

# RECORDING engineer/producer

*relating recording science • to recording art • to recording equipment*



*in this issue:*

## RECORDING DRUMS

- Eddie Bracket
- Russ Gary
- Roy Halee
- Reice Hamel
- George Klabin

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**RECORDING**  
engineer/producer

—the magazine to exclusively serve the recording studio market... all those whose work involves the recording of commercially marketable sound.

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

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coming in the Jan/Feb issue:

an on the scene report of Re/p's visit with BEATLES producer GEORGE MARTIN at the new AIR STUDIOS, London.

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Circle No. 102

## Letters

From: Alton E. Sigman  
Coordinator, Adult Programs  
Brigham Young University

... Because of the tremendous success which we have had with the Annual Audio/Recording Seminar at Brigham Young University, we have had several inquiries regarding our course outlines which were made available to each participant. Most of these inquiries have been a result of having seen the course outlines in the hands of a former participant and, consequently, those who have seen the outlines have inquired about procuring one for their own use. These outlines are updated each year so they are not duplications of previous years' work, and they contain pertinent material which could be helpful to anyone involved in the recording industry.

Inasmuch as we have approximately fifty of these outlines left over from our 1970 seminar, we have considered the idea of offering them for sale to anyone who would be desirous of obtaining the outline. For this reason, I am writing to you about the possibility of having a commercial ad in RECORDING engineer/producer concerning the availability of these outlines. We have appreciated very much the help and service which you have extended to us in the past in promoting this event and would appreciate your same consideration regarding this proposal.

*An ad for the limited number of these course outlines appears in our classified advertising department, opposite the inside back cover of this issue.*

*From personal study of the material in these course outlines we can recommend that the material is far more valuable than the costs mentioned.*

ed . . .

*More between Berliner and Eargle:*

From: Oliver Berliner  
SounDesign Engineers

I cannot agree with the conclusions reached by Mercury's John Eargle in his critique of my article in Vol. 1—No. 1 relative to my recommended 3dB difference between levels for a source which appears on both stereo channels. He says that *considerable* difference is necessary in order to overcome the build-up when the stereo record is played monophonically. I do not find this to be the case, and I

believe Mr. Eargle has given us the reason why this proposal does not work for him: In order for the 3dB difference in levels to be effective, two things must take place. The split must be set precisely at 3dB difference by using a signal generator . . . a listening test is no good for this. You must monitor stereophonically . . . mono monitoring *while mixing* may tend to deceive you, and I would venture to say that this is why Mr. Eargle has not achieved the proper and desired results. After the master has been mixed and monitored in stereo it may then be played back monophonically and the "split" source will be in proper balance.

Having authored some years ago what has become the standard reference on vu meters, "Uses And Abuses Of The VU Meter" which appeared in Audio Magazine, I am always vitally interested when the industry (again) attempts to replace this device. There is no question that with today's "hard" sounds an indicator faster than the standard vu meter may be necessary. Furthermore, author Paul Buff's analysis of the human engineering design factors of a proposed indicator is quite valid. But in the same June/July issue of Re/p Bones Howe cautions us to the problems engendered by the fact that our records will substantially be heard via cheap reproduction equipment and under conditions where the full dynamic range of the recording cannot be enjoyed (either because of radio station compression and/or limiting, or because of terrible listening conditions). It therefore follows that if you mix or balance based upon peaks rather than average program material levels you may find that a large percentage of those who listen to your recordings are unable to hear all but the loudest portions of the recorded material. It would thus seem that for certain types of music (we mean *rock*, of course) the better solution would be to continue to use the standard vu meter but put a limiter on each channel! . . .

*In a subsequent letter to Re/p, Mr. Berliner characterizes himself as the 'enfant terrible' of the audio world . . . at least that part of the audio world west of Arkansas.*

*It is our contention that Mr. Berliner has little residual right to such lofty, albeit, regional status without consistent exercise of those intellectually iconoclastic talents which have, over the years, spurred so much constructive thinking and retort.*

*Ever on . . . Oliver.*

*ed . . .*

## DEATH TAKES ARTHUR C. DAVIS

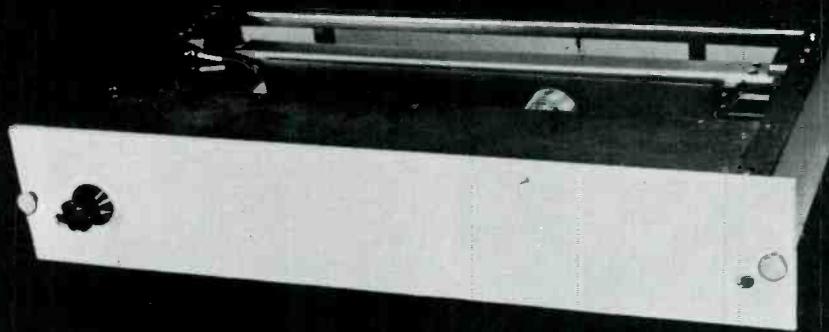
ARTHUR C. DAVIS, distinguished audio inventor and innovator died on November 7 at age 62. For the past six years he had been vice president of the Audio Controls Div. of Altec Lansing.

Mr. Davis, an AES Fellow had been the recipient of the AES' highest honor, "The John Potts Award."

Among his many other achievements, Mr. Davis was the co-inventor of Altec Acousta-Voicing.



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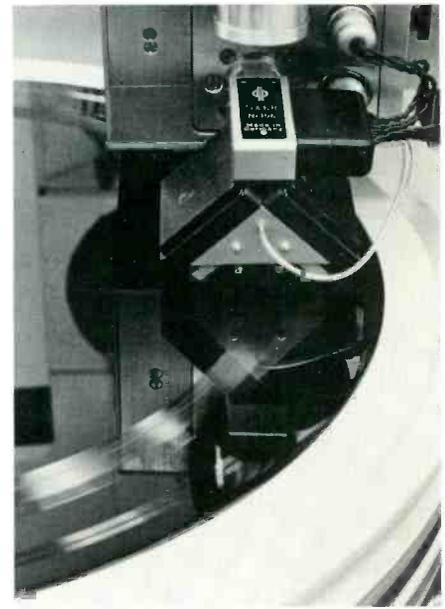
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## RECORDING DRUMS

by William Wolf

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### EDDIE BRACKET



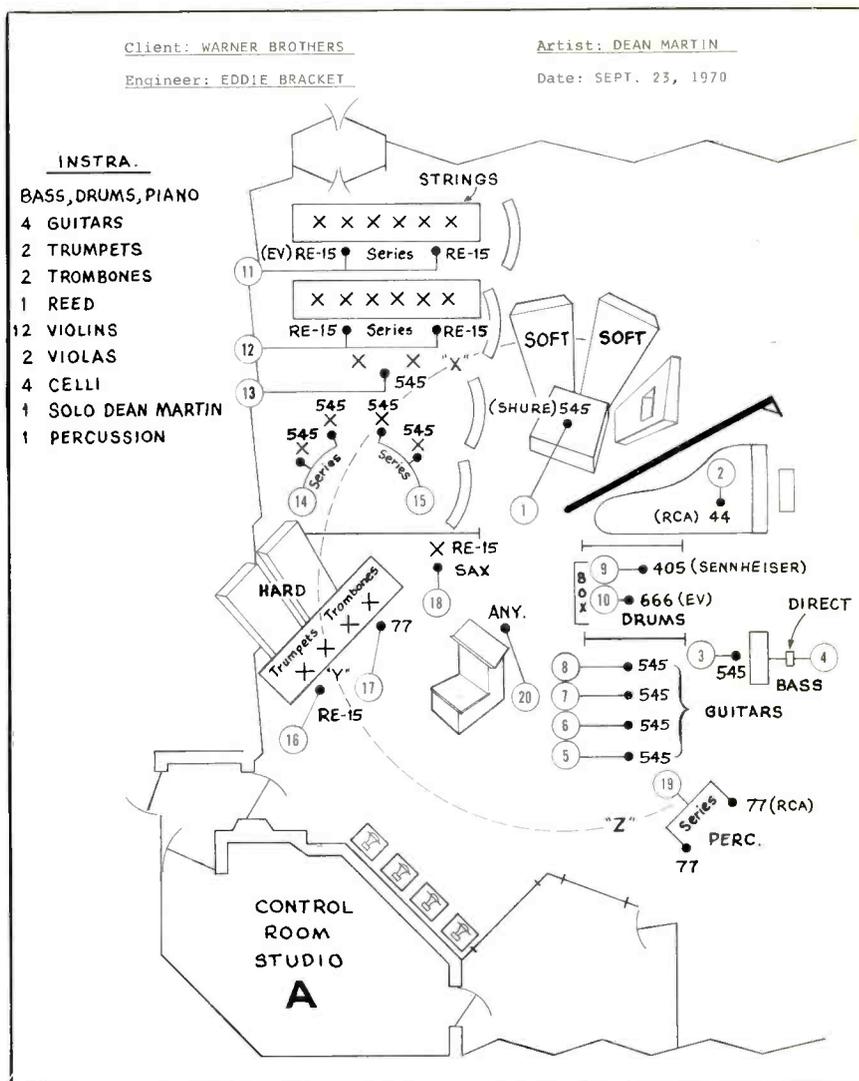
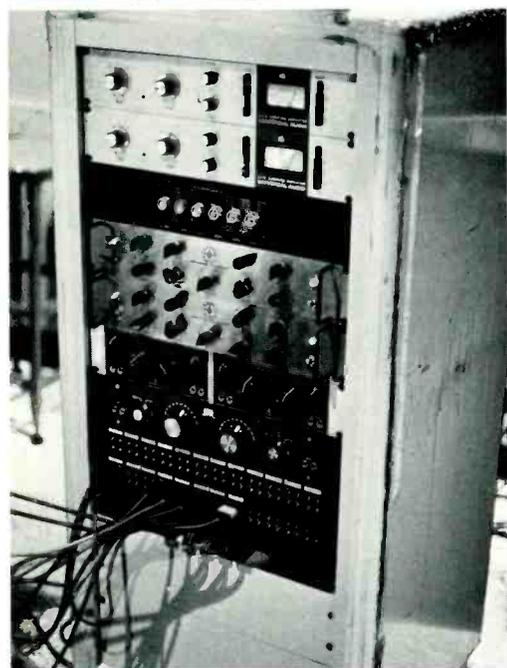
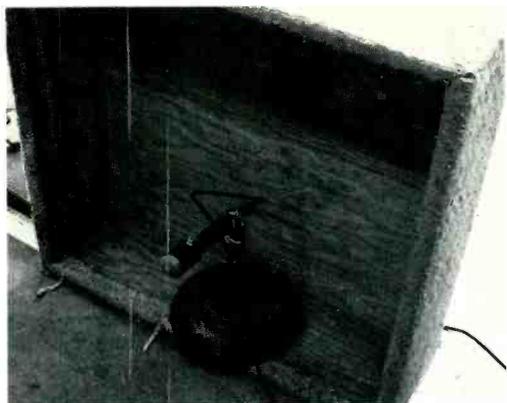
*Eddie Bracket's professional career began in 1959 when he was hired as a mixer by United Recording Studios. Since then he has made many award winning recordings of almost all the record industry celebrities: Frank Sinatra, Nancy Sinatra, Sammy Davis Jr., and Dean Martin, to name just a few. Some of his countless releases are I Gotta Be Me (Sammy Davis Jr., Reprise RS 6324) produced by Jimmy Bowen, Movin With Nancy (Nancy Sinatra, Reprise RS 6277), Watertown (Frank Sinatra, Reprise RS 1031), and My Woman, My Woman, My Wife (Dean Martin, Reprise RS 6403) also produced by Jimmy Bowen. Bracket is currently a member of Amos Engineering, of Hollywood, and is shown with his now famous "hit-hat", first worn while recording the smash hit "These Boots Are Made For Walkin'" by Nancy Sinatra.*

Eddie Bracket is well known for his skill in engineering the "straight ahead" session . . . typically involving several musicians (approximately 20 to 40), simultaneous (live) vocal recording, and little or no overdubbing. In addition, as many as five album cuts (sometimes more) will be recorded on a single date. This type of session requires a tremendous amount of speed, control, and precision on the part of the engineer. Thus, Bracket's drum recording techniques have evolved through years of experience and countless hours of extreme pressure.

In the "straight ahead" session, as in any performance involving a large number of musicians, problems relating to tempo and "tightness" require special attention. Bracket sees the drums as the rhythmic "hub" of a performance, and designs his studio set-up accordingly; the idea being that the distance (time delay in milliseconds) from the

drums to the furthest member of each section be the same from section to section, within the limits of the studio environment. Ideally, then, string player "X", horn player "Y", and guitar player "Z" are all equidistant from the drums (see diagram).

Another important consideration in the "straight ahead" session is studio *acoustical* phasing. Because of the previously mentioned tempo and "tightness" factors, baffling must be kept to a minimum, which means that leakage (drums being picked up by other microphones) must be accepted and used constructively. Therefore, in Bracket's set-up, no microphone is 180 degrees out of phase with the sounds emanating from the drum set into the room. If this "out of phase" condition were permitted to exist, the leakage onto the microphone in question might undesirably alter the drum sound when this microphone is mixed with the rest of the track.



