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December 1976
Volume 7 — Number 6

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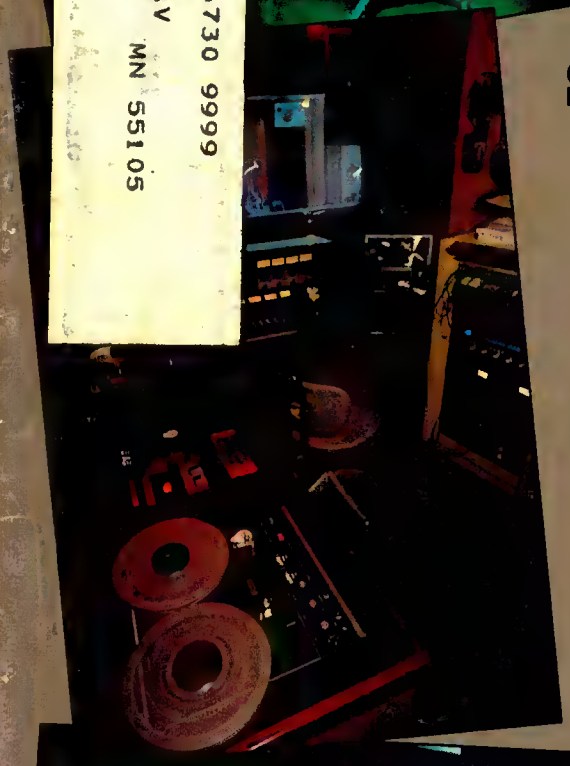

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Letters and Late News

From: **Malcolm Addey**
New York, N.Y.

Howard Cummings is quite correct in crediting Ken Townsend with developing Artificial Double Tracking but is incorrect on two other points.

ADT had absoluteley nothing to do with the use of the EMI BTR2 machine any machine could have been used! The point was that the Studer C37, 4-track machine was the only machine in its day to have a separate sync playback amplifier on each track. This enabled the mixing of the advanced signal from the record head, after having been delayed on a VSO'd ¼" machine, with the signal from the playback head.

Mr. Cummings' other error was the name of the engineer on those early Beatles sessions. It was, of course, my old friend and colleague **Norman Smith.**

Reply from Howard Cummings –

The reason I mentioned the U.K. BTR 2 tape machine is because I thought the first experimentation, series of sessions, or VSOing had been carried out with this unit. Mr. Addey and Mr. Townsend would be better qualified to answer this though.

The name of the engineer on those early Beatles' sessions is indeed **Norman "Hurricane" Smith,** *now famous singer. I succeeded in naming him correctly in the "Ken Scott Interview," (R-e/p, August 1976) but my later reference to Norman may have become intermingled with Producer George Martin's name.*

As an aside, Mr Addey is mentioned in the "Alan Parsons Interview," in the October 1976 issue of R-e/p.

From: **John W. Bittner, Jr.**
Mastering Engineer
Wakefield Manufacturing
Phoenix, Arizona

The article on half-speed cutting in the October issue by Stan Ricker and Peter Butt very adequately sums up the advantages of this technique. Permit me, however, to make some further comments.

Although the advantages of half-speed cutting in regards to an improvement in high end quality cannot be argued, the authors fail to mention one noticeable disadvantage. The bass frequencies are also shifted down an octave. Although this poses little problem for the cutter (except if feedback control falls off), it does require a tape transport with exceptionally good feedback response with freedom from head bumps if the bass is not to suffer.

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Letters and Late News

continued . . .

Finally, normal speed playback of a disk cut at half speed, shifts the mechanical noise on the disk caused by lathe rumble up an octave where it is more readily perceived. Unfortunatly, half-speed cutting, like everything else in the real world, only buys you something if you're willing to pay the price.

From: **Joseph F. Wells, Manager, Quality Assurance and Electronic/ Recording Development RCA Records Indianapolis, Indiana**

I enjoyed reading the article by Stan Ricker and Peter Butt about half-speed disc cutting in your October issue. Our experience confirms the advantages claimed for this method of cutting.

During the Audio Engineering Society Convention held this past May in Los Angeles, a paper was presented describing the Quadulator, a device which permits a normal stereo lacquer channel to be used for half-speed cutting of either CD-4 or stereo records. With this device, it is unnecessary to use specially equalized cutting amplifiers or tape playback electronics.

A copy of this paper is available upon the request of your readers.

ed: Mr. Wells' generous offer may be accepted by writing him at RCA Records, 6500 East 30 Street, Indianapolis, IN 46219

From: **Michael Rettinger Consultant on Acoustics Encino, California**

I was prompted to the write the [enclosed] paper "STANDING WAVES" IN ROOMS [see page 28] after I read Garry Margolis' paper "Inside the Studio Monitor," where he said (top of page 57 in the October 1976 issue), "If the reverberation characteristics of the control room are not uniform in frequency response and/or there are acoustical standing waves present the response of any system in that room will be affected." This is a very broad statement, outside of the fact that a room cannot have a number of reverberation characteristics, but only one reverberation characteristic, and the fact that a reverberation characteristic does not have a frequency response, because the reverberation characteristic is the variation of reverberation time with frequency; plus the fact that he does not define "acoustical standing waves" (are there other standing waves possible in a control room?), plus the and/or phrase.

Reply from Garry Margolis –

Mr. Rettinger correctly points out that a broad simpification I used in my article is imprecise. To be more accurate, the sentence should have read: "If the reverberation time of the control room is not uniform with frequency and/or serious standing wave effects are present . . ." This does not, however, change the point of that paragraph, which is that monitor equalization is not the universal panacea claimed by some proponents.

ABC/Westminster's Producer KATHRYN KING – one woman's success in the studio world, and a report on the state of the Classical recording market.

by Kim McKenzie

As progressive an industry as the music business is, the studio end particularly, it has been slow to realize the potential creative talents of women in decision making positions, as yet. Although she doesn't think of herself as a pioneer, ABC Records' classical producer Kathryn King is one of the first women in music to attain a position of creative control.

After studies at UCLA, majoring in Ethnic-musicology, and an apprenticeship of long hours in tape libraries, and stooped over an editing block, experience as an independent audio engineer, along with continued study of the classical field, Ms. King has risen to her current position as head of the classical department at ABC Records.

In expanding the ABC catalog of classical releases Ms. King has had to unify both the technical and artistic disciplines with those of marketing. Not the least of these duties is the constant task of keeping the pop-hedonist sales and marketing structure aware of the potential in the expanding classical market. In discussions with Kathryn, she analyzes the classical music market by comparing it today with the past few years, and projecting it for the next decade, or so.

The Classical Recording Market in the U.S.

There are indications that the classical music market is in much better shape today than it has been in quite some time. According to current estimates classical recordings amount to about 5% of total record sales in the U.S. (a significantly lower percentage than world-wide sales). This 5% compares to a low of only 2% of total U.S. record sales occurring just a few short years ago. The reasons for the percentage increase are both theoretical and factual.

For one thing, the established classical audience in America seems to be hungry for new repertoire. This has been borne out in a number of cases such as that of the album LA DAPHNE, a 15th century Italian opera, recorded for ABC/Westminster Records for the first time by Ms. King, which has sold quite well, gotten exellent reviews, and was nominated for a "Grammy," to boot.

Then, too, there seem to be several categories of contemporary classical musical activity spurring the increased interest. One of these areas might be called "serious music written in the traditional style," more or less a continuation of the music that has been written and recognized as classical music for centuries, but by more contemporary composers. Examples would be the works of Elliot Carter, Aaron Copeland and Samuel Barber. These works are pretty much what most concert audiences expect to hear in the concert hall, *new* works performed in a familiar classical style and structure. Another facet is represented by modern day serious music composers, like Isao Tomita, who use today's contemporary instrumentation in their presentations. Mr. Tomita, among others, employs the synthesizer to add to the appeal of familiar pieces by Debussy, Ravel, and Mussorgsky, and the like. These old favorites are presented in bright, exciting, new ways. A purist might take issue with the change in orchestration and interpretation, however the increased exposure does much to educate new audiences with historic classical compositions.

The third, and perhaps most progressive category comes from the younger composer who has lived through, and been influenced by the Rock experience. Daniel Lentz, Terry C. Riley and Steve Reich are writing in a style that is far and away from what was considered the norm. The structure is such that it does not necessarilly follow a pattern of: beginning,

building to a climactic middle and the predictable diminutive ending. The listening experience affords a certain mystery because it doesn't conform to a format. This music seems destined to remain in the land of esoterica for a while, however, because it rarely gets radio or media exposure.

The incursion of Classical Music on contemporary life style

The presence of classical music in contemporary rock recordings becomes evident in listening to Pink Floyd, Deep Purple, and Emerson, Lake and Palmer. The Electric Light Orchestra has a very definite taste of the classical style in their work. Oddly enough, the film industry has done more than any other media to acquaint the American record buying public with the traditional classics. Stanley Kubrick's films are perfect cases in point. His latest production being BARRY LYNDON in which Leonard Rosenman's score was applied. Mr. Rosenman and Mr. Kubrick chose to utilize a contemporary group of musicians, The Chieftans, whose forte is traditional or classical Irish music of the period. The music enhanced an added authenticity to the film work. 2001, A SPACE ODYSEY, and CLOCKWORK ORANGE are earlier works in which the use of one art form (classical music) effectively enriched the art of filmmaking, as well as having boosted classical record sales.

The Economics of Classical Recording

With all of the encouraging pictures painted, it's hard to believe that record sales of classical recordings aren't flourishing more. The truth is, the field faces some very real problems.

The recording industry in America is structured on a twelve month return basis. If a record doesn't recoup it's production costs in a year, it's more or less considered a failure, or worse, not considered at all. (What is known as popular music or "Top 40", in fact, does make it or break it within a few months after it's release, (with few exceptions) and that accounts somewhat for the pervading attitude.) However, in classical releases the return is much slower, and though it continues to sell for a long period of time, record company executives have difficulty in adjusting to the different marketing approach. The contrast in budgets is a big key. A "Rock" album's production budget can range from $30,000. to $75,000. and not seem unusual, whereas the accepted classical budget is closer to $30,000. *maximum.* Obviously the restrictions hinder the production of newly recorded material in the field.

New techniques in the audio recording field provide the tools for two things to happen. It can give the producer the freedom to make an incredibly clear, quiet and accurate recording, or it can be the road to destruction. Destruction coming in the form of changing the composer's original idea, which to a purist is the ultimate disaster. Noise reduction units such as Dolby and dbx, along with higher tape speeds improve the signal to noise ratio particularly in the lower dynamic range, and that has been a boon to the classical record producer. All this is assuming that the production budget will allow for the extra expense of tape necessary to work at the increased speed. So, we arrive back at point "A" in the profit or doom philosophy which centers around the economics. Innovative ideas in orchestra and microphone placement however are within the reach of the creative engineer and producer and recently have been put to good use by resourceful people. Recordists and mixers are also finding that the old tried and true method isn't always the best way, and this has opened the door to some refreshing music reproduction. The concert hall and the studio recording are being distinguished by classical producers and technicians as separate listening experiences. Rock audiences have been interested in hearing both the live and the studio reproduction for a long while and the classical audience is slowly becoming aware of the difference and enjoying both. This is another possibility for record sales being increased.

The situation in Europe's classical market is about 180 degrees from that in the U.S. Government financial support of the arts in general is a large contributing factor, and the percentage of classical recordings sold in Europe is close to 20%. The substantially higher list price and greater volume of sales generates a more adventurous attitude and of course the production budgets are considerably fatter than what U.S. companies can allow. America's domestic production is greatly effected by Europe's market because in many cases it is more economically feasable for an American label to licence a European or Japanese company and merely distribute their line in the states, creating that much less a chance for the music to be produced in the U.S.

The United States has quite a distance to go before reaching the potential, but with sales figures reflecting the increased demand for classical records and dedicated individuals like Kathryn King in the industry, the light at the end of the tunnel is a bit brighter. Music lovers deserve a wide variety from which to choose and classical music is one of those important choices.

CETEC AUDIO — CAL STATE UNIVERSITY, NORTHRIDGE TO CO-HOST "CREATIVE AUDIO EFFECTS FOR THEATRE" SYMPOSIUM

As announced by Bob Slutske of Cetec Audio and Dr. William F. Bellman of the department of theatre of the university demonstrations of newly developed creative audio effects for theatre presentation will be demonstrated on the consecutive Saturdays, January 24th and 29th 1977, from 9 a.m. through 5 p.m. at the university.

The demonstrations on these Saturday days will be the result of a period of concentrated evaluation, testing and rehersal using sophisticated audio equipment so far not commonly found in live theatre presentation. This equipment will include: multi-channel audio console with pre-settable distribution system, digital delay devices, new speaker systems, synthesizers, parametric equalization, wireless microphones, multi-channel panning, time warping devices.

As opposed to just a laboratory or an abstract evaluation of the techniques and equipment the demonstrations will be focused on the realism provided by solutions to problems presented in the preparation of the actual production of Ionesco's Rhinoceros.

According to Dr. Bellman: "It's (Rhinoceros) audio "score" will be developed utilizing the effects which will be demonstrated. There will be extended opportunity to try out the equipment and to discuss its effect with the theatrical specialists in attendance."

Persons interested in attending either of the demonstrations should contact either Dr. Bellman at (213) 885-3086 or Mr. Slutsky at (213) 875-1900 for detailed scheduling. Space is limited and there is no charge.

MANUFACTURING SWITCH: U.S. ELECTRONICS ASSEMBLIES TO BE USED IN GERMAN AUDIO PRODUCTS

There has been nothing unusual about U.S. manufacturers importing labor-intensive as well as quality foreign-made electronic parts and sub-assemblies to incorporate into their equipment. The switch is when a U.S. manufacturer ships his products overseas to be used in foreign-built equipment.

San Diego based **Communications Company**, has been shipping the electronic chassis of its ARA-412 acoustic response analyzer to Audio International, in Frankfort, West Germany, to be incorporated into real time analyzers now being sold throughout Europe. The equipment is used to test microphones, isolate interference, adjust equalization of amplifying systems, check loudspeaker deficiencies, and test tone controls.

Victor Hall, president of Communications Company, Inc. said, "Americans oftentimes view foreign-built equipment as being in a class by itself as far as quality is concerned. On the other hand, Hermann Hoffmann, president of Audio International, tells us that many Europeans feel that way about U.S.-made products."

The made-in-America ARA-412 requires a DC oscilloscope plus a "pink-noise" generator. The West German version, the ARA-412-27-G, has both oscilloscope and white/pink noise generator built in.

Hall expects the West German equipment to be marketed in the United States later during 1977.

TAPE SPEED/PITCH CHANGE CONVERTER OFFERED BY MCI

A pocket-size reference containing a tabulation relating tape speed variations to musical pitch changes is being offered by MCI without charge.

The table is useful to determine the amount of speed change necessary to achieve a desired change in musical pitch. Conversely, the change in musical pitch resulting from a given change in speed may be determined just as easily.

A copy of the tabulation entitled "Variations in Tape Speed Vs. Change in Pitch" may be obtained by request on letterhead addressed to:

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The world

of

ENGINEER / PRODUCER

EDDIE KRAMER

by
HOWARD CUMMINGS

Engineer, mixer, studio designer — Eddie Kramer has done them all — sometimes under less than ideal conditions.

Born in South Africa, Eddie came to settle in London in 1960. After flings at running messages and being a "general dog's-body" for about a year, he got into an advertising agency that dealt in TV production. While there one day, he picked up a TV yearbook, went through it with a pen, and with it, picked out half-a-dozen recording studios. One of the studios was Advision run by Roger Cameron, and later famous for the Yardbirds, Emerson, Lake, and Palmer, and Brian Auger. It was here he learned the basics of tape and film editing, disc-cutting, and the operation of film projectors and tape machines.

Pressed for money, Eddie heard about Pye Records opening a studio and managed to land a job through the graces of manager Bob Auger. To supplement his income while there, he built record store demo-booths and in 1963, a P.A. system for fellow South African Manfred Mann, then of the Mann-Hugg Blue Brothers.

With fellow work-mate Ron Pickup (that's right -- Pickup), a video engineer for ATV (Associated Television - London), and an Uncle's capital, Eddie next started his own recording studio in the back of a travel agency in the London suburb of Islington.

The new-founded KPS studios started off with an old 2-track Ampex borrowed from friend Ken Attwood of Pye, a Grampian Spring unit, 100-watt amp, and an 8-channel console built by Ron. Demos of the Kinks, John Mayall, and Zoot Money followed, along with a reputation for being a good demo studio in London's East-End. Says Eddie, "I really cut my eye-teeth on that, learning how to record under very adverse conditions, unlike the kids today who work in a 16 or 24-track studio and not knowing how to record 2-track or mono. I think every engineer should be required to take a minimum of a year recording 2-track and mono."

Later KPS was put up for sale and through the grape-vine, Regent Sound Studios bought them after hearing a demo tape. A new Regent Sound was built and Eddie was put in charge as manager. Rejecting the hectic pace after six months, and feeling that Olympic Studios "was the pinnacle at that time" -- he moved over after receiving a call from studio manager Keith Grant.

The plot thickens from here . . .

Eddie Kramer: Olympic Sound was, at that point, *the* studio. I don't think there was a studio in the world that could touch it.

Howard Cummings: Are we talking '67-'68?

Eddie Kramer: We're talking '67-'68, that's correct. The studio had just been built, it was built in '66 in fact.

Howard Cummings: I know they used to be in Baker Street.

Eddie Kramer: I worked there for about 6 months. In fact, I helped cut the umbilical cord, so to speak, of the board at Carton Street, just behind Baker Street. Keith Grant and Dick Sweetenham were the two driving forces behind Olympic Studios.

. . . I like to use . . . both distant and close miking . . . the catch phrase is . . . distance makes depth!

Howard Cummings: I recently picked up an album engineered by Keith Grant and the Dick Sweetenham I know of is an Audio Consultant or designer.

Eddie Kramer: Dick was the chief engineer for Olympic for many years and he designed and developed the first transistorized *modularized* console in England and I think in the world. I don't think anyone had done that at that point. The board at Olympic in Carton Street was a very advanced console, albeit a kind of slung-together type of board, but it *did* have the first modular approach to recording. The modules broke down to various modules within itself -- to perform with great ease and facility.

Howard Cummings: An "arm's reach" approach then.

Eddie Kramer: With an arm's reach approach, and there was something about the sound of his consoles which, to this day, I think, are some of the best in the world. His present company is Helios electronics which I'm sure you know about.

H.C.: Yea, The Manor. (U.K. Studio)

E.K.: Yes, I just did an album recently there. (Mott)

H.C.: Maybe you could compare it to the Abbey Road board -- the old *Abbey Road board -- the mainstay of 1961-1968.*

E.K.: I only saw it once, I never worked on it -- but there's something about boards like that -- they had a sound all their own. The first board that was at Olympic in '66 was the trendsetter for the future. During that time Dick was designing and building a new console for Olympic in Barnes (Southwest London) -- which was a 6-track console.

H.C.: Six-out.

E.K.: Six-out, in fact they eventually modified it to 7 because there was a 6-out and a pan position and the pan position was used as a 7th channel and later they had another channel to make it 8. They kept modifying this poor console -- it was modified so many times. However, that console, which was being built in the basement of Carton Street, was the forerunner of the contemporary Helios boards. Everything was a module: the echo, the equalizer, the line amplifier, and those within themselves broke down into more modules. There were little plug-in cards inside that, all with solid-gold contacts. He had this pin-board, it was a tiny little patch-bay, it was about 6" x 6" with little computer pins, into which you could pre-plug an equalizer or a limiter -- there was a little key switch on the module that you could key-in or out which nobody in America had even heard of. It was just a very advanced piece of technology he was using and he influenced me in the design of consoles that I put together for Electric Lady, and that in its turn influenced many American designers, so he is one of the forerunner founding-fathers of the electronics industry in regard to modern consoles.

H.C.: Any other early influences?

E.K.: Keith Grant was certainly influential in teaching myself and many other engineers the techniques of utilizing "space" in recording. I gained my own experience through doing a lot of classical sessions at Olympic, since I had a classical background. I wish I had done more of it, it certainly held me in good stead because there are certain approaches I use in modern rock recording.

But when I first saw the new Olympic it was an old movie studio. It was the *biggest* studio, it went on *forever.*

H.C.: You had not seen EMI No. 1?

E.K.: Olympic was the biggest I had seen up to that time. But there I got into classical, Stones, Spooky Tooth, Traffic, Beatles, and Hendrix among others. Another engineer who influenced me was Bob Auger at Pye. It's this thing about "depth" in recording. Close-miking is all well and good, but I think a lot of recordings today sound computer-synthesized. It's used to the point where that's all they think of. I like to use both distant and close miking . . . the catch-phrase is "distance makes depth," and I stand by that. One of the things that Keith and Bob Auger came up with is this . . . (gestures)

H.C.: ambience?

E.K.: Ambience, to give it this nice "fat" sound. I think the closer the mike, the less "bloom" from the instrument you get. That was the great thing about Olympic -- it was dead . . . but it wasn't dead. Acoustics are a matter of . . . 80% hard work and 20% luck and that 20% luck factor really happened at Olympic. The main studio is about 70' long by 50' wide by 35' high.

H.C.: The one I had seen was the one where they shot "1+1" with the Stones. Is that the large studio for BEGGAR'S BANQUET . . . SYMPATHY?

E.K.: Yes. Also, Olympic had that "dead" sound or that big "open" sound. Electric Lady is one of the closest in an American studio. You can open the room up and get the "depth" and length of the room or you can close it up. To me, this is absolutely essential.

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H.C.: How about the BABY YOU'RE A RICH MAN sessions with The Beatles. (June '67)
E.K.: Yeah, I did it, Keith Grant and myself on that and ALL YOU NEED IS LOVE. I did the basic track on LOVE, then they took it back to add strings for the TV show (satellite broadcast). So it was bass, drums, piano, guide vocal, and guitar . . . Paul played string bass on that -- Keith Grant's string bass was lying in the studio and he picked it up and played it.

H.C.: Was everything on BABY done by you at Olympic?
E.K.: **Everything**! It was done and mixed and finished there in one night.

H.C.: I had not heard that song in true stereo until about 9 months ago and what knocked me out was Paul's great bassline near the intro . . . my woofers . . . really great. It had never been released in true stereo in the States.
E.K.: Well, that's a (reflects) . . . that's a particularly nice recording. I'm very proud of that one. What we set out to do . . . we *had* to do better than what the Beatles had done before. It was a challenge to me and Keith to do *the* top job.

H.C.: At their (The Beatles) request or your own?
E.K.: Because of our own desire to top whatever they had done before.

H.C.: So you were kind of fighting Geoff Emerick (SGT. PEPPER engineer) in a friendly way.
E.K.: Oh, yeah . . . sure.

H.C.: How did you approach those sessions?
E.K.: They came in and said, (Liverpool accent): "Hey, we gotta do this television show. We gotta write something for it." On ALL YOU NEED, I remember John (Lennon) sitting there in the control room singing "All you need is love, all you need is love", repeating it and repeating it and they would keep doing takes and we'd let the tape machine roll until it was right. Then they'd come and have a listen. And when it came to actually getting sounds on LOVE, I would get a sound, and try to refine it in the mix and George (Martin) would say: "Don't, just leave it the way it is". He just liked things to be left alone, he didn't want me to fiddle around once I got a sound.

H.C.: How about the set-up on BABY?
E.K.: It was pretty "open" in terms of miking because there had been a classical session there previously. I think there was a D30 on bass drum and Ringo was underneath the projection-room overhang with a lot of live-sounding wood around. The talk-back mike was rigged up in such a way that Lennon could sing the song to the rest of the group from the control room.

H.C.: Wasn't there a keyboard that Paul was playing called an Ondioline?
E.K.: (pauses) . . . Ah . . . yes . . . *That's right!* It's coming back to me now. It was played as an over-dub. There were these weird French electronic instruments laying around the studio like the Ondioline and the Clavioline -- that was actually a Clavioline being played. It's a two-octave keyboard with slide-bar ring to control pitch and vibrato. There were only a few of them made. Keith (Grant) did the final mix on BABY.

H.C.: Anything besides those two songs?
E.K.: They did come in to help the Stones on SATANIC[4] on some background vocals . . . John and Paul.

H.C.: Let's see, that was Glyn Johns on 4-track which was pretty respectable, other than whoever cut the U.S. lacquer at Bell rolled off too much bottom-end.
E.K.: Disc-cutting wasn't too great an art at that time. I was tape operator on SATANIC though and also played some percussion.

H.C.: How did the recording of some of the cassette tracks for BEGGAR'S BANQUET come about? JUMPING JACK FLASH, PARACHUTE WOMAN, etc. ('68)
E.K.: Jimmy Miller (Stones producer), wanting to get a funky, open sort of sound, brought into the studio his Wollensak cassette machine and we recorded those basic tracks along with STREET FIGHTING MAN. Charlie (Charlie Watts--Stones' drummer) used the set of toy drums with brushes on it. We all sat 'round in a circle, tape machine in the middle, acoustic guitar with drums, they banged away, and that was it -- the basic track. *That* was then played back through a little Phillips speaker into a U67 and onto a 4-track machine.

I also did some guitar over-dubs and bass over-dubs, but I left for the States before BANQUET was finished.

H.C.: I know you were involved at the Woodstock Festival ('69) in an 8-track situation . . . with No-Doz?
E.K.: I didn't get any sleep -- that's for sure. I recorded 98% of it, all on 8-track. It was actually seven tracks of an 8-track, the other track being used for film sync. It was a very primitive console that belonged to the guy that did the P.A. and it was a nightmare. It was a 12-in 8-out with a pile of Shure mixers stacked 20" high, and I think there were a pair of really weird 604's in very small cabinets and two Scully tape machines -- one of which I think was in a crate -- very primitive. The electronics were in one box and the deck in another box. Our on-stage communications were very poor -- had a lot of hum and noise, etc.

H.C.: I felt the final mixes in the album were junk. How did you feel about them?
E.K.: Dreadful. I wish *I* had done them. They took it away from me because of some political reasons. There were some conflicts between the guy hired to do the "production" (chuckles) and myself.

