

Recording engineer producer

INCLUDING: CONCERT SOUND REINFORCEMENT

\$2.00
December 1976
Volume 7 - Number 6

REC 1 55105 016730 9999
FREDERIC DEVIR
1048 LINWOOD AV
ST PAUL MN 55105

Small Studios

What
\$20,000
Can
Buy

RELATING RECORDING SCIENCE • TO RECORDING ART • TO RECORDING EQUIPMENT

EVERYTHING AUDIO



helios

Helios Model 1167 Console with: 28 inputs, complete with 3 band equalization, linear echo sends to 4 channels, 2 independent cue systems, P & G faders and variable gain for both microphone and line inputs; 16 buss selectable with pushbuttons, panning between odd and even busses, 24 track monitoring from 24 v.u. meters. Available in both stereo and quad, 28 or more inputs, with delivery of stock units in 5 months.

The ultimate
in custom European consoles.

Accept our invitation to contact us and discuss your studio needs.

7037 Laurel Canyon Blvd., North Hollywood, California 91605 / 982-6200

For additional information Circle No. 101

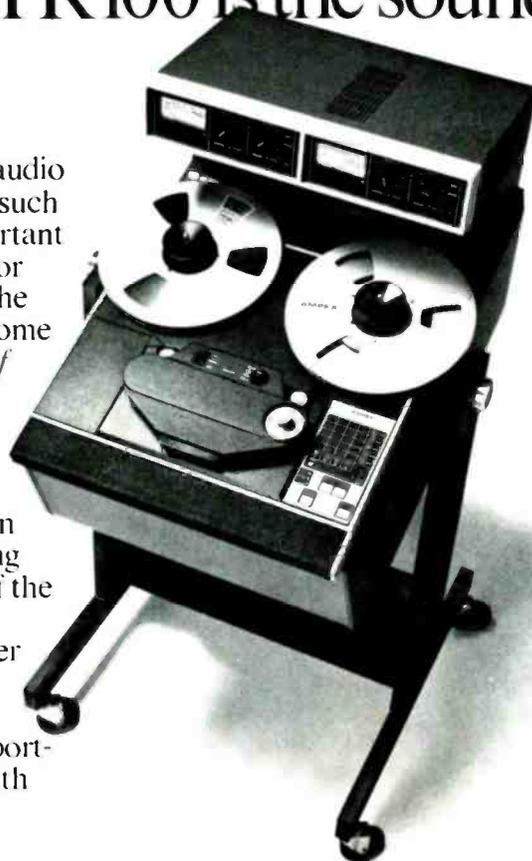
You're selling time, but they're buying sound.



ATR-100 is the sound buy.

You'll probably buy your ATR-100 because no other audio machine in the world offers such amazing fidelity. Every important performance specification for the ATR-100 is better than the competition provides, and some parameters are a full *order of magnitude* better.

But after you get used to your ATR-100, you'll discover a mechanical feature or two that you've never seen before. Like dynamic braking that stops tape safely even if the power is off. And a "smart" transport that waits for proper tension before moving the tape. And a remote control that fits in your hand like a portable calculator, complete with LED status indicators.



Finding edit points on a new Ampex ATR-100 is a two-finger pleasure. Twirl the knob on the capstan, and servo motors move both tape reels. You can rock back and forth over a note, syllable or sneeze as easily as pointing your finger.

It's been a long time since you've seen this sort of claim, but here it is, in writing: ATR-100 is the world's best audio recorder. It was designed for studios that can't take chances.

AMPEX

Complete technical and performance specifications are available in a free brochure. Write us at 401 Broadway, Redwood City, California 94063, or call (415) 367-2011.



Quality: SPECTRA SONICS audio control consoles show the care and attention to detail that are the mark of the skilled American craftsman. The internal wiring, module construction, console housing, and the control display reflect the precision and distinctive craftsmanship that is characteristic of SPECTRA SONICS.

Capability: SPECTRA SONICS audio control consoles provide an immediate initial capability that may be increased to 32 inputs and 32 outputs, at minimum cost. The flexibility of the system will provide line/microphone selection, attenuation, equalization and, through assignment controls, various other combinations for the most sophisticated signal processing now required in today's studio.

Reliability: SPECTRA SONICS audio control consoles have an established reputation of superior reliability. Through creative design, the circuitry is developed to function well below operating

limits to enhance an extended life for the components. Through empirical data on SPECTRA SONICS audio amplifiers, a reliability rate of 99.9% has been derived. These amplifiers are used in SPECTRA SONICS audio control consoles and materially contribute to system reliability.

Performance: SPECTRA SONICS audio control consoles are guaranteed to outperform any other console in the world in noise, frequency response, distortion, and peak overload. All consoles are provided with documented data acquired in tests of the complete system. Guaranteed performance specifications are: Frequency Response, $\pm 1/4$ dB 20HZ-20kHz; Signal/Noise Ratio (microphone input), not less than 82.5dB below +4dBm, output for a -50 input (50 ohms source); Signal/Noise Ratio (line input), not less than 87dB below +4dBm output for +4dBm input; Harmonic Distortion, less than .01% at +18dBm (1kHz); Intermodulation Distortion, less than .02% at +4dBm; Crosstalk, not less than 60dB at 20kHz (typically 80dB).

770 Wall Avenue
Ogden, Utah 84404
(801) 392-7531

6430 Sunset Blvd., Suite 1117
Hollywood, California 90028
(213) 461-4321

SPECTRA SONICS

LEADER IN ADVANCED TECHNOLOGY



RECORDING engineer/producer

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

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



Editor/Publisher MARTIN GALLAY
Associate Editor GARY KLEINMAN
Consulting Editor PETER BUTT
Assistant Editor SHARI HOLLANDER
Business Manager V.L. GAFFNEY
Circulation Manager CAROL MENDOLIA



"RECORDING engineer/producer" is published six times a year by RECORDING & BROADCASTING PUBLICATIONS, 1850 Whitley Avenue, Hollywood, California 90028, and is sent to qualified recipients in the United States. One year (six issues) subscriptions for other than qualified individuals or companies may be purchased at the following rates:

United States (surface mail) . . \$9.00
United States (air mail) . . . \$17.00
Foreign (surface mail) . . . \$9.50
Foreign (air mail) . . . \$19.00



RECORDING engineer/producer is not responsible for any claim made by any person based on the publication by RECORDING engineer/producer of material submitted for publication.

Material appearing in RECORDING engineer/producer may not be reproduced without written permission of the publisher.



Controlled Circulation Postage
paid at
Los Angeles, California

Postmaster: Send form 3579 for
address correction to:

RECORDING engineer/producer
P.O. Box 2449
Hollywood, California 90028
(213) 467-1111

\$2.00
December 1976
Volume 7 — Number 6

... production —
The studio world of Electric Lady's EDDIE KRAMER.
by Howard Cummings page 17

... acoustics —
"STANDING WAVES" in Rooms.
by Michael Rettinger page 32

... studio construction —
Acoustically/Aesthetically Treating the Studio,
on a Budget.
by Emil Handke page 36

... mixing —
PANNING . . . a possible new way to define
the least precise of the mixing options.
by Paul Laurence page 44

... small studio operations —
On the fringe . . . a look at how six \$20,000 studios exist
in the shadow of Hollywood. Their operational profiles,
their problems, their equipment, their expectations.
page 53

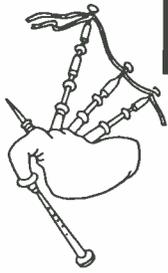


page 6 — Letters & Late News
page 8 — ABC/Westminster's
KATHRYN KING
by Kim McKenzie
page 69 — New Products
page 79 — Classified

The Cover:
upper-left — SOUNDTRAX
upper-right — WORLDWIDE AUDIO
middle-left — DEMO SHOP
middle-right — WESTWIND RECORDING
lower-left — CREATIVE ENT. ASSOC.
lower-right — OCEAN SOUND

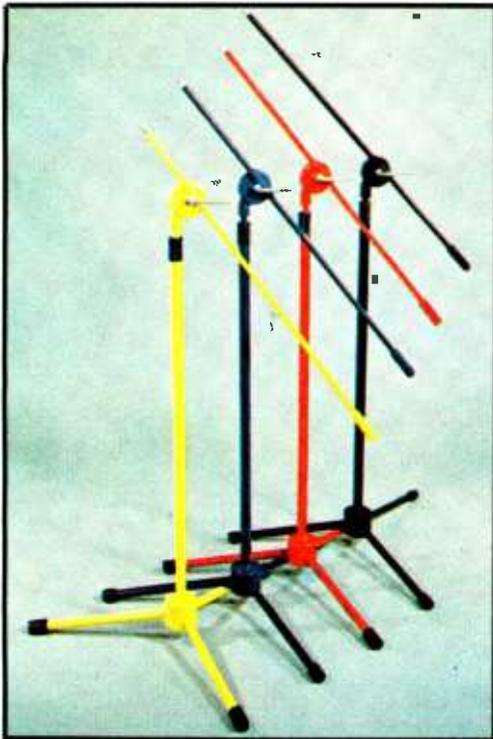
This Issue Of R-e/p Is Sponsored By The Following List Of Advertisers

A & R Record Mfg.	79	Modular Audio	66
Abadon/Sun	15	Monks, Keith, Audio	6
Allison Research	39	Nashville Studio Systems	64
AmpeX Corp	3	Orange County	65
Ashley Audio	67	Orban/Parasound	13-51
Audio Concepts/Dave Kelsey	57	Otari of America	21
Audio Consultants	47	Panasonic/Technics	37
Audio Distributors	81	Peavey Electronics	52
Audio Industries	62	Quad-Eight	31
Audiotronics	33-80	Teen City Album	71
Auditronics	68	Recording Supply	77
Auratone	12	SAE	14
Bisonbilt	44	Saki Magnetics	48
Capitol Magnetics	55	Scully/Dictaphone	40
College Recording Arts	82	Scully, L.J. Co.	7
Commco	78	Shure Brothers	CVR 4
Crown International	32	Soundcraftsmen	50
dbx	61-74	Sound Workshop	60-70
Electro-Voice	19	Speck Electronics	31
EI-Tech	59	Spectra Sonics	4-73
Everything Audio	CVR 2	Sphere Electronics	54
Express Sound	30	Stanton Magnetics	27
Frap	54	Studer of America	63
Garner	78-79	Taber	29
Harrison Systems	CVR 3	Tapco	23
Inovonics	82	Telex	45
Interface Electronics	24	Uni-Sync	46
Lang, Rus	8	UREI	11-79
Lexicon	49	Westlake Audio	42-43
Loft Modular	77	White Instruments	18
Magnetic Reference Lab.	72	Windt Audio	80
Yamaha International	16		



Keith Monks "PIPES"

In England, "pipes" are things that Scotsmen blow through to make weird noises. We call them microphone floor stands. Let us let you into a secret . . . we are crazy! We must be!



Can you imagine microphone stands (sorry, "pipes") in different colours such as red, blue, black, yellow, as well as chrome? Well, we make them and we can even do them in lots of 1 million in gold, silver, have union jacks on them, or the stars and stripes!

Wow!

Actually, they are marvelous for identification . . . drums red; strings blue; horns yellow; vocals black; etc. Makes sense? Not only that, but they are very hard wearing and they look attractive.

Colour is beautiful!!!

KEITH MONKS (AUDIO) LTD

West Coast USA:
Audio Industries Corp.
1419 N. LaBrea Ave.
Hollywood, CA 90029
(213) 851-4111

26-28 Reading Road South,
Fleet, NR. Aldershot,
Hampshire, England
Telephone: FLEET (02514)
7316 or 3566

East Coast USA:
Audio Techniques
142 Hamilton Ave.
Stamford, CA 06902
(203) 359-2312

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 absolutely 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 VSO'ing 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.

ASK THE MAN WHO BUILDS THEM

If you want to find out what's new in lathes, ask Larry Scully. He has designed "THE LATHE", a mastering unit which is years ahead of anything else on the market. RCA discovered this fact when they were able to increase the average level by 2.5 db with the new Scully system. Another advantage is service and parts-support . . . it's around the corner, not across the sea. For all the details, talk with Larry or any of the boys at Scully. Their reputation for quality manufacturing dates back to 1920, but their thinking is 1980.



a cut above the rest

"THE LATHE" BY L. J. SCULLY

L. J. Scully Manufacturing Corp., 138 Hurd Avenue, Bridgeport, CT 06604 Telephone 203 368 2332

For additional information Circle No. 105

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. Unfortunately, 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 elect-

tronics.

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 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 simplification 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.

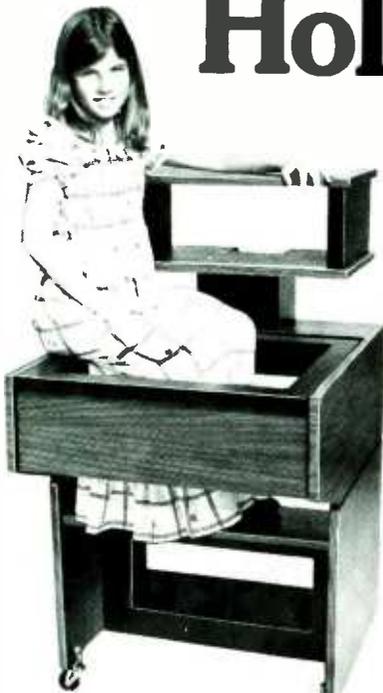
After studies at UCLA, majoring in Ethnic-musicology, and an apprenticeship of long hours in tape libraries, and stooped over an editing block, experience as an independent audio engineer, along with continued study of the classical field, Ms. King has risen to her current position as head of the classical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

Holds any model



Ampex, MCI, Scully, Tascam, Otari and any other 19" x 15 1/2" tape transport fits our RL 500 console. Constructed with the same care as the Scully consoles which we have manufactured for the past 12 years, the RL 500 incorporates the newest design features, including front panel removal for deck access in both horizontal and vertical positions and a rear shelf for your power supplies. Add these advantages to Rus Lang's reputation for quality, and the RL 500 becomes the best value on the market. Ask for details and pricing.

custom consoles and portable carrying cases for electronic equipment

Rus Lang Corporation

247 Ash Street, Bridgeport, CT 06605 Tel: 203 384 1266

DEALER INQUIRIES INVITED



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 excellent 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 necessarily follow a pattern of: beginning,

When You're Trying to Put a 10 lb. Sound Into a 5 lb. Bag.

The Model LA-5 has been developed for the sound reinforcement professional, to be used for the protection of amplifiers and speakers from power overload. The LA-5 has smooth, natural RMS action. It monitors the audio signal level and limits the power output to a safe value preset by the user without destroying natural transient peaks. It also helps the mixer who must continually be concerned about poor microphone technique and large dynamic ranges during live performances. Inputs and outputs are balanced, or may be used single ended. High input impedance and low output impedance allow maximum patching flexibility. Half rack size, competitively priced (under \$300.00). Available from your UREI dealer.



11922 Valerio Street No. Hollywood, California 91605 (213) 764-1500

Exclusive export agent: Gotham Export Corporation, New York

Quincy Jones... demands quality



Photographed at RECORD PLANT, Los Angeles, CA
 "...I mix with AURATONE® 5C Super-Sound-Cubes® the little powerhouse speakers. They tell me exactly what will be in the grooves. You hear it all with AURATONE!"

Join "Q" and other seasoned music world pros, top record company executives, engineers, producers, and artists who lay it on the line with AURATONE®.



Durability, flat full-range response, amazing power handling, and portability have made AURATONE® 5C's the Record Industry's favorite "mixdown monitors,"...for comparison and final mixes, auditioning, remotes, and reference standard speakers.

See your Dealer or order Factory Direct (30-day return privilege, one year guarantee). \$49.95 per pair. Shipping and handling add: U.S.: \$3.00 pair, Foreign: \$7.50 pair. Calif. res. add sales tax.

Mail to: AURATONE PRODUCTS
 P.O. Box 698—C7 Coronado, CA 92118

Ship pair 5 C's. Amount Enclosed \$ _____

Name (Please print) _____ Job Title _____ Date _____

Shipping Address _____

City _____ State _____ Zip _____

Please send additional information.

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 ODYSSEY, 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 its 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 its 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 free-

dom 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 feasible 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 rehearsal 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 Frankfurt, 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 AKA-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:

Mr. Lutz Meyer
MCI
4007 N.E. 6th Ave.
Fort Lauderdale, Fl. 33334

The Live-Performance Equalizer

The list of acts using the Orban/Parasound 621 Parametric Equalizer on the road reads like a "who's who in the Hot 100." And no wonder—like the proverbial one-man band, the O/P Parametric replaces a whole ensemble of audio processing devices—and never misses a beat. Not only will the 621 perform broadband equalization with a minimum of ringing (unlike third-octave equalizers), but its "Constant-Q" design also lets it create narrowband, tunable notches for feedback suppression.

Each of the four bands tunes continuously over 4.3 octaves with no change in curve shape. The "Q" of each band is continuously variable over a ratio of better than 10:1. Overload/noise ratio is a high 107 dB (typical); midband THD is below 0.01% at +18 dBm, assuring wide dynamic range and recording studio quality. A peak-stretching overload light and front-panel gain control permit instant correction of overload. And the 12 dB of available gain can be very handy when you're caught short.

Above all, we know that there are no second takes

in live shows. That's why we insist on an exceptionally rigorous quality control program. For example, each opamp used in the 621 is pre-tested before installation, and all 621's are carefully burned-in at high temperature before shipment. And it's nice to know that if trouble should ever develop, Orban/Parasound is well-known for fast, fairly-priced service. We've been in business for eight years; we are committed to customer satisfaction because we plan to be around many years more. Our equalizers reflect this commitment to quality, value, and service. They await your examination at your Orban/Parasound distributor. Write us for his name, and further information.

orban/parasound

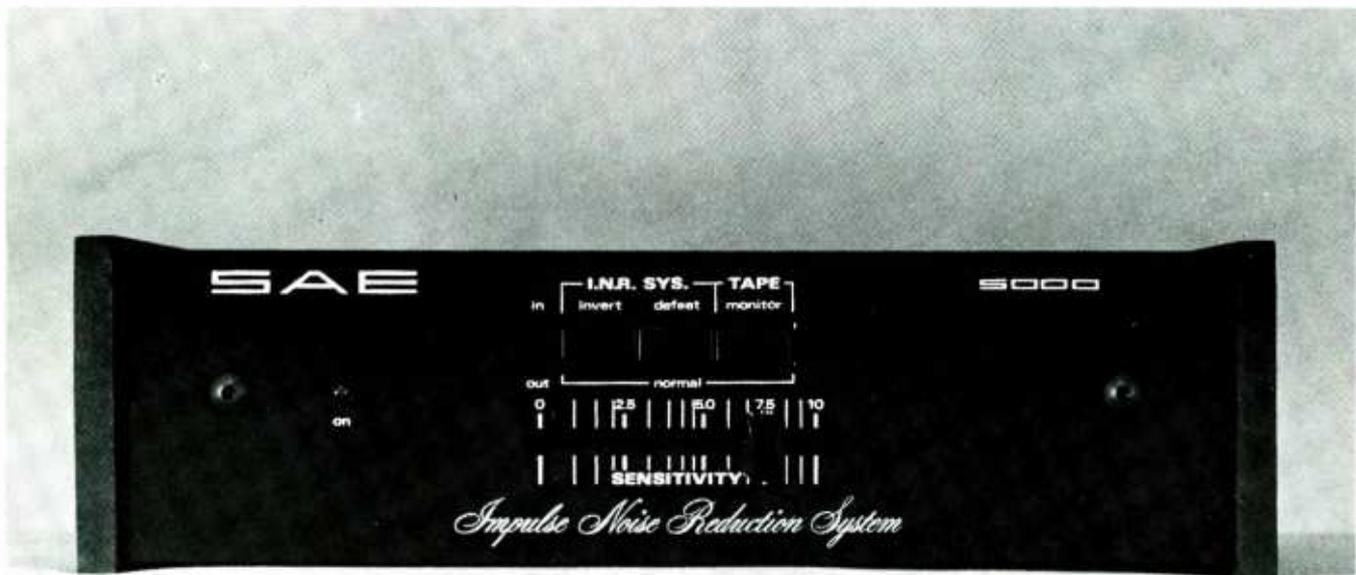
680 Beach Street
San Francisco, Ca. 94109
(415) 673-4544

Write for free article: "How to Choose Equalizers for Professional Recording Applications."



The "Click and Pop" machine

only by **SAE**



Ever since the invention of the recorded disc annoying "clicks" and "pops" caused by scratches, static and imperfections have consistently disturbed the listening pleasure of music lovers.

Now, SAE introduces the unique model 5000, an Impulse Noise Reduction System which eliminates those unwanted sounds with no adverse effect on the quality of the recorded material.

This breakthrough in electronic circuitry is so demonstrably effective that the SAE 5000 is destined to become an essential part of any sound system.

The SAE 5000 is compact and sleek, built to SAE's exacting standards, and ready to enhance the performance of any system, from the standard receiver/

turntable combination, to the most sophisticated audiophile components.

SAE is proud to add the 5000 to their broad line of *Components for the Connoisseur.*

SAE

SCIENTIFIC AUDIO ELECTRONICS, INC.
P.O. Box 60271, Terminal Annex
Los Angeles, Cal. 90060

Please send more information on the 5000.