On the drum set itself, Bracket uses just two microphones; one microphone on the bass drum and a single overhead microphone capturing the rest of the set. He has experimented with "multi-mike" techniques, but returned to the single overhead microphone approach, having found that a drum set often exhibits acoustical phasing problems which are aggravated by the additional microphones. (For example, striking one drum may cause out of phase resonances in adjacent drums.)

Bracket's choice for a bass drum microphone is the Electrovoice model 666 dynamic, placed in a rug covered box as shown in the photograph. His overhead microphone is a Sennheiser model 405 (or a Neumann model KM 56 if available). Optimum placement of the overhead microphone depends on the particular drums and drummer, but in general it is placed at approximately the same height as the cymbals. Equalization also varies from date to date, but Bracket often boosts his overhead microphone at 7.5 kHz (narrow bandwidth) on a Lang PEQ-2 equalizer.

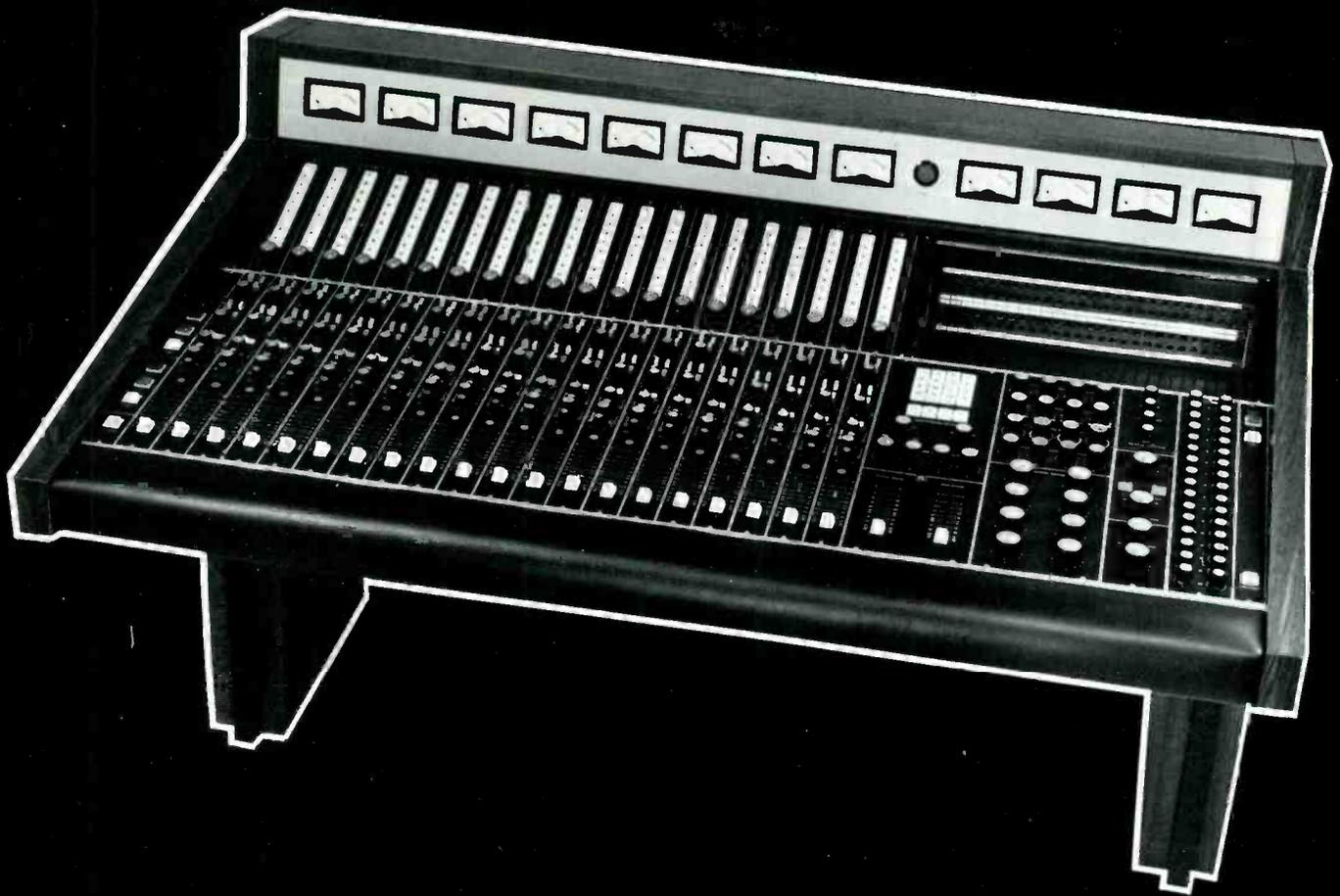
Bracket's tracking assignments (to the multi-track recorder) further demonstrate the need for precision

and control in recording "straight ahead" sessions. On the date covered by *Re/p*, the track assignments to the 3M 8-track recorder were as follows:

1. Lead Vocal (Dean Martin)
2. Horns
3. Bass
4. EVERYTHING ELSE (drums and percussion, strings, keyboards and guitars)
5. Back-up Vocal (overdubbed chorus)
6. 7, 8. Blank

It is obvious that, in addition to *recording* a thirty piece orchestra, Bracket is doing a great deal of *mixing* at the same time.

One last interesting point: Bracket brings to each session an "outboard" rack (see photo) containing two Universal Audio model 1176 Limiting Amplifiers, two Lang PEQ-2 program equalizers, one graphic equalizer, and three high/low pass filters (two Universal Audio and one Altec). This rack is an example of the insight and ingenuity that are needed in order to cope with the unique demands of "straight ahead" recording.



SPECTRA SONICS is pleased to announce that new "Beyond the State of the Art" audio control consoles are now in production. First exhibited to the professional audio industry at the Spring Audio Engineering Society Convention in Hollywood, these SPECTRA SONICS consoles have become, overnight, the ultimate standard to which all electronic performance is compared. Already installed and in operation at the RECORD PLANT WEST, LARRABEE SOUND STUDIOS, and MGM RECORDS in Hollywood, the SPECTRA SONICS Audio Control Console Model 1020-8/16 has received such immediate industry acceptance and acclaim, that continuous production of this console has been initiated.

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## RUSS GARY

*Two of the many popular artists recorded by Russ Gary are Creedence Clearwater Revival and The Supremes. Recent releases include Cosmo's Factory (Creedence Clearwater Revival, Fantasy 8402); three cuts from New Ways But Love Stays (The Supremes, Motown MS 726); and Crowfoot (Paramount PAS 5016) which he co-produced with Russell DaShiell. He is currently completing another of his own productions: Redwing, a new group from the San Francisco area. Gary's recording techniques can be seen and heard on a Creedence Clearwater Revival concert, taped for TV and simultaneous FM stereo broadcast, to be aired early in 1971. Gary records at Wally Heider's San Francisco studios.*

With the evolution of Rock music there has been an ever increasing demand for exciting and unusual drum sounds. In fact, it has been said that the basis of contemporary rock lies almost entirely in the rhythm section; and, as is well known, many rock recordings are done in "layers" . . . with the rhythm section first, then lead instruments and embellishment, and finally, vocals. Thus, the rock producer requires precise control over the particular components of the rhythm section—the individual parts of the drum set, as well as the whole set in combination with the electric bass and other rhythm instruments. Russ Gary has developed a drum recording technique which, in addition to providing this control, gives the drums increased presence—another factor of great concern to rock producers.

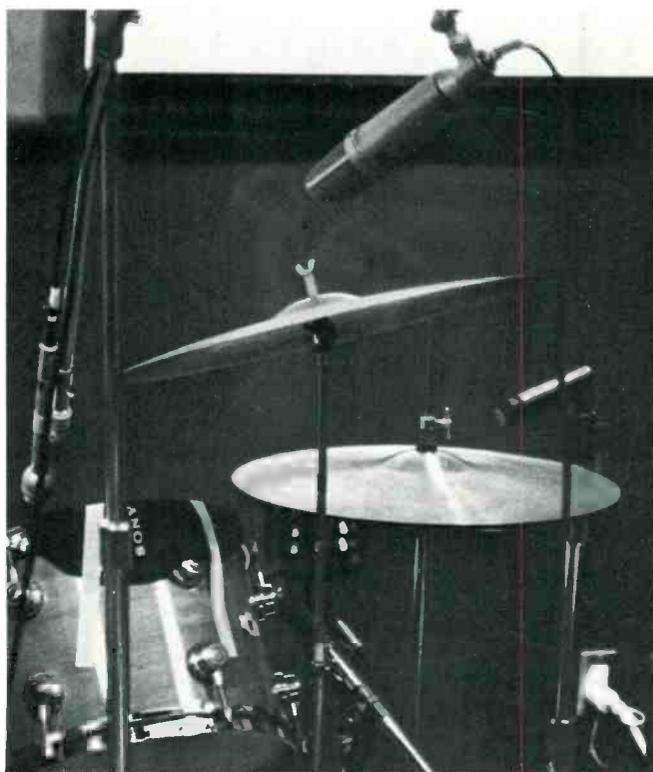


Essentially, Gary's technique involves close-miking each component of the drum kit individually, with appropriate pre-amplifier attenuation for overload protection. He generally records the drums on two tracks of the multitrack recorder and will mix differently, depending on the session; but the bass drum often is placed equally on both tracks. He prefers to baffle the drums loosely rather than totally isolate the drummer from the other musicians.

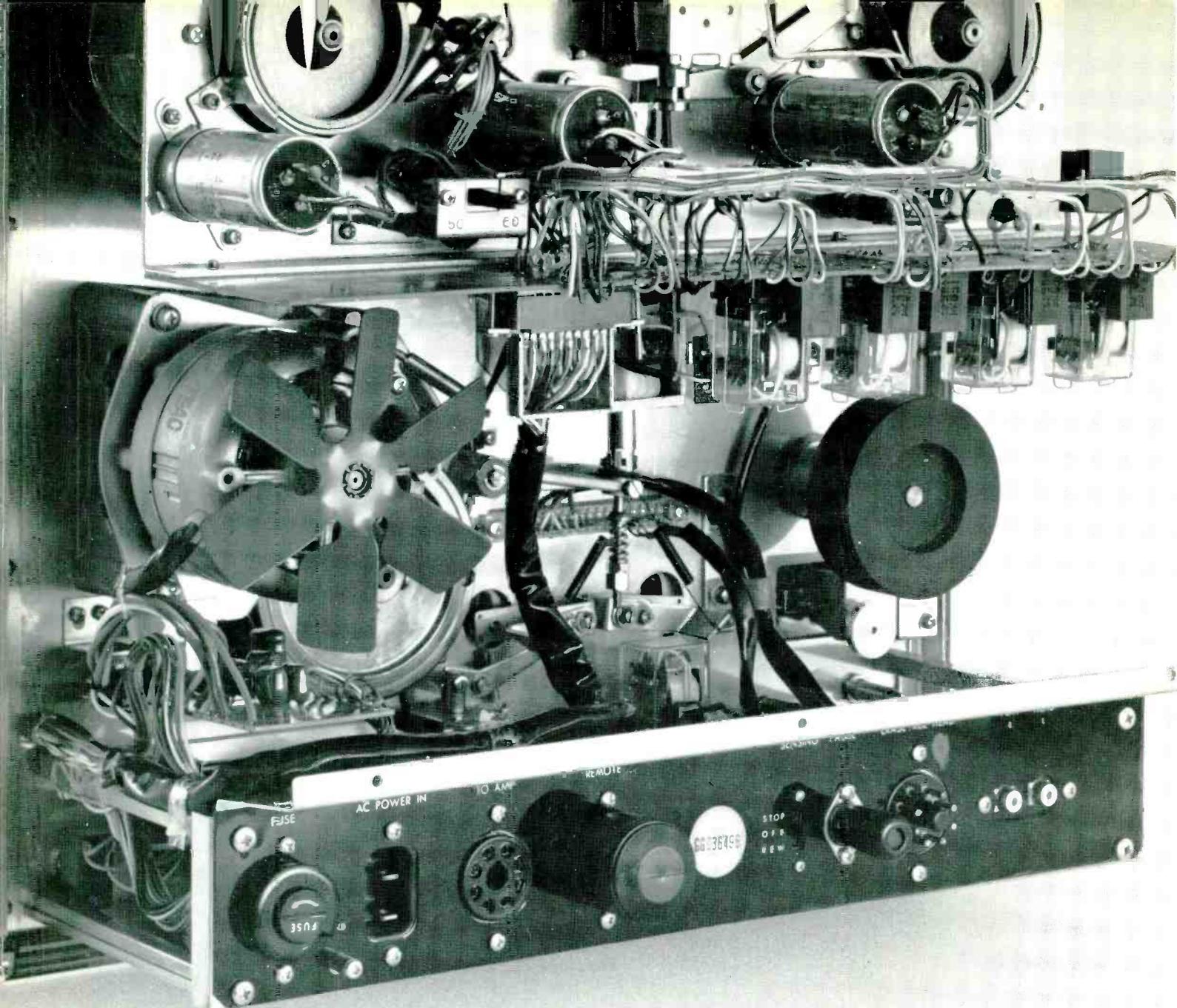
Gary uses dynamic microphones on every piece of the kit except the ride and crash cymbals. The miking layout used on the session covered by Re/p was as follows:

Snare Drum—Shure model 546  
High Hat—Shure model 546  
Small Tom Tom—Electrovoice model RE-15  
Floor Tom Tom—Electrovoice model RE-15  
Bass Drum—Shure model 546

Dynamic microphones are used because of their highly directional characteristics and their ruggedness in close-miking applications. On the ride and crash cymbals, Gary uses Neumann U-87's positioned as shown in the photographs.



