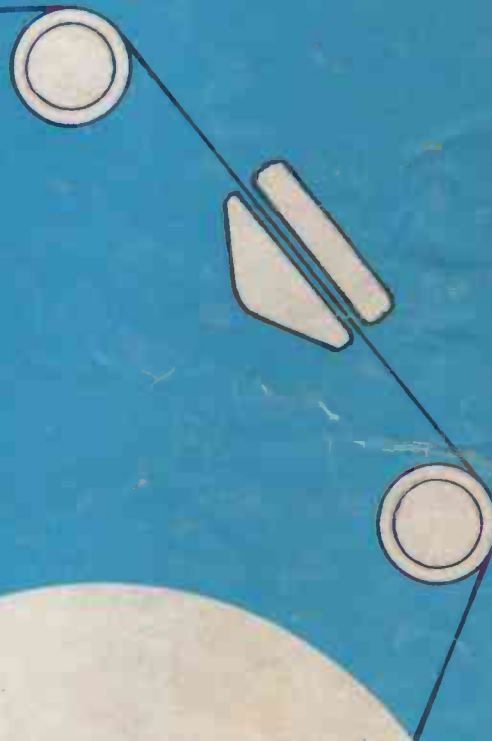


RECORDING engineer/producer

relating recording science • to recording art • to recording equipment



in this issue . . .

SPECIAL FEATURES:

RECORDING FORUM

the trend toward self-production

THE SYNTHESIZER

. . . is it the ultimate musical weapon?

P17

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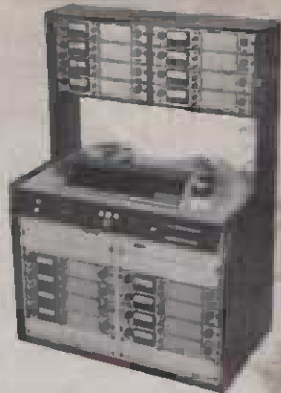
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Rather, it is more a case of hoping that you can identify with the purpose and earnestness of our effort to publish an extraordinary magazine devoted to the ART, SCIENCE and EQUIPMENT of recording.

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Re/p will be delivered to you on a controlled circulation basis, gratis, every other month during the remainder of 1970. Much of our decision to increase frequency for 1971, to regular monthly frequency, will be made on the basis of your responsiveness to Re/p. We are hopeful that your reaction to Re/p will encourage the volume of advertising necessary to support regular monthly frequency . . . without reduction in editorial quality or fewer number of pages per issue.

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MG



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RECORDING

engineer/producer

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RECORDING FORUM

Part I

The Trend Toward Self-Production

by: Pete Senoff

PARTICIPANTS: Phil Spector, Elliot Mazer, Gabriel Meckler, Dave Hassinger, Denny Cordell, Ian Anderson, Leon Russell

Getting together a studio session encompasses, among other things, such "necessities" as the producer, engineer, and, of course, the artist. It's been that way since the beginning of the recording studio concept and on paper, seems destined to be a generally-necessary formula.

But a trend has been developing of late, notably from England, that hinges on the concept of negating the role of the producer and investing more creative/production control to the artists . . . the groups. And a distinction between "groups" and "artists" is vital here, in that with a group . . . an assemblage that numbers anywhere from two to eleven members by today's standards . . . you're dealing with myriad personalities, egos, and opinions, while the solo artist has views that may or may not coincide with those of his producer. But it's still a 1:1 ratio; not so with the group concept.

ANDERSON

IAN

An English group that's abandoned the use of an outside producer is Jethro Tull, a four-man rock-jazz unit that seems not to have suffered from lack of a producer. They are one of THE most successful "underground" groups in the pop world, finishing second only to the Beatles (and ahead of The Stones) in popularity polls in both Britain and America. All production work is handled by the group's lead singer and instrumentalist, Ian Anderson . . . a 22 year old London Art School graduate. As Anderson sees it:

"Actually, a producer wouldn't do us much good. His job is basically as an organizer; like a foreman in a shop.

He kind of gets the thing together. He says break for tea and all that rot. He's someone who makes up for the deficiencies in young musicians, by simply saying "do this" or "do that" at a certain time. He knows sounds and how to work the board.

"But I don't think he'd work in our case. That's my job; to know the sounds and how they should be. It's not that I think I can do it better than a producer would, but I know what I'm doing now and so does the rest of the band. We know the sounds we want and how to make them."

Not that Jethro Tull is just a "sound-making" unit. Their music spans the divide between soothing Bachian "Bourees" and hard rock, with no apparent production failings in the offering.

But Anderson brought up one of the dominant viewpoints of the "drop-the-producer" clique: groups who've been together for a number of years feel that they know their sound well enough and know what they want out of their sound, to do the work themselves. To them, an outside producer would not only be superfluous, but potentially obstructive. They want to run the studios themselves.



.... PHIL



SPECTOR

A proponent of just the opposite opinion is producer-extraordinaire Phil Spector, who has always felt it necessary to control the actual recording. After a two-year retirement, Spector has re-emerged on the recording scene, producing an album for the Checkmates, Ltd, and a single for John Lennon; both, needless to say, incorporating the same studio philosophy that he employed dur-

ing his string of hits for such artists as the Ronettes, Ike and Tina Turner, and The Righteous Brothers.

"I've always had one particular thing," says Spector, "and mine is to control the recording session and to control everything; so that the people involved in doing everything else are free to do so. They shouldn't be bothered about how it sounds, if it's coming out right, etc. Their job is to do what they're supposed to do and my job is directing. That's really what it amounts to. It's the same as a director in motion pictures, but that job is called producing in the record industry.

"With groups today . . . I don't know how smart it is to work without a producer, but I guess if you know what you want to do . . . See, today's groups might have a good sound or a good idea and they'll go ahead and produce it themselves. But if you listen to the records, they're not what you'd call produced records . . . they're just records. A lot of the groups today don't really know what they're doing. When you have so much junk out there today, it's easy to throw your stuff in. And all the engineers today are geared to hit-sounding records and they listen, but . . . it's just like throwing records against the wall. I mean, if you knew how many records come out each week . . . it's about 400 to 500; so you can see the ratio with that many coming out and so few are hits. There's a lot of bad records out now."

Spector brought up one of the main counterpoints against self-production; lack of objectivity. The essentialness of an outside decision or opinion.

RUSSELL

LEON

This view was emphasized by singer-composer Leon Russell, a former sessionman for such people as Spector, Delaney & Bonnie Bramlett, and Joe Cocker. Russell's recently-released solo album, in fact, employs the same producer he worked with on the Joe Cocker sessions: Englishman Denny Cordell.

"I've always, before I came into contact with Denny, wished I had someone I could consult with for a split-second decision . . . someone who's judgement I could trust," Russell commented. "Just from the standpoint of I didn't want to screw around and have to hear the tape when it was time to make another one. A good strong "yes" or "no" will save five minutes when there's only six minutes to do it in. But that's just me . . . other production situations warrant different attitudes."



DENNY CORDELL

Cordell, on that same point . . . pending lack of objectivity, said: "I'm not even qualified to answer that, never having been a member of a group. I've never understood my function as a producer, anyway. I've just gone in and tried to get it together. My ambition is to help everybody realize their ambitions . . . no more."

MAZER

ELLIOT

Elliot Mazer, producer of such people as Gordon Lightfoot, Area Code 615 and Linda Ronstadt, is someone who's served as a member of a recording group . . . during the Area Code 615 sessions. But his views mirror essentially the same sentiments as Spector and Cordell, in respect to that issue of objectivity.

"Sometimes there is and sometimes there isn't that objectivity. I heard one record done recently by a very good band . . . one of the best. I think they're from England. They had some big records before this particular project; some well-produced records from one of the better English producers. But that was before they wanted to produce their own album. This first self-produced album has about four good tunes; playing, sound, and arrangement all are quite good. But the rest of the album is kind of suffering. And I feel that the lack of strength of the entire record can be attributed to that lack of objectivity. Or maybe a lack of the basic skill or basic understandings of what an album is. It's very hard to say. Sometimes a producer, by sheer nature of his task, should be a totally objective individual. It works sometimes and sometimes it doesn't. A lot of my artists are close friends and trying to talk to them to change their music because it might be better for the record or the market is sometimes very difficult. It's another one of those give and take situations."



. . . . GABRIEL

MECKLER

Another aspect of the drop-the-producer movement is the monetary situation, as suggested by Gabriel Meckler, producer of such sure best-sellers as Steppenwolf and Three Dog Night and who recently formed his own production company.

"I think it's a bad mistake on the part of the groups," Meckler said. "It's either an ego game or it's, in many cases, just a desire to make more money. Because I still think the most common thing among all those so-called beautiful people is the idea of making a lot of money and very fast. Those who make it think less about it than those who don't."



MECKLER

"But I don't know what other producers really do; I just know what I do. I'm not a producer . . . I don't know what that word really means. I'm more of a . . . film director, I guess. I do the same sort of things as a film director.

"I think groups definitely should have a producer. They should definitely take a lot of time and effort to find that particular person who really gets into what they're doing and really understands what they're doing.

continued

HASSINGER

DAVE

Dave Hassinger, a successful engineer-turned producer, draws some parallels among other groups and their producers.

"Why do the Rolling Stones have a producer? They tried to produce themselves, then they got Jimmy Miller . . . and he's done a great job with them. The relationship seems to work. Why have the Beatles kept George Martin? I could keep naming groups.

"But then some groups come along and say they know their sound. And they don't! They just want more freedom to experiment in the studio . . . at from \$75 to \$100 an hour in that studio. That's pretty expensive experimenting.

"There are some artists who can produce themselves. They know what they want and they can produce their sound; quickly and effectively. They don't go into tangents in the middle of everything and become befuddled and confused and so forth. But the groups that can produce themselves are few and far between.

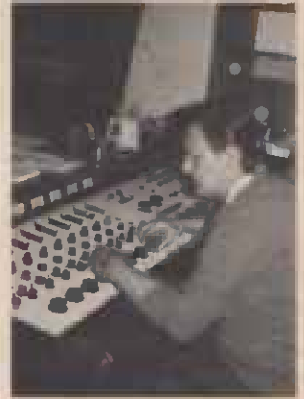
"I think one of the functions of the producer is to help the group produce something that the public will like. To just take a group in and allow them to "do their thing" is really a pain in the ass. I think the producer should help the artist or group do their thing. Maybe it comes down to this: maybe you shouldn't sign an artist that wants to do its thing without listening to anybody else. The job of the producer is to see if he can help the artist get what he wants. But when the artists become confused . . . and you can tell when this happens and they don't know what they want. Like sometimes it takes him six months to realize that he doesn't know what he wants. I think groups are becoming too analytical.

"But the Stones. I worked with them for 2½ years and they knew what they wanted to do. There was no fooling around. They approached the project and the music very professionally. I've never seen them argue with each other . . . never."

Hassinger's transformation from engineer to producer brings up another point of conjecture among producers. That is, how much of a natural evolution is there between the two positions?

As Hassinger saw it, "It really depends entirely on the individual. There's a lot of engineers who have no desire whatsoever to become producers. But the engineer feels he's contributing to the production and might feel that he wants to take a crack at it."

Just how did this engineer-to-producer movement start? Spector attributed it indirectly to the actions . . . or, rather, nonactions, of the groups themselves.



"Well, what it amounted to, really, was: A lot of groups came around and they said: "We're going to make a record" . . . So they went into a studio, but the engineer ended up doing most of the work. So the engineer would call up the record company and say 'Look, why don't I produce the group?' And that's really how it started. There's no real difference. But I think some of the really worst records have come from engineers turned producers. They're much too involved turning dials, etc. There's some good ones, to be sure, but not many. But you know, from their point of view: Why should they be content with \$40 or \$50 an hour when they can get a piece of the royalties?"

If, indeed, there is a factor of evolution involved in the step from engineer to producer, Mazer sees it as incomplete in itself. Another evolutionary step is needed . . . that of being a musician.

"That process of engineer-to-producer happens a lot," Mazur commented, "but I don't like it. Unless the engineer's a musician. I think that producers should be musicians even if they're not playing. They should have an indepth knowledge of music and a good level from which they can talk about it. I do my own engineering, but I don't consider myself to be a professional recording engineer. And I don't do any engineering for anyone else. It's an experience for me to do my own engineering. Engineers think about music from one angle and musicians from another. But its music you're trying to transcribe onto the disc, so its got to start with the musicians."

As a musician (keyboards, guitar), Russell would seem qualified to state his position. And he does:

"It's really all down to individual people . . . individual personalities. A good analogy for the music end is painting. A guy who delivers paint to an art store is just as qualified to be a painter, if he's got it in his head, as the master artist. All those incidental connections, like being an engineer . . . it doesn't matter. You either can do it or you can't; and if you want to learn bad enough, you can.

Meckler, in exploring the working relationship between producer and engineer, was more emphatic in his views:

"They're fools . . . really. First of all, because it never works. There's only been one engineer who's really made it. Bones Howe is the only person I know who started as an engineer and then became a producer. But I think the rest of them . . . it's like trying to make people realize what they do best and stick with it, instead of trying for a bigger name or more power. I think if you're an engineer, you get awfully stale about everything. And it's proven! You take every engineer over 30 years old . . . they're stale. It's a good idea if a producer has a certain amount of knowledge, not necessarily in the mechanics of recording, but a certain amount of musical knowledge; to be able to fuse things together and make things more interesting than they are. That's the idea of a record; to make things more interesting than they really are. It's like an image that you present to people. I think running a board is a big enough job by itself, without trying to produce the record at the same time. But the big problem between producers and engineers, I think is a lack of communication. Producers usually are a different type of people than engineers are. But I don't think the individual functions of the producer and the engineer are one in the same."