Name _____

Address _____

City _____ State _____ Zip _____

From the Land of Rock. And Rolls.



The Soundcraft Series II

Soundcraft's Series II offers all the features of the original Soundcraft console and a whole lot more. Series II lets you record 4 and 8 track with the four group output mixers and 8 and 16 track with the eight output mixers.

Each console is precision crafted in England utilizing discrete transistor circuitry and modular construction concepts. Rigid performance testing both before and after shipment assures you of reliability. And every Series II is backed by our one year warranty on parts and labor.

We believe this versatile new Soundcraft Series II represents an exceptional value for the quality conscious professional.

SPECIFICATIONS:
Output: +22 dBm into 600 ohms
Noise level (Faders down)
-90 dBm REMIX MODE. All inputs
open, line level -80 dBm
MIXING MODE. Distortion: Less
than 0.02% THD @ +4dBm,
1kHz. Frequency response:
-1dB at 20 HZ and 20kHz ref.
1kHz. Inputs: 250 ohms
microphone, balanced & floating
10k ohms line, unbalanced.



Abadon/Sun
INCORPORATED

P.O. Box 6520, San Antonio, TX 78209 (512) 824-8781

For additional information Circle No. 111

R-e/p 15

Think of them as your musical instruments.



The audience can't see you. But they can sure hear you.

They don't know it, but they're depending on just one person to get the music to them. And that guy is you.

It's not something an amateur can do. It's an art. And that's why Yamaha has designed 3 superb mixing consoles with the qualities and range of controls that the professional sound reinforcement artist needs.

For instance, our exclusive 4 x 4 matrix with level controls gives you more exacting mastery over your sound than the conventional method of driving speaker amps directly from the bus outputs.

Features like that are years away except on the most expensive mixers. On the Yamahas, it's standard equipment. And so are transformer

isolated inputs and outputs, dual echo send busses, an input level attenuator that takes +4 dB line level to -60 dB mike level in 11 steps, and 5-frequency equalization.

Whether you choose the PM-1000-16, the PM-1000-24 or the PM-1000-32, Yamaha gives you the flexibility you need to turn your job into an art. And because they're designed from the ground up to perform on the road, more and more professional sound men around the United States and the world are depending on Yamaha, night after night, gig after gig.

If you've never thought of your mixing console as a musical instrument, we'd like to invite you to stop by your Yamaha dealer. Once you've checked out the operation manual and tested for yourself what the PM Series can do, we think you'll come away a believer.



Box 6600, Buena Park, CA 90620

For additional information Circle No. 112



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 "I+I" 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.

NEW AUDIO SPECTRUM MONITOR!
1/3 OCTAVE REAL TIME ANALYSIS MODEL 142

FEATURES

- PEAK READING • TWO MEMORIES: CUMULATIVE OR SAMPLE • VARIABLE TIME CONSTANTS (0.1 - 2 SEC.) • CALIBRATED IN DBM • 10-20-30 DB DISPLAY RANGE • 40 HZ to 16 KHZ ON 1/3 OCTAVE ISO CENTERS • 11 x 28 LED ARRAY • BUILT-IN PINK NOISE SOURCE • 3 1/2" x 8" DEEP RACK MOUNT.

USES

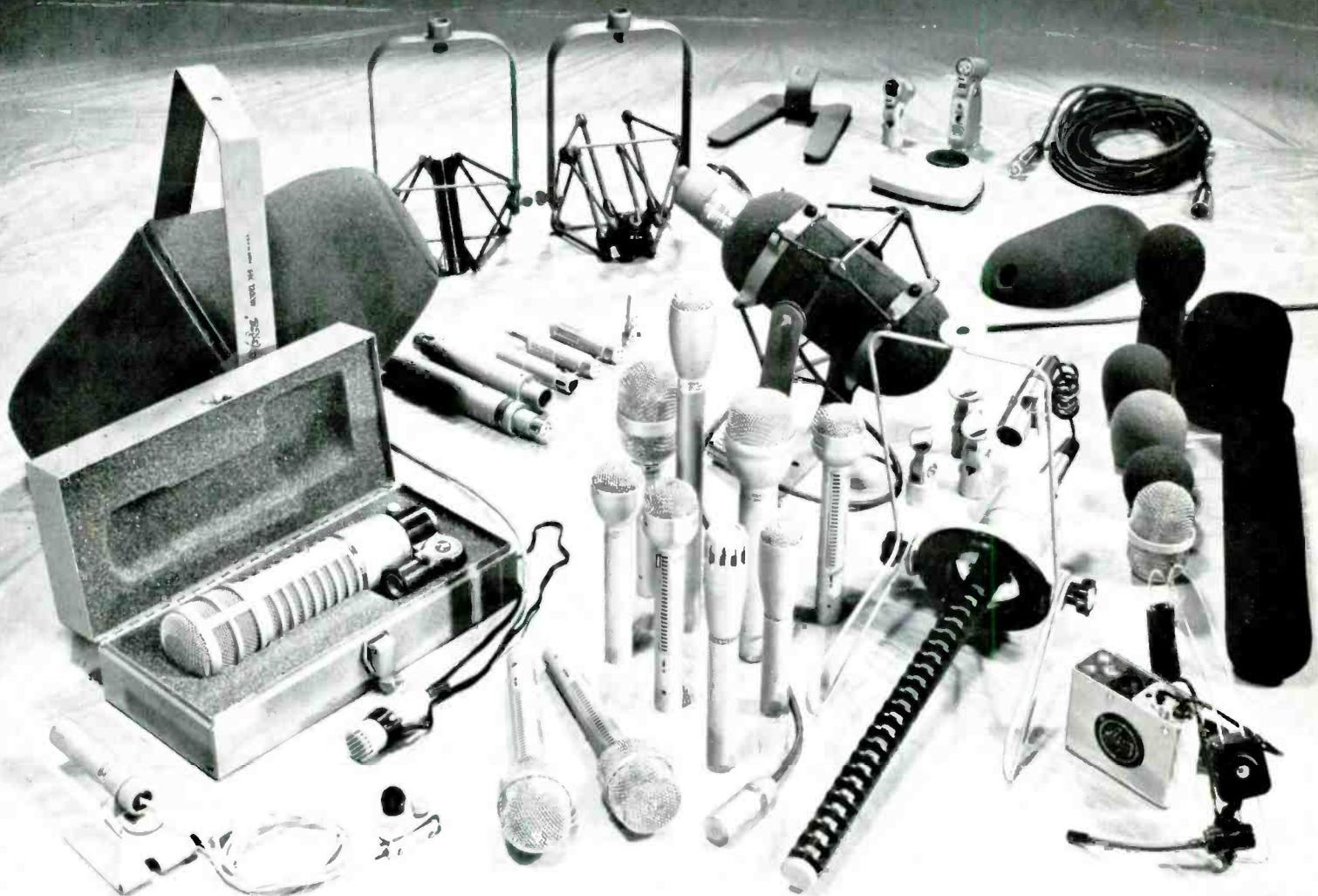
- PROGRAM MATERIAL MONITORING • RECORDING AND MIX-DOWN ANALYSIS • PORTABLE SYSTEM ADJUSTMENT • TAPE EQUALIZATION AND CALIBRATION • TRANSMISSION LINE EQUALIZATION • BEFORE-AFTER COMPARISONS • FREQUENCY RESPONSE TESTING



Suggested List Price \$3200

ALSO: Active and passive equalizers • Other real time analyzers
 Dealer inquiries invited

White Call or write today: WHITE INSTRUMENTS, INC.
 P.O. BOX 698 512/892-0752 Austin, Texas 78767



**From solo to full orchestra,
from studio floor to "live" concerts...
depend on the E-V mike system
for a competitive edge in sound quality.**

Variety is more than the spice of life. It's essential for top-notch audio... for the best sound on record... despite the acoustic or talent problems you might face.

Granted, most pickups can be handled with our traditional dynamic or electret condenser "basics". But when you need them, we have microphones to wear on the head, around the neck, or carry in the hand. Real problem solvers.

And E-V pioneered in the design of practical "shot gun" microphones that perform so well on overhead booms and in ENG units. We round out the line with a host of accessory windscreens,

filters, pads, and mounts... all the vital little extras you've asked for.

We call it the E-V System. Each model designed to best solve a particular problem... and all models designed to work together. To mix without abrupt quality changes. To be easily equalized because there are no power-robbing peaks. To work without fail, no matter what. And to provide the optimum signal-to-noise ratio (acoustic or electrical) that gives your signal a clean start.

Why worry about good sound? Because bad sound adds up. Fast! And considering all the dime store speakers, noise, and confusion at the listener's end, your audio needs all the help it can get!

Our microphone system is the place to start. Browse through our catalog. Digest our spec sheets. Try our mikes in your studio. The more you use the E-V system, the better you'll sound. Ask your E-V sound specialist for a guided tour, or write us today.

Electro-Voice®
a gulton company

Dept. 1161RP, 674 Cecil Street
Buchanan, Michigan 49107



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 SATANIC⁴ 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

OTARI MX-5050 the original (and still the best) compact professional recorder

Just over two years ago, Otari introduced a unique new product—the first truly professional recorder in a compact package—the MX-5050. Since then, the performance and reliability of this innovative new machine have been tested and proven in over a thousand critical professional applications—by broadcasters, recording studios, A/V departments, musicians, and semipro recordists worldwide. Universal acceptance and repeat orders by these satisfied customers tell this remarkable recorder's success story better than we can.



Bias can be re-optimized in seconds.

As you compare the MX-5050 with other recorders, keep this in mind. The MX-5050 is not a hi-fi machine with a few professional features added later as an afterthought. It was designed from the ground up based on Otari's 10 year experience as Japan's leading manufacturer of professional recorders and high speed duplicators. It is a full professional machine with the performance, features, and field proven reliability that you expect to find only in the larger professional recorders.

Here are some of the key reasons why the MX-5050 is the best compact recorder available today.

Production Features: Creative production is simplified with: Front panel edit to spill tape. Lift-up head cover to mark splices and clean heads. Built-in splicing block on head cover. Adjustable cue to defeat head lifters. Selective reproduce to add new tracks in perfect time synchronization. Two speed operation, 15 and 7½ or 7½ and 3¾ ips (field changeable in dc servo versions).

Performance Features: Headroom is 19 dBm, a full 15 dBm over the switch selectable fixed output of +4 dBm. This standard reference level output can be rear panel switched to -10 dBm to drive a PA system or power amplifier. S/N ratio is NAB weighted 69 dB full track, 68 dB half track, and 65 dB quarter track. Crosstalk is greater than 60 dB half track. Outputs are 600 ohm balanced (standard on half track) or unbalanced. Line input and output connectors are XLR.



Operating Features: Bias is front-panel continuously adjustable (not limited to fixed positions). With built-in test oscillator (not available on other compact professional recorders) bias can be optimized in seconds when changing tape. Record EQ and standard reference level are also front adjustable. Straight-line tape path simplifies threading. Capstan is located on back side of tape for improved tape life. An extra reproduce head is standard on all versions to allow playback of tapes in different formats. For pitch control and freedom from power line variations, an optional dc capstan servo is available with ±10% correction range.



Easy threading; capstan on back side.

Versatility: Available in full-track (with half-track reproduce capability standard), two-track, and quarter-track versions. Walnut case (standard), rugged portable road case, rack mounting adaptor, or floor console. Universal power supply standard. Low impedance input and output transformers and remote control also optional accessories.

See your nearest Otari dealer for the full story or contact Otari. And, if it's multichannel you need, ask about the standard-setting four and eight channel versions of the MX-5050.

OTARI

Otari Corporation
981 Industrial Road
San Carlos, Calif. 94070
(415) 593-1648 TWX: 910-376-4890

Otari Electric Co., Ltd.
4-29-18 Minami Ogikubo
Suginami-ku, Tokyo 167, Japan
(03) 333-9631 Telex: J26604

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.

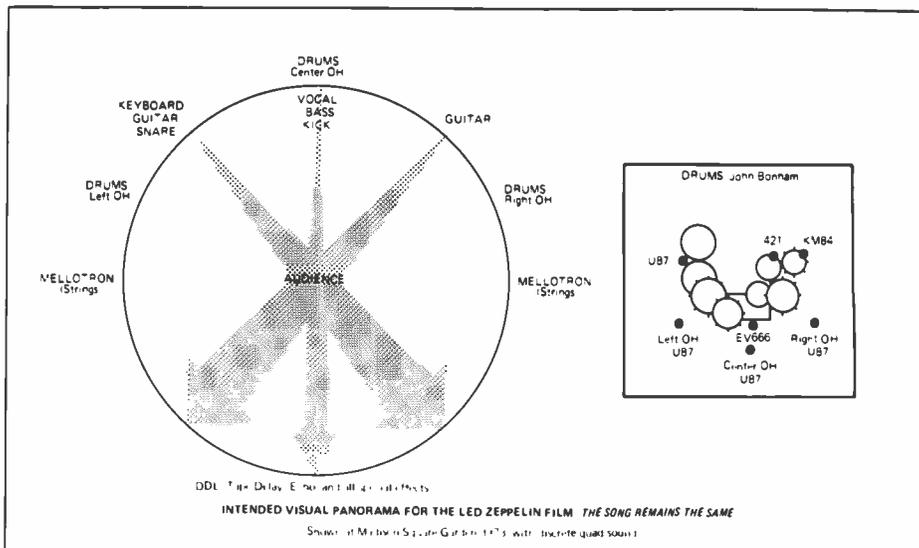
E.K.: Yeah, well *that* was more of the stuff that she *should* have done. As a first album of that nature, no pun intended, it was very good and may have been a bit stronger if Donny Hathaway had produced the whole thing. I also think I could have mixed it with the voice up a hair more. I *was* very 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 criss-crossed 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 over-dubbing -- 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 between quad and 4-track stereo and what would happen when it was reduced from quad to 4-track stereo.

The Live Reverb Chamber From TAPCO



We designed features into our two-channel Tapco 4400 Reverberation System that, quite literally, give you the electro-mechanical equivalent of a live reverb chamber. Innovations that make our 4400 a more usable reverb at a more reasonable price include: **Bi-Level Peak Sampling** circuits and **Dual Differential Constant Current** drive circuitry that minimize the "spring slap" associated with other reverbs, and smooth out any reverb irregularities. **AutoPad®** gain controls match the 4400 to any audio equipment. **Reverb Drive Meters** let you constantly monitor your signal level for optimization of performance. The four-band **Reverberation Equalizer**, with specially selected center frequencies, allows you

to synthesize a reverb that is indistinguishable from the reverb quality you get in nearly any size room. **Input Mute** permits you to conveniently evaluate the reverb decay by itself. These features are unique -- and they'll work for you!

The reverb quality of any brand has to be heard to be completely assessed. So lend an ear. Hear and compare the 4400 at your Tapco dealer.

The Tapco 4400 Reverberation System goes for only \$389.00 suggested pro net. Nothing has been eliminated except the price!



For more information write or call Larry Panypa, TAPCO, 405 Howell Way, Edmonds, WA 98020 / 1-206-775-4411

Eddie Kramer . . .
(continued)

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 *GRAFFITI*. ('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 facilities 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-

INTERFACE ELECTRONICS

STEVENSON

PROFESSIONAL MIXING

SERIES 104 AND 108

CONSOLES



INTERFACE ELECTRONICS

3810 WESTHEIMER • HOUSTON, TEXAS 77027 • (713) 626-1190

back in a Westlake room?

E.K.: No. A normal room. Theoretically if it sounds right in a Westlake room, it should sound right everywhere 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. . .

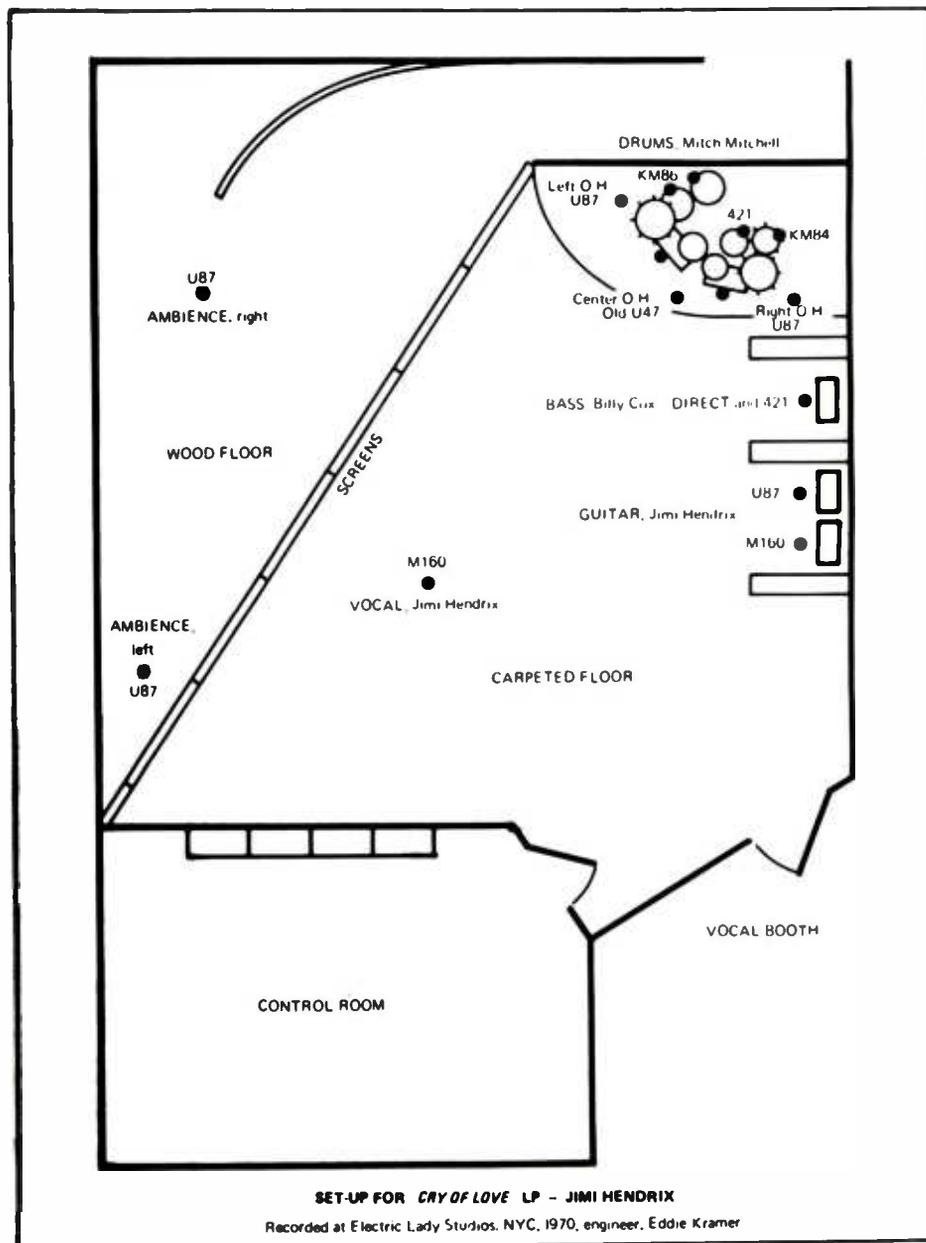
E.K.: Yes . . .

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.



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 (Greenwich). 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 there one week.

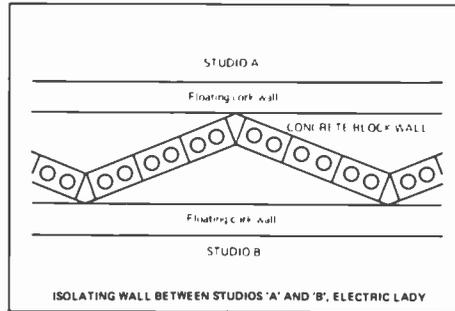
Anyway, they did nothing with the lease for about six months and Jimi wanted this spacey night-club recording studio with a tiny control room at one end. John Storyk (co-designer) had drawn up architectural plans after meeting with Jimi, and after seeing it myself I said, "You guys gotta be out of your 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 Michael 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.



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 album² 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 . . . 1983¹ 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



No matter how young or old the recording, the Institute of the American Musical, Inc. relies on Stanton for playback.

Speaking of problems, how would you like to be faced with the need to accurately reproduce the sound from Edison Diamond Discs, Pathés and Aeolian-Vocalions? That's just what the Institute is faced with -- and that's precisely why they turned to Stanton cartridges.

The Institute collection consists of approximately 35,000 recordings, from just about every American theatre or film musical since the Berliners of the 1890's through to the latest stereo and quadraphonic recordings. They have original, historic machines to play the old recordings, but the arms are heavy and the old styli insensitive and somewhat worn. Furthermore, the acoustic playback does not permit them to filter the surface noise or tape these rare records.

Miles Kreuger, President of the Institute, discussed his problem with other famed and experienced archivists. They all agreed that the Stanton calibrated 681 Series was the answer. Naturally, it is the 681 Triple-E for critical listening and taping with more recent discs; the special 681 stylus for LP's; and, for some old 78's, a 681 cartridge, especially wired for vertical response (with a 1 mil stylus).

Today, scholars, authors and researchers, can get perfect to adequate reproduction of any of the material in the collection. The work of the Institute is important work . . . Stanton is proud to be an integral part of it.

Whether your usage involves archives, recording, broadcasting or home entertainment, your choice should be the choice of the professionals . . . the Stanton 681 Triple-E.