Gary's equalization varies from one drum set to the next, especially with regard to the snare drum and the bass drum. For example, on a brighter snare drum, he might boost at 100 Hz to obtain a fuller sound. In general, he will boost the ride and crash cymbal microphones at 10 kHz. On the tom tom microphones he will attenuate at 100 Hz and boost the higher frequencies to bring them, as he puts it, "crashing through".



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### TEAC

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Circle No. 107

Re/p 14



## ROY HALEE

Roy Halee has recorded such well-known artists as Bob Dylan; Blood, Sweat & Tears; Simon and Garfunkel; and countless others. Recent releases include Blood, Sweat & Tears 3 (Blood, Sweat & Tears, Columbia KC 30090), which he co-produced with drummer Bobby Colomby; Bridge Over Troubled Water (Simon and Garfunkel, Columbia KCS 9914), co-produced with Paul Simon and Art Garfunkel. He also co-produced (and engineered) their previous hit album Bookends (Simon and Garfunkel, Columbia KCS 9529).

Technological advancements in the recording industry have precipitated an intermingling of the once clearly defined roles of producer, engineer, and artist. The multi-track mix-down has been compared to playing a musical instrument and this analogy can be extended to other aspects of the recording process as well. Hence, during the last decade, we witnessed the emergence of a hybrid . . . the producer/engineer.

Roy Halee is an example of this genre and in that capacity he has found that constant experimentation is the key to accurately "translating" the sound of a group or artist onto tape and disc. "There are no hard, fast rules," says Halee, and this remark typifies his approach to the recording process in general, and to drum recording in particular.

Because of Halee's widely varying techniques, it is helpful to begin this discussion with some examples in the more basic areas of microphone selection and equalization.

Halee will often record the bass drum with two microphones—a dynamic of good quality pointed at the batter head and equalized for maximum "attack", and a second microphone (usually an Electrovoice 666, Shure 546, or RCA 77) facing the front head (or open front of the drum) and processed through a limiter for maximum "tonality". In some instances, he might use this same approach in recording the tom toms; the top head microphone providing attack, with the underneath microphone (limited) providing tonality.

On the snare drum he again will often use two microphones. For the top head, he prefers the Altec 633 "salt-shaker" microphone (equalized at 8 kHz) because its compact physical dimensions permit optimum placement without impairing the drummer's

freedom of movement. Underneath he uses the Electrovoice RE-20, equalized in the low frequency region, if necessary, to compensate for an overly "snappy" snare sound.

Halee's choice for an overhead microphone is the Neumann U-47, which he will equalize at 100 Hz and 8 kHz depending on the material, drum set, and recording environment.

He may, on occasion, limit the cymbal microphone and adjust the limiter to "beat" in time with the music. This interesting effect can be heard on the *Blood, Sweat & Tears 3* album.

Halee is totally flexible with regard to studio set-up and, in general, arranges the musicians in a way that is most comfortable for them. However, he may record the drums (or any instrument) in an unusual location if he is looking for a particular effect. For example, on "Bridge Over Troubled Water" (from *Bridge Over Troubled Water*, Simon and Garfunkel) the drummer (in this case Hal Blaine) was recorded *inside* an echo chamber, creating what Halee describes as "explosion drums". On "The Boxer", from that same album, Blaine was placed near an elevator shaft and recorded by microphones located at various intervals along the shaft.

Thus, Halee, in his position as engineer/producer, emphasizes flexibility and creativity in his drum recording techniques. His aim is to avoid imposing any preconceived attitudes about the recording process on any group or session, and he will experiment freely to obtain a particular "sound" or effect . . . in his own words, "It depends on the artist, the song he's written, what it means, and what the overall feeling is."

## REICE HAMEL

In his capacity as "remote" engineer, Reice Hamel has captured on tape the live performances of many successful recording artists. Buddy Rich, Vikki Carr, Count Basie, Judy Garland, George Shearing, and Joan Baez appear on his long list of credits. His most recent release is *Keep The Customer Satisfied* (Buddy Rich, Liberty LST 11006). Hamel travels throughout the U.S. recording his remotes, but he can be reached, in Las Vegas, at (702) 382-8006.

The value of live performance recording to an artist's career has long been acknowledged. Many times a group will give a performance in front of an audience that can never be recreated in the more sterile atmosphere of the recording studio. Yet many producers do not wish to sacrifice recording quality

to get that performance, and, because of this, the problems facing the location engineer are both numerous and difficult to categorize.

Every night club or concert situation is different . . . acoustics, available space and set-up time being a

*continued/page 19*



# Crown

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# THE WAY WE RECORD DRUMS AT SOUND IDEAS STUDIO

by George Klabin, with Geof Daking  
Sound Ideas Studio, New York

The primary importance of a solid drum track to a successful recording session has been often acknowledged. This explains the almost constant experimentation to achieve better recorded drum sounds . . . even though drum recording is already a comparatively highly developed art.

In this article we will concentrate on our method for recording "ROCK" drums. We find that most of what we do to record "Rock," with some slight variations, works very well for "Rhythm and Blues", and "Jazz".

By definition, in recording the rock sound we attempt to isolate the full frequency ranges of each component of the drum set to yield a tremendous presence from each unit . . . with an absence of distortion. This is most often done by individually miking each component of the drum set.

The "Rhythm and Blues" sound is similar to the rock sound, except that it is typified by being a "thicker" sound with more concentration on a "fat" snare sound and a "deeper" bass drum. The cymbals play a more subordinated role. A small amount of distortion is often useful and desirable to add "thickness" to the R&B sound. Examples of this valid use of distortion can often be heard on 45 RPM mono recordings, cut very loud, using Gramplan feedback cutting heads on tube equipment. This effect, referred to as "blooming," is a type of combined harmonic and intermodulated distortion in the area of 1% to 5%, which can be useably produced only by distorting vacuum tube equipment. Solid state cutting equipment will not produce the same useable type of controlled distortion.\*

Recording "jazz" drums presents a unique problem in that we are often concerned with capturing the set as it would sound to a listener attending a jazz concert. (In comparison to rock, jazz recordings may seem to emphasize the cymbals, notably the ride cymbal, and in general require a different spatial perspective.) A jazz producer may compare the control room sound to the sound he hears in the studio, and care should be taken to familiarize him with the particular studio environment, because, for example, an acoustically dead room will invariably absorb some highs and the producer may wish to adjust the drum miking accordingly. We feel that the drum recording techniques outlined below are easily adaptable to the demands of jazz recording.

## THE ROOM

The most important factor for getting a "tight" studio drum sound is the environment surrounding the drum set. At Sound Ideas Studios we will get a loose or splashy sound if the area around the drum set is allowed to remain "live". However, when we place the set of drums, on a rug, in an area where the

sound will be absorbed, top, bottom and sides; say, in a corner which has been covered with heavily absorbent materials, behind baffles high enough to contain the entire set, we need no longer be concerned with the major problems of wall sound reflections, or our drum sounds leaking onto other live mikes. In a good sound absorbing environment we are able to get the "tight" ultra present sound we are generally looking for.



## THE DRUM SET

There are many reasons for every studio to own a complete set of professional quality drums . . . which remain forever in . . . and are forever tuned to that studio. There is no question that, partly owing to a general lack of drum tuning ability, even an inferior set of drums tuned to an existing environment will record better than a set brought into the studio and hastily tuned for a date. The time spent convincing producers and groups to at least try the 'house drums' or any component of the house set, may be very well worth the effort, when the takes are monitored.

Generally speaking, the average snare drums and tom-toms, tuned well, have too much "ring" for rock recording. We have experimented with the many methods of damping, from the simplest placement of a wallet on the head of the snare drum, to permanent attachment of pieces of foam rubber to the heads. (photos) The exact position of the damper material on the head which yields the best sound can only be determined by trial and error with the individual drum. Too much damping will obviously impede the action of the heads, making rolls, for example, difficult or impossible to play.

We have found that wooden shell snare drums provide a "fatter" sound, while metal snare drums put out a higher pitched, thinner sound. We look for full,

"fat" sounds having rapid decay, as being the sound which makes the best snare drum and tom-tom recordings.

Concerning the toms, mounted and floor, we are cautious to keep them from resonating when other components of the drum set are being played. This too, calls for some experimentation in damping. On occasion we are asked to get a change of pitch sound, a "boiiiiinnnggg" effect, from the floor tom. We do this, perhaps as others do it, by first matching the pitch of both top and bottom heads . . . then purposely increasing the tension of the top head (or loosening the bottom head) even further. The disparity of the frequency responses between the heads provides the effect.

We record the Bass Drum with the front head removed, and a quantity of absorbant material stuffed into the shell, and the batter drum head (rear head) taped inside and out with a cloth backed adhesive tape such as Mystic tape around the area to be struck. (photos) This produces the 'dead' yet present bass drum sound which records best. We go with the clean precise "thump" of the wooden beater, rather than the more muted sound of the felt beater, because we can always reduce (at the console) any excess of bass drum presence, if that it what we have too much of.

We prefer 16" high-hat cymbals for their ability to generate somewhat greater volume over a wider range of frequencies than smaller diameter hi-hats.

The choice of cymbals is very highly personal. Again, it's what they sound like on tape that counts. The studio's cymbals ought to carry, at least, the advantage of being a known quantity on tape in the



studio. It is not a question of whether your or our cymbals are better than the group's. It is a question of compatibility, and that you as an engineer already know how to record your cymbals, drums or any of the other instruments permanently located in your studio. The judgement of the cymbal sound can't possibly be made before it is played, miked and recorded.

It is important that the selection of a drum set, and each of its components, should be made, as we have suggested, with the best possible understanding of what a good recorded drum sound is . . . by those who know what a good recorded drum sound is. A DRUMMER/ENGINEER is obviously the one, or perhaps the two people who can make the decisions. We were extremely fortunate that the choice of our percussion equipment was made with the help of our staff mixer Geoff Daking, himself a credited drummer.

### MIKING

On the snare drum we use a high quality dynamic microphone that can withstand high level transients, having found that a condenser microphone tends to thin the sound and is subject to transient distortion. We use the Sennhesier MD421 ribbon dynamic and place it as close to the rim of the snare drum as possible, perhaps two inches, and an inch or two above the head (see photo). Thus, the microphone picks up the sound right from the head, before it has had a chance to bounce around or dissipate and change.

A good microphone pad or preferably attenuation in the first stage of the microphone pre-amplifier is needed with this type of close drum miking.

As for miking the snare drum from the bottom, we don't feel it works at all, since nearly all that is heard is the snare sound and little of the attack from the stick hitting the top head, which is most important.



We may have to equalize the snare drum sound a bit, adding some peak at 5kHz. The primary area of the frequencies produced by the snare drum does not extend much over 10kHz. Using a condenser microphone will tend to accentuate the high frequencies and we would have to roll off at 10kHz (in a dip) to eliminate that accentuation. Therefore, to us, it's preferable to use a dynamic microphone on the snare drum and boost at 10kHz when needed, because rolling off at 10kHz on a condenser microphone invariably affects the presence region somewhat, unless a sharp dip curve is used. Many consoles do not have any peaking or dipping equalization at 10kHz, only shelf attenuation and boost.

The small tom can be miked separately if desired, or it can be picked up very nicely by an overhead microphone, placed two feet above it. In this application we use a condenser microphone which from that height will also pick up the crash cymbal. If we want to mike the small tom very closely, we use a dynamic microphone and place it a few inches from the outer rim of the drum.

For the floor tom we use a low output dynamic microphone. We tried a condenser microphone, but found that we could not place it close enough to get good presence on the drum without also picking up severe low frequency transients which sent our meters peaking, even though the sound was not subjectively very loud. The proximity effect of the cardioid microphone also aggravated this condition. To reduce the low frequency transients we switched to a dynamic microphone, one with only fair low frequency response, and found we could place the microphone very close to the floor tom, just a few inches above and near the outer rim. We got a clean sound, but with all the attack obtainable from close miking techniques (close miking also avoids leakage of other drums into the mike in question). We may have to boost the bass frequencies somewhat, but this is done after the microphone pre-amplifier stage, and therefore can be controlled easily.

On the bass drum we use a high quality dynamic microphone, the Electro-voice 666, mounted on a floor stand and pointing right into the open front of the bass drum. It's important that no part of the microphone or stand touch the drum and pick up vibrations.

Getting a good bass drum sound is actually more dependent on the preparation of the drum (as discussed previously), the way it's played and the equalization used. The microphone plays almost a secondary role, as long as it has good transient response. Sometimes a bass drum may exhibit undesirable resonances (ringing sounds) which should be dead-

ened by tuning and taping the head, and selecting the proper beater, etc.

