quality of transcendent magic? That's what we look for. If we're satisfied on most of those points, then we may sign the artist.

EC: Does an act have to be performing somewhere before you're interested in them?

HOLZMAN: We'd like to see them work. We learn a lot. We want to know as much about the artist as possible before we make a decision.

EC: You seem to be very careful about signing anybody.

HOLZMAN: Of course. It's like I'm marrying somebody. I don't want any surprises later on; except happy surprises. I want to know them as well as I can. I don't need any Megalomaniacs – although most of our artists, and the ones we've run into, are reasonably sane.

JAC HOLZMAN

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EC: Have you personally signed most of the acts on the label?

HOLZMAN: Yes, I have, in most cases. But it is not always me. Sometimes people are signed on the spot, without any reference to me at all. There are four or five of us who run this company on a direct basis. I do not make all the decisions.

EC: Do you make the decisions about what is released, how it is going to be developed, and so forth?

HOLZMAN: I certainly decide exactly what's coming out. There are other people who come up with the various marketing concepts and plans, subject to review. I don't try to come forth with all the ideas. That would be foolish of me. I am personally involved in most decisions as to which acts get on our label.

EC: Are you directly involved in producing any of those acts?

HOLZMAN: I am no longer producing any records myself. I've had to give that up. It creates too many problems. It creates problems of time, and of jealousy with other artists. It's just not worth it. But I am actively concerned with how the record sounds, who the producer is, and all those special things. Selection of the right producer and having the right song takes an artist from a record that sells 400,000 albums to a record that sells a million-plus albums.

EC: When you talk about the "right producer" I wonder how the independent producer can get started?

HOLZMAN: It's very tough for an independent producer to break in. And the reason that it is difficult is that I can't, nor can any head of A&R, entrust a major artist to a producer who is untried. I think that one thing they can do, is just to hang around studios, and learn as much as they can. Be very musical, and try to produce demos.

EC: Would it help the independent to ally himself with a manager that you know?

HOLZMAN: I don't know whether it will help or not. It really gets down to what you hear when you make a decision. I don't know where to tell young producers to get their start. But I can say that aside from the selection of the artist, the matching of a producer to an artist is an A&R man's most important creative function. Given an artist with the same songs, the same musical arrangement ideas, the same vocal equipment in an identical studio, and two producers will handle that artist totally differently. One will get a hit, and one won't get a hit. I'm going to go with the one that I think is going to get a hit, by which I mean that record which is going to connect with the greatest number of people possible — namely, record buyers.

EC: Can you tell me what types of music interest Elektra Records?

HOLZMAN: We're interested in all forms of music. We have a predominant interest in contemporary popular music, Rock & Roll, and new music. We are the original pioneers when it comes to commissioning music to be written for the medium of the phonograph record. Look at the Nonesuch Electronic Music Series, which are all direct commissions from a record company to encourage new music.

I don't think it's necessary for a record company to be responsible to anybody who wants to make a record by making it easy for them. I think the best work comes by people who have fought and scraped, and bought their ticket into this business — like the rest of us have. I'm not interested in handing it to people on a silver platter. I tried that, and it doesn't work.

EC: Do trends affect the direction of your company? For example, did the English trend affect your decision about when to break the Doors?

HOLZMAN: I don't believe in trends all that much. A trend is an historical extrapolation of things that have already happened. It does not necessarily mean that they are going to continue. Anybody who projects that because it came up black on a roulette wheel sixteen times, it's going to come up black the seventeenth, is in for a very rude mistake. You always have to be ready for the happy surprise. That's part of the excitement of this business.

EC: Are there any new areas you may be moving into, such as R&B?

HOLZMAN: Rhythm and Blues requires a very particular sensibility, which none of our A&R staff really has. So we'll tend to stay clear of what we really don't have a great feeling for. We're not trying to be a full-spectrum company, whatever that means. We're trying to do whatever we can do, and to do it well.

I'm getting interested in jazz now. A number of my staff are getting interested in jazz. It's possible that we'll move into that area.

EC: You speak about moving into the area of jazz. I wonder about the value of aiming records at a wider audience, and maybe incorporating several areas in one?

HOLZMAN: You can get into the same danger as TV: You can go to the lowest common denominator all the time. And you don't go for things that reach.

A Carole King record, or a Carley Simon record, or any of those kinds of records, transcend categories, which everybody likes to conveniently pigeon-hole them in, because it's easy to understand. Pigeon-holing is a concept for small minds who can't deal with anything that's much bigger than a peanut. Records that transcend categories like Pop, Top Forty, things like that, these are the records that, by virtue of their ability to connect with the listener, end up selling more than any other records.

EC: You've mentioned some artists who write their own material. Do you insist that your artists write their songs?

HOLZMAN: I look for songs, and I have people who are willing to take songs that they don't write themselves. We have artists who don't write their own material, and artists who write all their own material.

EC: I'd like to talk about the output, now that we've discussed what goes into the records. I've heard that singles aren't really profitable. If so, why make them?

HOLZMAN: For a single, you have to figure in copyrights, artist royalties, and a whole bunch of direct and indirect costs. We don't make much money on singles. We're out there selling singles because we know that a successful single is a calling card for a potentially successful artist. You're selling the bulk of stereo LP's today off of monophonic AM play. There has not been a major American artist who has arrived in the last two or three years, who did not happen as a result of his single.

EC: How do you get AM radio play? Or any radio play?

HOLZMAN: You sweat a lot. You bang on every door of every radio station that's likely to play your record. You're not going to take an electronic music record to a stoned country station. You know your stations that would possibly play the record. Your promotion people have relationships with the stations. They go, they play the record for them, and the station makes an A&R judgement.

EC: Do you use the charts at all? If so, how do you interpret them?

HOLZMAN: Oh, sure, everybody uses the charts. We know what's happening, but the charts are interesting. How much credibility you place in them is another matter. I place a fair amount of credibility in the top fifty of each chart. I think they're subject to errors below that.

The charts are indications of the relative strength of record sales. The charts are helpful. However, I think sometimes too much emphasis is placed on them.

EC: How about the trade journals? Are they of value to you?

HOLZMAN: Bob Hamilton and Bill Gavin have extremely important information sheets, and they're both scrupulously honest.

EC: Do you think independent producers should read the charts, and follow their records on the outside?

HOLZMAN: I think it's always helpful for producers, or people intimately involved with records, to know as much about the business as they possibly can. This way they can ask intelligent questions when they need to be asked, and not bother us with unintelligent questions.

EC: I get the impression you ask a lot of questions, and do a great deal of research before making any decisions.

HOLZMAN: You do that, but there's a point beyond which you operate on blind instinct: It seemed reasonable to me. Most decisions can be excessively

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based on fact. You have to marry some kind of gut instinct to whatever your intellectual processes tell you the facts are. If you go strictly on an intellectual basis, you may make a mistake because your gut may be telling you something else.

EC: Is that the way most record executives operate?

HOLZMAN: There are no two who do anything the same way. Yet their systems work. Geffen works a lot by instinct. So do I. His instincts are uniformly excellent. Joe Smith is one of the great and skillful crapshooters in this business. He knows how to roll the dice, and when. That's a hell of a talent.

EC: I'm curious about how important graphics are to you?

HOLZMAN: Very important! I don't think that they sell records, but they should accurately convey a sense of what and who the artist is, and what he is trying to say.

EC: Does the independent producer have control of the graphics?

HOLZMAN: No, control of graphics remains with this record company. We give nobody control of the graphics.

EC: We've discussed a lot of aspects of making records. Which producers have your respect, and might be examples for new independents to emulate?

HOLZMAN: I carry with me at all times a list of every producer who ever made a record that I like. It's quite formidable, about fifty or sixty producers who I think are first-rate.

Lou Adler, Denny Cordell, Tommy Dowd, Gus Dudgeon – all are perceptive and tasty men who know exactly what they are doing, otherwise they wouldn't have gotten to where they are. John Fogarty, David Gates, Roy Halle, Bones Howe, Glyn Johns, Arif Mardin, George Martin, Jimmy Massena, and Gordon Mills are all excellent producers. Graham Nash is one of the best producers around today. Richard Sanford Orsaff, Van Dyke Parks (when he works), Richard Perry, Norbut Putnam, Richard Podilar, Paul Rothchild, and Paul Samwell Smith are all first-rate. Phil Spector, Bill Susick, Tony Visconte, Lenny Warrencker, Jerry Esther, and Bob Zachary are all first-rate producers. They all fought their way into this business. Nobody made it easy.

EC: What do you think is the basis for your company's success?

HOLZMAN: When you are trying to build a record company, you try to be in enough of the right places at the right time, so lightening may happily strike you at least once. Starting a record company, or being a producer, or an engineer, is just being aware of everything, doing everything you can do, and hoping that luck will happen.

A great deal of it is luck. How you then parlay that luck, and make it work for you in a positive way – that's talent. We could, for example, have taken all the money we made on "Doors" albums, and closed up shop. But instead, we reinvested in our business, and grew from a few million dollars in sales, at that time, to our current stature.

Continued from Page 13

the issue of the value of a single record. Could you explain why the profit margin is low on singles?

SMITH: The first thing to consider is the fact that about 40% of the single records shipped are returned to the company. It costs about 11 cents to press each record. This means that four cents of the profit of each record comes off the top. Secondly, we sell a record for forty-five cents to our distributors, and we're paying a royalty of a dime, and we pay the publisher four cents. We're down to a situation where the energy involved makes it not highly profitable for us – and we're a successful singles company!

EC: If the profit is so low, why do you still make them?

SMITH: The hit single record is a shortcut. We caught a hit with the Doobie Brothers, and tied that up with appearances around the country. Then we had something to talk about.

If we release an album, and there is no hit single in there, why in the world should anybody pick up on that album? Without the hit single, appearances can still help get a group off the ground.

EC: If there is no hit single, why should anybody want to see the group at personal appearances?

SMITH: Capricorn has its own agency kind of operation. They are able to put new acts on the road, and package them with the Allman Brothers. Chrysalis, a label deal we have from England, has three major acts. Chrysalis is able to put their other acts on the bill with Jethro Tull, Ten Years After, and Procul Harum. That way the new acts can latch on and get exposure.

Remember, a Jethro Tull tour will play in front of half-a-million people. If an act on that tour plays in front of that many people, it's possible that two percent, or ten thousand, of those people will be interested in buying that record. You're off and running from there.

EC: Getting back to selling you an artist, do you personally listen to the songs that are brought in here?

SMITH: If a manager who had a track record with us brought in a tape and said, "I've got something," then I, or Mo Ostin (President of Reprise Records) would listen to it. We are really the A&R acquisition staff for this company. We have A&R producers for the general, run-of-the mill tapes that come in – a whole listening group of people who will evaluate and send the tapes to us. If the staff bombs it out, we'll let it go by. If they think it's interesting, then we'll get into it.

JOE SMITH

A year from now
the top ten records
will include five people
that you never
heard of today.

EC: You're saying that though you may not hear everything that comes in, you make the final decision on signing any artist?

SMITH: You must understand that a commitment to sign an artist is an enormous commitment. You're talking $50,000 or $60,000 dollars to start – to record, to advance, to promote, to tour. I would like to keep control of that. So if our A&R staff finds something they like, that is an enormous influence on me. But I still would like to listen to it myself, and to use whatever instincts I have.

EC: What do you mean by instincts? What clues do you use?

SMITH: I try to look at it in its totality. A&R people are looking at music. They would never have signed Black Sabbath. They most likely would never have signed Deep Purple. They never would have signed Alice Cooper. I think because I am not musical and Mo is not musical, we can make our judgements based on the totality of an act.

We have enough confidence in our judgement to go, because our instincts have been good enough times. We have a very imposing artist roster, a lot of which was started from ground zero. Having heard Van Morrison with only a single record, we signed him. He wasn't a terribly important artist at the time, nor was James Taylor, nor was Neil Young, nor was Jimmy Hendrix, nor was Black Sabbath, nor were any number of people. So our instincts have been good – we've been lucky. There is an enormous amount of luck in this business, an enormous amount of fortune.

EC: Well, I suppose the independent producer can't do much about the luck or the fortune. But you mentioned the "totality" of an act several times. Can you explain that a little better?

SMITH: I can't go just on what a prestige product for our label might be. My judgement is based on what it takes to get us even, to get our money back. If an act's potential is only a little above break-even, why should I get involved in it? I've got to believe that it has an unlimited ceiling. It has to have a potential to go to the moon, or certainly to make a lot of money. That is our purpose.

We're trying to present music as legitimately and as honestly as possible. If a legitimate producer comes here with an act he believes in, he has a pretty good chance with us, provided we like, and we're satisfied the act has some staying power, some talent within it to perform, to write, and to make future albums.

EC: If the kind of act you're looking for happens to be signed on another label, do you ever try to get them?

SMITH: Sure. If an act is dissatisfied where they are, and they're at a point in their career where they have got three to five more years of growth and sales potential, why not?

It depends on the commitment you want to make. If the Beatles were to form a group again today, I think that we'd go after them, and offer them an enormous amount of money to sign. We are not really at the point where we have to go after a lot of talent. We're not especially interested in ripping off acts that are coming from other labels – though, if it's right, why not?

EC: Do you see any trends in pop music?

SMITH: R&B music has really infiltrated pop music. Soundtrack music has achieved a new level of acceptability and respectability for Black music. Though it is in one of its up cycles, Black music has always been twenty to thirty percent of the pop music business.

EC: Do you see any other trends?

SMITH: It's very hard to tell. We still continue to hit on big English rock groups. The euphemism is high-energy. The word is loud – they turn up those amps and they go.

EC: If an independent producer has an act he thinks will please you, how can he approach you?

SMITH: The unknown independent producer cannot get me on the phone, unfortunately. It's not that I am trying to put any bars on that door. We have a hundred acts on this label, and each one of them knows me. They each have a manager and a public relations person, and when they have a record out – look out! It's very hard for some kid coming in from Oklahoma, with a master, to see me.

EC: But by remaining virtually inaccessible, aren't you limiting your acquisition possibilities?

SMITH: I don't want to sign too many things. I don't want to tax our people into taking on a lot of new acts, and into trying to break them. I'd rather sign a Seal & Crofts, who already are at a certain point: They're off the ground.

I can't take a lot of new records. I wouldn't even take an important master, a real great master, unless I felt the act could make an album, and an album after that, and then more single records. I wouldn't get involved with a one-shot record. The energy expended is too great, unless we have a future with the artist.

EC: Perhaps you can help the independent producer by defining what you like in a producer. Which producers have your respect, and might be examples for new, independent producers to emulate?