H.C.: How did you guys handle stage set-ups between acts?
E.K.: With great panic! (laughter) There was a revolving stage which collapsed after the first act (chuckles) and it was no longer a revolving stage (chuckles). It just couldn't take the weight so it was just a matter of everyone jumping in to pull mikes and cables. It was a nightmare. It was a wonder that anything went on tape!

H.C.: At this point, did you work out mike set-ups in advance of the act appearing or use stock set-ups regardless *of the group that was appearing?*
E.K.: I used stock set-ups when the groups were similar. I usually filled in the drums with 87's and a lot of Shure P.A. mikes on other things. It was basically caught "on the run".

H.C.: What's the story on the "live" Jobriath recordings? ('73)
E.K.: That particular session was interesting in that it was the first time I had been back to Olympic ('73) in years and I was looking forward to it. It was a big, big session. There were 30-odd strings, live piano, drummer, French horns, trombones, trumpets, flutes, harp, cor anglais, four basses with extensions, and four cellos. Jobriath did the arrangements -- he had never done any arrangements for strings before -- he picked up a book on arranging, studied it for three or four days, then wrote them. It was one of the most exciting big orchestral dates I had ever done.

H.C.: Now . . . the whole thing was live?
E.K.: It was *live*. Literally live to 16-track with a six-piece choir in a vocal booth.

H.C.: What about his vocals?
E.K.: He did a sort of *spacey* type vocal by putting his foot down on the

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sustaining pedals and then leaning into the piano mikes to get that distant effect. Very nice.

H.C.: What about mike selection and isolation of the musicians for this live set-up?
E.K.: A C24 way, way up in the ceiling, about 30 feet up capturing the basic stereo picture which was my main stereo feed. Then some 87's, old C12's, 67's for the strings fairly close-in, the funny old brass STC on the trumpets, and a KM84 on the French horns with a V-shaped screen behind them with aluminum backing so that when the horns blow to the rear, the mike will pick up the reflection -- indirect miking.

H.C.: What about the drum set-up?
E.K.: It was close miking for some of it -- the snare and bass drum. There were baffles around the percussion and a small screen in front of the woodwinds. The harp was a KM84 wrapped in foam stuck inside the harp. The piano was miked in a classical sense -- the lid was off -- and there were two 87's up about four feet and a small screen down one side.

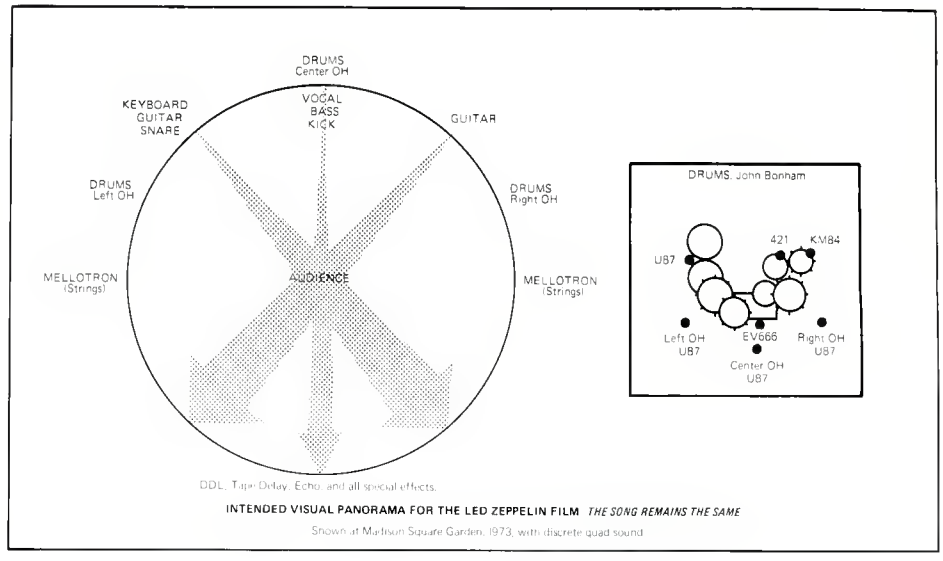
H.C.: Comment on the Lena Horne sessions for the NATURE'S BABY LP. (Electric Lady Studios -- 1973)
E.K.: It sticks out in my mind as a very good album that could have been better from my point of view.

H.C.: Technically or material-wise?
E.K.: Well, both. The material was good but in some instances I don't think it matched her voice or what she could have done.

H.C.: I liked NATURE'S BABY and FEELS SO GOOD.
E.K.: Yeah, well *that* was more of the stuff that she *should* have done. As a first album of that nature, no pun intended, it was very good and may have been a bit stronger if Donny Hathaway had produced the whole thing. I also think I could have mixed it with the voice up a hair more. I *was* very happy with the strings -- I thought they were excellent and the rhythm section was good. She's a wonderful person to work with.

H.C.: She seems to be. Very hip and "smooth".
E.K.: She's an artist of such high caliber, that it's very rare that one gets a chance to work with someone like that (chuckles). She's part of musical history you know, a very vibrant performer, and very exciting to work with. She's quite something.

H.C.: Anything that stood out for you on LED ZEPPELIN II?
E.K.: "II" was actually mixed at A&R (NYC), Mix (room) 1, and some of the tracks were recorded around the city . . .



Groove Sound and what was that terrible 8-track studio? . . . home-built board . . .

H.C.: Regent?
E.K.: No . . .
H.C.: Broadway? . . .
E.K.: No . . .

H.C.: Mayfair?
E.K.: Right, there you go. Gary Kellgren used to work there, in fact one Hendrix track was cut there. (BURNING OF THE MIDNIGHT LAMP) But ZEPPELIN II, some was done in England, some in Europe, but I mixed it in 2 or 3 days at A&R . . . 8-track . . . nice . . . tough album . . . tough-*sounding* album.

I did have a problem with the panning and special effects, but Shimon Ron (maintenance man, later chief engineer at Electric Lady Studios) sorted it out for me. I mixed it on an old Altec 8-track console with two pan pots.

H.C.: Which you put to use on MOBY DICK.
E.K.: That and WHOLE LOTTA LOVE. But I think we came up with one of their best sounding albums under the conditions.

H.C.: Let's talk about the Zeppelin movie, THE SONG REMAINS THE SAME (shot in 1973 at Madison Square Garden).
E.K.: Ostensibly that was going to be an album, and suddenly it turned into a movie (chuckles) -- suddenly one track of my 16-track disappears for a sync channel. We used the Bearsville Truck (Location Recorders), with 604's and a lot of Shure mixers stacked up because we ran out of channels. I think they had only 16 actual channels on the board so we used the Shures for percussion and audience mikes -- four audience mikes -- two on either side of the stage crisscrossed pointing out into the audience, and two three-quarters of the way back into the hall pointing down towards the stage. So we had a semi sort of quad audience reaction. At this point Jimmy (Page) and I had discussed general ambience. I said, "What's the final product going to be?" And, he said, "Well, if we make a movie, we'll probably do it in quad." So I knew exactly what to do. My whole thinking was predicated on quad and I thought of that all through the project.

On the Sunday night we heard about the robbery, which made everyone a bit uptight. (Approximately $200,000 in cash was missing from their safe at Zeppelin's hotel.) At the time it seemed a very exciting show, it seemed like the playing was pretty good. Robert's (vocalist Robert Plant) voice wasn't quite on -- there were a few squeaks and squeals -- and we felt we could easily punch those in. There was a minimal amount of overdubbing -- Robert punched in maybe three or four words.

H.C.: Literally, through the whole 100 minutes or whatever of film?
E.K.: That's about it, and in retrospect I think he could have done a bit more to tighten up his vocals, but Jimmy wanted to keep it pretty much intact. I've heard some criticism on some parts of the musical performance. I don't know what your feelings may be.

H.C.: I've only seen some clips, but what I kind of noticed is that the real power is not conveyed in that performance as in the studio, possibly *because there's a lot of over-dubbing done with Page -- between Page and Jones -- guitars, bass, the layering. You're only listening to one guitar on stage . . .*
E.K.: Right. You *are* only listening to one guitar on stage is very true . . .

H.C.: So Page has to try to do a lot of fills and as fast or as good as he may be,

he can't do it all.

E.K.: Right. Also, that footage is now over three years old. A lot of it had to be re-staged and re-shot in London because some of the original footage wasn't too good – it was the wrong angle, there was insufficient lighting, etc. So they took some rough mixes and played them backed and mimed to it on a shooting stage in London.

When I mixed the album and the movie, both at once, I took the 16-tracks, which is now 15-tracks, and mixed down to five tracks of an 8-track Dolby tape -- four tracks being a quad mix and one track being sync. This is why the quad mix is so important, because all the effects: DDL, tape delay, echo, any and all special effects, were criss-crossed on the back. The echo of the instrument would appear at the *opposite* corner in most instances. What I was trying to do was make it surround you to make you feel you were in the center of Madison Square Garden such that the stage and the audience would wrap around you, meeting at a center point.

When we were mixing it on four (JBL) 4311's (at Electric Lady), we all became knocked out with the quad. The actual first mix to the 8-track was left-right front, left-right back, sync, and, oh!, the voice had to be on *its* own track so the film studio could bring it up and down in the transfers to the 6-track mag-stripe. The 8-track tape was then sent to Twickenham Studios in London and transferred. In their transfers they made a horrible mess of it. I had not gone to England to supervise the transfers, and when Jimmy heard them he said, "God, they're horrible". So we brought them back to Los Angeles for Todd-AO to *re-transfer*. We had to re-equalize and go over it again.

Now we decided to go Dolby with the Dolby Cinema System and equalized monitors. At this time the transfers are pretty much how I mixed it on 8-track; the high-end is there, the low-end, everything is there. So we started to mix the damn thing. (Film) After screwing around with the back speakers, we got the thing sounding "fat" -- when the bass played, you really felt it in your chest -- when the bass drum hit, it really socked you. Now this quad is sounding spectacular! It's four discrete channels and it sounds -- I can't tell you how it sounds -- and we were hoping that Warner Brothers would go with this system, which was a Dolby-ized, equalized speaker system in quad mag for major cinemas and 4-track stereo for smaller cinemas. This was not to be. I think through reasons of cheapness they decided to go 4-track stereo which meant there was *no* Dolby, there was *no* equalization of speakers, and I'm terrified of what it sounds like in a theatre.

You know what 4-track stereo is like. It's three speakers in front and surround-speakers on the back -- which is *one track!* All my stereo is just shot to hell because this is now combined into one channel!

H.C.: Well, your ambience . . .

E.K.: ambience is just gone into one channel -- into mono. It's a combination of the left and right -- all the ambience, the echo, the special effects which add to the "fatness" of the track -- are now gone! The tracks in front probably sound OK, but the rear is mono! You can't get any of the special effects!

At one point in DAZED AND CONFUSED, Jimmy hits his guitar with the (violin) bow . . .

H.C.: bop-BOP, bop-BOP . . .

E.K.: right, and I criss-crossed them so that the bow was struck in one corner (bop) and you'd hear it in the opposite corner (BOP), and no way you're going to get that in 4-track stereo. Four-track stereo is a compromise and a very poor one at that.

H.C.: Did you or Page confront Warners as to why they did what they did?

E.K.: It's so dark and mysterious and confusing. I don't know how much power Page had in that decision and I don't know if he fully understood the difference beween quad and 4-track stereo and what would happen when it was reduced from quad to 4-track stereo.

H.C.: Obviously he could hear the difference, because it was in quad at one time and then in 4-track stereo.
E.K.: Yes, but he heard it at Todd-AO studios under perfect conditions! He heard it in *quad* with Dolby and an equalized speaker system *and* he heard it in a *4-track stereo,* Dolby, equalized speaker system -- which was not a bad compromise *when* you add all those other bits and piece in, such as Dolby and equalized speakers.

I think Warner's excuse was it was too expensive to install Dolby, equalized speaker systems . . .

H.C.: . . . And tune the theatres.
E.K.: And tune the theatres. All I know is what I mixed did not come out in the film. But since we were so happy with this 8-track quad mix, we used it for the album mix by combining left and right, front and back, and adding the separate voice track. Actually it mixed fairly easy, it took us about two weeks to mix it.

H.C.: Did you feel like using some excessive compression or some double-tracking for the film mix in order to convey that power that Zepp shows on record?
E.K.: Well, no because it had to be a natural "live" experience, and it had to stand up by itself and if it didn't stand up by itself, well, that . . . I think it's strong enough. My main criticism would be one of corporate insensitivity to what it could have been.

H.C.: How's the Stones' Mobile? I know you did some work with it on Zepp's GRAFITTI. ('75)
E.K.: Right, and I also did an album that never came out, with . . . what's that group . . . Santana. I did a "live" thing with them on the Stones' Mobile, once at Montreux (Switzerland) and once in London at the Hammersmith. (theatre) . . . I was also recording some of the basic tracks around '71-'72 and was supposed to produce that album with . . . mmmm . . . can't think of it . . .

H.C.: CARAVANSERAI . . . or the one with EVERYBODY'S EVERYTHING using the Tower of Power horns?
E.K.: *That's* the one I was on. That's the one. At Montreux it was a TV thing, a disastrous control room at the back, etc. Then I came to California to cut the track for EVERYBODY'S EVERYTHING.

H.C.: Heavy bass line -- very "toppy" bass line. Back to the Mobile facilities -- I know they used to have Tannoys . . .
E.K.: Right. They used to have four Tannoys in specially-made slim cabinets because they couldn't fit in . . .
H.C.: And then they replaced them with Altec's because the Tannoys didn't have enough room to "breathe".
E.K.: Right. The facilties are great, I love that truck. By the time I got to it to do the Zeppelin things, it wasn't in too great a shape. I mean it had coffee and Coca-Cola spilled all over it and had to spend hours cleaning it up -- they'd been running it ragged.

H.C.: Helios 24-16 and 3M-79's? (Board and tape machines.)
E.K.: Right. With the four slim Tannoys in front of you and the usual AKG's and Neumanns.

H.C.: How was Kendun (L.A.) for Bad Company? (RUN WITH THE PACK LP, '76)
E.K.: It worked pretty well actually -- the mixing. When I went to cut the lacquers I was very disappointed. I couldn't figure out their room. I spent two days there cutting and eventually cut what I thought was right. So I went ahead and cut 21 parts, and when I got back to New York and listened to it, it was awful. So I had to re-cut everything, at Sterling (NYC), and it was a lot better.

H.C.: Now you cut *the original lacquers in a Westlake room in Los Angeles. Did you listen to your first* New York *play-*

back in a Westlake room?
E.K.: No. A normal room. Theoretically if it sounds right in a Westlake room, it should sound right everythwere else. This is where a lot of people go wrong -- it doesn't. I don't like Westlake rooms, period. I think a lot of people feel this way.

H.C.: How do you feel about some of the external black-box gear on the market these days?
E.K.: Dolby is nice if you're in a situation where you need super-super quiet stuff like acoustic guitars or piano-voice kind of things and while recording 24-track. I *don't* like using it for rock n' roll -- that's for sure.

H.C.: Did you use it on AXIS or ELECTRIC LADYLAND? ('67-'68)
E..K.: Nooo . . . and I *don't* like dbx. I really can hear that thing work, and at this time, computerized mixing is a waste of time for me. I tried it and I didn't like it.

H.C.: Where and why not?
E.K.: Kendun. It's too unreliable . . . and I can hear coloration. I'd rather get a member of the group involved in the mix.

H.C.: How did you come upon the Nanuet Theatre (New York) for Kiss? (ROCK AND ROLL OVER LP)
E.K.: That was fun, great fun. We were down to the wire trying to find a place to record in and through a friend of a friend we heard about it. I took a look at it and said: "That's it! That's the place!" It's a theatre that was built about three years ago and is now bankrupt. We had to go in, and get the place cleaned up -- I mean there was mold growing on the carpets -- had to have the whole place fumigated and the air conditioning turned on. We organized a *total* recording environment in two days! (chuckles) We had a control room built -- took the Record Plant truck, took all the equipment out of it -- and built a control room in one of the dressing rooms in one day . . . *one day*. The combination of speakers was amazing. We had big Reds (Altecs) on the bottom and 4311's on top, run in tandem together for the bass-mid-high end combination.

H.C.: Now when you say theatre, is that movie theatre or dramatic theatre.
E.K.: Entertainment theatre, a theatre-in-the-round, circular like an amphitheatre with the revolving stage in the middle. The drums were set up right in the middle of the stage and the amps were set up in the orchestra pit. Then there's a tunnel which runs from the dressing rooms to the stage, and I faced the bass amp into the tunnel and miked it about 10 feet away to get that nice echo-y feel.

I had another drum kit in another room, a sort of big dressing room which is all concrete and plaster walls. Guitar amps were sometimes in different rooms -- everything's bright, really "live" sounding.

H.C.: What kind of a ceiling were you dealing with?
E.K.: Quite high. Thirty-five to forty feet. But dead! The room is dead! You'd *think* it would be a super-super-live room but it isn't. They've got this compressed concrete with straw in it on all the walls and acoustic tile ceiling so the decay time is quite short. It's spatial, but it's not echo-y, so you get decay time but not a lot of echo. Very interesting. It was designed so you could sit anywhere in that theatre and hear the same sound.

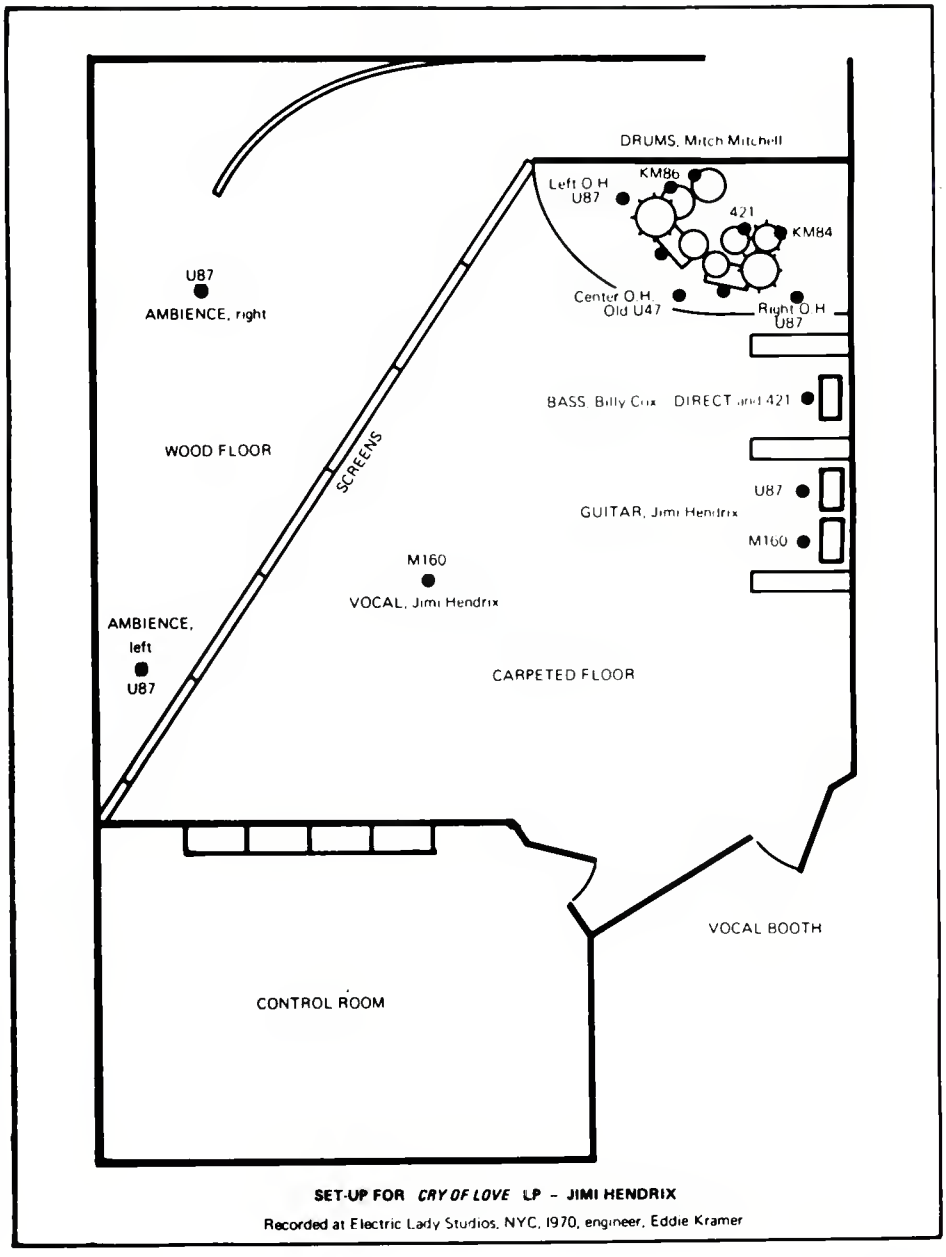
H.C.: Instead of a split second later.
E.K.: Right. Without that heavy echo.

H.C.: What about mikes?
E.K.: I used some AGK C451's, those little pencil cardioids on rooms and cymbals, an *old* U47 on the center of the drums, 87's, 67's, Sennheiser 421's, and Beyer M160's on the guitar amps.

H.C.: Jimi Hendrix was noted for doing a lot of jamming, be it in a club or in a studio. I guess it got to a point where he needed a studio 24 hours, seven days a week. He probably didn't want to put up with Record Plant booking . . .
E.K.: Yes . . .

H.C.: The money was available or he'd have had to pay it in taxes . . .
E.K.: Correct . . .

H.C.: . . . so how did the design of Electric Lady come about?
E.K.: Well, originally the room was going to be a night-club-cum-recording-studio.



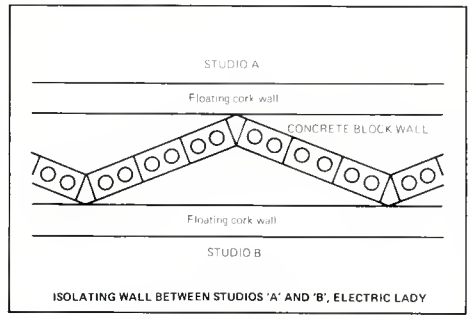
SET-UP FOR *CRY OF LOVE* LP - JIMI HENDRIX
Recorded at Electric Lady Studios, NYC, 1970, engineer, Eddie Kramer

During the early part of '69, while I was an independent engineer, I was approached by Michael Jeffries (Hendrix' manager) and Jimi to do this. They had secured a lease on a building in the Village (Greenwhich). It was a night-club that functioned for about six months. It seated about 500 people and its past goes back to the 20's and 30's in a musical sense. The downstairs was a country club country music and square dancing and the upstairs was a movie house. So there's always been music going on in this place and it was at one time known as the Generation night club. The owner had Jimi come down and jam and Janis Joplin was ther one week.

Anyway, they did nothing with the lease for about six months and Jimi wanted this spacey night-club recording studio with a tiny control room at one end. John Storyk (co-designer) had drawn up architectural plans after meeting with Jimi, and after seeing it myself I said, "You guys gotta be out of your minds. This could be the greatest studio in New York, possibly the States. It's got the shape, it's got the right size, it's got high ceilings." So we convinced Jimi and Michail not to go ahead with the club.

John re-designed the whole place for a studio. Originally it was going to be three studios but felt eventually we wanted large studios and dispensed with the third, even going so far as to knock down one of the walls that went up and moving that wall back even further.

H.C.: So what faces each other is Studio B – Studio A.
E.K.: Correct! Now *there* we had a problem. We had to isolate the two studios so if you did strings in "A" and a rock group in "B", you wouldn't hear any leakage. That construction is a masterpiece of sound separation. There's three walls 3' 6" thick. The two outside walls float on cork and rubber and they do not touch the ceilings nor the sides. The inside is a zig-zag wall inside with pre-formed concrete bricks about a foot wide with holes in them, filled with sand, so there's tremendous mass plus the air gaps. When we dug down to grade in "A", we discovered a river running underneath, so we put two sump pumps back in the shop and two in the ladies room.



ISOLATING WALL BETWEEN STUDIOS 'A' AND 'B', ELECTRIC LADY

H.C.: What about ceilings?
E.K.: There are three ceilings there. There's the original double acoustic tile ceiling because of the movie house above Studio "A". There's a hung wire-lathe and plaster ceiling with a coating of Sound-Shield 85 on it which could have been thicker. When we found this out, we had to build gobos to make up for the lack of bass-energy absorption, and it worked out very effectively. The walls have carpeting floor to ceiling, and soft surfaces in the control room with the felt. With the carpeting and the felt, it just made everything more cocoon-like. One could wash the walls in any one of four color combinations with a professional theatre lighting system that was remote-controlled. By pushing a button, you could raise or lower the reds, greens, blues, and make different combinations of those colors to alter the mood to suit the artist's fantasy . . . which is what Storyk and myself and Bob Wolsch created . . . an environment for the musician to work in, since he was of prime concern to us. Also, on the zoning of the air conditioning – the studio, the control room, the vocal booth area, the passage-way, and Studio "B" are all on separate zones – there's about 10 – 12 zones in there.

H.C.: I noticed that the ceiling in Control Room "B" is a bit low.
E.K.: It is because of the theatre upstairs which has a tapering floor to their screen. We left Studio "B" with a wood floor to leave some sort of liveness. It's a very good room actually -- a good rhythm section room. "A" has a split floor diagonally with wood on one half and carpet on the other. So they're fairly "live" rooms, fairly flexible, has that great rhythm section sound, and is still one of the great rooms in the country.

H.C.: What were you using to drive the four (Altec) 9845's?
E.K.: At the beginning, Mac 75's. Now the outsides are driven by Phase Linear and the two insides are driven by Mac's along with the cue system. I love tube amplifiers. I really do.

H.C.: You like that valve action?
E.K.: Mmm . . . (yes).

H.C.: How about the chambers?
E.K.: The EMT's are great. There are six EMT's, No. 1 EMT is superb.

H.C.: Do you have "live" chambers then?
E.K.: No.

H.C.: Let's cover the point of studio psychology and environment. We've already talked about lighting to a degree. Were there bad things you encountered in past situations that you wanted to avoid in this design?
E.K.: Well, I'm *not* a great fan of recording studios at this stage, in particular the sort of thing that is prevalent today -- the very dead acoustics in most of the studios being built -- with tremendous sound traps and bass-energy absorbers. I like to record "live" whether it be in a house, or in a concert-hall . . . there are very few studios around which can give me the sound that I want. I like to have a drum or a guitar played and hear it!

