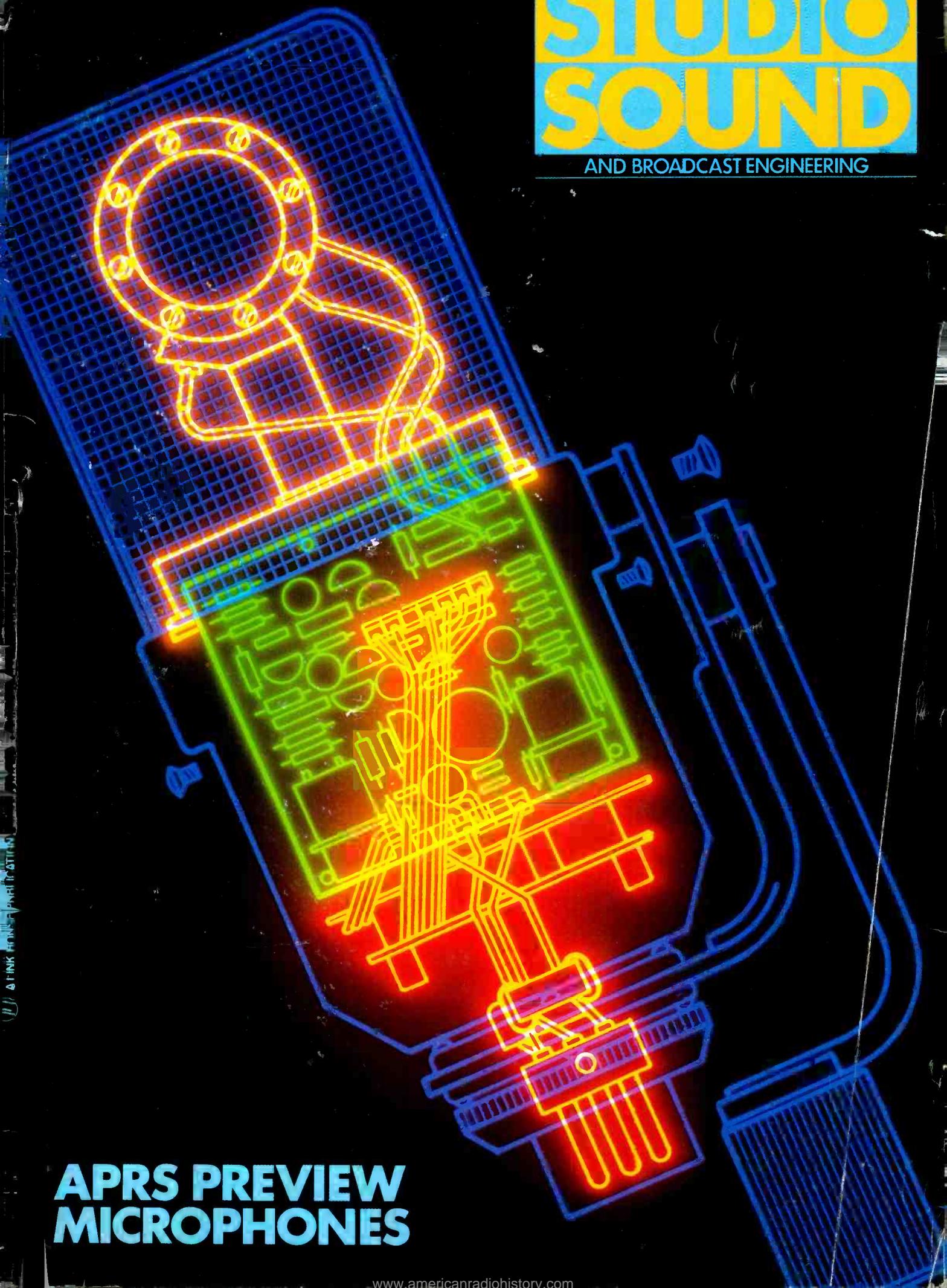


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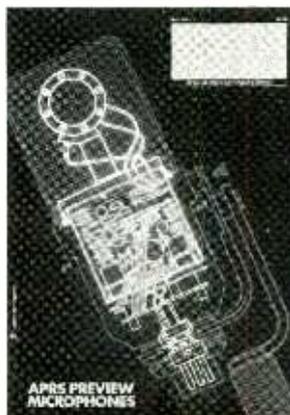
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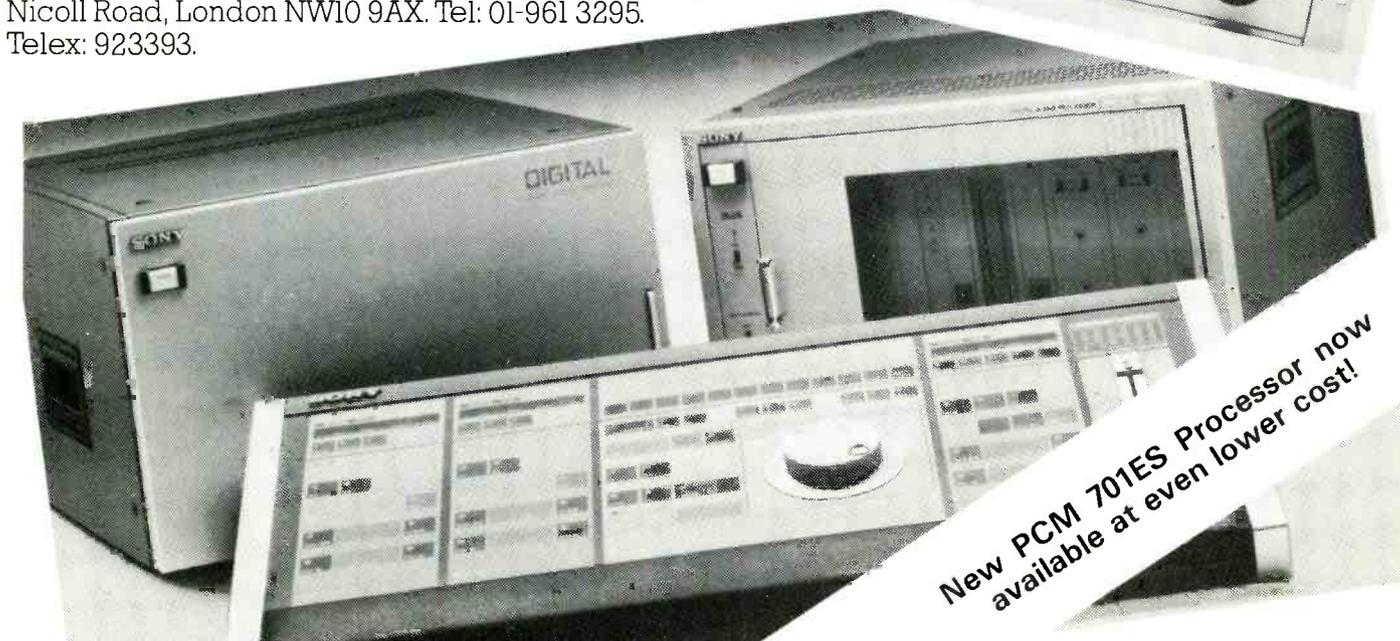
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EDITORIAL