SMITH: I think the best record producer that I ever knew, or listened to, was Phil Spector. I think that Phil Spector is the only record producer who created something. Everything he did up to the Beatles, he created. I saw dumbfounding control of sound in his work. He made a total record.

I am delighted that Richard Perry has achieved star status. Richard is very forceful in the studio, and in the selection of material. He has great taste, and he is obviously able to put it together.

John Simon is a brilliant producer. John has got a great Rock and Roll feel. Ted Templeman and Lenny Waronker have done some marvelous things. Gus Dudgeon, in England, is a good producer. He is able to get on tape everything that is there. He disciplines it, and puts it together. Bob Ezerin is a Canadian kid who made Alice Cooper into a recording act. Alice is a great in-person act, and Ezerin has made them into a very important studio band.

Denny Cordell is a fine producer – knows where it is at in the studio, and knows how to get the feel and work with acts.

David Rubenson, in San Francisco, is a marvelous producer. Arif Mardin is so tasteful, is so good, so together in the studio, that you know that there is not a wasted moment. Tommy Dowd has excitement, enthusiasm, great song sense, and is a great engineer. Jerry Wexler is inspirational – marvelous song sense. He picked songs for Arethra Franklin over the years. He picks songs for artists who don't write.

EC: We've discussed the production aspects of your company. I wonder if we can further examine the marketing end of the business? For example, what role does Top Forty AM radio exposure play in the breaking of your records?

SMITH: If we had to rely on that kind of radio, we would be out of business. When we started with rock music, back in '66, with The Greatful Dead, and in '67, with Jimmy Hendrix, they never were played anywhere. That was really underground.

FM has grown and boomed. While the actual numbers may not be as great as AM, FM radio is hitting a great record buying audience. FM's power is like "Rolling Stone," whose average subscriber, according to an independent survey, buys four or five albums a month. So an ad in "The New York Daily News," with a two-and-a-half million circulation, may not get the results of an ad in "Rolling Stone," with only a two-hundred-fifty thousand circulation.

FM radio is a great answer for a company like ours. Personal appearances have been enormous. You know that Alice Cooper had no radio play. Personal appearances triggered everything, and then radio stations played Alice very reluctantly.

I spend a lot of time talking to Top Forty people. They have admitted they cannot be all things to all people. If they started to play some of the serious Rock music we're putting out, they would chase away their audience. It basically consists of teens, and women from eighteen to thirty. They have no men between eighteen and thirty-five; FM has swept them away, because their audience goes for hipper sounds.

EC: Do you use the charts? If so, how do you interpret them?

SMITH: Charts are generally an indication of popularity. They are inaccurate to the degree that their research is sloppy: They call the record stores, and depend on the stores to do it right. It's a reasonably accurate summary. If you're in the top five, it is a reasonable indication that you've got a big record. Once we sell thirty to fifty thousand albums, we're usually on the charts.

EC: I see. But do you actually use the charts to help guide any decisions?

SMITH: We make decisions based on what we sell. We get an IBM report daily, so we know what we have sold every day. We know what is happening on radio, and that's what is important. The charts will follow. If the charts don't reflect our sales, we go to them, and we present our case. Obviously it is not to our advantage to lie about any one record. Why would we want to destroy our credibility?

EC: Are the trade journals of much value to you?

SMITH: Yes, to some degree. But we know what they're reporting. They're reporting that various radio stations are playing the record. We've got promotion men who phone in every night and tell us what radio stations are on a record.

The value of journals is that they are telling other people where the records are being played. For example, suppose we couldn't get a record on in Philadelphia. The program director in Philadelphia then reads Cal Rudman, Ted Randal, Bob Hamilton, and Bill Gavin, and he sees that it is on everywhere else. Then he might go with the record. He wouldn't go with it on our say so.

EC: I'm curious about how important Graphics are to you?

SMITH: Graphics won't do anything for you unless the record makes it. If the record makes it, then a more attractive package catches your eye a little. Graphics generally speaking are a bow to the ego of the artist.

EC: You seem to genuinely enjoy your work. Now that your company is successful, what continues to motivate you?

SMITH: I'll tell you Errol, I don't know how long I can do this. I have been doing this for a long time. It's a business that is extremely exciting. You know that a year from now the top ten albums will include five people that you never heard of today. On the other hand, five of the top ten – you'll wonder what happened to them next year. So there is always that need to be good.

At a certain point in Clive Davis' career, or Amet Ertigan's career – those dozen of us who are running record companies – when you have achieved some kind of material success, when you have achieved recognition, you wonder what motivates you. What motivates a guy like Amet Ertigan? He doesn't need any more money than he already has got. He's certainly famous. He's sought after. What motivates him is what motivates me, or Clive, or Mo, Jac Holzman (who's a rich guy), Jerry Moss (who's a rich guy), is the need to do well at what you do,

Concluded on Page 27

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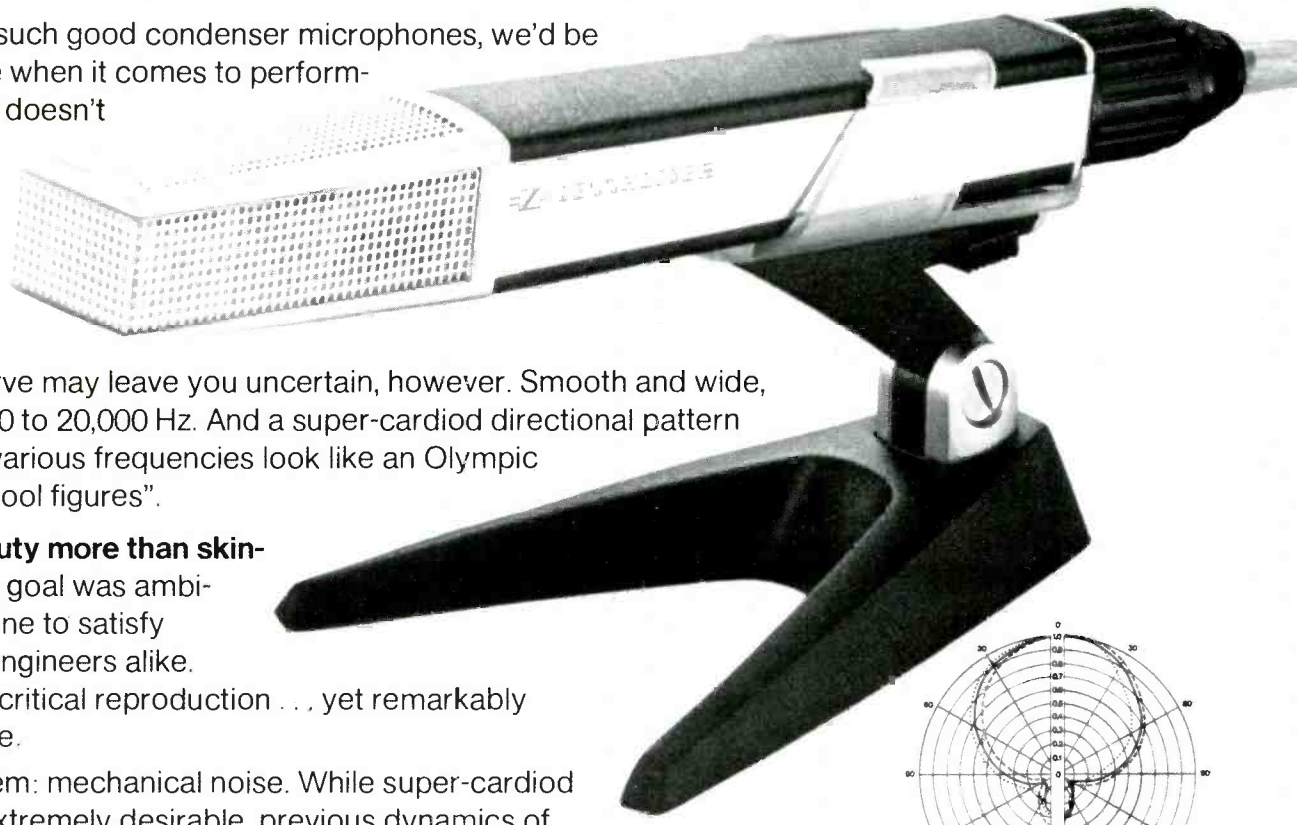

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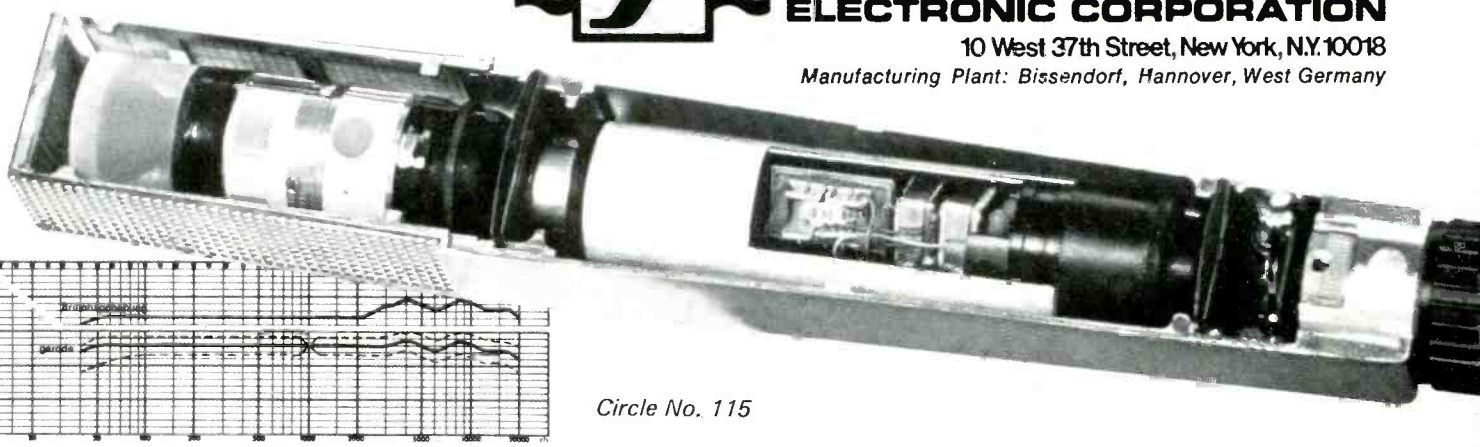

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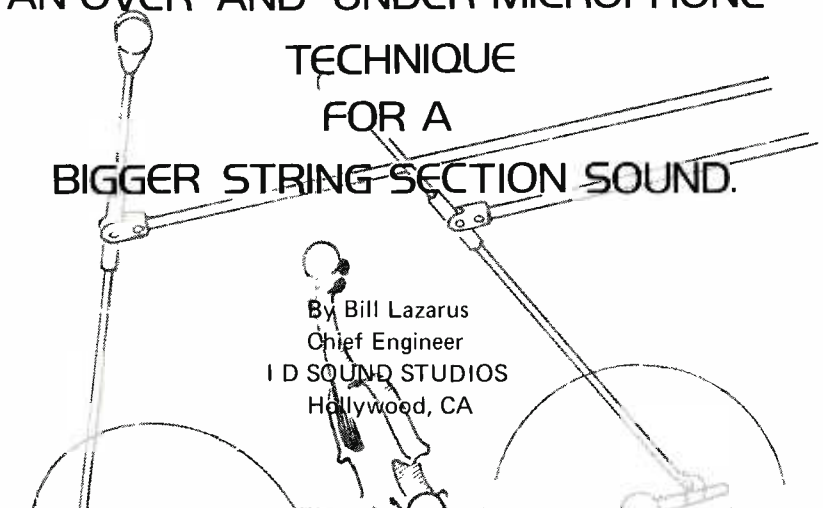
By Bill Lazarus
Chief Engineer
I D SOUND STUDIOS
Hollywood, CA



Economics and player availability being what they are, frequently an engineer and/or a producer is faced with the problem of attempting to make a *short* string section appear to sound like a much, much bigger section. The *over-and-under* technique of microphone placement described here, which we have used successfully for some time, appears to go a long way toward solving this problem. Further, there is no reason why the technique cannot be easily used in combination with other *fattening* techniques such as doubling, and the addition of echo, and the like, to produce a very dramatic apparent fullness from a small string section.

Essentially what we are doing is using two microphone systems to simultaneously record two distinctly dissimilar shades of the string sound the section is playing. The key to the effect is, of course, the two channels of dissimilar sounds coming from the same instruments. The dissimilarity in signal is caused by two main factors. First, the sound coming off the top of the string instrument; the fingerboard, or the bowing and pizzicotto area of the instrument, going to the overhead mikes is a decidely different shading of the string sound than that coming off the bottom of the instrument beamed to the underslung microphones. Second, because the overhead and the underslung mikes are of a different type . . . directional condenser types overhead; omnidirectional dynamic types underslung, the inflection of the mikes themselves produces a different shading of the string sound to each of the two channels.

The technique is equally effective regardless of whether the two signals are mixed to one track (if one track is all that is available) or whether the mikes of each system are fed to separate tracks for panning to a beautiful, wide stereo effect.

There are probably any number of variations of the technique that can be used, but we most commonly use a pair of microphones, one overhead and one underslung for every two players in the section. The overhead condenser mike in directional (cardioid) configuration is placed between the pair of players, probably some 3-1/2 feet over the instrument so that the pattern covers only the two intended players. This is the determining factor in establishing how high the overhead mike will be set. Of course, the closer the mike to the players, the more restrictive will be the pick-up pattern, and the better the isolation.

The underslung dynamic type mike in omnidirectional configuration is also focused between the two players, tilted up about 45° at a sitting waist level, probably just below the music stand, to pick-up the sound emanating from the bottom of the instruments. The underslung mikes will be several feet closer to the instruments than the overheads. The very slight time delay between the signals reaching their microphones is still another factor tending to make the sound seem fatter.

We like to go for as much separation as we can conveniently get within the section . . . but not absolute separation. I like to stagger the players, that is not have them sitting directly behind one another. This seems to help the separation of the parts being played.

The cello, or celli section can be miked in much the same manner, with the cardioid pattern favoring the area between the fingerboard and the bridge, and if only one instrument is being used, aimed slightly to one side so that it is also covering the output of the 'f' hole. The omnidirectional mike is directed almost towards the floor, but with some of its pattern to the bottom of the instrument nearest to the peg.