Equalization may be necessary to improve the sound. We had a problem with a muffled sound, in a certain low frequency area, with everything else just right. Rather than fool with the physical set-up, which had been worked on a great deal already, we experimented with our equalization. We found that by rolling off about 6db at 800Hz in a dip and boosting at 200Hz in a shelf, we eliminated the dullness, which was being produced by something in the 800Hz area masking the sound we wanted to get in the lower range.

We don't usually find it necessary to mike the high hat, since the snare drum microphone is inches away, and picks it up quite well. But it is a coincidence that the ratio of high hat to the rest of the set is right for our ears when all the other drum microphones are balanced to our liking. If necessary we could use a dynamic microphone, an inexpensive one, placed right near the high hat to pick it up separately. This technique can be especially useful in recording jazz drums.

When recording a drum set having both a ride and a crash cymbal, we let our overhead condenser microphone pick up the crash cymbal, and often use a fifth microphone for the ride cymbal. This microphone can be a dynamic, although we usually use a Neumann U-67 or U-87 (condenser) which gives a very pleasing and true sound to the cymbals. We place the microphones quite close to the cymbals, perhaps six inches to a foot away, using proper microphone pre-amplifier attenuation.

Some general views about miking: The microphones and stands must not touch the drums. If something sounds strange or ringy when it didn't a moment ago, you will usually find that a stand or microphone is being hit by a drum. Using goosenecks extending from the baffles eliminates the many bulky stands that must be used to hold the microphones.

Also, using too many condenser microphones on a drum set, especially close to one another, can cause phasing cancellations when the set is heard in mono versus stereo. Sometimes this cancellation may be desirable, but that is a matter of chance.

One little thing to look out for: Don't let the snare drum sound leak out into the room and get onto another microphone recording some other instrument to such an extent that when that instrument is heard at proper relative level in the overall mix, the snare drum sound is changed. This can often occur, even in a dead room, when recording an instrument with a low volume output, such as an acoustic guitar, near the drums.

In general, miking drums is a matter of

experimentation, experience, and patience. The producer's taste is most important and we feel a studio should be ready and willing to adapt to it. For example, some rock groups may prefer a very "live" and "splashy" drum sound to a tight sound, to simulate the effect they get when performing on stage.

## EQUALIZATION

Equalization of the drums has been discussed to some extent previously, but in general it depends on the sound desired, taking into account the monitoring situation one is in. We find that in our very dead studio room it is often necessary to add a little brightness to the drums, perhaps in the 5kHz and 7kHz region. Some highs are always going to be dissipated in a highly absorbent surrounding. We usually don't need too much equalization, perhaps 2 to 4db. If we needed more, I would feel that there was something wrong with our set-up. We do strive for a somewhat "natural" sound on the drums, but after all, close miking techniques are part of the "illusion" created in today's rock recording.

## THE MIX (Recording the drums onto the master tape)

We usually record drums in stereo on two tracks, sometimes putting the bass drum on a third track. If we do use just two tracks, we put the bass drum equally on both, the snare drum on one side, the floor tom on one side, and the small tom on the side opposite the floor tom. The cymbal microphones are panned somewhere between the two tracks. By placing the toms on opposite tracks, we hear a very exciting and interesting effect when the drummer plays around the set. The sound moves across, between the two sides, as he plays from one tom to the other. We usually don't put any reverberation on the drums, but sometimes, especially on rhythm and blues dates, we do add some reverberation to the snare

drum while recording. We couldn't do it later because, at that stage, we would be adding reverberation to the whole drum track, which would undesirably reduce the presence.

We find it important not to put too much cymbals on the mix. When the cymbals are struck hard, for emphasis, they sound very loud—there's no avoiding that with our overhead microphones—but they do not overpower the set when we are a bit conservative at the console. We once had a producer who insisted on miking the cymbals very closely and sending them onto the track very loud. It all sounded great when listening to the drum track by itself, but when we tried to mix we had problems. The cymbals were the loudest sound on the drum track and we had to mix the drums down too low to allow the other instruments to stand out properly. Therefore, we lost the drum set, and all the presence. Putting a lot of cymbals on a mix will also cause problems when cutting the tape onto a disc, but these problems relate to a different stage in the recording process and should be discussed separately.

## IN CONCLUSION

The most important thing to remember—and here I think I can make a statement which is universally true: no matter how hard *you* work to get a good drum sound in your studio, it won't help a bit if the *drummer* doesn't know how to hit the drums properly. No amount of equalization or microphone selection and placement can compensate for a drummer who can't get a full, rich sound from his drums. END

## HAMEL/continued

few of the many variables. Thus, the location engineer must be prepared to adapt quickly and at the same time provide some degree of consistency from date to date. Reice Hamel has developed a "remote" recording technique which, he feels, gives the producer the flexibility in mix down usually obtainable only from multi-track masters made in a recording studio. In addition he includes the "room" sound, using a self designed MS technique, but in a manner that does not impede control of the mix down.

Drums present particular problems in live performance recording because of their high energy output—they may easily leak onto other microphones on the date. Hamel's drum recording techniques take advantage of this high level energy and also provide a full frequency, very present representation of the drums.

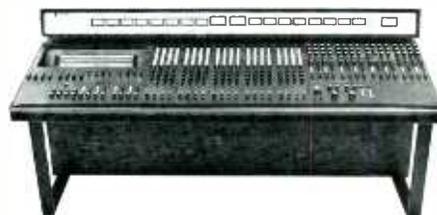
Hamel generally captures the set with two microphones; one overhead, and one for the bass drum. His choice for the overhead is the AKG C451 condenser

microphone with an omnidirectional head; leakage onto this omni microphone not being a serious problem due to the drum set's energy content.

On the bass drum he uses the Neumann KM 83 omnidirectional condenser microphone. In this application, use of a condenser microphone is somewhat unique. (Hamel rarely uses a dynamic microphone on *any* instrument.) He's found that dynamic microphones give a "boomy" sound to the bass drum that he feels is undesirable. He prefers to have the front head of the bass drum removed, and places the microphone inside the drum, suspended on a self designed, rubber shock mounted goose neck. To compensate for the extremely high energy output of the bass drum he uses the -10db pad provided with the KM 83 and also pads at the console, using another self designed device.

On a typical 8 track date, Hamel assigns the drums to one track of the multi-track recorder. However, additional constructive drum sound is picked up by his "room" microphones.

Thus, Hamel has decided on the all condenser (tightly miked) approach in an effort to give recording studio quality to his remote recordings. His techniques will be explored further in subsequent issues of Re/p. END



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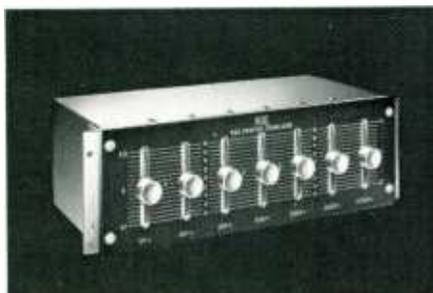
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By Delos A. Eilers, Technical Service Engineer  
Audible Range Products  
3M Company, Magnetic Products Division

With most of the world's entertainment and historical events being preserved on magnetic recording tape, professional recording studios and tape duplicators, historians and educators, audiophiles and home recordists are all concerned about the permanence and retrievability of the information that is invisibly stored on a magnetic-coated ribbon.

The preservation of both operating and historical recordings is the primary concern. Essential to this is the prevention of damage to the recording tape, not only to safeguard the information, but to obtain the maximum use from every reel of tape for economy.

If stored information is irretrievable because of the lack of safeguards by operating personnel or a major catastrophe during handling and storage, the result can be anything from temporary inconvenience to a complete loss of a recording library. If tapes fail before their normal life expectancy, operating expense increases.

#### BASIC TAPE FACTS

Modern magnetic tape coatings have the ability to retain the intelligence placed on them during the recording process for an infinite period of time. Taped signals are essentially permanent and will remain unchanged until actually altered by an external magnetic field. This erasing of the tape may be done *intentionally*, so that the tape can be used for another recording, or *accidentally*, by operator error or poor storage procedures.

Even though the magnetic signal will not deteriorate, the physical properties of the recording medium are susceptible to damage. As a general rule, the problems encountered with recording tape performance are predominantly physical. Therefore, it is important to preserve the tape in a form that will make it physically possible to recover the recorded information when needed.

If all of the following suggestions were adopted completely, an ideal situation would exist. Since many recording facilities will function adequately with less than the ideal, you may wish to employ a portion of the recommendations. We strongly believe, however, that the overall reliability of your tape operation is directly proportional to the care exercised in the two important topic areas: *handling* and *storage*.

## THE RECORDING AREA

Ideally the equipment room of a recording studio or professional recording facility should approach, as closely as possible, a "clean room" environment. By definition, this area is characterized by the absence of normally expected airborne dust and lint.

The design of the recording equipment area should be such that reasonable control of temperature and relative humidity can be exercised. Variations of temperature should be held within  $\pm 5^{\circ}\text{F}$ . of a pre-selected value and the relative humidity should be kept constant to within  $\pm 10\%$ . In broad terms, this would be a temperature in the 70's and a relative humidity of about 40%.

It is doubtful that smoke will contaminate the tape, but ashes can. Therefore, smoking should not be allowed directly over the machines or when handling tape. Food and drink should also be prohibited. Minute food particles can easily be transmitted to the tape and tape decks from the operator's hands. A spilled drink will contaminate not only the tape but also seriously affect a machine's operation.

The integrity of the equipment area should be maintained by periodic cleaning of shelves and floors. When vacuum equipment is used for cleaning, the exhaust from this unit must be located outside the room.

When recording on location or at home, it may be difficult to control the surrounding environmental conditions. Contamination (dust, dirt, debris) can enter the tape transport and cause tape damage. The only positive method of preventing contaminated tape is to eliminate the entry of foreign material into the machine. It is recommended that the recorder (and playback unit) always be covered during storage and as much as possible during operation. Some equipment manufacturers provide, or have available, some type of dust cover which covers the tape drive mechanism and effectively seals out contamination. Many of the protective covers permit the machine to be operated while they are in place and are ideal for use in uncontrolled environment.

## TAPE STORAGE

The temperature and humidity of the tape storage area should closely approach that of the work area. The smaller the environmental change experienced by the tape, the better will be its operation and



reliability. As a general rule, a temperature between  $60^{\circ}$  and  $80^{\circ}\text{F}$ . and a relative humidity between 40 per cent and 60 per cent is recommended. If the environmental conditions of the storage area vary widely from the recording area, allow time for the tape to reach temperature and humidity equilibrium before putting it into use.

The molded plastic cases of some cartridges and cassettes can be permanently distorted if subjected to high temperatures. Tape splices are also affected by heat. The splices may separate, and the adhesive may soften and "ooze" from the edges of the splice and stick to adjacent tape layers. The exposure of the splice adhesive will also collect any contamination present in the case, causing additional problems.

Protection from accidental erasure while in the storage area is easily accomplished and is, for all practical purposes, of little concern. There are two reasons why this is true. First of all, electro-magnetic fields strong enough to cause erasure are just not normally found in an "office or home" atmosphere.

Secondly, if the tape is kept as little as three inches away from even a strong magnetic source, this spacing should be sufficient to offer adequate protection. During storage, the tape must be enclosed in a container (original box, plastic case, tape canister) for several reasons. One reason is to provide protection from physical damage. Another reason for using a container is obviously protection of the reel from dust.

The closed containers should be placed into storage on edge, so that the reel is in an upright position. While they may also be stored individually, lying flat, tape boxes should never be stacked so high that there is a possibility of crushing or distorting the bottom container from the excessive weight of the stack, since this could cause edge damage to the reel of tape in that canister.

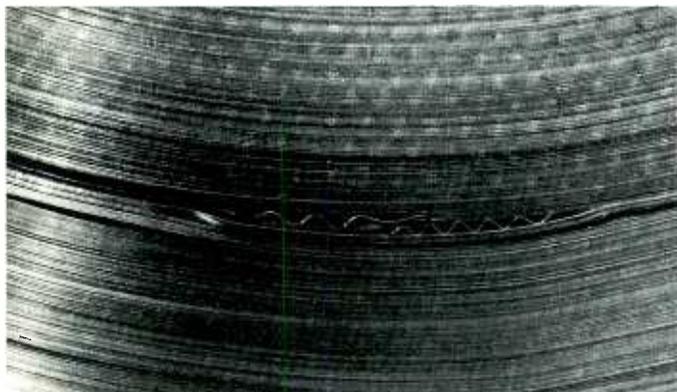
For long term storage, additional protection from dust and moisture can be gained by sealing the container in a plastic bag. It is generally considered good practice to clean the container before using it so that dust that may have accumulated during storage will not contaminate the recorder or tape.

The care exercised in preparing tapes for storage is every bit as important as the excellence of the storage area. Of primary importance is the way the tape is wound on the reel, since poor winding can result in distortion of the tape's backing.

A wind tension that is relatively low is recommended. Three to four ounces per  $\frac{1}{4}$  inch of tape width is sufficient to render a firm, stable wind on an NAB hub or reel configuration. This tension, while great enough, does not result in high pressures within the roll that could permanently distort the backing. Backing distortion, caused by extreme pressures within the tape pack, may result if a roll of tape wound too tightly is subjected to an increase in temperature while in storage.