Write today for further information to:
Stanton Magnetics, Terminal Drive,
Plainview, N. Y. 11803.



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.

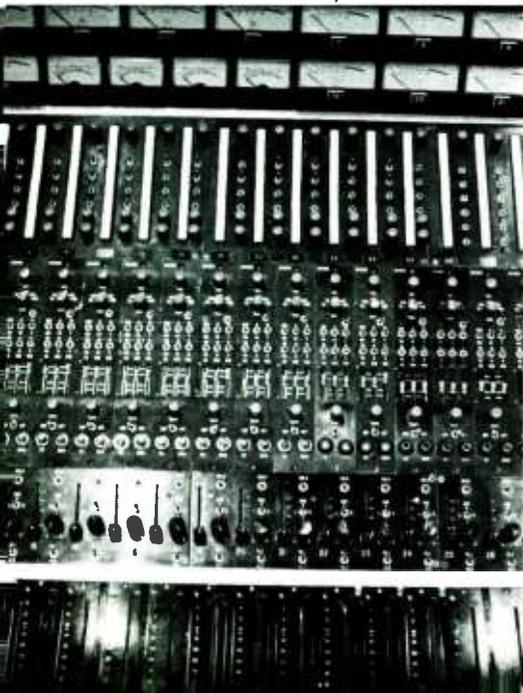
H.C.: How about your approaches on ARE YOU EXPERIENCED vs. AXIS vs. ELECTRIC LADYLAND?

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

... console layout
Studio "A" Electric Lady



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 LOVE², RAINBOW BRIDGE⁸.

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 brush-work 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 time-keeper 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?

*In 1974, Alan Douglas came into control of the rediscovered Hendrix "warehouse" 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 posthumous 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)

Listen to the Sound of Dependability

STL test tapes maintain a reputation as the most dependable and accurate tapes you can buy because of the **consistently** high standards produced on the finest precision equipment.

In addition, they are available in more sizes than that offered by any other manufacturer in the world.

Listen to the sound of dependability . . . and accuracy. Order **STL** test tapes and find out where your system really is.

All audio widths from 150 mil. to 2-inch. Prompt delivery insures freshness.

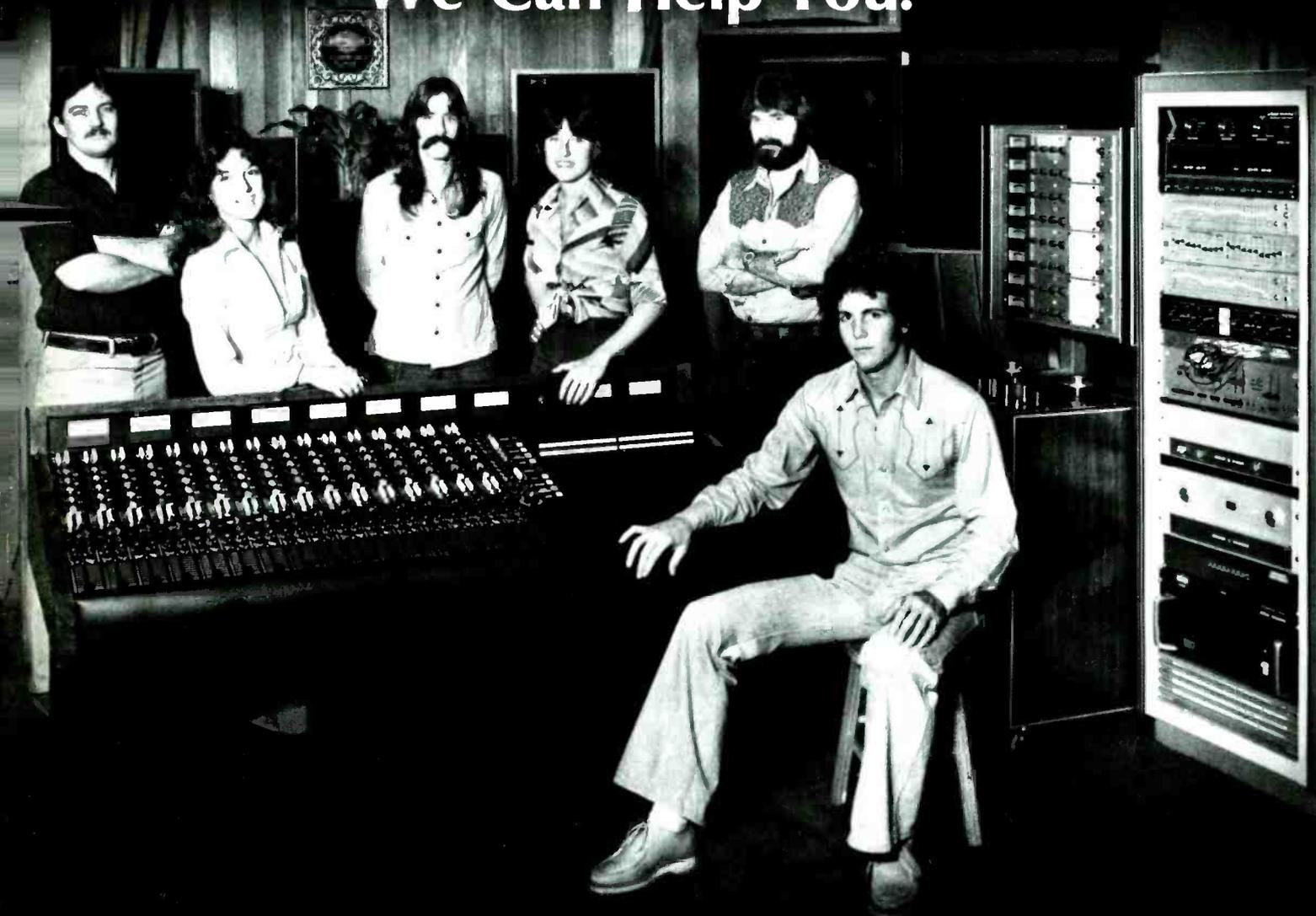
For the distributor in your area—Call or write:

TABER Manufacturing & Engineering Company

2081 Edison Ave. • San Leandro, Ca. 94577 • (415) 635-3831

Tennessee distributors: Auditronics, Inc., Studio Supply Company

If You Don't Have A Fortune To Spend On Your Studio, We Can Help You.



For two years, THE EXPRESS SOUND CO. has specialized in turnkey studio systems for people just like you. Working intimately with our clients, we have confronted and solved the complex problems relating dollars to performance. More than ever before, your success and profit will be born of hard work and talent. Mega-budgets are no longer the requisite ingredient in the studio formula.

We're waiting to hear from you...with a quarter million dollar inventory, a complete technical services department and a committed and conscientious crew of professional people just like you.

Even if you have a fortune to spend, we can still help you.

1833 NEWPORT BLVD.
COSTA MESA, CA. 92627
714/645-8501



Five good reasons

to put your hands on a new Quad/Eight
"Modular Series" audio mixing console.

The new Quad/Eight Modular Series mixing consoles reflect the identical technology and quality of the Internationally accepted custom-bus console line... and are priced to fit every budget.



5 NEW MODULAR SERIES MIXING CONSOLES WITH THESE EXCLUSIVE FEATURES

All Console Systems Feature:

- 4 independent, fully equalized echo send/return modules with integral tape delay, meter select, and full program assign.
- Individually switchable insert: patch before or after equalizer.
- Dual phantom power with individual on/off.
- Microphone overload indicators with master threshold preset.
- Standard 5 1/4" and 7" accessory spaces.
- Control room monitor, studio monitor, and communications modules

All multitrack systems feature two solo circuits; input and monitor/mixdown positional.

All Input Modules Feature:

- 33 frequency, 3 band, stepped equalizers.
- 4 independent echo/oldback sends with individual pre/post, on/off switching.
- Conductive plastic full-travel attenuators.
- Discrete amplifier circuitry in primary signal paths.

SIERRA—16 to 36 inputs, plus 4 echo send/return modules, four selectable mixing busses and separate quadraphonic outputs.

PACIFICA—16 to 36 inputs, plus 4 echo send/return modules, eight selectable mixing busses and separate stereo outputs.

VENTURA—24 to 36 inputs, plus 4 echo send/return modules, sixteen selectable mixing busses and separate quadraphonic outputs.

BRENTWOOD—24 to 36 inputs, plus 4 echo send/return modules, 24 selectable mixing busses, separate quadraphonic outputs and VCA design with 6 sub-groups.

BEL-AIRE—24 to 36 inputs, plus 4 echo send/return modules, 24 selectable mixing busses, and separate quadraphonic outputs. Automated fader design with 6 sub-groups, including Compumix processor.

Please write for complete information on the new Quad/Eight Modular Series.



Quad/Eight Electronics
Quad/Eight International
11929 Vose St., North Hollywood, CA 91605
(213) 764-1516 Telex: 682 446

For additional information, circle No. 121

R-e/p 31

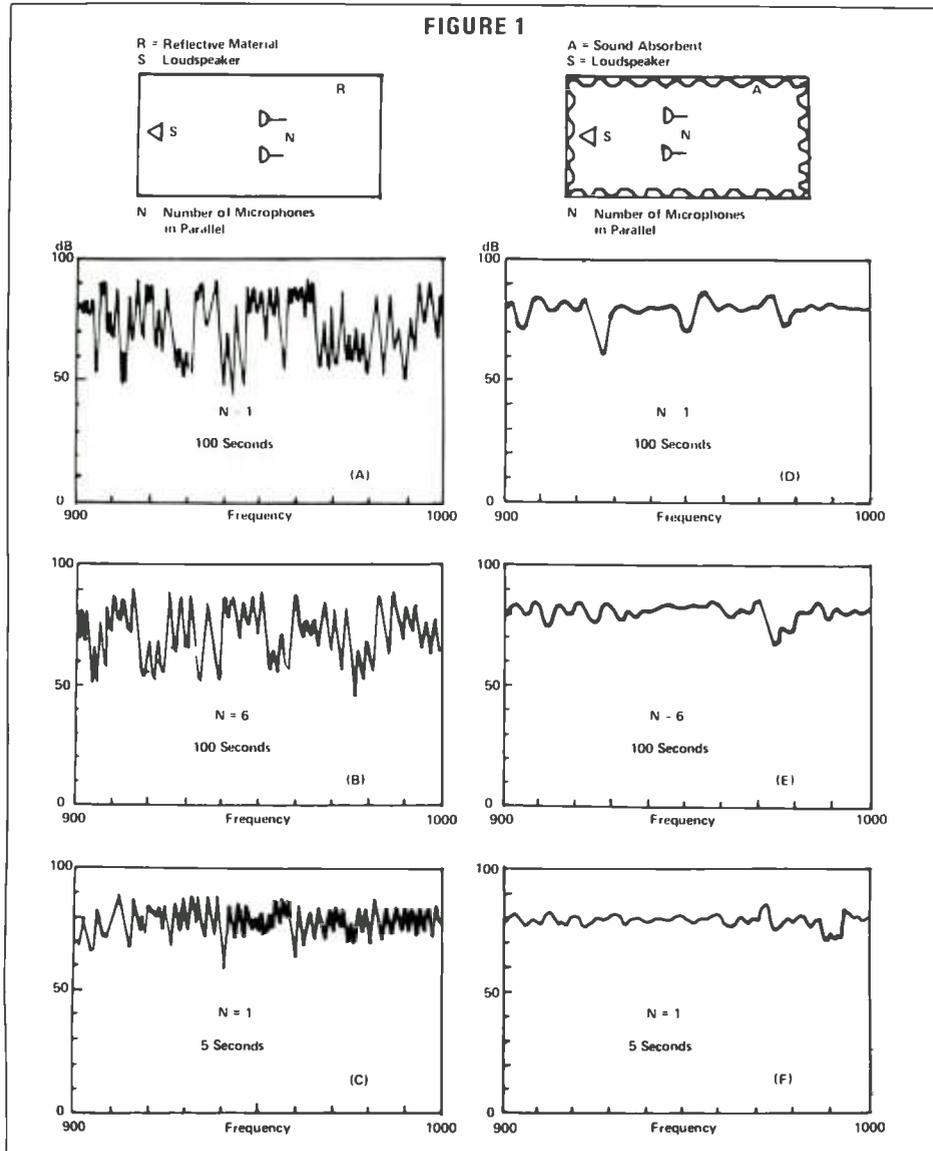
"STANDING WAVES" IN ROOMS

by

Michael Rettinger, M.A.

Consultant on Acoustics

Encino, California



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 catchphrase, 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 Acoustical 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-frequency 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.



SP800B

FOR THE STEREO STUDIO

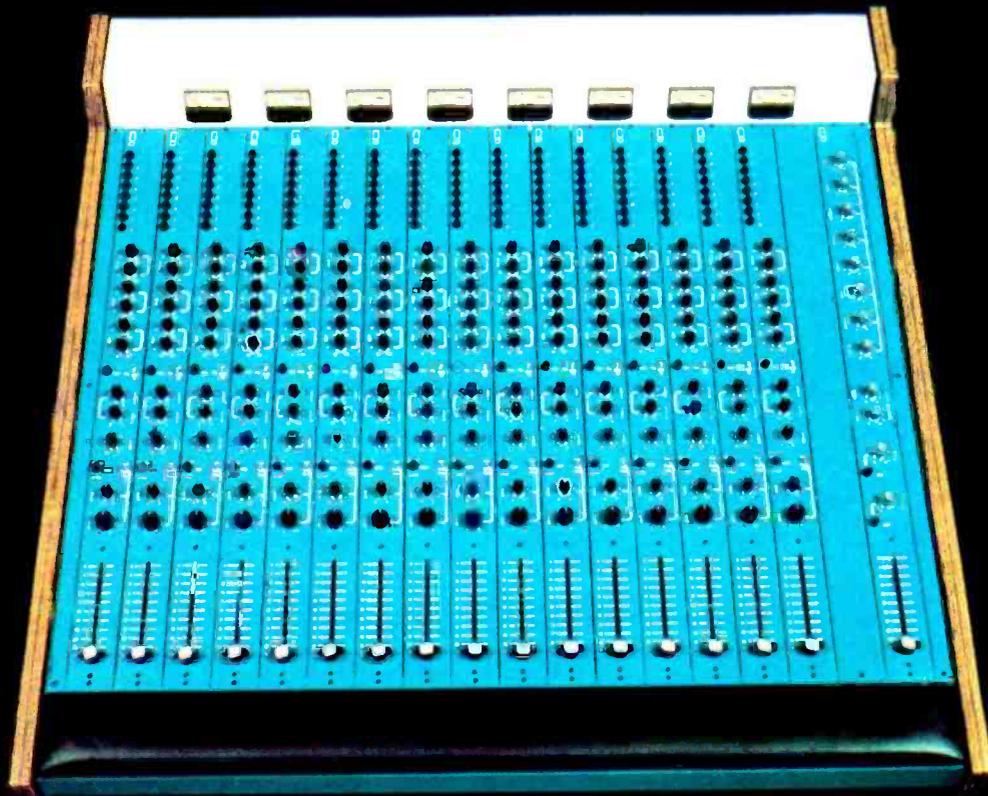
If you've planned on purchasing a quad console for your quad control room. A wise decision.

If you were going to get a quad console for your stereo control room. Good luck.

If you want a stereo console for a stereo control room. The SP 800 B.

The SP 800 B. It can do anything the others can, but mixdown to quad. So what.

It's only \$4,500 retail price.



You may see, hear, and feel the SP 800 series consoles at:

SOUND IDEAS
151 West 46th St.
New York, N.Y. 10036
(212) 575-1711,
245-8221

TEXAS STUDIO SUPPLY
2036 Pasket
Houston, Texas 77092
(713) 688-8067

HUN SOUND
65 Lovell Ave.
San Francisco/
San Rafael, CA. 94901
(415) 454-2911,
924-2600

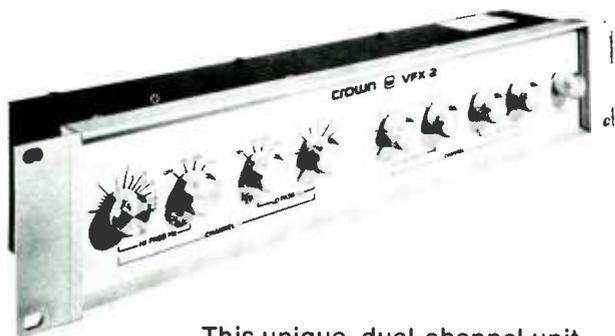
OSPECK
ELECTRONICS

11408 Collins St. N.H., CA. 91601
(213) 769-7090

For additional information Circle No. 122

Are you sure what the crossover point for your next installation should be?

If not...
you might think
about including a
Crown VFX-2
in your tool kit.



This unique, dual-channel unit has continuously variable filters. With it you can "fine-tune" the crossover point in any sound reinforcement system.

As a temporary test rig, the VFX-2 installs quickly. You can diagnose crossover problems in existing systems, no matter how old or new, and prescribe a solution.

For permanent installation, you'll find that the VFX-2 costs *less* than many fixed filters, and provides other advantages. For one, a 15dB gain that eliminates the need for input transformers. An 18dB per octave rolloff that's sharp by any standard. Crossover points can easily be changed to suit different performances. The VFX-2 also works as a bandpass filter, or for tri-amping a mono system.

Hum and noise 113dB below rated output (IHF), IM distortion less than 0.01%, 19 inch rack mount.

Try a VFX-2 on your next installation. Be sure.

When listening
becomes an art,



CROWN
Box 1000, Elkhart IN 46514

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:

$$f \gg \frac{3cS}{16V}$$

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

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:

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

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 position 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 position 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 positions, or employ a graphic equalizer towards the desired end. □□□



Our system is hard to beat

The all time favorite monitor system in U. S. recording studios is the Altec 604. Add our Mastering Lab frequency divider with its improved mid-range, distortion-free crossover and extended bass and you have a system that is truly hard to beat.

We have packaged 604s and M/L dividers in a bass reflex enclosure and named them Big Reds. For super bass response and increased sound pressure level, we add an extra 15" woofer, plus a low frequency crossover and call them Super Reds.

Use our M/L dividers to perk up your present 604s or go all the way with either of our Red systems and join the list of studios that benefit from monitoring with the Mastering Lab system.

audiotechniques, inc.

142 Hamilton Avenue, Stamford, CT 06902 Telephone: 203 359 2312

MASTERING LAB CROSSOVER USERS

A & M Recording
 American Recording
 Applewood Studios
 A & R Recording
 Artists Recording Studio
 Asterik Recording
 Atlantic Recording Studio
 Audio Arts
 Autumn Sound
 Randy Bachman
 Bearsville Records
 Blood, Sweat & Tears
 Blue Rock Studios
 Burbank Studios
 Caribou Ranch
 CBS, N.Y.C.
 CBS, San Francisco
 Chapell Music
 Chariot Studio
 Chelsea Sound
 Cherokee Recording
 Chicago Recording

Conway Recording
 Da'llasonic Recording
 Davlen Sound
 Dawnbreaker Studio
 Disney World
 Dynamic Sounds
 Earth Audio
 Falcon Records
 Frankford—Wayne
 4 Star
 Good Times Studio
 Great Lakes Audio
 Hallmark Studios
 Wally Heider, Los Angeles
 Hit Factory
 House of Music
 Hugo & Luigi Records
 John Kay
 Kendun Recorders
 David Kershenbaum
 Mama Jo's
 Manta Sound

Mediasound, N.Y.C.
 Minot Sound
 MZH Studios
 Graham Nash
 Nimbus Nine Productions
 Ochoa Recording Studio
 ODO Recording
 Original Sound
 Paramount Recording
 P & P Recording
 Richard Perry
 Pinellas Music
 Producer's Workshop
 RCA, N.Y.C.
 RCA, Los Angeles
 RCA, Toronto
 Record Plant, N.Y.C.
 Record Specialists, Trinidad
 Roade West Recording
 Rockland Recording
 Salty Dog Studio

Sigma Sound, Phila.
 Sigma Sound, N.Y.C.
 Sound Exchange
 Sound Factory
 Sound Ideas
 Sound Labs
 Soundmixers, N.Y.C.
 Springfield Sound
 Sundance Recording
 Sunset Sound
 Sunswept Studio
 Howard Schwartz Recording
 The Guess Who
 Toronto Sound
 United Artists Studios
 Valentine Recording
 Vantone Studios
 Venture Sound
 Village Recorder
 Western Recording
 Whitney Recording



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, relative-

ly speaking, the same way: There is an overabundance 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 avail-

able. 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 . . .

there is a way to give your studio some

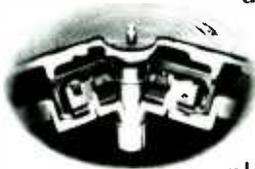
... continued -

Your professional turntable cannot match the performance or reliability of this one.



The Technics SP-10 MK II.

Every professional needs the precision of the Technics direct-drive system. That's why radio stations use it. And discs abuse it. But every professional also needs abundant torque. And now you can have it. In the SP-10 MK II.



At $33\frac{1}{3}$ RPM, the SP-10 MK II will reach the exact playing speed within 0.25 of a second.

That's less than $\frac{1}{12}$ of a turn. While it comes to a dead stop in only 0.3 of a second. And you don't have to worry about subtle slowdowns because a tracking force of even 1,000 grams won't noticeably affect its speed.