After we have physically set the studio up, we solo each microphone to make sure we are getting the same level from each mike. Balancing the mike levels is

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FIGURE 1: REPRODUCER ALIGNMENT TEST TAPE CALIBRATION GRAPH

Tape Speed: 190 mm/s (7.5 in/s)

TEST TAPE CATALOG NUMBER	EQUALIZATION STANDARD	TRANSITION FREQUENCIES/ [Hz]	REFERENCE FLUXIVITY/ [nWb/m]	TRACKS
☑ 21 T 102	IEC	Flat and 2240	200	Full
☐ 21 T 104	NAB	50 and 3150	200	Full
☐ _____	_____	_____	_____	_____

Serial Number 0726 Date of Calibration 19721230

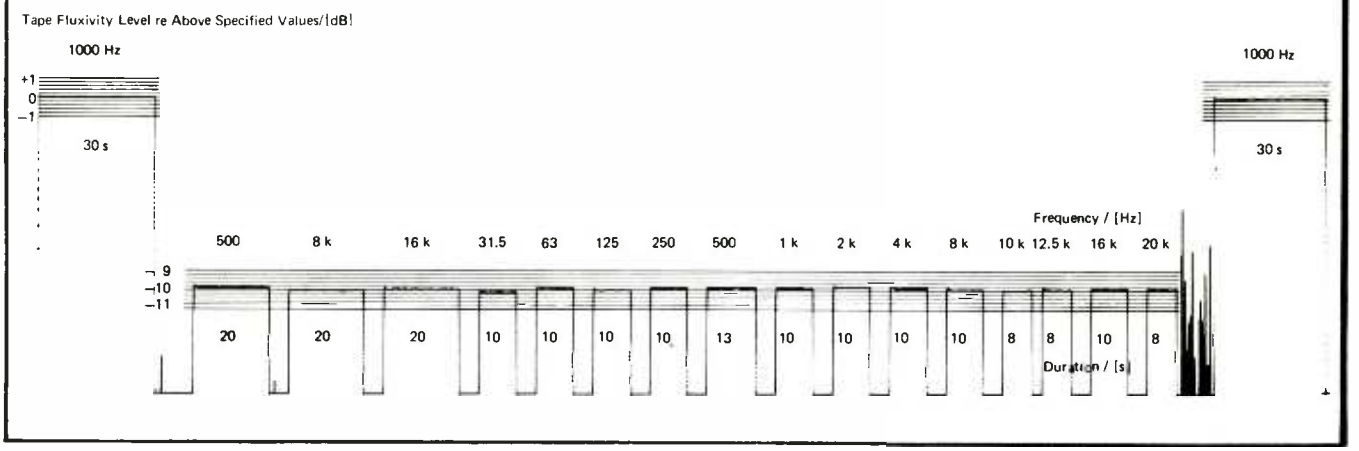
This graph shows the frequencies, levels, and durations of the signals recorded on this test tape.

Deviations from the "0 dB" or "−10 dB" levels calibrate this tape for deviations from the standardized values of response and reference fluxivity that are given in the Table to the left. In other words, these are the voltage levels that would be measured on a perfect "standard" reproducer.

A properly adjusted reproducer should ideally give the same response as that shown on this calibration graph.

One millimetre on the level scale corresponds to a level difference of 0.2 dB. One millimetre on the time scale corresponds to one second.

The dynamic response of the graphic level recorder used here corresponds to that of the "Standard Volume Indicator" (vu meter) of ANSI C16.5-1954, R 1961.



In conventional manufacture of test tapes, the total tape flux is visually monitored and manually corrected. *No* record is maintained of either the amount of the corrections, or of the actual recorded tape fluxes.

When the recording head becomes contaminated, the "correction" usually results in proper *total* flux, but an *uneven distribution* across the tape width. When the monitoring head becomes contaminated, the "correction" results in increased total flux. Thus, the commonly used "correction process" often produces greater error than was present in the "uncorrected" recording.

To prevent this, MRL employs *no* corrections during the manufacture of the test tape. *Instead,* a continuous recording of the tape flux is made on a graphic level recorder. If the tape flux varies beyond tolerance, the tape is rejected, and the source of error is determined before production is resumed.

The above chart is a reduction of a typical MRL alignment tape chart-record. The original copy of each tape's chart is shipped with the test tape, noting the date of manufacture, serial number of the tape, and the levels on that particular test tape. Actual signal levels on the tape may be corrected from these charts when extreme accuracy is essential.

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fairly important to the technique. In doing this I wouldn't rely exclusively on the VU meter readings; this is a case of where I would rather trust my ears a bit more than reading electrical levels from mikes of different types and in different configurations, because of the two types of levels an engineer must be concerned with . . . electrical and apparent levels. Although 0VU peaks are desired, apparent levels most likely will not activate the balistics of the meter when high frequency modulation is being played . . . even when fortissimo dynamics are being played. However, pianissimo passages will electrically activate the balistics of the meter when played at the lower register of stringed instruments. So the ear may be a bit more reliable.

I choose to add a little bit of echo on the overheads. This tends to accent the time delay to the overheads just a bit more, giving a sort of *halo* effect. EQ, too, should be used very sparingly . . . just enough, a taste, to emphasize the difference in color between the two signals.

The choice of microphones is wide open; whatever suits the kind of coloration you desire for the final effect. I would suggest, however, that all of each type be of the same manufacture, and be as closely matched as possible.

A typical studio set-up.

The author and a friend demonstrating.

Continued from Page 23

and to continue to maintain the respect of those people that you respect.

I want Clive Davis to be concerned about me as a competitor, and I want him to say, when he leans back at night, that Joe Smith is tough, Warner Brothers – that's a tough company. And he wants me to think the same about him, because excellence is a thing you pursue always.

I enjoy my work because of the nature of what it is. I meet the most exciting and creative people. I am in awe of Van Morrison . . . he knocks me out. He writes those songs . . . he sings like that. I've seen him on so many occasions. Some nights he soars. Or the Grateful Dead, who I have lived and died with for seven years now. There are some nights when they get me off-my-feet crazy, they're so great.

So you're around exciting people. You're around a dynamic business of young people, too. It has changed my life considerably. I have young children. My ability to have any dialogue with them depends a great deal on the fact that I have some kind of idea of what they're into for part of their lives – which is music.

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Cetec Inc., North Hollywood, California, announced the opening as of March 1 of a European branch, to be called Cetec U.K., located at High Wycombe, just outside of London, England. In making the announcement, Mr. Ned Padwa, Cetec's Vice President and General Manager also announced the appointment of Mr. Brian Wills as Manager of Cetec U.K. and Director of European Sales for Cetec Inc. Mr. Wills, who has had broad experience in the field of professional audio sales in the U.K., was previously associated with Cetec as the U.K. Sales Representative for Cetec's line of Gauss High Speed Tape Duplicators. Cetec also manufactures the Electrodyne and Langevin lines of audio control equipment.

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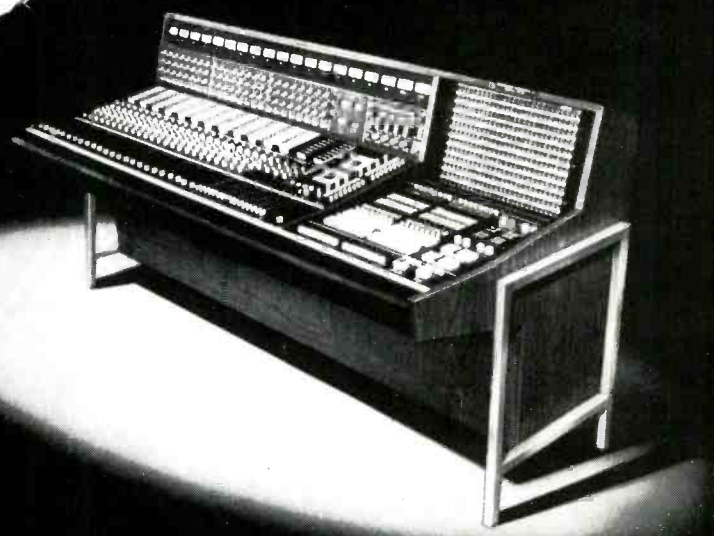

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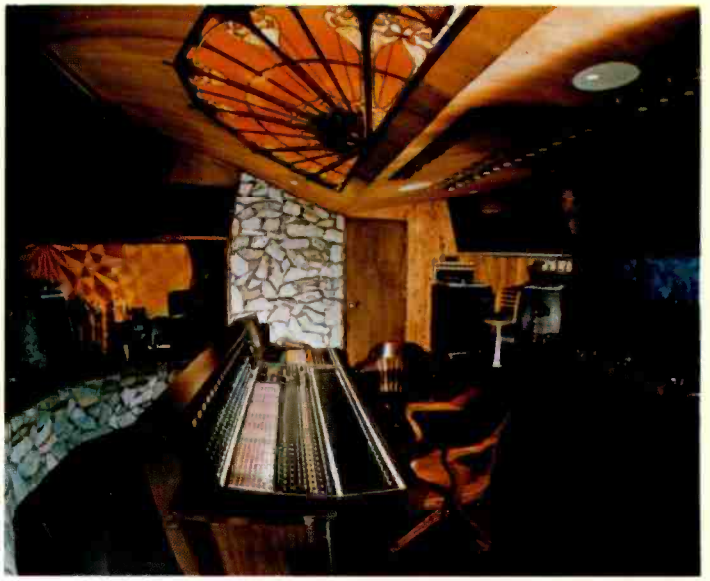

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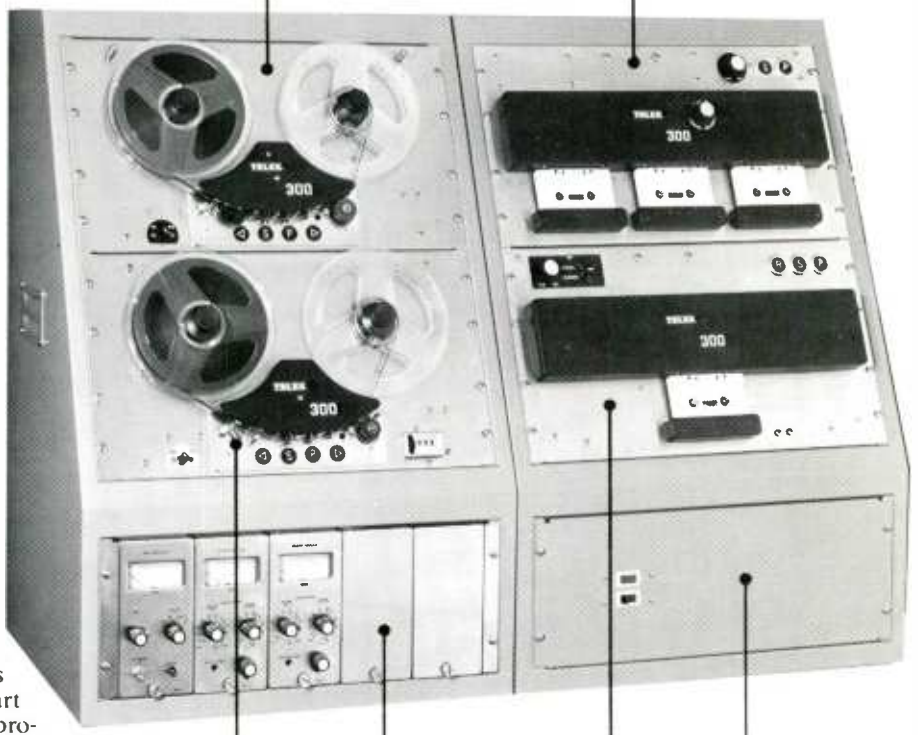

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GROUNDING!

by DON FOSTER

There is probably nothing more important in installing a studio, or making major alterations to the equipment in an existing studio than attention to the grounding conditions. Grounding has always been a problem of great concern to professional audio people. Our purpose in this article will be to report on some of the changes in thinking, and generally update the information on grounding that is available.

All grounding procedures have as their ultimate goals the maintenance of circuit stability; the prevention of oscillation of the associated components in the circuits caused by the differing electrical potentials which exist in a given electrical environment. The most common audio end product of an improper grounding condition; the oscillation of the components in the system, is the introduction into the system of a deleterious audio range *hum*.

The term *GROUND* is practically defined as a point of electrical reference for all types of signals; an electrical point of reference for all of the equipment involved in a system. So, ground is simply a point from which we can describe voltages, DC or AC, as being measured above ground (+) or below ground (-).

A *GROUND LOOP* occurs where the grounding in a system is improper, and is usually caused when two or more electrical paths of different electrical potential allow the ground to be diverted from just a single direct path or point. This deviation of ground path develops a loop in which a voltage tends to be created. This voltage is induced into the system wiring in such a manner as to affect the audio with a spurious signal; the result of which is usually *hum*. Depending on the circuitry this unwanted voltage producing the hum may be an oscillation at a very low frequency, or it may be a very high frequency as an RF carrier that carries the residual 60Hz in the room into the circuitry.

There are essentially four types of ground: 1) Transmission, 2) Shield, 3) Power, 4) Mechanical.

TRANSMISSION GROUND: Transmission ground is related, as the name implies, to the actual signal voltages as they are transmitted through the electrical system. In an unbalanced system the low or cold side of the signal pair is the transmission ground. In a balanced system the high and low sides, the two current carrying wires, are both referenced to transmission ground (the third wire), but they are not directly connected to it.

SHIELD GROUND: Shields on signal cables or around sensitive electronic components should all be connected at a single point, and that point is separately connected to the ground buss. Where shields are used there are two general rules for good grounding practice: 1) Shields should be grounded at only one end, often known as a telescoping shield.