Indeed, the individual functions of the producer and the engineer are not one in the same. Nor are the viewpoints of any random assortment of producers, engineers and/or artists. Future articles in this series will deal with other facets of concern, of argument, and conjecture among the people behind the recording industry.

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ENVELOPE

'Envelope' is an essential term in the description of that which the synthesizer does. Defined as the shape of the sound (composed of components of attack, sustain, decay); the envelope is the amplitude shape, plus the particular harmonic content of the note at any given point along the way. The infinite variety of envelopes, the infinite variety of amplitude shapes . . . thus, the infinite variety of new sounds is what the synthesizer is all about, in describing the new sounds produced.

Consider the descriptive envelopes of two different sounds. First, a percussion sound that has no duration at all; it is immediately loud with rapid decay. In the immediacy of its attack, within that micro-second, the sound possesses a very complex waveform. Then the decay of the waveform is considerably less complex. This, then, is compared to the strumming sound of the double bass where the attack has fewer overtones, a simpler waveform than exists in the micro-second just after the attack. These are decidedly two different envelopes, and the variations between the two sounds are infinite; and practically unsoundable except as a synthesis of electronic generation. Or using another example 'envelope' is what makes the subtle difference between the sound of a plucked violin and that of a mandolin.

In the sense that they, apparently, did not know or couldn't describe what they were looking for as 'the search for new musical envelopes,' every musical instrument developer is, and has been, looking for exactly that; the search for new sounds, the search for new 'amplitude shapes in time' (envelopes). Still, the end product of the search for new sound, irrespective of any name, is the search for further enrichment of the musical vocabulary. This is certainly the goal of the synthesizer development.

If just a bit more understanding is needed, consider that the electronic organ offers different envelopes. It is commonly possible to produce a sound envelope that is, say, closer to an oboe than a clarinet. This sound will be what the manufacturer decided it would be, by virtue of the limited electrical modification that it is possible to make.

A tone generator of a certain value is, in essence, one envelope, unchangeable, once manufactured. In effect, the same principal is involved with the synthesizer, except that the maker of the synthesizer has left the envelope structure more neutral instead of deciding ahead of time what envelopes and parochial variations will be produced as the unit is activated. The synthesizer by virtue of its design philosophy offers the flexibility to create any desired envelope, i.e.: the different unique and new sounds identified with electronic music. The synthesizer's relative popularity, today, is undoubtedly as much a consequence of the remarkably organized hardware, as it is of successful function and demand for new sound.

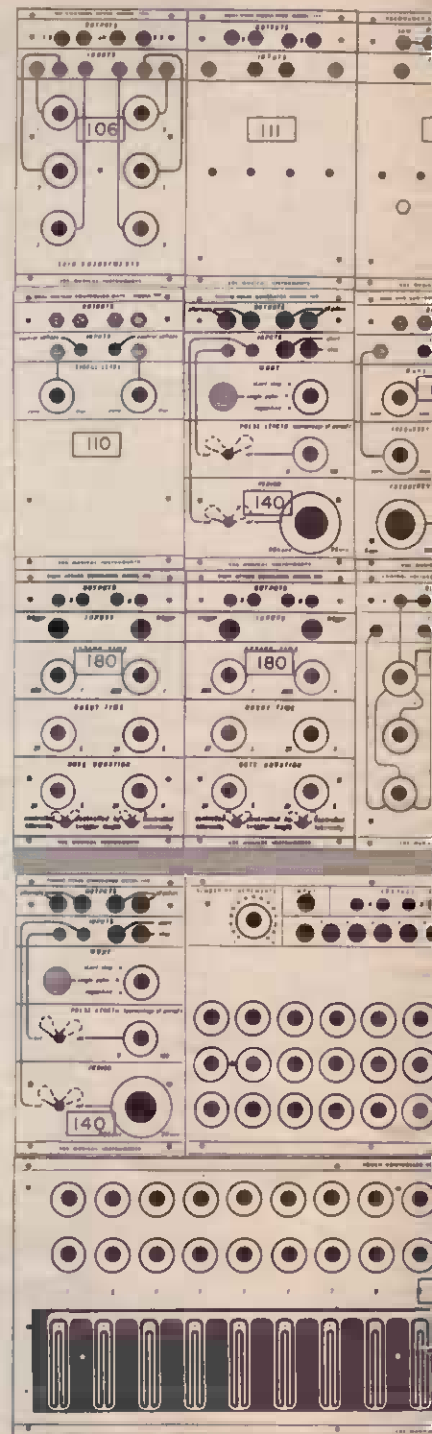
The rigorous time and technique limitations imposed by the record, cut and splice method of combining signals, forced the synthesizer developers into the evolution of the total voltage control modular approach.

In outward appearance the difference between the two systems, Buchla and Moog, is apparent in that Buchla departs from the conventional approach to conventional music and uses a series of pressure sensitive touch plates, another form of voltage control in place of the easily recognizable Moog black and white diatonic keyboard. The difference in input method is not great in terms of what each is. But the means of input is significant in the way in which each system is used.

RECORDING STUDIO USE

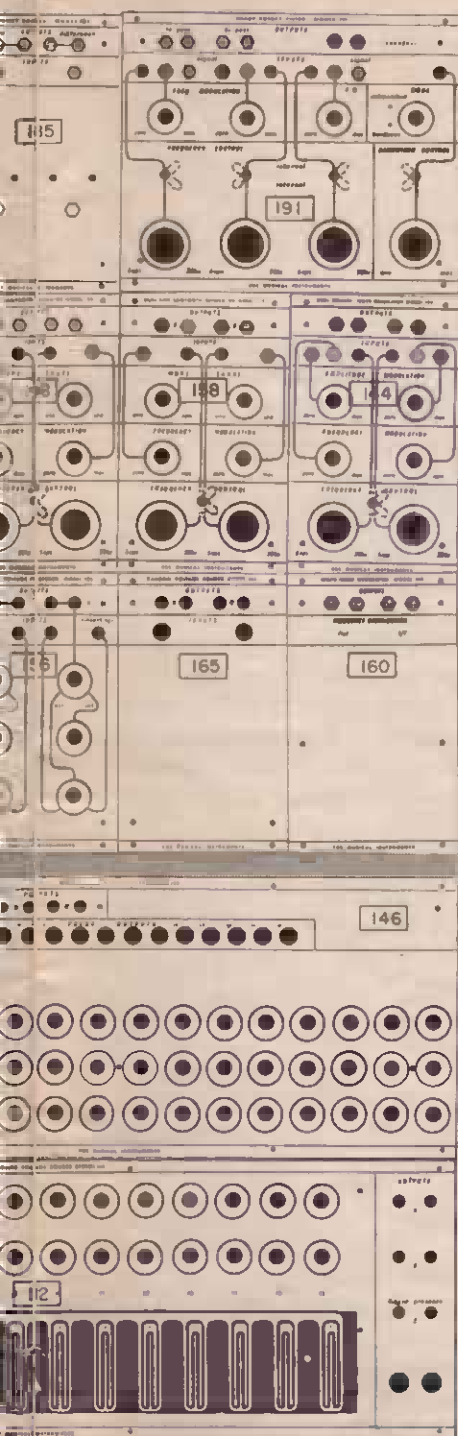
Obviously the electronic music synthesizer is a performance device, a musical instrument, and by this very nature it belongs in the recording studio inventory of musical instruments . . . alongside pianos, organs, drums and other special effects collections that studios accumulate.

TYPICAL BUCHLA



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- 165 Dual Random Voltage Source
- 160 White Noise Generator

THE MOOG AT SOUND CITY STUDIOS

As *Re/p* has been told by Joe Gottfried, President of Sound City Studios in Van Nuys, owners of the only Moog installed in an L.A. area recording studio (at presstime), "every group who comes in here is interested in using the thing. It has brought in some very good business, and probably would bring in a great deal more if we advertised it. But we have been pretty busy putting in our new room, so we aren't sure that many people know we have it."

Jack Crymes who has prime responsibility for most of the electrical installation and maintenance at Sound City, and who seems to have the daily responsibility for the care and feeding of the thing, reports a pretty good knowledge on the part of many groups and producers, especially keyboard people, as to the function and operation of the synthesizer. Jack reports that they haven't had any problems with it so far. Sound City feeds the synthesizer direct, using the techniques reported on in page 27 in Bill Robinson's article "Fundamental Signal Feed Techniques For Recording Electronic Musical Instruments."

At Sound City, the Moog is set up for playing right in the control room with monitoring on headphones or through the monitor speakers.

Re/p definitely gets the impression that one experience with a synthesizer tends to be habit forming. Once a performer, group, producer has used it they begin immediately to think of the part it can play in the next recording session.

If the synthesizer can play an important role as a musical instrument, and if its installation in the recording studio can also contribute a competitive promotional value to the studio, it certainly has fulfilled 2 of at least 3 of its potential uses.

THE SYNTHESIZER AS A MIXING DEVICE

Both systems, the Moog and the Buchla, are each in and of themselves extraordinary mixing devices. In a fairly fundamental sense, at least as it relates to common mix-down procedure, the Buchla Model 114, touch controlled voltage source (pressure plate keyboard), is essentially a mixing keyboard.

Consisting of ten pressure sensitive touch activated keys, with ten associated control voltage and timing pulse outlets, the unit allows the mixing of 10 inputs (in multiples of 10, with an increased number of keyboards) down into 1 input (per keyboard). By turning the volume pot completely off for a given channel, and using the touch plate only, the mixing engineer can control the amplitude simply by the amount of finger pressure used. This makes it possible to literally 'play' a ten channel mixer. An extremely intricate mix can be achieved that would be very difficult, if not impossible, to achieve by other means. For instance, imagine alternating rapidly between two solo vocal tracks. Not just mixing back and forth, ping-ponging, but oscillating from one to the other . . . twenty, fifty or even two hundred times a second. A strange and unique tremolo effect is produced which gives the illusion of not just multiplying the sound, but of enriching it in a very special way. This can be easily done by using a pulse generator and a sequencer, both standard components of the synthesizer systems.

To carry the idea a step further, there are certain automatic mixing processes which could not happen any other way for all practical purposes; concepts which barely exist, because until now they have been functionally impossible.

The pulse generator and sequencer can be used to program a series of events in any predetermined order, level and duration (from 200 events per second, to one every 20 seconds).

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100134	CAPSTAN SOLENOID ARM	2.30
100080	CAPSTAN IDLER CAP	3.30
100038	CAPSTAN DUST CAP ASSEMBLY	5.40
100039	CAPSTAN DUST CAP ASSEMBLY (3/4-7 1/2 ips)	11.00
100076	CAPSTAN IDLER ASSEMBLY 1"	31.00
100068	CAPSTAN IDLER ASSEMBLY 1/2"-1/4"	31.00
100068M	CAPSTAN IDLER ASSEMBLY 1" w/ML-6 COATING	37.50
100068M	CAPSTAN IDLER ASSEMBLY 1/2"-1/4" w/ML-6 COATING	37.50
100092	BRAKE BAND (Raybestos)	3.70
100093	BRAKE BAND (Felt)	5.20
100025	REEL IDLER FLYWHEEL (7 1/2-15 ips)	18.00
100170	MOTOR FAN90
100168	PUSH BUTTON SWITCHES (Set of 4) (350-351 type)	6.00
100150	ROTARY GUIDE 1"	65.00
200041	CAPSTAN ASSEMBLY 1"	140.00
200020	CAPSTAN ASSEMBLY 1/4"-1/2"	140.00
200012	CAPSTAN SHAFT	43.00
90-0001	CAPSTAN BEARING (Ball)	2.00
200028	CAPSTAN ASSEMBLY FLYWHEEL (300 Type)	55.50
200028M	CAPSTAN ASSEMBLY FLYWHEEL (300 Type w/ML-6)	74.50
200040	CAPSTAN DRIVE MOTOR (300 type)	150.00
100209	CONVERSION KIT—To direct drive BEAU motor (Complete)	350.00
100147	CAPSTAN MOTOR (350-351-440 type)	150.00
100126	CAPSTAN MOTOR FLYWHEEL	12.00
500019	TORQUE MOTOR ASSEMBLY (Take-up or supply) Please specify	170.00
500020	BRAKE ASSEMBLY (Take-up or supply) Please specify	49.00
100120	TURNTABLE	4.00
100129	TURNTABLE PAD60
100089	CAPSTAN SOLENOID ASSEMBLY	19.50
100111	EYE BOLT90
468-008	FELT WASHER10
100115	SOLENOID RETURN SPRING65
100086	SOLENOID PRESSURE SPRING65
100113	SOLENOID STOP	2.40

Many other parts (motors and heads) are in stock,
 but not listed.

Requests are always answered, and shipments are
 always made promptly. Write, or Call.

d Research Laboratory Corp.
 14th Avenue, New York, N.Y. 10022
 (212) 751-4663

passage could sound within the desired basic tonal structure of the passage . . .
 and in a matter of minutes. The value of this capability becomes more apparent
 when we consider doing a quadrasonic mix-down (16 to 4). After all, engineers
 only have two hands!