Recording a change of editorship

A new face

Unless you are in the habit of reading the staffing masthead at the bottom of the contents page, you are probably unaware that there has been a change in editorship here at *Studio Sound*. The purpose of this editorial is quite simply to say 'Hi', introduce myself and try to give some outline of the future direction that we will be taking as a magazine. (Quite simply?—I've been putting off writing this for days!)

This is in fact the second issue that I have been nominally responsible for. It takes many months before you are in total control as you work through the agreements, arrangements and policies made by your predecessor. Having been deputy editor for the last two years, I have had a say in the formulation of many of the editorial policies and style during that time. Because of this, don't expect to see any large changes too soon. It is far better that any changes are gradual; this then allows time for consideration and reflection. I am at present looking at every aspect of the magazine and some areas that are not really covered to any extent. My aim, or should I say philosophy, is to produce a magazine that I would like to read. My passport lists my profession as recording engineer and although I have not restricted myself purely to engineering for a couple of years now, that is still the way I see myself and so can hopefully share interests with a very large proportion of our readership.

I also feel that the magazine should be more than a passive observer of the recording industry from the outside. We see ourselves as part of the same business that you are in although our end product is slightly different.

Please make use of the magazine. Write to us, ask questions, tell us news, suggest ideas for articles or areas of coverage. Even telephone us at the office and we will try to be as civil as editorial schedules allow. I of course reserve the right to disagree which is my privilege as editor. I might also suggest that the reason we have not carried the article you would like to see is because you haven't written it yet! A great deal of an editor's time is taken up by twisting arms of potential contributors and sweet talking manufacturers and engineering people into exercising their literary talents. One slight change that you will now see is that we are very keen on short pieces of half a page or so.

Becoming editor of this magazine is rather like joining a very exclusive club. The other nine members have all contributed to some aspect of the magazine and many of them are remembered either by name or by certain epic articles that have appeared in the last 25 years. Some were excellent at steering the magazine through areas of change within the industry and some took the magazine into areas that we see little trace of in recent years although it was all formative. If, however, you look through back issues particularly from the early '70s you will see types of article that have not been seen in *Studio Sound* for many years.

This brings me to a point that I would welcome any comment on.

In the early '70s there used to be fairly regular articles that could really only be described as educational. In recent years we have assumed a very informed and professional readership profile which is exactly right but this should not prevent learning. I'm not suggesting topics such as 'What is bias?' or 'How to build a recording studio' but the occasional seminar-type piece that would refresh our minds in a specific area with a return to the basic technical facts then bring us fully up to date on the latest thinking in that area. Your feelings please.

All that really remains is for me to wish Richard every success in his future activities. He will still be retaining very close links with the magazine and I look forward to many articles from him on a regular basis.

I think that I have now achieved what I set out to do this month: introduce myself and give a few guidelines for the immediate future of the magazine. It's now down to business.

Keith Spencer-Allen

Hail and farewell

This is the last Editorial I will have a hand in on *Studio Sound*, on account of the fact that, at the time of writing, I have just left the magazine! Keith Spencer-Allen has taken over, and with the title comes the task of writing these bits at the front of the magazine.

I am obviously very happy to have been the editor of *Studio Sound* since September 1980, and hopefully my 'reign' will have been well-received by you lot out there. Keith follows on in a similar tradition to myself in that he, too, is a working studio person (like Mike Thorne before us) . . . an activity which I hope, enables the magazine to keep in touch with the industry more effectively.

I am in fact disappearing back 'into the industry' again, to concentrate more on studio work, but I will also be working in computing and data communications as they apply to the music business, as well as other industry activities more concerned with writing. In addition, I will be submitting a regular column, plus the odd User Report, for *Studio Sound* in a new role as contributing editor. I am completely confident that Keith will take the magazine to even greater heights and there are a lot of developments on the way which will make the magazine even more useful to the working studio person, whether his or her forte is recording, mixing, maintenance, management or production.

In saying goodbye, I'd like to thank everyone involved in all aspects of the magazine: staff, contributors, readers, manufacturers . . . all those who have made *Studio Sound* the world's leading recording journal. It's going to continue that way!

Richard Elen

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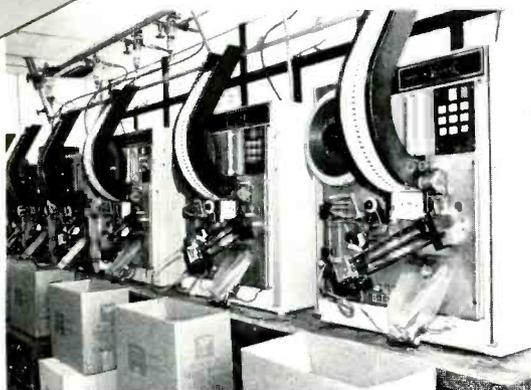
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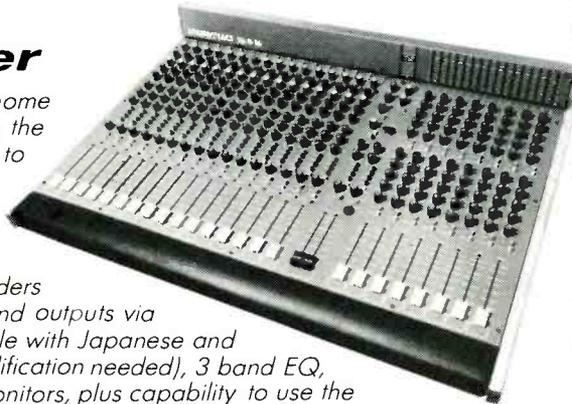
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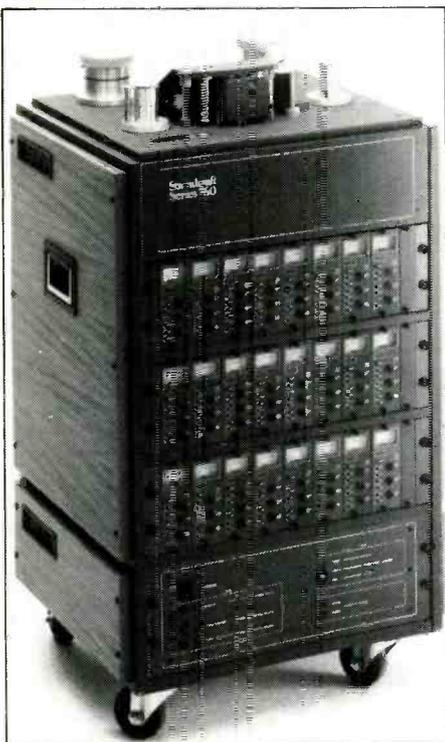