H.C.: You like a longer time-constant.
E.K.: *Much* longer. So bear in mind that I try to avoid studios now if I can. Most of the things I do now are done remote: in a house, in a castle, in a theatre, Zeppelin in the Stones' house; I feel that rock n' roll, in the way I like to hear it, there are very few studios that are capable of giving me that sound *in* the studio that I would like to hear *on tape.* That is not to say I can not *get it* in the studio. That studio would have to be a very "live" studio -- i.e. Electric Lady, the big studio at Record Plant, L.A., A&M has a fairly "live" large room, and Cherokee (L.A.) has a "live" room. But with a studio you have a problem with rock n' roll. You get a sound set up, you spend a couple of hours getting a great drum sound, and then you have to break it down the following day. It's very hard to get a "lock-out" situation where you can go in for three weeks or two weeks and know you can come in at 2 o'clock and finish at midnight or 1 a.m. and know no one's going to touch the set up, let alone your board EQ. I mean it's something that might take you a whole afternoon to get; a drum sound, a guitar sound, get all the EQ and mike placement correct and get the room ambience right -- which I use a lot of.

Avery Fischer (Hall - New York City) just recently has been renovated and they spent $6 million doing it, and what did they use? They went back to basics -- wood and plaster -- the best treatment if you want a "live" room that's natural sounding. Drapes, wood, plaster, a little bit of glass where nec-

Studio "A" ELECTRIC LADY, NYC

essary. I like things to sound "natural" and wood reflects sound in a nice way.

H.C.: Yet is not excessively "ring-y".
E.K.: Right. I go into a studio and clap my hands to see if it sounds like it's getting sucked up a vacuum tube or by a million traps. For example, the acoustics for recording at the Fillmore East were the . . . best. The acoustics in that place were *so* good. I think it may be because of the fact that the stage is raised, it's wooden, it's sort of floating and it has drapes and old, funky chairs -- there's something magical about that hall. Everything I recorded there sounded excellent.

H.C.: Plaster and wood then.
E.K.: You're right on the point. It's the oldest trick in the book – going back to the Avery Fischer Hall.

Mood lighting is very important in a studio, the temperature and humidity are very important . . .

H.C.: For the instruments as well as the people.
E.K.: Both, right. In these overly acoustically dry, and physically dry places, you find the piano starts to crack . . .

H.C.: . . . and the drums fall apart.
E.K.: And humidity really helps you. In fact, the more humid it is, the better the separation, too.

Food is another thing. I think it's essential that a studio provides a little restaurant kind of thing so a group doesn't have to go out at 2 a.m. to try to find a restaurant.

H.C.: What do you look for in a board?
E.K.: Flexibility, cleanliness . . . ergonomics in the sense that something is easy to work, where you put your hands on the board, and you know the next place you put your hand it's gonna be a knob you can grab easily . . . that the equalizers are in good reach . . . that the pan pot is right where you want it instead of being *way* up at the top-end of the board. How the hell are you going to mix like that?

H.C.: Unless a gorilla is mixing.
E.K.: The thing should follow a logical pattern.

The new board at the Record Plant (New York City) is pretty well laid-out as is the one I designed at Electric Lady. And, of course, my favorite of all time would be Helios.

H.C.: I can't let you get away without talking about your work with Mr. Guitar and his group; Jimi Hendrix and his Experience. What did Jimi want in an engineer? – Let's go back even further than that! Chas (Chas Chandler, Jimi's co-manager) found Jimi in the Village, took him to England ('66), they found Mitch and Noel (drums and bass), and you were on staff at Olympic. Before they contacted you, had they done HEY JOE at Kingsway? (London)
E.K.: Mmm . . . (yes). Jimi and Chas, I think, were basically unhappy with the sound. They knew it could be better than that. But Jimi looked for someone who had imagination -- someone who could "fly" with him, so to speak, in the sense of suggesting ideas and coming up with crazy things, and that would interpret *technically* what he was thinking *musically*. I was the new, young engineer at Olympic, just starting to make my name, and they decided to take a chance . . . poor guys, I don't know why they did it. (laughter)

H.C.: So he felt you could translate his "head" electronically.
E.K.: Yes.

H.C.: Going back to this "open" sound concept from your Olympic days, I seemed to notice it when you did VOODOO CHILD . . . if you did it or Gary Kellgren . . .
E.K.: I did.

H.C.: . . . which I assume was . . . 100% live?
E.K.: Oh, yes, VOODOO CHILD was. Many tracks subsequent to that at Electric Lady, when we were working on the album[2] just before he died (Sept. '70), while cutting live, I always had an M160 (Beyer) on his vocals. They're the only mike you can get any separation from and still give you a reasonable vocal sound. And more often than not, when Jimi would cut "live" vocals, we could never top them.

I worked with him at the Record Plant in '68. In '69, we had a parting of the ways brought on because Jimi wanted to take over everything including mixing, and I had to put my foot down -- not that I didn't want him involved. I wanted him involved – to the point where the best mixes were the ones where he was involved, but directed. I would sit down and prepare the mix and give Jimi a particular guitar or particular vocal and the interchange of ideas were good as a team.

H.C.: Could you name some specific titles?
E.K.: Oh, I would say . . . 1983[1] in particular, a classic example -- which was a 14-hour straight mix which Jimi and I did together. I got the basic thing together and made suggestions, then Jimi would say: "Hey, could you make it sound underwater?" -- that was his favorite phrase. Since there were so many things happening in the mix, it was essential that Jimi be involved. Once it got to the point where Jimi wanted to do everything -- that's when I put my foot down -- where we had the disagreement. It was a

short-lived disagreement to the point where I designed and built Electric Lady studio for him.

H.C.: What do you mean, "Jimi wanted to do everything?
E.K.: He wanted to mix and engineer as well. When it came to setting up the board, he wanted to take over the board. At that time I felt very strongly about that – someone taking over something which I was doing for him. And it later turned out, that he would leave everything to me.

H.C.: It seems like he was going through a change in '69.
E.K.: He *was* going through a change. He was recording at the Record Plant -- I didn't have anything to do with it. I was designing and building him a studio and I was independent as an engineer doing Zeppelin, etc., plus building him a studio which took 13 months to build. He was very impatient, understandably so, it was a complex studio, solid as a rock. I ran it, built it, put it together, was recording, producing -- it all became too much so I decided to break away and become an independent Producer-Engineer. I feel a lot happier about it.

H.C.: How about your approaches on ARE YOU EXPERIENCED vs. AXIS vs. ELECTRIC LADYLAND?
E.K.: Each album got consecutively more complex -- I think ELECTRIC LADYLAND is possibly the pinnacle of special effects.

H.C.: What about the development of Jimi in the studio?
E.K.: Jimi was just developing as an artist and his music was getting more and more complex and I think it reflected itself in the way the albums were sounding. I had to develop more and more stuff to do.

H.C.: So more demands were made on you.
E.K.: Yes, of course.

H.C.: How many mikes do you think you may have used?
E.K.: That's a very good question. (pauses) Snare, bass drum, two overheads . . . 4 or 5 mikes.

H.C.: The reason I ask is: do you follow the theory that the more mikes you place on a drum set, the worse it will sound? . . . Phasing, hot-spots, etc.
E.K.: Mmmmm . . . very difficult to answer that. It's more of what you want in a set of drums, if you want that "presence" from each drum or if you want that big, overall, open, splashy spread. I use the combination of both. I can't really say one is favored over the other.

H.C.: I noticed a definite difference in the presentation of Mitch between the first three albums and CRY OF LOVE[2], RAINBOW BRIDGE[8].
E.K.: I think you can attribute that to Jimi's emotional and growing changes in his music and becoming aware of his "blackness" and aware of the fact that he had to start changing his image.

H.C.: What I hear is change in perspective: bass drum-snare balance, cymbals, etc. Instead of looking at a kit, I'm looking at individual items in that sometimes shuffle-beat.
E.K.: Bass and snare would be up more in the things you're thinking of. He *was* playing more of an R&B type of feel by necessity because of Jimi's influence. It certainly made everybody sit up and think. It had to influence his music – no question. He didn't want to get up on stage and jive around – he just wanted to play music.

H.C.: Which I think he accomplished on BAND OF GYPSY'S, ('70).
E.K.: I agree. Outside of all the ranting of Buddy Miles. There was a lot of that edited out.

H.C.: Could we take apart 1983 and AND THE GODS MADE LOVE off of ELECTRIC LADYLAND . . . if you used some phasing . . .
E.K.: Yes . . .

H.C. The panning, Jimi's guitar effects, the slowed-down bass drums on the intro of GODS . . .
E.K.: At this point I would like to say that people should really try to discover those things for themselves. When it gets to special effects and such, I think the albums should rest as they are and people should just enjoy them for what they are.

*H.C.: Any comments on the Alan Douglas involvement?**
E.K.: Absolutely not. Suffice to say that I refuse to recognize what he's done. I think what he's done is a travesty of musical justice. I refuse to get involved in anything altering what a man has done. I would never have gotten involved in it. Unconscionable!.

H.C.: You also did some work with a New York group called Cactus, some of which you recorded at Electric Lady, and the drums of Carmine Appice also held up well for me, especially on something like SONG FOR ARIES.
E.K.: Thanks. There was a certain amount of kidding that took place between Carmine and Mitch and a mutual appreciation and admiration for each other's work.

H.C.: I considered Mitch having more of a jazz-swing feel whereas Carmine had more of a heavy-handed 4/4 approach. Fair statement?
E.K.: Oh, yea, fair statement. I think Mitch had the lighter touch and certainly more of the ability to play complicated fills and disturb the beat and then come back down on one.

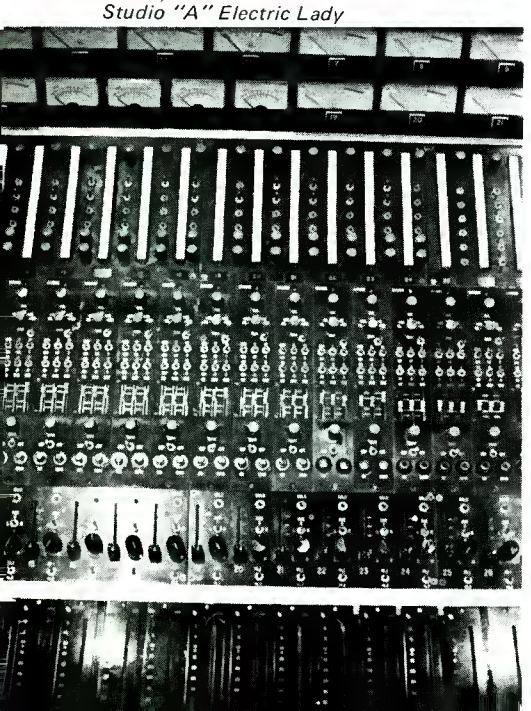
H.C.: I particularly notice on his brushwork on something like UP FROM THE SKIES. (AXIS LP)
E.K.: Oh, that's great -- that's lovely.

H.C.: Another thing would be that when Hendrix was playing in '66-'67 Mitch did not always serve as the traditional timekeeper of the group in that he could float around and Noel (bassist Noel Redding) would be the anchor-man.
E.K.: By necessity. Mitch had the ability to . . . almost read what Jimi was thinking. Even though Jimi would dictate a lot of the things to play on the run-downs -- where to put accents and where to put fills -- it was generally left up to Mitch's imagination, which was pretty vivid. Jimi would never cease to be amazed at Mitch's ability to play ridiculous things.

H.C.: He's my favorite drummer . . .
E.K.: He's certainly one of my favorite drummers -- no question about it. Mitch for me is really "it".

H.C.: . . . and I wish he'd get back into the scene. How did your treatment vary in miking Mitch as more of a "lead" instrument as opposed to Carmine's drums?

. . . console layout
Studio "A" Electric Lady



In 1974, Alan Douglas came into control of the rediscovered Hendix "wharehouse" jams of 1967–'70. After erasing members Mitch Mitchell (drums) and Noel Redding – Billy Cox (bass) from the multi-tracks, he added session musicians in these roles and "produced the two postumous Hendrix albums of 1975.

E.K.: I remember miking Mitch on the AXIS album, which is the one you like, by raising him on that platform about a foot and using distant miking and close-miking – with that D30 on the bass drum and, more than likely, 67's or C12's on the cymbals . . . probably C12's, and 87's on the floor toms.

H.C.: What about his creativity?
E.K.: There were no meetings in advance, and Jimi created things in a very loose sort of fashion. *He* knew in his own head what he wanted to do and how he wanted to create -- he had pages and pages of lyrics to choose from -- but he knew *exactly* what he was doing; every over-dub, every backwards guitar solo, every double-tracked thing was very carefully worked out . . . in his *own* head.

H.C.: In a very private sense then.
E.K.: In a *very* private sense. So I was not to know what he was going to do until he walked into the studio. I don't think anybody else did. There were jams and rehearsals, but I wasn't privy to them.

H.C.: So it was a matter of "let it flow".
E.K.: Very much.
H.C.: I was very impressed by AXIS[5] *, which you did -- particularly the drums.*
E.K.: Olympic Sound!

H.C.: There seems to be a variance in the drums between AXIS and ARE YOU EXPERIENCED[6] *with Mitch.*
E.K.: Probably a different kit . . . I probably recorded them better. More than likely on AXIS, I set up a drum platform at that time.

Over the last 4 or 5 years, if I could find 6 old U47's, I'd use them exclusively for drums.

H.C.: The old tube-type.
E.K.: Mmm (yes), one of my favorite mikes of all time. At Olympic the C12 . . . the old C12's. 67's of course. D20's, which you cannot find anymore -- rare beasts . . . or was it a D30. They only made a few of them. Also, a lot of AKG dynamics.

H.C.: Do you remember using any of the BBC PGS mikes?
E.K.: Very rarely. I hate them actually . . . lacked separation . . . horrible. If I were to use a ribbon, it would have been for trumpets and trombones. Better than that was the old STC ribbon, sort of flat-shaped, made of brass, kind of wedge-shaped -- wonderful old thing. I try to follow the whole concept of classical recording to make the instrument sound as real as possible . . . as natural as possible and that's the thing I strive for as much as I can.

EDDIE KRAMER
Partial Discography

	Title	Studio	Artist	U.S. Label & Release Date
1	Electric Ladyland	B	The Jimi Hendrix Experience	Reprise 1968
2	Cry Of Love	B,C,D	Jimi Hendrix	Reprise 1971
3	Beggar's Banquet	A	The Rolling Stones	London 1968
4	Their Satanic Majesties Request	A	The Rolling Stones	London 1967
5	Axis: Bold as Love	A	The Jimi Hendrix Experience	Reprise 1968
6	Are You Experienced?	A,D	The Jimi Hendrix Experience	Reprise 1967
7	Led Zeppelin II	D	Led Zeppelin	Atlantic 1969
8	Rainbow Bridge	B,C,D	Jimi Hendrix	Reprise 1971
9	Jobriath	A	Jobriath	Elektra 1973
10	Nature's Baby	C	Lena Horne	1973
11	Run With The Pack	E,F	Bad Company	Swan Song 1976
12	The Song Remains The Same	C,G	Led Zeppelin	Swan Song 1976

STUDIOS WHERE THE MATERIAL WAS RECORDED

A — Olympic, London
B — Record Plant, NYC
C — Electric Lady, NYC
D — Miscellaneous
E — The Rolling Stones Mobil Truck
F — Kendun, Burbank
G — Todd-AO (film)

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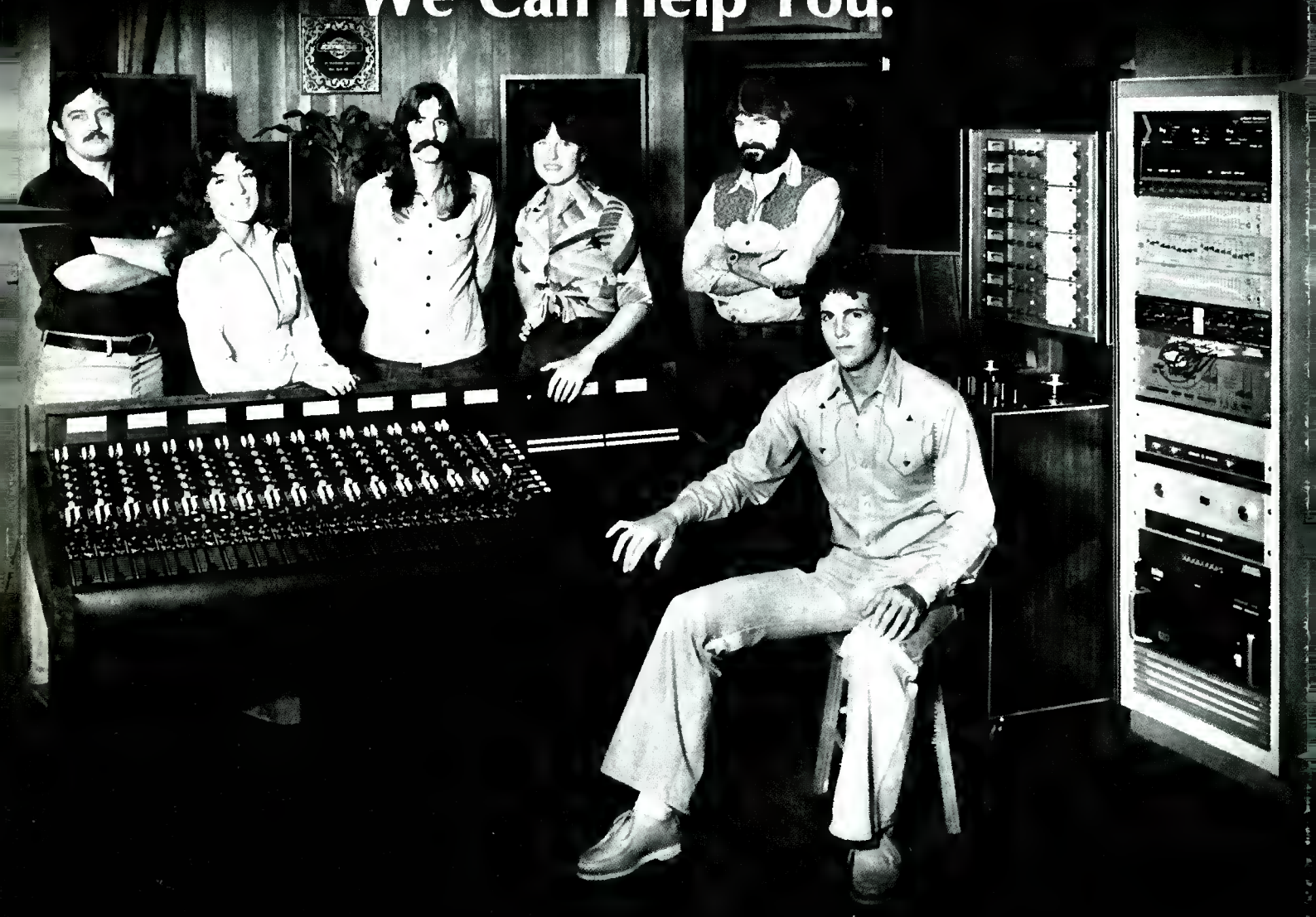

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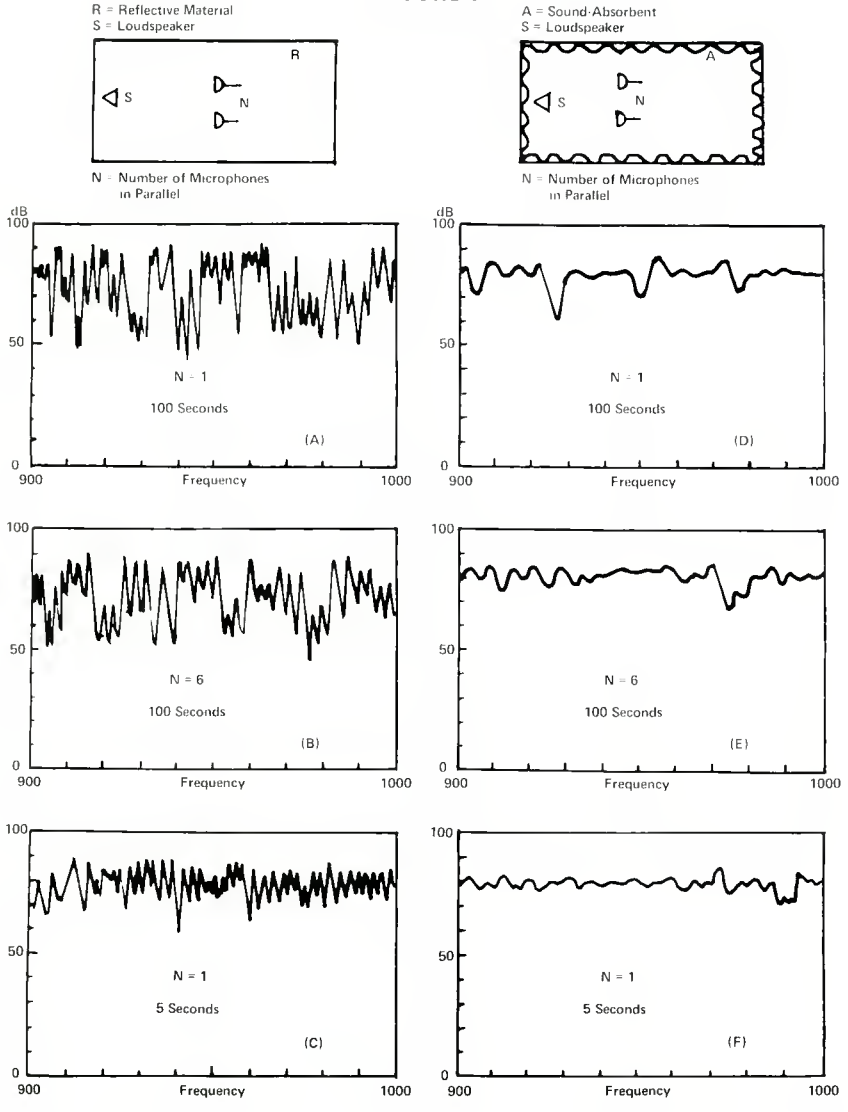
"STANDING WAVES" IN ROOMS

by
Michael Rettinger, M.A.
Consultant on Acoustics
Encino, California

FIGURE 1



The term standing waves, in quotation marks of the title of this discussion, has come to achieve a derogatory meaning whenever control room acoustics are discussed, and has indeed become a catch-phrase, a word used for effect by one having only superficial acquaintance with the subject. For this reason also, it is often employed to explain an undesirable room quality for which no other apparent reason seems to exist.

However, the acoustics of all enclosed spaces are characterized by standing waves during prolonged tone passages. The phenomenon is called sound transmission characteristic, and was first investigated by E.C. Wente of the Bell Telephone Laboratories in his "The Characteristics of Sound Transmission in Rooms," (Journal of Acousical Society of America, October 1935, Page 123). The only rooms which do not conform to this effect over a wide frequency range are anechoic chambers, although even in these there occur low-fequency interference effects when it is not possible to achieve near 100% absorption at the bass.

Figure 1 shows these standing waves in a 10'x20'x25' room — about the size of a control room with a volume of 5000 cubic feet. Before the application of the acoustic material material on the walls and ceiling of the enclosure, the room reverberation time was 2 seconds at 1000 Hertz; after the application of the sound-absorbent, this time was 0.5 seconds — a time in the order of that of a control room.

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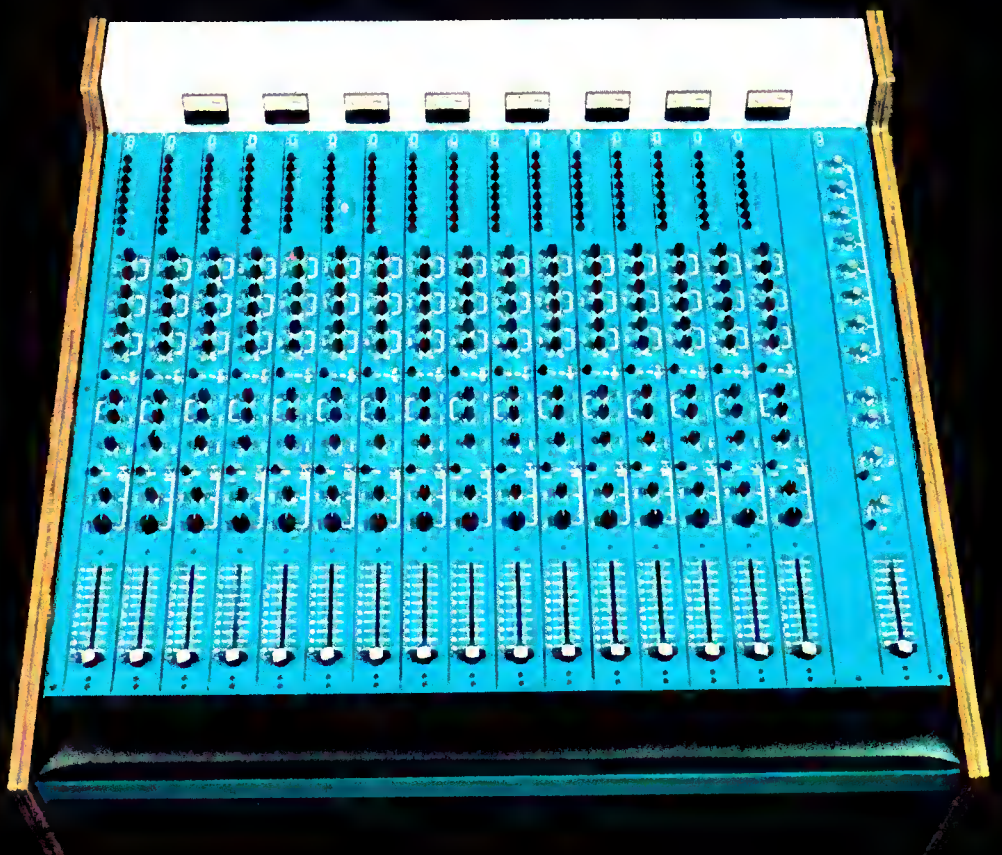

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continued . . .