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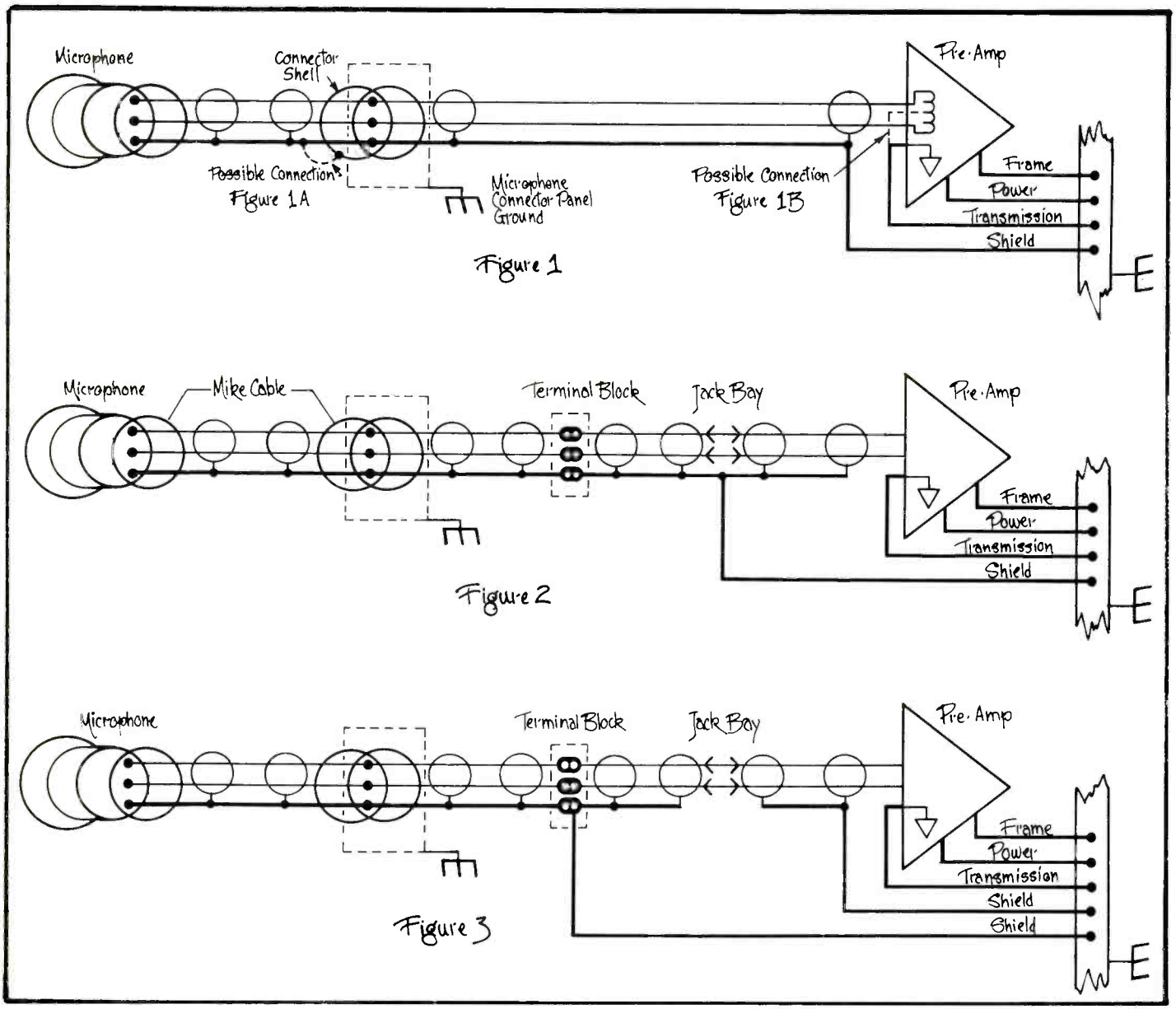

2) Shields should never carry DC or audio current. Shield grounds inadvertantly connected incorrectly are a very common cause of ground loop.

POWER GROUND: The power ground is the low side of the DC power to supply the necessary operating voltage and current for the amplifiers. This would be negative if referenced to a simple power supply, and $\emptyset$ if referenced to a bi-polar supply.

MECHANICAL GROUND: The frame ground may or may not be needed depending upon the design of the individual equipment. If the equipment is tube type it would more than likely be mounted in a metal chassis which should be separate from all the other grounds, with a separate line run to the ground buss.

To better understand how these definitions apply let's start with a line drawing of a circuit from a microphone into a pre-amp. (FIGURE 1). It should be noted that what follows is based on ground lines which are several feet in length, thereby causing the possibility of ground loops. If the equipment being investigated is extremely compact, and the various ground connections are within a few inches of one another, it may be possible to simplify the grounding. Also, we can for the moment ignore the sophisticated equipment such as equalizers, limiters, mutes and solos which may also be a part of the internal equipment of a console.

In FIGURE–1, regarding transmission ground, we show a balanced input from mike to pre-amp which allows for only minimum noise pick-up on the mike lines. Another point, if in a typical case like this the connectors are mounted in a metal connector panel or box then there is a good possibility that the panel or box itself may be grounded. This is not always necessary, but in an area of high radio frequency interference the panel or box may need to be grounded as an additional shield against spurious signal pick-up.

A word of caution about a double grounding condition which may exist with the mike cable shield (FIGURE–1A), and here we get into the application of shield grounds. There are some cables which have a connector shell that is electrically tied to the shield as well as to pin No. 1. If the metal mike connector is grounded to the box – with the total box being grounded, such as with electrical conduit then you will have two grounding points; one at the box and one at the console. Your mike circuit, in this case, now has a ground loop which is big enough to pick up the residual hum in the studio room, and induce it into the mike line by means of the shield . . . which is now no longer a telescoping shield.

Back to transmission grounds for a moment. There are some who advocate grounding the center tap of the input transformer at the pre-amp. (FIGURE–1B) This is not usually necessary unless you have extremely long

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microphone cable runs, and then it becomes a matter of trial and error as to whether it is necessary to eliminate the noise pick-up from the line. A balanced line with today's shielding does not generally pick up noise. Being a balanced line means that the noise pick-up will be cancelled out.

FIGURE–1, then, shows the direct wiring of the mike lines to their individual pre-amps with the proper ground connections. Note that the shield ground is carried all the way through to . . . *but not connected* . . . to the pre-amp. The transmission ground is shown connected to the ground buss. This would be that point of audio after the input transformer that would be considered as the low side of the audio signal, usually at Ø volts, referenced to ground. This is generally a common side through the entire amplifier up to the point of amplifier output.

There are many possible variations of this simple method of grounding. Just as an idea it might be possible to go from the mike line to an IC direct with an input, with both sides above ground for transmission purposes – an inverting, and a non-inverting input – two points of input with the common mode arranged internally in the IC, which point would then become the transmission ground.

FIGURE–2 shows another method of shield grounding. The other types of grounds such as transmission, power and mechanical (frame) grounds would be the same as in Figure–1. In Figure–2 the mike line as connected at the terminal block and continues on through the jack-bay. The distance of the run in this case is unimportant if the grounding is proper. The shield ground in this case is multed at the jack-bay, and the jack-bay is shown with the normals so that all the mike lines go to their respective pre-amps. All the mike line shields are tied at the jack-bay both in and out, and this is now a common grounding point for the shields, which point is now returned to the ground buss. Since these are telescoping shields; that is open at the pre-amp side, then there will be no problem with hum pick-up, as no ground loops can develop.

FIGURE–3 shows another grounding method for the shields. Here the common mult point for the shields is at the terminal block where all the mike lines come into the rack or console. As you can see the shields dead end at the jack-bay, both to and from the jack-bay. The output side is still not connected at the pre-amp in order to keep all DC current as well as signal current out of the shield at this point.

This pre-amp shielding information is based on good practices in both manufacturing and wiring of systems. Of course, there are many wide and varied approaches and many differences in physical layout, so what may seem best in one case may be impractical in another case.

But the rules mentioned earlier still hold – no matter what direction you take.

First, the shields should be grounded only at one end. This means all shields are effectively telescoping shields.

Second, the shields should never carry audio signal or DC current.

Third, when designing or constructing a system, the problem of grounding and installing the mixing board is much easier if the board internally is designed properly from the standpoint of grounding. Consider the entire system when designing a mixing console so that all peripheral equipment will not only match, in and out, impedancewise, but also will be such that no ground loops will occur no matter what is plugged in at the jack-bay.

It is beyond the scope of this article to give all the methods and systems for each application. This would require a book.

To continue with more general system wiring, FIGURE 4 shows a simple one-module type wiring, but not necessarily the way you might wish to do it. This shows how each amplifier consists of the transmission ground, the power ground, and frame ground. The shield grounds are all separate and telescoping.

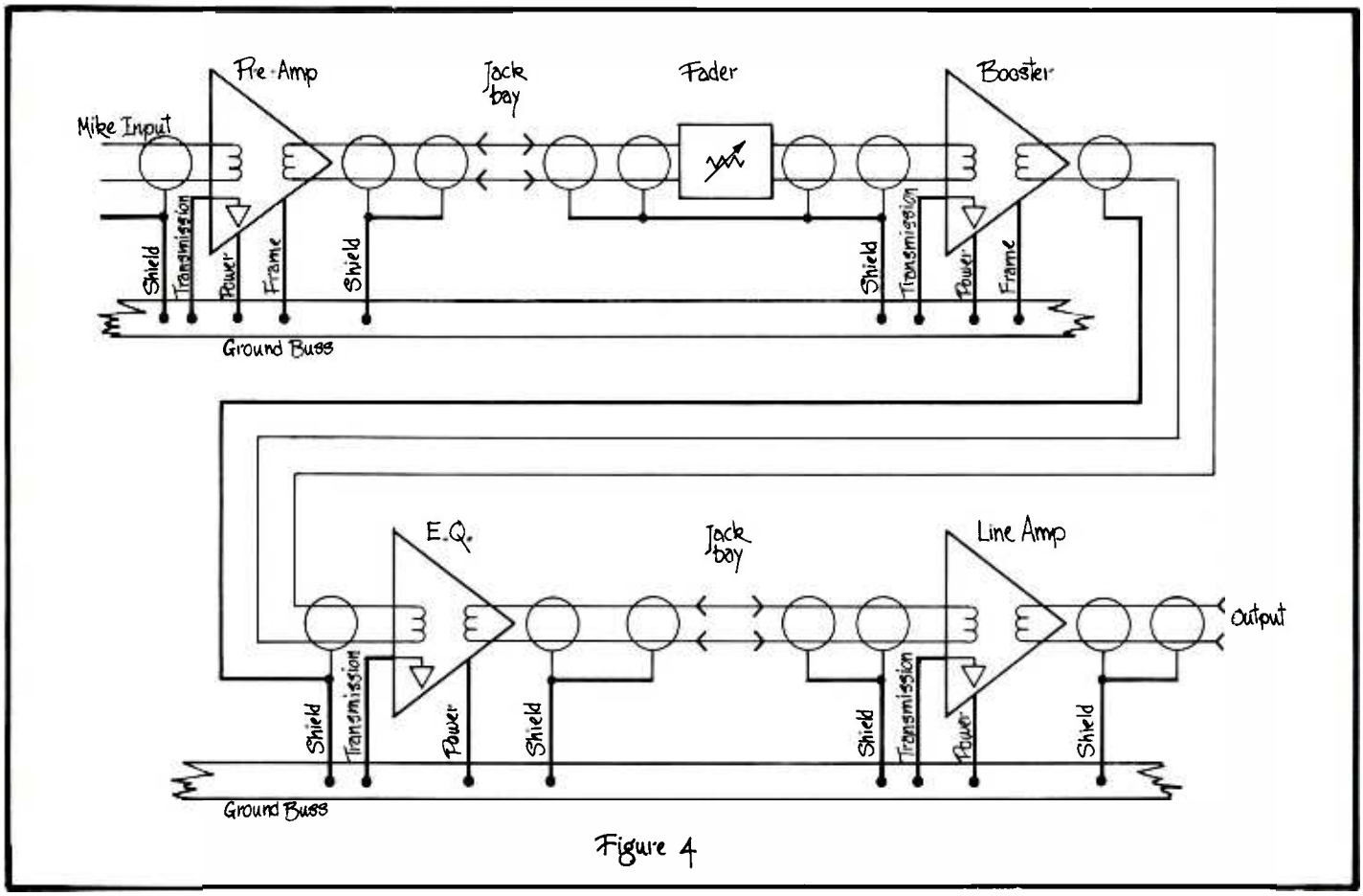

Figure 4

$1890

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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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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 new Series 70 Recorder/reproducers.

We've got what you need.

TASCAM CORPORATION

5440 McConnell Avenue
Los Angeles, California 90066

Circle No. 126

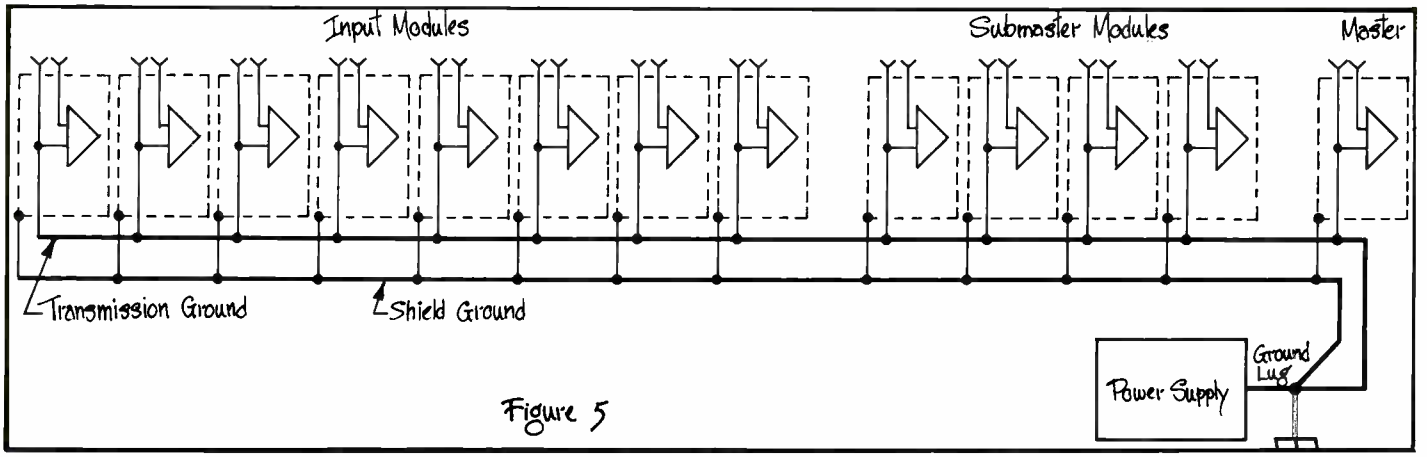


Figure 5

This method can be followed generally so that each point of gain, such as an amp., each point of control such as a fader or equalizer, each point of output such as a recorder, will be referred to a common ground, the ground buss. The system, then, ought to be stable.

It is also possible to have one ground for all the low sides of an unbalanced system. In a design of this type the low side of the audio circuit is very compact and all the wiring of components to this common ground circuit through a low-side wire, that is shielded, will connect together, but the shields will connect to another common point. Then both the low-side and the shields connect at one final point. (FIGURE–5).

With professional consoles the next point of contention is the outboard equipment such as equalizers, limiters, noise reduction devices, echo devices, and tape machines.

When any of these devices are inserted into a system they should, of course, not create any unwanted disturbance, such as inducing hum or noise, but should operate and perform the function they are designed for. We cannot control the built-in noise that any of these devices might generate internally, but we can make sure the grounding and shielding is correct. For instance, if the device is a limiter with input and output transformers, then your transmission ground is isolated from the incoming and outgoing circuits. This ground usually appears as a ground point on the connector and should be grounded separately from the shield wires coming in and out. Although the shield wires are telescoping both in and out from these devices and might not really create a problem if strapped to the ground point of the equipment, it is safer to run a separate shield ground wire to the ground buss. The measured difference might be negligible since this part of the circuit is operating at +4dBm level.