You won't find any belts, gears or idlers in the SP-10 MK II. But you will find our lowest wow and flutter ever (0.025% WRMS). Inaudible rumble (-70dB DIN B). And a platter that spins at the exact speed ($33\frac{1}{3}$, 45 or 78 RPM) regardless of fluctuations in AC line voltage or frequency. The reason: A quartz-locked frequency generator DC servo motor.

And the SP-10 MK II is as reliable as it is precise. Even with its abundant torque, you can stop the platter with your hand. Because we designed it to take all the

punishment a professional can dish out. Even after years of continued use.

You'll also get all the refinements a professional needs. Like a quartz-locked stroboscope. Remote control. Electro-mechanical braking. A dynamically damped platter. And a separately housed power supply.

The SP-10 MK II. One component in the new Professional Series from Technics.

Panasonic Company
Technics Dept. 718
One Panasonic Way
Secaucus, N.J. 07094

Attention: Sid Silver,
Technical Service Specialist.

Technics
by Panasonic
Professional Series

- Send me technical information on the Technics SP-10 MK II turntable.
- Have a Technics audio specialist call for an appointment.

NAME _____ TITLE _____
COMPANY _____ Please Print
ADDRESS _____
CITY _____ STATE _____ ZIP _____
AREA CODE _____ PHONE NUMBER _____

The Return Of Professionalism To 8-Track Recording.



Scully's 284B-8 doesn't compromise on quality. It's the only master recorder/reproducer of its type that handles 14" reels at speeds up to 30 ips. And when you consider its other features, you'll know that the 284B-8 is a sound investment.

- Handles 1" tape on 10½" as well as 14" reels
- Standard DC capstan servo with pitch control
- Innovative low-noise electronics
- Motion direction sensing
- Dynamically operating disc brakes

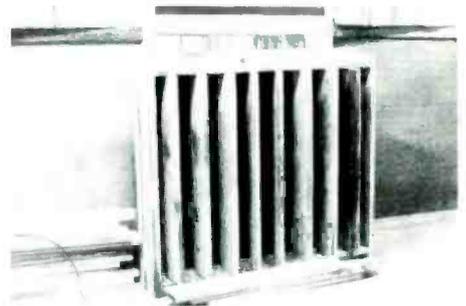
- Variable speed accessory with L.E.D. speed read-out

Sales, service and replacement parts are available from over 200 distributors worldwide. Get the facts, contact Scully Recording Instruments, Audio/ Electronics Division of Dictaphone Corporation, 475 Ellis Street, Mountain View, CA 94043 (415) 968-8389 TLX 34-5524

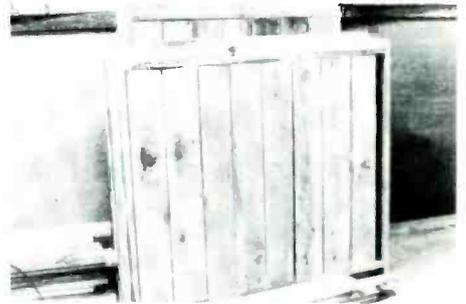
▶ Scully
Recording Instruments

Scully and Dictaphone are trademarks of Dictaphone Corporation, Rte. New York

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-foot-across beach umbrella. The umbrella was suspended from the ceiling by ropes, connected to pulleys. 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 —

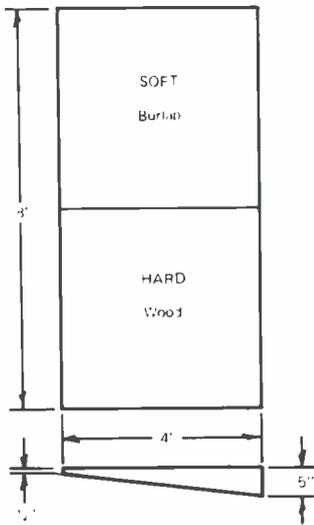
The sound separation baffles were the most common type. Dimensions were 4 feet 1½ inches high, by 4 feet 3 inches wide, by 7¾ inches thick. The baffles were stuffed with 6 inches of insulation and covered with burlap. With a couple of baffles, it was decided to face one side with wood in order to yield 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 maneuvered 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 hoisted 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



... bass trap under construction —



... completed covered with carpeting —

of the "look" as well as the price, which was pretty friendly.

After all the panels were in place on all of the walls finishing strips were used to cover any visible 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 desirable 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 ordinarily 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



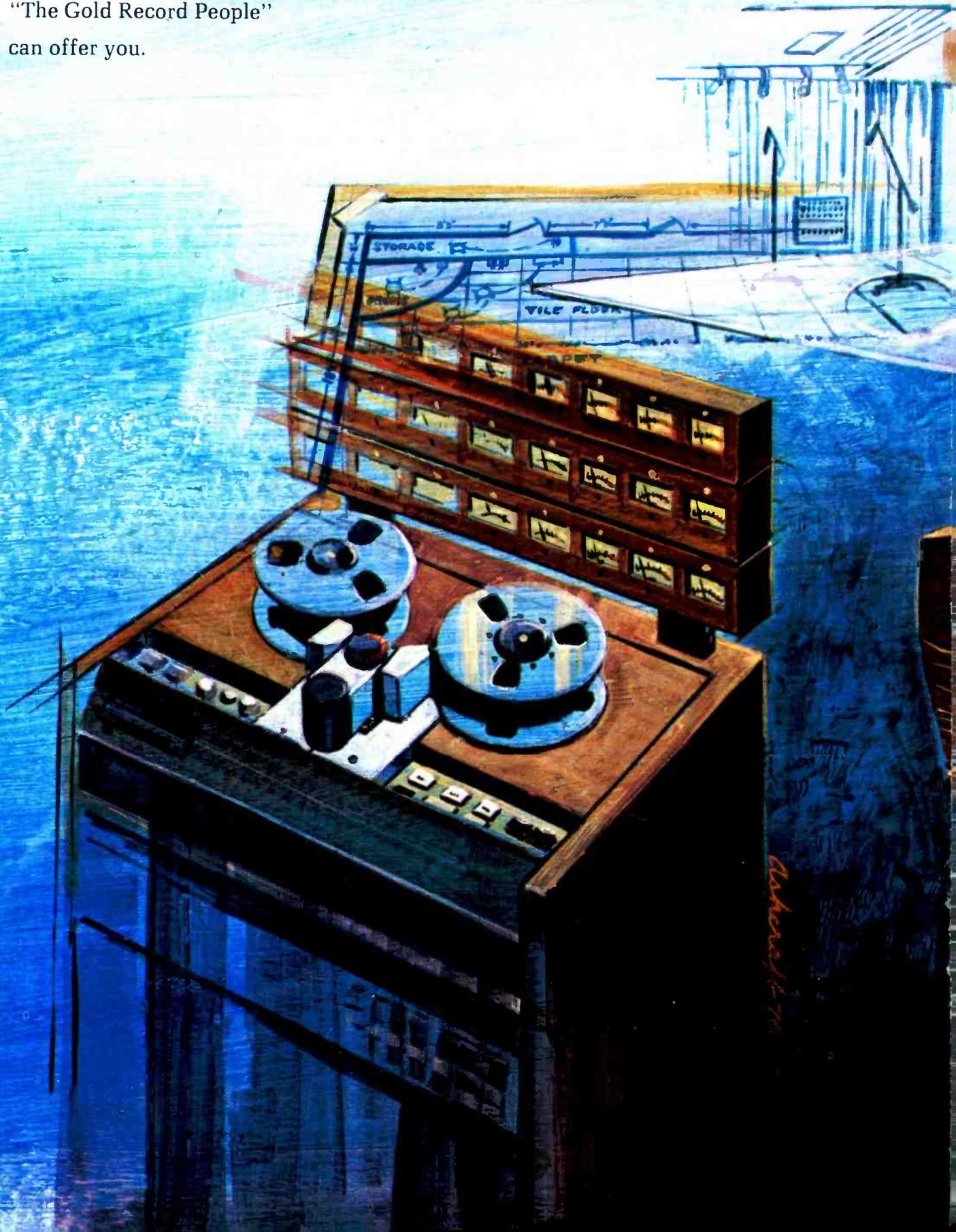
... ballasted drum booth base under construction —



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

Looking for a Recording Studio?

Whether you are looking for studio time, equipment or design, you owe it to yourself to find out what "The Gold Record People" can offer you.





from acoustic design
to down beat...

**Westlake
Audio**

6311 Wilshire Blvd.
Los Angeles, California 90048
(213) 655-C303

For additional information Circle No. 128

R.e/p 43

Musicians Monitors and Microphones don't always Mix!

Eight years of professional touring experience have at least taught us the things that DON'T work!

Custom electronic systems for musicians require experienced engineering and stage savvy!

Our background includes working with: The Doobie Brothers, Jefferson Airplane, Traffic, Derek and the Dominos, The J. Geils Band, Roberta Flack, Bob Hope, Etc. Etc.

BISONBUILT builds: Total P.A.s, Special application monitor systems, Artist controlled amplification systems for all instruments.

Complete continuity from connector to road box.

BISONBUILT packages electronic systems for the professional touring musician who requires total reliability first time around!

If this is you, contact:



David Hadler Salina Star Route
Boulder, Colorado, 80302
(303) 442-0639

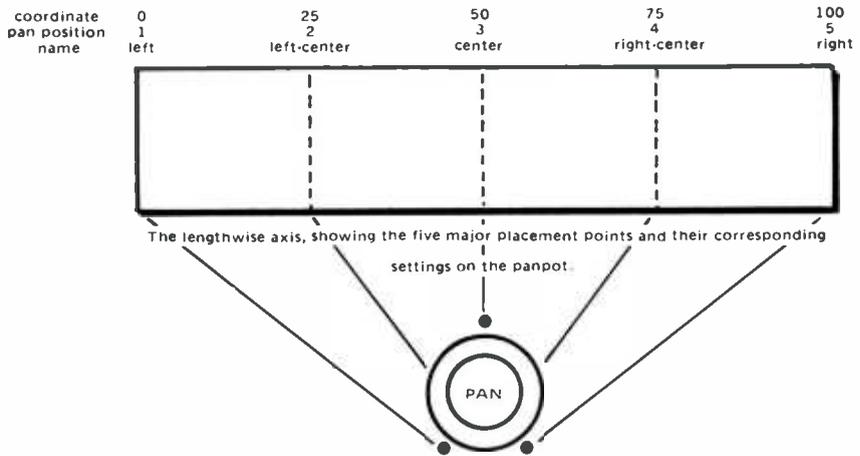


Figure 1. No doubt there is a threshold of sorts for where we begin to perceive a non-coincidence, or difference, of panning position. Certainly it would be hard even with a lot of left-right separation on the instruments to detect a spread of seven units or less, i.e., if the panning positions of the 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 spectrum'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

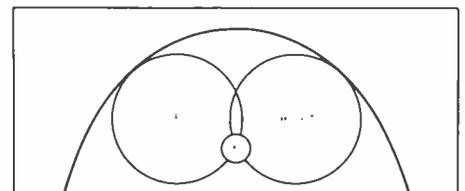


Fig. 2. The "natural" drumkit, approximating the way our ears would hear it from, say, 6-15 feet away and directly in front. The most complimentary miking would be two fairly distant mikes for the left and right sides, and one more – but not too close – for the kick, each microphone having its own track of tape. In the mix, the kick is centered (consistent 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.

We Offer Our Complements

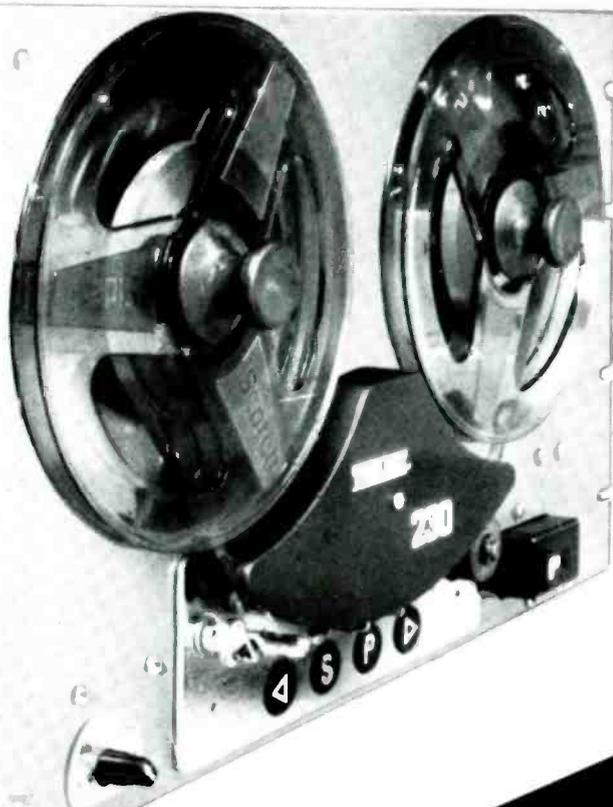
Modular tape components that complement each other so you can design any customized tape system you need. Heavy duty, reel-to-reel or tape cartridge transports in one, two or four channel configuration complemented by separate record/play or play only electronics. Your choice of tape speeds, options and accessories including remote control.

- You rarely see our tape components because they work behind the scene. They work day

in, day out at broadcasting commercials or monitoring spacecraft, activating machinery and displays, playing background music, repeating announcements or recording scientific research data. They monitor the speed of a train, record patrol car communications or provide the roar of an amusement park dinosaur. They record medical data, log security information and emit high pitched sound for warehouse rodent control. And they serve as court recorders, in

typing pools and dial access systems. They work continuously.

- When you design a custom tape system to record, to monitor or to play, specify reliable Telex tape components. You'll collect the compliments. With our complements. For detailed information please write:



PRODUCTS OF SOUND RESEARCH
TELEX[®]
COMMUNICATIONS, INC.

9600 ALDRICH AVE. SO. • MINNEAPOLIS, MINN. 55420 U.S.A.
Europe: 22, rue de la Legion-d'Honneur, 93200 St. Denis, France
Canada: Telak Electronics, Ltd., Scarborough, Ontario

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 different¹ 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

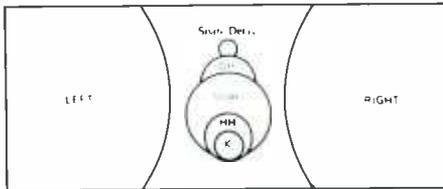


Fig. 3. A common reorchestration, beginning pretty much with 16-track tape. Non-"natural" aspects include the overhead (a perspective you could not hear standing 6-15 feet in front of the drums), the fact that it's a mono overhead (we hear in binaural), the snare delay (again giving you an impossible 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).

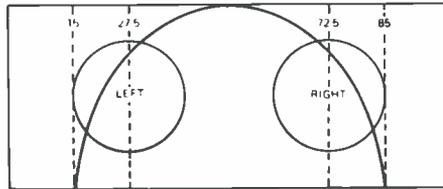
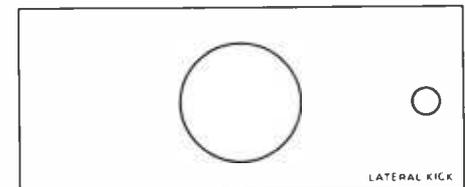
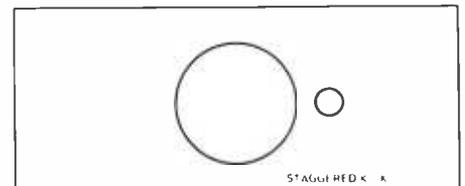
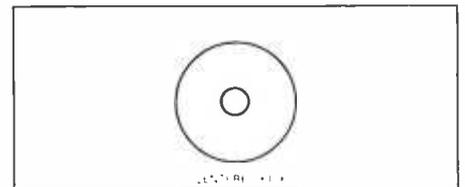
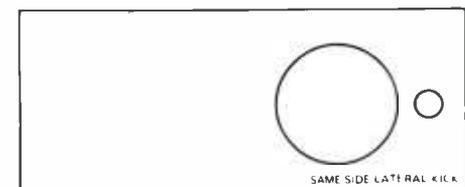
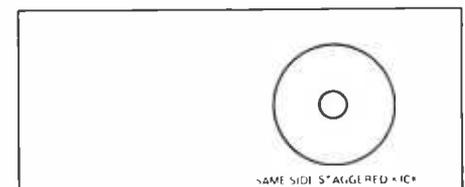


Fig. 4. To create an 70% drum spread, you would not send your drums L and drums R tracks to 15 and 85 respectively, because to do so would be to ignore the fact that a mono track (which is what each of the sides is) will extend 12.5 units to either side of its panning position at a moderate level in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

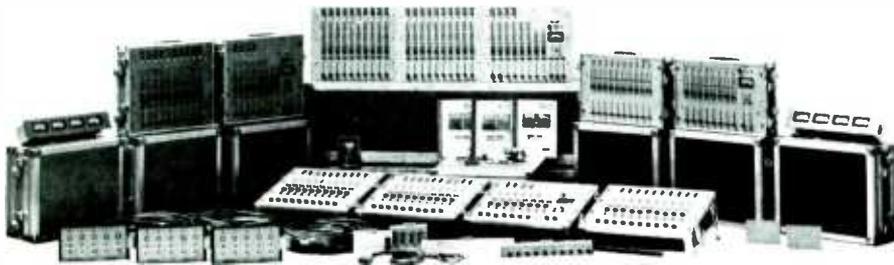
CENTERED MONO OR SMALL SPREAD STEREO TOPKIT



STAGGERED MONO OR SMALL SPREAD STEREO TOPKIT



Trouper Series



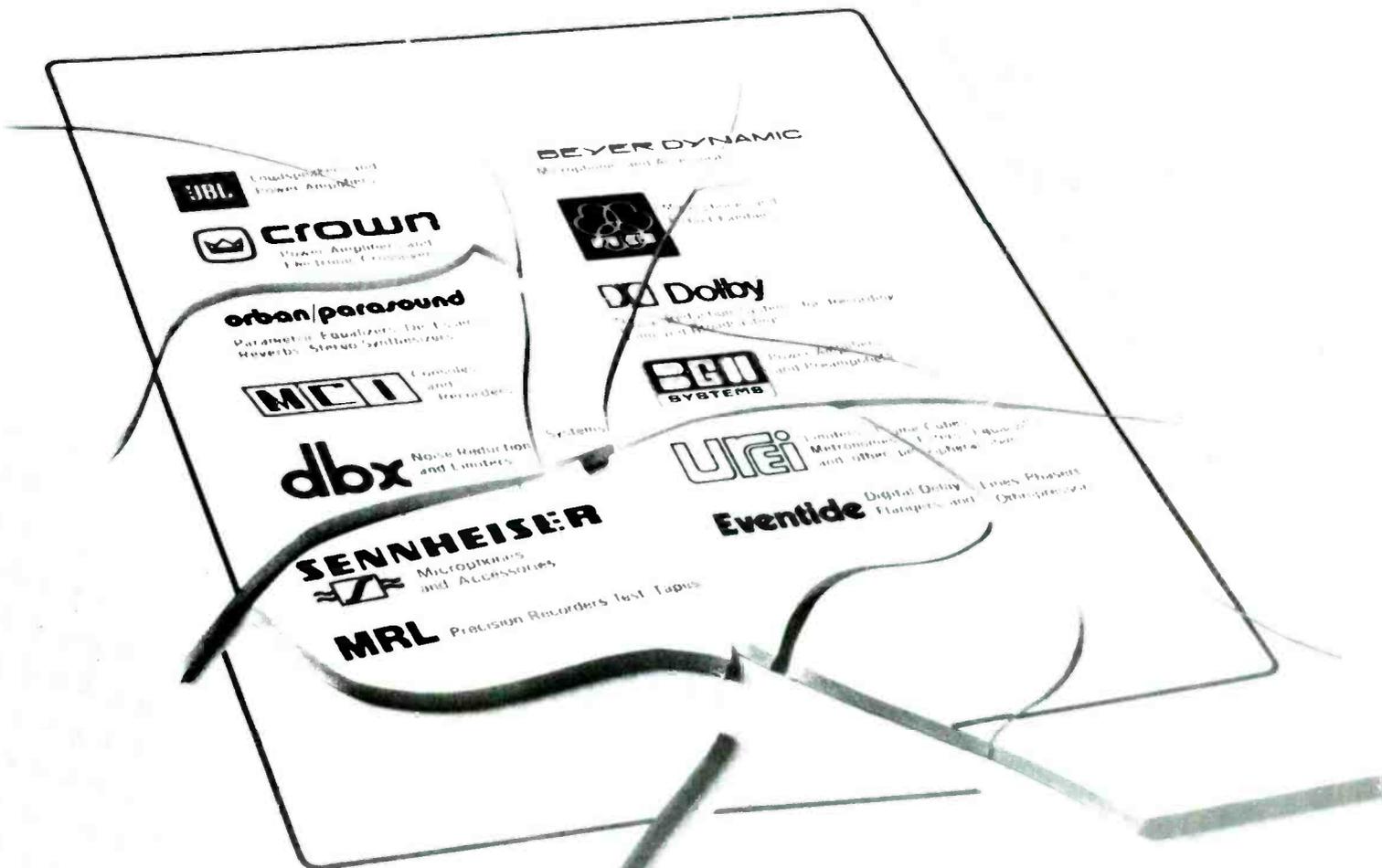
Professional Musicians Need Professional Equipment

Trouper Series live music mixers are built for you the professional musician; who wants professional performance. Take just what you need! You can expand your basic system at any time, as well as add our optional accessories. Bolt them on, plug them in, and you've got one of the most flexible, portable custom mixing systems available at less than half the price. Our mixers and accessory packs fit neatly into extra durable, ready-to-travel flight cases. If you want the world to hear you at your best, check out the Trouper Series and write for our free catalog.