"STANDING WAVES" IN ROOMS

In diagram A of Fig. 1, the change in frequency from 900 to 1000 hertz was effected in 100 seconds - about one hertz per second, and only one microphone was used to pick up the signal. The irregularities in the transmission characteristic are pronounced, the difference between "peaks" and "dips" often amounting to 40 dB.

In diagram B, made with the same oscillator speed, six microphones were connected in parallel in picking up the signal. The irregularities in the transmission remained very much the same, because the resulting voltage from the array of transducers at any one frequency is proportional to the vector sum of the pressures at the six microphones.

In diagram C, the change in frequency from 900 to 1000 required only 5 seconds, or one hertz per 0.05 seconds. The transmission curve for this test is considerably smoother, because the interference effect between the direct and the reflected signal is insufficiently long to produce marked reinforcements or cancellations of the signal at the microphone.

Diagrams D, E, and F pertain to the acoustically treated room, and were made under the same frequency change and microphone conditions as the opposing diagrams A, B, and C. The curves still contain irregularities, but the peaks and dips of the curve are much less pronounced. This is for the reason that less of the reflected sound can meet with the direct sound at the microphone to establish these interference effects.

The point to notice is that all rooms, except anechoic chambers, are beset with standing waves as long as the signal is prolonged.

Sometimes a more sophisticated but still inexpert commentator instead of speaking of standing waves will use the term "normal modes" or even the German equivalent "eigentones" to express his dissatisfaction about the hearing conditions in a room. But again he is not likely to describe the situation accurately, because all rooms have normal modes, and their number is a function only of the volume of the enclosure for any given frequency. Under the condition that:

$$f \gg \frac{3\,c\,S}{16V}$$

$$\frac{3 \times 1130 \times 1900}{16 \times 5000} = 80 \text{ Hertz}$$

where c = velocity of sound (1130 feet per second)

where S = interior surface of the room (1900 square feet for a 10 ft. by 20 ft. by 25 ft. enclosure)

where V = the volume of the room (5000 cubic feet for the 10 ft. by 20 ft. by 25 ft. enclosure)

Thus, the number of normal modes up to the frequency under consideration is given by:

$$N = \frac{12.56 \times f^3\ V}{3 \times c^3}$$

Thus, up to 282 Hertz, there will be:

$$N = \frac{12.56 \times 282^3 \times 5000}{3 \times 1130^3} = 325 \text{ normal modes.}$$

The effect of normal modes in a room, in the way of ac-

centuating certain frequencies, is much the same as for standing waves — the more absorbant the room at a given frequency, the less is the effect.

All these effects vary from place to place in a room. For this reason it is almost impossible to reduce the peak level at a given postion in the room for one frequency, as by placing a reflecting baffle at one place, without introducing a peak at another frequency. Also, when more than one mixer position is under investigation, it pays to position a real-time analyzer at each postion to learn of the effects at both places when changing the configuration of the room at one place. By using pink noise as the source signal, so that one sees the sound transmission characteristic at both positions, one is even made more aware of the futility of smoothing out the transmission characteristics by the use of reflecting baffles, helium filled balloons, rotating vanes, etc.

One should also be aware of the fact that at those mixer's positions where the direct sound predominates over the generally reflected sound, such structural changes in the room are equally useless in obtaining a smooth transmission curve. Indeed, in such a case it is hardly possible to talk of a transmission characteristic, because what one actually measures in the way of a response curve is that of the loudspeaker or loudspeakers (when more than one such emitter is operating at the same time.) The only recourse one has in such a case to achieve a smoother graph is to install either another type of reproducer, change reproducer postions, or employ a graphic equalizer towards the desired end. □□□

ACOUSTICALLY / AESTHETICALLY TREATING the STUDIO on a LIMITED BUDGET

by
EMIL HANDKE
Nashville Studio Systems
Nashville, Tennessee

By way of introduction, our experience over the past few years has involved, in most cases, working with smaller studios, and smaller budget-restricted, start-up studio packages located in the South-East and lower Mid-West. (Although, we must emphasize that we have also done some fairly sizeable and expensive jobs, as well.) All of this experience leads us to author this article in the belief that by describing one of the most typical of our recent projects, as well as detailing several solutions to, more or less, common problems, we will be answering a number of the most frequently asked questions about small studio acoustics.

In working with the smaller start-up situations it typically happens in, relatively speaking, the same way: There is an overabudance of everything intangible . . . creativity . . . enthusiasm . . . talent . . . everything. Everything, that is, but financial resources. It becomes fairly apparent, pretty quickly, that, yes! we are going to have (barely) enough for the for the hardware; the console, the tape machines, the monitors, the mikes, etc., but where, oh-where are we going to get the money for acoustical treatment.

Closely associated with this primary economics problem is the location and the physical layout of the studio and control room. It isn't at all surprising, after all this time, to be shown the site, which is, generally, the most useless, least adaptable space and environment available. Then very quickly thereafter comes the inevitable question: What can I do to make this garage (or basement, or storefront, etc.) acoustically correct?

Before reading the next lines **do not, do not** become disheartened, yet!

The usual first response to the question is, "You can't unless you have, or want to spend a lot of money." In most situations there are just too many general problems to correct.

Ah . . . but, read on . . .

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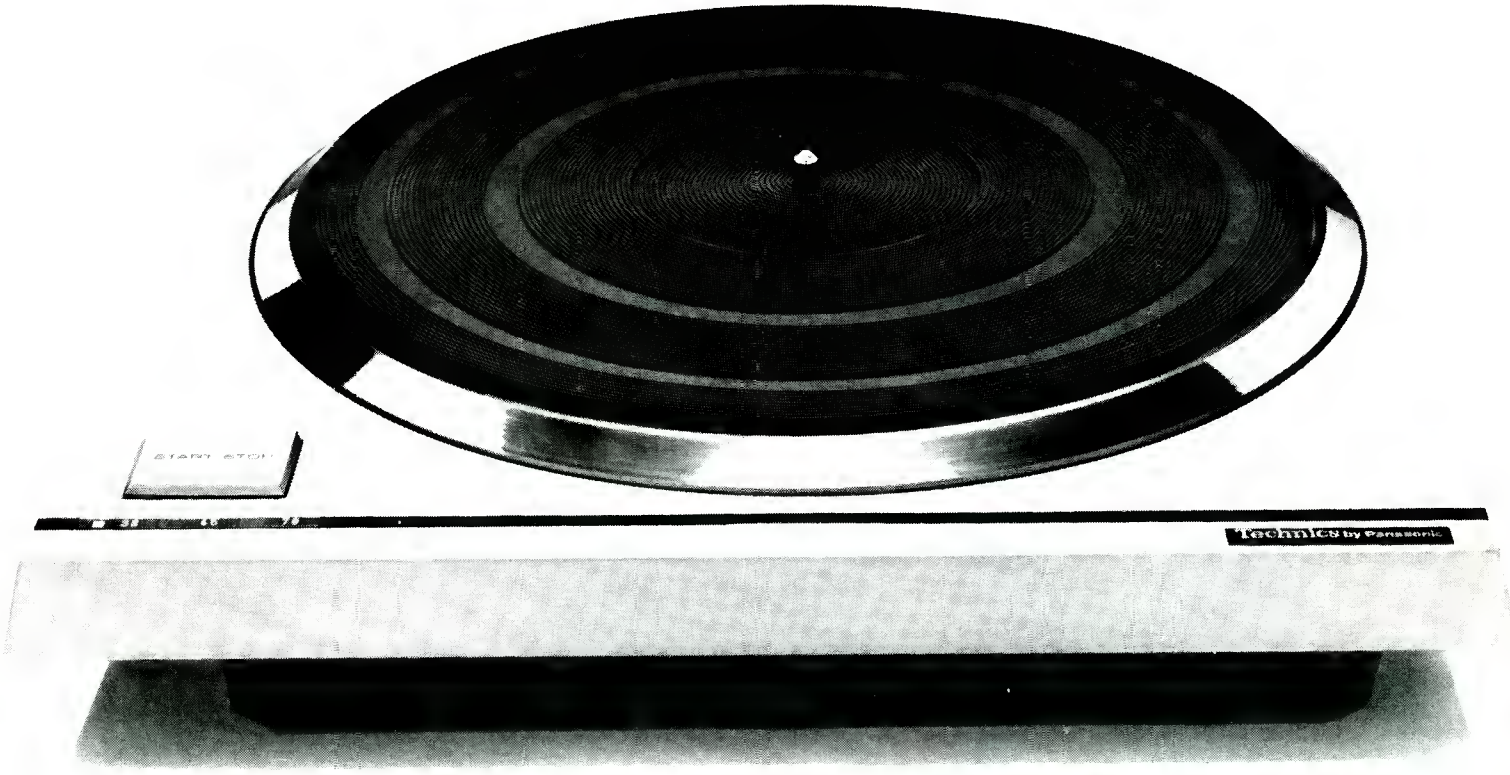

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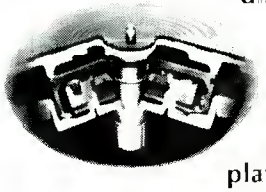

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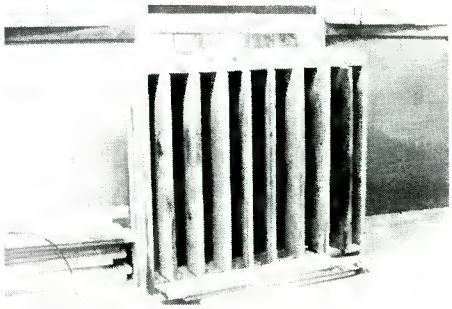
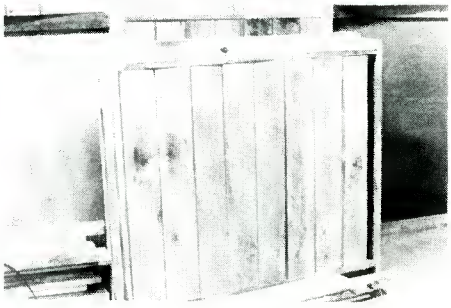
the normal trapping found in most drum booths. Of course, since the louvers are individually controlled, it is possible to have either the trapping or the hard surface, or anywhere in between. The trapping is packed with insulation and on the outside of the baffle we covered the insulation with burlap.



. . . hard side of the baffles — louvers open and closed —



To top the booth off we used the ubiquitous eight-feet-across beach umbrella. The umbrella was suspended from the ceiling by ropes, connected to pulpulleys. Obviously, it is possible, then, to raise and lower, or tilt the umbrella for any sound that is required. This gives us a good deal of control of a generally troublesome instrument, that has the tendency to bleed over into other microphones outside of the booth.

BAFFLES —

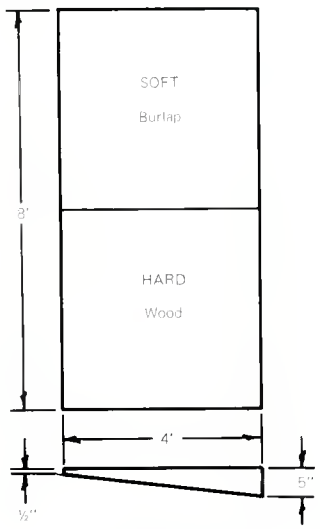
The sound separation baffles were the most common type. Dimensions were 4 feet 1½ inches high, by 4 feet 3 inches wide, by 7¾ inches thick. The baffles were stuffed with 6 inches of insulation and covered with burlap. With a couple of baffles, it was decided to face one side with wood in order to yield a live sound from that side of the baffle. This was done so that these baffles could be rolled together to create a live area, specifically for recording acoustic guitar.

Thanks to the cooperation of Walt Johnston, his secretary Margie Landgraf, and Bruce Bolen; all of Gibson Guitar of Nashville, and Norlin Music the studio turned out to be a warm, inviting place, and taken altogether, a more than fairly acceptable acoustical product.

In closing, we would like to again emphasize that an acoustical exercise such as this one *is not* . . . we repeat . . . *is not* . . . guaranteed acoustics . . . but, **IT WORKS!**

are raised and manuevered into place along the parallel walls. (Simply bolted into place they can easily be removed, at some future time, if they need to be moved.)

With the frames mounted on the walls, insulation (for as much sound isolation as possible) was stuffed into the frames, being retained by stapled chicken wire. The frames are then faced, alternately, presenting the room with a sequence of hard, live, reflecting (wood) surfaces, and soft, dead, absorbing (burlap) surfaces. By continually reversing the panels, right down the wall, it was possible to keep the hard and soft sections opposite each other. It is important to note that the wood panels are fastened to the angled fairing strips producing an angularized wall, effectively eliminating the parallel wall problem.



WALL PANEL DETAIL

To complete the walls finishing strips were used to cover the bolts. The result was a surprisingly permanent looking installation.

The BASS TRAP —

The Bass Trap at the end of the room was constructed in a similar manner. Panels, 4' by 8' but, this time, by one foot thick were built on the floor, stuffed with 18 inches of insulation which was then compressed into the one foot thickness.

This was, in turn, covered by slotted, perforated board. With the bass trap panels hoised into place and bolted to the wall, the entire trap area was then covered with carpet.

The live wall at the opposite end of the room was also built with the panel idea. However, after stuffing the panels with insulation, they were just covered with medium-to-hard rough sawn oak. All of the wood used for the live areas was the same rough sawn oak. Oak is ordinarily a little too hard, in our experience, but it was selected for this job because of the "look" as well as the price, which was pretty friendly.

. . . bass trap under construction —

. . . completed covered with carpeting —

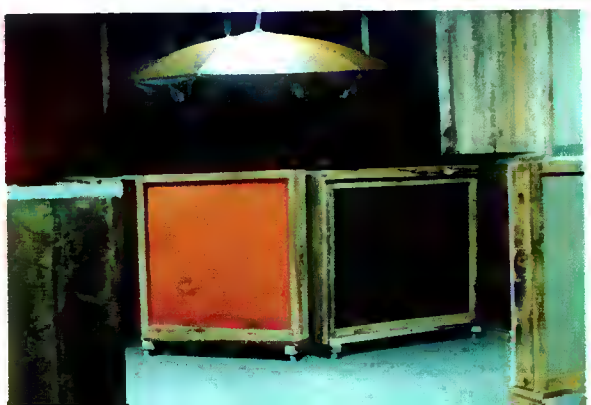
After all the panels were in place on all of the walls finishing strips were used to cover any visable counter-sunk bolt hole.

The DRUM BOOTH —

The Drum Booth was, of course, placed in a corner of the room so that we could utilize two of the existing walls, eliminating the need for additional construction. The booth area is seven feet, six inches high by the same dimension deep. As shown, a drum riser was built about 6 inches high. Having filled the riser with sand to give it a good solid base, a heavy one inch plywood deck was placed on top. The entire riser was carpeted. There are those who like live wood areas under the snare drum. If this is desireable a section of the carpet can be cut from beneath where the snare drum sits.

To enclose the front and sides of the drum booth we built three baffles. These are somewhat thicker than the baffles ordinarilly built for instrument separation. The dimensions of these are four feet, one and a half inches high, by four feet seven and half inches wide, by eleven and a half inches thick. The reason for the extra thickness is for the trapping effect, but the panels were designed to have moveable wood louvers. These louvers were constructed so that when shut a solid hardwood side was presented to the drums to yield a livelier sound. However, when the louvers were in the open position, the condition would be

. . . ballasted drum booth base under construction —



. . . completed drum booth surrounded by baffles and covered by the umbrella —

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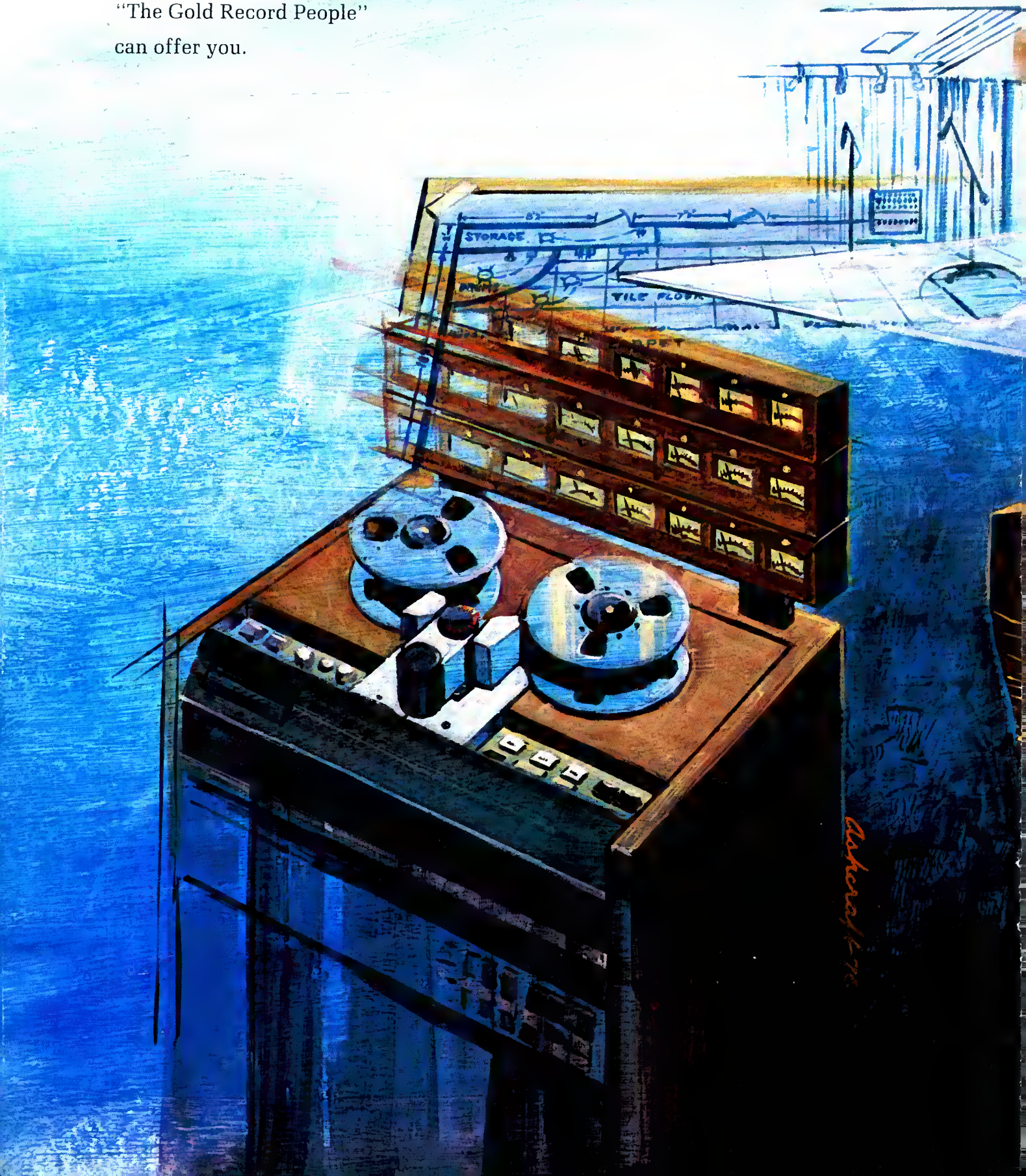

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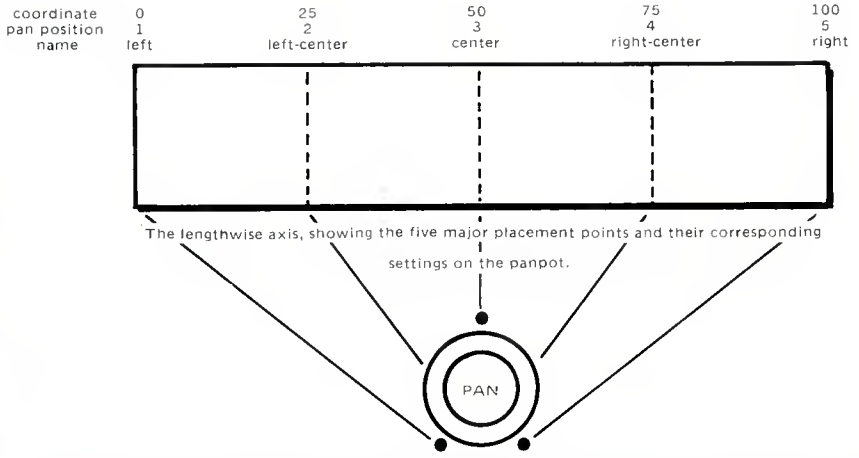

The lengthwise axis, showing the five major placement points and their corresponding settings on the panpot.

Figure 1. No doubt there is a threshold of sorts for where we begin to perceive a non-coincidence, or difference, of panning position. Certainly it would be hard even with a lot of left-right separation on the instruments to detect a spread of seven units or less, i.e., if the panning positions of the left and right sides were separated by seven or less units on the lengthwise axis. And no doubt level – of that particular instrument, of everything else, and the recording as whole – is a factor as well, all circumscribed by the probable fact that, like vision or pure hearing, people's perceptions differ. So we will call this threshold – wherever it might be – the beginning of a "substantially different panning position".

PANNING . . . . . a possible new way to define the least precise of the engineer/producers' mixing options . . . . . by Paul Laurence

As every elementary student of recording knows, the ways in which a console can process a sound fall into four basic categories: changes in volume (level), tone (most often equalization), reverberant qualities and much of front-back placement ("echo"), and left-right placement (panning). And panning is usually mentioned last, not only because it's considered the least important of the four (having technically no influence upon the actual "sound"), but also because it's just plain old hard to talk about, with any degree of conciseness, anyway. "Now I want that piano over to the left – not all the way over, but so that . . . it's *near* the guitar, sort of touching it, but not so that it gets in the way of the vocal. What I mean is for his right hand to be over . . . ".

And, on it goes. This article proposes an alternative to all that – a standardized and unambiguous structural framework for the panning function, which will not only help us in conveying what we mean in talking about it, but also in being able to manipulate it more precisely.

Let us subdivide the stereophonic spectum's left-right axis into 100 equal units. Normally in a case like this (where there is a clearly-defined midpoint – the center panning position – and the left and right halves are mirror images of each other), the midpoint would be assigned the value of 0, with the numbers proceeding negatively to the left and positively to the right. To do so, however, would necessitate having to deal with two variables: direction relative to our 0 (meaning + or –) and distance (the number of units). In the interest of ease of operation and minimizing the likelihood of confusion between hastily-scrawled "+"s and "–"s, our purposes might best be served in making the panning model an absolute value scale, whereupon an

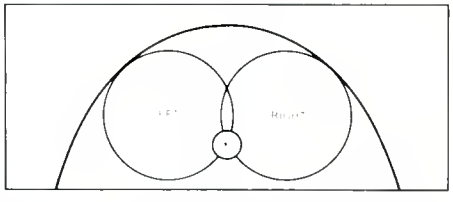

Fig. 2. The "natural" drumkit, approximating the way our ears would hear it from, say, 6–15 feet away and directly in front. The most complimentary miking would be two fairly distant mikes for the left and right sides, and one more – but not too close – for the kick, each microphone having its own track of tape. In the mix, the kick is centered (consistant with the visual picture of a drumkit viewed in this way), and the sides are kept in comparatively close – less than a 60% spread – to keep the kit in proportion with the other instruments.

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instrument or track of a tape's panning position can be identified with just a number.

So, the left-hand axis goes from 0 to 100, with the five basic placement points being at 0 (far left), 25 (left-center), 50 (center), 75 (right-center), and 100 (far right), also known as placement points 1, 2, 3, 4, and 5 respectively.

This model can be at least *somewhat* correlated with the sweep of the panpots themselves: the furthest left position (be it 6:30, 8:00, or whatever) being 0, 12:00 being 50, and the furthest right position being 100 on the lengthwise axis.

AN ANALYSIS OF THE QUALITIES PLACEMENT AND SIZE AS THEY RELATE TO THE INDIVIDUAL TRACK

PLACEMENT:

Everything that you hear on a record appears somewhere along the lengthwise axis – it has placement, in other words. Except for those comparatively rare instances where something is performed for the mix and hence exists only on the mixed master, the instrument's panning position is that of the track of the master tape from which it was derived. A track's panning position is essentially that point along the lengthwise axis that coincides with the track's own midpoint (defined as the point exactly midway between the track's furthest left and right extents). And, of course, a track may be sent to or "have as its panning position" any point along the axis.

Now to talk about all the placement aspects of something like drums entails getting into two further areas: One – assuming stereo drums – is its "spread". Nowadays the final drum picture is almost always derived from two or more tracks of topkit sent to substantially different[1] panning positions on the lengthwise axis, creating "stereo drums". Now with two tracks of different though significantly-overlapping perspectives of one instrument playing simultaneously for both, you can in the mix enlarge that instrument's size, totally independent of level, to be all out of proportion to those of the song's other instruments, so much so that just knowing its panning position doesn't give you nearly enough

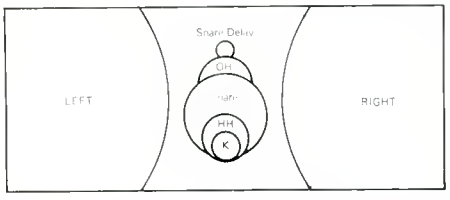


Fig. 3. A common reorchestration, beginning pretty much with 16-track tape. Non-"natural" aspects include the overhead (a perspective you could not hear standing 6-15 feet in front of the drums), the fact that it's a mono overhead (we hear in binaural), the snare delay (again giving you an impossible perspective, and of just one drum), the centered snare and high hat, and the full stereo spread (which places you, the listener, practically inside *the kit).*

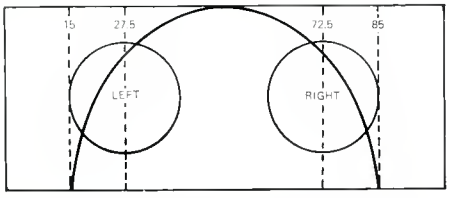
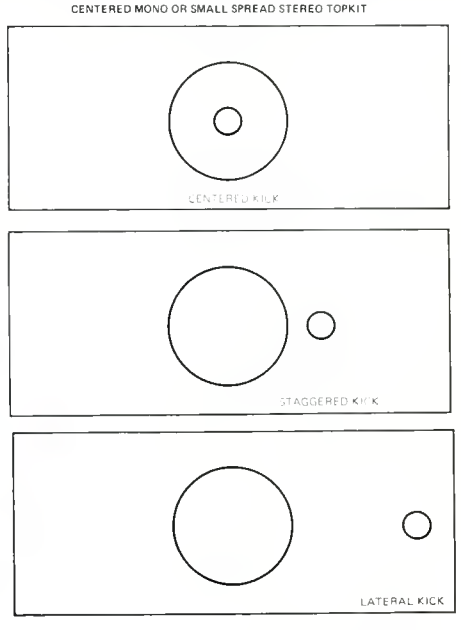
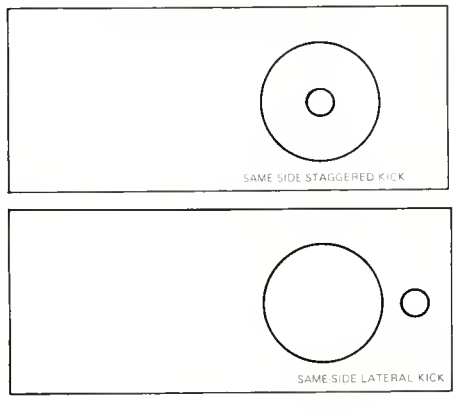


Fig. 4. To create an 70% drum spread, you would not send your drums L and drums R tracks to 15 and 85 respectively, because to do so would be to ignore the fact that a mono track (which is what each of the sides is) will extend 12.5 units to either side of its panning position at a moderate level in the mix, giving you an actual drum spread of 70 + 2 x 12.5, or a 95% spread. For a 70% spread, send your coordinates to 27.5 and 72.5 on the left-right axis.