In today's technology, tape machines usually are equipped with an AC ground. This will likely create hum problems because most tape machines use the frame on the machine as a ground point for audio transmission, shields, and low-side of DC power. In my experience, the law not-with-standing, the first thing to disconnect is the AC third wire ground at the tape machine chassis. A separate ground buss can be run from the tape machine. Then all the lines coming to and from the tape machine can now use the tape machine as a point of reference and all the shields can connect at the tape machine and be telescoping back to the jack field.

Checking out a new board that is designed high impedance in and out – with options, shows how simple internal grounding can be in a well designed system. This is well illustrated in the recently introduced Tascam Line of consoles. The whole system is unbalanced but from the FIGURE-5 it is possible to get in and out of this with certain equipment that can be balanced where necessary.

Taking a look at the totally unbalanced system from a design standpoint, first it is a modular plug-in system with all the internal output connections made to a mother board on the inside front of the console.

The shield ground, in this case both a shield ground and module frame ground, run separately from the DC supply low-side and ground. Each module is encased in an anodized frame which is the shield ground. At the rear of the module are inputs for mike and line using a jack and an RCA plug. The low-side is tied to the transmission ground on the amplifier panel, but not tied to the frame ground at this point. Any long run high-side signal circuits that are run inside this frame are shielded. But a telescoping shield is used so that no transmission signal is conducted through the shield.

The module has on the rear an echo send and a receive connector, RCA type. This is not grounded to the frame but the low-side is tied to transmission ground of the amplifier panel.

The transmission low-side from each module is at the same potential as the negative DC point which is the common ground. This DC point is common on the mother board and this is carried back to the power supply.

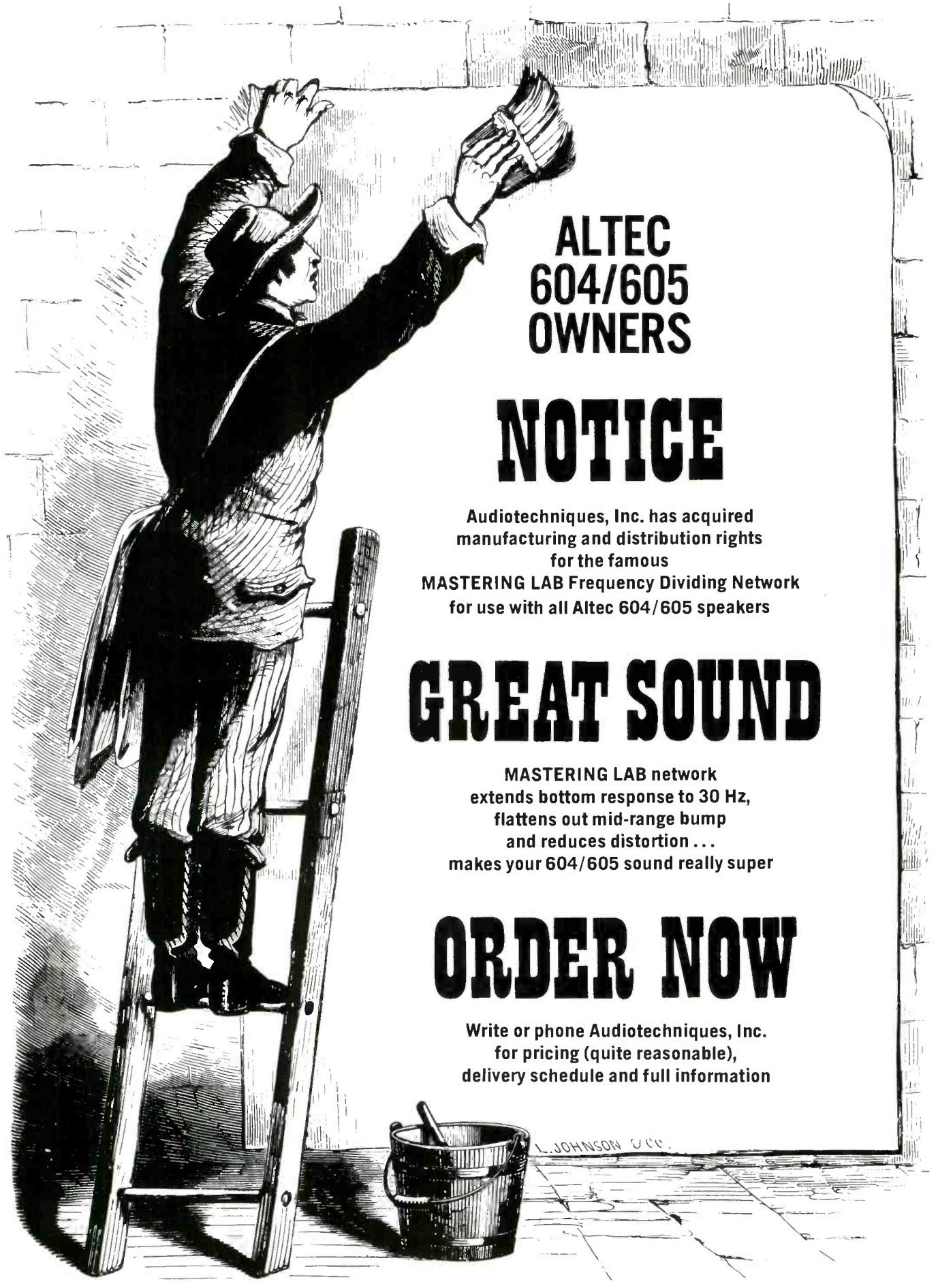
The shield or frame ground does not connect or touch any transmission ground in any of these modules. On the mother board these shield grounds become common to each other but a separate line runs to the power supply at which point, the negative DC, the transmission ground and the shield-frame grounds join together.

Along the same lines of high impedance work and wiring, it turns out that so called hi-impedance wire is not necessarily the best way to go. See the accompanying chart, comparison between a foreign hi-impedance wire and type No. 8761 two wire and shield. It turns out that the 8761 has less hi-frequency loss although it is used mostly in equipment and rack wiring in professional work. See FIGURE–6.

A misconstrued thought that has been around for a long time is that in a high-impedance system you use a hot line with a shield around it. This is a misconception – especially in long runs of 15 to 20 feet. The shield is actually carrying audio signal – so it is not really a shield. In my experience I have found that by using 8761 there is less hi-frequency loss and a third wire for a shield. The white wire is the hot wire, the black wire the cold wire and the shield is used as a telescoping shield and connects only on one end. This way the shield does not carry signal which is a requirement for proper wiring.

Another item that occasionally creates a problem in grounding is the direct box. The direct box is a piece of outboard equipment that is frequently used with an Electric Guitar.

The guitar may use its amplifier in the studio so that the guitarist can hear what he is playing. In addition, another mike can be used to pick up the acoustical sound from the guitar amplifier. This makes it possible to end up with several ground points.



Audiotechniques, Inc., 142 Hamilton Ave., Stamford, Conn. 06902 Tel: 203 359 2312

Circle No. 127

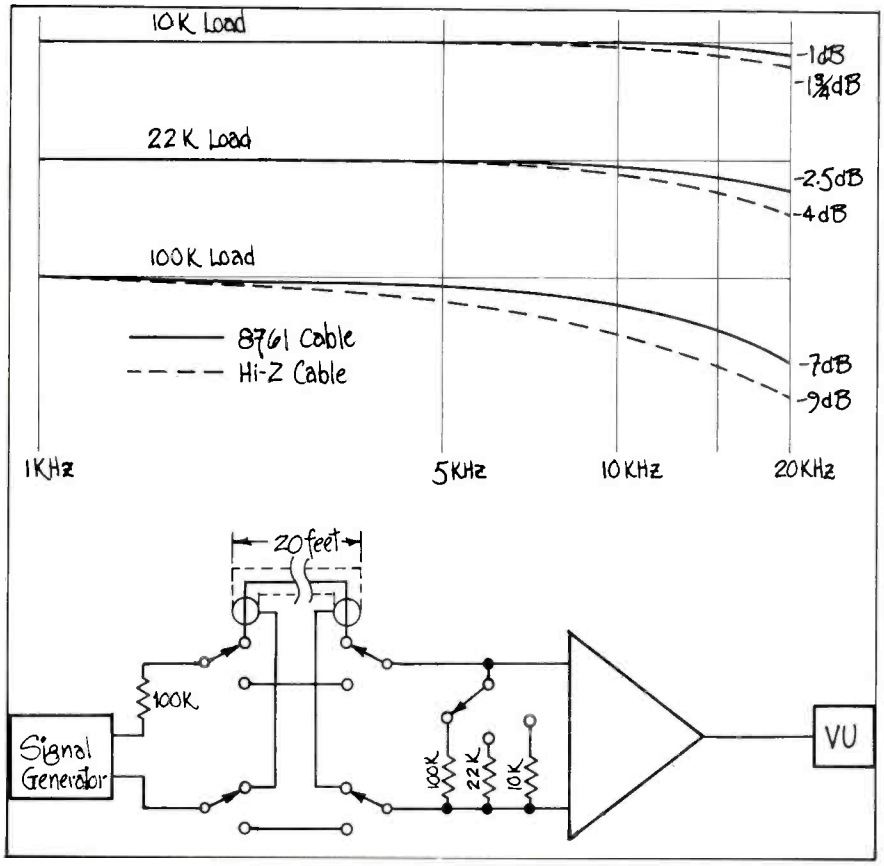
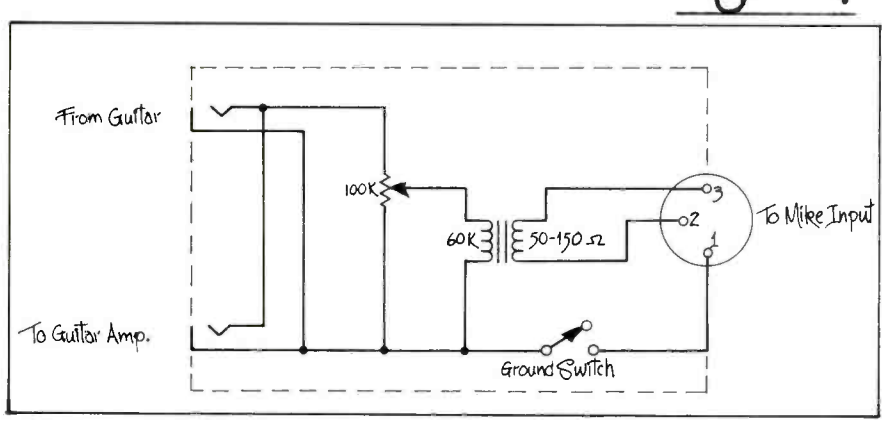


Figure 6

Figure 7



The direct box illustrated (FIGURE—7) is built so that the point of ground may be changed — at the box. This is necessary because of the way guitar amplifiers are wired. Guitar amplifiers are wired to be used on the stage and unfortunately these units use a hi-impedance feed from the guitar output to the amplifier. This is the way it started and this is the method still used unless some enterprising technician has made a change.

Once again we are using a high-impedance cord from the guitar to the amplifier and the low-side is not really at ground potential but is subject to all types of induced pickup noise and hum. Add to this the direct box whose ground really is now the microphone cable shield and you begin to have problems.

Since the output level of the guitar electrically is greater than the output of a microphone, this electrical signal has to be reduced in the direct box. This is done by feeding the guitar's electrical signal into a step down transformer — to make the signal comparable to a mike signal. The secondary of the transformer now plugs into the mike line, and into the console as a direct mike input, but from the guitar. Depending upon how the guitar amp is wired and how the input signal is referenced to ground, it is possible for your mike line to act as an antenna and it is quite possible to pick up radio stations on your guitar amplifier. It is actually working backwards and the amplifier is acting like an AM radio detector and amplifier. So effective grounding is quite important in this case.

The guitar amp may have a ground switch which usually connects the chassis of the amplifier either to one side or the other of the AC line — through a capacitor of course — as you could not connect directly to the AC line without fireworks and a hot chassis.

So it turns out to be anyone's guess as to the best place to put the ground connection — especially with the guitar being used.

The best suggestion is to keep all grounds separated at first, then try different ones to see which one gives the best results. If the direct box is built properly, it will give you this feasability.

Another good rule to remember in grounding is that when you are checking out grounding circuits, always keep one hand behind you so that your body does not complete the circuit. It's possible — if you complete the circuit, that this might come as a terrible shock to you and your ears would light up and we'd never hear from you again — so be careful!

A FUTURE ARTICLE WILL REVIEW R/F SUPPRESSION TECHNIQUES.

AUDIO ENGINEERING SOCIETY EXHIBITS

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AKG MICROPHONES – NORTH AMERICAN PHILIPS CORPORATION 81 & 82
ALLISON RESEARCH INC. 56 & 57
ALTEC MISSION ROOM
AMPEX CORPORATION 14A-14D
AUDIO DESIGNS & MANUFACTURING INC. 10, 11 & 12
AUDIO DEVICES, INC. 93
AUDIO EUROPE, INC. 95 & 96
AUDIO INDUSTRIES CORPORATION 62
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CERWIN-VEGA ASSOCIATES BOSTON ROOM
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DOLBY LABORATORIES, INC. 51 & 52
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HARVEY RADIO COMPANY, INC. 61
HOLZER AUDIO ENGINEERING CORP 109
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INTERNATIONAL TELECOMM INC. 18
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PACIFIC RECORDERS & ENGINEERING CORP. 32
PENTAGON INDUSTRIES, INC. 27
PRATT SALES CORPORATION 67
QUAD/EIGHT ELECTRONICS 70 & 71
QUANTUM AUDIO 68
RECORTEC INC. 69
REVOX CORPORATION 53
SANSUI ELECTRIC CO., LTD. ROOM 1
SCHEUBER, PETER 5M16,17,18(5th floor)
SCULLY/METROTECH, DIV. OF DICTAPHONE CORP. 2 & 3
SENHEISER ELECTRONIC CORP. 9
SHURE BROTHERS, INC. 49 & 50
SPECTRA SONICS 55
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STROM COMMUNICATIONS CORP. DETROIT ROOM
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3M COMPANY, MINCOM DIVISION 105,106&107
UNITED RECORDING ELECTRONICS INDUSTRIES 33
WATERS MANUFACTURING, INC. 13
WESTLAKE AUDIO, INC. 35 & 38 thru 42
XEDIT COMPANY 54
ZERO-IMPEDENCE SYSTEMS 76

AUDIO ENGINEERING SOCIETY

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Los Angeles Hilton

REGISTRATION

Monday	May 14 – 1:00 to 5:00 P.M. (Set-up)
Tuesday	May 15 – 8:00 A.M. to 8:00 P.M.
Wednesday	May 16 – 8:30 A.M. to 8:30 P.M.
Thursday	May 17 – 9:00 A.M. to 5:00 P.M.
Friday	May 18 – 9:00 A.M. to 5:00 P.M.