DESIGNERS & MANUFACTURERS OF PROFESSIONAL AUDIO SYSTEMS & EQUIPMENT
5559 CAHUENGA BLVD NORTH HOLLYWOOD, CALIFORNIA 91601 / 213 985-9501

WE'VE GOT ALL THE PIECES.



FROM THE COMPANY THAT KNOWS HOW TO PUT 'EM TOGETHER.

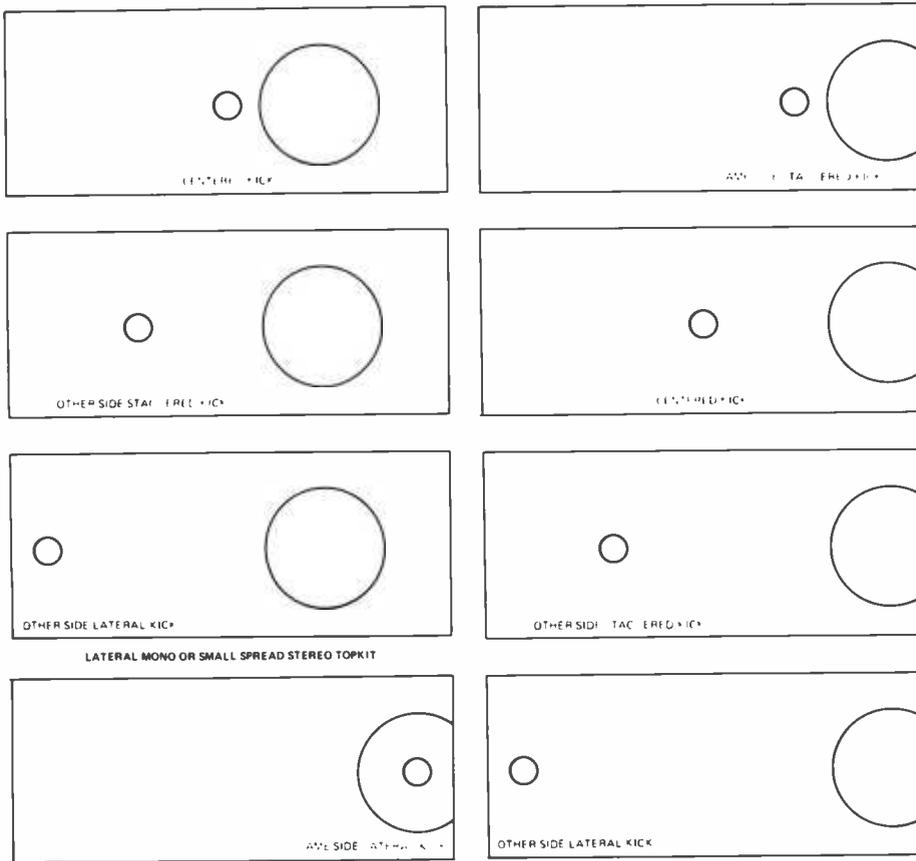
Audio Consultants, Inc.

7 Music Circle North, Nashville, Tenn. 37203 (615) 256-6900

Opening Jan. 1977: 1903 Apollo Richardson (Dallas), Texas 75081 (214) 238-0605

Call Claude Hill or Dave Purple in Nashville.

Don Woerner is the man in Dallas.
For additional information Circle No. 132



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



Increased Performance for your Mincom



Think Ferrite 10 Times Life • All Track Formats • 100's in Service • Unconditional Warranty. Ferrite Heads Available for all Professional Recorders.

1649 12th Street • Santa Monica, California 90404 • (213) 451-8611

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 of 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 leakage?

Leakage -- drum leakage especially -- was a very important 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

New Stereo Delta-T

Give it your
thin vocals
your bland
instrumentals
your dry
mono tracks



Now relax, playfully invite your muse, and transform these tracks, adding body, stereo perspective, flanging, and a host of other time-base effects. Since Lexicon introduced digital delay over six years ago, most studios have come to depend on it at least for doubling and slap. Now, the stereo 102-S with the new VCO module* produces many other effects, including more natural double tracking, flanging, vibrato, time delay panning, extreme pitch modulation, and signal transformation for special effects. Of course, you can also use the two channels for completely independent processing.

The Lexicon Delta-T has earned an enviable reputation for its 90 dB dynamic range, impeccable audio quality, high reliability, and functional modularity. All this is retained in the new 102-S, while two channel operation, finer delay steps (3 ms), and the VCO have been added. And the 102-S is economical. Its totally modular construction allows you to start with a bare bones mono system and expand later as needs and budget grow. We'll help you define the configuration you need to get started. Call or write Lexicon for further information.

Write on your letterhead for AN-3, *Studio Applications of Time Delay*. A 30-minute demo tape is also available for \$1 in cassette, or \$5 on 7 1/2 ips/2 track tape.

*The new VCO module also fits any 102-B or C mainframe to enhance its time-base signal processing capability

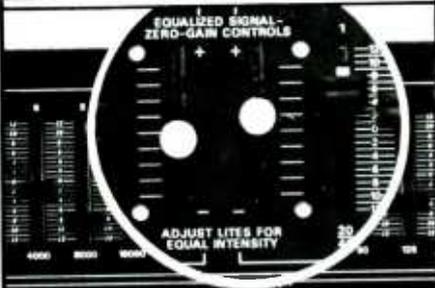
lexicon

60 Turner Street
Waltham, Massachusetts 02154
(617) 891-6790

Soundcraftsmen

**"TOTAL-SYSTEM"
EQUALIZATION AIDS**

**NEW FULL-SPECTRUM 18dB
LEVEL CONTROLS; LED's
for ZERO-GAIN and OVERLOAD
MONITORING; 1dB MARKINGS**



Soundcraftsmen

SPECTRUM/BALANCED OCTAVE EQUALIZER
PROFESSIONAL TWIN - GRAPHIC MODEL TG 2209-800

**NEW 1/3 OCTAVE PINK NOISE
INSTRUCTIONAL TEST
RECORD for OCTAVE-WIDE
ENVIRONMENTAL SET-UP**



FOR THE STUDIO



600-OHM BALANCED IN/OUT

FOR THE ROAD



SG-2205-600 less case — \$399.50

GUARANTEED SPECIFICATIONS

FREQUENCY RESPONSE: ± 0.25 dB 20 to 20,480 Hz at zero setting.
THD: Less than .05% at 1 volt.
SIGNAL-TO-NOISE: Better than 90 dB.
INDIVIDUAL OCTAVE-CONTROL RANGE: Minimum ± 12 dB (Typ. ± 14 dB), each octave centered at 30, 60, 120, 240, 480, 960, 1920, 3840, 7680, and 15,360 Hz.

CIRCLE SERVICE CARD # OR WRITE TO:

SOUNDCRAFTSMEN

1721 NEWPORT CIRCLE, SANTA ANA, CA 92705

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 therefore 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 Dinklage 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 broadens 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 instruments 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.

The New Price/Performance Reverb Leader:



Introducing the new *dual channel* Orban/Parasound Spring Reverb. The new 111B retains all of the electrical features of its popular single-channel predecessor and augments them with a new bass control and "quasi-parametric" midrange control. The new midrange equalizer permits stepless adjustment of its ± 12 dB equalization range, as well as continuously variable center-frequency and *bandwidth*. This equalization flexibility is unparalleled in the low-cost reverb field and effectively complements the simple equalizers usually found on low-cost mixers and consoles.

Included in the new package is our unique "floating threshold limiter" which minimizes "spring twang" and provides absolute protection from overload. And our highly-respected electronics provides a bright, super-clean sound with the best signal-to-noise in the spring reverb field. Most remarkably, the two-channel 111B

costs exactly as much as our single channel model. The only thing you give up is the flexibility of our dual-chassis construction—now the spring is mounted with the electronics.

At \$695 for two channels, the 111B provides the quality alternative to the cheaper, consumer-quality reverbs on the market. With industrial-quality construction, line-level balanced outputs, compact size, and smooth, four-spring (per channel) sound, the 111B is the ideal choice for the user with space and/or budget limitations. And as always, you can count on Orban/Parasound's reliability and prompt service. For more information on the new 111B, see your local Orban/Parasound distributor, or contact

orban/parasound

680 Beach St. San Francisco, CA 94109 (415) 673-4544

**At last, a stereo power amp
with professional performance
for less than \$1.00* per watt!**

THE CS-800

The latest high speed, high voltage, discrete technology combines with unique packaging and exclusive features to create the Peavey CS-800, a new stereo power amplifier that is unrivaled by anything on the market at its price.

The CS-800 produces 400 watts RMS of pure, undistorted (0.05% THD) power per channel. Overall, that's 800 watts of solid, high fidelity (5 Hz to 30 kHz) amplification retailing for only \$649.50*. At about 81 cents a watt, that's an incredible value for a stereo power amp with the CS-800's performance and versatility.

Features such as LED's on each channel give precise indication of any possible overload or clipping. A back panel patching facility incorporates small plug-in modules that provide

the CS-800 with balanced inputs and even a two-way electronic crossover. The amp's twenty-four high voltage output transistors are mounted on massive, fan cooled heat sinks for ultimate reliability even under the most demanding operating conditions. Protection circuits are built into each channel to protect speaker systems from any sudden abnormally high DC voltages. A steel reinforced die cast front panel in a 19" rack mountable chassis add to the system's appearance and versatility.

The Peavey CS-800 is a highly professional amp with honest performance at a very reasonable price. Drop by your Peavey Dealer for a demonstration of what the CS-800 can do or write us and we'll send you complete specs. We think you'll be impressed.



Peavey Electronics
Box 2898
Meridian, Ms. 39301

*manufacturer's suggested list price

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?

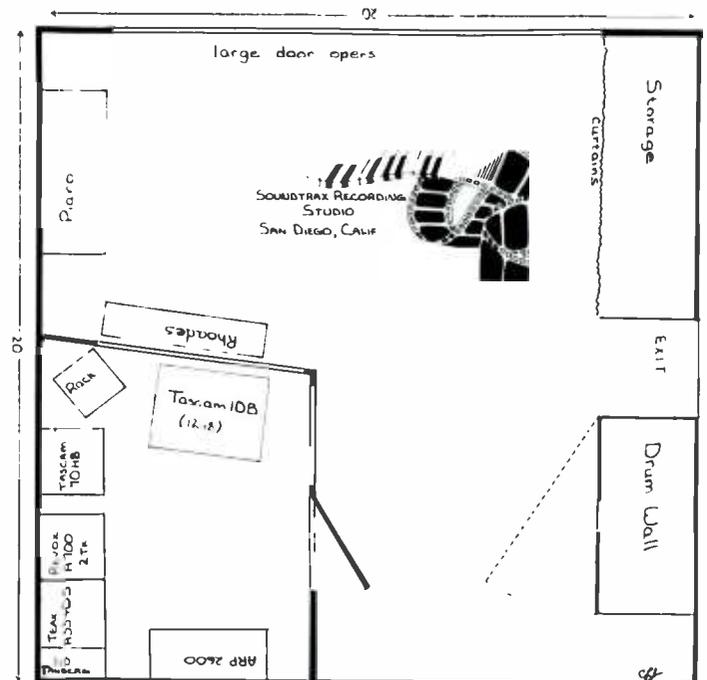
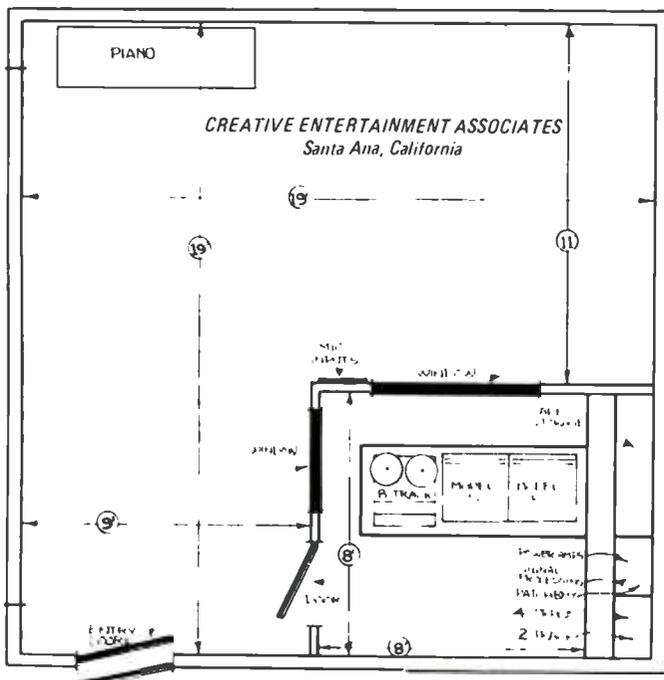
The following, then, are observations and direct quotes derived from a roundtable discussion with the key people from 6 such studios. To start with, it was both

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 comparative 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.

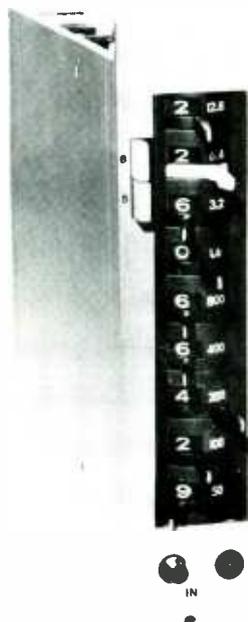
"At the rates the 8-tracks are charging around here these days, if that's all I had to depend on for my income it wouldn't be enough to live on, the way we work it -- doing demos.

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

from

Sphere
ELECTRONICS

**THE GRAPHIC
EQUALIZER**



9 FREQUENCIES
WITH PRESENCE
SHIFT

Sphere
ELECTRONICS

20,211 G PRAIRIE AVE
CHATSWORTH CALIF 91311
213/349-4747

THE CONSOLE COMPANY

For additional information Circle No. 138

THE MOST ACCURATE PROFESSIONAL
PICKUP IN THE WORLD!



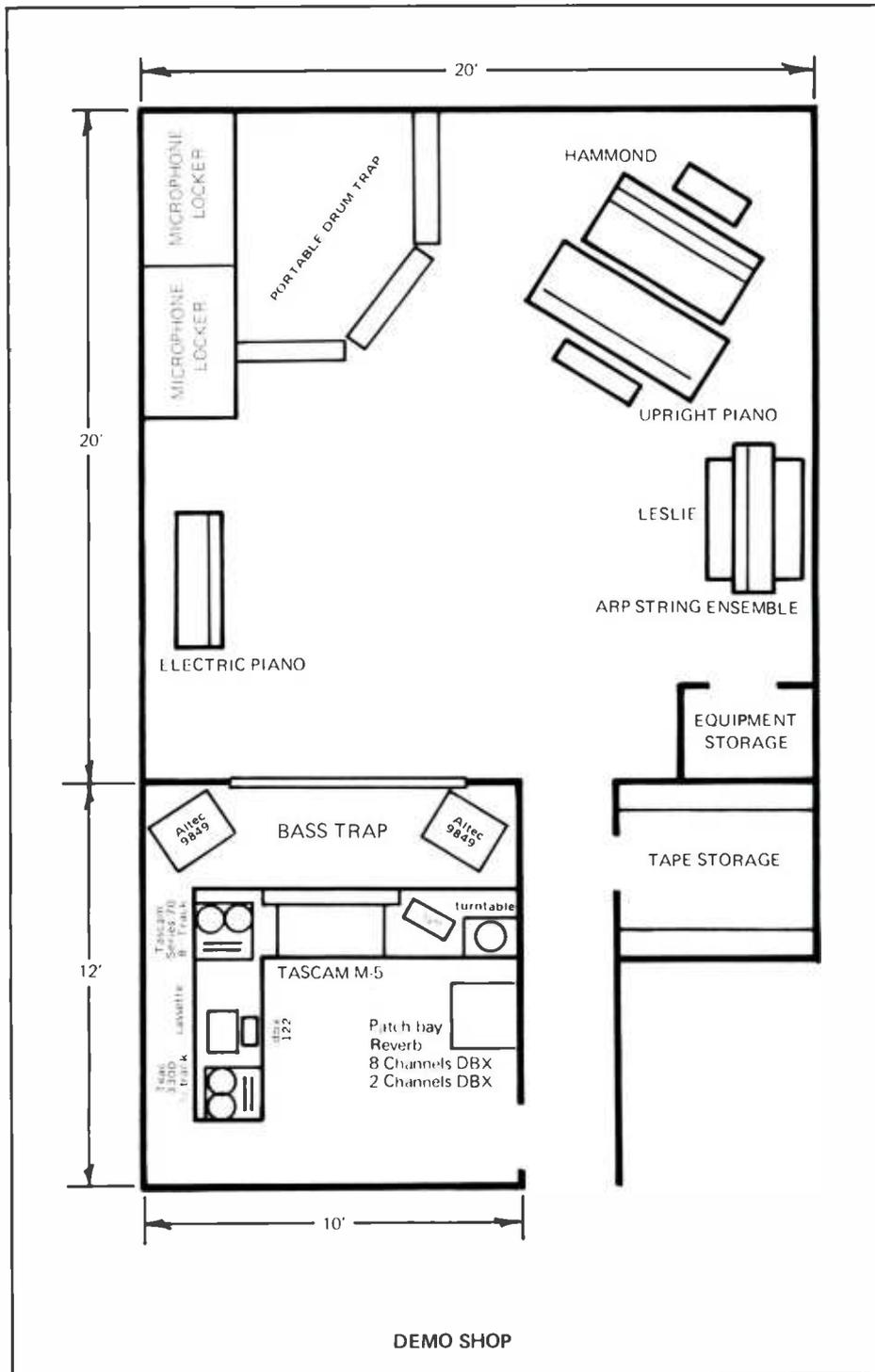
FOR GUITAR, PIANO, BASS . . .
ANY ACOUSTIC INSTRUMENT.

FOR INFORMATION WRITE OR CALL:

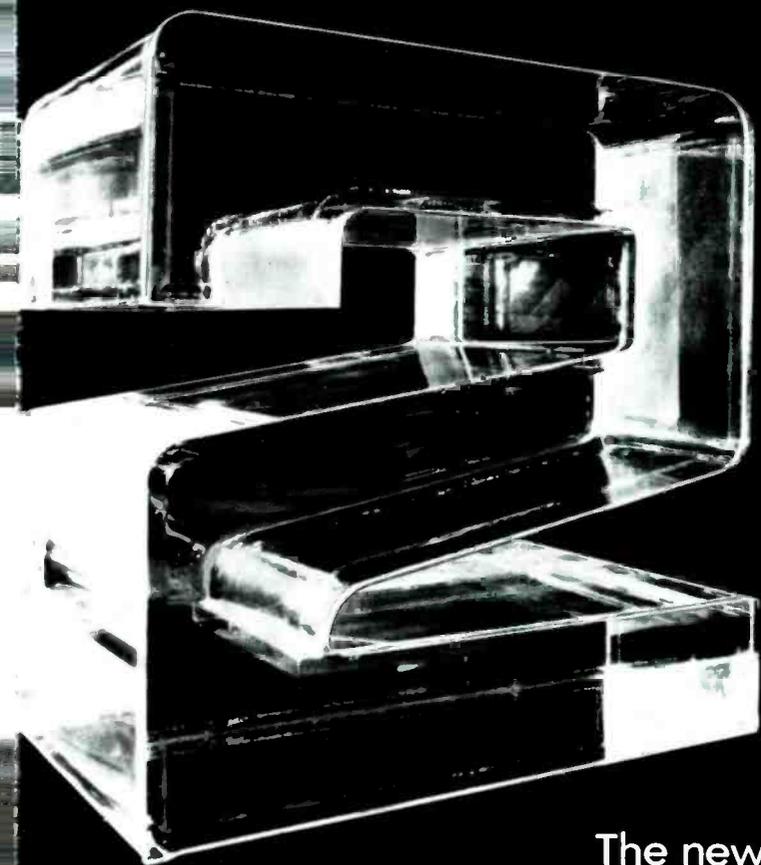
FRAP
FLAT RESPONSE AUDIO PICKUP

Box 40097, San Francisco 94140 • (415) 824-2223

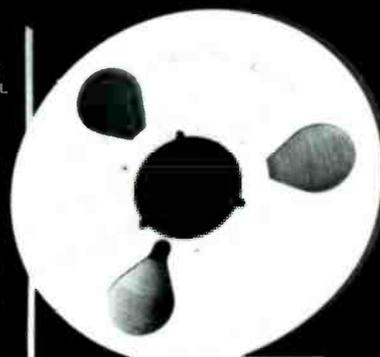
For additional information Circle No. 139



Introducing the solution to the print-through problem.



audiotape
Q15
audiotape
audiotape
audiotape
audiotape



MIL

The new Formula Q15 Low Print Mastering Tape on 2 mil base.

Now you can have low print without giving up output or low noise.