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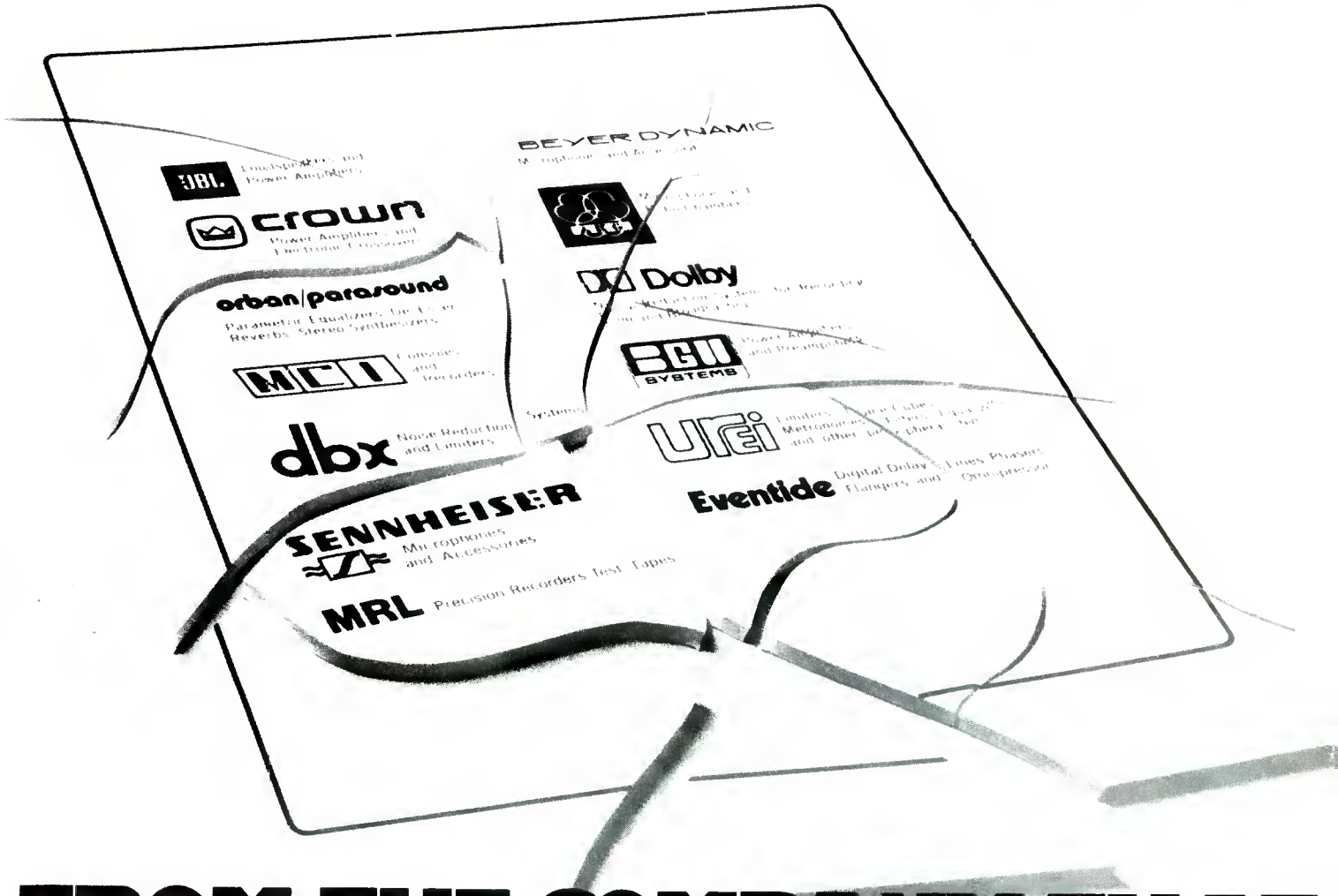

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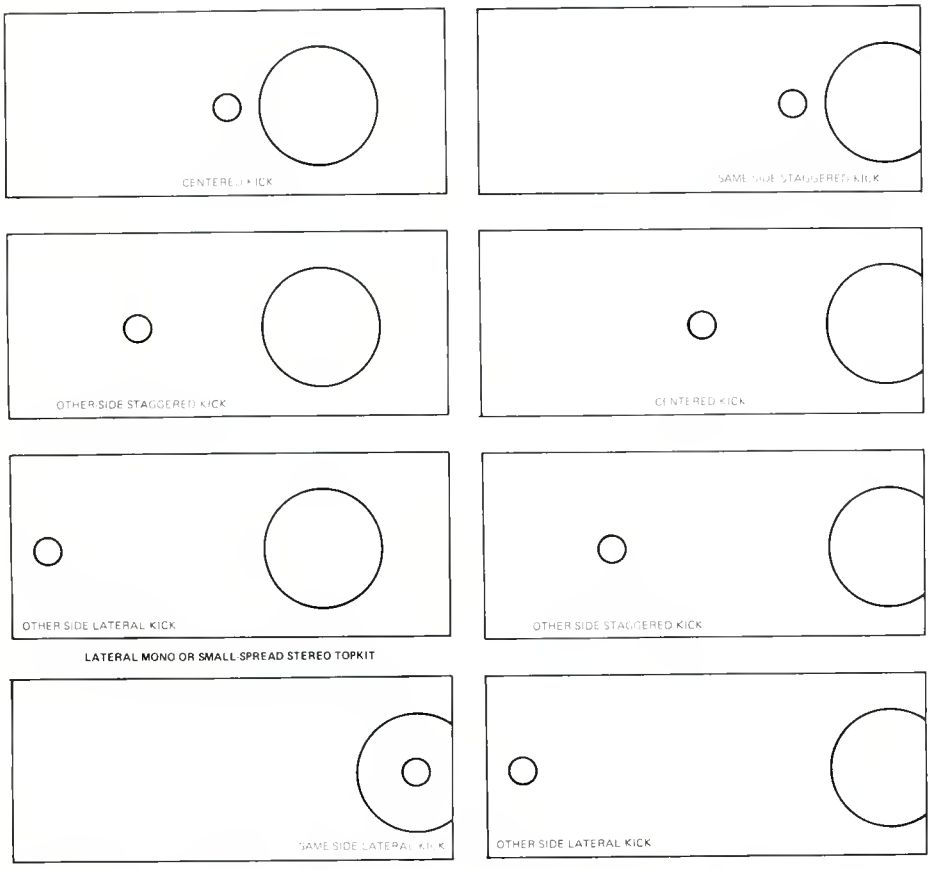

information about what that drumkit really looks like. We must talk about its spread as well — the total distance it covers on the left-right axis, rather than just the coordinates of the outermost tracks. Likewise, the midpoint or "panning position" of the drums as a whole might be similarly redefined as the point halfway between its furthest left and right extents.

And, also, because the drumkit is a three-dimensional instrument over whose surface can be found a variety of different textures, there is the consideration of "internal placement" — the placement of the individual components within the spread . This fact of having different and at least partially isolatable textures, in conjunction with limitless possibilities for spatial reorchestration made possible through multi-miking and multi-tracking make internal placement a must if one is to really communicate the subtleties of a particular kit.

SIZE:

For a track to be anything more than "barely audible" is for it to necessarily occupy more space than just its placement point; it has size. And how do you measure this size? You don't. You estimate. To do this you must first of all get in the right state of mind. Then sit right in between your speakers (or better yet, put on a set of headphones), and balance the two sides of your ears so that the center-panned tracks are exactly in the center. The lead vocal or bass guitar are perhaps the two consistently best reference points here. Then on top of or behind the music, you superimpose the left-right axis. And it's been found that it is fairly easy to "measure" a track relative to any one of the four 25-unit segments demarcated by the suggested five basic placement points.

And generally how large are tracks? Conveniently, a mono track will rarely create a spread of even 25% at a fairly high level in the mix. Or, stated another way, the track will seldom extend more than 12.5 units to either side of its placement point.

A stereo spread, being composed of at least two (by-themselves) mono tracks, is likewise influenced. Specifically, it will extend 12.5 units to the left of the left coordinate and correspondingly to the right of the right coordinate, creating a spread of 25 units beyond merely the distance between the furthest left and right panning positions.

A track's size is determined by many factors, first and foremost, what that instrument sounded like live. Intangible though it may be, people do agree that some players "just have a big sound", "big"ness oftentimes being related to "goodness". (Certainly this is the general belief in the area of drums, where it is said "The better the drummer the

fewer mikes you need and the farther away they can be"). Judy Garland had a big sound, and so did Jim Morrison. Jim Gordon *has* a big sound. Among bands, the Who and Led Zeppelin (both, you should note, just three pieces) are known for their large sound. Andy Johns touched upon this *("R E/P", October 1975)* when he said of Zeppelin: "... it is such an immense sound when those three guys are playing together ... Their records are just an attempt to get what they sound like in a real situation."

Another factor is the actual level at which the guy is playing, which most would agree is directly proportional to the size from both a tonal ("it fills the sound out") and pure level vantage point.

Leakage is a very complex, if usually not too significant factor in a track's size. There are three major groupings of variables, all interrelated to form a complex matrix of relationships. First we must ask: "How much is this instrument leaking?" Or, restated: "How much is this instrument going into other mikes and being recorded on what will be final tracks?" Then, "What are the tonal qualities of all those respective leakages?" That is, how all has the signal degenerated by travelling through different amounts of space to get to all those microphones? And, lastly, "Where do all the leakage images appear in the mix relative to the instrument itself?" As panning coincidence partially offsets the broadening potential of the leakage.

In the days of 4-track tape (to say nothing ot 12-input boards), leakage was a much greater factor than today. Who can imagine the records of the Big Band Era without that room sound and those super-distant horns? Or, Da Blooze without leakeage?

Leakage -- drum leakage especially -- was a very imporatant aspect of the early Beatles sound. Their early records, simple as they were, were dissected by many in an attempt to come up with some halfway-concrete explanation for the worldwide madness known as "Beatlemania". "Newsweek" found the first few Beatle offerings "stupefyingly repetitive", an English musicologist noted their "pentatonic clusters", and many spoke of this thing called the "Beatles Beat".

And part of the "Beatles Beat" was, of course, not only *what* Ringo was playing, but the actual drum sound as well. As such, it was not an extraordinary drum sound -- certainly not "powerful" by any means -- but it did have a special something, one reason being because of the leakage situation.

There was first of all quite a lot of drums leakage, because electric guitarists and bassists didn't play nearly as loud in the studio then as they do now, there was little in the way of baffling, and the vocals were as a rule done live. All of

these factors contribute to the second important characteristic of the early Beatles' drum leakage, namely that each leakage is tonally distinct. Looking at the three tracks laid for the basic, we have the track that the drums are on (with the bass), and then the two tracks it's leaking onto: the lead guitar/rhythm guitar (presumably recorded from the amps and fairly close to the drumkit), having one kind of drum leakage, and the vocals (whose mikes were presumably further away from the drums), having a treblier drum leakage image. The difference between these two leakage images was made greater in the mix by adding reverb to the vocals, and therfore to that track's drum leakage as well. Thirdly, possibly by conscious intent but more likely because that was the way things were generally panned in those days, they maximized the effect of all this drum leakage by "spreading it out" in the mix such that some kind of drum image appeared at all three panning positions. Beyond this even, the weakest and furthest-back leakage image (the one on the vocal track) usually appeared in the middle, giving the drumkit the maximum possible spread. And under these three conditions (an instrument is leaking at a fairly high level into the mikes of what will turn out to be two or more non-similarly-panned tracks), there is often created a multi-textured, discontinuous (often chaotic) "crazy quilt" effect, making localization difficult.

Another factor in the ultimate size of an instrument is how it was miked, or more accurately "From how many different perspectives – direct included -- was it derived?" To a point, adding another perspective contributes another texture tonally, adds to its definition visually, and also builds up the size, all more so if the perspectives are treated differently. With a three-dimensional instrument like drums, this broadening occurs quite naturally in the course of multi-miking, as almost every mike of the kit will see at least a little of what all the other mikes are there to record. In a nutshell, every channel is getting a (radically) different mix of the exact same program.

With a mono sound source such as an electric guitar (amp), you can create intra-instrument leakage by adding additional microphones, that is, perspectives. And it is interesting to note that both the Who's Peter Townshend and Led Zeppelin's Jimmy Page regularly use a combination of close and distant miking for their guitar overdubs. Just listen to "Who's Next" / "Quadrophenia", or "Houses of the Holy" / "Physical Graffiti".

Getting into the effects on a track's size of all the different means of signal processing can be tricky. With limiting and compression in particular this is true. As they influence both the level and the "picture" opinion seems pretty well divided on the subject of whether they make a sound larger or smaller, and indeed there are convincing arguments for both viewpoints. This much we do know: Limiting and compression bring the peaks down, making it in a sense "less loud", and as level relates proportionately to size, we'd have to say that they make the track smaller. Or, we could say that limiting and compression, in bringing up the *average* excursion, make the track louder and hence larger. Both limiting and compression "shave off the ragged edges" and hence tighten up the focal field, compression engendering that "squeezed-in" or "squashed" quality, all of which would seem to reduce the track's size. Yet we could say that limited or compressed track is more rhythmic, more predictable, punchier, or "harder", all of which would seem to indicate an increase in size. And the process of expansion fits neatly in here as well -- just think of it as "de-limiting" or "de-compressing".

The influence of equalization on a track's size is also fairly complex. The best way to talk about it is in terms of the three general bandwidths: Lows (up to 250 Hz.), Mids (250 Hz. - 1.5 KHz.), and Highs (1.5 KHz. and above). With regard to just level, boosting always adds, so in this regard makes the track larger. Now in terms of just the visual aspects, it's something else again. Boosting adds tone or "fullness", so I guess you'd have to say it makes the track louder (and hence larger), and conversely ducking makes the track "thinner", "less there", or smaller. Now this is true except for the high frequencies, which when boosted give that edge -- a "pointiness" -- which could be seen as making the track smaller. And conversely here, rolling off highs (especially above say 3 KHz.) can make the track "darker", fuller, or larger.

Then there is a category of miscellaneous ways to shape a sound, almost all of which seem to make the track larger. Certainly, any of the ones that introduce a real or simulated "motion" to the sound -- like the Leslie speaker, tremolo, phase-shifting, wah-wah, or various synthesizer processings -- contribute size.

Three of the most important determinants of a track's size don't usually happen until the mix. First there is that vast cornucopia of different processes known as echo, which always broaden a track in terms of pure hearing (say from a mono radio), and 90+ percent of the time from a visual standpoint as well. Let's talk about reverb. Reverb usually broadens the original image, along both axes, the crux of the issue being where the return shows up along the lengthwise axis relative to the original signal. With a mono chamber, you could really only say that the reverb visually broadens the tracks that it comes up behind, or at

least close to. A perfect example of placement disassociation of send and return would be (again) the early Beatles' records. Especially on something like "From Me To You", which was mixed to the 2-track listening configuration, with all the instrumentfs on one track, and the vocals and harmonica overdubbed on the other track, meaning zero intertrack leakage. Only the vocal track was echoed, and the return was panned to the same position as the instruments track, in no way visually broadening the vocals, which appeared on the other side of the left-right axis. A normal mono chamber, panned center, could be seen as broadening all the centered tracks given reverb. A stereo reverb situation, where the return comes up directly behind the send, broadens all the tracks echoed.

With delay echo, there are a number of variables, all interrelated, which determine whether the original signal's size is increased or not. First is the time interval. As the human ear cannot distinguish two bits of auditory information occurring within 30-40 milliseconds of each other and below, a delay below this threshold will invariably broaden a track from a purely aural vantage point. As far as visually, we can say that the shorter the interval, the further it can be panned from the original signal and still preserve the illusion of just one (broadened) signal. And the converse holds true as well, that a slow repeat has got to be panned closer to the original signal to effectively broaden. Then there is the question of level of the delay. The louder the delay, the more likely it is to be perceived as a separate signal, i.e., the less it will contribute to the track's size. And lastly, there is the aspect of tonal discreteness. A wah-wahed delay, for example, would probably stand out as a distinct thing at anything more than a minute level, as would be the case with a delay EQed radically differently from the original track.

If our instrument is stereo, it can be spread to any number of different sizes. There is a very interesting anomaly in talking about the size of tracks that compose a stereo instrument, namely that they seem -- only in the presence of at least one other track composing the same instrument -- much larger than an ordinary mono track. This is probably due to in many cases composing a two- or three-dimensional instrument (like piano or drums) to begin with, being at least semi-distantly miked (which makes it larger than being close-miked), intra-instrument leakage on the other tracks composing that same instrument, and oftentimes actual elements in common with those other tracks.

With regard to the average (mono) track though, level in the mix is by far the most important factor in its size. Any track -- even if totally "dead", "dull", or "presence"-less -- can be made larger than any other mono track simply by giving it more level.

A FUZZY OVERVIEW: PERMUTATIONS OF THE BASIC DRUM PICTURE

It is true that there are nearly limitless varieties of drum pictures. Consider this particular tip of the iceberg: Limiting ourselves to just talking topkit vs. kick (ignoring the snare, cymbals, and everything else), limiting ourselves to just kits with one kick drum, excluding medium-spread topkits and large-spread topkits, ignoring all the different ways there are to mike, equalize, echo, pan, mix, and otherwise modify drums, limiting ourselves to just five placement points along the lengthwise axis ("lateral" meaning 0 to 100, "staggered" meaning 25 or 75, and "centered" 50), and ignoring pictures which are mirror images of ones we already have, there are still 13 different basic types of drum pictures. Some of them, of course, are totally preposterous, and could be of value only in the rarest of circumstances. Still, it gives a clue to that left undrawn.

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RING AROUND HOLLYWOOD

ON THE FRINGE — a look at six of the smaller studios . . . their operational profiles . . . their problems . . . their equipment . . . their expectations — a continuation of R-e/p's series of reports on life in the small studio business.

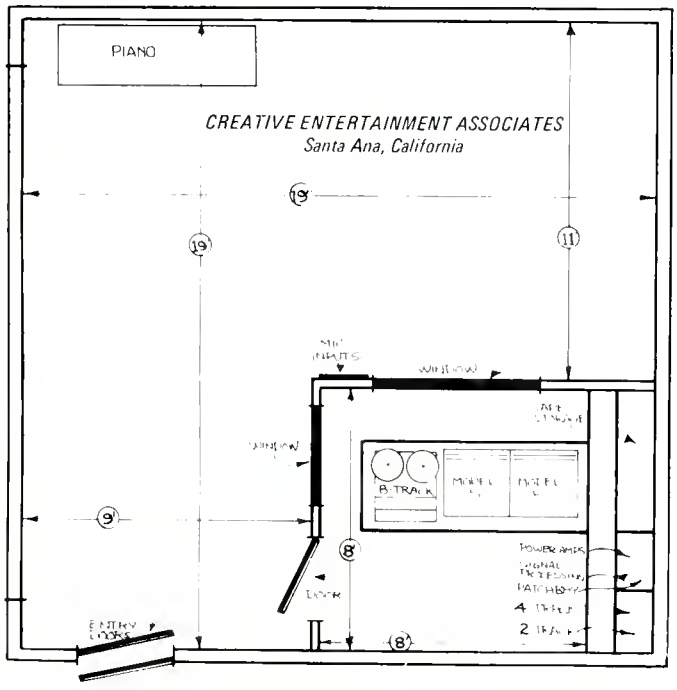
Smaller studios throughout the universe have very special problems, but do those within the hail of the *big enchilada* in Hollywood have, not only the special problem of smallness; limited budgets, etc., but also do they have some peculiar to their being in L.A.'s orbit. The question is: Can a small recording studio in San Bernardino . . . Orange County . . . San Diego . . . a mere *45 minutes from Broadway* (oops! sorry, Sunset Boulevard) make it . . . and how?

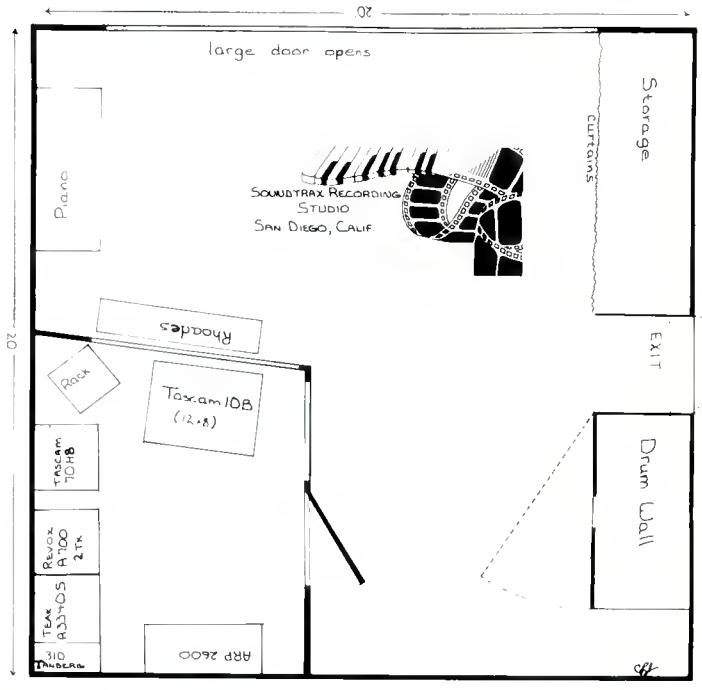
The following, then, are observations and direct quotes derived from a roundtable discussion with the key people from 6 such studios. To start with, it was both illuminating and slightly surprising to find the degree to which each entrepreneur had gone to position his individual 8-track operation, consciously or subliminally in such a way that it seemed to offer itself as an alternative kind of value in the competitive market for recording.

Perhaps furthest-out in his thinking about how to exist and profit is Ron Carlton of the **Demo Shop**, located in the northern Orange County city of Fountain Valley. It should be stated, at this point that these individuals representing each of the studios, prior to the roundtable, were comparitive strangers to each other.

Ron Carlton: "Well, I'm a little different from all of these guys, (the others sitting at the table.) I didn't get into the 8-track studio strictly as a service studio operator, a service business. It's really that word has gotten around and our walk-in business has picked-up. I'm in a house, I can't get a business license to run a [commercial] studio. I can't advertise because of the zoning restrictions. So everything I do is, so to speak, under the table.

"So, I've approached it as a different kind of business. What we've done is formed a production company called "Spice of Life Productions", and I'm into





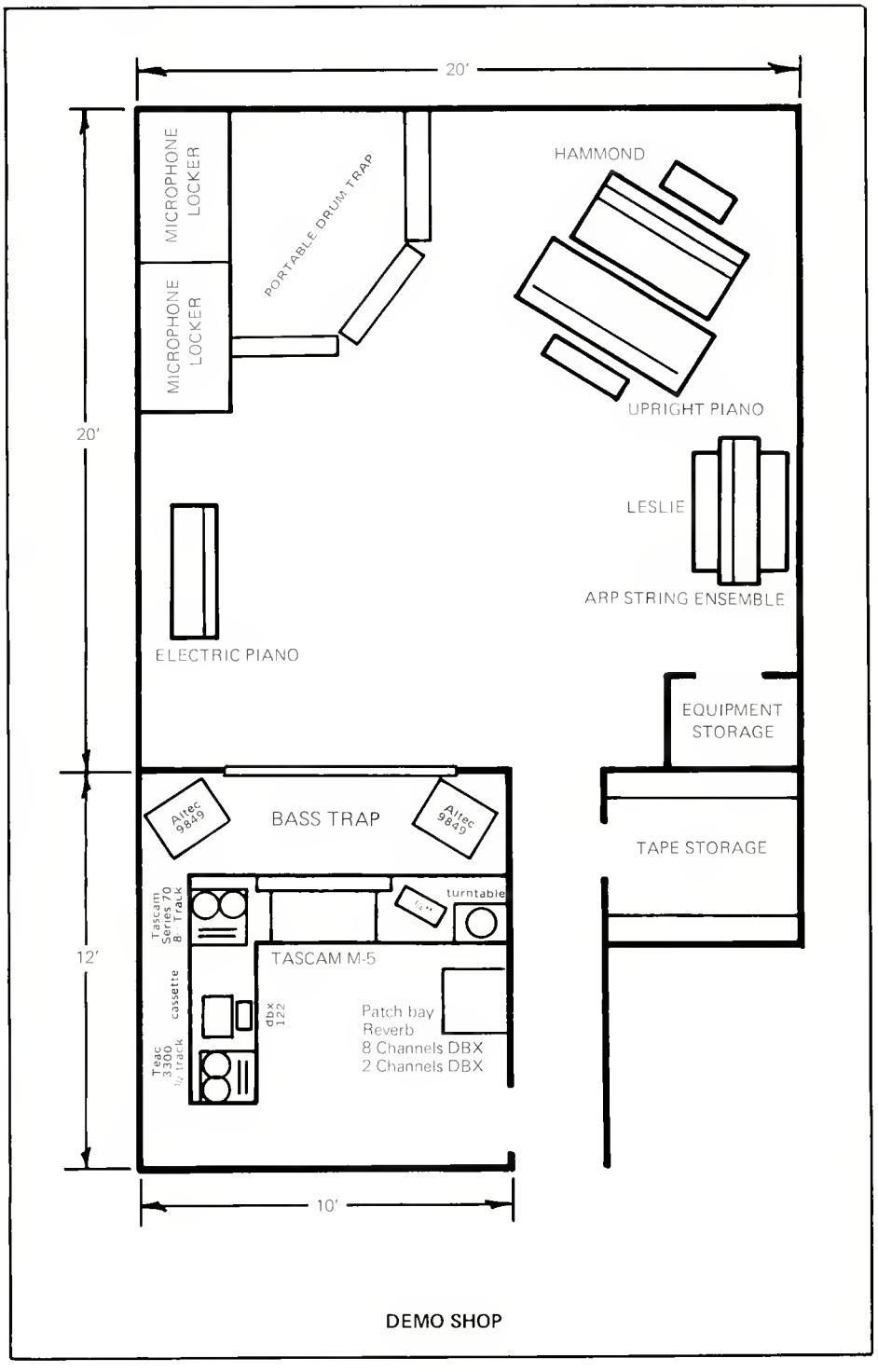
producing. What we are doing primarily is using the studio [in the garage] as a tool of the production company. The way we operate is to go out and scout acts . . . talent that is working and who we feel has a potential. If we are really interested we'll furnish everything -- studio-time -- publicity -- photographs, everything we will need to hustle them up in Hollywood. Of course, we won't do it until they sign a one year contract that makes us their agent. We have our own publishing company and our own record label, for which we can get distribution.