As to who should 'play' the synthesizer, a musician or an engineer, it doesn't
 matter really. It depends on what the end result is to be. If the reason for the
 synthesizer's use is to be the performance of a piece of music, then the obvious
 answer is that a musician probably should 'play' it. If the synthesizer is to be
 used as a piece of recording studio hardware, a mixer, then perhaps an engineer
 should be the operator. All of this presumes that it is possible to make the tradi-
 tional distinctions between functions in today's experience. Philosophically, this
 assignment of tight responsibility becomes more difficult every day that these
 technological achievements are with us. Good musicians have long considered
 good engineers . . . 'good musicians.' The awareness of electronic capability
 among musicians, mostly the young ones, has reflected a certain amount of
 reciprocal respect from the engineers toward the musicians. The understanding
 of synthesizers will escalate the mutual understanding that now exists. However,
 the understanding isn't easy unless we want to scrap some really established pre-
 cepts. This is easier for the young to do, having been nurtured in a multi-mode
 environment, unknown to their elders. Consider, as demonstration of this, the
 high-fi amplifier/tuner. Today, in one piece of equipment we have a choice of
 modes; radio, AM or FM, phonograph, tape recorder . . . all adjustable to an
 individual bias and all in one piece of equipment. How different from the single
 station selector and volume control on the radio. Kids have grown up with multi-
 mode things, they can understand the strange logic which says one thing; which
 really means many things; this is now amplitude, now it is frequency, now it's
 tempo. Different from the concept of middle 'C' on a piano . . . which is always
 middle 'C.' Not so on the synthesizer, where middle 'C' means anything the
 individual wants to make it mean.

Will the synthesizer replace musicians? Over the years every time technology
 has devised another mechanical or electrical means for making sounds, the ques-
 tion is asked. In almost every case the answer is the same, and depends on the
 economics of the situation. But do not be misled, the synthesizer can come close
 to generating, say, a clarinet; but it will never be a clarinet. If there is a demand
 for someone to play a clarinet, there will still have to be clarinet players. There
 are many in the electronic music movement who believe it is wrong to use the
 synthesizer to imitate established sounds. In a sense these people are saying that
 if you want to hear Bach, hear him in the mode of his creation. These people
 say, in essence "use the new to create the new." Still, there is no question that
 much of the current general popularity that the Moog is enjoying, is as a result
 of performance of the old master.

That the synthesizer is one thing to some and another to others is well illus-
 trated by the fact that the Buchla delivers the synthesizer in 'use mode.' There is
 really no such thing as a standard Buchla. For about the same purchase price,
 the hardware can be ordered for the particular use the composer might put it to;
 that the recording engineer might need. The composer for instance would require
 multiple keyboards, one sequencer and many oscillators. He would not probably
 require many of the filtering devices that would be important to the recording
 studio. Conversely the recording studio, if the unit is to be used as a mixing
 device, would not need so much emphasis on the sound generation equipment;
 but would require a greater number of sequencers, filters, ring generators, voltage
 controlled amplifiers and things of the sort which generally modify existing sound.
 At this point, the word we use to name the thing 'synthesizer' loses some of its
 meaning. "A synthesizer" is not the same thing to both composer and engineer.
 It looks as though we must invent a modular language as well.

"Ultimate" is indeed, a difficult word to use.

dates and program announced for:

4th ANNUAL 'BYU' AUDIO RECORDING SEMINAR JULY 13-17, 1970

Within the subject framework of 'keeping-up with the world's most rapidly changing industry,' Brigham Young University at Provo, Utah will again, for the fourth consecutive year, conduct the recording industry's only independent multi-subject, multi-interest seminar.

The BYU Audio/Recording Seminar is more specifically a production of the University's Electronics Media Department. The department is under the direction of Dean Austin, and assistant director Dean VanUitert.

"Actually, the Department of Special Courses and Conferences of the University is handling the details of the seminar," said Dean Austin, as he described the curriculum and logistics preparations being made to accommodate the 1970 seminar.

"As an example of the spectrum of subject matter to be covered," continued Dean VanUitert, "we will have expanded the technically oriented sessions, while continuing to add new dimensions of subject matter such as an increased attention to the business and management aspects of the recording business.

Four men who have been instrumental in the development of the seminars, from the very beginning, will return to lead discussions in their specialties, again in 1970. They are James B. Conkling, long active as head of several major record companies; Milton T. Putnam of United Recording Electronic Industries complex; John A. Neal of the Glen Glenn Sound Co.; William Robinson of the Sunset Sound Recorders.

Returning for his second appearance, as a guest lecturer, will be Irwin Spiegel, a prominent practicing attorney and Director of the Entertainment Law Institute at the University of California, who will deal with the contemporary legal mechanics related to the recording industry. This discussion will include the relationships between talent, recording companies, music publishers and song writers.



Sunset Sound's Bill Robinson leading a discussion and practical operation session during the 1969 'BYU' Audio/Recording Seminar in Provo, Utah.

First time lecturers include Mr. D. F. Morris of United Recording, Paul Beaver of Elektron-Muzics, Howard Holzer of Holzer Audio Engineering, James Cunningham of 8 Track Recording Co., and Joseph Kelly of Glen Glenn Sound Co.

The Department of Special Courses and Conferences will accept advance registrations up to July 1 at the rate of \$70.

After July 1 registrations will be accepted only as space permits at \$85. Registration may be made by writing:

FOURTH ANNUAL AUDIO RECORDING SEMINAR
Department of Special Courses and Conferences
Room 242 Hereld C. Clark Building
Brigham Young University
Provo, Utah 84601

All registrants will be sent complete information on accommodations in the Provo area. Arrangements for accommodations on the BYU campus may be made by writing the Department of Auxiliary Services, at the University.

RECOGNITION-1969

A SALUTE TO THE ENGINEERS THE PRODUCERS, THEIR STUDIOS . . . FOR THE PARTS THEY PLAYED IN 'MAKING' THE RECORDINGS WHICH WON THIS YEAR'S NARAS AWARDS

BEST ENGINEERED RECORDING

engineer: GEOFF EMERICK
engineer: PHILLIP McDONALD
producer: GEORGE MARTIN
studio: EMI ABBEY ROAD STUDIO, London

album: ABBEY ROAD

nominees for best engineered recording

engineer: BONES HOWE
producer: BONES HOWE
studio: HEIDER NO. 3
AGE OF AQUARIUS

engineers: ROY HALLEE, FRED CATERO
producer: JAMES GUERCIO
studio: COLUMBIA, Hollywood
BLOOD SWEAT & TEARS

engineer: BRUCE SWEDIEN
producer:
MOOG GROOVE

engineers: LEE HERSCHBERG, LARRY COX,
CHUCK BRITZ
producer: ANITA KERR
VELVET VOICES & BOLD BRASS

ALBUM OF THE YEAR

engineers: ROY HALLE, FRED CATERO
producer: JAMES GUERCIO
studio: COLUMBIA, Hollywood
BLOOD SWEAT & TEARS

BEST "R&B" MALE, VOCAL

engineers: SCOTTY MOORE, MAC EVANS
producer: JOHN RICHBOURG
studio: (Memphis)
CHOKIN KIND

BEST CONTEMPORARY MALE VOCAL

engineers: HANK MAGILL, GROVER HILLSLEY,
ALLEN LENTZ
producer: RICK JARRARD
studio: RCA, Hollywood
EVERYBODY'S TALKIN

BEST "R&B," GROUP VOCAL

engineer: TONY MAY
producer: ISLEY BROTHERS
studio: "A&R" STUDIOS, New York
IT'S YOUR THING

BEST CONTEMPORARY FEMALE VOCAL

engineer: CHUCK BRITZ
producer: JERRY LIEBER, MIKE STOLLER
studio: WESTERN RECORDERS, Hollywood
IS THAT ALL THERE IS

BEST MALE COUNTRY VOCAL

engineers: NEIL WILBURN, BOB BREAUULT
producer: BOB JOHNSTON
studio: (location, San Quentin)
A BOY NAMED SUE

BEST CONTEMPORARY GROUP VOCAL

engineer: BONES HOWE
producer: BONES HOWE
studio: WALLY HEIDER, Hollywood
AQUARIUS

BEST COUNTRY FEMALE VOCAL

engineer: TOM SPARKMAN
producer: BILLY SHERRILL
studio: COLUMBIA, Nashville
STAND BY YOUR MAN

BEST "R&B" VOCAL FEMALE

engineer: TOM DOWD
producer: JERRY WEXLER
studio: CRITERIA STUDIOS, Miami, Florida
SHARE YOUR LOVE

BEST COUNTRY GROUP VOCAL

engineers: TOM PICK, MILTON HENDERSON
producer: CHET ATKINS, DANNY DAVIS
studio: NASHVILLE SOUND MACARTHUR PARK
MACARTHUR PARK

BEST LARGE GROUP INSTRUMENTAL JAZZ PERFORMANCE

engineer: R. VAN GELDER
producer: CREED TAYLOR
studio: VAN GELDER RECORDING, Englewood Cliffs, N.J.
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Last week your job got a lot simpler.

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2110	8" full range
2115	8" extended range
2120	10" extended range
2125	12" shallow frame-extended range
2130	12" high power-extended range
2135	15" high power-extended range
2150	15" Concentric composite (less crossover)
2205A	15" high power low frequency transducer 8 ohm
2205B	15" high power low frequency transducer 16 ohm
2205C	15" high power low frequency transducer 32 ohm
2215	15" extended bass low frequency transducer 16 ohm
2220A	15" high efficiency low frequency transducer 8 ohm
2220B	15" high efficiency low frequency transducer 16 ohm
2290	15" Passive Radiator
2295	12" Passive Radiator

HORNS AND LENSES

2305	horn/lens 90° Conical
2307	horn for 2391
2308	lens for 2391
2309	horn for 2390
2310	lens for 2390
2327	2" to 1" throat adaptor
2328	2" to rectangular throat adaptor
2329	2" dual to rectangular "Y" adaptor
2330	1" to rectangular throat
2340	right angle horn, 1" throat 80° x 40°, 800 Hz.
2341	right angle horn, 2" throat 60° x 40°, 800 Hz.
2345	radial horn, 800 Hz. 90° x 40°
2350	radial horn, 300 Hz. 90° x 40°
2355	radial horn, 300 Hz. 60° x 40°
2356	long throw radial, 150 Hz. 20° x 40°
2360	1 x 2 multicell, 300 Hz.
2365	2 x 4 multicell, 300 Hz.
2370	2 x 5 multicell, 300 Hz.
2375	3 x 5 multicell, 300 Hz.
2380	3 x 6 multicell, 300 Hz.
2390	horn/lens 120° x 45°
2391	horn/lens, 90° x 40°
2395	horn/lens, 140° x 45°

COMPRESSION DRIVERS

2405	ultra-high frequency driver
2410	30 W. driver 1" throat aluminum diaphragm
2420	30 W. driver 1" throat aluminum diaphragm extended H.F.
2440	60 W. driver 2" throat aluminum diaphragm
2470	50 W. driver 1" throat phenolic diaphragm
2480	120 W. driver 2" throat phenolic diaphragm

DIVIDING NETWORKS

3105	7000 Hz. (for 2405)
3110	800 Hz. (except 2220)
3115	500 Hz. (except 2220)
3120	1200 Hz. (for 2205A, 2220A)
3125	1200 Hz. (for 2150)
3150	500 Hz. high power (except 2215)
3180	800 Hz. high power (except 2215)

ENCLOSURES AND SYSTEMS

4310	control monitor - gray
4310 WX	control monitor - oiled walnut
4320	studio monitor - gray
4320 WX	studio monitor - oiled walnut
4370	slant-front paging radiator 180° x 90°
4375	vocal column (speech range) (line radiator)
4380	(extended range) column (line radiator)
4503	utility cabinet
4520	utility dual rear loading L.F. horn
4530	utility single rear loading L.F. horn
4550	utility dual front loading L.F. horn
4560	utility single front loading L.F. horn

MIXER POWER AMPLIFIERS

3101	10/15 watts, 2 channel
3202	25* watts, 5 ch. max#
3204	40* watts, 5 ch. max#
3206	60* watts, 5 ch. max#

POWER AMPLIFIERS

4004	40* watts, with PRO-GUARD
4006	60* watts, with PRO-GUARD
4010	100* watts, with PRO-GUARD
4015	150* watts, with PRO-GUARD
4030	300* watts, with PRO-GUARD

PREAMPLIFIERS

5100	1 mic preamp - self powered
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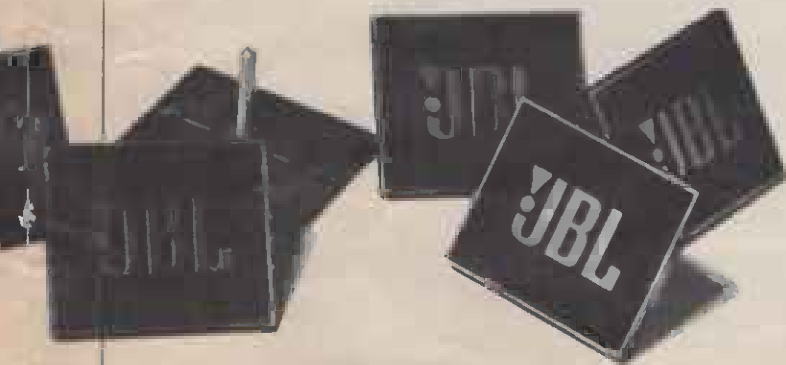
MIXER/PREAMPLIFIERS

5300	5 channel max #
5600	8 channel max #

ACCESSORIES

7001	PRO-VOX
7102	Speaker Monitor Panel
7103	VU Meter Panel
7104	PRO-NOI
7105	PRO-PLUS
7106	PRO-COM Compressor
AMC-2	2 Mic Preamp Expander
EPC-10	Precedence Circuit, Plug-In
MBT-10	Matching/Bridging Transformer, Plug-In
MPT-1	Pre-Amp for Magnetic Phono or 3 1/2" & 7 1/2" Tape Head, Plug-In
RM-6	Rock Mount for 3101
RM-7	Rock Mount for 3202
RM-8	Rock Mount for 3204, 3206
RMP-1	Blank Panel 1 3/4" x 19"
RMP-2	Blank Panel 3 1/2" x 19"
RMP-3	Blank Panel 5 1/4" x 19"
RMP-4	Blank Panel 7" x 19"
RMP-5	Blank Panel 8 3/4" x 19"
RMP-6	Blank Panel 10 1/2" x 19"
SPT-1	Pre-Amp for Tape Head 1 1/2", Plug-In
UH-1	Pre-Amp for High Impedance, Plug-In
VU-10	VU Meter - Rectangular Edge Reading
XE-10	"T" Pad Converts Mic Input to Unbalanced 50K Input, Plug-In
XT-10	Microphone Transformer, Plug-In

Notes: * All amplifiers are rated by RMS Professional Standards.
Ask for specification sheets for higher commercial rating. # Using AMC-2 expander module.