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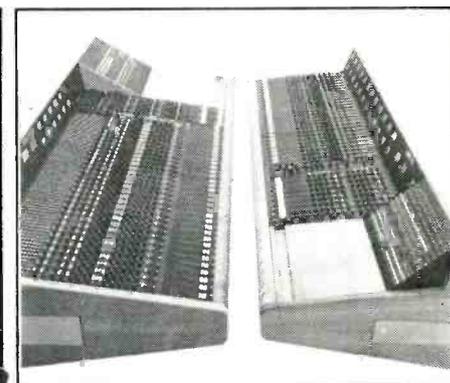
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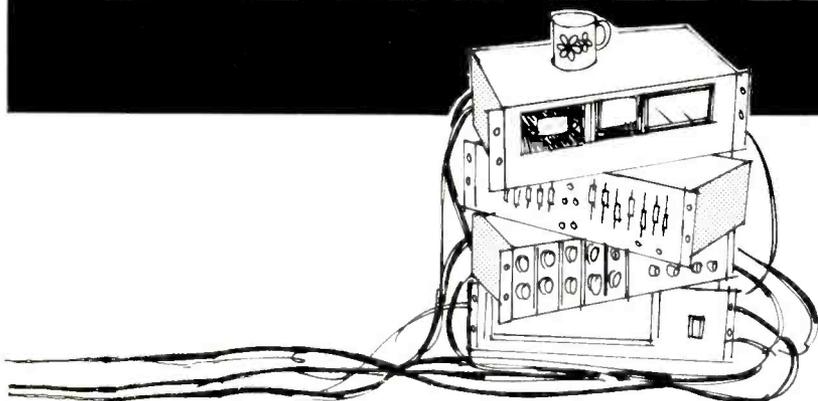
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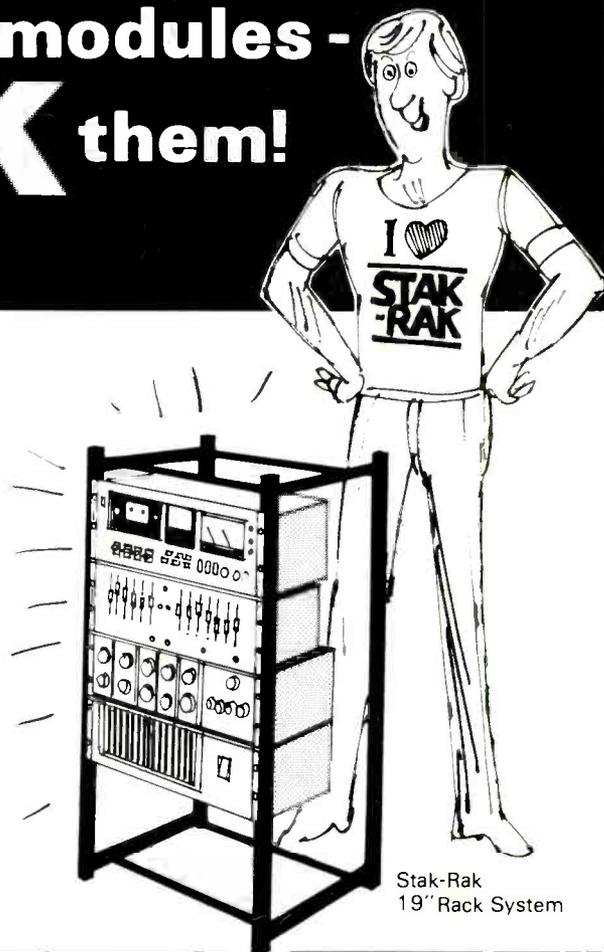