Just as there is the possibility of a problem if the tape tension is too great, too low a wind tension can cause difficulty too. If the wind is too loose, slippage can occur between the tape layers on the reel. This

“cinching,” as it is called, can distort the tape by causing a series of creases or folds in the area that has slipped. When the roll is unwound, the surface will be wrinkled. When an attempt is made to use the tape again, the wrinkles and creases will disrupt the necessary intimate contact between the tape and the head. Because the tape is repeatedly lifted from the head, the result will be a series of signal variations. If the tape is properly rewound immediately after cinching, there is a good possibility that the information may be saved.



Some recorders now in use do not have a method of adjusting wind tension; therefore, care must be taken while operating these machines. Sensible operation of “Fast Forward, Rewind and Start” controls can eliminate the sharp stress loading associated with starting and changing tape directions. Tape distortion and “cinching” can be reduced by allowing a minimum slack loop when threading and starting the machine. It is also good practice to allow the spinning tape reels to completely stop before changing tape direction.

Along with proper tension, another important consideration is wind “quality.” The successive layers of tape should be placed on the reel so that they form a smooth wind with no individual tape strands exposed. A smooth wind offers the advantage of built-in edge protection.

A scattered wind will allow individual tape edges to protrude above the others. Since there is no support for these exposed layers, they are vulnerable to damage.



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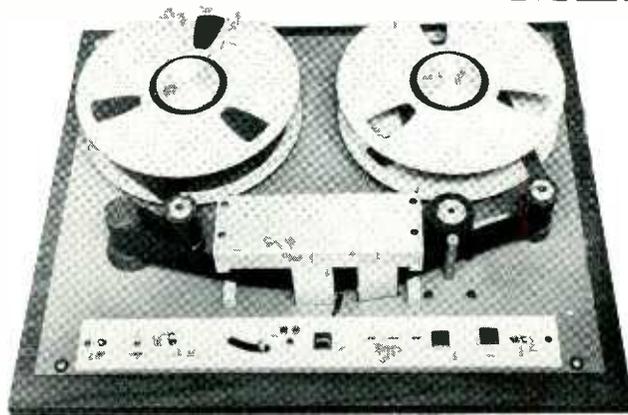
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Re/p 23

It is sometimes suggested that tapes in storage be rewound at specific intervals, such as every 6 to 12 months, to relieve internal pressures. This would be recommended for tapes of marginal quality or for those with other than heavy duty binder systems. For modern day tapes with polyester backings and advanced binders, this periodic rewind might not be necessary.

A good practice, however, is to select a random sample from various areas of the library for visual inspection. The reels chosen can be examined for loose winds and dust accumulations. They should be checked for rippled edges and other signs that indicate the presence of physical distortion. If anything is found that indicates a problem may exist, additional samples should be inspected to ascertain what percentage of the library may be affected.

If the above recommendations concerning the storage environment and the actual preparation for storage are followed, no serious problems should be encountered even in long term storage.

### WHEN TAPES ARE SHIPPED

It is sometimes desirable to send recorded tapes from one location to another. There are certain precautions that apply to the shipment of recording tapes that should be followed to insure safety in transit.

Logically, the first consideration would be the physical protection of the tape while being transported. The outer shipping container into which the tapes are placed must afford the necessary strength and rigidity to protect the tape or tapes from damage caused by dropping or crushing. While a container that is 100 per cent water-tight would not be necessary, it must nevertheless provide a reasonable degree of water resistance. It should, for example, be capable of protecting the contents from being damaged if, during shipping, it is left on a loading dock in the rain.

While it is good practice to always secure the free end of a reel of tape, it is particularly important when preparing reels for shipping. A short length of pressure sensitive tape is all that is necessary.

While the purely physical shipping precautions are not unique to magnetic tape but are considered good practice in preparing any item of value for transport, there is another consideration that is of prime importance. Since the tape is a carrier of magnetic information, measures must be taken to protect the reels from accidental erasure.

Laboratory conducted tests have determined what would constitute adequate protection from stray magnetic fields of a magnitude which may possibly be encountered in transit. It was found that field strengths within the tape of 50 oersteds or less caused no discernible erasure.

The average bulk degausser, purposely designed to produce a maximum external field that is used to erase tape while still on the reel, produces a field of 1500 oersteds. Sources of magnetic energy to which tape being shipped might be subjected would be motors, generators, transformers, etc. These devices

are designed to contain their magnetic fields to accomplish some type of work. With this in mind, it is safe to assume that field strengths of as much as 1500 oersteds would not be encountered in ordinary shipping situations.

Because field intensity decreases rapidly with distance from the source, the 50 oersted point (mentioned earlier as not affecting the tape) is reached at a distance of 2.7 inches from a 1500 oersted source. From this it can be seen that the easiest and least costly method of obtaining erasure protection is by insuring a degree of physical spacing from the magnetic source. It is suggested that tape being prepared for shipment be packed with bulk spacing material such as rigid foam or cardboard between the tape boxes and the outer shipping container.

Based on the information in the paragraphs above, three inches of bulk spacing should give adequate protection and virtually eliminate any potential for erasure. This magnetically protective spacing can also be justified because of the excellent protection gained against physical damage to the contents.

Tape in transit may be subjected to temperature extremes. Temperatures as low as -40°F. might be encountered in the cargo hold of high flying aircraft. A temperature of 120°F. or higher could be encountered in a motor vehicle in the summer sun. It must again be emphasized that all incoming tape should be allowed to reach environmental equilibrium before being used.

### GOOD OPERATING HABITS

The container in which the tape is stored is probably the cleanest area in the recording studio; and, of course, this is the reason that tapes should remain in the box until actually placed on the tape deck and be returned to the container immediately after use. To maintain the cleanliness of the container, it should be closed when the tape has been removed for use.

It has been said that careless handling and poorly adjusted tape decks are the two predominant reasons why tapes fail prematurely. If strict attention is paid to these two areas, immediate benefits will be noted in increased tape life, and the threat of information loss will be substantially reduced.

When handling tapes, use utmost caution to insure that the tape does not become contaminated by fingerprints. Simply stated, fingerprints are nothing more than deposits of body oils and salts. These oils will not attack the oxide-binder system, but they will form excellent "holding-areas" for dust and lint.

Fingerprints on the backing are just as serious as on the coating because dirt deposits will transfer from the backing of one wrap to the coating of the next wrap on the reel. When a reel that has been contaminated in this manner is put into use, the tape deck itself can be affected and will spread this contamination to other clean reels of tape that are used after the dirty reel.

This is one of the reasons for stressing the importance of visually inspecting the tape deck after each roll of tape is run to determine if cleaning is necessary. If the deck becomes contaminated with dust or accumulations of minute wear products from the tape, complete contamination of an entire roll of tape can result. Contaminants can collect on heads and guides and be dumped along the backing or coating surface of the tape. This contamination will then be wound into the tape layers under pressure, causing it to adhere firmly to the surface. Each one of these deposits will appear as a dropout or group of dropouts the next time the tape is used.

Tape contamination caused by fingerprints can be reduced by remembering not to touch the tape unnecessarily. Frequent cleaning of the tape deck will reduce the chance of spreading contamination from one reel of tape to others in the library. A cotton swab or lint-free pad moistened with Genesolve-D (an Allied Chemical trademark) or Freon TF (a DuPont trademark) or similar cleaner is recommended for cleaning all components along the tape path. If other types of cleaning agents are used, they should be given time to thoroughly dry before loading the tape. This will prevent damage, should the cleaner have any tendency to attack the magnetic tape. Accumulation of tape wear products on the transport can be largely eliminated by using a high reliability tape.

Empty reels should be thoroughly inspected and cleaned before winding tape on them for storage. Reels with hub damage, such as a plastic burr, or with dirty hubs can cause tape distortion exactly as

outlined in the preceding paragraphs. Maintaining reel integrity cannot be over emphasized since valuable information can be lost, not because of tape failure but because the tape was distorted by a dirty reel.

One of the most serious and more common forms of tape failure is generally categorized as edge damage. Damaged edges can be caused by the reel, the tape deck or the operator. A broken or badly distorted reel can quickly damage a tape. The effect of a broken or cracked flange is easily noticed since the tape will exhibit a series of nicks or mutilated areas along one edge, and the cause can be easily detected because of the obvious defect in the reel. A bent or distorted reel, however, can also cause damage to one or both edges if the tape is allowed to rub against the flange when being used. A similar type of edge damage also will occur if any of the deck components are misaligned.

Either of these faults can result in complete failure of a roll of tape. Not only will the edge track be lost, but the debris generated from the edge damage can be redeposited onto the surface of the tape across the entire width. An examination of the edges of a tape that has been damaged in this manner would disclose an accumulation of backing and oxide debris.

While this type of damage is serious, it is sometimes difficult to ascertain its cause or even to notice the effect until the damage is severe. Operators must acquire the habit of physically inspecting the deck in the area of the guides and heads for an excessive build-up of oxide or backing debris. This is generally

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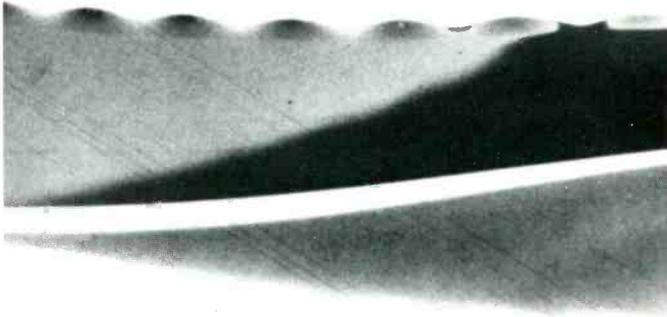
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the first clue that something is wrong. Excessive dropouts on an edge track or loss of high frequencies may also indicate that an alignment or tracking problem exists.

It is also good practice to observe the physical condition of the tape. A sure sign of developing edge damage would be a lip or distortion on the edge being injured. When wound on the reel, the effect of this lip will be cumulative and can stretch the backing. The stretched backing will be rippled and will not conform to the recorder heads the next time the reel is used.



If tape in this condition is properly rewound immediately before being put into storage, it may be possible to salvage the roll. If this is not done, the backing will be permanently stretched and will not recover. This will result in the entire roll having to be discarded.

Operating personnel should use care in handling the reels of tape. The hub is the strongest and most stable part of the reel. It is important that the reel be picked up in a manner that will not cause the flanges to be squeezed together. When the reel is mounted on the recorder, pressure should be applied only to the hub and never to the flange. *Always handle the reel by the hub and not the flanges.* If this single fact is remembered, you will never be guilty of squeezing the reel flanges together when picking up a roll of tape or when handling it. If the flanges are forced against the tape, this could result in edge damage. This is particularly true if the roll has a scattered wind, since the exposed edges of the misaligned strands can be folded over and creased.

It is strongly recommended that operators be constantly on the alert for signs of potential trouble. This can best be accomplished by understanding what to look for and by making continuing inspections of both tape and deck a habit.

END

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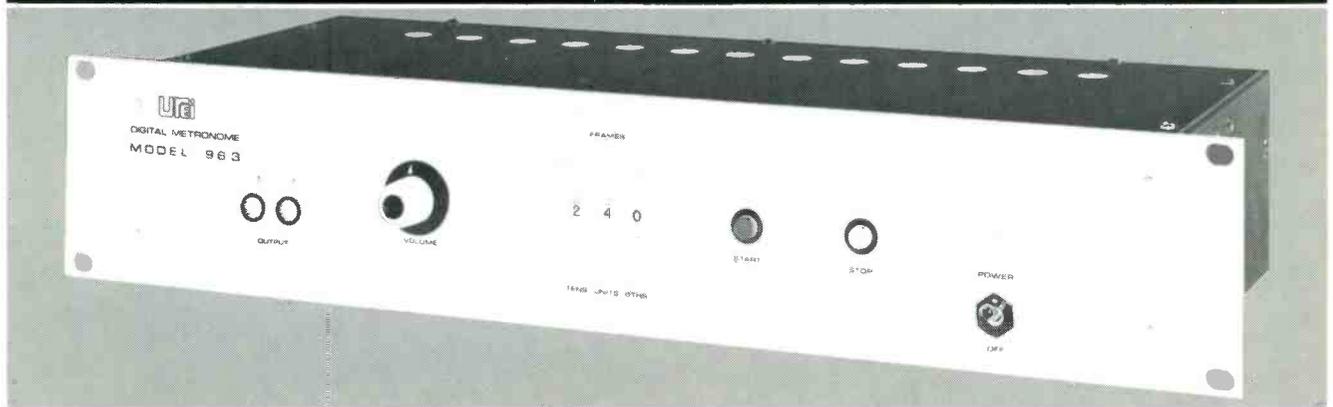
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by Stan Polinski

## RECORDING MOTION PICTURE MUSIC

*an interview with*

ARTHUR PIANTADOSI



SCORING: Motion picture music and subsequent recordings.

Arthur Piantadosi is a scoring\* and supervising feature re-recording mixer. Honored the past two years with Academy Award Nominations for “Best Sound Achievement” for work on the production MAROONED in 1969, and FUNNY GIRL in 1968, Arthur lists nominations for some 12 to 14 productions dating back many years. Included are the motion pictures THE KING AND I, FLOWER DRUM SONG, and CAROUSEL. It is safe to say that Arthur Piantadosi has ‘paid his dues’ while rising through the ranks from boom-man to the position of great responsibility which he now occupies.