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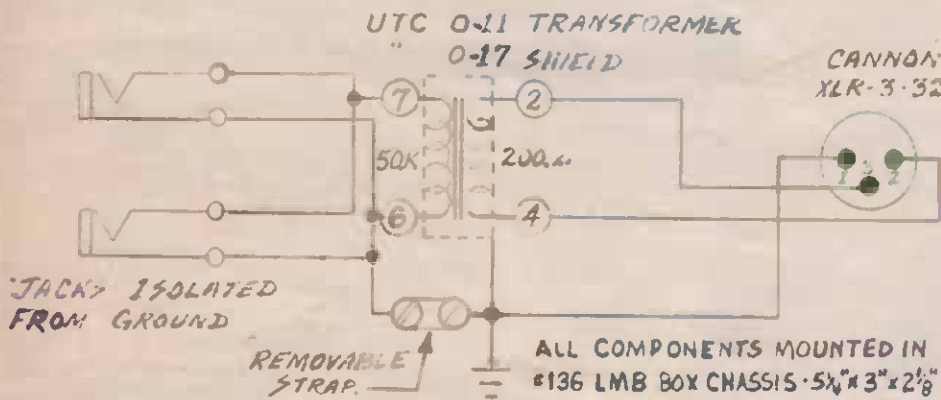
*U. S. Patent No. 3,376,515 and other Patents Pending

Circle No. 109

by WILLIAM ROBINSON
 Engineering Director
 Sunset Sound Recorders
 Hollywood, California

FUNDAMENTAL SIGNAL FEED TECHNIQUES FOR RECORDING ELECTRONIC MUSICAL INSTRUMENTS . . . AMPLIFIERS . . . EFFECTS.

There are variations of three basic methods which seem to satisfy most requirements . . . that is, those requirements which don't demand instant audio annihilation . . . for getting a signal out of an electronic musical instrument and its amplifier.



Assuming that the sound to be picked-up is generated by a fundamental electronic instrument, say, an electrified guitar, one without built-in reverberation, wah-wah or the like. Then, there is no particular problem in coming directly off of the magnetic pick-up on the instrument into a mult-jack, with the dual feeds then going, on the one hand, to the guitar amplifier, while the other line, then, goes to the microphone input of the mixing console through an impedance matching transformer . . . Direct Box. (See figure 1)

The obvious advantages, here, are that the player has complete monitoring capability through his own amplifier in the studio, while the mixing engineer retains complete control of the output volume of the instrument in the control room.

Electronic instruments with built-in special effects; the fuzz tones, wah-wahs, reverbs, etc. are picked up directly in two additional ways. If the amplifier being used by the musician in the studio has either a line-output or a pre-amp output the mult jack approach is still where the process starts. One line from the jack goes out through the impedance matching transformer (sometimes called a bridging transformer) straight to the microphone input of the control console. The mult feed from the jack goes back into the amplifier.



As in the previous example, the player still has complete liberty to monitor his own performance at any volume level in the studio. The use of any of the special effects originating in the instrument or the amplifier, remains the choice of the artist. The engineer, on the other side of the glass, still has absolute control of the volume of the sound being recorded.

Although less desirable from the control-of-volume point of view of the engineer, the third method of direct pick-up is used because of its simplicity. This method looks pretty much the same as the immediately preceding set-up, except that a pair of clip leads are used to clip onto the voice coil of the amplifier speaker before going back into the bridging transformer and then on into the microphone input of the mixing console.

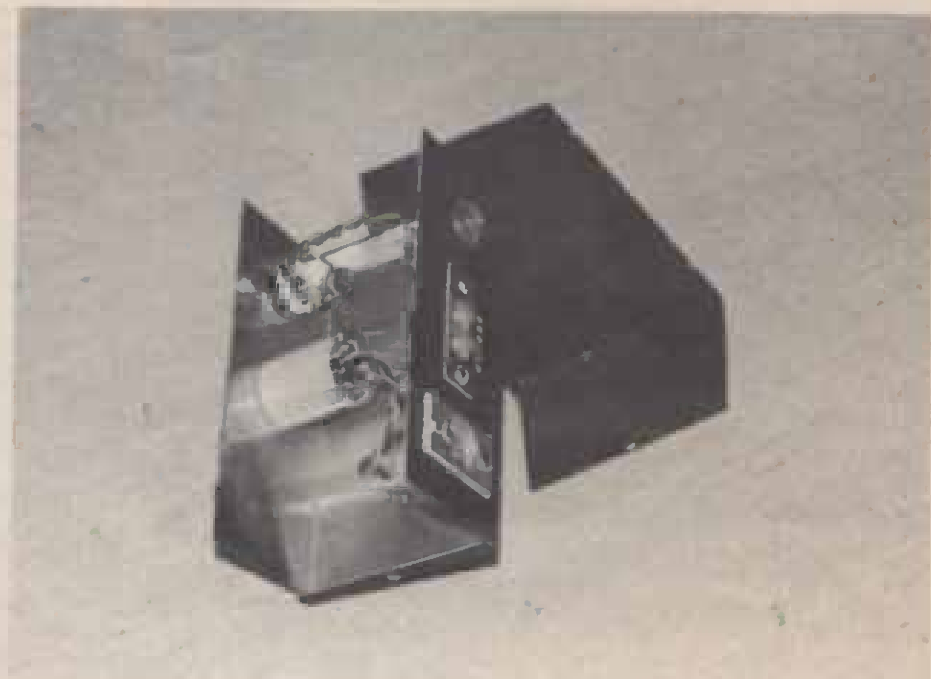
In this situation the player has the opportunity of "playing" with the amplifier volume controls, thus affecting the volume of sound fed to the mixer. To the degree that the performer might want to do this, the absolute control over the volume being fed to the tape machines is no longer vested completely in the engineer doing the mixing.

These techniques can be applied to almost every electronic instrument; electronic piano, electronic harpsichord, etc. In each case the signal must be fed through an isolating or bridging device (impedance matching device) into the mixing console, while at the same time allowing the musical signal to also get to the performer's amplifier in the studio.

Direct signal pick-up eliminates distortion from both the amplifier and the speakers, which in musical instrument amplifiers are nowhere near the quality or balance of the studio monitoring system. Too, the recording system is not exposed to any extremely high sound power levels. Those remain safely isolated out in the studio.

CONVENTIONAL MICING

Especially as it applies to 'rock', the biggest problem in picking-up an amplified instrument sound through conventional microphones is that the acoustical power coming out of the amp speakers can very easily overload the microphones. However, in order to record the electronic instrument and its amplifier as faithfully as possible to the sound which the combination is putting out, using conventional micing methods would mean that the microphone must be placed only inches from the amp speakers. Where this is not wanted, the use of dynamic micro-



phones is recommended because of their ability to withstand extreme sound pressures, of between 110 and 140 dB before 'CO'

Still, there may be times when the producer/mixer might want the best of both the direct and conventionally miced sound. If there are enough inputs in the console, then both the microphone line and the one coming in from the 'Direct Box' (bridging device) can be run into separate 'pots' for recording on the common track. As the engineer seeks the brilliance and clarity of the instrument sound fed direct, or the sound of the instrument plus the ambience of the room (studio) as the sound comes from the conventional micing procedure, he can switch from input to input, or blend both of the signals together.

THE DIRECT BOX

The primary impedance of the matching transformer should, of course, be high

enough so that it does not disturb the match of the output of the magnetic pick-up from the instrument . . . and, so that it attenuates the high end, or doesn't drop the level too much . . . so that the signal comes out of the 'Direct Box' at approximately microphone level. It should be a nominal impedance of, say, 30,000 ohms to 50,000 ohms. The primary impedance should be high enough so that it doesn't disturb or load the instrument's magnetic pick-up and delivers enough signal at the console for control.

The matching transformer should be mounted in a small, well shielded box. Careful attention should be given to 'grounds' or shielding of both input and output cables. Appropriate connectors on each cable should be compatible with the output of the magnetic pickup on the instrument, and the input connector to the mixing console.

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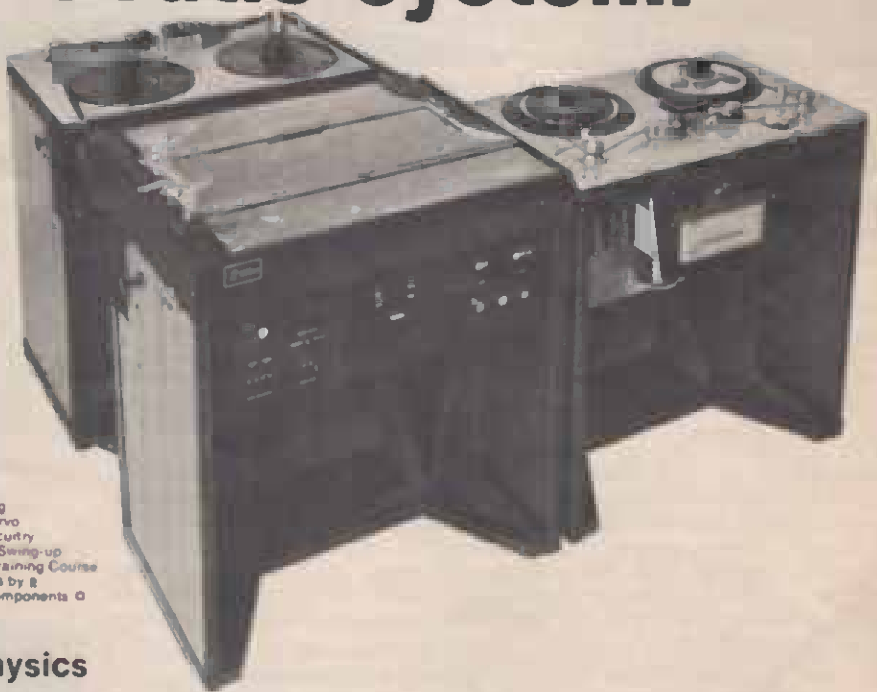
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Capitol Records
Jacksonville, Illinois

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American Sound Corporation
Warren, Michigan
IM Company,
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Audio Communications
Dover, New Jersey
Cinematage
Englewood, New Jersey
National Tape Service,
West Caldwell, New Jersey
African Audio Corporation,
Hauppauge, L.I., New York

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Plastics Products,
Memphis, Tennessee
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St. Peters, Australia
Caram Corporation,
Montreal, Canada

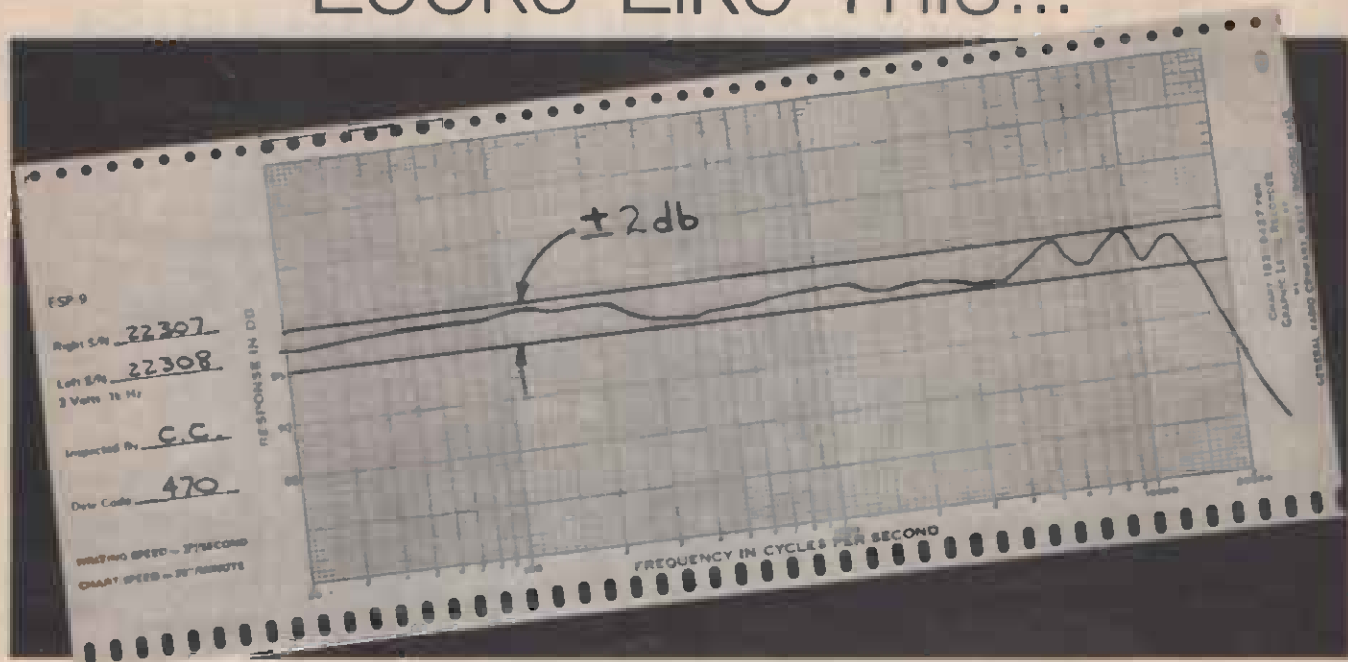
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Hannover, Germany
EMI Europa (Electrola)
Kahn-Brunsfeld, Germany
Euron Corporation,
Berlin, Germany