Recording Workshop – 7:30 P.M. Registration at the door.

EXHIBIT HOURS

Tuesday and Wednesday, May 15 and 16 – 1:00 P.M. to 9:00 P.M.
Thursday and Friday, May 17 and 18 – 11:00 A.M. to 5:00 P.M.

DEMONSTRATION ROOMS

Foy, St. Louis, Dallas, Hartford, New York, Buffalo, Boston, Detroit, Washington, Cleveland, Mission

TECHNICAL SESSIONS

Golden State Room: Sessions A, C, F, G, H, J, K, N
Los Angeles Room: Sessions B, D, E, K, M

SESSION A
TRANSDUCERS

TUESDAY, MAY 15, 9:30 A.M.
GOLDEN STATE ROOM

A-1 THE USE OF A DIGITAL COMPUTER IN LOUDSPEAKER DESIGN
A-2 A PROPOSED STANDARD METHOD OF MEASURING THE DIRECTIVITY FACTOR (Q) OF LOUDSPEAKERS USED IN COMMERCIAL SOUND WORK
A-3 TIME-SHARED COMPUTATION OF SMALL'S CLOSED-BOX LOUDSPEAKER SYSTEM MECHANICAL PARAMETERS
A-4 THE DESIGN AND MANUFACTURE

OF LOUDSPEAKER CONES – AN INTRODUCTION
A-5 DISTORTION IN DIRECT RADIATOR LOUDSPEAKER SYSTEMS
A-6 LOW FREQUENCY MEASUREMENT OF LOUDSPEAKERS BY THE NEAR-FIELD SOUND PRESSURE SAMPLING TECHNIQUE

SESSION B
AUDIO IN AM/FM/TV BROADCASTING

TUESDAY, MAY 15, 9:30 A.M.
LOS ANGELES ROOM

B-1 TESTING BROADCAST AUDIO SYSTEMS
B-2 THE USE OF WIRELESS MICROPHONES IN TV BROADCASTING
B-3 A PROFESSIONAL MIXER/COMPRESSOR FOR REMOTE OR STUDIO USE
B-4 THE APPLICATION OF HUMAN ENGINEERING CONCEPTS TO "TOP – 40" STYLE RADIO

SESSION C
SOUND REINFORCEMENT

TUESDAY, MAY 15, 2:00 P.M.
GOLDEN STATE ROOM

C-1 THE EQUIVALENT ACOUSTIC DISTANCE
C-2 AN INVESTIGATION INTO THE TECHNIQUES OF REVERBERATION TIME MEASUREMENT
C-3 THE DESIGN AND DESCRIPTION OF THE SOUND REINFORCEMENT AND COMMUNICATIONS SYSTEMS IN THE MARRIOTT CENTER, BRIGHAM YOUNG UNIVERSITY
C-4 EQUALIZATION AND SUBSEQUENT OBSERVATION OF THE SOUND SYSTEM AT THE MARRIOTT CENTER, BRIGHAM YOUNG UNIVERSITY
C-5 ACOUSTICAL AUDIO SYSTEM RESPONSE MEASUREMENTS USING THE SONIPULSE DISCRETE PULSE TECHNIQUE

SESSION D
AUDIO IN MEDICINE

TUESDAY, MAY 15, 2:00 P.M.
LOS ANGELES ROOM

D-1 A REVIEW OF DAMAGE RISK FOR OCCUPATIONAL NOISE EXPOSURE
D-2 HEART EVALUATION WITH THE USE OF SOUND
D-3 UTOPIAN HEARING
D-4 DIAGNOSTIC USES OF SOUND
D-5 NOISE IN THE SURGICAL SUITE

SESSION E
SIGNAL PROCESSING

TUESDAY, MAY 15, 7:30 P.M.
LOS ANGELES ROOM

E-1 OPERATION OF CONTINUOUSLY VARIABLE DIGITAL AUDIO DELAY LINE IN RECORDING PROCESS
E-2 ASPECTS OF A HIGH QUALITY FIELD RECORDING UNIT
E-3 RECENT EXPERIENCES IN QUADRAPHONIC BROADCASTING
E-4 A FRESH APPROACH TO AUDIO LIMITING
E-5 DELAY PLANE ANALYSIS

SESSION F
MAGNETIC RECORDING AND REPRODUCTION

WEDNESDAY, MAY 16, 9:30 A.M.
GOLDEN STATE ROOM

F-1 THE USE OF FLUX LOOPS FOR CALIBRATION OF MAGNETIC REPRODUCERS
F-2 PROPOSED EQUALIZATION FOR 15 IN/S STUDIO MASTER RECORDING ON HIGH-OUTPUT, LOW-NOISE TAPES
F-3 THE APPLICATION OF SERVOMECHANSIMS TO AUDIO TAPE MACHINES
F-4 THE "DIFFERENCE METHOD" FOR AZIMUTH ADJUSTMENT IN MAGNETIC TAPE REPRODUCERS
F-5 TRACK-TO-TRACK PHASE ERRORS IN MULTICHANNEL RECORDERS – WHAT DOES IT MEAN?

SESSION G
TAPE DUPLICATION

WEDNESDAY, MAY 16, 2:00 P.M.
GOLDEN STATE ROOM

G-1 AN INTEGRATED SYSTEM FOR HIGH SPEED CASSETTE DUPLICATION
G-2 PROPOSAL FOR STEREO COMPATIBLE, TRULY DISCRETE QUADRAPHONIC 8 TRACK CARTRIDGES
G-3 LESS TAPE NOISE IN NEW UD TAPE
G-4 EFFECTS OF BIAS FIELD AMPLITUDE, FREQUENCY, AND SHAPE ON DIFFERENT MAGNETIC COATING THICKNESSES
G-5 THE FUTURE EQUIPMENT NEEDS FOR THE TAPE DUPLICATION INDUSTRY: A DISCUSSION

SESSION H
DIGITAL TECHNIQUES IN AUDIO

WEDNESDAY, MAY 16, 7:30 P.M.
GOLDEN STATE ROOM

H-1 DIGITAL BAND-LIMITED NOISE GENERATOR
H-2 A COMPUTER BASED RESEARCH LABORATORY FOR SOUND PROCESSING AND ANALYSIS
H-3 LINEAR PREDICITIVE METHODS OF SPEECH DIGITIZATION
H-4 APPLICATIONS OF DIGITAL SPECTRUM ANALYSIS AND CORRELATION
H-5 DIGITAL PROCESSING AND DISPLAY OF AUDIO SIGNALS
H-6 REAL-TIME DIGITAL FAST FOURIER TRANSFORM HARDWARE
H-7 PANEL DISCUSSION

SESSION J
AUTOMATION IN THE RECORDING STUDIO

THURSDAY, MAY 17, 9:30 A.M.
GOLDEN STATE ROOM

J-1 AN OPERATOR ORIENTED AUTOMATED REMIX SYSTEM FOR STUDIO USE
J-2 MIXDOWN: A NEW DEFINITION
J-3 AUTOMATED MIXDOWN IN PRACTICE
J-4 STORAGE SYSTEMS FOR AUTOMATED MIXDOWN CONTROL DATA

SESSION K
MOTION PICTURE SOUND

THURSDAY, MAY 17, 9:30 A.M.
LOS ANGELES ROOM

K-1 PRODUCTION OF WIDE-RANGE, LOW DISTORTION OPTICAL SOUND TRACKS UTILIZING THE DOLBY NOISE REDUCTION SYSTEM
K-2 STEREOPHONIC PHOTOGRAPHIC SOUND TRACKS
K-3 A VIDEOTAPE AUDIO POST-PRODUCTION SYSTEM
K-4 DESIGNING A POST-PRODUCTION COMPLEX
K-5 MODERN MOTION PICTURE RECORDING TECHNIQUES

SESSION L
QUADRAPHONICS SEMINAR

THURSDAY, MAY 17, 2:00 P.M.
GOLDEN STATE ROOM

L-1 THE CHOICE OF A MATRIX FOR QUADRAPHONIC REPRODUCTION FROM DISK RECORDS
L-2 BEYOND QUAD
L-3 REVERBERATION REQUIREMENTS FOR QUAD STUDIO RECORDING
L-4 A SURVEY OF RECENT DEVELOPMENTS IN QUAD SOUND PART I
L-5 A SURVEY OF RECENT DEVELOPMENTS IN QUAD SOUND PART II
L-6 QUADRAPHONIC RECORDING TECHNIQUES AND PRACTICES IN THE RECORDING STUDIO

SESSION M
DISC RECORDING AND REPRODUCTION

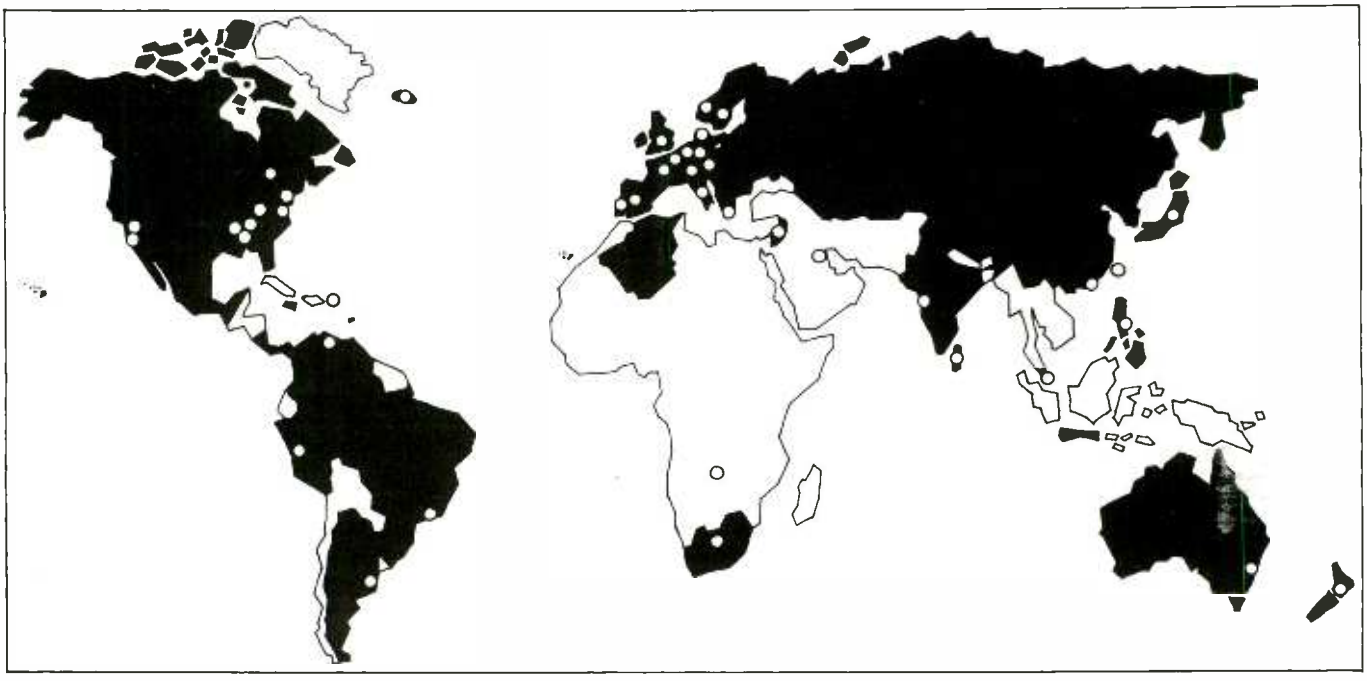
FRIDAY, MAY 18, 9:30 A.M.
LOS ANGELES ROOM

M-1 QMX CARRIER CHANNEL DISC
M-2 DISC MASTERING, ITS PROBLEMS AND ITS FUTURE

SESSION N
RECORDING WORKSHOP

FRIDAY, MAY 18, 7:30 P.M.
GOLDEN STATE ROOM

Countries shown in black have Dolby equipped recording centres.
Dots show location of authorised distributors of professional Dolby Noise Reduction equipment.



The geography of silence.

International operations in the music industry are easier, now that so many studios are Dolby- equipped. In addition to aiding engineers to achieve the highest possible quality on an original recording, the Dolby system reduces any low-level noise introduced when further work is done with a tape at another studio, often in another part of the world.

Because so many studios now have Dolby equipment installed, the system is widely used to protect the substantial investments of time, money, and creative effort made at recording sessions. Whether an original tape is sent to Nashville or Peking for reduction, or a copy master is sent to a licensee in Tahiti or Hanover, professional Dolby installations are there to guard against noise build-up.

Be sure that your studio sends and receives Dolby-encoded tapes.
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Circle No. 128

NEW PRODUCT NEWS

3M INTRODUCES PROFESSIONAL QUARTER-INCH RECORDERS

Professional audio recorders in one- and two-track quarter-inch and four-track half-inch configurations, which incorporate the features of the M79 multi-track series, have been announced by 3M Company's mincom division.

The new recorders, which were designed for broadcast, education and recording studio use, operate at three speeds (7 1/2, 15 and 30 ips), but are capable of variable speeds from 5 to 45 ips by virtue of a new DC servo capstan assembly.

The recorders embody the 3M-patented "Isoloop" drive, and single card electronics. The introductory machines are console mounted. Rack-mounted configurations will be available later.

As with the multi-track M79 recorders, the quarter- and half-inch machines are convertible to any of the one-, two- or four-track configurations.

Suggested list prices are $5,725 for the four-track, $3,725 for the two-track and

$3,325 for the one-track.

PROFESSIONAL AUDIO PRODUCTS, 3M CO., 300 SOUTH LEWIS ROAD, CAMARILLO, CA 93010.

Circle No. 129

HIGH PRECISION VCA FROM ORBAN PARASOUND

A new voltage-controlled amplifier, designed for the most stringent audio-frequency applications, is now available from Parasound, Inc. Designated the ORBAN/PARASOUND Model 169A, the new entry provides an accurate voltage-controlled gain without audibly degrading the controlled signals in any way.

Designed for quality-conscious recording studios and broadcasters its total harmonic distortion is typically rated at 0.05%, and its typical overload-to-noise ratio is 92dB. As supplied, the 169A can provide up to 25dB gain. The 169A module, an encapsulated circuit board, has pre-drilled holes for two resistors which can be added to adjust the gain for specific requirements.