"When we get a group we put them out on our label, then when we push them it makes them look a lot more successful to a booking agent, or a record company. It's one step further than a demo tape. It's really a great help when you are trying to sell them.

"We also have some video gear which is helpful in rehearsing their stage acts, choreography, etc., in the studio. Taking the video tape up to the producers and bookers along with the 45's makes a monstrous impact. We do a lot of lounge acts. Generally at that level they pay better than the rock n' rollers. There's more work for them, and because they work more steadily, their own cash flow is more stable and they are less up-tight, more secure -- more willing to work the act out.

"At the rates the 8-tracks are charging around here these days, if that's all I had to depend on for my income it wouldn't be enough to live on, the way we work it – doing demos.

"One more quick point for anybody wanting to try it our way. Watch out when you take one of your clients over



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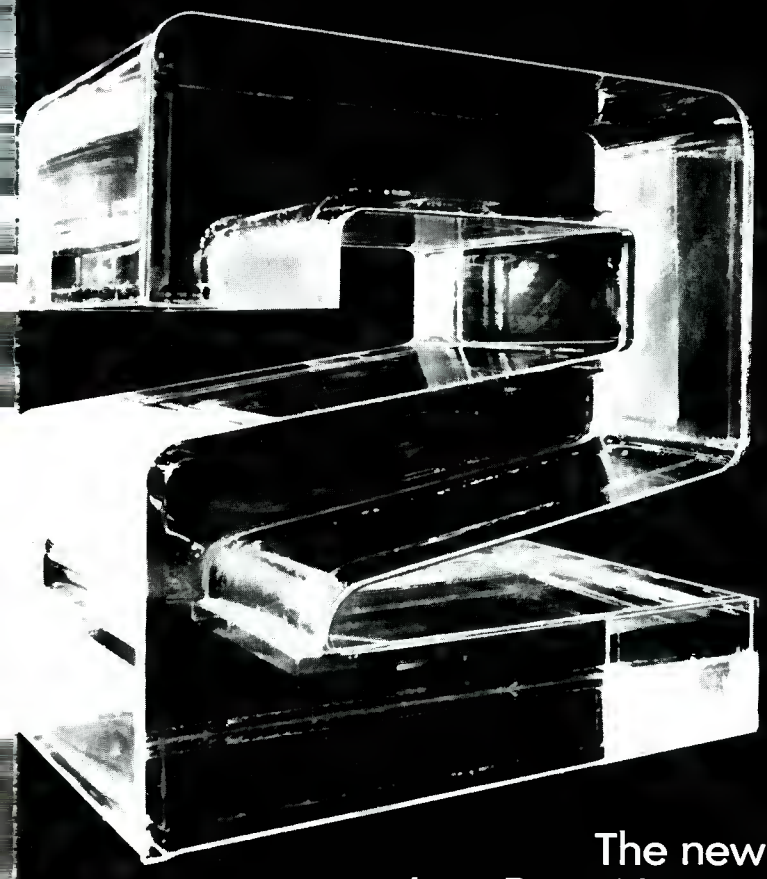

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to a big label, when they are ready to go. You must be really careful not to just walk in with something that's *real gold* and say, look what I've got. 'Cause at that level they'll kill you. [They will] take your act and not even wave goodbye. Right now the most important guy we have in our operation is a $100 an hour lawyer . . . a very well known record attorney, and it's amazing at how differently we are treated when we just mention his name. But beware! I wouldn't think of ever again trying to sell my own tapes."

In describing their business Jim Zebrowski and Frank Cervantes of 8-track **Westwind Recording** in San Bernardino, stress that they are probably further from L.A. than the others (to which Jim Papageorge of **Soundtrax** in San Diego took slight exception, but agreed it wasn't important) and that their market, they supposed, was in, more or less, of an entertainment desert.*

According to Frank Cervantes: "We do around 50% in demos, say, 35-40% in jingles and commercials. The rest in custom work, schools and churches, and stuff like that. Jim, how would you break it down?"

Jim Zebrowski: "Really all different types of recording. It seems like we do a lot of single artists. A lot of folk stuff. I was surprised to hear Ron say he does demo disks. We've done a couple of 45's, a couple of singles and a few LP's. Most demos just go to stereo tape, but I like what he says about how the 45's make a group look . . . more together. Professional!"

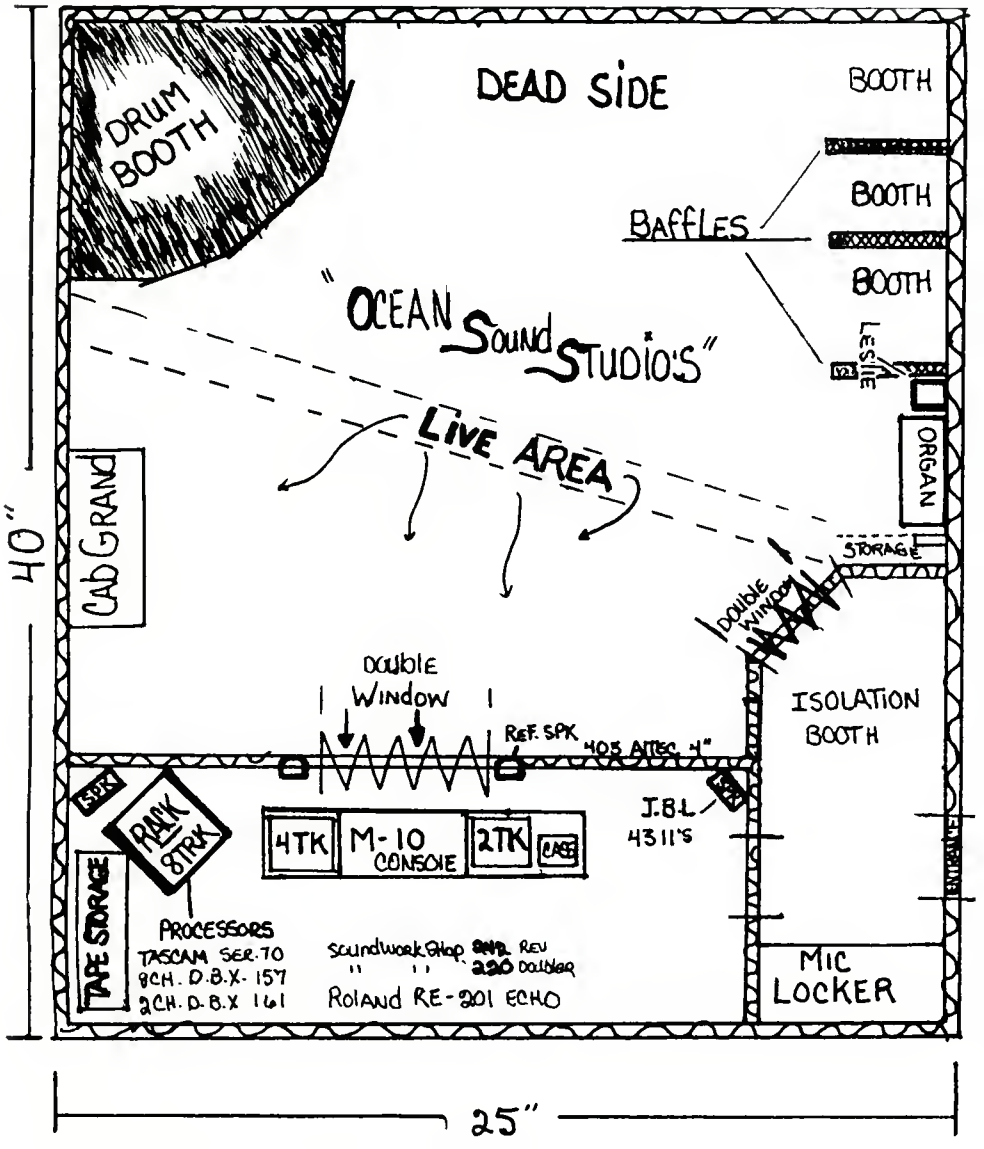
Jim Papageorge operates 8-track Soundtrax in San Diego. As the name is meant to indicate Jim is trying to position his operation, in his words, "for the long-term we are shooting for film soundtrack scoring. But that's a hard market to crack, and we are paying our bills with demos, like everybody else. We don't screen our clients (a reference to Ron Carlton's method of operation). Anybody who wants to record demos, we take on. I'm sure most of us do that.

"We split our business almost 50-50 between what we call commercial production, which is radio, TV, and film, and the rest which is what recording studios traditionally do . . . the music aspect. I would say that the romance is recording music, and the bucks are in commercial production . . . the mega-bucks.

"In answer to your question about the markets for multi-track music production in San Diego, there seems to be a change coming. In the past, of course, it has been the big 16 and 24-track studios, who have done most of that. It was worth it to go to L.A. or someplace else. But, now the 8-track studios, which I call budget professional or small budget full-ons are starting to make a serious impact because we are getting better, and for "x" amount of dollars we can sell days . . . for an amount that would previously only buy hours in the big sixteens and twenty-fours! But, the key is if we can get a lot of the same quality now, that the big boys get.

"As for disk production, we've done a couple of albums in the past year. We've got three 45's being mastered right now. The interesting thing about the 45's is that one is Polynesian, one is talking, and one is a rock n' roll demo. I would never have guessed I'd be doing Polynesian 45's for sale in New Zealand."

Little do they realize that in that same desert a number of years ago, the likes of Paul Buff, of Keepex, Gain-Brain, and Automation fame and fortune, wrestled with many of the same small studio problems, not the least of which was the non-standard tape format problems. In the early sixties Paul made a neat profit (a set of vibes, a Fender Jazzman, and $500 cold cash) from the sale of his 5-track studio (yes, a 5-track machine he kluuged together, when 3-track was state-of-the-art) in Cucamonga to one, Frank Zappa. Paul recorded quite a few gold surfing things, like WIPEOUT, and PIPELINE in that studio, which he reports are still selling quite well in international markets, according to producer royalties.



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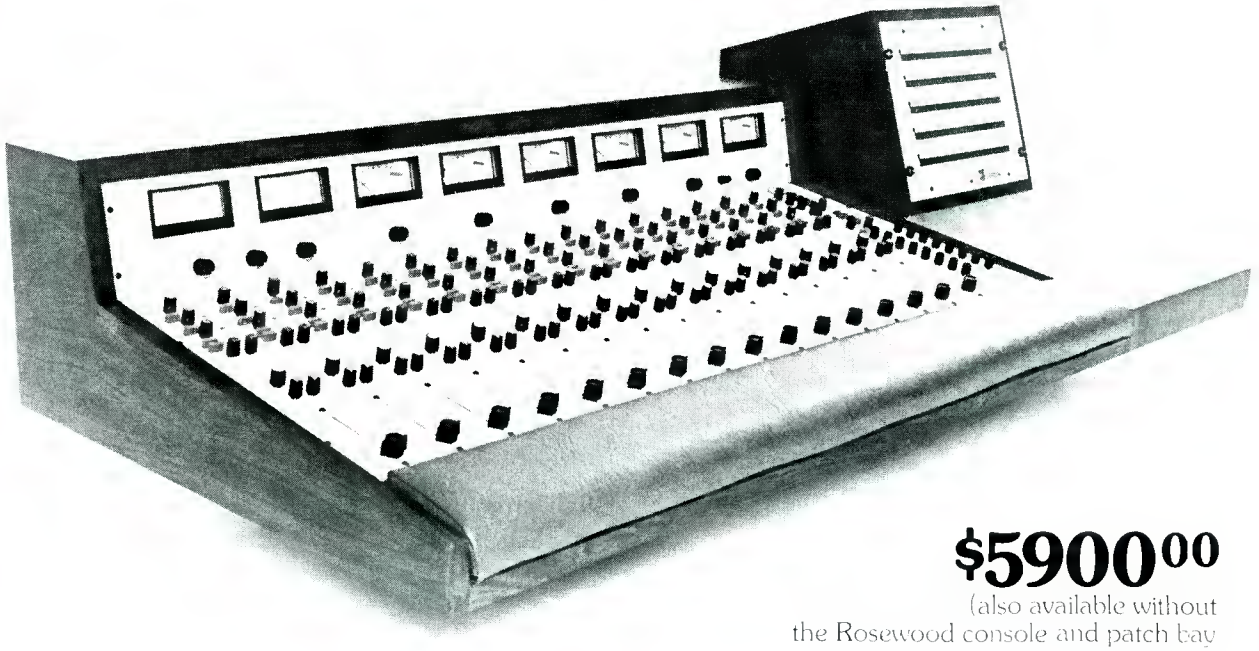

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ium on our own time, but beyond that we can do jingles fairly cheap and quick.

"Our market for commercials is centered around consumer outlets in this area. Small operations, small chains. We look for those who are just big enough to have reasonable budgets. We contact the sales people at the radio stations on a local level so that when they go out to sell radio time they each have one of our demo cassettes, and they use that as a sales tool to help them sell . . . they're selling for us as well. I would say as far as jingles go our pitch is hassle-free production.

Mike Kicenski: "In most of what we do we are pretty much self-contained. On our album projects all the group has to do is show up to record. We do pretty near everything else here, we even design the jacket in our own graphics department. Jeff is a terrific artist. The only thing we send out is mastering, pressing and printing. We think we have a very unique situation for any group coming in to us. Besides just the recording we can supply a lot of *creative*. I would say we've been involved in four album projects in the last 10 months.

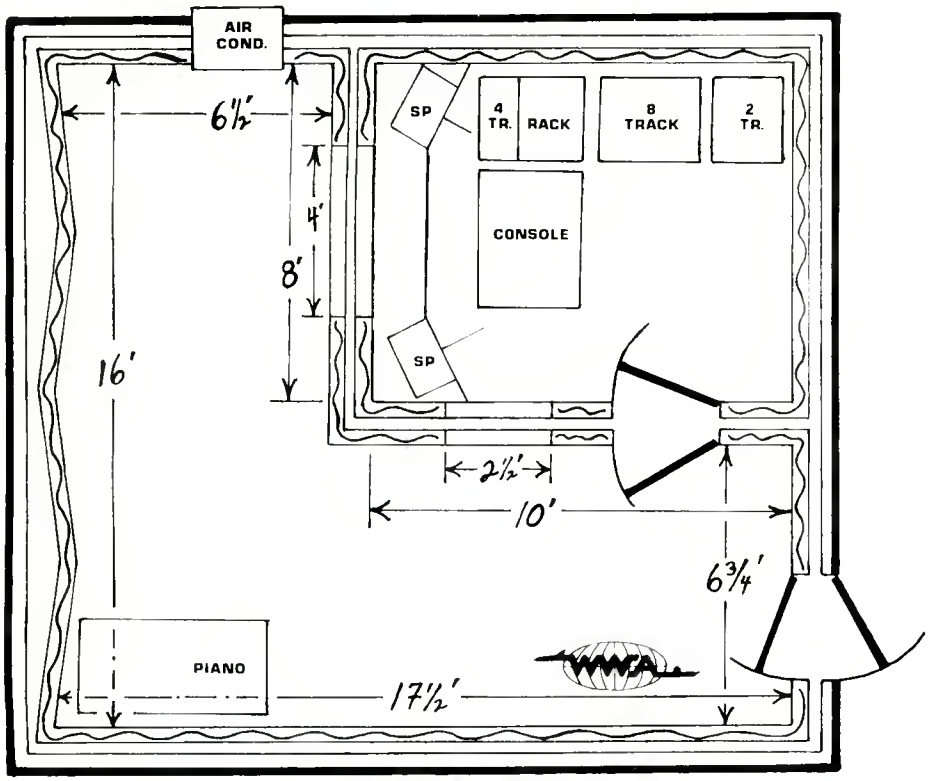
"As far as where we are going, I guess, we sell ourselves as a creative house in addition to being a recording studio."

Al Lyon, of **Ocean Sound** in Huntington Beach, operates in yet another way, somewhat more of a traditional recording studio. "I don't do a whole lot of jingles. 90% of my business is making demos for bands trying to get a contract, or producing low budget albums. Custom work. It's almost all music. Maybe 10% of my time is spent on commercials; there is a lot of money in commercials, that's where I'd say the majority of your money could be made in a small facility . . . if you like that kind of work. In the last year I've done a couple of 45's, three albums, and a couple of movie sound tracks, surfing films.

"I prefer to work with groups on a long-range program rather than have four, five or six groups in in a week, doing a different group every day. I'd rather take two or three weeks, or a month, and go start-to-finish on a project . . . really concentrate on it with the group to do an album. Whether it's going to be an album that's going to press, or whether it's a demo to approach a record company with."

John Vestman and Craig Black run **Worldwide Audio** in Long Beach. It's another 8-track studio specifically dedicated to the music aspect of recording, and like the others of the same purpose reflects the previous musical activity of its owners. However, the relationship between the studio's avowed purpose and its equipment sets it distinctly apart from the others. Worldwide seems to come as close as any to being the only one of these studios that competes head-on with Hollywood. Each of the other studios is basically equipped with TEAC/TASCAM 8-track gear: either model 5 or model 10 mixers, and 8-track, ½-inch recorders (either series 70 or 80-8 machines). To further qualify all of these operations, they are each what might be described as first generation studios. That is, their current major equipment components have remained basically the same since each began professional operation. However, Worldwide has been equipped from the start with a Soundcraft (England) 12 x 4, full function recording console and an Otari 8-track, one inch, 15-30 ips. recorder. Their choice of this equipment level is explained by John Vestman. "We have been exclusively into music recording, (maybe only because since we've been open we haven't had time to go out and seek the other markets.) Our appeal to our client is that when a band wants to make a demo, you don't make them a demo; you make them a master tape . . . and the master is the demo. They are going to have a master quality demo at almost just a demo price . . . an inexpensive price.

"In my opinion no 8-track is good enough for super demos, unless you are doing someone, say, a three piece combo, that just wants stereo drums, a guitar, a bass and a voice. Definitely 16-track is a must to step up into doing masters, and that's our goal. So, with the equipment we have, which we think is already quite a step-up over what demo places usually have, we can produce a really quality product, pretty much for just an increased tape cost. We run the Otari at 30 ips, the frequency response is excellent, the noise is zero. We don't use anything but the Ampex 456 Grandmaster which gets fantastic signal-to-noise, and that's really our main selling point.



WORLD WIDE AUDIO
LAKEWOOD, CALIFORNIA

Editor:

It does seem, in analysis of the conversations to this point, that either these studios have successfully camouflaged their competitive feelings or that competition is not a primary motivating force either, vis-a-vis, each other, or Hollywood. Each has, seemingly, successfully created an imagined or real way to direct some unique service to the market.

Additionally, the dialogue was sufficiently the same from each to report a concensus, only hinted at in one of Jim Papageorge's statements: "That small studios are getting better"; and Jim Zebrowski's remark that, "in the next couple of years, especially if we see 16-track, one inch, there won't be such a thing as a [format] compatibility problem."

In continuing to discuss the very evident optimism about the future of the small studio business, it was the feeling, conveyed in any number of comments, that there was a cause and effect relationship working. It was reasoned that with a substantially larger number of smaller studios coming into existance, because of the ability to produce a reasonable pro-

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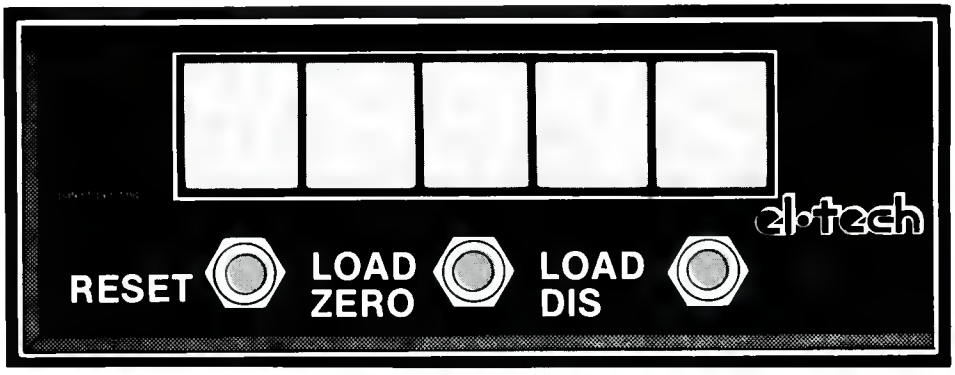

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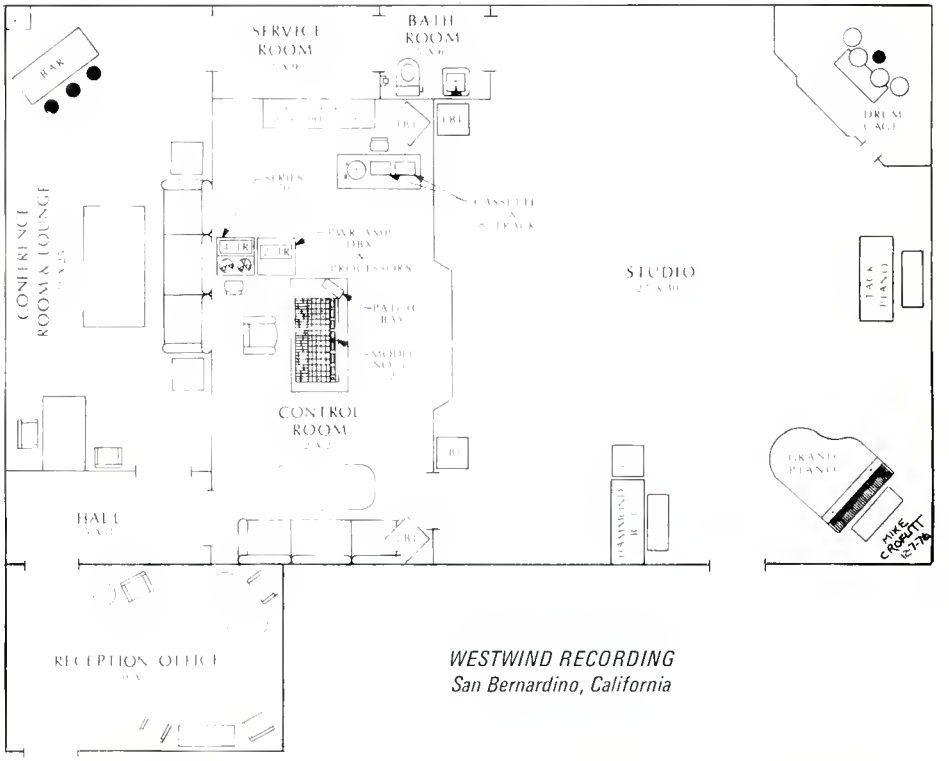
duct from a relatively modest start-up expenditure, a fair number of equipment manufacturers, becoming aware of the market potential, have been developing equipment specifically to enable the smaller operator to narrow the audio quality gap that exists between the typical product produced by both the large and small segments of the studio market. While there is no question that competitive forces have driven hourly recording rates down in this market area, that factor has encouraged a greater number of customers to come into the studios.

Another very visible result of this general evolution has been the growth of a new class of equipment sales and the service organizations specializing in the small studio market, both in this area and across the country.

It should be acknowledged at this point that each of the studios participating in this forum were primarily equipped by one such specialist: Express Sound Co., of Costa Mesa, California. The principals of that company: John Boyle and Jerry Smith were primarily instrumental in organizing this forum. John and Jerry, both group musicians during college, had each been with audio equipment manufacturers (Tascam/TEAC and Altec) prior to originating Express a little more than two years ago. According to John: "We began to see this small studio thing happen right across the country; guys like these being able to get into business and turn out a pretty representative product. So, when the opportunity came up we opted for Orange County." Jerry Smith: "If anything, I would say the whole thing is evolving a little ahead of schedule . . . quicker than we thought."



WESTWIND RECORDING
San Bernardino, California

The actual stories of how the first equipment procurements were arranged and negotiated led to an almost general admission that the embryo studio proprietor has need of a whole lot more information on one significant subject: Acoustics. Around the conference table there was a period of vigorous discussion of what *should have been done*, including one estimate that it might have been wise to budget as much as 25% of the original hardware shopping list for acoustic treatment.