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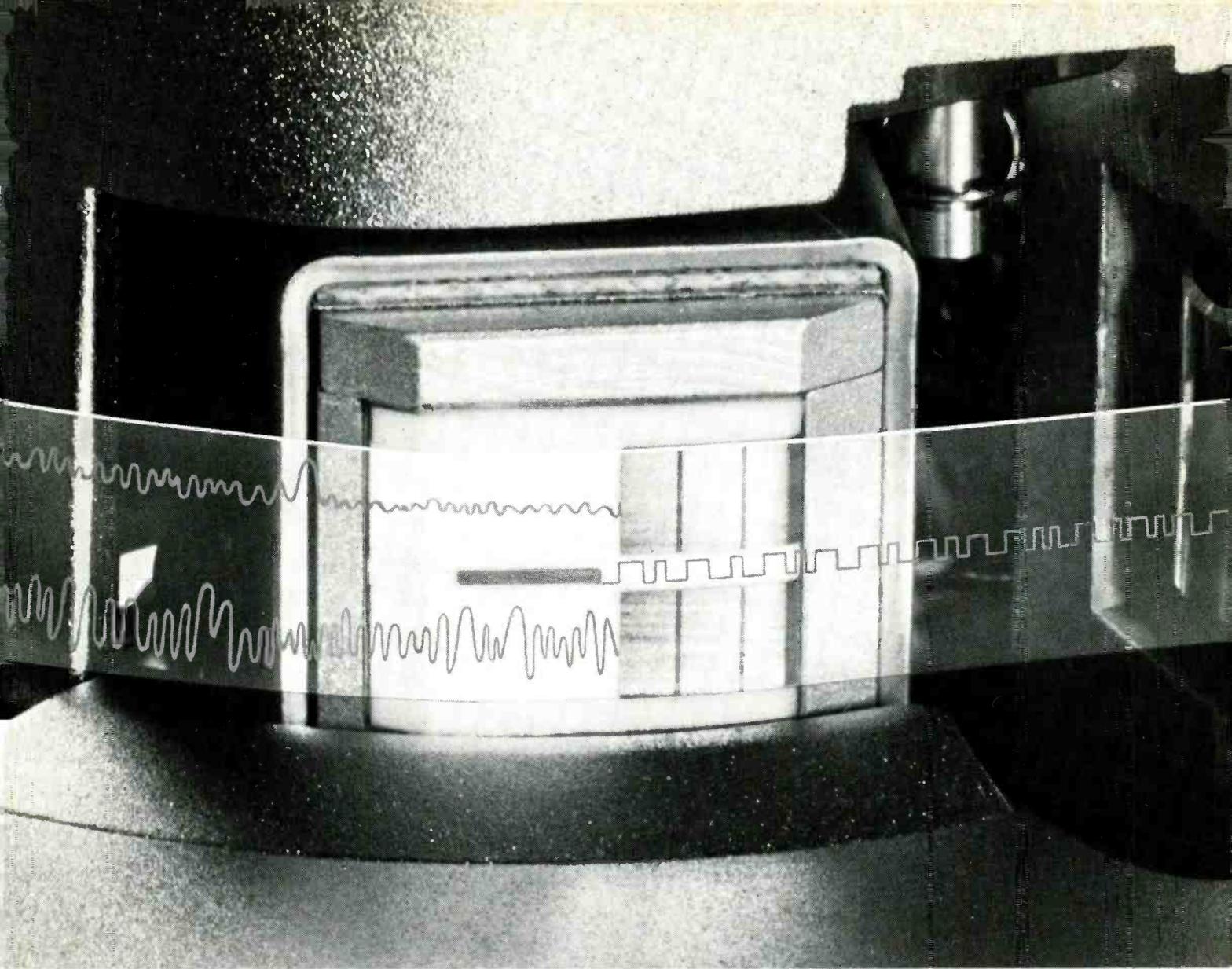
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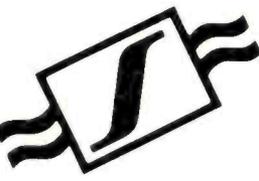
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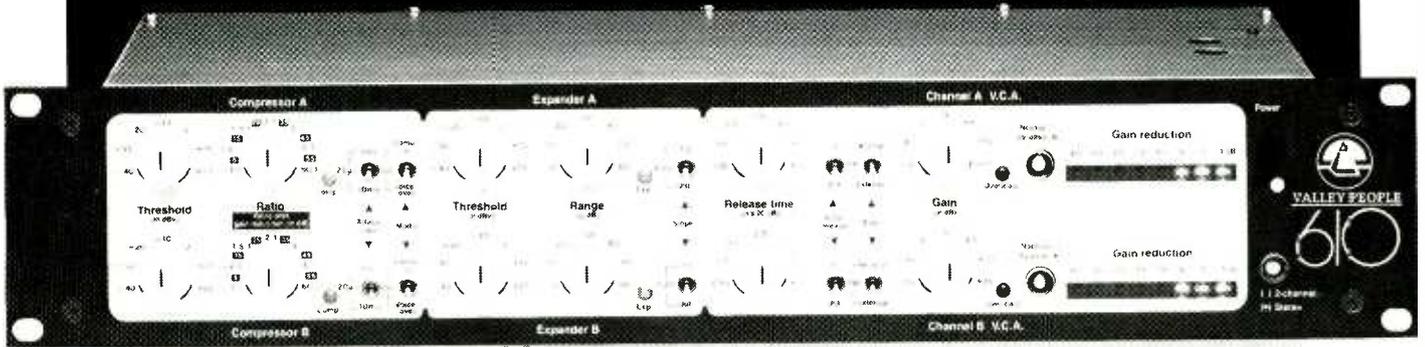
The system has recently been extended by the addition of two new products. The MKE 212 acoustic boundary microphone gives a clean, balanced, natural sound that adds a new dimension to sound recording. The MKE 2 is a subminiature tie-clip microphone. Using the same capsule as the MKE 212 it provides a clear, crisp sound from a package only 5mm. (dia.) x 10mm. For full details of Sennheiser products and our guide "How to choose, use and abuse microphones" please contact us on 0753 888447