Far from viewing movie sound mixing as some deep black magic, he tends to be almost over-practical as he explains his approach to mixing. Lest this be misunderstood, decisions that might have appeared to have been made in an almost casual way, are in essence, practical judgements made easily from a great store of technical experience superimposed on the practical criteria of human response.

*We properly started our interview with the basic question: What are the essential differences between recording music for movies and recording music for record release?*

A.P. . . . “Well the great chasm here is the difference in laying down music which you know will be played as you laid it down; as opposed to motion picture technique where you’ve got to figure many more angles than just how the music sounds by itself, raw. For instance, the music may well end up playing under dialogue part of the time. It may play under sound effects part of the time. And, it will, on occasions, be fighting or working with both of these at the same time. At times the ratio will be 50-50. At times 70-30. Sometimes 60-40. The ratio of required strength of each sound component will change constantly during a scene.

So, what is required in recording motion picture sound is a mix which is pliable enough for you to keep some semblance of order in the original concept of the music, and lay it into a motion picture so that it will contribute whatever value it can.

*sp. . . . Knowing that a particular cue\* is to play under dialogue, what equalization would you use which is different than that which you might use otherwise . . . also, which instruments, if any, would you emphasize or de-emphasize?*

A.P. . . . “Well oddly enough, through experience, you find that what plays best under dialogue is a ‘thick’ orchestration, rather than a ‘thin’ one. When the lead line of a melody is carried in one instrument with the rest of the orchestra subordinated, what happens in the theatre is that the ear goes to the line which the individual instrument, the flute or the guitar, might be playing. If the dialogue is going on at the same time the ear has two things it is attempting to track simultaneously.

CUE: Individual musical or sound effect selection out of a series of same.

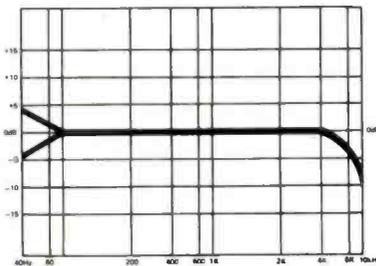
Now, if the orchestration is thickly laid on, when the music is recorded in sections rather than solo instruments, it usually can be more easily handled for the ultimate benefit of both the music and the dialogue . . . and the picture as a whole.

**TAKE:** One recording of a cue.

*sp. . . When you play back a take\*, do you usually listen to the dialogue along with the music and the picture?*

**A.P. . .** "About 50% of the time. Generally speaking, it's a matter of personal choice, and personal experience. I no longer feel that it is completely necessary for me to do so, only because I have experience in both scoring and re-recording. By this time, I have done it often enough so that by now I can calculate the relative sound levels rather than having to actually hear them. Still, about 50% of the time we do play back with picture and dialogue."

**FLAT:** As opposed to the 8kHz sharp roll-off as per Academy standards for photographic sound response. (see Fig. 1)



*sp. . . Do you use a flat\* monitor when recording music for motion pictures?*

**A.P. . .** "Yes. But, I use a flat monitor for reasons other than my own. On the scoring stage I use a flat monitor to please the orchestra and the conductor. However, I know that when we get the scoring into the re-recording studio we are going to have to equalize it ever so slightly . . . the gain in playing the score back with a flat response is rather great psychologically, I think."

*sp. . . If you know that the re-recording monitor is equalized for photographic sound reproduction resembling that which plays in the theatres (Normally rolled off at 8,000Hz\*; Fig 1) do you have any equalization problems when you move the score from the music recording control room to the re-recording studio?*

**RE-RECORDING STUDIO:** Designed to acoustically resemble the typical motion picture theatre in order to monitor that which audiences will be hearing.

**A.P. . .** "With the graphic equalizers and everything else we have at our command today, it is a simple matter to restore what might be lost in the transition. The monitor in our re-recording studio\* is a different monitor, it's a different room, it has purposely different acoustical characteristics than the music recording studio. And, so, you have a whole new bag to contend with; equalization being only a part of it.

*sp. . . Would you treat a session in a different way if you knew beforehand that the picture was to be released in stereo?*

**MAGNETIC RELEASE:** The sound track composed of magnetic stripes onto which the sound is magnetically recorded. 35mm film contains 4 stripes, for sound distribution to the left, center, right, and surround. 70mm film has 6 stripes for sound distribution, to the left, left center, center, right center, right and surround. The stripes are assigned to their respective speakers placed in theatres accordingly.

**A.P. . .** Oh, my yes, First of all there is the flat response characteristic because we are now dealing with magnetic release rather than photographic release\*. Secondly, when we lay down an orchestra, which we normally do on a 3 stripe piece of film (3 channels, left-center-right) I divide the orchestra for optimum handling in re-balancing when the track goes back for re-recording. I lay down the left, the center, and the right so the elements which contend with each other, within the orchestra, the various sections, can be rebalanced; one section enhanced, another section muted, etc. In that way the orchestra is split-up on a three stripe piece of film\* for re-balancing when the music is played against the elements of dialog and sound effects."

**PHOTOGRAPHIC RELEASE:** The sound track which is actually photographed onto the picture information on a strip between the picture and sprocket holes. (Sometimes called optical release)

What we are really looking for in a stereo release is still a pleasant distribution of stereo sound."

*sp. . . What kind of separation and isolation do you try to obtain in recording music for monophonic pictures?*

A.P. . . . "Certainly not optimum separation and isolation. That would be unpleasant. I would shoot for just enough separation so that we could handle the elements in re-recording and re-balance with only small effort . . . not a great effort."

*sp . . . What kind of microphones do you prefer for recording vocals?*

A.P. . . . "I am a believer in not making too big a thing about microphones. I remember doing FUNNY GIRL with Barbra Streisand when she first came to the coast. She was new to our game, and we were new to her. We had a mike hung for her in the vocal booth . . . ready for her to sing. She asked what kind it was . . . mentioned the kind she normally used for all her record dates in New York. When I found her reaction was that strong, we located that same type of microphone here in town; hung it for her, and supplied her that other element . . . that little additional degree of confidence, by virtue of the fact that when she sang she was looking into the face of the same old microphone, and so, felt more comfortable. I do not think that the picture, the recording, or subsequently the album would have been any different than if she had sung into the mike we had first chosen. The difference was psychological, and powerful. With the mike of her own preference she was comfortable and the recording session went better.

*sp . . . Do you have any particular preference for microphones on strings?*

A.P. . . . "Yes, I like a good condenser microphone. A good quality condenser seems to give strings an added bite. I have used 6 to 8 different kinds on strings, and again, I don't feel that that's what is important . . . just so that the mike is of good quality.

Much more important to the recording, I think, is the technique of mike placement; the way in which the orchestra is placed in the room; that the strings are on a hard surface rather than a rug, or next to a certain kind of wall . . . a hard one, not an absorbant wall. I think these, each of these, factors is much more important than the microphone.

*sp . . . Any comment about microphones on Brass or Drums?*

A.P. . . . "No, not really. Again, I am a firm believer in the ear being the final arbiter. If I'm happy with what I'm hearing I stay with what we are using. If not, we change. On drums I like one of the brittle mikes . . . one of the miniature condenser mikes. But, any mike that can help to contain the rattle, which most drums do, is a good mike for them. Also, now-a-days we have such good, handy, equalization, whether we are scoring or re-recording, that we can build into the cue that which we need and like.

*sp . . . Knowing that the end product you are working with is to be a photographic sound track, with its own inherent limited frequency response, and signal to noise problems, do you think a noise reduction unit like the Dolby system would be beneficial to motion picture sound recording?*

A.P. . . . "Speaking as a purist, yes.

Speaking as a practical person, no. What we contend with in motion pictures are the pop-corn machines, the air conditioners, all of the resident sounds in the theatres, along with the optical hiss inherent in the release print. With all of that going against us, a lot of subtle background noise is going to be there whether you want it or not.

I think this becomes more apparent, particularly in pictures where they depend on silence to supply dramatic effect. For example, in the picture 2001. When we went to exterior shots of the space ship there was supposed to be silence, because there is absolute silence in space. However when we went to that silence in the theatre, all the ambient sounds of the theatre could be heard. With the air conditioner,

*sp . . . In reference to microphone techniques, and microphoning, do you usually use a very tight miking set-up? What do you prefer for motion picture music?*

A.P. . . . "I don't really like tight sound unless it's called for for some reason. If we are recording a small rock group in a motion picture, then I think that this kind of sound needs a tight pick-up, and I naturally gravitate to that. If we are recording an orchestra we are then dealing with a lot of players, large sections, and I prefer to back off for a 'thick' recording.

*sp . . . Do you use Limiters or Compressors for any particular instrument or vocal?*

A.P. . . . "I feel that these pieces of equipment have a tendency to flatten out the recording. I can't remember the last time I felt that I had to use either. I feel that if you can mix the recording you are ultimately better off. This is not to say that if I had to, I wouldn't use either; I would.

*sp . . . Have you ever had any problems with musicians who are geared to recording for records?*

A.P. . . . "No real problems . . . generally they like a tighter sound. They look for something tighter at the recording session. The problem, if it is a problem, is trying to please the composer, conductor and the musicians on the scoring stage with the kind of sound they want. Then trying to please the Producer, Director, Composer and myself, again, at the re-recording session. The difference between the two is enough so that I would prefer not to be as tight sometimes as the musicians would like me to be, when they hear the recording played back on the scoring stage, before re-recording. *continued/page 36*

# DOLBY AND MULTITRACK IN LONDON

With the increasing sophistication of pop and rock recording, quality conscious London studios are finding the DOLBY SYSTEM essential in preventing the noise problems which are otherwise inherent in multitrack recording. In London's rapidly expanding network of 16-track studios, 19 of the 20 recorders currently in use are fully equipped with Dolby noise reduction units.

Robin Cable at Trident Studios  
23 Dolby A201 units,  
including 16 on two 16-track recorders

Mike Claydon at I.E.C. Recording Studios  
fully Dolby equipped 13-track installation

Frank Owen at Island Studios  
30 Dolby A201 units,  
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top right:  
One of the Dolby installations at Olympic Studios  
London's first multitrack studio to use  
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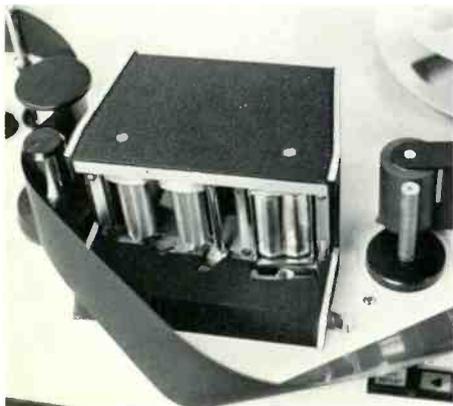


# NEW PRODUCT NEWS

SCULLY 'SERIES 100' SIXTEEN TRACK RECORDERS PRICED AT \$13,750. Using a revolutionary new record-play magnetic head design, and state of the art micro-miniature solid state electronics, the new 'SERIES 100' line of 16 track recorders priced at \$13,750 are said to offer virtually every recording studio the opportunity to install 16 track recording capability.



One key to the low price of the 'SERIES 100', said to approximate one half the cost of conventional 16 track machines, is the use of the unique head system utilizing a single head for both record and play-back functions. The design eliminates the need for a costly separate play-back head, and the attendant switching apparatus involved for



over-dubbing. The one-head system eliminates all sync problems. Switching noise, too, is completely eliminated. Punching in and out is done without concern for switching transients.

In introducing the new line of recorders, company president, Lawrence Scully, emphasized that the original design parameters were established, "to at least equal current performance levels of the existing 16 track machines costing twice as much."

Preliminary engineering notes indicate improvements in several important performance areas, including a significant improvement in 'signal to noise.' Full engineering specifications are to be released shortly.

Operationally, by the use of the most advanced high threshold logic integrated circuitry, the tape transport system is said to be "totally spillproof." The operator is able to switch from any mode to any other mode instantly. Also offered is a unique cue mode, and tape lift capacity in play mode.

Ease of calibration and unit alignment is another of the advantages offered through the use of a single master bias alignment for all 16 tracks.