Sono Press Rheinland-Meuse (Arnia),
Gütersloh, Germany
General Recording Sound,
Milano, Italy
RCA S.P.A.,
Roma, Italy
Hitachi Maxwell Ltd.,
Kyoto, Japan
Sony Corporation,
Tokyo, Japan
TDH Electronics,
Tokyo, Japan
Toshiba Musical Industries,
Tokyo, Japan

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EMI Records S.E. Asia,
Singapore, Malasia
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To guarantee performance to specifications, this individual machine-run response curve comes with every ESP-9 Studio Monitor Headset. You get, for the first time, flat ± 2 db monitoring over the entire audible spectrum because the ESP-9 is a breakthrough electro-acoustical development achieved by exploiting electrostatic principles. Only Koss electrostatics give push-pull balanced acoustical circuitry, cancelling all second harmonic distortion to provide fatigue-free listening through long recording sessions. Now you hear what the program material *really* sounds like, uncolored by monitor room reflections. Exceeding the range and cleanliness of any speaker system, the ESP-9 gives the measure of separation and accurately positions the soloist. 40 db isolation through comfortable, fluid-filled cushions relieves the noisy distraction caused by producers, A and R men, time-killing artists, and other visitors in the control room. The ESP-9 eliminates the masking effect of blowers, breath sounds, clothes rustling and other control room ambients. So now you have a running check on low-level system noise. You monitor the sounds you only saw before on the VU meter, like the "whoosh" of a stage door closing, ventilator rumbles and music stand rattles—because speakers simply don't have the super-wide-range you need to hear them.

The ESP-9 has a signal handling capacity of 10 volts at 30 Hz with good wave form versus 6 volts for the integrated ESP-6 introduced last year. This is made possible by increasing the size of the coupling transformers by a factor of 4 and mounting them in the E-9 Energizer external to the cup.

The E-9 Energizer offers the option of self-energizing for the bias supply, or energizing through the ac line; choice is made with a selector switch on the front panel. When energized through the ac line, very precise level measurements can be made. Thus the unit is ideal for audiometry, and for evaluating the spectral character of very low level noise in tape mastering machines and recording consoles.

SPECIFICATIONS

Frequency Response Range, Typical: 15-15,000 Hz ± 2 db (10 octaves) 10-19,000 Hz ± 5 db. An individual, machine-run calibration curve accompanies each headset. Sensitivity: 90 db SPL at 1kHz ± 1 db referred to 0.0002 dynes/cm² with 1 volt at the input. Total Harmonic Distortion: Less than 1% of 1% at 110 db SPL. Isolation From External Noise: 40 db average through fluid-filled cushions provided as an integral part of the headset. Power Handling Capability: Maximum continuous program material should not exceed 10 volts (12 watts) as read by an ac VTVM; provides for transient peaks 14 db beyond the continuous level of 10 volts. Source Impedance: Designed to work from 4-16 ohm amplifier outputs. External Power Requirements: None, except when used for precise low level signal measurement, when external ac line can be selected by a front panel switch on the E-9 Energizer.

See your dealer today or write for free technical paper, "An Adventure In Headphone Design" and ESP Catalog 108.



KOSS

KOSS ELECTRONICS INC.

2227 North 31st Street
Milwaukee, Wisconsin 53208

KOSS ELECTRONICS S. r. l.
Via Valtorte 21/20127 Milan, Italia



Mixing Stereo Monophonically
by Oliver Berliner

A short while ago a mild furor was generated when AM radio stations began to receive stereophonic promotion records and discovered to their horror that the soloists were 3dB or more too loud when the stereo discs were played monophonically. It was quickly determined by these broadcasters that an instrument or voice which was recorded with equal intensity on both of the channels would

encounter the effects of simple addition of the two portions and become at least fifty percent too loud.

To overcome this "oversight," Howard Holzer, audio engineer, developed a device which is inserted into the disc mastering system and detects information appearing with equal intensity on both of the incoming sources, automatically suppressing it without affecting the other program material. While this approach is certainly worthwhile, if not mandatory, the fact that the recordists made its advent necessary is inexcusable.



*Walter Carlos,
creator of
"Switched-On Bach"
and "The Well-Tempered
Synthesizer,"
uses the Dolby System.*

Mr. Carlos says, "The raw materials of electronic music — the outputs of my Synthesizer, for example — are sounds which can be varied from striking purity to extreme complexity. After a desired sound is created, often with considerable effort, it must be preserved with care, to be combined later with others in a meticulous layer by layer process. The noises of magnetic recording are significant hazards in this regard, since they are particularly noticeable in electronic music. However, my experience confirms that the Dolby System effectively attenuates the noise build-up in electronic music synthesis. My studio at TEMPI is equipped with ten Dolby units, which I consider to be indispensable in my work."

Whatever your recording activities, the dependable Dolby System can help you make good recordings even better. Now in use in over 200 companies in 27 countries around the world.



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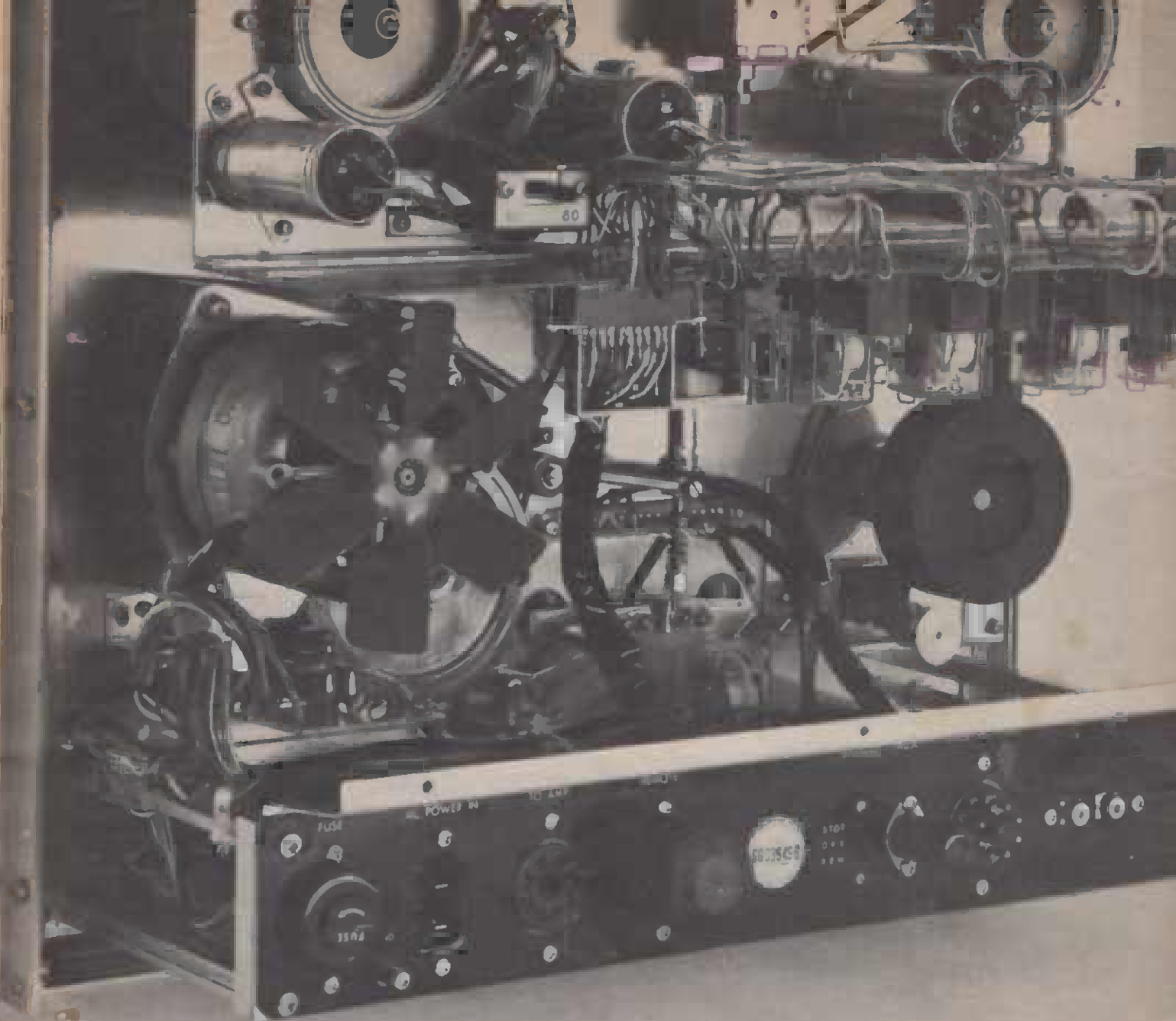
for International Inquiries:

346 Clapham Road London S W 9 England
telephone 01-720 1111 cables Dolbylabs London

Ten years ago this writer produced, without even the benefit of today's "mix-down", a two-channel stereo master of a vocalist backed by a 30-piece orchestra. The tape was transferred to stereo disc, but no mention was made of the disc being stereo. It was sent to many AM radio stations and was bought by the public for play on home stereo and monophonic record players . . . for it was assumed by the users that the album was available *only* in monophonic format. Not a single report was ever received from any user to the effect that the vocalist was too loud under mono listening conditions. The disc played perfectly and no one noticed anything unusual. Why? Because there was nothing unusual . . . except in the method of splitting the vocalist between the two channels.

Some, although unfortunately not enough, sound mixers already were aware, way back then, that the additive effect of audio information of equal intensity on both stereo channels could be avoided by splitting the source to both channels in *unequal* amounts. To be precise—it was discovered that if you split the soloist in such a way that he is 3dB (or more) "hotter" on one channel than on the other, the cumulative effect when the stereo recording is played monophonically is minimized to the point of being unnoticeable. In fact, with exactly 3dB difference in levels, and with the level of the louder channel set for proper balance between orchestra and soloist (letting the weaker portion of the split source fall where it may on the other channel) not only is there no noticeable additive effect when listening monophonically to the stereo recording, but when listening in stereo it is impossible for the consumer, and for most experts, to tell that the soloist is not split equally between the channels.

A unique console specified by this writer and designed and built by Charles S. Broneer, provides splitting of any source to any pair of output lines in any ratio *except* 50-50. The console purposefully will not allow the latter; the closest to this that it permits is a split with the 3dB intensity difference between channels. It has thus been positively established that with a console capable of providing other than 50-50 splitting, a two-track recording will reproduce perfectly in a stereo or monophonic system, and without the requirement of expensive and critical supplementary devices which should never have been necessary in the first place.



BACK TALK

When it comes to tape decks, we say you can't beat our systems.

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Booth 33, Los Angeles Hilton Hotel,
May 4-7, 1970

TEAC

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GETTING A SESSION STARTED . . . RIGHT

by BRIAN INGOLDSBY
Decca Studios
Universal City

We believe that a good recording session happens in the 'right' atmosphere. It happens, most often, when there exists, from the beginning of the date a feeling of trust that everyone involved . . . 'knows their thing.'

Any evidence that the studio is well prepared for the session is one of the surest ways, and quickest ways, too, for establishing the kind of rapport needed for a profitable session. Profitable sessions mean repeat business!

The information which we feel we need, to insure that we are pretty well prepared for the date, is that which we get on a form very similar to this one. This information is obtained as soon as the studio time is booked. For us this

is the beginning of the session . . . even though the actual recording may be weeks away.

Generally speaking, from this material it is very possible for the ENGINEER/STUDIO to develop a recommendation to the Producer for the use of any of the various modes available for recording the session. This is where the communications relationship is firmly founded.

Beyond all the wizardry of our studios, our engineering and our mixing, perhaps, the factor we most importantly contribute to the ultimate recorded product is the pure 'encouragement' that we can offer the artist, 'to do his thing . . . the best way he can,' based on our ability to do our thing.

A lot of this starts with the basic description of what 'he' thinks 'he' is after. Communications.

The intangible 'good' of a well conducted, well organized recording session may have little to do with the ultimate chart-action of a particular product. . . . Or has it really as little an effect as some people think?