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APRS 84

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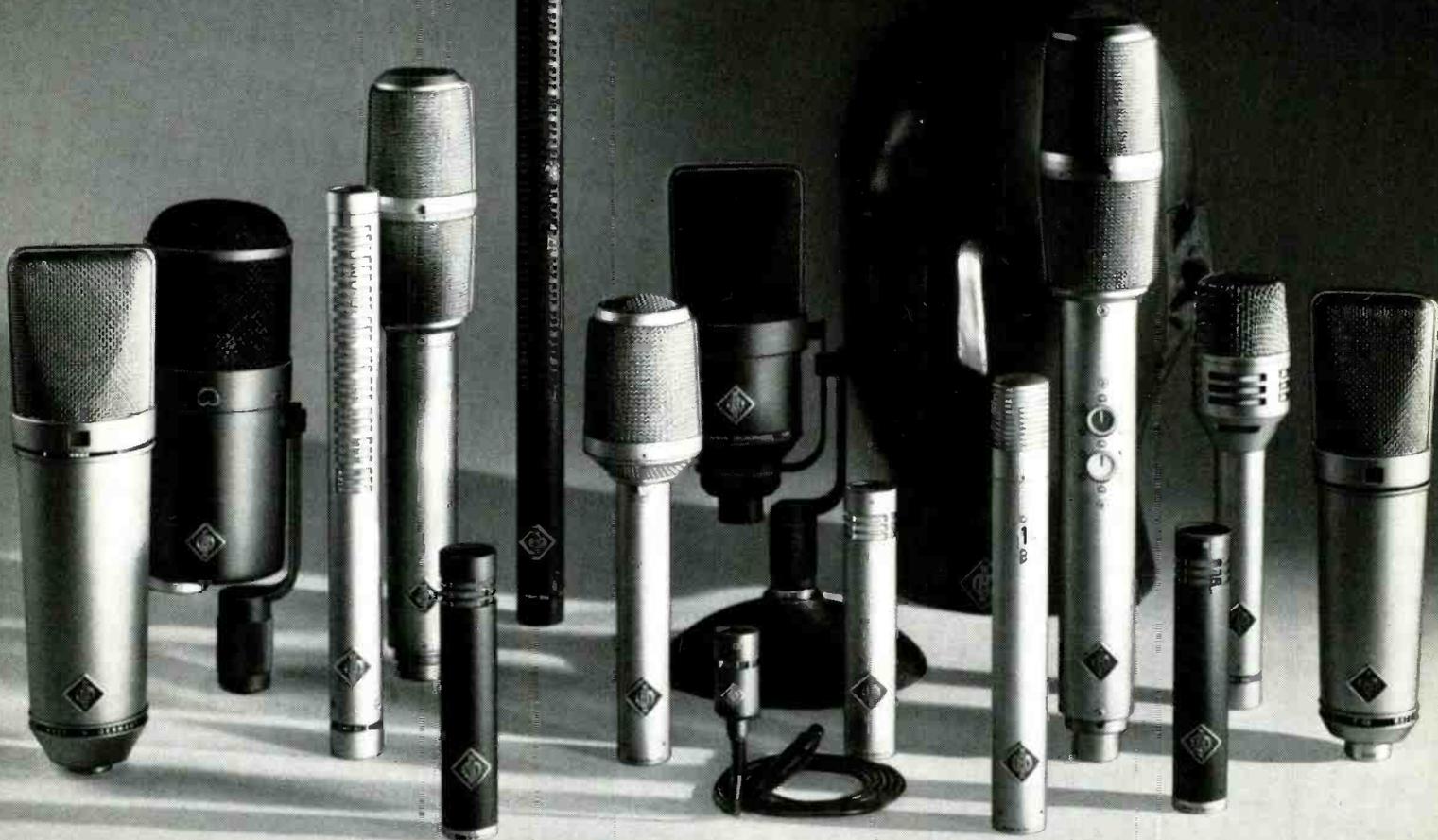
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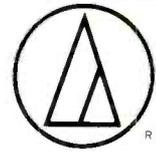
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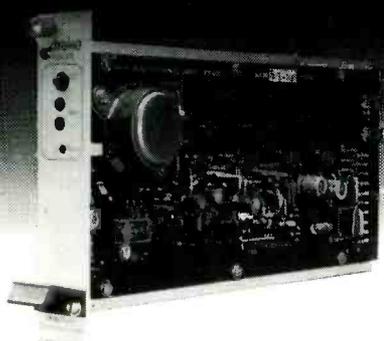
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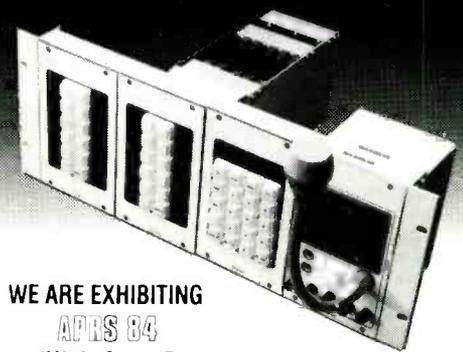
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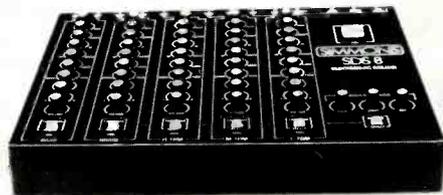
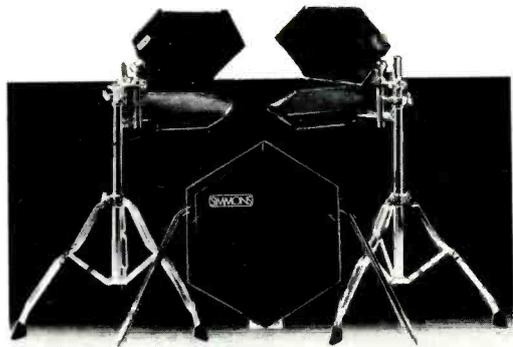


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In stereo form, "Dreadnought A" delivers 300 watts RMS per channel into 4 ohms and in bridged-mono format delivering an effortless 500 watts RMS per channel. If this is not sufficient, there is of course, the mighty "Dreadnought B" which in stereo delivers 480 watts RMS per channel into 4 ohms and a staggering 700 watts RMS in bridged-mono mode.

These units are available in basic form and can have input sensitivities and connection terminals optimised for your specific requirements at no additional charge. Each amplifier carries a 3 year parts and labour warranty and as their main UK retailers, we keep spare units on hand at all times. We are therefore able to carry out service/repairs quickly, should they be required. This is, of course, especially relevant to Studio use.

Dreadnought A:

200 RMS p/ch into 8 ohms stereo.
300 RMS p/ch into 4 ohms stereo.
350 RMS p/ch into 8 ohms mono.
500 RMS p/ch into 4 ohms mono.

List price: £630 ex. VAT per unit.

Dreadnought B:

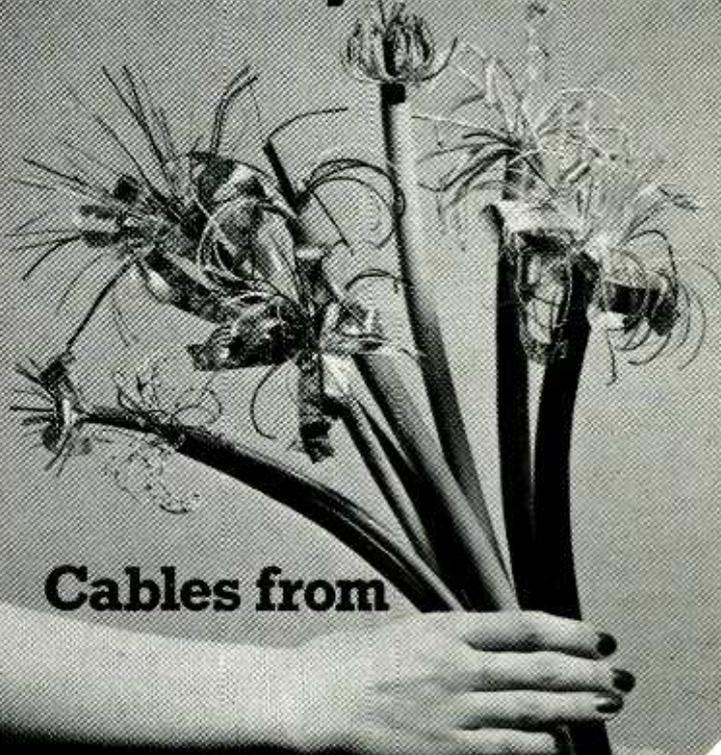
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Otari & Turnkey, together at APRS '84

Reinforcing our leading position as full line dealer, our stand is adjacent to that of Otari during the APRS show in London.

Since the introduction of their MTR 90 series, the Otari range of professional audio recorders have rapidly gained a reputation for both quality and reliability amongst the major studios.

For our part, we have supplied machines for applications that range all the way from one man studios through to major audio visual sweetening installations.