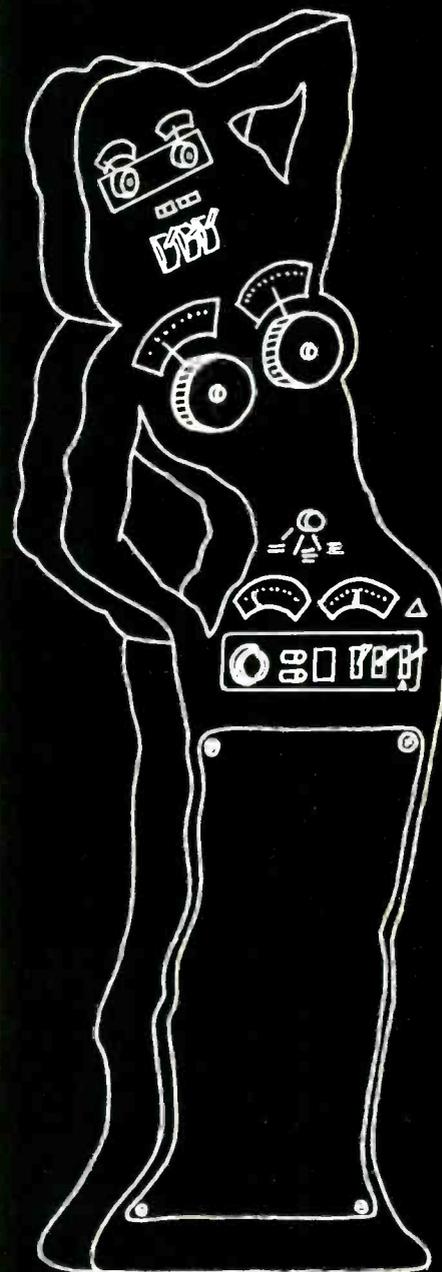
In lowering the cost of 16 track recording many of the redundant features found on present 16 track systems, microphone inputs, visible gain controls and the like; those standard features primary to consoles, have been eliminated as standard features in the 'SERIES 100'. A complete array of these redundant features can, however, be ordered as optional accessories.

An 8 track version of the 'SERIES 100' is also available. The 8 track version is designed for easy convertibility to 16 track when the need might arise for increased capacity.

Delivery of the first 'SERIES 100' systems is scheduled for January 1971. SCULLY RECORDING EQUIPMENT CO., 480 BUNNELL ST., BRIDGEPORT, CONNECTICUT 06607

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# Total Tape Duplicating with "Building Block" Simplicity

## CASSETTE TO CASSETTE, REEL TO CASSETTE, REEL TO REEL

The Telex series 235-1 is more than just another tape duplicating system. It is a concept based on modular "building blocks" which complement each other and provide total flexibility for tape duplicating. It solves the problems of interfacing between open reels and cassettes. It is a system designed for future expansion. Engineered to make tapes of true, professional quality. And it's priced within your budget.

The Telex system consists of only five basic units.

1. Solid state modular electronics containing amplifiers, meters and controls. This unit works with any combination of ten cassette or reel slaves.
2. Cassette master play transport.
3. Open-reel master play transport.
4. Cassette slave record transport. Records three cassettes simultaneously.
5. Open-reel slave record transport.

The five units are totally compatible. Intermix cassette and open-reel master or slave transports to suit your duplicating requirements; cassette to cassette, reel to cassette, reel to reel, or even cassette to reel. All units fit into table top consoles of uniform size so when your requirements change, you just add more units. It's that simple. Telex series 235-1 is heavy duty equipment with hysteresis synchronous motor tape drives, momentary push button controls and time delay circuits for smooth, positive tape handling. Selected premium grade duplicator heads provide long life and excellent frequency response. And fail safe, automatic features enable non-technical personnel to operate the system efficiently. Telex "building blocks" make a totally flexible and complete duplicating system. It's the sensible approach, designed to meet your needs today, next month and in the years to come. Made in the U.S. to professional standards. Systems start at \$1860.



Solid State Electronics. Bias oscillator module and two or four channel amplifiers.

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DOLBY LABORATORIES ANNOUNCES COMPACT 360 SERIES A-TYPE NOISE REDUCTION SYSTEMS. The new Dolby 360 Series noise reduction units are compact complements to the established A301 studio system. Designed specifically for recording applications in which space and weight are important, the new units are especially useful for multi-track and portable work. Performance characteristics of the Dolby Models 360 and 361 are identical, fully compatible and interchangeable with the Dolby A301 system.



The Model 360 is a basic single-channel noise reduction processor unit. The unit can be used for either recording or playback, the operating mode being pre-set by push button switches on the front

panel. This model is designed for monitoring, editing, and disc cutting, as well as for applications in which simultaneous record-playback monitoring facilities are required (one unit in record, one in playback). Operating controls include illuminated push-button switches for Rec/Play mode and noise reduction In/Out, and a push-button switch for Dolby Tone calibration oscillator. The price of the Model 360 is \$675.

The Model 361 is a single processor unit with built-in changeover facilities. This model is designed to serve one recorder track during both recording and playback (with monitoring of line-in or the unrestored tape signal during recording). The operating mode is set by push-button switches on the front panel. Remote facilities are also provided, enabling changeover to be controlled automatically by the record relay circuit of the tape recorder. Operating controls include illuminated push-button switches for Rec/Play mode, Remote control, noise reduction In/Out, and for monitoring Check Tape (unrestored signal directly from tape) or Normal Signal. Push-button switch for Dolby Tone oscillator. The price of the Model 361 is \$740.

Both units are only 1 3/4 inches in height and mount in standard 19 inch racks. This makes possible the mounting of the 360 or 361 in the "doghouses" of tape recorders. A 16 channel installation requires only 28 inches of height. DOLBY LABORATORIES INC. 333 AVENUE OF THE AMERICAS, NEW YORK, NEW YORK 10014.

Circle No. 118

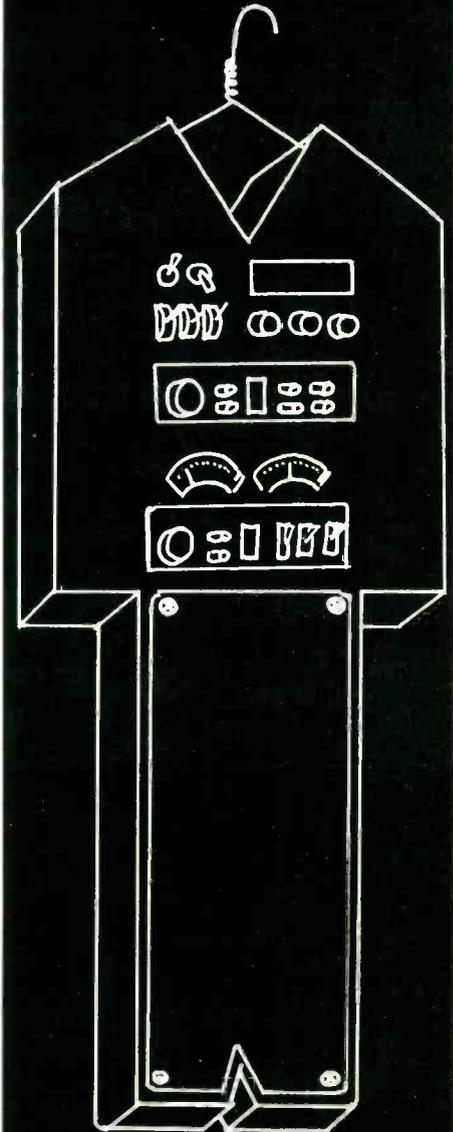
TELEX INTRODUCES CASSETTE DUPLICATING MASTER Telex announced the addition of the 235CM-1 cassette duplicating master transport to its already extensive tape duplicating line. The 235CM-1 is directly compatible with the entire Telex 235-1 duplicating system and conforms to the unique Telex "building block" principle. The 235CM-1 features an IC logic control which provides end of tape sensing for automatic shut off in both play and rewind modes. This combined with time delayed rewind, stop, play and fast forward controls insures against tape breakage or damage. The unit is equipped with a two speed (7 1/2, 15 IPS) hysteresis synchronous motor with automatic equalization. It is available in both two and four channel configurations with individual equalization and level adjustment for each channel. All primary solid state circuitry is on modular glass epoxy plug-in boards.



The 235CM-1 has a master switch for selecting either reel or cassette master system control and a frequency response from 30-10,000 Hz±3dB. The unit plugs into any existing 235-1 system to make it capable of duplicating reel to reel, reel to cassette, cassette to cassette, or even cassette to reel. The basic set of electronics accommodates both reel and cassette master and up to ten cassette or reel slaves. Telex priced the 235CM-1 from \$495.00. TELEX, 9800 ALDRICH AVE. SOUTH, MINNEAPOLIS, MINN. 55420.

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# We build consoles.



## Any Size.

Small. Medium. Large. Or extra large. One simple unit or several complex systems. Whatever your requirements, we accommodate. Which is one reason we've grown to the size we are. Another reason is the way we build maximum versatility and optimum performance into every unit we turn out. We'd like you to see our brochure to see for yourself. Just write for it. Bushnell Electronics. We build consoles.

# BUSHNELL

ELECTRONICS CORPORATION

15210 Stagg Street, Van Nuys, California 91405  
TELEPHONE (213) 989-2740

Circle No. 120

GOTHAM AUDIO CORPORATION announces its exclusive U.S. representation of the STELLAVOX Model Sp 7 Portable Synchronous Tape Recorder. This relative newcomer to the field of portable master recorders weighs but 8 lbs. including full complement of batteries, making it the lightest such instrument in its class.



The STELLAVOX Sp 7 measures 10½" x 8½" x 3¼" and provides four tape speeds (3¾, 7½, 15 & 30 ips), plug-in head assemblies for any track configura-

tion, tape oxide and equalization, STEREO recording, dual peak indicating meters, automatic level control, full SYNC capability with either Neopilot for mono or new SYNCHROTONE for stereo sync recording. Adapter for reels up to 10½" diameter, internal powering for two FET condenser microphones, remote controlled START/STOP, internal quartz synchronizer, electronic clap stick and many other features.

This rugged Swiss made instrument is easy to service since all electronic subassemblies are potted plug-in units, while all mechanical subassemblies require but three screws to be removed for replacement. Its unique capstan motor (pat. pend.) is only 2 inches high and also serves to open and close the capstan pressure rollers electrically without the need to open the recorder's cover. Many accessories are offered. Performance data equals or betters that found in any professional studio recorder. Descriptive literature is available. Sale is through specially franchised dealers from Coast to Coast. GOTHAM AUDIO CORPORATION, 2 WEST 46th STREET, NEW YORK, NY 10036 or 1710 N. LA BREA AVE., HOLLYWOOD, CA 90046.

Circle No. 121

## YOU-SHAPED SOUND...

### with Automated Processes Quadrasonic Stereo Panner Model 480

Precise, finger-tip, 360° control of a sound source into 4-channels is yours with the Model 480 Quadrasonic Stereo Panner. It lets you create any type of motion pattern; sequeways between stereo programs; reverb sound combinations; or static positioning (if that's all you want).

The single-knob "joystick" provides infinite resolution . . . stepless movement, noiseless and accurate. It also acts as a visual indicator for the phantom sound source.



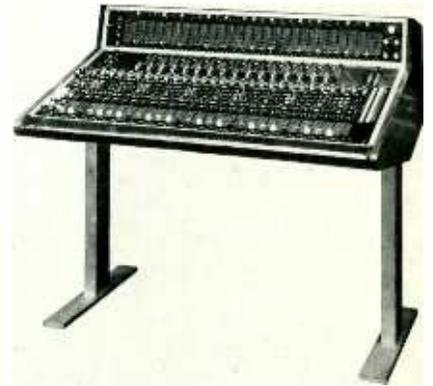
We designed the Model 480 to meet the demanding requirements of 4-channel sound positioning...low noise conductive plastic elements, precious metal contacts, connections for splitting 1 channel into 4, or simultaneous 2 into 2.

No power supply required. Occupies only 3" x 3½" of panel space, 3½" deep. To put "you" in the 4-channel driver's seat, contact us at once for technical literature.

**AUTOMATED PROCESSES, INC.**  
35 CENTRAL DRIVE, FARMINGDALE, NEW YORK 11735-516-694-9212  
In Canada: PERCEPTION INDUSTRIES, INC.

Circle No. 122

NEW CONSOLE FROM ALTEC LANSING. Altec's new entry in the console field provides up to 28 inputs and 16 outputs, measures only four feet in width and is delivered to the user fully wired ready to operate. The console is identified as Altec model 9300A.



With the requirements varying between studios, Altec decided to design a fully modular, plug-in type console which would never become obsolete as the studios requirements grew. The console can be expanded in capabilities through the simple expediency of adding Altec plug-in wired modules. The console's small size, accomplished by compact solid-state design, will do the work of boards three times its size.

An exclusive feature of the console is the application of the Altec Modulite™ volume level meter, a major development in accuracy and reliability in monitoring console outputs. Modulite is virtually instantaneous in following the audio envelope with a sequential pattern of colored lights giving the mixer a true picture of modulation. Response time is faster than the conventional meter and it is easier for the eye to catch colored lights than to focus on a meter needle.

Other features include a channel check which provides individual check of all input lines without disturbing the program; a pre-cue push button transfers signals from the output buss to cue buss; echo facilities permit selection of internal or external reverb devices and a bright or soft timbre; color-coded knobs enable fast and easy matching of input channels with correct output selector modules; more than 22 dB of headroom is provided.

Full details on this latest development in consoles is available to the broadcast and recording industry. Ask for information on the new 9300A console and write ADVERTISING DEPARTMENT, ALTEC LANSING, 1515 SOUTH MANCHESTER AVENUE, ANAHEIM, CALIFORNIA 92803.

Circle No. 123

PHASE SHIFTER FROM COUNTRYMAN ASSOCIATES. The Type 967 Phase Shifter provides a simple repeatable means of creating the unusual effects of phase cancellation. The Type 967 effectively delays the input signal up to 1 millisecond. Such delay is commonly produced, with some difficulty, by two tape recorders running out of synchronization.