The most obvious acoustical problem relates generally to the smallness of the enclosures that are available for use as small studios. One of the favorite locations for a studio is the typical *automobile housing area* (if in public you don't want to call it a garage). It would seem that garages built in Southern California usually measure 20' x 20'. For some specifically unrelated reason proprietors of studios built within such structures arbitrarilly and automatically conclude that the size of the control room ought to be about 8 feet deep and 10 feet wide. The low frequency problems start from there.

Acoustics and Control Rooms

Jeff Aronson of CEA: "The 8 x 10 control room was a decision we made ourselves. It never crossed our minds that we wouldn't be able to pass the lows when we built it. It was just a decision we made about how much space we wanted out there [in the studio], and how much

we wanted in here [control room]. We were just trying to get as much [space] out in the studio as possible.

"Even with this, one of our clients told us they tried us for one thing [project], then they went somewhere else simply because of the size . . . room for the band. Our biggest hang-up now is size.

"Anyway, in the control room, it doesn't pass the bass, it being so narrow front to back. We now know that the room has to be 15 feet deep to pass about 33 cycles, so it's got to be about 13.5 feet to pass about 40. And 40 is critical. Our tapes were ending up a little *tubby*. When we went to master our disks, or in broadcast, the most consistant thing we found was they lacked mid-range. Now when we master we boost everything in the mid-range at 3.2 KHz. So by bringing that up we eliminated the *tubbiness*. Now, we are used to hearing what comes out of the speakers, and it transposes well. I think we have mastered the problem by watching references. But, the difference is if any strange guy comes in, even if he's a good engineer, he's gonna' be lost at first."

Al Lyon, "Kentucky EQ." Al confirmed the CEA statement, "that's what I keep hearing from everybody, that my control room isn't big enough to reproduce bass, and that's true, as it turns out. But, I've learned to mix in my room so that the inadequacies are compensated for, and my tapes sound fine over other systems. Like Kentucky Windage, we use Kentucky EQ . . . if you know you're shooting high-right, then you aim a little low-left. I think you can get away with that more if you are into commercials, tape for radio; but it is more critical when you go to disk with music. But, I know that that's just one more mental step that otherwise had the room been right, I wouldn't have to take into consideration. It's an annoyance!

"But, to some degree I think everybody has to do the aural mental adjustment thing in any new room you go into. The variables are just too great. You have to get used to the idiosyncrasies of any new room . . . they are all going to have them. But, I guess, most of us type of operators really don't go into a lot of different rooms to mix in, and the kinds of clients we have probably don't have professional producers who have seen in lots of different studios. So if you can really say you know your own room, and you honestly do, then you are probably going to be able to live with the limitations."

Another limiting factor was voiced by Jim Papageorge in terms of what any operator might, or might not want to do to correct a control room problem architecturally in someone else's building, when the occupant is on a relatively short

lease. Jim reports that he has already added 3 to 5 thousand dollars to the value of the building they occupy. "There is a limit beyond which you don't want to go. It's amazingly similar, we had the same 20' by 20' garage and cut our control room to approximately 8 feet wide by 10 feet deep, it's off square, so it's 11' by 9' on one side and 7½' on the other side. To solve the control room problem, which I agree you don't think a lot about when you are building a small control room, we use a three-way combination of some amount of room design, the cross-over characteristics of our monitors, and an equalizer on the pre-amp section of the monitors. But, I think in a situation like ours, with a two year lease, it's better to electrically equalize your little control room; rather spend the money to buy an equalizer than construction. When you leave you can take the equalizer with you.

"I've got to mention this, EQ isn't my biggest problem with a small control room. Trying to achieve accurate stereo panning has been really difficult. You don't realize it until you go into a huge studio and listen to it. It's hard to imagine that six-inch spread at the listening point in your control room is going to be a thirty-foot spread in a big studio or in a theatre. That's my biggest problem, panning.

"About size limitations, to get a big group in the studio, well into 20 feet by 20 feet it's going to be close, and you have to have a sense of humor, but it can be done. We've done a 35 piece choir, and last week we had a 15 piece brass band in. If you approach the client right, you can handle it. We like to remember there's a reason why he's coming to our place. There is something about us that he thinks we can do. So , rather than say we can't, we work around the problem. For example, because of the smallness we went for a dead sound in our studio, and we use close miking 99% of the time, with carpeting on the walls. With that kind of treatment we can take on anybody. I feel, as far as the sound of our room, because there isn't any sound. We use extra good mikes, up close, and don't feel that size affects our performance at all. Of course, that makes having a good reverb all the more important . . . damned near indispensible."

Worldwide Audio reports having had professional acoustical help from the beginning of their project. Their advice included the installation of 3 broad band bass traps, and a compression ceiling. According to John Vestman: "Electrical equalization is good to fix things up to a certain extent, but any time you put a signal through a piece of electronics it has plus or minus factors that affect the sound, and additional chance for noise. We felt the proper choice was to flatten the control room acoustically. However, in the real world, we know there are some engineers who won't go near a control room unless it has a third octave equalizer in the monitor system.

"Anyway, when we were faced with making compromises, we emphasized the acoustic work in our control room. Listen to the Loggins and Mesina albums. All of them were done in their front room. So, we thought, forget all the expensive stuff out in the studio because you've usually got the piano under a ton of blankets, you're taking the electrical things direct. Drums and vocals seem to be the only thing you worry about in the studio, and a lot of that is mike placement and baffles."

Editorial Observation:

If, at this point R-e/p can be allowed to generalize the conversations, a bit, by reading between the lines of what was said, at this, as well as other meetings like it, it would appear that the elements of trust that develop (if they are going to develop at all) between the purchaser and the vendor of studio equipment become a good deal more sincere and strong at some point **after** *the initial equipment package has been negotiated.*

Some of this feeling is exhibited in statements like this one from Westwind's Frank Cervantes:

"It's relatively easy for a guy starting out to understand he's got to be competitive in equipment . . . he knows he has to have eight tracks . . . reverb . . . noise reduction . . . etc., etc., etc. But it's a lot harder to understand, for example, the dollars needed to flush mount your monitors in a soffitted wall. It takes time to appreciate all of those kind of suggestions when you are starting out . . . and then you wished you'd done it in the beginning."

In a more-or-less classical marketing sense, documented from time-to-time in texts discussing consultative kinds of selling and marketing of capital equipment, when the negotiative shopping is being done there very often is still too much of the buyer/seller competition existant for the consultative trust (relative ego) to be as effective as it will be when divorced of the natural suspicions summarized by: "is he selling me what I will need, or is he selling me what he wants to sell me . . . for what profit?"

However, it is comforting to know that such experience is general and is not confined exclusively to transactions in the recording studio supply business -- small or large. But, the fact is that the greatest majority of true professional audio dealers and distributors today, have progressed considerably beyond being just sales outlets or convenient stocking points for equipment. As might be naturally expected the pro-audio distribution system has certainly more than kept abreast of equipment developments; without question, influencing in what forms certain classes of equipment will reach the market. Equally important is the growing sophistication of their technical and operational experience, as well as their own stocks of advanced equipment for analysis and application.

In view of this, the general marketing conclusion applied to the recording studio market in particular seems to be that if the buyer is convinced of an established level of capability and honesty of the vendor, the buyer might be considerably better off to include economic provision for advice (consulting) somewhat in advance of even site selection; but definitely long before seeking bids on equipment. This is certainly the unstated message being heard at meetings like this one.

The discussion of acoustics, as might be expected, naturally led into talk about monitoring systems and methods. If the expenditures for mixing systems and tape machines tended to be only the next step up from high grade consumer equipment (excepting Worldwide) it was more than a little surprising to have found choices of monitor systems on the high quality, expensive side. However, it must be noted that in a couple of cases the monitors installed at the moment are not the same as those originally installed.

Monitors

Al Lyon (Ocean Recording) makes the following very perceptive comment about relative values in speakers. "The most expensive thing in the monitor system isn't the speaker, it *is* the power amp. Power is going for about 3 bucks a watt, and 3 dB more efficiency translates to twice as many watts, so if you pay $300 instead of, say, $200 for a more efficient speaker you may have saved yourself $200 in the power amp. The importance of a good monitor speaker system is like the importance of his shoes to a marathon runner. Because in that control room how long you are going to be able to work, and what kind of product you are going to be able to produce is totally dependant on what you are going to hear."

Slightly afield the subject of aesthetics in the studio and control room was entwined in the conversation at this point. On the matter of aesthetics of the studio and the control room, Al also had the following to say, which seemed to be the

after more than 100 installations

Why "SON of 36 GRAND" is still today's best console value

...both of these ads appeared a few short years ago...when we were delivering serial numbers 18 and 38. Now, we are delivering numbers 105 and 106...and the claims made in these ads have certainly borne the test of time! But, we would like to have you think of it this way: These deliveries are additional units of *improvement, update, experience, refinement,* and *change.* Yes, a lot of this is the result of updated component technology. (When we find a better way to make "SON" we immediately make those changes.) More important though, "SON OF 36 GRAND" is still very much the *product of perpetual progress* talked about in those early ads ...mostly because of the great wealth of feedback from so many of the installations in the U.S. and abroad where - "SONS" are continuing to *pay the rent,* day after day, night after night, after night...in recording studios...remote vehicles...sound reinforcement systems...radio and television studios...theaters...

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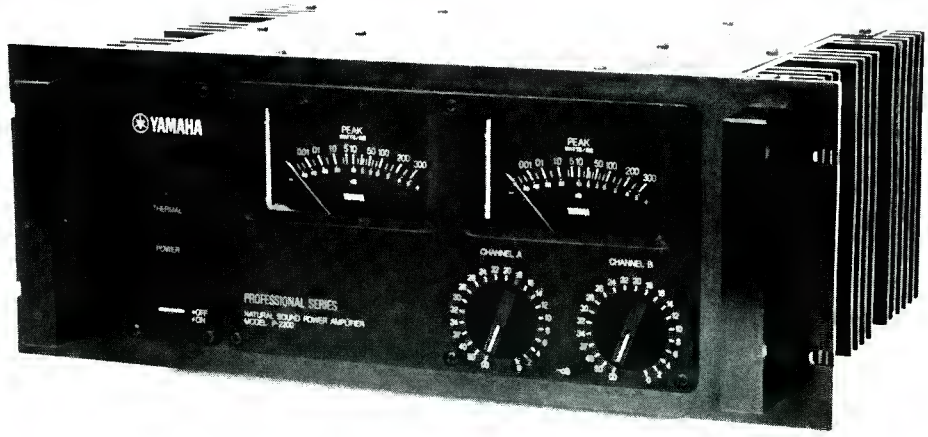
New Products

NEW YAMAHA P-2200: MORE THAN JUST "ANOTHER BIG AMPLIFIER"

At 350 watts into 4-ohms sustained output (times two channels), the new Yamaha P-2200 is said to provide plenty of puch to reproduce the powerful peaks essential for clean studio monitoring. The P-2200 can also be applied for live rock disco sound systems, where an amplifier is expected to "cook" all night long. Power alone is not the only virtue of the new P-2200: it exhibits ultra-low distortion, less than 0.5% THD at full rated power -- the kind of low distortion that is undetectable by even the most critical listeners.

The P-2200 features *PEAK-READING METERS* that accurately display a full five decades (50 dB) of output level. The peak meters have large, illuminated faces marked with dB and with watts-into-8-ohms scales. It also has log-linear INPUT ATTENUATORS marked in 22 calibrated dB steps, detented for extra accuracy, and provide a smooth, noise-free transistion from the highest to the lowest audio level. DB-Calibrated input attenuators have numerous advantages, both on the road, in the club, and in the studio.



The new Yamaha P-2200 features *INPUT CONNECTORS* for each channel including one male and one female XLR connector (unbalanced) plus a parallel phone jack; a *POLARITY* switch allowing either pin 2 or pin 3 to be chosen as the "hot" lead; the outputs utilize 5-way binding posts which give the choice of direct-wired connections for permanent mounting or of high-current "banana" plugs.

The list of professional features of the P-2200 includes a high damping factor, high frequency response, high stability, front panel controls all recessed to avoid damage or accidental setting changes, multiple protection circuits, massive side-mounted heat sinks, and 19-inch standard rack mounting.

YAMAHA INTERNATIONAL CORP., MUSICAL INSTRUMENT DIVISION, BOX 6600, BUENA PARK, CA 90620

For additional information Circle No. 152

NEW SHURE PRODUCTS: AUDIO EQUALIZATION ANALYZER AND EQUALIZER

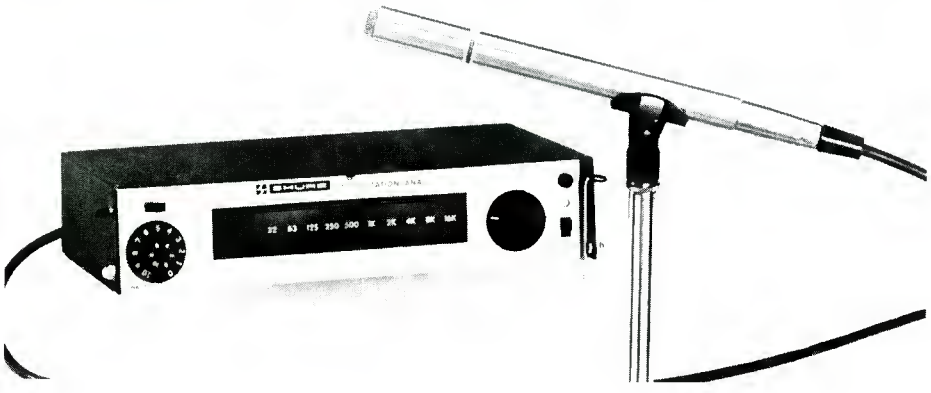
Shure Brothers, Inc., Evanston, Ill., has announced two new products which make it significantly less complicated and costly to (1) find room response trouble spots in sound reinforcement, playback and hi-fi systems and (2) equalize such systems to desired frequency response curves.

The two products, the Shure M615AS Equalization Analyzer System and the SR107 Audio Equalizer, contribute greatly to simplifying the equalization process. The M615AS is a significant breakthrough in analyzer equipment cost and functions. It includes the M615 Analyzer (with built-in "pink-noise" generator), ES615 Analyzer Microphone, tilt bracket and custom carrying case, but is priced far below the cost of equalization analyzer systems previously available.

Sound technicians and touring performers, who frequently need to equalize for the varying frequency response conditions of different locations, will find the M615AS valuable as a permanent addition to their sound equipment inventory.

The second part of the new equalization product combination is the Shure SR107 Audio Equalizer, a highly versatile, compact, easy-to-use unit that provides adjustment of tonal balance on an octave-by-octave basis across the audio frequency range. It is a balanced input and output line level device, designed for installation between the audio console or mixer and the power amplifier of a sound system, or between the preamplifier and power amplifier of a hi-fi system.

Following are additional features of both products.

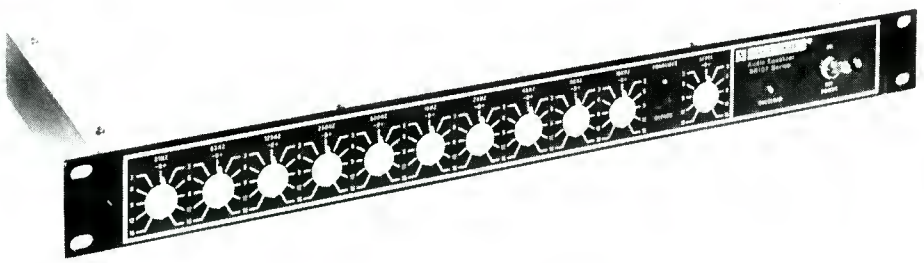


M615AS Equalization Analyzer System:

The 615AS permits rapid, easy and precise adjustment of a sound system equalizer to compensate for variations in room acoustics, speaker placement and equipment freqnecy response. Two rows of light-emitting diodes (LEDs) indicate frequency response level in each of ten octave bands centered from 32 Hz to 16,000 Hz. The SR107 Audio Equalizer filter controls are adjusted until the Analyzer's corresponding HI and LO LEDs turn off. Tedious response curve hand-plotting is not necessary – the M615AS indicates directly how to adjust each equalizer filter.

Two resultant curves may be selected: flat, or a 3 dB per octave rolloff above 1 KHz, typical of most "house curve" responses. Other features of the M615 Analyzer include input and microphone overload LEDs, microphone input attenuator, and pink noise output, input level and hi/lo envelope controls.

The ES615 Analyzer Microphone,



supplied as part of the M615 system, is an omnidirectional, dynamic, measurement microphone. Its broad, flat frequency response with controlled low-frequency rolloff is designed specifically for use with the M615 Analyzer. A switch on the M615 Analyzer provides either microphone input low-frequency response compensation for the ES615 microphone or a flat frequency response characteristic.

Operating voltage of the Model M615 is 108-132 Vac. The unit is also available as the Model M615-2E with switch-selectable operating voltages of 90-125 or 180-250 Vac.

User net price of Model M615AS Equalization Analyzer System is $429; the Model M615AS-2E is $470.25.

For additional information Circle No. 153

Model SR107 Audio Equalizer:

The SR107 is designed for maximum simplicity of operation and maintenance. It has ten rotary controls -- each controlling one octave -- that cover the entire audio spectrum from 31 to 16,000 Hz with both boost and cut flexibility.

Each control is adjustable for approximately 15 dB of boost or attenuation. The equalized output is adjustable over a ±15 dB range and overall gain of up to 20 dB may be introduced to compensate for low input signals.

Other features include an overload indicator, master level control and bypass switch.

The SR107 is ideal for use in live performance applications and with audio playback systems (including hi-fi; two required for stereo) to provide tonal balance within or between vocal and instrumental elements of a performance for overall improvement of sound quality. The SR107 is also equally adaptable to providing feedback control in either a house sound system or stage monitor system.

In a playback system, the SR107 may also be used to eliminate such equipment response problems as transducer incompatibility, tape hiss, and disc surface noise.

User net price of the SR107 (operates from 108-132 Vac) is $250.00; the SR107-2E (105-125 or 210-250 Vac) is $297.50.

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

For additional information Circle No. 155

NEW SUNN CONCERT MONITOR SYSTEM

Sunn's new Concert Monitor is designed to serve as an effective 'front fill' enclosure that is both accurate and versatile.

Two 10" Sunn, special design speakers are combined with a high frequency tweeter in a uniquely shaped cabinet that can be placed at several angles depending on its use and position on the stage.

Each enclosure has its own volume control for further flexibility and will handle 50 watts RMS.

The Concert Monitor is a two-way speaker system in a ported bass reflex enclosure.

SUNN MUSICAL EQUIPMENT CO., DEPT. 1001, AMBURN INDUSTRIAL PARK, TUALATIN, OREGON 97062

For additional information Circle No. 156

TEAC/TASCAM 90-16 RECORDER-REPRODUCER ANNOUNCED

The newest of the second-generation Teac/Tascam series professional equipment is a 16 track, 16 channel machine that handles one-inch tape at 15 ips, with optional dbx noise reduction.

The new model carries a nationally advertised value of less than $12,000, with optional 16 channels of dbx for less than $2,000.

According to Ken Sachs, national sales manager of the Teac/Tascam series, "Specific features were built into the 90-16

giving it ease of operation, unique functional capabilities at the price, and even the convenience of remote operations." Sachs pointed to the following features: A combination record-reproduce head which allows full reproduce frequency response in the sync mode. Two other heads are erase and monitor. A transport system that offers full IC logic circuits for feather-touch performance with a special tension servo motor to maintain constant, even

tape flow. A special motion-sensing mechanism eliminates accidental tape spills and stretch. The AC servo-controlled, direct-drive capstan is capable of variable speed operation of ± 30 percent. Electronic braking allows quick, smooth entry to the play mode from either fast mode.

Input, normal and monitors buttons in the output select allow, respectively, source calibration, usual record functions (recording, overdubbing or sync, reproduce), and monitor activation.

Function select buttons automatically accomplish all monitoring combinations and enclode/decode switching of the optional dbx package. Dynamic range, signal-to-noise ratio and headroom parameters are dramatically increased with the optional dbx package.

For added convenience, the output select and function select panel can be removed from the 90-16 and located within easy reach of the mixer console. The entire meter bridge can also be removed for those installations that require a re-positioning for optimum visual monitoring. **TEAC CORPORATION OF AMERICA, 7733 TELEGRAPH ROAD, MONTEBELLO, CA 90640 (213) 726-0303**

For additional information Circle No. 157

ACOUSTILOG 232 REVERB TIMER

The Acoustilog Model 232 Reverberation Timer is a state-of-the-art measurement system that will compute room decay time within each of seven octave-wide bands, Using a digital read-out system with superior resolution, the Model 232 allows the operator to make accurate measurements with complete confidence, while at the same time freeing him from the time-consuming calculations required with the Sabine and Norris-Eyring formulae.

The reverberation time (or decay time) of a room is the time it takes for echoes and reverberation within the room to die away. It has been defined as the time interval during which the sound level decays by 60 dB, as measured from the instant an applied sound source is switched off. Reverberation time is abbreviated, T60.

Acoustilog's exclusive level detection system is said to do away with those tedious and error-producing manual calibration procedures required with competitive systems. For operational convenience, the Model 232 contains its own built-in pink noise source, and all measurements may be easily made by one person.

Acoustilog's systen design features two sets of octave band filters; one each in the send and receive lines. The addition of send-line filtering permits greater accuracy of measurement, and provides improved protection of the test loudspeaker.

With the Model 232's 10 millisecond resolution capability, small studio control rooms, with decay times of less than 300 milliseconds, may be measured quickly and accurately. The employment of a free-standing microphone (user-supplied) prevents interference effects in the vicinity of the system case from causing misleading readings.

The Model 232's low cost and simplicity of operation extends the usefulness of T60 measurements far beyond traditional applications. For example, as a production tool the system may prove valuable in verifying the performance characteristics of artificial reverberation chambers. Used in conjunction with a

good equalizer in the reverberation line, the output of the chamber may be quickly tailored to approximate, or contrast with, any desired reverberation characteristic. The advantages become apparent on any production assignment where more than one reverberation chamber is used.

The Acoustilog Model 232 Reverberation Timer requires only 1¾" of rack space, and can be mounted with a test amplifier, equalizer or gain set in a convenient portable rack cabinet for acoustic measurement jobs. It's anodized front panel is clearly engraved, and a new, high-brightness LED readout combined with a circularly polarized filter assures readability under even the most unfavorable lighting conditions.

A front panel jack provides a convenient output for the pink noise generator which, together with the built-in octave band filter system (or flat), may be used for making room or system equalization tests.

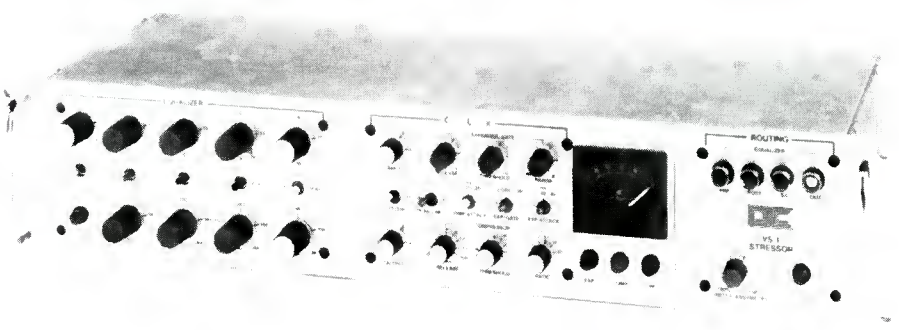
ACOUSTILOG, INC., 19 MERCER STREET, NEW YORK, N.Y. 10013 PHONE (212) 925-1365

For additional information Circle No. 159

ORANGE COUNTY OCA VS-1 STRESSOR

The flexibility of this newly announced unit revolves around two devices: the OCASEQ Parametric Equalizer and the OCACLX Compressor-Limiter-Expander.

A 'Routing' switcher alters the relationship of the two devices, placing the Equalizer either before or after the Compressor-Limiter-Expander. A third position inserts the Equalizer into the control circuitry of the Compressor section, creating a frequency sensitive compressor, or, alternately, a 'four band dynamic



equalizer'. This format is extremely useful, creating a very powerful, bright and 'punchy' signal.

The OCASEQ Equalizer may be used separately, in a fourth position. The Equalizer provides those features necessary in contemporary production work. It is a creative tool designed with a powerful 40 dB control range, consisting of four equalizer sections, each with a center frequency tunable over a five octave range. The complete audio spectrum is covered twice, with both wide or narrow bandwith (Q) options.

The OCACLX Compressor--Limiter-Expander combines the separate, and necessary functions of an ultra-fast PEAK LIMITER and a variable threshold, multi-ratio COMPRESSOR with those of an invaluable EXPANDER/GATE. The advantages of this combination include the possibility of using a soft compression slope, retaining dynamics, yet maintaining complete control of transients and providing absolute overload protection in the peak limiter section, independent of the compressor settings. The expander section provides up to 30 dB of noise reduction. The limiter section has adjustable asymmetry to allow full "positive-peak" modulation.