During this months APRS show, you will have a unique opportunity to discover and evaluate the full range of Otari product from Turnkey.

5050 MkIII Series From their best selling two track, through four and to eight these are the budget Otaris with a difference.

There's a list of features that separates these recorders from overrated, domestic machines. XLR's, line up tone oscillator, SRL setting, flux choice and a range of front panel trimmers.



4050 Duplicators Running at an 8:1 ratio, these fast duplicators start at a basic one to one system that you can add to and expand as the need arises.

Available from Turnkey at a price which makes in-house duplication a reality for every professional studio

MTR 12 Series The big reel successor to the acclaimed MTR10 stereo master recorder. Thoroughly recommended by leading engineers. With every feature for music and broadcast. Versions up to half inch two track.



MTR 90 Series II This is the best selling 24 track that major studios worldwide are upgrading to.

Visit Turnkey and Otari on stands 2 through 9, and then discover the most advanced analog recorders available in the marketplace today.



An unrepeatable eight track offer. and a rock bottom sixteen track package

We have a batch of Seck 24-8-2 mixers on offer at a greatly reduced price. (The £999 ticket applies to the 'road case' version of the studio version is just £950).

Our special stock is in original working condition, covered by the manufacturers guarantee.

Though these mixers are designed for eight track use, they can be used for sixteen. The grand total of 24 input channels, permits easy monitoring. A rock bottom price is possible with the Fostex B16

Other B16 packages As well as the Seck range we can offer Soundtracs, AHB, and the RSD Studiomaster. Each product has its particular application and it is important to evaluate the choices carefully. Only Turnkey gives you such a wide range of choice.

Call for more information.



100dB/mW, Denons folding Phones

Eventually our supply of DH61-S headphones had to run out. For nearly five years they were our best selling budget phones. In the meantime a revolution in lightweight headphone design took place. These new style 'phones have found their way into studios. Here's our choice.

They fold down, and arrive packed in, a cassette sized case. Foam pads ensure comfortable wearing over a long period of time. An adaptor lead terminates in a stereo plug.

The Denon AH P5 are the new way to listen.



The end of synthesisers as you know them

An idea can be played on the keyboard in any conceivable voice, recorded digitally and edited or retimed. And each development or orchestration can be added and manipulated and recorded separately on the sixteen track recorder. There's final mixdown, playback and music printing.

That's just a fraction of what Synclavier can do. Whole verses of real sounds can be captured

and minutely manipulated.

Users such as Martin Rushent and Daniel Miller are discovering the potential of Synclavier as a production tool. There's a great deal of exciting progress being made with this computerised music system. All pointing to the future of music - and recording.

For full details on Synclavier, and the latest software and hardware updates, call David Whittaker at Turnkey.



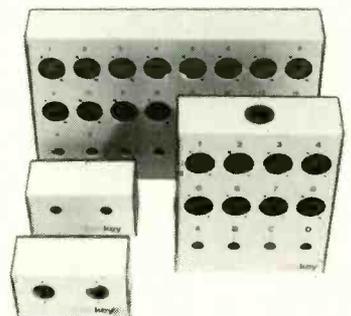
Contracts complete

Madness already update to an Otari MTR 90 ... Chelsea Music Studio took delivery of a large frame Soundcraft 1600 ... just yards away, Snake Ranch have a Soundcraft 2400 ... Manfred Manns Workhouse takes a MTR 90 twenty four track ... A third MTR 90 goes to Multitrack Hire ... Bright Records go for a full twenty four track system ... Chris Bayliss and Steve Hillage both take a 24 track Soundcraft.

Custom mike boxes no more lost fingers

If you have ever drilled out a die-cast box to take XLRs and jacks, you'll appreciate what we mean.

There are five types of box. A two way type for male, female XLR or jacks, eight female XLRs plus four jacks, and one double that. Made from sturdy steel, finished in two tone brown, and offering both side and back cable entry. Available with various legends to help organise your wiring system. Small boxes are marked 1/8, 9/16 or 17/24. Call us for prices both with and without connectors.



Expert service on all Revox products

Seen above, a well used G36 from the good old valve days, undergoing repair in our service department. Whilst not an everyday occurrence we are asked to do cope with all manner of maintenance on Revox. From a line up to thorough overhaul, we offer a complete and efficient service.

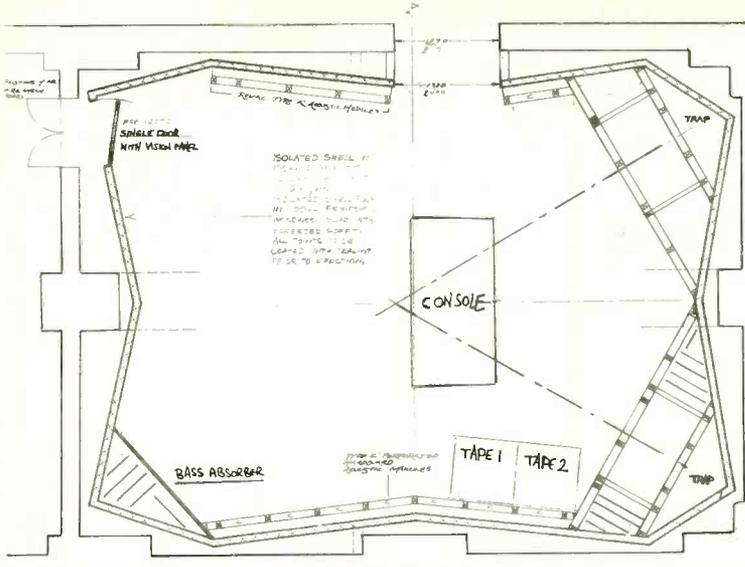
Our daily London van service can pick up and drop off the equipment for convenience. We are only as far away as your phone.

Service can be undertaken on all professional audio products. Call for more information.



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TURNKEY CAN OFFER COMPLETE SERVICE AND LINE-UP FACILITIES ALL PROFESSIONAL AUDIO PRODUCTS WHETHER PURCHASED FROM OURSELVES OR NOT WE CAN HELP YOU TO FIND AND ARRANGE FINANCE. INSTANT CREDIT OF UP TO £1000 IS AVAILABLE TO PERSONAL CALLERS ONLY IF YOU HAVE A VALID CREDIT CARD.



Kajagoogoo studio breaks new ground

The concept behind this working band's studio is somewhat different from the more conventional projects that Turnkey Two undertakes.

The original specification was to build a combined control room and studio, to create and record music in.