Formula Q15 on 2 mil polyester base *exclusive* from Capitol provides lower print than any other studio tape. The principle is simple—we began with our heavy duty, low noise formulation which already featured excellent output and low print-through. Then we coated it on 2 mil base. The additional spacing between recorded layers, compared to 1½ mil base provides at least 2 dB additional print reduction resulting in an unprecedented

signal to print ratio of 59 dB.

No wonder the Q15 2 mil is a natural choice for those critical needs where print-through has often proved troublesome—like narration or where the recorded material must be stored for very long periods of time.

So if you've got a print-through problem, we can solve it. After all, no other tape manufacturer knows professional recording and duplicating needs better than Capitol.

AUDIOTAPE, A PROFESSIONAL PRODUCT MANUFACTURED BY THE SAME PEOPLE WHO MAKE AUDIODISCS, AUDIOFILM,™ AUDIOPAK® BROADCAST CARTRIDGES, AND THE LEARNING TAPE.™

audiotape

BY CAPITOL

Capitol™ CAPITOL MAGNETIC PRODUCTS A DIVISION OF CAPITOL RECORDS, INC. 1750 NORTH VINE STREET, LOS ANGELES, CALIFORNIA 90028

For additional information Circle No. 140

R-e/p 55

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 L.P.'s. Most demos just go to stereo tape, but I like what he says about how the 45's make

**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 kluged 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 PIPE-LINE in that studio, which he reports are still selling quite well in international markets, according to producer royalties.*

a group look . . . more together. Professional!"

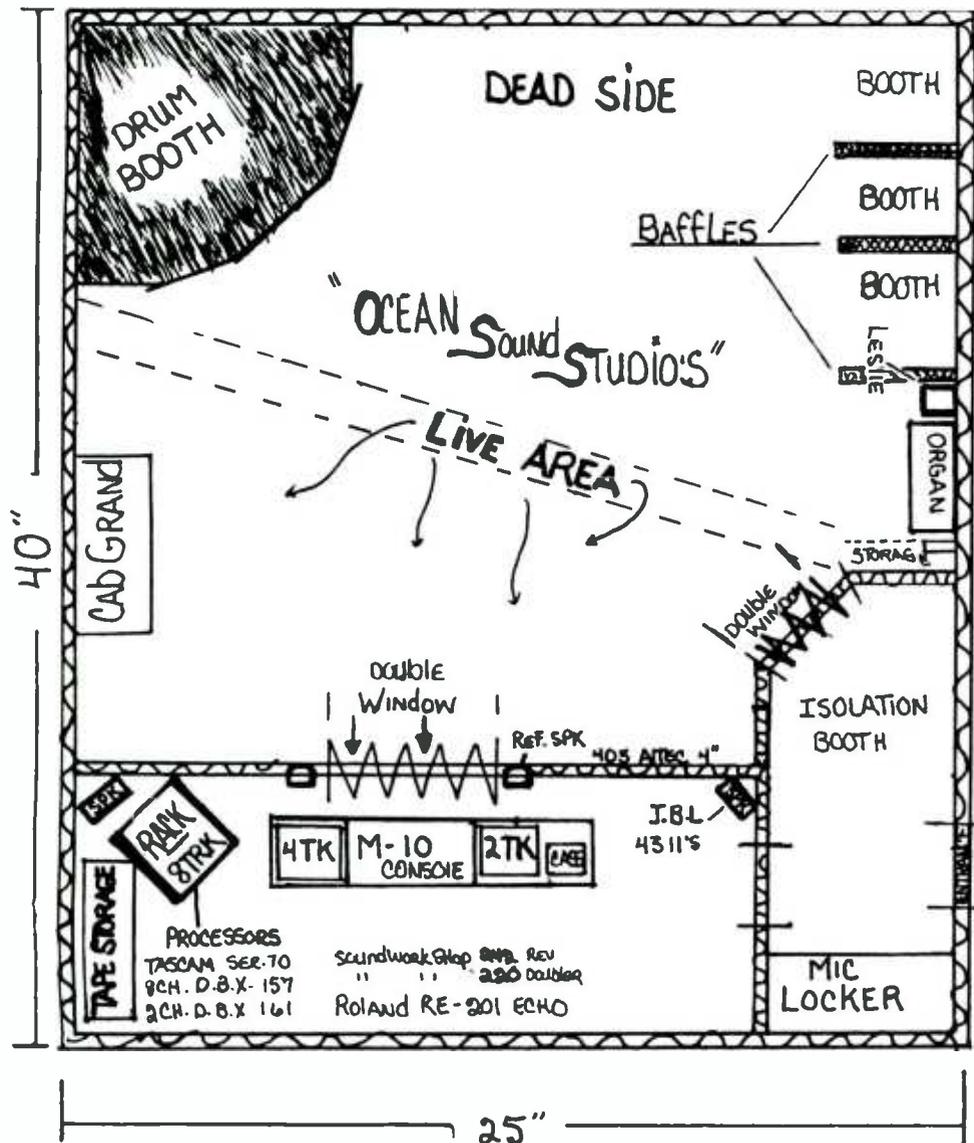
Jim Papageorge operates 8-track Soundtrax in San Diego. As the name is meant to indicate Jim is trying to position his operation, in his words, "for the long-term we are shooting for film soundtrack scoring. But that's a hard market to crack, and we are paying our bills with demos, like everybody else. 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.

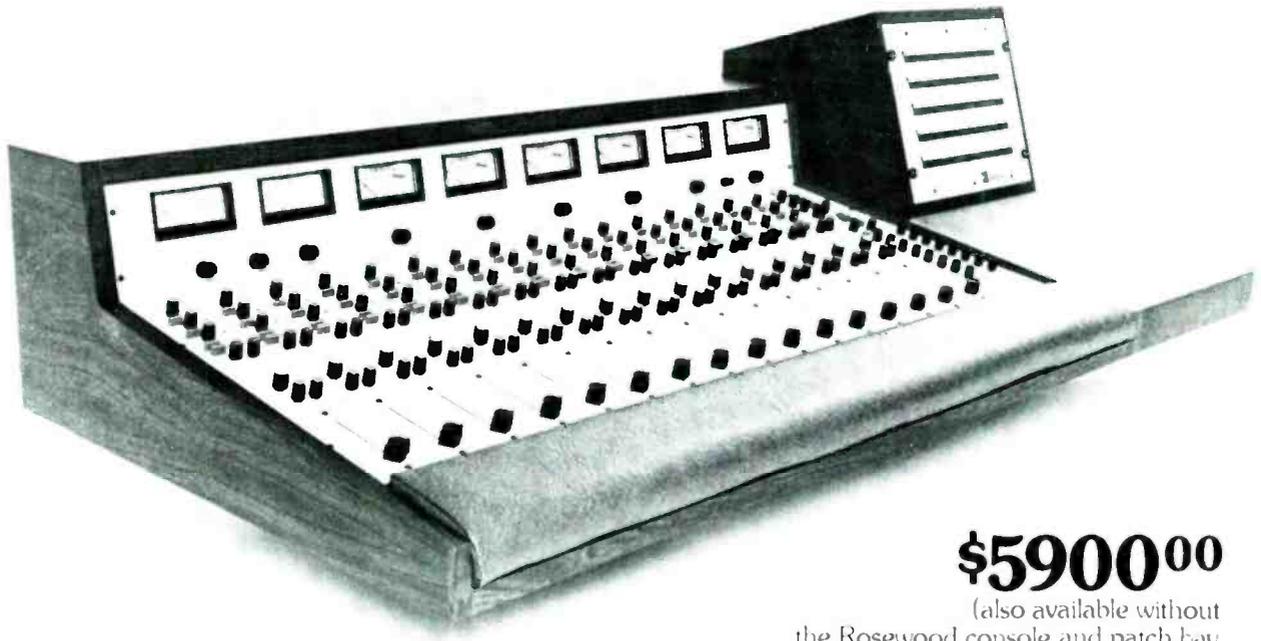
"In answer to your question about the markets for multi-track music production in San Diego, there seems to be a change coming. In the past, of course, it has been the big 16 and 24-track studios, who have done most of that. It was worth it to go to L.A. or someplace else. But, now the 8-track studios, 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."

Creative Entertainment Associates is an 8-track studio run by Mike Kicenski and Jeff Aronson in Santa Ana. Mike and Jeff both agree that their bread and butter has been jingles. As Jeff says, "About 60 - 40%. The albums bring in much more money per project. It's a bigger cha-cha. But in one day we'll do a jingle or a spot for a radio station . . . and it's finished. Quick turn-around. For our radio accounts we offer to produce, not only record, a jingle for so and so much money. We guarantee to have the fully produced spot on the air in three days. Depending on what they want, what the budget is, we can give them everything right out of our shop. That's creative, writing, scoring and lots of times including the voice-over. Since both of us are musicians, we will, maybe only have to pay a drummer, sometimes the voice-over. But most of it we can do it ourselves. Obviously, we have to put a prem-



**“Unquestionably the best value
we’ve ever offered in a
professional 16x8 console”**



\$5900⁰⁰

(also available without
the Rosewood console and patch bay
for \$4900.00)

Each Input Position Features:

Eight push button track assignments • Balanced low Z mike input (JENSEN transformer) •
Line input • Six point – three section equalization • External patch points •
Two cue sends • Two echo sends • Solo and mute • DUNCAN fader

Plus:

Full size lighted VU meters • Professional + 4 level in and out •
Built-in talk back • XLR connectors for all mike & line inputs, outputs, and echo •
Full 120 point balanced and normalized patch bay

And The Best Part:

It sounds good!

Built exclusively for AUDIO CONCEPTS INC. by QUANTUM AUDIO LABS.

AUDIO CONCEPTS, INC. / THE WESTERN DIVISION
7138 Santa Monica Boulevard • Hollywood, California 90046 • (213) 851-7172

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, 1/2-inch re-

orders (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.

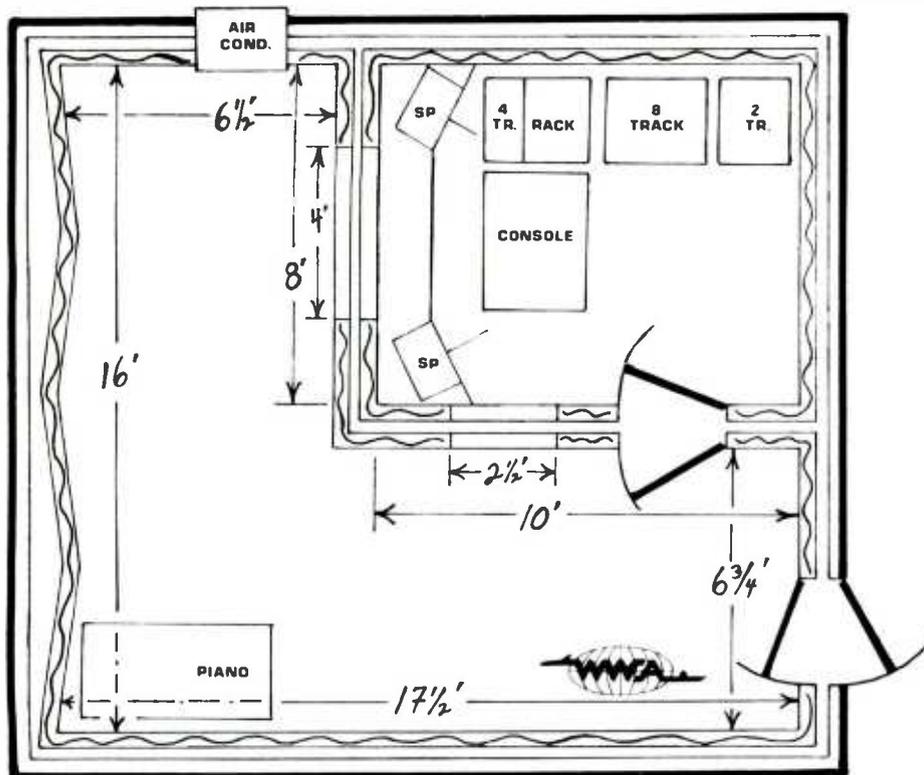
"In my opinion no 8-track is good enough for super demos, unless you are doing someone, say, a three piece combo, that just wants stereo drums, a guitar, a bass and a voice. Definitely 16-track is a must to step up into doing masters, and that's our goal. So, with the equipment we have, which we think 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.

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 consensus, 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."

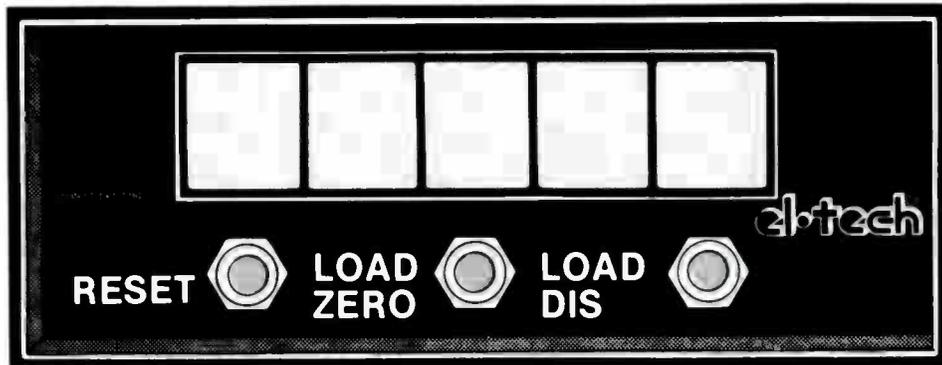
In continuing to discuss the very evident optimism about the future of the small studio business, it was the feeling, conveyed in any number of comments, that there was a cause and effect relationship working. It was reasoned that with a substantially larger number of smaller studios coming into existence,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



WORLDWIDE AUDIO
LAKEWOOD, CALIFORNIA

IF YOU'RE LOST

Everytime you search for program material on your tape machine? Let the El-Tech Take Finder find it for you!



'The Take Finder'

Shown Actual Size

Locating program material on tape machines has been a problem since the early wire recorders. To overcome this problem on expensive multi-track machines, manufacturers have recently provided a remote digital readout which indicates exact tape location. Unfortunately these readouts have not been available for most machines since they were designed specifically for these recorders. Now, the El-Tech Take Finder gives the owner of any tape machine a simple inexpensive tape location digital readout.

The El-Tech Take Finder indicates tape location on a large 5 digit L.E.D. display, which can be located up to 25 ft. from the tape machine. A small cable connects the display unit to a sensor which optically senses reel rotation. The sensor picks up reel rotation without any mechanical inter-connection by illuminating the edge of the reel and sensing the amount of reflected light. By placing small pieces of black tape on the reel edge light reflection will be interrupted as the marker passes under the sensor. The sensor is easily adjustable for any tape width which means you can use it on your 2 track, 16 track, or any type machine.

The display unit contains a memory for holding selected numbers and also gives a relay contact output when the memory and display equal. By connecting the relay output to the stop circuit of a machine automatic return to a memory number can be obtained.

Many hours spent searching tape can be saved with the Take Finder. The Take Finder allows you to find any position on tape without the hassels normally encountered.

Only \$349.95 from the following distributors:

El-TECH
112 17th St.
Knoxville, TN 37916
615-546-5509

Nashville Studio Systems
16 Music Circle South
Nashville, TN 37203
615-256-1650

The Express Sound Company
1833 Newport Blvd.
Costa Mesa, CA 92627
714-645-8501

and other professional sound distributors



patent pending

112 17th St. - Knoxville, TN 37916 - 615-546-5509

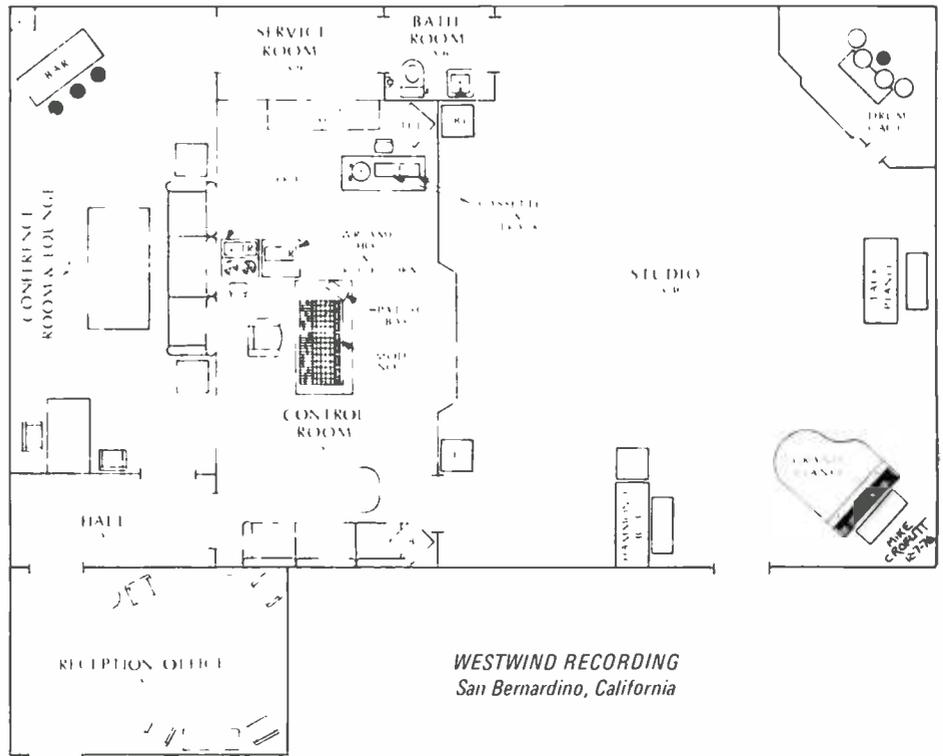
For additional information Circle No. 142

el-tech

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."

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 arbitrarily 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

SUPER SONIC... The Sound Workshop 840
A compact eight-in/four-out recording—P.A. mixing console of superior sonic and functional design. • For 4-track recording, sound reinforcement, and on-stage keyboard or monitor mixing. • Each input channel features full panning and track assign, monitor send, echo send, two band EQ, 28 dB trim control, mike and line inputs and direct recording outputs. • And of course its Sound Workshop quality with our two year parts and labor warranty.

Sound Workshop
PROFESSIONAL AUDIO PRODUCTS
1038 Northern Blvd., Roslyn, New York 11576 (516)621-6710

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 constant 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

dbx your Dolby "A" and eliminate ALL the hiss



with the new dbx K9-22 card noise reduction system

It's a direct plug-in replacement for the Dolby "A" CAT-22 card. It interchanges instantly with no adjustments. It gives you the flexibility to use both dbx and Dolby "A" formats with your existing Dolby main frame. It provides more than 30dB noise reduction and 10dB extra headroom. It eliminates the hiss which remains with Dolby "A". It gives greater than 100dB dynamic range. It requires no level match tones. It's affordable. It costs only \$250 per channel, or less than half the cost of a free standing noise reduction system. It can go wherever you go in its optional Halliburton travel case. It's the new world standard in noise reduction. It's available now from your dbx dealer whose name we'll supply along with complete product information when you circle reader service number or contact:

Dolby is a trade mark of Dolby Laboratories.

dbx

dbx, Incorporated
296 Newton Street
Waltham, Massachusetts 02154
(617) 899-8090

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 indispensable."

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-elp 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.

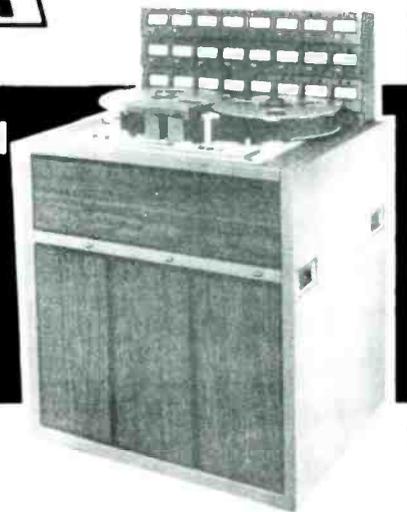
A/I/C is where it's at ---

MCI _ MCI _ MCI

MCI ... from AUDIO INDUSTRIES CORPORATION

a|i|c ... EXCLUSIVE sales and service

MCI ... factory trained technicians



** ... did you know, that all MCI recorders are first assembled, calibrated, QC'd and test-run at the factory before shipment ... then re-assembled, re-calibrated, re-QC'd and test-run again by AIC prior to customer delivery ... MCI / AIC twice the value!*



audio industries corporation

1419 N LA BREA AVENUE • HOLLYWOOD CALIF 90028 • TELEX 67-7363

Just One Call Does It! (213) 851-4111

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

Check
our

Multi-TRACK RECORDers

The goal of every studio owner is to have the most reliable recording equipment available, knowing well that "down time" because of equipment failure costs him money. We at STUDER proudly feel that we not only have the most reliable recorders but that we also have a service philosophy that other companies envy. Let us tell you about it.

Write or call, Willi Studer America, Inc., 1819 Broadway, Nashville, TN. 37203. Phone 615-329-9576, Telex 55-4453. In Canada, Sluder Revox Canada Ltd. Phone 416-423-2831, Telex 06-23310.

STUDER

a standard
of excellence.