While the 169A includes four independent control voltage inputs, a current input is also provided to allow the customer to add almost any additional number of voltage inputs simply by adding resistors. In decibel units, the gain reduction is ten times the sum of all control voltages; however, this relationship can be changed by the customer. If the customer desires, he can easily install an RC preemphasis network as the 169A module provides the necessary pre-drilled holes and traces.

The 169A module measures 3.875" x 5.75" x 0.75", and is configured with an 18-pin connector at one end. The module requires a bipolar ±15 volt supply, regulated to ±0.1%. As an option, Parasound, Inc. provides this supply, along with a rack which can house up to twelve 169A's. With a 100-quantity price of $59 each, the new 169A is available 30 days from date of order.

PARASOUND, INC., 680 BEACH STREET, SAN FRANCISCO, CA 94109.

Circle No. 130

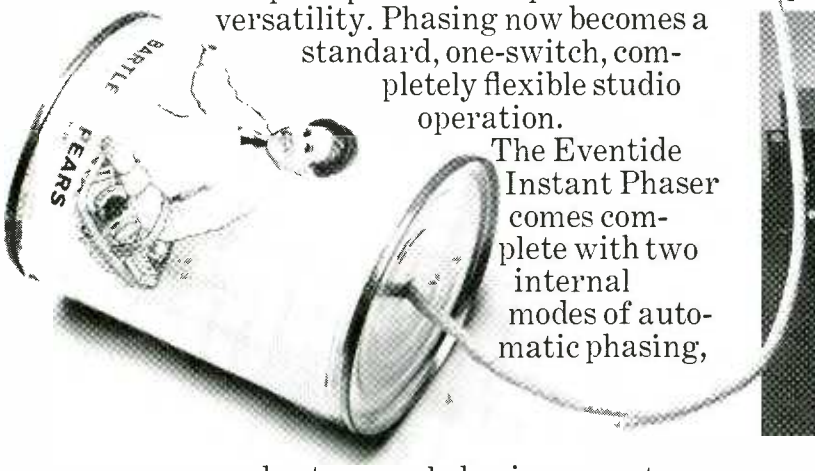
Why recording is no longer simple.

When Bessie Smith was belting her stuff onto wax, all a recordist had to do was stand over the plate and pick the cuttings off. Recording was fast and cheap, and studios were simple.

One by one, innovations became recording essentials. Equalizers. Limiters. Compressors. Noise Reduction Systems. VFO's. Some made it possible for artists and producers to lay down the sounds they envisioned. Others helped envision new sounds.

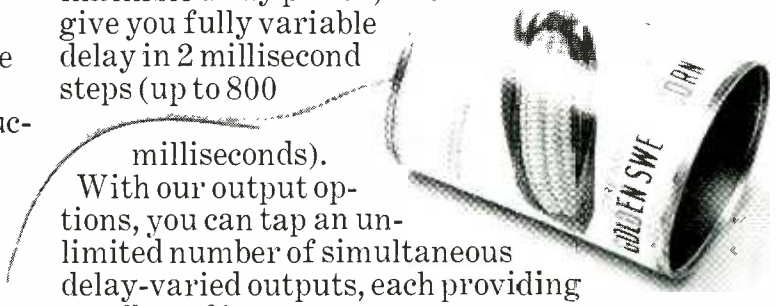
Eventide Clockworks builds units that redefine the capabilities of your existing equipment. And other units that remove guesswork and make previously hard-to-set-up techniques into one switch operations.

Our Instant Phaser, for example, eliminates haggling with VFOs, multiple tape decks and pre-limited versatility. Phasing now becomes a standard, one-switch, completely flexible studio operation.



The Eventide Instant Phaser comes complete with two internal modes of automatic phasing, panel-set manual phasing, remote control provision, phase depth control and stereo output. Cost is only $500.

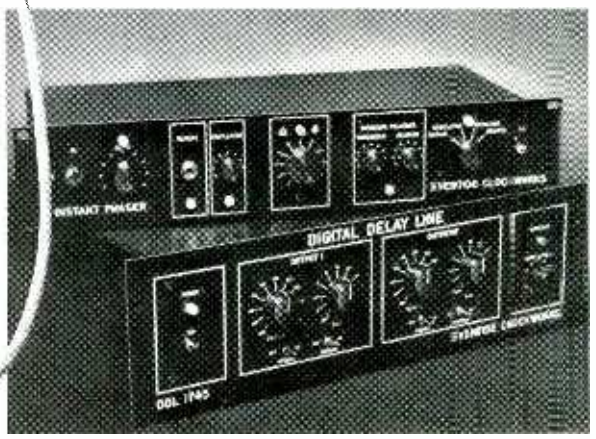
Eventide Digital Delay Systems, unlike other systems and methods that lock a producer into a single inflexible delay period, give you fully variable delay in 2 millisecond steps (up to 800 milliseconds).



With our output options, you can tap an unlimited number of simultaneous delay-varied outputs, each providing an effect of its own.

DDL 5851, for echo delay and sound reinforcement applications starts at $1795; Model 1745, a complete delay system for recording applications including instrument & voice multiplication, from $3300.

We've helped over 100 major recording studios. By making the impossible possible and the improbable practical.



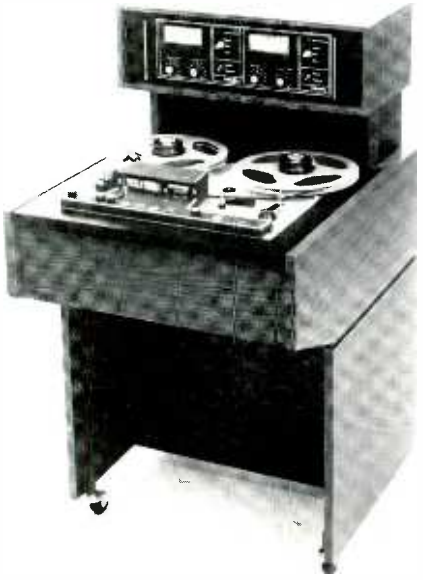
Eventide
the next step

For demonstrations and name of distributor nearest you, contact: Eventide Clockworks—265 West 54th Street—New York, N.Y. 10019 (212) 581-9138
Circle No. 132

Re/p 50

DICTAPHONE'S SCULLY DIVISION INTRODUCES NEW STUDIO RECORDER

Mountain View, California, March 16, 1973 – Scully Recording Instruments, a division of Dictaphone Corporation, today announced a new professional recorder/reproducer described as one of the most advanced units of its type and price.



Called the Scully 280B, the new unit combines completely redesigned electronics and a new tape motion sensing system to provide recording professionals with improved performance and reliability, according to Earl J. Peterman, Vice-President and General Manager of Dictaphone's Scully/Metrotech divisions.

"Our design objective with this new product was to develop a system that would take advantage of the state-of-the-art in electronics, control logic and design architecture to provide recording engineers with better performance, greater editing flexibility, and improved maintainability," said Peterman.

Peterman said that it is Scully's marketing aim with the 280B, and others in the series, to gain a larger share of the mastering market serving the three billion dollar record industry. He also noted that the new recorder had the price and the versatility that would also appeal to the broadcast, educational and general recording markets as well.

According to Peterman, specifications for the 280B have been established to position the recorder at the top of the performance line. S/N ratios top 72dB at mastering speeds. Bandwidth is essentially flat, displaying ± 2dB 30Hz to 18kHz. The unusually good performance figures are the result of utilizing the latest in semi-conductor and head technology, he said.

"Maintenance engineers should find the Scully ideal. Mother-daughter board architecture results in one of the cleanest electronic cabinets ever. There is no maze of wires and cables to work between. Instead, all test and adjustment points are readily accessible from a comfortable working position. All electronics slide out on roller arms and the individual channel modules are easily removed," Peterman continued.

He noted that significant improvements have been made in tape handling and the general operating procedures. A new motion sensing system, called OPTAC, and internal logic enable the engineer to select a new mode and activate it without touching the Stop button first. It also allows the engineer to enter and leave the Record mode while the transport is in Play. "This punch-in punch-out capability is exceeded only by recorders equipped with coded-track editing accessories," said Peterman.

Selective synchronization is standard on all multi-channel machines, thus the ability to sequentially record programming material synchronous with previously recorded tracks is inherent.

Available in either rack or console configurations, pricing on the 280B series starts at $2395, with 1, 2 and 4 channel models available with most of the popular head configurations.

SCULLY/METROTECH, 475 ELLIS STREET, MOUNTAIN VIEW, CA 94040

Circle No. 133

AUDIOTECHNIQUES, INC. TO MANUFACTURE, DISTRIBUTE MASTERING LAB CROSSOVERS

Audiotechniques, Inc., Stamford, Conn. today announced the signing of an agreement with the Mastering Lab, Hollywood, Calif., giving Audiotechniques the exclusive manufacturing and distribution rights for the Mastering Lab Frequency Dividing Network.

Audiotechniques president Hamilton Brosious and Sherwood Sax, Mastering Lab president, said that the manufacture of the crossover units would continue in the Los Angeles area for the present.

The Mastering Lab Frequency Dividing network was specifically designed to enhance the performance of the well-known Altec 604 and 605 series speakers. The device has achieved wide popularity among Hollywood recording studios and was recently recommended by Altec engineers as a major improvement in 604 series equalization.

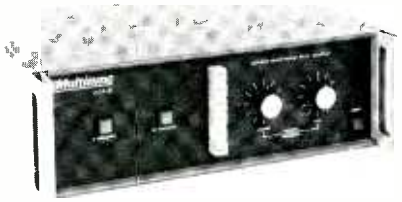
According to Brosious, manufacture and test procedures for the ML network will be under the direction of Audiotechniques vice president, Bob Berliner. Berliner anticipates initial deliveries shortly after May 1. Sales and service of the crossover networks will be through a nationwide group of professional audio dealers.

AUDIOTECHNIQUES, INC., 142 HAMILTON AVE., STAMFORD, CONN. 06902.

Circle No. 136

MULTISYNC MDA-1B VARIABLE SPEED MOTOR DRIVE AMPLIFIER

Announced by Pacific Recorders and Engineering Corporation the MDA-1B is a self contained rack mount, on table top unit, intended to supply drive motion power to professional tape decks for the purpose of varying tape speed under precise control.



The MDA-1B contains its own power suoplies, oscillators, and power amplifiers. The connections to and from a deck are made by two control cables. These can be inserted into existing connectors without any modification to the tape deck.

All functions of the tape deck remain intact with the addition of variable speed control.

With the MDA-1B a tape speed of 30 ips, is available from a 7.5/15 ips capstan motor.

The logic design enables the operator to conveniently switch between drive amplifier control and normal, returning the capstan motor circuitry to its original deck connections.

Disconnecting and re-connecting the cables while operating will not damage any circuitry. The output amplifiers are specially designed with self-protecting circuits to eliminate the problems of damaging user equipment or the amplifier.

Among the applications suggested for the MDA-1B are: "Phasing-Delay" Effects, tune tracks for recording non-tuneable instruments, 30 ips drive for 7.5/15 ips recorders, compensate for off-speed tapes, variable-delay for double-tracking, and lengthen/shorten running time of broadcast tapes.

PACIFIC RECORDERS & ENGINEERING CORP., 11760 SORRENTO VALLEY RD., SAN DIEGO, CA 92121.

Circle No. 137

ITI INTRODUCES NEW COMPACT MODEL MEP-130 PARAMETRIC EQUALIZER CHANNEL MODULE.

The MEP-130 combines the best features of a three-knob switched frequency equalizer, a graphic equalizer and an active program equalizer. All controls are infinitely continuously variable – no stops, detents or arbitrary positions. Features include three overlapping frequency ranges (10-800Hz), (100-8,000Hz), (400-25,600Hz), boost or cut up to 12 dB. Three selectivity or "Q" controls vary the frequency band's skirt characteristics from 4 to 14 dB per octave. The low and high frequency band "Q" controls, when turned to the full ccw position change their respective bands into continuously variable frequency shelving curves.

The noise level is less than -84 dBm, and the distortion less than 0.03% THD, at any level from 0 dBm to +24 dBm (10-40,000Hz). The module may be inserted in any line without program quality degradation.

Panel size is 1½" x 8"; overall depth including mating connector is 6¾". Front panel is black anodized satin finish aluminum. Special colors and finishes are available upon request.

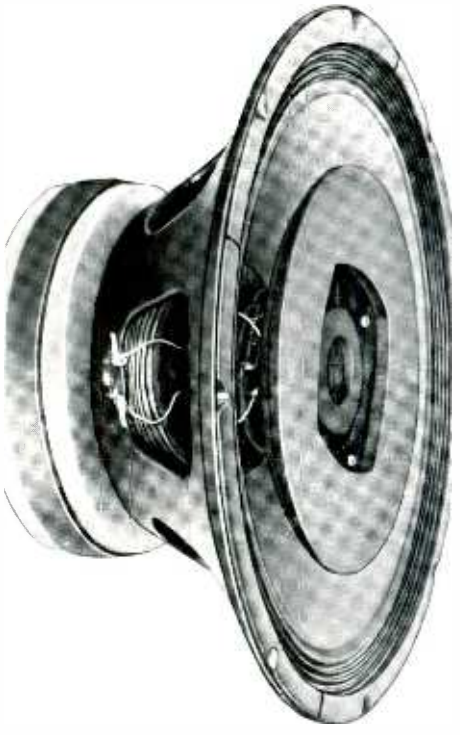
Price is $670.00.

ITI, McCORMICK ROAD and SCHILLING CIRCLE, HUNT VALLEY, MARYLAND 21031.

Circle No. 138

DUKANE INTRODUCES NEW TWO-ELEMENT COAXIAL SPEAKERS

The Communications Systems Division of Dukane Corporation has developed new 12- and 15-inch coaxial speakers with phasing rings that smooth out the frequency responses. These rings correct for a phase difference caused by the positioning of the low- and high-frequency cones at two locations along the speaker axis. They also improve dispersion, extending coverage without sacrificing proper sound distribution.



The 12-inch speaker, rated at 30 watts, was conceived to provide designers of professional sound systems with a unit that economically fills the power gap between the ratings of the 8-inch and 15-inch coaxial speakers. Rated at 50 watts, the Dukane 15-inch speaker is equipped with a 3-inch diameter low-frequency voice coil operating in an intense magnetic field created by an 100-ounce magnet to handle peaks several times greater than the unit's normal power rating. A diffusing ring maximizes the off-axis high-frequency response.

These speakers also feature built-in crossover networks and roll-damped, curvilinear cones treated to resist moisture. For both units Dukane provides on- and off-axis sound pressure level ratings in 1/3 octave and broad band increments.