The now completed facility occupies some 400 square feet of space in central London. Andy Munro's live end - dead end approach results in the expected positioning for the equipment.

The 'control room' is at the dead end - allowing accurate monitoring from the built in JBL 4435, 'bum' speakers. A Soundcraft 2400 series console was also supplied, installed and commissioned by Turnkey as part of the contract.

Uniquely, all the effects equipment is racked in mobile units that work with the musicians on stage - and then become part of the studio for recording.

The live end is treated with slate on the walls, permitting very bright, lively acoustics.

Using both ends of the room offers a full range of acoustics for every type of recording.

This studio cum control room offers a comfortable working environment, to create and record in. A good example of Turnkey's next generation of studios.

Call Andy Munro for full information on our studio design and construction service. Or talk to us directly during the APRS show and find out more about some of our recent projects.

Livingston choose Otari from Turnkey, once again.

Only months after upgrading a 24 track Lyrec with an Otari MTR90, Livingston studios in Wood Green decided to take another.

Once the engineers and clients settled in with the new equipment, the potential of the MTR90 was quickly realised. All the many features that identify the machine as a fast, reliable production tool were quickly proven. The decision to upgrade their other studio to another Otari, followed rapidly.

More and more studios are upgrading to Otari from Turnkey, as the logical choice for the highest audio quality.

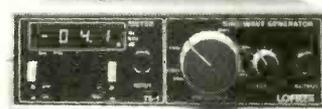
Make a point of visiting the Turnkey and Otari on stands 2 through 9 during the APRS. Talk to Garry Robson or Andrew Stirling and discover how we can help you upgrade your studio to the very latest technology.



Now, battery power for Loft's test set

Now the ideal test set will run on batteries as well as mains. It has the minimum of controls. Starting with an audio oscillator that covers the entire spectrum in a single sweep. Then a digital reading level meter that measures directly in dB's over a range of 74dB's. And finally a frequency counter that displays the oscillator or meter input in large LED digits.

A test set that's small enough to



operate anywhere, yet precise enough for any professional application.

The Loft TS1 is manufactured by the Phoenix Audio Labs and distributed exclusively by Turnkey.

Call for full specifications.



In-line Turnkey Exclusive. The TS24 from Soundcraft

If you have been watching their studio console designs progress through the years as closely as we have, you will have noticed that much of their success is due to challenging innovation.

It comes as no surprise then, that when their R&D department went ahead with developing the long awaited in-line console a fresh approach was needed.

Their latest TS24 console takes an innovative step beyond the usual in-line approach.

Normally, an in-line channel contains two signal paths - one sends to the multitrack, the other is used for monitoring. When you mix, the monitoring is usually unused and you re-use the signal paths that went to the multitrack they connect to the mix buss. You

reconfigure the console when you change from record to mix.

The TS24 dispels all of this confusion. The signal path which is designated 'channel' always goes to the multitrack, and the 'mix' path is always connected to the mix buss. So your monitor becomes your mix, and you can mix as you go.

Soundcraft's new TS24 is a

departure from their usual split console approach, yet it offers very logical, fast operation in a most compact way.

The many innovative features and facilities are described in a new, eight page brochure. Call us for a copy.

We have Soundcraft at APRS. Talk to Turnkey, nobody knows Soundcraft better.

CALL TURNKEY FOR FULL INFORMATION AND PRICES ON ALL PROFESSIONAL AUDIO PRODUCTS. COMPLETE 44 PAGE CATALOGUE IS AVAILABLE ON REQUEST WE CAN HELP YOU TO FIND AND ARRANGE FINANCE. INSTANT CREDIT OF UP TO £1000 IS AVAILABLE TO PERSONAL CALLERS ONLY IF YOU HAVE A VALID CREDIT CARD.

A cassette with XLRs, from Tascam

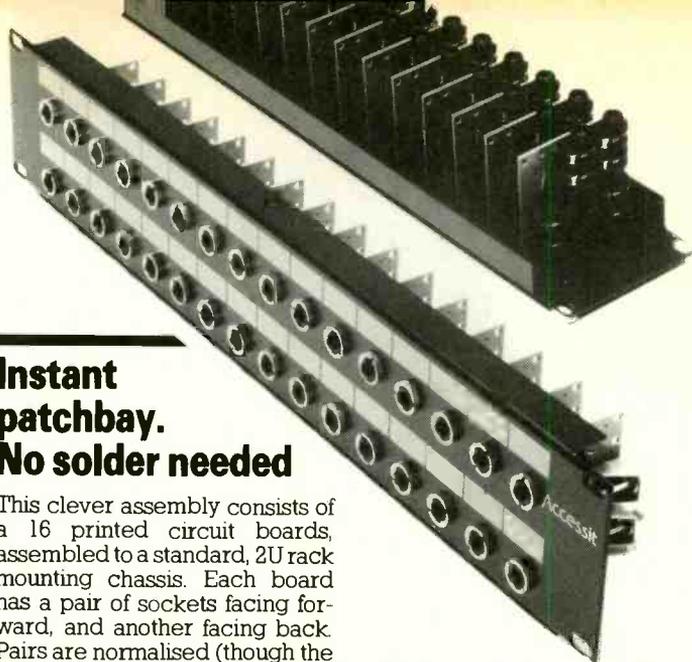
Whilst Tascam still refuse to acknowledge anything but the minus ten standard on their home recording equipment, a new cassette deck solves the problem when you need a cassette deck that will interface at studio level. The Tascam 122B is a special version of the 122. Balanced input and output connections, on XLRs and at levels to the +4dBm standard.

The features of the best selling

122 original are still there. Front panel calibration, three tape type selection, Dolby B and HX, plus two speeds.

A DC servo capstan maintains precise speed accuracy and microprocessor controls ensures smooth operation.

Now you have the choice of two professional cassette decks from Tascam. Call us for the latest price information, or more on any Tascam product.



Instant patchbay. No solder needed

This clever assembly consists of a 16 printed circuit boards, assembled to a standard, 2U rack mounting chassis. Each board has a pair of sockets facing forward, and another facing back. Pairs are normalised (though the link can be simply snapped out). Available with jack or phono on rear, standard jack on the front.

Modpatch is the easiest way to set up a basic patchbay that needs to stay flexible.

Klotz in Stock

Adding to our range of cables (West Penn, Musiflex, MP1) we now stock black Klotz. Order as symmetric for twin, or asymmetric for single. Also heavy duty speaker cable. Klotz cables are heavy duty, with a very flexible, rubber like outer.



Do you have a copy of our Fact File yet?