CHATEAU SEVEN GROUP, LTD. BOX 312, PEMBINA, NORTH DAKOTA 58271. PHONE: (204) 772-6350

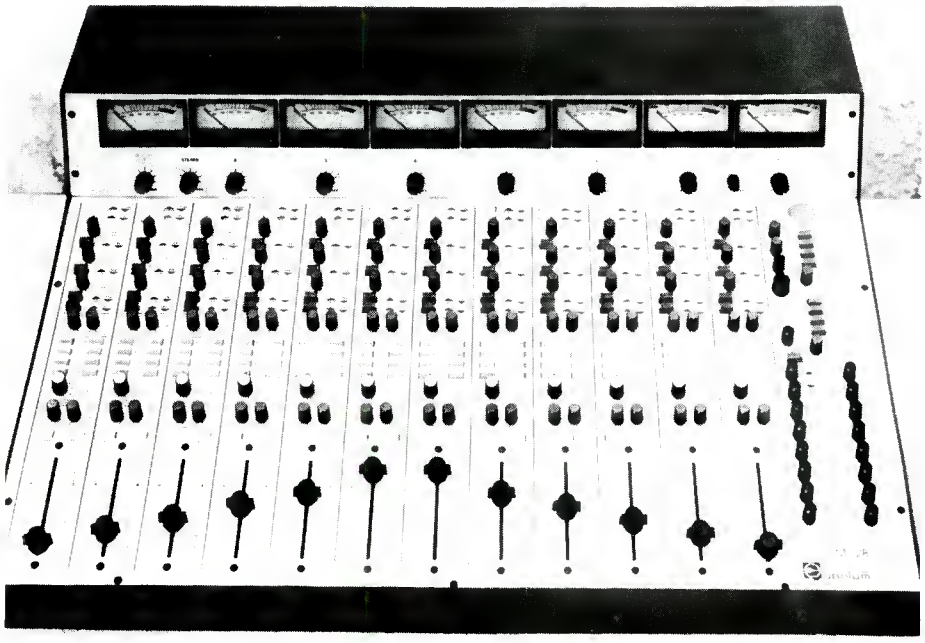
For additional information Circle No. 160

QUANTUM QM-128 CONSOLE MIXING SYSTEM

A unique, 8 buss console, designed according to the manufacturer to obtain the maximum performance at a price which is within the reach of any small to medium sized studio. Quantum Audio Labs has designed this console to use the latest in electronic technology and at the same time give the maximum number of features available on a console of this size. Even though the console bears an extremely low price considering the many features provided, it is claimed there is no compromise in its high standard of performance by using inferior mike transformers, slide faders, meters, or poor circuitry. All components must meet the highest standard before being included in this console.

The QM-128 features include: Low noise mike stage, 6 frequencies of equalization on three knobs, EQ in/out switch, solo and mute on each input, two independent echo sends and two cue sends, and 8-track monitor with 2-track play-

For additional information Circle No. 161



back.

Additionally included are talkback mike and level control; control room, studio, cue, and solo master controls, echo returns to 4 output busses, and professional XLR type input/output connectors.

The basic QM-128 console is priced at $4,300.00.

Available options include the QM-173 patchbay, $749.00; Phantom mike power, $150.00; and walnut cabinet for the console and patchbay, with wristpad, for $300.00. A special option is the 8-input expander with 8 additional monitor points, available for $2,500.00.

QUANTUM AUDIO LABS, INC., 1905 RIVERSIDE DRIVE, GLENDALE, CA., 91201. PHONE (213) 841-0970

For additional information Circle No. 162

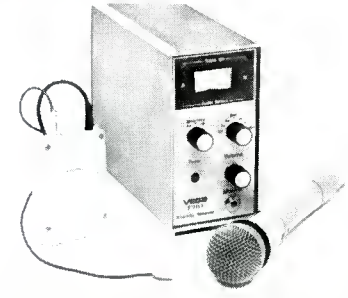
VEGA MODEL 63 DIVERSITY RECEIVING SYSTEM

Vega's new single-package dual diversity receiving system is designed to virtually eliminate problem noise and signal dropouts that are occasionally encountered when a wireless microphone system is used on a set, in studios and in theatres. Because excellent soundtracks can be obtained from fully concealed wireless mikes, much of the tedious dialogue looping on filmed or taped programs can be eliminated. The Model 63 Diversity Receiving system works well with any VHF wireless microphone; when used with Vega's new Model 77 transmitter, the audio quality is said to be like a hard-wired connection.

Wireless microphone systems operate at very high frequencies where the radio waves travel in sight lines. Scenery, props, walls, etc., sometimes absorb the radio waves, or reflect them out-of-phase with direct waves, as performers move around a stage or set. In either case, a signal fade or dropout can occur. Vega introduced dual diversity receiving to eliminate such fades and dropouts.

The compact Model 63 measures just 3.7" x 6.8" x 9" . . . identical to a single Vega Model 58 receiver. Inside, the Model 63 contains two low-distortian, high-sensitivity receiver sections and a combiner circuit that silently and electronically switches the audio feed to derive signal from the receiver section having the strongest input. By connecting the two receiver sections to antennas that are separated by about ½-wavelength, the likelihood of a dropout or fade occurring simultaneously at both receivers is all but eliminated.

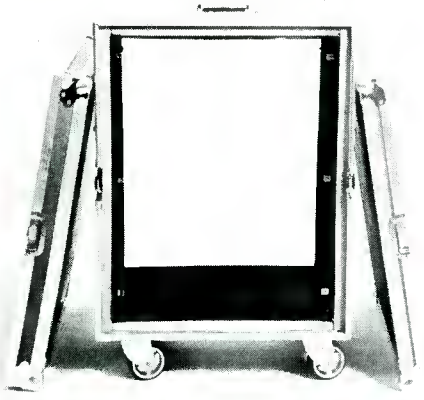
The combiner has integrated-circuit switching that is designed to preserve the phase and amplitude of the audio with no annoying clicks or pops. Front panel functions include LED's that show when RF and audio is present at each receiver input, an LED for power "on", an illuminated VU meter that can be switched to display audio or RF level from either receiver section, as well as AC power, a headphone monitor jack with volume control, and a selector switch for diversity or fixed reception. The main audio output is available at a balanced, XLR connector that is switchable for mike level or line level.



For those who need simultaneous diversity reception for several wireless microphones, Vega offers a Model 463 Mainframe. The Model 463 houses up to four Model 63 Diversity Receivers, and includes twin, active antenna splitters and a rechargeable battery/AC power supply. Inquiries are invited regarding the Model 63, Model 463, Model 77, and Vega's full line of professional wireless microphone products. Also, a new Technical Applications Bulletin on antenna useage (TAB No. 1) is free for the asking.
VEGA, 9900 BALDWIN PLACE, EL MONTE, CALIFORNIA 91731
PHONE: (213) 442-0782

For additional information Circle No. 164

BOBADILLA ANNOUNCES NEW LINE OF PORTABLE AUDIO EQUIPMENT CASES



Need a case for expensive rack mountable equipment that must be portable yet provide maximum protection? The photograph above depicts a 24" rack case mounted inside an outer protective shell suspended by 1" of polyester foam lining. The case has removeable front and back covers, ball corners and 3½" steel casters. For price quotes on any custom case need, and further information, write to:
BOBADILLA CASES, 2302 EAST 38TH STREET, LOS ANGELES, CA., 90058
PHONE (213) 589-5211

For additional information Circle No. 165

MODEL 840 RECORDING/PA CONSOLE FROM SOUND WORKSHOP

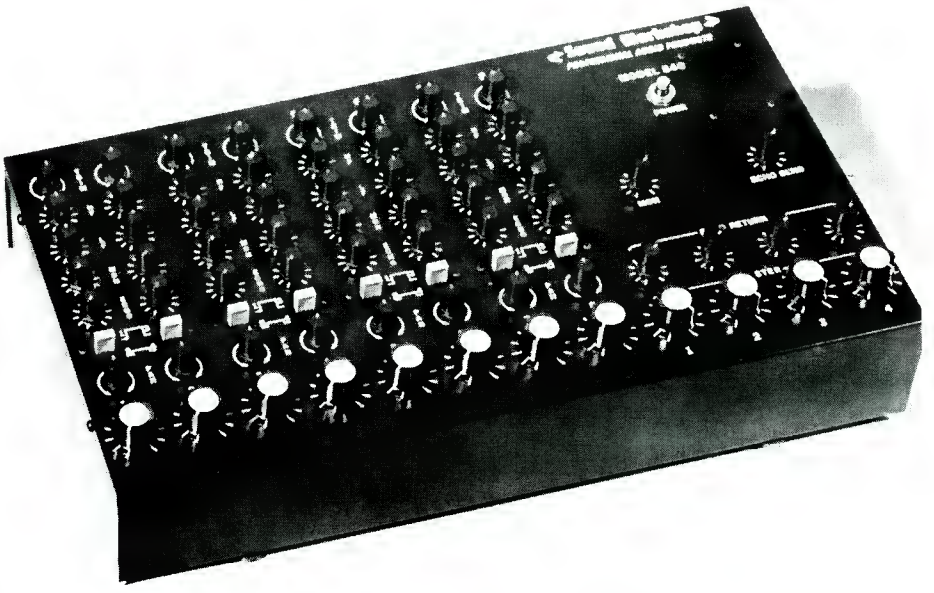
Sound Workshop's new Model 840 Recording/PA Mixing Console features 8 inputs and 4 outputs. The 4 output busses are selectable as 2 stereo busses, with panning, for added versatility in PA and production work. Each input channel has 2 band EQ, wide range trim control, monitor and echo sends, pan pot, output buss select, rotary channel level control, and stereo buss mute switch. Master level controls are provided for echo send, monitor send, the 4 buss outputs and the 4 echo returns.

The use of *transformerless* low impedence microphone pre-amps as well as low noise wide range integrated circuits provide sonic performance unsurpassed in it's price range.

All 8 inputs can accommodate line or mike level sources, and provide for a direct output as well. The Sound Workshop Model 840 is a compact mixing console designed for 4 or 2 track recording of the highest quality, or the control center of a modest high quality PA system.

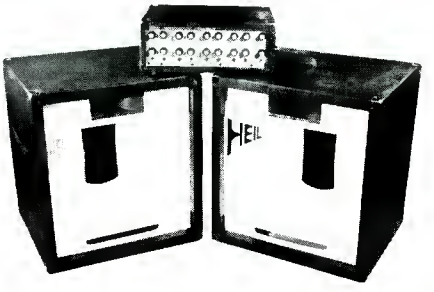
The Model 840 sells for $800, and is covered by Sound Workshop's 2 year parts and labor warranty.
SOUND WORKSHOP PROFESSIONAL AUDIO PRODUCTS, 1038 NORTHERN BOULEVARD, ROSLYN, NEW YORK 11576. PHONE (516) 621-6710

For additional information Circle No. 166



HEIL "CUBE" SOUND REINFORCEMENT SYSTEM

As a replacement for older, less efficient column systems, the HEIL CUBE SYSTEM is a fiberglass front loaded horn coupled to the 12" transducer at 250 Hz.



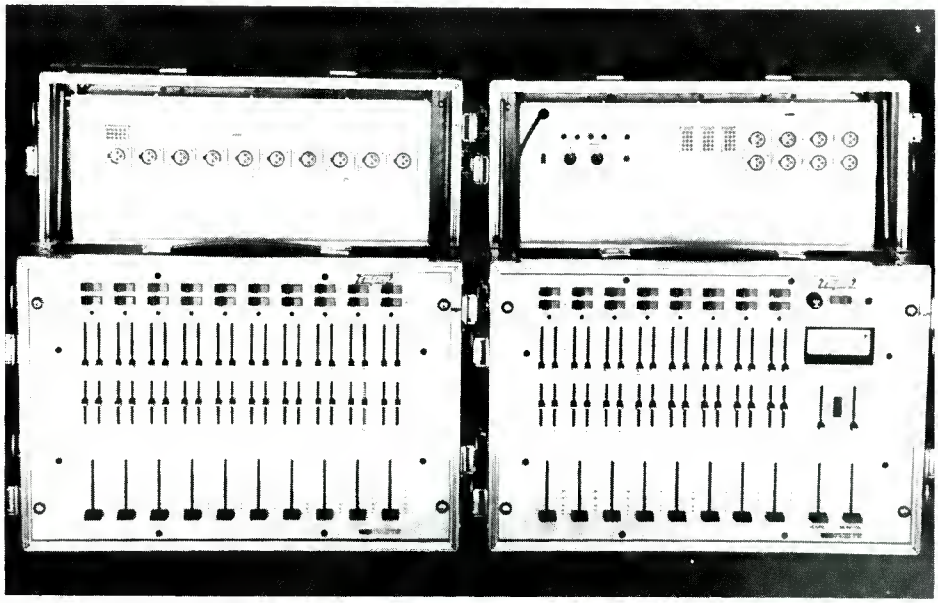
A rear folded horn coupled to the tuned port lets this enclosure produce tones down to 65 Hz. The system, according to the manufacturer's claim, is highly efficient, consistant with other Heil products, and will produce 95 dB with only one watt of input!

The amplifier/mixer to drive the CUBE enclosures, is the new HEIL NASHVILLE, a 4-channel, 8-input mixer with reverb, bass and treble on each channel driving an 85 watt R.M.S. power amp which is rated at .1% distortion! The total system is highly portable and lightweight.
HEIL SOUND SYSTEMS, HEIL INDUSTRIAL BOULEVARD, MARISSA, ILLINOIS 62257

For additional information Circle No. 167

TROUPER II: LIVE MUSIC MIXER FOR THE TRAVELING MUSICIAN

Utilizing the advanced technology developed for the Trouper's III and IV, the Trouper II is basically a scaled down version of the above mixers making it fit within the price range of many touring groups, seeking a professional piece of equipment.



The Trouper II, like other models in the series is expandable and contractable. It expands up to 38 inputs (8 inputs for the output control module and 10 inputs for each expander module). It retains most of the features of the other models including: separate monitor and echo send controls, echo receive, preview selector switch for listening to monitor or house outputs in the earphones, headphone jack and level control, Phantom Power Supply for condensor microphone, House and Monitor master level controls, VU Meter with LED peak indicator, high and low frequency EQ, LED peak indicators, and mic pads.

Each module weighs less than 30 pounds apiece and measures 15¾ x 19 x 4½ inches. The Trouper II is available in durable flight cases making it perfect for the road.

The Trouper II utilizes studio technology for the touring musician and performers, combining lightweight cabinets with quality components and workmanship to meet the standards of the professional musician. Suggested retail price is $1,500 for the output control module and $1,450 for the input expander module. For additional information:

UNI-SYNC, INC., DEPARTMENT P, 5559 CAHUENGA BOULEVARD, NORTH HOLLYWOOD, CA., 91601

For additional information Circle No. 168

OTARI INTRODUCES NEW GENERATION OF COMPACT PROFESSIONAL RECORDERS

The new generation of Otari compact professional recorders is said to combine all the features and benefits of its popular MX-5050 recorder with several new items not usually found in recorders in this price range.

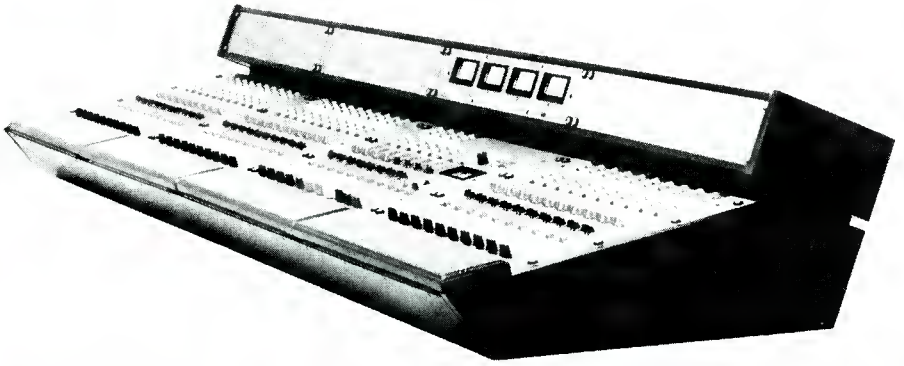
Model designation of this new machine is the Otari Mark II. Its new features include separate transport and electronics to allow mounting versatility, dc capstan servo with ±7% pitch control as standard instead of an accessory, all plug-in electronics for ease of service, complete accessibility on front and rear panels to electronics adjustments, and an interface jack for coupling a dbx or Dolby noise reduction system.

Two versions of the Mark II are available, both with half-track (0.075 or 1.9 mm track) format: a two channel ¼-inch and a four channel ½-inch. Mouting configurations include a table top console and a floor console, both with electronics located above the transport.

Other Mark II features are: smooth tape handling, professional outputs (600 ohm) and connectors (XLR's), fixed output position at standard operating level of +4 dBm or -10 dBm (rear panel selectable), splicing block on head cover (two channel version), and new, easier to operate reel hold down knobs. Options include: low impedance microphone transformers, balanced-line input and output transformers, remote control and floor console.

OTARI CORPORATION, 981 INDUSTRIAL ROAD, SAN CARLOS, CA., 94070, PHONE (415) 593-1648

For additional information Circle No. 169



THE TROUPER IV LIVE MUSIC MIXING SYSTEM

The Trouper IV has been designed to fit the needs of the most demanding requirements, according to the manufacturer. The console is composed of Output Control and Input Expander modules weighing less than 30 pounds apiece and measures 15¾ x 19 x 4½ inches.

Each input contains: level control, solo switch, 3-band graphic EQ, two monitor and one echo send controls, COMPUGUARD Peak Limiting with 3-level peak indicator which can display over a 70 dB range, mike pads and mike/line switch combination which allow you to pad a total of 70 dB in 10 dB steps, and subgroup assign switches. The Output section features include: control, House and Monitor master level controls, solo preview system with switchable VU meter and peak indicator, preview selector switch for listening pre or post faders in the carphones, headphone jack and level control, independent announce input level controls for house or talkback to the monitor system, 2 line input level controls for background music or on stage cues, front panel mounted power switch and fuse.

Back panel features: XLR type connectors for all balanced inputs and outputs, on/off switch for built-in phantom power supply for condensor microphones, external equipment jacks to inject signal processing equipment in to the Trouper system, echo send and receive jacks, individual subgroup outputs with external equipment contacts, subgroup defeat switch which inactivates the subgroup system for mono operation (subgroup output may still be used for recording feeds or monitor channels), console interconnect for the additional input Expander Modules (38 input Total), and 3 external equipment power jacks for Uni-Sync accessories (i.e.: Meter Line Amp Package, Dual Graphic Equalizer with COMPGUARD, Stereo Pan Package, Quad Limiter/Meter Package,, and Spring Reverb Unit).

The Trouper IV is rack mountable in a low profile all metal console cabinet or available in durable flight cases.

UNI-SYNC, INC., 5559 CAHUENGA BL. NORTH HOLLYWOOD, CA 91601

For additional information Circle No. 174

TEAC TASCAM SERIES 80-8 NEW 8-TRACK RECORDER/REPRODUCER

The newly introduced 8-track, 8-channel machine that utilizes ½-inch tape at 15-ips - is now being delivered to dealers across the country.

According to Ken Sacks, national sales manager of the TEAC Tascam Series, "the 80-8 has a national advertised value of less than $3,000.

"The unit was developed from the experience we gained with the TEAC A-3340S four-channel tape deck and the Tascam Series 70 8-track unit."

Sacks explained that the ½-inch, 8-track approach is a break with the old format. "But by using the half-inch format at just one speed, we have been able to reduce the price," he said. "The popularity of the unit is an indication of our success."

The 80-8 has three heads -- erase, record/reproduce and monitor which are controlled by three buttons in the output select: input, for source calibration; normal, for most modes, including sync and reproduce; and monitor, for monitor activation. Full IC logic circuits and a motion-sensing mechanism eliminate accidental tape spill and stretch.

Function select buttons control all combinations of monitoring and encode/

decode switching of the optional dbx module. The dbx encode/decode processor allows up to 30db of noise reduction. Fast-acting LED peaking overload indicators are factory-calibrated at +10 VU, but are adjustable.

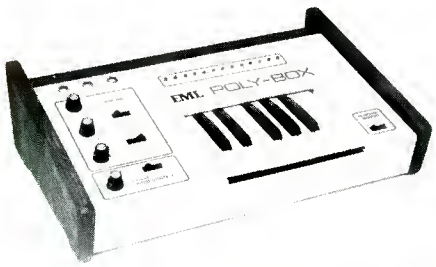
A flip-up hinged head cover eases editing and cueing. The hum shield for the record/reproduce head is spring-loaded and has a click stop for ease of threading. By removing two front panel screws, the meter section of the 80-8 swings down to provide immediate access to pertinent calibration controls.

TEAC CORPORATION OF AMERICA 7733 TELEGRAPH RD, MONTEBELLO, CA., 90640 PHONE (213) 726-0303

For additional information Circle No. 175

ELECTRONIC MUSIC LABS ANNOUNCES NEW POLY–BOX

Poly-Box is a pitch following chord generator which adds 26 pitches and a unique POLYPONIC capability to almost any synthesizer. The one octave keyboard with memory is used to select chords, and the Poly-Box pitches follow the synthesizer oscillator through portamento, vibrato and keyboard transpositions.



Poly-Box can produce pitches from one octave above to 3 octaves below the synthesizer oscillator. Other features include: manual pitch control, phasing capability, and a tunable low pass filter. Just 2 or 3 patchcords are required to add Poly-Box to any patchable synthesizer. Non-patchable instruments require a minor modification.

ELECTRONIC MUSIC LABORATORIES, Inc., P.O. BOX II, VERNON, CT 06066 (203) 875-0751

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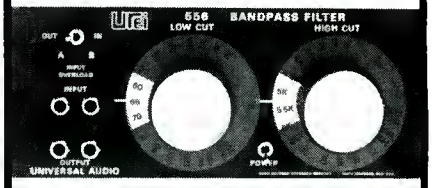

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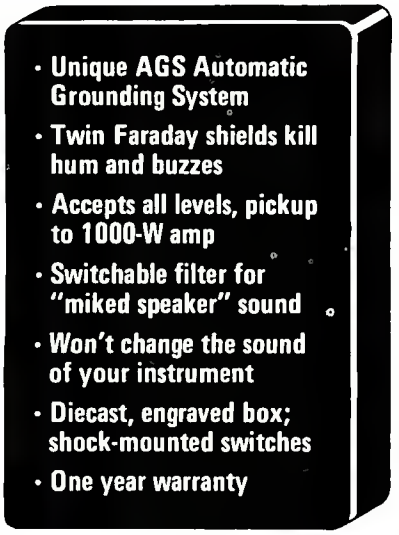

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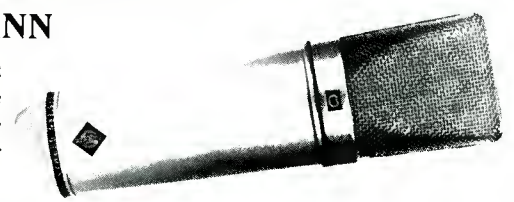

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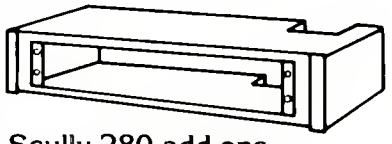

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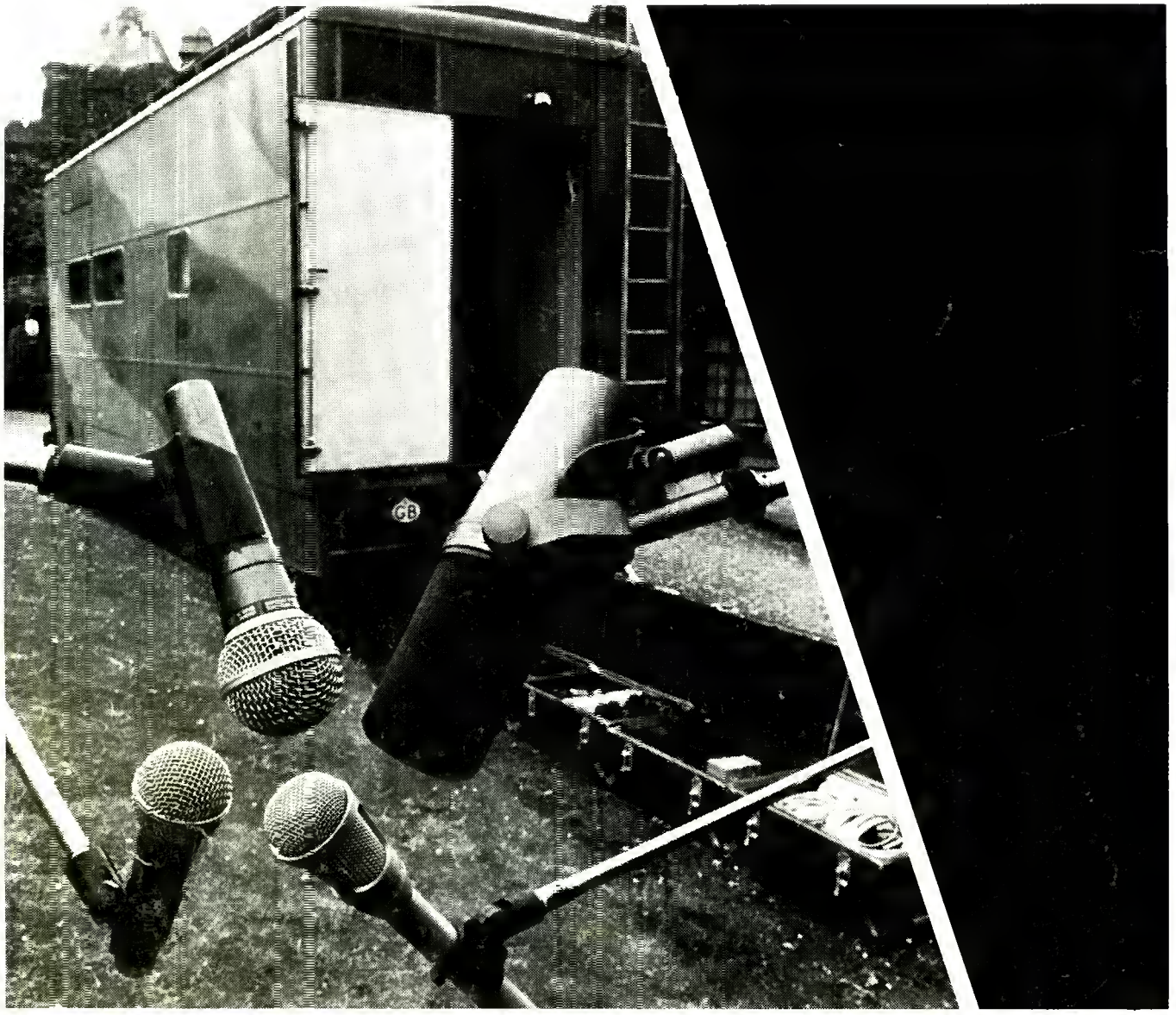
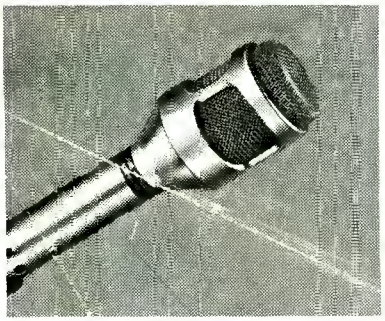


Stones' Rolling Studio



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