Date Order Called _____
Session Date _____
Company Name _____ Time Needed: _____ to _____
Ordered by: _____ Override Time Needed: _____
Producer Name _____ Confirmed: Yes No
Artist & Group Name _____ Phone No. _____ Ext. _____
Order No. _____
Master No. _____
Album Single
Future Sessions call for O.K.? Yes No
Open Account Yes No
1. Number of Instr.: _____
2. Instrument Types:
1. _____ 11. _____
2. _____ 12. _____
3. _____ 13. _____
4. _____ 14. _____
5. _____ 15. _____
6. _____ 16. _____
7. _____ 17. _____
8. _____ 18. _____
9. _____ 19. _____
10. _____ 20. _____
3. Will there be a Vocalist or Choral Group , and if so how many: _____ Will be Live or Over-Dub .
4. Any Microphone Preference for Vocals: _____
5. Type of Music: _____
6. Number of Tracks required: _____
7. Which Studio preferred: _____
8. Engineer: 1st Choice: _____ 2nd Choice: _____
(Note Engineer Overtime)
9. 2nd Engineer needed: Yes No
10. Any special set-up for Instrumentation: (Ask if isolation between Sections or Instruments)
11. Any Special Equipment needed; _____
Earphones for all? Yes No
12. Is Session closed for ring through only? Yes No
13. Reported to Unions? Yes No

ALTEC LANSING AUDIO CLINICS SET

Altec Lansing will conduct its annual Audio Clinics in the key cities of Washington, D.C., Kansas City, Missouri, and San Mateo, California.

The first Altec Audio Clinic would open a two-day session in the nation's capital on April 13. On April 21 and 22, it will be conducted in the Hotel President in Kansas City. The last clinic will be at the Villa Hotel in San Mateo on April 28 and 29.

The second day of each clinic will feature a School of Instruction on System Design and Application of Sound Equipment. "Acousta Voicing™" contractors will be given an additional day and a half for training purposes.

An estimated 400 authorized Altec Lansing sound contractors, leading architects and consulting engineers are expected to be in attendance at these clinics.

Further information on attendance can be obtained from Altec Lansing, 1515 So. Manchester Ave., Anaheim, Ca. 92803.

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When you're laying down the master, you'd better be sure your piano is air quality. That's what the Yamaha C7 Grand is all about. It's a 7'4" concert instrument that ranks among the world's great pianos. Just ask the talent at your next session.



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way through month after month of masters, rehearsals and spilled drinks, too.

Yamaha Electone E-3.

It's a symphony orchestra in a box for just \$2,395. With fewer controls, the E-3 gives you more

sounds, more music than organs costing as much as \$8,000. What's more, it's a regular sound effects machine. Think about *that* the next time you have to synthesize some sounds.



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Send for complete specifications and dealer information.

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- U1-D Upright Piano Business _____
- E-3 Organ Address _____
- Other _____ City _____ State _____ Zip _____

CHECK LIST

Checking Out

TAPE MACHINES

1. Mount an alignment tape . . . align playback channels
2. Switch to record function . . . mount NEW roll of tape
3. Feed reference signal . . . 1000Hz, 700Hz
4. Adjust recording level to '0' vu
5. Shift monitor switch to 'play back' mode
6. Adjust bias for peak bias . . . according to tape used
7. Make frequency run at 10db lower than standard reference
8. If machine requires adjustment . . . if frequency response does not meet the standard . . . adjust recording equalizers so that frequency response meets tolerances . . . +/-1db

SPECTRA SONICS OPENS HOLLYWOOD DEMONSTRATION STUDIO

"Convenience to the Southern California market, and a whole lot of pride in what we have put into this equipment . . . that's why we decided to establish our new demonstration studio and field engineering sales office here in Hollywood". So stated Bill Dilley, President of the Ogden, Utah based Spectra Sonics Co., as RECORDING engineer/producer was guided around the ultra modern facility now located in the heart of Hollywood's recording district.

Spectra Sonics is a ten year old designer and manufacturer of precision performance audio equipment.

Located on the 11th floor of 6430 Sunset Blvd, Hollywood, literally overlooking scores of the recording studios which populate the area, the facility will be managed by Albert Siniscal who will be assisted by sales engineer Richard Guy.

Demonstrations of the Spectra Sonics systems will include full four channel monitoring with electronic crossovers/tri-amplification for each channel, and will be arranged on a private appointment basis to allow recordists the opportunity to personally experience the performance of the Model 1020-8 Audio Control Console system. The system built around the model 101 Audio Amplifiers provides 20 position inputs, 8 program outputs with free grouping for 16 track monitoring with pan, simultaneous 16 track to stereo/mono mixdown, tape remote controls, equalization, and several other advanced features.

Reported as an industry first, Spectra Sonics is unconditionally guaranteeing the Model 101 Amplifiers, around which all of their console systems are built, for a minimum of two years.

Re/p was joined in the tour of the new facility by Gerald Goffin, owner of Larabee Recording Studio, and Michael Lloyd, VP. of MGM Records. Lloyd reports that MGM ought to have their new recording center, 2 or 3 studios, in operation in Hollywood by July 1, 1970.

Telephone numbers for the Spectra Sonics demonstration studios: (213) 461-4321 and 981-3440



NOTICE

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

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

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AUDIO ENGINEERING SOCIETY

Thirty-Eighth Convention...Exhibition of Professional Products...

Los Angeles Hilton Hotel
Los Angeles, California
MAY 4-5-6-7, 1970

Registration Hours:

Monday, May 4 — 8:00 A.M. to 5:00 P.M.
Tuesday, May 5 — 9:00 A.M. to 8:00 P.M.
Wednesday, May 6 — 9:00 A.M. to 5:00 P.M.
Thursday, May 7 — 9:00 A.M. to 8:00 P.M.

SESSION A

MONDAY, MAY 4, 1970 — 9:30 A.M.
GOLDEN STATE ROOM

MOTION PICTURE SOUND TECHNIQUES

- A-1 A NEW PRODUCTION SOUND DOLBY AND AUTOMATED TRANSFER UNIT
- A-2 RE-RECORDING PROCESS
- A-3 THE SOUND RE-RECORDING CONSOLE
- A-4 FILM RECORDING EQUIPMENT, AS INSTALLED AT THE AMERICAN ZOETROPE COMPANY
- A-5 A NEW SPROCKET DRIVEN AUDIO RECORDER/REPRODUCER
- A-6 AN ELECTRONIC LOOPING SYSTEM

SESSION B

MONDAY, MAY 4, 1970 — 9:30 A.M.
LOS ANGELES ROOM

ACOUSTICAL NOISE AND NOISE CONTROL

- B-1 SOME PROBLEMS AND SUCCESSES IN CONTROLLING NOISE EXPOSURE IN CALIFORNIA INDUSTRY
- B-2 A SYSTEMS APPROACH TO AIRCRAFT NOISE CONTROL
- B-3 THE MOTOR VEHICLE NOISE PROBLEM AND WHAT IS BEING DONE ABOUT IT
- B-4 MEASUREMENT OF TRAFFIC NOISE ON CONNECTICUT HIGHWAYS
- B-5 NEEDS AND SPECIFICATIONS FOR AUDIO EQUIPMENT USED IN PSYCHOACOUSTIC WORK
- B-6 AN AUTOMATIC HIGHWAY NOISE MONITOR

AUDIO ENGINEERING SOCIETY EXHIBIT

	BOOTH Nos.
Agfa-Gevaert, Inc.	56
AKG Microphones, North American Philips Corporation	141/142
Altec-Lansing	105/106
Ampex Corporation	92-96
Artisan Sound Recorders	DEMO RM. F— Buffalo Room
Audio Designs & Manufacturing, Inc.	118/119
Automated Processes, Inc.	49
B & K Instruments, Inc.	59
The R. T. Bozak Mfg. Company	98
David Clark Company Incorporated	63
Carl Countryman & Associates	117
Crown International	29
Custom Fidelity, Inc.	61
D. B. Audio Corporation	60
Dolby Laboratories, Inc.	67/68
Du Kane Corporation	112
Electrodyne Corporation	110/111
Electro Sound, Inc.	25-28
Electro-Voice, Inc.	DEMO RM. A—Mission Rm.
Fairchild Sound Equipment Corporation	7/8
Daniel N. Flickenger Associates	3
Gately Electronics	52
Gauss Electrophysics, a Division of MCA Technology	122/123, 129/130 DEMO RM. B— Cleveland Rm.
Gotham Audio Corporation	113-116
GRT Corporation	70/71/72
Harvey Radio Company, Inc.	10/11
Hewlett-Packard	5/6
Holzer Audio Engineering Corp.	DEMO RM. C— Washington Rm.
Infonics, Inc.	55
Koss Electronics, Inc.	41
Langevin Co., Inc.	40
James B. Lansing Sound, Inc.	DEMO RM. K—Foy Rm.
Lipps, Inc.	51
Magnetic Recording Systems, Inc. (MRS)	54
Melcor Electronics Corporation	1/2
Metrotech Incorporated	108/109, 120/121
R. A. Moog, Inc.	69
Moser Development Company Johnson Industries Broneer Engineering	136/137
Nagra Magnetic Recordings, Inc.	58
OPAMP Laboratories	20
Otari of America, Ltd.	124/125
Parasound, Inc.	69
Pentagon Industries, Inc.	4
Philips Broadcast Equipment Corporation	DEMO RM. D— Detroit Rm./50
Quad Eight Sound Corporation	89/90/91
Sarex Corporation	140
Scientific Electronics System	62
Scully Recording Instruments Company	108/109, 120/121
Sennheiser Electronic Corporation (N.Y.)	97
Shure Brothers, Incorporated	104
Sonic Arts Corp.	53
Spectra-Sonics	138/-39
Stanton Magnetics, Inc.	107
Suburban Sound, Inc.	42
Superscope, Inc.	30/31
Systron Donner, Microwave Division	34
Taber Manufacturing and Engineering Division	103
Tannoy (America) Ltd.	DEMO RM. J—St. Louis Rm.
3M Company	126-128, 133-135
Tonus, Inc.	DEMO RM. E—Boston Rm.
United Recording Electronics Industries	131/132
Universal Audio Waveforms	
United Research Laboratory Corporation	45
Valve Engineering Company	21
Vega Electronics Corporation	65/66

SESSION C

MONDAY, MAY 4, 1970 — 2:00 P.M.
GOLDEN STATE ROOM

DISC RECORDING AND REPRODUCTION

- C-1 DEVELOPMENT AND APPLICATION OF A NEW "TRACING SIMULATOR"
- C-2 INTERACTION BETWEEN TRACING AND DEFORMATION ERRORS
- C-3 AN EVALUATION OF THE FORCES REQUIRED TO MOVE A TONE ARM
- C-4 MAXIMUM LEVELS IN THE RECORD/PLAYBACK SYSTEM
- C-5 THE COMPATIBLE STEREO GENERATOR AND ITS APPLICATION TO ALL STEREO MEDIA

SESSION E

TUESDAY, MAY 5, 1970 — 9:30 A.M.
GOLDEN STATE ROOM

MICROPHONES AND PLAYBACK CARTRIOGES

- E-1 MINIATURE ELECTRET MICROPHONES
- E-2 THIRD ORDER GRADIENT MICROPHONE FOR SPEECH RECEPTION
- E-3 EXPERIMENTAL WIDE BANDWIDTH TOOTH CONTACT MICROPHONE
- E-4 MICROPHONE ACCESSORY SHOCK MOUNT FOR STAND OR BOOM USE
- E-5 CLOSING THE WIRELESS VERSUS WIRED MICROPHONE DEPENDABILITY GAP
- E-6 BI-RADIAL AND SPHERICAL STYLUS PERFORMANCE IN A BROADCAST DISC REPRODUCER
- E-7 NEW DIRECTIONS IN MICROPHONE PLACEMENT

SESSION G

TUESDAY, MAY 5, 1970 — 7:30 P.M.
GOLDEN STATE ROOM

ELECTRONICS APPLIED TO MUSIC

- G-1 TECHNIQUES OF GENERATING AND GATING SOURCE SIGNALS IN MODERN ELECTRONIC ORGANS
- G-2 THE ELECTRONIC PIANO
- G-3 CHANGING PITCH AND TIMBRE OF WOODWIND INSTRUMENTS BY ELECTRONIC MEANS
- G-4 A RING MODULATOR DEVICE FOR THE PERFORMING MUSICIAN
- G-5 THE USE OF A BUCHLA SYNTHESIZER IN MUSICAL COMPOSITION
- G-6 DEMONSTRATION OF THE PRACTICAL APPLICATION OF ELECTRONICS IN MUSIC

SESSION J

WEDNESDAY, MAY 6, 1970 — 9:30 A.M.
GOLDEN STATE ROOM

ARCHITECTURAL ACOUSTICS AND ELECTROACOUSTICS

- J-1 NOISE: THE NEW POLLUTANT, MOTION PICTURE PRODUCED BY THE NATIONAL EDUCATIONAL TELEVISION NETWORK WITH A GRANT FROM THE ACOUSTICAL MATERIALS ASSOCIATION
- J-2 AN HISTORICAL AND ARCHITECTURAL REVIEW OF OPERA HALLS OF THE WORLD
- J-3 MICROPHONE THERMAL AGITATION NOISE
- J-4 PLANNING OF THE U.S. AIR FORCE AUDIO VISUAL CENTER, MORTON AIR FORCE BASE, SAN BERNARDINO, CALIFORNIA