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

Only 10 hours from opening crate to opening date

SON OF 36 GRAND is built because we spend 50 or more hours in factory check-out and growing performance. Our SON OF 36 GRAND starts with as soon as it's installed and the SON's record for reliability, flexibility and performance are your assurance that it will keep on working. Help on getting the substituting modules. And that 100 is built. Prices start at less than 18 thou for 16 in 16/24 out. See SON OF 36 GRAND in booth 8446 AES Convention

auditronics, inc.
Los Angeles
P.O. Box 12637
Memphis, Tenn. 38104
901/276-6338
Distributed at of the stores by WESTLAKE AUDIO Hollywood

61 CHANGES LATER SON OF 36 GRAND STILL LOOKS THE SAME.



after day, night after night,
after night... in recording studios... remote vehicles... sound reinforcement systems... radio and television studios... theaters...



When you consider "SON OF 36 GRAND," as we sincerely hope you will, either for a new project, or when you are considering

upgrading, you will be capitalizing on the reliability, as well as the operating experience of, perhaps, the largest club of owners of any single line of recording console equipment. There can't be anything iffy about your choice. We will be more than delighted to put you in contact with others whose requirements, similar to yours, have been satisfied by "SON OF 36 GRAND!"

...and, amazingly, prices still start at less than 23 thou for 16 in, 16/24 out... for a real pro-console...

we would be delighted to tell you more... please call -

auditronics, inc.
P.O. Box 12637 • Memphis, Tenn. 38104 • 901/276-6338

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 punch 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 transition 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 frequency 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

TWO FOR ONE



With the **Sound Workshop 220 Doubler/Limiter** you get two for one.

An **electronic delay** system capable of delaying audio signals from 5 to 40 milliseconds to give you 2 sounds from 1. 2 voices, 2 drum sets, 2 guitars, 2 anything.

And... a sophisticated **peak limiter** to add punch to your sounds, and keep a hold on your levels so you can keep a hold on your music.

Two for one—a doubler; a limiter. And of course it's **Sound Workshop** quality. We guarantee it. For 2 years parts and labor.

The **Sound Workshop 220 Doubler/Limiter** \$500.

bringing the technology
within everyone's reach

Sound Workshop
PROFESSIONAL AUDIO PRODUCTS

1038 Northern Blvd., Roslyn, New York 11576

(516) 621-6710

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 encode/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 system 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

MAKE IT WITH QCA

VOLUME LABEL PRESSING
CUSTOM PRESSING
JACKET DESIGN & FABRICATION
CUSTOM MASTERING (Neumann & Westrex 0)
EXCELLENT SERVICE

For information
call or write **JOE SLUDER**
2842 Spring Grove Ave.
Cincinnati, Ohio 45225
Phone (513) 681-8400

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 1 1/4" 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.

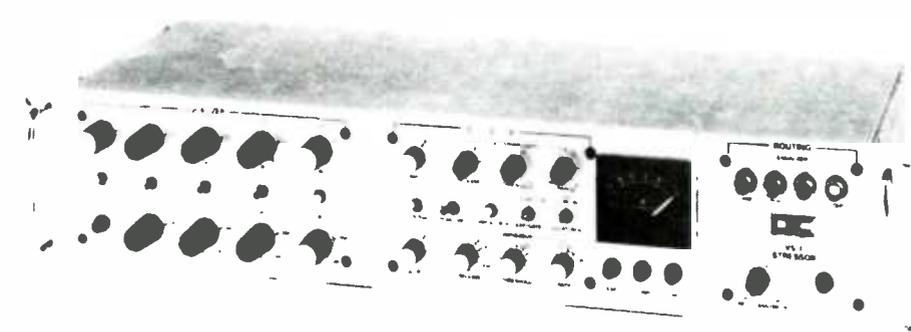
ACOUSTILOG, INC., 19 MERCER STREET, NEW YORK, N.Y. 10013 PHONE (212) 925-1365

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 bandwidth (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-



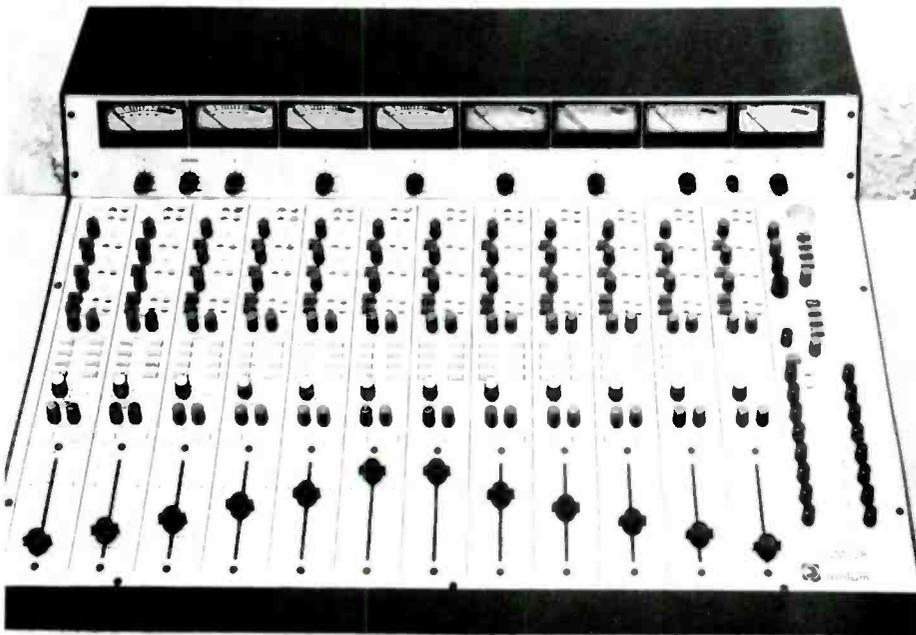
Magnetic Reference Laboratory

Whether you're using low noise or high output tape, with or without Dolby, from 1/4" to 2", 3/4 to 30 ips, you'll choose MRL . . . because only MRL guarantees every test tape they manufacture.

Their dependability and accuracy have made MRL the world wide choice of most major recorder manufacturers . . . and, after all, they would know what test tape is best for their recorders, they're the people who design and build them.

For full information, contact:
Magnetic Reference Laboratory, Inc.
229 Polaris Ave., Suite 4
Mountain View, CA 94043
(415) 965-8187

Exclusive Export Agent: Gotham Export Corp., New York, N.Y.



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-distortion, 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 1/2-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.



COMPLIMITER™



MODEL 610

Used in recording studios; disc mastering studios; sound reinforcement systems; TV, AM, FM broadcast stations to maintain a sustained average signal at a level significantly higher than that possible in conventional limiters, and with performance that is seldom attained by most linear amplifiers.

Rack mounted, solid state, new functional styling, the Model 610 is in stock for immediate shipment.

Specifications are available from:

SPECTRA SONICS

770 WALL AVENUE, OGDEN, UTAH 84404
(801) 392-7531



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 usage (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 removable front and back covers, ball corners and 3/2" 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 impedance microphone pre-amps as well as low noise wide range integrated circuits provide sonic performance unsurpassed in its 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.

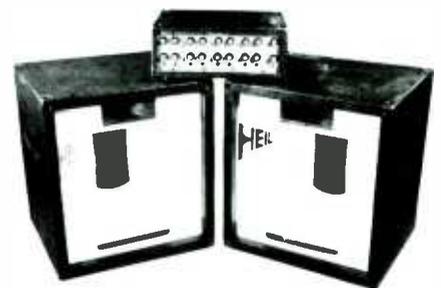
The Model 840 sells for \$800, and is covered by Sound Workshop's 2 year parts and labor warranty.

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, consistent 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.

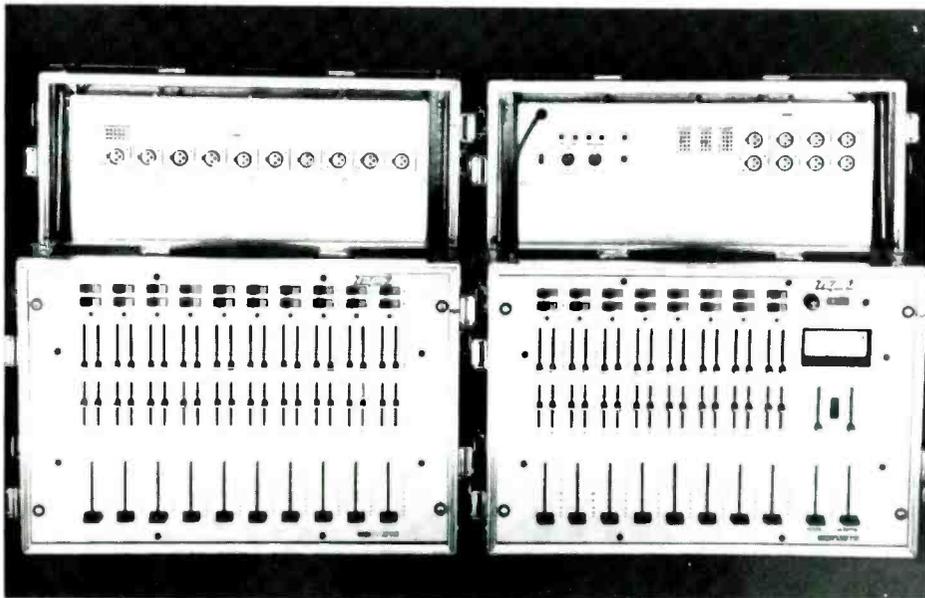
Sales Manager Professional Audio

responsible for US and Canadian sales of accepted and rapidly expanding line of tape noise reduction and signal processing systems to the recording and broadcast industries. Successful applicant will be a dynamic self-starter, equally able to sell face-to-face, and motivate reps and dealers.

Some recording studio background is required and actual engineering or mixing board experience is highly desirable. Knowledge of studio systems and field applications is helpful. Position requires up to 50% travel. Send resume including salary expectations in confidence to:

Larry Blakely, Director of Marketing, dbx, Incorporated, 296 Newton Street, Waltham, Massachusetts 02154.

An equal opportunity employer.



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, head-phone jack and level control, Phantom Power Supply for condenser 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 15 3/4 x 19 x 4 1/2 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 $\pm 7\%$ 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 1/4-inch and a four channel 1/2-inch. Mounting 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

An ALL MODULAR pro mixing board
 modular design for the 1980's
 all plug-in electronics for ease of service
 all electronics adjustments on front and rear panels

COMING ATTRACTION

LOFT MODULAR DEVICES
 SERIES 440 & 400

Active Crossover

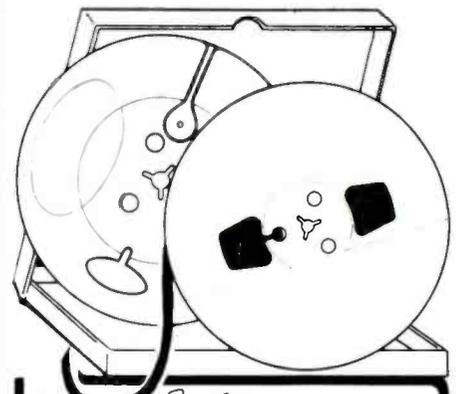
ALSO FEATURING

- Graphic EQ's
- Phasers-Flanger
- Limiters-Compressor
- Stereo Delay Line
- AND MORE

check out the details—

LOFT MODULAR DEVICES
 1715 S. Maple, Chanhassen, FL 33426, 201-466-1706
 Dealer Inquiries Welcome

For additional information Circle No. 170



complete supplies for reel to reel audio recording

- TAPE** AMPEX and Scotch all professional grades on reels or on hubs
- EMPTY REELS** all sizes, widths and hub types
- BOXES** for all reels, in various colors
- LEADER-,TIMING-& SPLICING TAPES**

Top Quality Competitive Pricing
 Immediate Shipment

Call or Write for Details/Prices
Recording Supply Co.

DIVISION OF POLYLINE CORP.
 1233 RAND RD. • DES PLAINES, IL 60016
 312/297-0955

For additional information Circle No. 171

**Your oscilloscope
can be a Real Time
Audio Analyser.
Add ARA-412.**

**ARA-412
Acoustic
Response
Analyser.**

Now you can perform Real Time Audio Analysis with just three things — (1) your dc oscilloscope, (2) a "pink noise" source, and (3) the new ARA-412. This unique, easy-to-use instrument permits you to test microphones, isolate cross talk, balance crossovers, check loudspeaker deficiencies, test tone controls, adjust equalization and much more. The ARA-412 is priced at **\$1,450.**

For additional applications, write for the free ARA-412 data sheet (FOB San Diego)

**COMMUNICATIONS
COMPANY
inc.**

3490 Noell Street
San Diego, CA 92110
Telephone (714) 297-3261

For additional information Circle No. 172



**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 15 3/4 x 19 x 4 1/2 inches.

Each input contains: level control, solo switch, 3-band graphic EQ, two monitor and one echo send controls, COMPGUARD 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 earphones, 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.

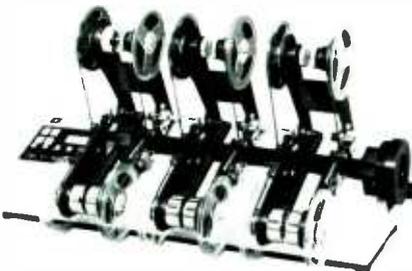
Back panel features: XLR type connectors for all balanced inputs and outputs, on/off switch for built-in phantom power supply for condenser microphones, external equipment jacks to inject signal processing equipment in to the Trouper system, echo send and receive jacks, individual subgroup outputs with 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

Dub faster



Dub easier

Garner Model 1056 updates your dubbing operation. Five 1200' professional copies in four minutes. Threads fast. Rewinds in 60 seconds. Single capstan drive and solid state electronics guarantee unvarying high quality. Priced low enough for quick payout. Write for brochure and names of users.

For additional information Circle No. 173



GARNER INDUSTRIES
4200 North 48th St.
Lincoln, NE 68504
Phone 402-464-5911

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

The newly introduced 8-track, 8-channel machine that utilizes 1/2-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 1/2-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, in-

cluding 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 POLYPHONIC 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

For additional information Circle No. 176



CLASSIFIED ADVERTISING RATES

Prepaid* with submitted copy:
.... \$40.00 per column inch
(2 1/4" x 1")
(One inch minimum, 4 inches maximum. Space over 4 inches will be charged for at regular display advertising rates.)

*If billing is required add 20%, \$8.00 per inch.

BOOKS

MICROPHONES: DESIGN and APPLICATION . . .

by Lou Burroughs

A practical, non-theoretical reference manual for those involved in the application of microphones for recording, TV, motion pictures, sound reinforcement.

Hardcover \$20.00

R-e/p BOOKS
P.O. Box 2449
HOLLYWOOD, CA 90028

HANDBOOK OF MULTICHANNEL RECORDING

by F. Alton Everest

320 pages 201 illustrations
The book that covers it all . . . a comprehensive guide to all facets of multi-track recording . . . acoustics . . . construction . . . studio design . . . equipment . . . techniques . . . and much, much more.

Hardbound \$10.95 Paperback \$7.95

send check or money order to:

R-e/p BOOKS
P.O. BOX 2449
HOLLYWOOD, CA 90028

SOUND SYSTEM ENGINEERING

by Don & Carolyn Davis

296 pages 8 1/2 x 11

Hardbound \$19.95

R-e/p BOOKS
P.O. Box 2449
HOLLYWOOD, CA 90028

SERVICES

PROFESSIONAL MONITOR TUNING

Even the finest control room designs require speaker line tuning for accurate response. Milam Audio uses only the finest Real Time Equipment to read and correctly perform monitor tuning. For information contact:

MILAM AUDIO CO.
1504 N. 8th Street
Pekin, IL 61554 (309) 346-3161

EQUIPMENT

ONE STOP FOR ALL YOUR PROFESSIONAL AUDIO REQUIREMENTS
BOTTOM LINE ORIENTED
F. T. C. BREWER COMPANY
P.O. Box 8057 Pensacola, Florida 32505

FREE CATALOG & AUDIO APPLICATIONS



CONSOLES
KITS & WIRED
AMPLIFIERS
MIC, EQ, ACN,
LINE, TAPE, DISC,
POWER
OSCILLATORS
AUDIO
TAPE BIAS
POWER SUPPLIES

OPAMP LABS, INC.
1033 N SYCAMORE AVE
LOS ANGELES, CALIF 90038
(213) 914-3560

For additional information Circle No. 177

Now Precise Audio Bandwidth Control

Models 555 and 556 are active cutoff filters that adjust audio bandwidth. They can be used for special effects: to improve loudness, for noise reduction, disc mastering, tape duplicating, re recording, and driver protection in high power PA systems. The filters are 18 dB octave state variable type, continuously tunable. The low end adjusts from 20 Hz to 200 Hz, high end from 2 kHz to 20 kHz. Model 555 is single channel, 556 is dual ganged. Each is half rack size with built in power supply. Available from your UREI dealer.



11922 Valerio Street, No. Hollywood, Calif 91605
(213) 764-1500
Exclusive export agent
Gotham Export Corporation, New York

Erase faster



Erase cleaner



Erase easier



Garner Erasers cut man-hours spent erasing audio and video tapes. Simple, safe continuous belt operation gives you "hands-off" professional erasures in only four seconds. Handles up to 10 1/2" reels, cartridges, and cassettes. Acclaimed by major users, yet priced low enough for the smallest studio or station to afford.



GARNER INDUSTRIES
4200 N. 48th St.
Lincoln, NE 68504
402-464-5911

For additional information Circle No. 178

For additional information Circle No. 179

EQUIPMENT

NEW . . . Spectra Sonics Quad Joystick Model 904-P, new cost \$182.00, will sell for **\$120.00**
AAA TAPE SUPPLY CO.
 1214 Page Av., Jackson, MI 49203
 (517) 787-4020

OTARI . . . come in and audition the new line of "Sensible Alternatives" to the ranks of Professional Tape Recording. 1/4"/mono through 1"/8.
MIDWEST SOUND
 4346 W. 63 St., Chicago, IL 60629
 (312) 767-7272

Direct Box

Professionally Built for
 Studio & Road Use

- Unique AGS Automatic Grounding System
- Twin Faraday shields kill hum and buzzes
- Accepts all levels, pickup to 1000-W amp
- Switchable filter for "miked speaker" sound
- Won't change the sound of your instrument
- Diecast, engraved box; shock-mounted switches
- One year warranty

\$59.95

Ask about our snakes, cables and other "goodies in little black boxes."



Windt Audio Engineering
 13026 Saticoy St., No. 4A
 N. Hollywood, CA 91605
 (213) 768-0100

For additional information Circle No. 180

EQUIPMENT AVAILABLE

DYMA builds roll around console mounts for any tape recorder. DYMA builds beautiful studio cabinetry.
DYMA
 Box 1697
 Taos, NM 87571

SMALL 4-16 TRACK STUDIOS

Detailed technical assistance + acoustical consultation, from our engineering division to our clients - either here or via phone & included FREE.
 +
 Tascam Warranty Service Station + Sales
 Sonic Engineering Lab, 11 1/2 Old York Road, Willow Grove, PA 19090, Phone (215) 659-9251.
The Only One

ELECTRODYNE MIXING CONSOLE

16 in / 8 out - perfect condition
 6 years old
 originally sold for \$28,000, selling for \$6,000
 Call: (809) 722-0390
VINNY

WHITE BOX RECORDING TAPES

Scotch 201-1200'x1/4"--@\$0.75 per roll per 100; Scotch 202-1800'x1/4"--@\$1.00 per roll per 100; Scotch 206-1200'x1/4"--\$1.50 per roll per 100; Scotch 207-1800'x1/4"--\$2.00 per roll per 100; 1/4", 1/2" and 1" also available on hub in bulk, w/wo box. Write/call:
AAA Tape Supply Co.
 1214 Page Ave.
 Jackson, Mich. 49203
 (517) 787-4020

3M Series 400 M-23 8 Track Tape Recorder, 6 years old, replaced heads (minimal wear), very good condition. Specifications and pictures upon request \$6,500.

(8) Dolby 361-A noise reduction units. Excellent condition \$600 each.
 call
 W. Ramsey, (512) 478-9294

HIGH INTENSITY turned sound reinforcement + disco + 4-24 track studios, including narrow band (5 Hz!) feedback and ring mode suppression, detailed regenerative response environmental equalization ±1 dB at your ears, room design/measurement/treatment, 15% articulation loss of consonants, our 18 dB computer designed crossovers and enclosures. 1000's of customized and expandable professional products including: splayed fiberglass horns, consoles, comp/rms/peak limiters, continuously variable electronic crossovers, digital/acoustic/analog delays, omnipressors, flangers, reverb, echo, doubling, tripling, p.a. noise reduction, piezo transducers, frequency shifters, notch filters, etc. All shipped prepaid + insured. Sonic Engineering Labs, 11 1/2 Old York Rd., Willow Grove, Pa. 19090, (215) 659-9251.
 +Anechoic Chamber+
 Inventors/Engineers

MCI Now the best selling multi-track recorder!

MCI . . . only from **AUDIOTECHNIQUES, Inc.** in the great northeast!

Tape recorders from one to 24 tracks -

Recording consoles up to 40 inputs -

MCI sales - service, factory trained technicians. Studio Design and construction service.