A single front panel control provides a continuously variable phase shift. A switch selects the phase shifted signal, the unmodified input or the unshifted and shifted signals mixed linearly.

The Type 967 allows up to 720 degrees of phase shift at 3kHz and is



designed to operate at input levels up to +10dbm. The noise figure is -60dbm. The unit is battery operated (100 hours battery life) and lists for \$300.00. COUNTRYMAN ASSOCIATES, 424 UNIVERSITY AVENUE, PALO ALTO, CALIFORNIA 94301.

Circle No. 124

NEW COMPRESSOR ANNOUNCED BY QUAD-EIGHT ELECTRONICS. The Auto-Mix 2B is a modular compressor featuring continuously variable attack time (100ms to 2 ms) and release time (100ms to 5sec) with shorter release times available with an external strap.



selectable with a front panel push button. Ten de-essing curves cover all applications of de-essing. An 11 position curve selector accessory may be used externally or any one curve may be chosen by an appropriate connection on the 36 pin PC connector.

Front panel controls include a gain reduction meter; four rotary controls: input level, compression threshold, attack time, release time; and three push buttons: gain reduction in/out, slope selector 4:1/2:1, de-ess in/out. The separate input and compression controls allow for a 90 db S/N at all compression conditions (-86 dbm output noise compared to a +4 dbm output signal level). The output capability is +24 dbm and THD is less than 0.25% (20Hz to 20kHz) with or without compression to full rated output. Power requirements are 28 volt regulated bi-polar DC.

The price of the Auto-Mix 2B is \$250.00. QUAD-EIGHT ELECTRONICS, 11810 VOSE STREET, NORTH HOLLYWOOD, CALIFORNIA 91605.

Compression ratios of 2:1 and 4:1 are

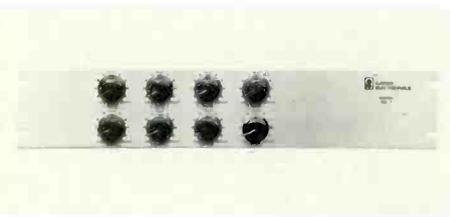
Circle No. 125

GATELY ELECTRONICS announces two new equalizers designed to work with their EM-7 Echo Mixer.

The first, the PEQ-7 is a four channel peaking type equalizer. This unit features two low frequency peak frequencies, 40 and 100 hz, and five high frequency peak frequencies, 1.5, 3.0, 5.0, 10 and 20 khz. Boost or dip at the selected frequency can be inserted in steps of 2, 4, 6, 9 and 12 db. The unit utilizes IC circuitry and has zero insertion loss. The unit plugs directly into the EM-7.

The second, the EQ-7B is an IC version of the EQ-7 shelving type equalizer. It features zero insertion loss, extremely low noise (-86 dbm) and an equalization

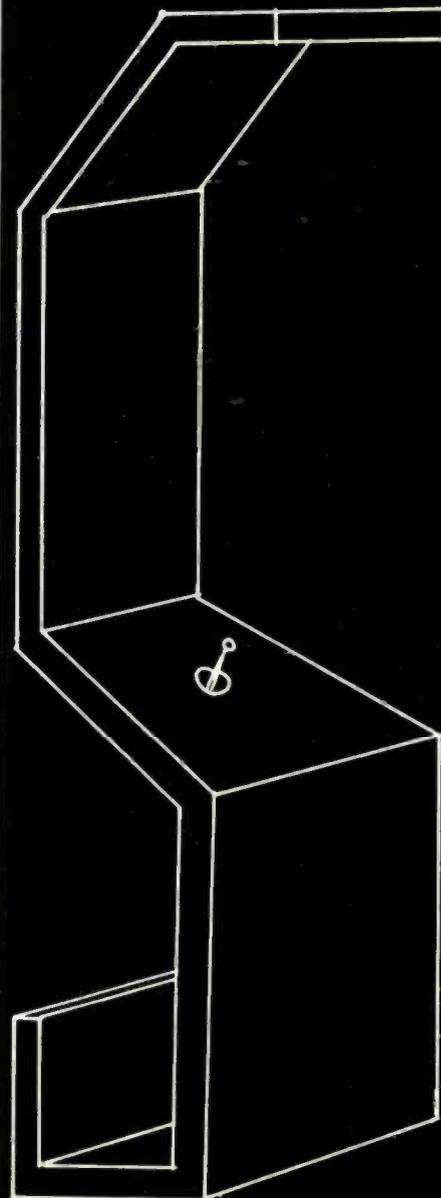
capability of +15 db at each of the frequency extremes.



These two new products further expand the flexibility of the Gately Series 7 series of low cost mixing systems. GATELY ELECTRONICS, 57 WEST HILL-CREST AVENUE, HAVERTOWN, PENNA. 19083.

Circle No. 126

# We build consoles.



## Any Kind.

One circuit, or thousands. Vertical or horizontal. Right or left handed. It takes all kinds. So, as one of the West's largest custom console builders, we build all kinds. Maximum versatility and optimum performance are two things they have in common. Just write for our brochure and you'll see what we mean.

Bushnell Electronics. We build consoles.

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Circle No. 127

**FOUR-CHANNEL QUADRAPHONIC PAN-POT FROM QUAD-EIGHT:** Known as the "Quad-Panner," this new mixing tool is designed to provide Quadraphonic panning in four unity gain channels. The four inputs are individually controlled with a "joystick" panoramic control, which positions the program material to any point in the Quadraphonic area with constant acoustic level. It is balanced or mixed with a level adjustment control for each channel.

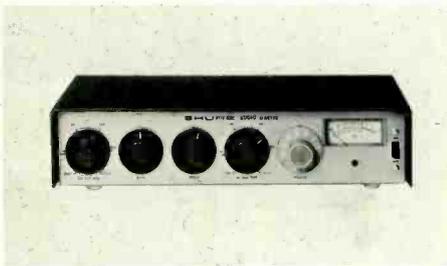


An additional and exclusive feature is a four position blend control which permits either extreme Quad movement or three blended, limited spatial movement

Circle No. 128

**SHURE INTRODUCES "AUDIO MASTER" FREQUENCY EQUALIZER.** Shure Brothers Inc., Evanston, Illinois, has announced a unique frequency-equalizing audio control center for numerous sound shaping and control applications in sound systems and broadcast and recording studios.

Called the M63 Audio Master, the new component is designed for use with Shure M68 and M67 Series of Microphone Mixers and other high level output devices to obtain an almost unlimited variety of response curves.



Applications for the Audio Master include converting the output device to a

Circle No. 129

remote amplifier—with equalization—in broadcast stations, equalizing music and program material in broadcast and recording studios, frequency shaping to reduce feedback and enhance sound quality in sound systems, removing objectionable high or low frequency noise in public address systems, and providing audio control and monitoring facilities in multiple mixer applications.

Bass and treble controls, along with variable high-pass and low-pass filters and a volume control, give the Audio Master its sound-shaping abilities.

The Audio Master accepts two high level inputs, and has outputs for headphones, 600-ohm balanced line, high-low impedance microphone level, and auxiliary high impedance, high level. For monitoring applications, the new component has an illuminated VU meter that follows program material with accuracy.

List price of the M63 Audio Master is \$160.00. For additional information, write: SHURE BROTHERS INC., 222 HARTREY AVENUE, EVANSTON, ILLINOIS 60204.

*continued from page 29*

the pop-corn machine, the nervous movement of the audience, we didn't hear silence at all. Our concentration on the dramatic effect was broken by the 'silence' of the theatre. The same problem existed in MAROONED.

*sp... How did you overcome the problem?*

A.P. . . "We were convinced that absolute silence in the theatre was 'deadly'. The producer had already decided that he did not want music, nor did he want a sound effect. We were in something of a dilemma with his instruction: Do something!

What we decided on was kind of a psychological substitute. We invented a sound which wasn't music, wasn't a sound effect, but was a psychological substitute for both of them, by having something not quite earthy and not quite extra-terrestrial. The sound we invented, was invented to do just one thing; fight the terribly distracting problem of 'silence'. It was a sound intended to make the audience think of space, but it was not intended to be space. It wasn't meant to be realism. We were only taking license and contributing to motion picture 'make believe!' It was quite successful, we think."

*sp... How so you feel about the new school of absolute realism in motion pictures today, as opposed to the old 'movieland magic' of yesteryear?*

A.P. . . "I think that in this day and age of motion pictures . . . and the so called realism glaring at us from every side it is good to think that the silver screen up there can bring us something other than the everyday reality of a polluted stream or the reality of a garbage pail.

I feel that it is our business to think in terms of creating some aural/visual/psychological magic . . . if we can without being too pretentious. *END*

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A major manufacturer of recording, professional and broadcast products is seeking manufacturer's representatives for their broad line audio products in selected major market territories.

This established line offers a single source of extremely high quality studio equipments including tape recorders, mixing desks, microphones, signal processing equipment, and other accessories.

Our agents will receive full home office and field support from the factory and through our own local field offices.

Qualified individuals and/or M.R. organizations interested must show solid sales experience in the field and must have an established rapport with the users of recording, professional, and broadcast audio products.

For further details, write: Box BEC, Re/p, 6430 Sunset Bl., Hollywood, Ca. 90028

**WANTED:** Major Recording Studio needs engineer (mixer) preferably from the New York City or Nashville area. Phone (212) 581-2178 or write A.L. Holmes, 729 Seventh Ave., N.Y., N.Y. 10019

### NOTICE

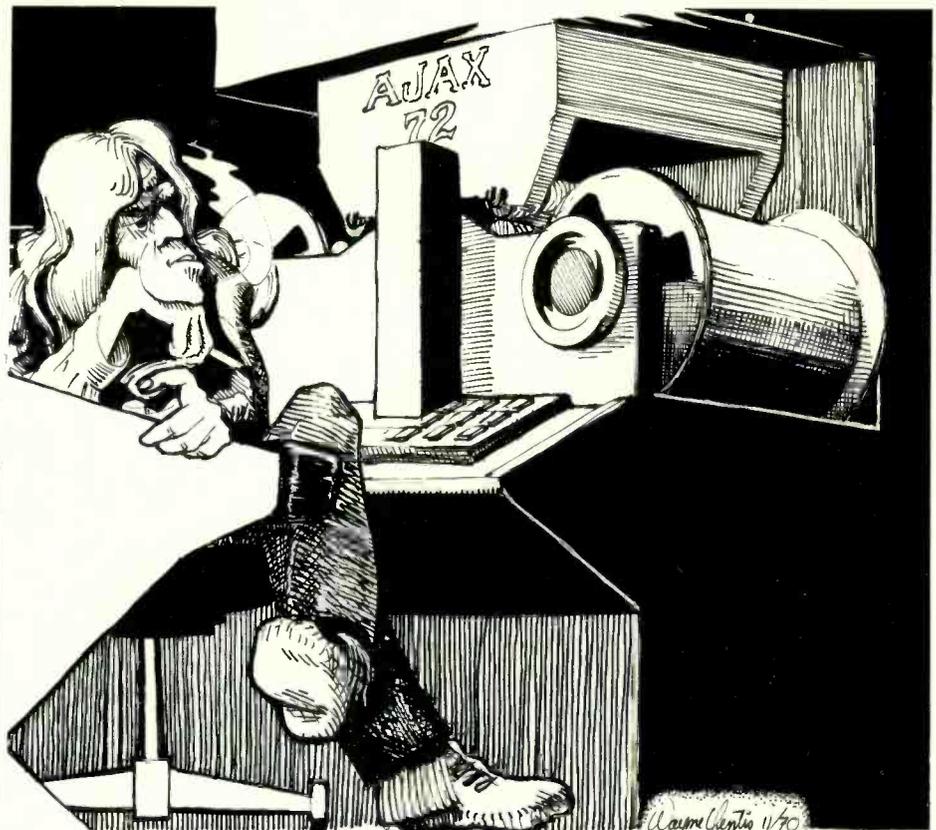
INDIVIDUALS seeking employment in the recording industry may submit their qualifications for **FREE** publication in *RECORDING engineer/producer*.

Listings will be limited to 30 words, and will be limited by available space. Listings will be selected for publication on the basis of earliest postmark. Listings will not be automatically repeated or carried over to the succeeding issue.

**CREATIVE YOUNG ENGINEER** owns two-track studio, wants apprenticeship with eight-track or larger. Need week's notice only. Masters available. Contact: CEE Recordings, P.O. Box 8921, ABQ, N.M. 87108

**ENGINEER** with ten years television audio mixing in various musical shows including New York network. Seeking position as audio mixer with recording studio. Resume on request. P.O. Box 2169, Grand Central Station, New York, N.Y. 10017

coming in the Jan/Feb issue:  
an on the scene report of *Re/p*'s visit with BEATLES producer **GEORGE MARTIN** at the new AIR STUDIOS, London.



... TRACK 68, ECHOED COWBELLS; 69, DRIPPING WATER LEFT; 70, DRIPPING WATER RIGHT... NOW WHAT ABOUT TRACKS 71 AND 72??

### Limited Supply Now Available: complete course outlines of the **1970 Brigham Young Audio Recording Seminar**

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Circle No. 131



# 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.)

ELECTRO-VOICE, INC., Dept. 1001RP,  
674 Cecil Street, Buchanan, Michigan 49107

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. \$88.00 list. less normal trade discounts

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