SESSION O

MONDAY, MAY 4, 1970 — 2:00 P.M.
LOS ANGELES ROOM

AUDIO IN AM, FM AND TV BROADCASTING

- O-1 TRANSMISSION OF ADDITIONAL AURAL CHANNELS ON A TELEVISION CARRIER
- O-2 REPORT ON POSSIBLE MULTIPLEX METHODS FOR THE TRANSMISSION OF FOUR CHANNEL FM STEREO
- O-3 A REVIEW OF PROGRAM LEVEL INDICATING SYSTEMS
- O-4 READOUT DEVICES OTHER THAN THE STANDARD VU METER AS A BETTER MEANS OF MEASURING PEAK LEVELS
- O-5 PANEL DISCUSSION — A REVIEW AND DISCUSSION OF THE PROBLEMS AREAS OF PEAK LEVELS AND LOUDNESS CONTROL AND MEASUREMENT
- O-6 MICROPHONE READINGS FOR RADIO AND TV WHEN LOUDSPEAKER EQUIPMENT IS SIMULTANEOUSLY USED FOR AN AUDIENCE

SESSION F

TUESDAY, MAY 5, 1970 — 2:00 P.M.
GOLDEN STATE ROOM

LOUDSPEAKERS

- F-1 LOUDSPEAKER MEASUREMENT TECHNIQUES SOME OBSERVATIONS AND SPECULATIONS ON THE ROLE OF SPEAKERS IN STEREOPHONIC REPRODUCTION
- F-2 THE INTER-RELATIONSHIP OF CABINET VOLUME, LOW FREQUENCY RESONANCE, AND EFFICIENCY FOR ACOUSTIC SUSPENSION SYSTEMS
- F-3 ACUSTICAL CIRCUITS REVISITED
- F-4 TIME DELAY DISTORTION IN MULTI-SPEAKER LOUDSPEAKER SYSTEMS
- F-5 WISDOM AND WITCHCRAFT OF OLD WIFE'S TALES ABOUT WOOFER BAFFLES

SESSION H

TUESDAY, MAY 5, 1970 — 7:30 P.M.
LOS ANGELES ROOM

AUDIO MEASUREMENTS AND INSTRUMENTATION

- H-1 AN IMPROVED FIELD CORRECTOR FOR FREE-FIELD MICROPHONE CALIBRATIONS
- H-2 SIMPLIFIED SPECTRAL ANALYSIS BY USE OF A BAND LIMITED RANDOM NOISE TEST RECORD
- H-3 IMPULSE RESPONSIVE ADAPTER FOR CHART RECORDER
- H-4 ACOUSTIC IMPEADANCE CALIBRATOR FOR MASK AND MICROPHONE MEASUREMENTS
- H-5 THE MEASURE OF FLUTTER IN AUDIO TAPE RECORD/REPRODUCE MACHINES
- H-6 PRECISION SOUND LEVEL RECORDING SYSTEM FOR INDUSTRIAL ENVIRONMENTS

SESSION K

WEDNESDAY, MAY 6, 1970 — 2:00 P.M.
GOLDEN STATE ROOM

SIGNAL CONTROL AND PROCESSING

- K-1 DESIGN PHILOSOPHY IN THE CONSTRUCTION OF MULTI-CHANNEL PORTABLE MIXING CONSOLE
- K-2 MODULES . . . WHY?
- K-3 WHEN IS PHASE SHIFT OBJECTIONABLE?
- K-4 ELECTRONIC ADJUSTMENT OF MONITORING ACOUSTICS
- K-5 THE STEREO SYNTHESIZER AND STEREO MATRIX: NEW TECHNIQUES FOR GENERATING STEREO SPACE
- K-6 THE DISCLOSURE OF HIDDEN INFORMATION IN SOUND RECORDING

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AND
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SESSION L

THURSDAY, MAY 7, 1970 — 9:30 A.M.

GOLDEN STATE ROOM

MAGNETIC RECORDING AND REPRODUCTION

- L-1 A NEW ROTARY TURRET HEAD MOUNTING SYSTEM FOR MULTIPLE TRACK CONFIGURATIONS
- L-2 A STAND VOCABULARY FOR AUDIO TAPE DUPLICATORS
- L-3 DEVELOPMENT OF A NEW MAGNETIC TAPE FOR MUSIC MASTERING
- L-4 MEASUREMENTS OF MECHANICAL PROPERTIES OF MAGNETIC TAPE
- L-5 A DROP-OUT PERCEPTIBILITY COUNTER
- L-6 SPECIFICATIONS FOR MAGNETIC RECORDING AND REPRODUCING HEADS, AND TAPES
- L-7 MUSICASSETTE INTERCHANGEABILITY: THE FACTS BEHIND THE FACTS

SESSION M

THURSDAY, MAY 7, 1970 — 2:30 P.M.

LOS ANGELES ROOM

AMPLIFIERS AND AUDIO CIRCUITRY

- M-1 AUDIO ENGINEERING AND THE PUBLICATIONS GROUP
- M-2 ELIMINATING RF FROM AUDIO SYSTEMS
- M-3 OPERATIONAL AMPLIFIER IMPLEMENTATION OF IDEAL CROSSOVER NETWORKS
- M-4 A LOW NOISE APPROACH TO THE MIXER STAGE AMPLIFIER
- M-5 A GAIN-REDUCTION AMPLIFIER THAT EMPLOYS A JUNCTION FIELD-EFFECT TRANSISTOR AS AN ACTIVE ELEMENT OF A RESISTIVE DIVIDER

SESSION P

THURSDAY, MAY 7, 1970 — 7:30 P.M.

LOS ANGELES ROOM

AUDIO APPLIED TO EDUCATION, SCIENCE, AND INDUSTRY

- P-1 ACOUSTICAL HOLOGRAPHY AND ITS POTENTIAL AS A TOOL FOR STUDYING SOUND FIELDS
- P-2 AUDIO COMMUNICATIONS FOR THE SCIENTIST
- P-3 DIGITAL-AUDIO INDUSTRIAL CONTROL DEVICES
- P-4 MULTIMEDIA AUDIO VISUAL TECHNIQUES AND RELATED SOUND SIGNAL ACTUATION TECHNIQUES
- P-5 TRANSIENT RESPONSE OF EARPHONES FOR AUDITORY RESEARCH

SESSION N

THURSDAY, MAY 7, 1970 — 2:00 P.M.

GOLDEN STATE ROOM

MUSIC, SPEECH AND HEARING

- N-1 GROWTH OF VOCAL OUTPUT
- N-2 APPLICATION OF RATING SCALES TO QUANTIFY SUBJECTIVE EVALUATIONS GROUP OF CONCERT HALLS
- N-3 THE SIMULATION OF MOVING SOUND SOURCES
- N-4 A DEMONSTRATION OF MOVING SOUND SOURCES
- N-5 DETERMINATION OF AN EFFECTIVE TONAL RING SIGNAL
- N-6 SIMULATING JET AIRCRAFT FLYOVER FOR SUBJECTIVE JUDGMENTS

SESSION O

THURSDAY, MAY 7, 1970 — 7:30 P.M.

GOLDEN STATE ROOM

SOUND REINFORCEMENT

- O-1 DESIGN OF A HIGH QUALITY PUBLIC ADDRESS SYSTEM FOR AIRCRAFT USE
- O-2 ACOUSTICAL TREATMENT AND SOUND REINFORCING SYSTEM FOR THE WASHINGTON STATE LEGISLATURE
- O-3 THE DESIGN AND TESTING OF VARIOUS SOUND REINFORCEMENT SYSTEMS FOR INTERNATIONAL HOTEL, LAS VEGAS
- O-4 PROVIDING FOLOBACK WITH OUT-OF-Phase LOUDSPEAKERS
- O-5 MULTICHANNEL SOUND SYSTEMS FOR MULTIPURPOSE HALLS
- O-6 THE BIG SOUND IS ON THE MOVE WITH DISNEY ON PARADE
- O-7 SOUND SYSTEMS IN REVERBERANT ROOMS FOR WORSHIP

SESSION Q

THURSDAY, MAY 7, 1970 — 6:30 P.M.

A RECORDING STUDIO WORKSHOP FOR EXHIBITORS

- Q-1 BUS PICK-UP FOR AES REGISTRANTS WITH REGISTRATIONS ONLY AT 7th STREET ENTRANCE HOTEL ON LOWER LOBBY
 - Q-2 7:00 P.M. — VARIOUS RECORDING STUDIOS HOLLYWOOD/LOS ANGELES AREA
- NOTE: In order to attend the studio workshop it is necessary to be registered for the conference and to return the reservation form no later than April 20, 1970 to:

Mr. Wm. L. Robinson
SUNSET SOUND RECORDERS
6550 Sunset Blvd.
Hollywood, California 90028
(213) 469-1186

MAIL TO: Recording engineer/producer
6515 sunset blvd., hollywood, calif. 90028

Please include a Recording engineer/producer address label whenever you write to us about your subscription. The numbers on your address label are essential to insure prompt and accurate service.

CHANGE OF ADDRESS

Please let us know six weeks before you move. Place your current Recording engineer/producer address label in the space provided above and print your new address below.

Name

Address

City State Zip

(attach label here)

NEW PRODUCT NEWS

NEW DYNAMIC MICROPHONE FROM ELECTRO-VOICE To be featured in the E-V lecture-demonstration room at the Los Angeles AES Convention is the 'RE20' one of the latest advancements in the development of dynamic microphones. Claimed to have the widest, most uniform response curve of any dynamic microphone (45Hz to 18,000Hz), it is said to have characteristics comparable to high quality condenser mics.

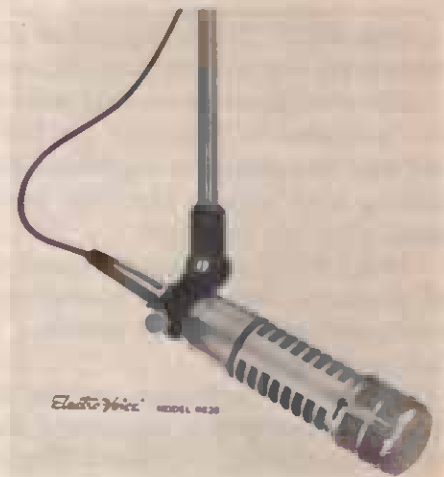
The RE20 case is machined from solid bar stock, and has built-in shock mounting and electrical shielding. A built-in pop filter eliminates breath and wind noises.

Acoustically, the RE20's cardoid pattern is very uniform. Off-axis response is almost as flat as on-axis, with maximum rejection designed for typical boom and stand usage. A bass tilt-down switch aids in reducing rumble.

These electrical and acoustical advantages are complemented by the usual ability of the dynamic microphone to "take it."

The RE20 is finished in Fawn beige Micomatte and is guaranteed unconditionally against malfunction for two years from the date of purchase, under the complete terms of the E-V warranty policy.

ELECTRO-VOICE, INC., Buchanan, Michigan 49107.



Circle No. 117



Circle No. 118

FADEX TO BE SHOWN BY AUDIO DESIGNS Audio Designs and Manufacturing, Inc., will exhibit their FADEX in booths 118 and 119 at the AES Show. Designed to operate in a line level circuit of any audio system, the FADEX adds sophisticated flexibility by automating and controlling variable timing of fading in separate channels. Fade time operates in increments as small as one second, and can be set to fade anywhere from 1 to 29 seconds. FADEX also makes it possible to program a tape and have a fade initiated at any given point, either up or down. Repeatability is assured through automation and quality circuitry, and may be tandemed together and operated from a single set of controls. Illuminated push-buttons on the face of the FADEX module always show its state. FADEX is available in three different models: Combination Fade Up-Down (#424), Fade Down Only (#424A), and Fade Up Only (#424B).

Audio Designs Manufacturing, Inc., 15645 Sturgeon, Roseville, Michigan 48066.

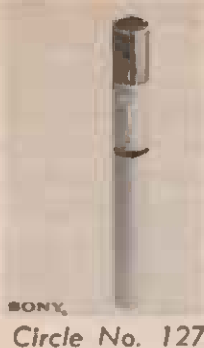
NEW MELCOR ELECTRONIC REVERBERATION UNIT Known as Model RE-100, the new fully electronic reverberation unit makes use of the latest state-of-the-art developments in integrated circuits and computer technology to attain excellent performance without the use of bulky and less reliable mechanical systems. Input and output amplification and equalization are self contained, and no additional equipment is required for connection to a system. Front panel switches provide selection of various types of reverberation and reverb times.

Because of the small size and weight resulting from its design, the Model RE-100 can be mounted in audio console or rack. Its small size makes individual reverb on different channels practical. It is particularly useful in portable systems.

Melcor's Model RE-100 may be seen at booths 1 and 2 at the Los Angeles AES Convention. Melcor Electronics Corp., 1750 New Highway, Farmingdale, New York 11735.



Circle No. 119



Circle No. 127

NEW COMPACT CARDOID CONDENSER MICROPHONE FROM SONY/SUPERSCOPE Designated the Model ECM-22, this newly announced microphone uses a permanently polarized electret capsule in its construction. As a result, the requirement of a polarizing voltage, a major source of noise in condenser microphones, has been eliminated.

Built into the three-way activation switch, in addition to 'on-off' is a mode selector enabling selection of either flat frequency response, or response that is 'rolled-off' below 200Hz.

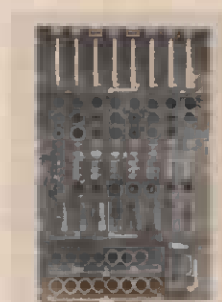
The ECM-22 is delivered with a swivel-mount stand adapter, wind screen, and a 20 foot cadmium-bronze, two conductor shielded cable at \$99.50 retail.

Superscope, 8150 Vineland Ave., Sun Valley, California 91352.