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

MCI . . . The finest name in Audio Recorders and Consoles, now offers 1 to 24 track Master recorders and up to 40 in, 40 out Automated Consoles. For Midwest Factory representation contact:
MILAM AUDIO CO.
 1504 N. 8th Street
 Pekin, IL 61554 (309) 346-3161

New York's leading dealer specializing in Semi-Pro and Professional Recording and P.A. Equipment. Teac, Tascam, Sound Workshop, Nakamichi, DBX, MXR, Dynaco, ADS, Frazier, Eventide, Electro-Voice, Shure, Scotch, Maxell, and more. We go both ways: Lowest prices in sealed factory cartons, or complete laboratory check-out and installation. All equipment on display.

AUDIO BY ZIMET
 1038 Northern Blvd.
 Roslyn, L.I., New York 11576
 (516) 621-0138

Check Audiotechniques First

. . . FOR NEUMANN

We're one of the nation's largest Neumann dealers. Our microphone specialists can recommend the Neumann mikes best suited to your requirements.



NEUMANN MICROPHONE SALES AND RENTALS

audiotechniques, inc.

142 Hamilton Avenue, Stamford, CT 06902 Telephone: 203 359 2312

SPECTRA SONICS 24/24 -- a great board-- 24 in, 24 out, the current model with all the options plus the producer's desk. We bought it in January 1976 and doubled our gross, tripled our net. Selling to buy a Harrison 4032. If you want a Harrison and can't afford it, buy our Spectra Sonics at a big savings and let it earn a Harrison for you. Call for information:
DIFFERENT FUR MUSIC
 (415) 864-1967

SPECTRA SONICS custom console 16 x 16, 32 pan pots. Currently in use. Good, quiet board \$11,000 or best offer.
5th FLOOR RECORDING
 (513) 651-1871



Scully 280 add-ons . . .
 Accepts a pair of Dolby 361s or any 19" x 3 1/2" electronic panel. Only \$49.95 FOB Bridgeport. Send check with order.

Rus Lang Corporation

247 Ash St., Bridgeport, CT 06605
 Telephone: 203 384 1266

New and Used MCI RECORDERS and CONSOLES

. . . from the South's **LARGEST** dealer of professional audio equipment . . .

AUDIO CONSULTANTS, INC.
 7 MUSIC CIRCLE NORTH
 NASHVILLE, TN 37203
 (615) 256-6900

AUDIO CONSULTANTS, INC./DALLAS
 1903 APOLLO
 RICHARDSON, TX 75081

For Sale
COMPLETE 8-TRACK CONTROL ROOM SET-UP: 8-track MCI recorder, 2 track Ampex, 20 x 8 Gately console \$7,500 (also, 4 track MCI available)
BOB SMITH
ROOSTER BARK STUDIOS
 1331 N.E. 119 Street
 Miami, FL 33161
 (305) 891-1206

VERY CLEAN AND HIGHLY MODIFIED AMPEX 1100's/1200's 24 TRACK MACHINES

These are ultra machines with unusual factory installed mods - better than new.
SUBMIT OFFER
 Dept. HG
 c/o R-e/p, Box 2449
 Hollywood, CA 90028

FOR SALE: One 3M-M64 2 track recorder, 15-30 ips, absolutely brand new condition.
 If interested, call Alan Kubicka or Cleon Wells at --
CHICAGO RECORDING
 (312) 822-9333

URIE, Sennheiser, Crown, Emilar, Cetec, Yamaha, Otari, Shure, AKG, etc.



P.O. Drawer 1923 150 N. Hull St.
 Athens, Ga. 30601 (404) 353-1283

PINK NOISE TAPES

Equalize with professional accuracy.
 1/3 octave bands ±1 dB 31.5 Hz - 16 kHz
 15 ips at OP. level (185 nWb/m \$28 ppd
 7 1/2 ips at 10 dB below OP. level \$23 ppd
 Both 1/4" 2 track. STATEX, Audio Div.
 Box 5334-X, San Antonio, Texas 78201
Quality Products Since 1929

WANTED used CHAMBERLAIN
 call collect
Dennis McMurrin
 (319) 366-4525

TRACKS!! The complete semi-pro recording center. Get our low prices on TASCAM, TEAC, NEOTEK, MULTI-TRACK, DBX, MXR PRO, SHURE, BGW, TAPCO and many others. Complete studio packages available.

TRACKS!! from
DJ's MUSIC LTD.
 1401 Blanchan
 La Grange Park, Ill. 60525
 (312) 354-5666

For Sale
 One Tascam Series 70 1/2" - 8 track, in console, complete
 One Teac Series 7030 GSL 1/2" - stereo in console, complete
 One Model 10 Tascam Board, 13 in/4 out, all modules, complete
 One BX 10 AKG Reverb
 One Console for Model 70 Tascam Series
STUDIO EXPANSION, PRICED FOR QUICK SALE
JESTER SOUND STUDIOS
 423 KUHLMAN LANE
 BILLINGS, MONTANA 59101
 (406) 245-2174

For Sale
 2 Electro-Voice SENTRY III studio monitors with equalizer . . . \$1150/pair. 2 MB-520 condenser microphones . . . \$300/pair.
 1 Blake McDonald stereo line amp . . . \$75.
OMEGA AUDIO
 (214) 226-7179

(616) 452-1596
Your Direct Line To the finest

PROFESSIONAL AUDIO EQUIPMENT

We represent, stock, sell and SERVICE

only the best names such as:

- | | |
|---------------|----------------|
| Ampex | Pulse Dynamics |
| Beyer | Ramko |
| Cetec | Revox |
| Crown | Russco |
| dbx | Scully |
| Edcor | Sennheiser |
| Electro-Voice | Shure |
| Edital | Sony |
| Fidelipac | Soundcraftsmen |
| LPB | Spotmaster |
| Marti | Switchcraft |
| Micro-Track | TEAC |
| Nagra | Tascam |
| Neumann | UREI |



AUDIO DISTRIBUTORS, INC.
 2342 S. Division Avenue
 Grand Rapids, Michigan 49507

TRADES WELCOME
Anything That Doesn't Eat
 Lease Plans Available

a+r presents . . .

"THE PACKAGE"

- 1000 Pure Vinyl 45 RPM Records.
- Labels—Black & White at this Price.
- All Metal Parts & Processing.
- Mastering by Dick McGrew using Neumann VMS 70 Lathe and SX 74 Cutter.
- Guaranteed Delivery.

COMPLETE PACKAGE . . . \$19900

(FOB DALLAS)

DELIVERY GUARANTEE

A + R Record Manufacturing Corp. guarantees that for everyday your order is delayed past our promised shipping date we will give you 50-extra records at no additional cost.

Call Toll Free for more information.
 800-527-3260

a+r record manufacturing corp.
 902 N. Industrial Blvd
 Dallas, Texas 75207 (214) 741-2027

For additional information Circle No. 182

For additional information Circle No. 183

Heart Transplant



Tape Recording Electronics

Modern recording capability for new or old recorders. 2-speed EQ, separate EQ for optional SYNC amp. "Linearized" record amp and phase-corrected reproduce circuitry. Fully remotable. Pin-compatible with most Ampexes, adaptable to many others.

Model 375, \$690.



1630 Dell Avenue, Campbell, CA 95008 (408) 374-8300

85% Of Our GRADUATES ARE WORKING IN THE RECORD/MUSIC INDUSTRY

It's not by chance that the College for Recording Arts is fully accredited by the National Academy of Recording Arts and Sciences Institute.

It's because our curriculum has one main purpose: to prepare you for a Music Industry job. Our graduates got jobs because they were persistent and didn't give up. And because they gained enough experience to be immediately valuable to a potential employer. This is what the College for Recording Arts is all about.

You'll learn from professionals who are active in the Music Industry.

You'll learn by experience in our many studios: a 16-track studio, a radio broadcast studio, a disc mastering studio with the latest Neumann disc mastering system, and a separate 8-track studio with one of the most sophisticated synthesizer systems available today.

You'll learn the principles of Audio Engineering, Music Production, Music Law, Music Business and Finance, Studio Electronics, Disc Mastering, and Electronic music synthesis.

If you are seriously interested in starting a career in this industry, and have the desire to work hard for it, call or write for our Catalog.



College for Recording Arts
665 Harrison Street
San Francisco, California 94107
(415) 781-6306

SEMESTERS BEGIN OCTOBER, FEBRUARY, AND JUNE.

CUTTERHEAD REPAIR SERVICE
For all Westrex, HAECO, Grampian heads
Modifications done on Westrex. Avoid
costly down time. Maximum 3 day turn
around upon receipt. Details:
**INTERNATIONAL CUTTERHEAD
REPAIR**
222 W. PALISADES BL., PALISADES
PARK, NEW JERSEY 07650
(210) 461-8658

STAGE and STUDIO AUDIO EQUIPMENT
Turn-Key Design, Permanent, Mobile
Wiring/Switching Networks, Flight Cases,
Component Sales: AKG, BGW, dbx, Otari,
SAE, Sennheiser, Shure, Soundcraft, Sound
Workshop, Tascam, UREI.

MIDWEST SOUND
4346 W. 63 St.
Chicago, Ill 60629
(312) 767-7272

For Sale
MCI 528 RECORDING DESK
Perfect condition, factory maintained.
Custom Meter Panel w/phase meter.
\$46,000
CRITERIA RECORDING STUDIOS
1755 N.E. 149 Street
Miami, FL 33181
(305) 947-5611

EXCELLENT EQUIPMENT
1 - MCI JH-416 Console \$12,500
1 - 3M M-56 8-track with full remote \$7,500
1 - AMPEX AG-440B-4 \$3,500
1 - UREI 527A Graphic \$600
1 - AKG BX20E, perfect condition \$2,850
1 - AKG D224E \$130
1 - dbx 157 \$450

ABADON - SUN
P.O. Box 6520
San Antonio, TX 78209
(512) 824-8781

PRO AUDIO EQUIPMENT AND SERVICES

Custom touring sound, 2-, 4- and 8-track studios, disco systems. Representing Akai, AKG, Altec, Beyer, BGW, Cetec, Cerwin-Vega, Community Light & Sound, dbx, Dynaco, Dokorder, E-V, Gauss, Lamb, Langevin, 3M, Martex PM, Maxell, Meteoc, Russound, Revox, Sennheiser, Shure, Sony, Soundcraftsman, Sound Workshop, Spectra Sonics, Switchcraft, TDK, TAPCO, TEAC, Technics, Thorens, and more. Offering these professional services: custom cabinet design, room equalization, loudspeaker testing, custom crossover design, electronics modification, and custom road cases. Call or write for quotes, or drop us a line for our latest catalogue.

K&L SOUND
75 N. Beacon Street
Watertown, Mass. 02172
(617) 787-4073
(Att: Ken Berger)

FOR SALE
AKG BX-20 E Stereo Reverb.
Excellent Condition
\$2,500 or Best Offer
call APPALACHIA SOUND
(614) 663-2544

LOW \$\$\$
AMPEX 440B (2), SCULLY 280-2 14", T.T.'s QRK(2) + SP 1300 (2), MARTI LIMITER CLA-40H (3), SPARTA MIXER AS-30B, BELAR SCM-1, and more!!
contact
MEDIA
G.C.S.
Box 2776
NYC 10017

FOR SALE
MCI JH-416 Recording Console, 16 inputs/16 outputs, wired for 24. Stereo-Quad.
EXCELLENT CONDITION - \$15,000
or best offer
call APPALACHIA SOUND
(614) 663-2544

For Sale:
1 - LANGEVIN AM-4, 8 in 4 out audio console, with producer's desk in good condition, with some spares \$3,000
1 - LANGEVIN AM-3, 8 in 2 out audio console, with Orban/Parasound reverb, patch bays, and cabinets, with some spares - mint condition \$2,000
Thomas W. Bethel
Director of Audio Services
Oberlin College
Oberlin, Ohio 44074
call - (216) 775 8272

EMPLOYMENT

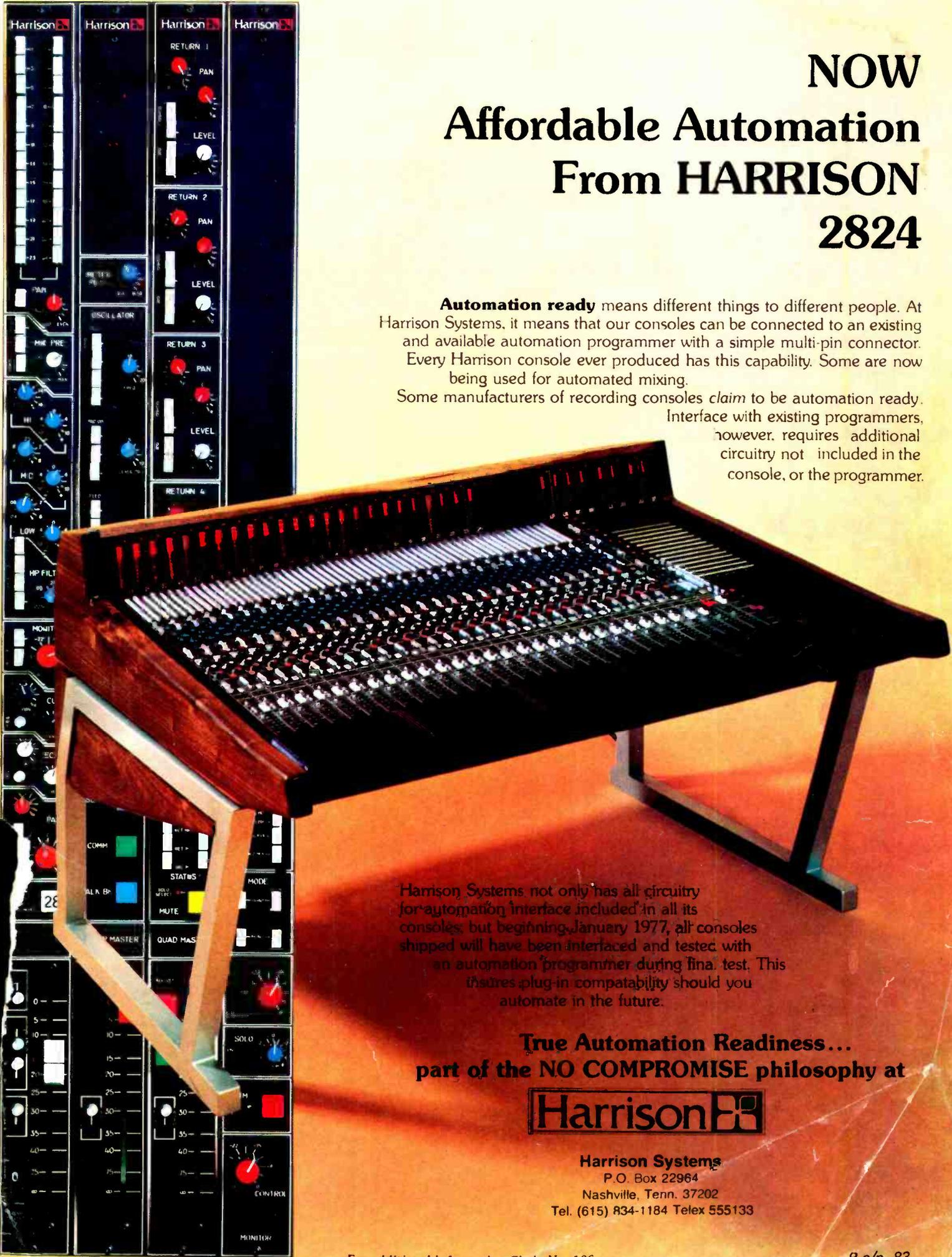
POSITION WANTED
Recent B.S.B.A., Magna Cum Laude, former pro-musician (Berklee alumnus), Syn-Aud-Com grad, currently running small studio (4 - 8 track) desires work in large metropolitan area. Resume available upon request. Contact:
RICK DEVANEY
1200 BAXTER STREET
JOHNSON CITY, TN 37601
(615) 929-8715

NATIONAL SALES MANAGER
Manufacturer of high quality stereo equipment is seeking a young, aggressive individual to plan, implement and manage its sales program.
Applicants must have proven record of Sales and Management abilities in the consumer electronics field.
Submit resumes in confidence to:
Box RU, c/o R-e/p
P.O. Box 2449
Hollywood, Ca 90028

NOW Affordable Automation From HARRISON 2824

Automation ready means different things to different people. At Harrison Systems, it means that our consoles can be connected to an existing and available automation programmer with a simple multi-pin connector. Every Harrison console ever produced has this capability. Some are now being used for automated mixing.

Some manufacturers of recording consoles *claim* to be automation ready. Interface with existing programmers, however, requires additional circuitry not included in the console, or the programmer.

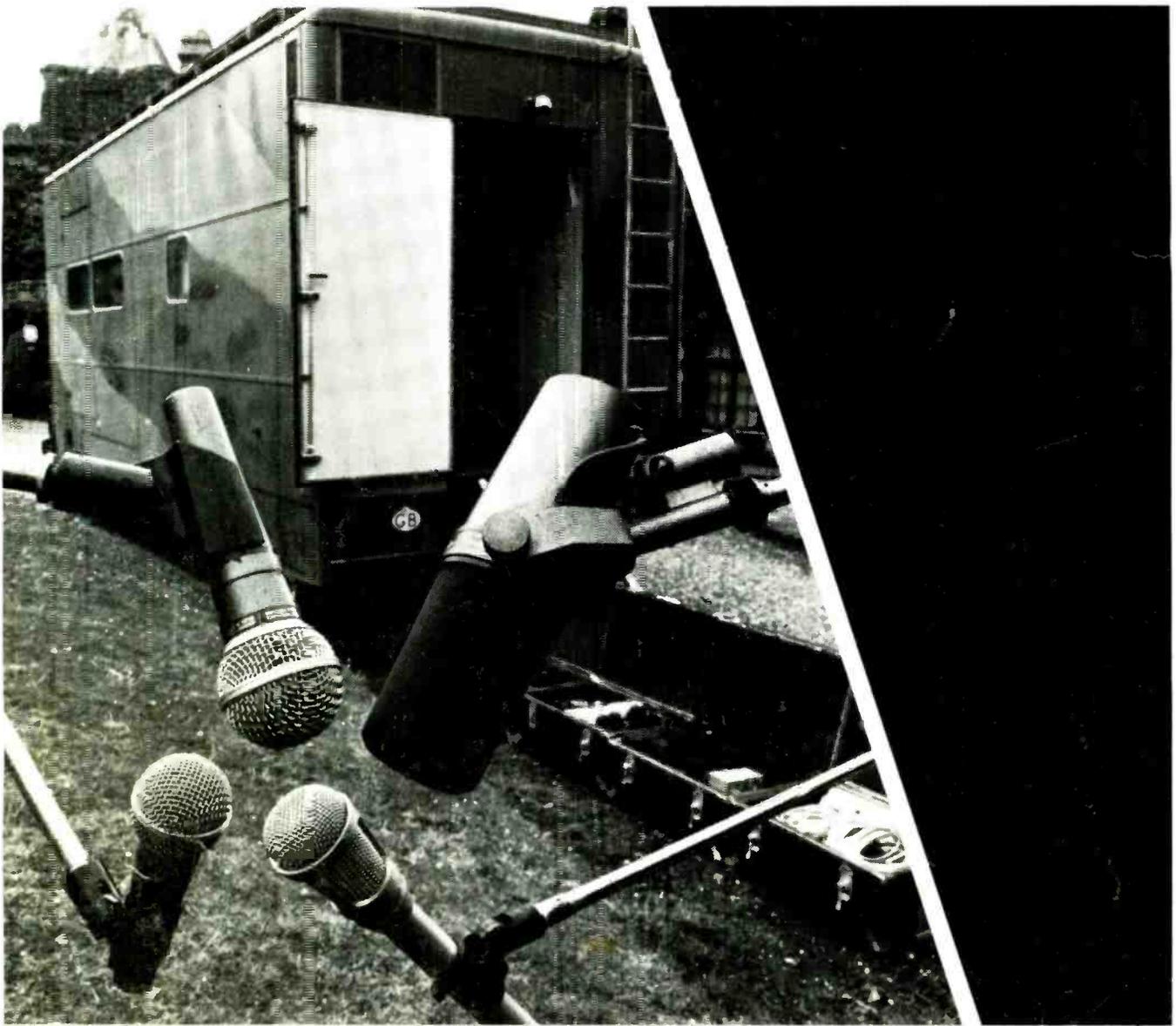


Harrison Systems not only has all circuitry for automation interface included in all its consoles, but beginning January 1977, all consoles shipped will have been interfaced and tested with an automation programmer during final test. This insures plug-in compatibility should you automate in the future.

True Automation Readiness...
part of the **NO COMPROMISE** philosophy at

Harrison 

Harrison Systems
P.O. Box 22964
Nashville, Tenn. 37202
Tel. (615) 834-1184 Telex 555133



Stones' Rolling Studio



A complete recording studio in a van? For Mick Jagger, it is almost a necessity. Mick and the Stones can be inspired to produce their next hit anytime, but when they're on tour or on vacation, the best recording studios aren't always around the corner. The Stones rely on their Shure-equipped mobile studio for the unmatched recording perfection they insist upon for these moments of midnight inspiration. Whether in a recording session or on stage, the Stones' SM7, SM58, SM82, SM53 and SM56 microphones are their assurance of consistent quality and natural sound.

Shure Brothers Inc.
222 Hartrey Ave., Evanston, IL 60204
In Canada: A. C. Simmonds & Sons Limited



Manufacturers of high fidelity components, microphones, sound systems and related circuitry.

For additional information Circle No. 187