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

Circle No. 139

NEW 2,000 WATT AMPLIFIER WEIGHS ONLY 25 POUNDS

The model KW-2 Audio Power Amplifier from Countryman Associates can deliver over 2,000 watts RMS at any frequency from DC to 20kHz with less than .05% harmonic distortion.

Employing advanced heat sink design and high frequency power supply technology, the KW-2 is housed in a 5 3/16" x 19" x 12" rack enclosure and weighs only 25 lbs.

Designed to provide high reliability in rugged commercial sound system applications, the KW-2 can deliver full power continuously at air temperatures up to 140°F.

A unique output circuit, by automatically disconnecting defective devices, permits uninterrupted service during failure of up to 20% of the KW-2's 38 output and power converter transistors, thus achieving fail-safe performance usually associated with systems using several smaller amplifiers.

Other advanced protection circuits even allow direct connection of audio input and output to the AC power line without damage.

An unusual feature of the KW-2 is its ability to deliver a full 2,000 watts into any load impedance from 1 ohm to 8 ohms, a significant advantage in portable sound systems with frequently changing speaker requirements.

Modular construction of the KW-2 makes it easy to service and permits the user to add or change modules as his needs change.

Standard equipment with the KW-2 is a metering module displaying computed peak or average output power from .01 to

10,000 watts on one continuous scale and a power supply module accepting 100 to 130 volts 50 to 400Hz at 25 amps max.

Optional modules include an exclusive load protect circuit that monitors voice coil temperature and gently reduces audio gain to hold it within safe limits thus preventing speaker or cutting head damage without limiting peak power capabilities.

COUNTRYMAN ASSOCIATES, 424 UNIVERSITY AVE., PALO ALTO, CA 94301.

Circle No. 141

ALLISON 2/5 VOLTAGE CONTROLLED AMPLIFIER

Allison Research, Inc. announces production of its new VCA 2/5. The device is a voltage controlled amplifier designed specifically for Automated Mixdown Systems. Within one compact package, five voltage controlled outputs are provided from one audio input. A master input controls all outputs simultaneously, while individual control of outputs is obtained via separate control inputs. An X-Y Matrix is included to allow controlling four of the outputs with 2 control lines, for quad panning. Control inputs are provided for linear or log control voltages, or both.

Distortion is said to be typically less than .1% for outputs up to plus 20dBm, while worst case noise (unity gain) is typically minus 90dBm.

Allison invites inquiries from original equipment manufacturers and other potential users.

ALLISON RESEARCH, INC., 2817 ERICA PLACE, NASHVILLE, TENN. 37204.

Circle No. 142

CROWN INTRODUCES THE DC-300A

Recent trends in speaker design have demanded a new type of output capability in direct-coupled solid state amplifiers. Highly reactive speaker systems showing a wide-ranging frequency-dependent impedance curve have created problems for current amplifier design. The CROWN DC-300A is said to solve these problems with a unique new output protection circuit design, and incorporates a number of other new features designed to improve performance and simplify operation.

The DC-300A will drive any impedance load, including a totally reactive load, with no adverse effects. The new output protection design eliminates the flyback pulse, an annoying by product of the VI type output protection circuitry pioneered by the CROWN DC-300 and currently used widely in the high-powered solid state amplifier field. The new output circuitry has also allowed the elimination of the DC fuses and the protection mode switch, with a consequent simplifying of the operation of the amplifier.

Utilizing the latest technology, the input amplifier of the DC-300A is designed around a dual integrated circuit, further simplifying the circuit design.

For those who require a large monaural amplifier, the DC-300A becomes a 600 watt continuous power (8 ohm) mono amp with the simple insertion of two plug-in parts to the main circuit board. The balanced 70 volt mono output will drive any load from 4 to 16 ohms with no difficulty.

Specifications for the DC-300A are: Power output: not less than 150 watts rms per channel into 8 ohms (both channels operating), DC-20 kHz at rated distortion. Typical power at clip point (one channel operating) 190 watts rms into 8 ohms, 340 watts rms into 4 ohms, 500 watts rms into 2.5 ohms.

PRICE: $685.00 without optional walnut cabinet.

CROWN INTERNATIONAL, BOX 1000, ELKHART, INDIANA 46514.

Circle No. 144

HELPINSTILL PIANO PICKUP

The Helpinstill Piano Pickup transforms any grand piano into an electric instrument, and is designed to be quickly attached and completely portable. It uses six sections of electromagnetic pickups suspended approximately 1/8 inch above the piano strings by an adjustable frame. A control box is connected to the pickups by a cable with six mini-jacks, and provides volume controls for each section and a "Timbre" selection switch for tone coloration.

The pickup is designed to be used in conjunction with either a guitar amp capable of wide-range reproduction, or through a concert or club P.A. system, or a combination of both. Outputs on the control box provide guitar-level high impedance signals and low impedance connection through a Cannon-type 3-pin male connector. Installation on any grand piano listed in the application chart provided should take about 15 minutes, or slightly longer if not listed and experimentation is necessary.

The clarity of signal and high volume

before feedback give the pianist enough volume and, more important, clear presence among any collection of amplified instruments. In solo applications, its even amplification of the whole keyboard range results in more bottom to the sound than was previously possible using microphones or acoustic (contact) pickups. In the recording studio, the Helpinstill Pickup provides a full fidelity signal which can be selectively equalized approximately in octaves; in addition, use of the pickup permits the recording of "live" sessions without booth isolation of the piano.

Special shielding completely surrounds each pickup section, preventing hum and interference pickup in the most severe applications. The Helpinstill Pickup is self-powered, requiring no batteries or a.c. connections. An optional carrying case provides sturdy protection for the unit on tour, allowing it to be transported as easily as a guitar, completely assembled and ready for installation.

List price $495.00. Carrying case $55.00.

HELPINSTILL DESIGNS, 4932 GLENMONT, HOUSTON, TEXAS 77036.

Circle No. 145

STANDARD TAPE LABORATORY STEREO CARTRIDGE SYSTEM ALIGNMENT TAPE INTRODUCED BY FIDELIPAC.

Fidelipac, a division of Telepro Industries Incorporated, announces their new Model 350-STA Stereo Cartrdige System Alignment Tape. This test tape, prerecorded by Standard Tape Laboratory, uses Fidelipac's Model 350 Phase Adjustable NAB Type A Cartridge. It is suitable for alignment of monophonic and stereophonic reproducers employing NAB track configuration for broadcast cartridge machines. It will establish references for standard operating level, 50 microsecond playback response and precise aximuth alignment. The control track is unrecorded preventing equalization reference tones from actuating machine cue functions.

The tape, recorded for 7½ ips (19.05 cms) playback, consists of the following tones:

15 kHz tone for aximuth adjustment.

700 Hz tone at -10 dB level followed by 15 kHz, 12 kHz, 10 kHz, 7.5

kHz, 5 kHz, 2.5 kHz, 500 Hz, 250 Hz, 100 Hz and 50 Hz for adjusting equalization to a curve having time constants of 50 microseconds (high frequency) and 3180 microseconds (low frequency).

700 Hz tone at normal operating level: 185 nW/m, the basic operating level used by all major U.S. manufacturers of professional tape equipment.

The fidelipac Model 350-STA Stereo Cartridge System Alignment Tape is priced at $35.00 and comes complete with protective case and detailed instruction booklet. It is available, world-wide, through Fidelipac Distributors.

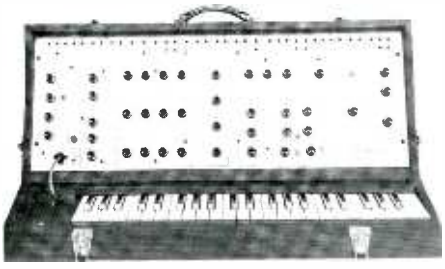
FIDELIPAC, 3 OLNEY AVE., CHERRY HILL, N.J. 08034.

Circle No. 149

EXPANDABLE KEYBOARD SYNTHESIZER FROM ELECTRONIC MUSIC LABS, INC.

The ElectroComp 101 is tailored to the small-medium size recording studio that recognizes the need for an expandable synthesizer.

The 101 offers the convenience of portability, the speed of prepatching, yet offers a full patch panel for inexpensive expansion with the addition of the ElectroComp Studio Synthesizer.



The 101 provides a two-voice polyphonic keyboard, 4 voltage controlled audio oscillators, a voltage controlled filter, voltage controlled amplifier, two envelope generators, white noise source, microphone amplifier, sample and hold, ring modulator and mixers.

The price is $1295.

ELECTRONIC MUSIC LABORATORIES, INC., P.O. BOX H, VERNON, CONNECTICUT 06066.

Circle No. 150

KEYSOR-CENTURY OFFERING Q-540, NEW RECORD COMPOUND

Q-540, a new compound for pressing CD-4 (quadraphonic) records and matrix quad records, is now being offered by Keysor-Century Corporation. Q-540 is said to offer greater brilliance and clarity than ordinary compounds, and has a much longer wear characteristic.

One of the problems in CD-4 record pressing has been that the 30,000 cycle carrier channel at the bottom of the groove tends to wear off with repeated playings. Q-540 it is claimed solves this problem by making the surface area of the grooves tougher and more resistant to wear. According to Keysor-Century, records pressed with Q-540 will deliver true quadraphonic sound with total fidelity for over 3 times as many plays as records pressed with ordinary compounds.

Although Q-540 was primarily developed for use with CD-4 recordings, Keysor-Century's Technical Sales Manager, Russ Peters, states that it has several advantages that make it most desirable for matrix quad, stereo, and monaural recordings as well. Among these are anti-static and fast flow characteristics. "Because of its anti-static properties, Q-540 results in records with less surface noise due to the surface being less prone to dust and lint attraction. And because it flows faster, the pressing cycle can be shortened. It fills better at unusual pressing conditions than ordinary compounds and is less susceptible to warping at a faster cycle rate."

KEYSOR-CENTURY CORPORATION, 26000 SPRINGBROOK ROAD, SAUGUS, CALIFORNIA 91350.

Circle No. 151

CLASSIFIED

EQUIPMENT AVAILABLE

NEUMANN VMS-66 Computer Controlled Disc Mastering Lathe, complete with VG-66s Solid State Cutting System, HK-66 High Frequency Limiters, and SX-68 Stereo Cutterhead. This equipment represents the highest state-of-the-art technology, and is in mint condition. $38,500.00 complete. ARTISAN SOUND RECORDERS, 6430 Sunset Blvd., Suite 1516, Hollywood, CA 90028. (213) 461-2751.

ONE STOP FOR ALL YOUR PROFESSIONAL AUDIO REQUIREMENTS.
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USED MYLAR TAPES. L 1800 foot. Ten for $8.50 postpaid. Fremerman, 4041 Central, Kansas City, Missouri, 64111

AUDIO EQUIPMENT NEW AND USED whatever your needs. Whether you're building a new studio or re-modeling your present one, check us first for a package price. We will not be undersold. AMBOY AUDIO ASSOCIATES, 236 Walnut St., South Amboy, N.J. 08879. (201) 721-5121

284-8 Scully Recorder w/sync master amps, $7500. OPAMP 12-in, 8-out console, $6000.
VOLUME III STUDIOS
1429 Oakland, Denton, Texas 76201
(817) 382-4014

RECONDITIONED PRECISION TAPE REELS, as new 1x10½" . . . 10/$35, 2x10½" . . . 10/$70. Free list.
WIDE RESPONSE
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Los Angeles, Calif. 90064

1 Scully 284-12 recorder in deluxe 2-deck cabinet.
1 Stevenson 12 in, 4 out console.
5 Advent 100A Dolby noise reduction systems.
1 Ampex 300-2 recorder with transistorized playback preamps.
SMOKE SIGNAL SOUND STUDIO
P.O. Box 3100
Carbondale, Illinois 62901
549-4962

Will purchase 16-track plus entire inventory recording studio equipment.
J.R. Adams, Manitou Valley,
Ste. Agathe des Monts
Quebec, Canada

WANTED TO BUY
Audiotechniques, Inc. wants to buy your used Scully Model 280 series tape recorders, any width from quarter inch to two inch. Write or phone Bob Berliner or Ham Brosious giving condition, serial number and configuration.
AUDIOTECHNIQUES, INC., 142 Hamilton Avenue, Stamford, Conn. 06902 (203) 359-2312.

EMPLOYMENT OPPORTUNITIES

Excellent ground floor opportunity with rapidly expanding electronics firm as Manager for newly created professional audio products division. Responsible for establishment and implementation of marketing program and product development serving commercial sound contractors. Experience required. Please submit resume to:
L.J.Lynn, Director of Marketing & Sales
SUNN MUSICAL EQUIPMENT CO.
Amburn Industrial Park
Tualatin, Oregon 97062

We have an opening for an exceptional experienced lathe operator who would like to work on the best product with the best equipment and in the most creative atmosphere. Top pay for a top man. Call or write:

THE MASTERING LAB
6033 Hollywood Boulevard
Hollywood, CA 90028
(213) 466-8589

MARKETING/SALES MANAGER
Console and component manufacturer is in need of a Marketing/Sales Manager. The basic requirements are a BSEE or equivalent with a minimum of five years sales experience. Please submit resume and salary requirements to:
Box DA c/o R-e/p
Box 2287, Hollywood, CA 90028

MARKETING MANAGER
PROFESSIONAL AUDIO EQUIPMENT
Launch new marketing program to $20m fee paid West Cost
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SMITH'S PERSONNEL SERVICE, Agency
1457 Broadway NYC 10036 (201)947-3806

Manufacturer of professional quality audio products seeks an agressive sales oriented electrical engineer with strong interest in audio equipment for sales position in the most lucrative market area. Person selected will enjoy direct working relations with key personnel in company. Attractive offices in prestige location, basic salary and incentive commissions, high salary potential. Write: Recording engineer/producer —Dept.— AH, Box 2287, Hollywood,Ca. 90028.

ADVERTISERS' INDEX

A & M's Larry Levine & friends

You'll find those friends in the midst of the action whenever Larry supervises a recording session. They're Shure microphones — and vital components that contribute to the superb studio facilities and remarkable flexibility at A & M Records. As director of recording, Larry had some interesting things to say about his own microphone preferences: "We've been using the Shure SM57 and 545 dynamics, and SM33 ribbon microphones for some time now — and give them a real workout in every session"! As for applications, Larry adds: "That SM57 is a terrific all-purpose microphone and we use it a lot for vocal pickup. We use the SM33 ribbon on drums and low-frequency instruments, and the 545 on guitars, bass and piano for brightness and definition." Point is, there's a problem-solving Shure microphone for almost every recording application. Write for our new Professional Products catalog.

Shure Brothers Inc.,
222 Hartrey Ave., Evanston, Ill. 60204.

SHURE

Circle No. 156