GATELY ELECTRONICS SERIES 8 CONSOLE MODULES In building block manner these new Gately console modules offer the ability to expand a system to full 24 inputs, for 8 and 16 track work by adding the appropriate building blocks.

All features; equalization on every channel, panning, choice of seven different peaking frequencies (5 high, 2 low), full 8 channel program assignment with solo, 2 or 4 channel echo assignment, full mix-down to stereo and derived mono, and slide attenuators with optional cue are standard and are included in this new systems approach.

Guaranteed noise is -127dBm and output is in excess of $+24\text{dBm}$. The Gately Series 8 system will be demonstrated at Booth 52 at the Los Angeles AES Convention. Complete product information will be sent from the company at 57 West Hillcrest Ave., Havertown, Penn. 19083.



Circle No. 128

B&K INSTRUMENTS ANNOUNCE THEIR NEW $\frac{1}{3}$ OCTAVE GRAPHIC SPECTRUM EQUALIZER Known as the Model 124, this unit to be shown by B&K in booth 59 at the Los Angeles AES Convention, modifies or shapes the frequency response of any audio system. The input signal drives 25- $\frac{1}{3}$ octave filters. Separate solid state amplifiers couple each filter to its own slide attenuator. An output amplifier sums the signal outputs from each attenuator and provides a low-impedance driving source.

Each of the 25 attenuators mounted on the front panel controls the contribution of its associated $\frac{1}{3}$ octave filter to the total output. Because the attenuators are logarithmic, the array forms a visual picture of the spectrum shape.

The range of each attenuator is $+10\text{dB}$ gain at the top to -40dB attenuation at the bottom. A detent at 0dB level permits easy normalization of the system. A VU meter prevents overload, clipping or distortion and maintains proper drive levels in the spectrum shaper.

B&K INSTRUMENTS at 5111 W. 64th Street, Cleveland, Ohio 44142.

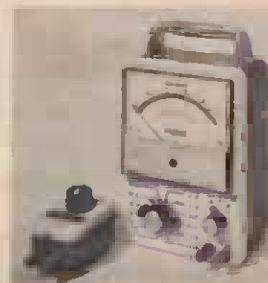


Circle No. 129

VOLTMETER FEATURES -82dBm SENSITIVITY Abphot Corp. announces its model 1001 electronic analog voltmeter, a precision solid state instrument for use in measurement of AC signals having amplitudes of 30 microvolts to 100 volts in the frequency range of 10 Hz to 1 MHz. The instrument's sensitivity combined with its low internal noise, typically, -108dBm on the 300 microvolt scale, make it a versatile instrument for use with today's modern low noise audio equipment. Important features include: 300 microvolt full scale sensitivity, $4\frac{1}{2}$ " taut band movement, 1 megohm input impedance.

Price of the model 1001 is \$160.00.

ABPHOT CORP. (Instrument Div.), 105 West 27th Street, New York, N.Y. 10001.



Circle No. 130

NEW KOSS ESP-9 STEREO PHONES REPRODUCE ALL 10 OCTAVES $\pm 2\text{dB}$ Technically these new phones from Koss offer a frequency response of 15-15,000Hz $\pm 2\text{dB}$ covering the 10 audible octaves. Used, and pictured here, with separate energizing source containing oversized coupling transformers, these phones feature a high power capability in the very low-bass range delivering good wave form at 30 Hz with up to 10 volts input.

The ESP-9, latest in the line of electrostatic principle sound reproducer phones, is the lightest yet offered, making them attractive to studio personnel who frequently wear phones for extended periods.

The ESP-9 and other precision Koss products can be seen and tested at the Los Angeles AES Convention at booth 41.

Complete specifications can be obtained from Koss Electronics, 2227 North 31st Street, Milwaukee, Wisconsin 53208.



Circle No. 131

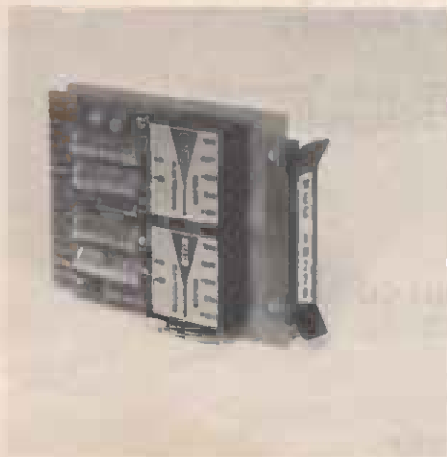
DUAL MICROPHONE PREAMPLIFIER MODEL AM220 A new dual microphone preamplifier containing two complete microphone preamplifiers on a single PC card is available from Melcor Electronics

Known as Model AM220, the unit's two amplifiers feature a balanced transformerless input which is achieved by using the differential input capability of the Melcor Model 1731 Audio Operational Amplifier. The balanced input retains the hum cancelling features of the transformer input construction while eliminating the distortion, phase shift, size and weight normally associated with magnetic elements.

The Melcor AM220 is ideally suited for operation with high level capacitance microphones. Gain is factory set at 45 db, but can be precisely adjusted from 45 db to 20 db with the addition of fixed resistors connected across the appropriate terminals of the external connector. The gain changes take place in the feedback loop of the Melcor 1731 amplifier to maintain optimum signal-to-noise ratio.

This and other Melcor products can be seen in booth 1 and 2, Los Angeles AES Convention.

Additional information can be obtained from Melcor Electronics Corp., 1750 New Highway, Farmingdale, New York 11735.



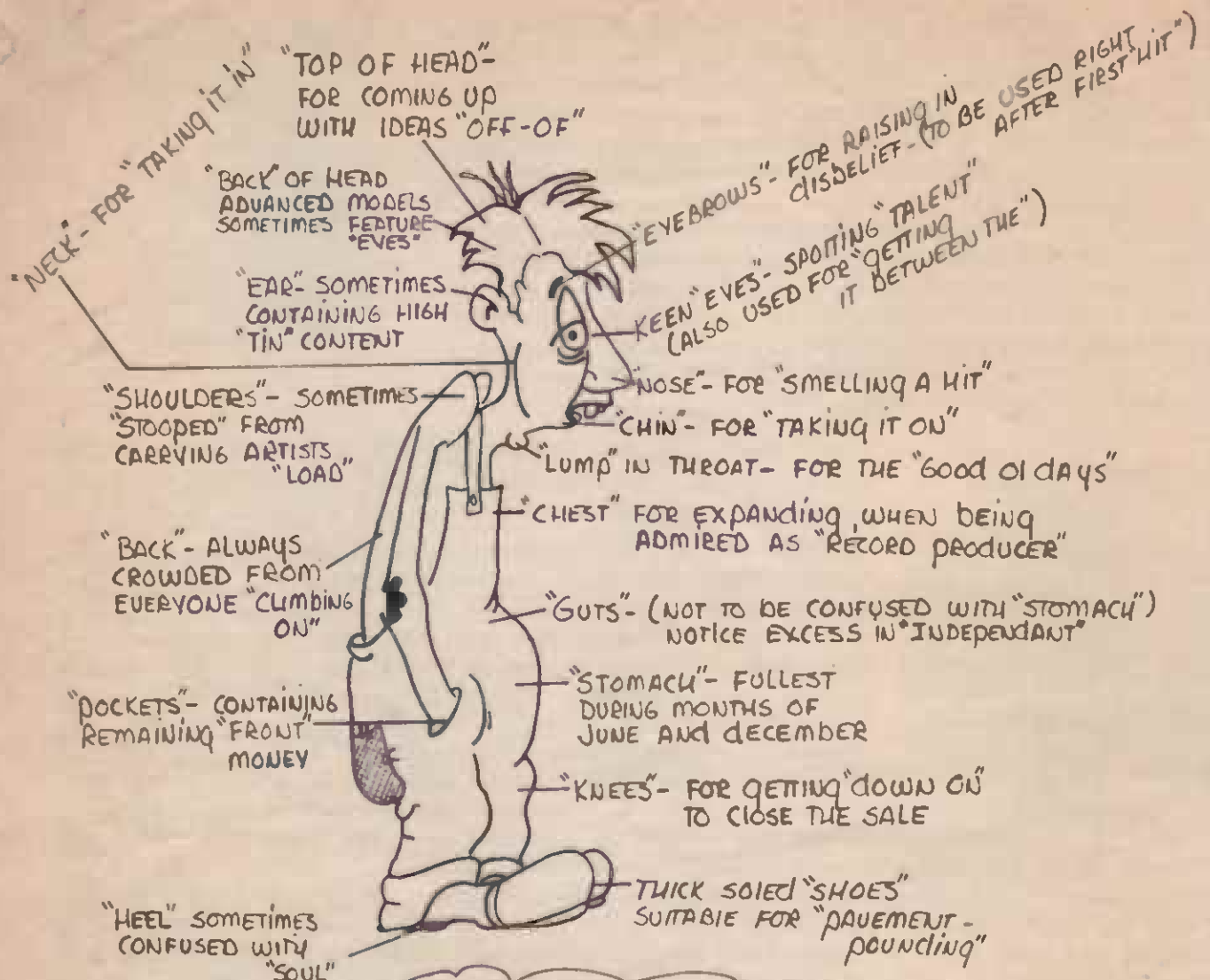
Circle No. 132

GOTHAM EMT-156 COMPRESSOR/EXPANDER/LIMITER Gotham Audio Corporation will introduce the EMT-156 Stereo Pulse Duration Modulation Limiter, Compressor and Expander. The characteristics of the three functions can be varied to suit the program material. In automatic mode, a built-in analog computer controls the release time of all three functions. The unit is programmed to minimize the perception of gain changes. A separate input is available to accept external programming of the gain function.

The EMT-156 will be featured among the broad line of Gotham products at the Los Angeles AES Convention at the Gotham Booths 113-114-115-116. Complete specifications and technical data can be obtained from Gotham at 2 West 46th Street, New York, N.Y. 10036.



Circle No. 133



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Integrated
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**Rx for
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Modern tape-recording science announces a breakthrough in mastering technique—the Crown Integrated Mastering System with CX822 or CX844 tape recorder. It is a complete mastering system including computer-logic controlled transport, loZ mic input mixers (2/channel), headphone amps, bass and treble equalizer for each channel, built-in echo option, trac-sync, and rugged carrying case, all in one compact unit. The Crown Integrated Mastering System is a "sure cure" for on-location mastering sessions suffering from these ills:

SYMPTOMS

1. Feverish activity, indigestion and hypertension
2. Recordings muffed; clients upset or lost
3. Recording crew discouraged with technical problems

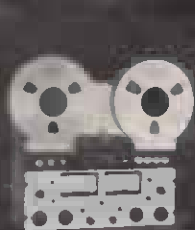
DIAGNOSIS

1. Equipment in many separate units, meaning a truck for transportation and cramped, cluttered recording area
2. Complicated setup, needing two or more strongmen, with never enough time to adequately check out each component
3. Innumerable cables which (if you remember them all) work perfectly until two minutes before recording time

CURE

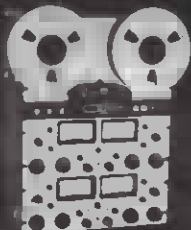
1. One Crown CX822 or CX844 tape deck, each a single unit complete for mastering, easily transported and very compact
2. One-man setup with plenty of time; simply plug in microphones and headphones
3. Relax. With no space, time or cable problems, you can concentrate on creative recording, with superlative Crown quality that will delight your client.

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CX822

Two-channel deck
\$2329 complete



CX844

Four-channel deck
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D40 2-channel 60w amplifier — \$199



The
channel
Am

RE 15

RE 10

RE 11

RE 16

NEW Model RE10 \$156.00 shown on Model 421 desk stand \$18.50. Model RE15 \$265.00 shown with Model 307 suspension mount \$34.50. NEW Model RE11 \$166.00 shown with Model 311 snap-out stand adapter \$6.50. NEW Model RE16 \$275.00, shown on Model 421 desk stand \$18.50. List prices shown. Normal trade discounts apply.

Freedom of choice!

EY Professional sound has entered a new era. It started with the Electro-Voice Model RE15. And now there are four E-V dynamic cardioid microphones that share its distinctive advantages — with some unique benefits of their own.

Unaffected by Distance . . . Angle

Basic to all of these microphones is Exclusive Electro-Voice Continuously Variable-D* construction. Now it offers something you've never heard before with any microphone: no matter what you do, microphone response never varies!

Whether performers almost swallow the microphone, wander far off-mike . . . or even move around to the back . . . you'll still get the same smooth response. Only the level changes.

Once you set equalization it remains constant. You have full assurance that tonal balance won't change between the dress rehearsal and the final performance, no matter what the talent does.

Improved Cardioid Pattern

Only acoustics and noise can limit you. Yet even here these new E-V microphones gain an advantage from the super-cardioid pattern that provides better sound control than ordinary cardioids. With maximum rejection 150° off axis, it is easier to eliminate unwanted sound while maintaining normal stand or boom microphone positions. There's also an integral bass-tilt circuit to cut rumble below 100 Hz. when needed.

Now Select from Four Models

In addition to the original RE15, we've added the RE16. The same fine microphone with an external "pop" filter to solve the problems of ultra-close miking.

The new RE10 is the economy version of the RE15. The same concept and quality, but for slightly less rigid requirements. And the RE11 is the lower cost twin to the RE16.

These four great cardioid microphones give you new freedom to head off sound problems before they start. Your E-V microphone headquarters has them waiting. Choose today.

*U.S. Patent No. 3,116,207. Trade mark registered.

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