Based on our wide experience of private and commercial studio projects, we have prepared a unique file of information.

It contains facts, figures and comment, covering all aspects of establishing a successful 16/24 track operation.

In short, it is essential reading for anyone considering a major multitrack venture.

For your free copy, apply directly to Garry Robson.

Snip, Splice and Demag. Our latest Tape Care product review

If you buy Ampex tape from Turnkey, then you already know about our keen prices, prompt delivery and periodic bulk rebate. In addition we carry a wide range, and extensive stocks of all the top quality tape care accessories.

Leader Tape Red, green, white and yellow in 1/4 inch, no yellow in 1/2 inch and just red and white in 1 and 2 inch.

Editing Tape Up to one inch available. We turn our stock often so the adhesive is always fresh and permanent.

Editing Block Again, from 1/4 inch to 2 inch is kept in stock.

Editing Blades Hard backed blades to cut tape and not your fingers. Always in stock.

Chinagraph Pencils Are so popular that we keep them in four colours. Red, white, yellow and black. Only sold in dozens.

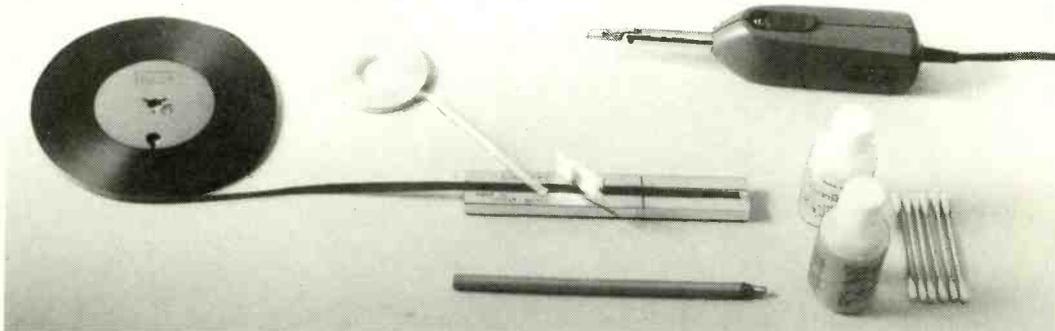
Demagnetiser This is made by Teac as used in our service department. As pictured above.

Empty spools Both 5 and 7 inch plastic - plus metal NAB spools, 1/4 and 1/2 inch.

Cleaning Kit Includes head cleaner and rubber restorer plus a supply of cotton buds.

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All these products are available by mail, or call in to our showroom. You can place your order by phone, quoting your credit card number for quicker processing. Our daily London delivery service means that we can offer a fast and direct delivery if necessary. Now you can call Turnkey for all your tape needs.



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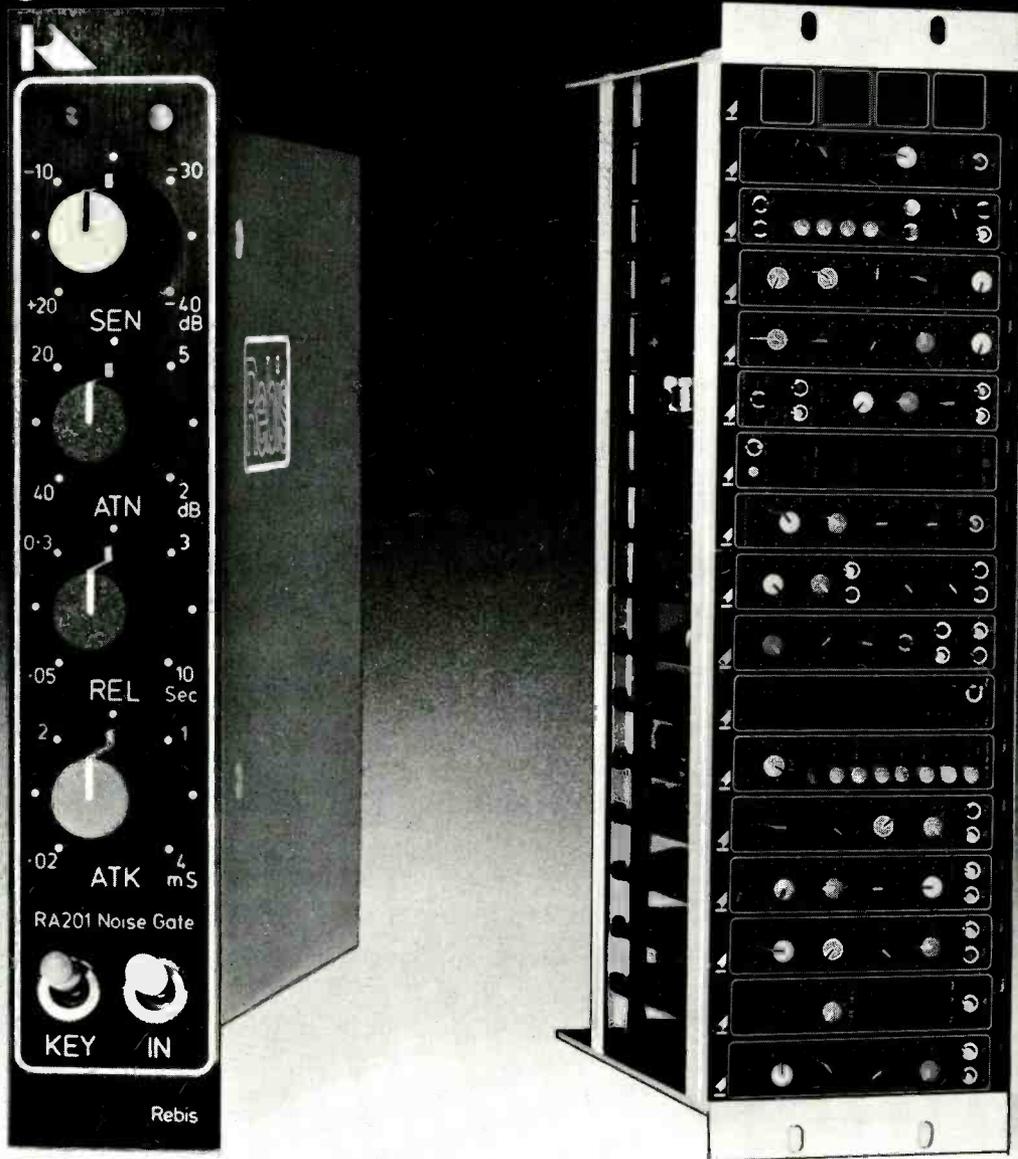
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The N°1 System

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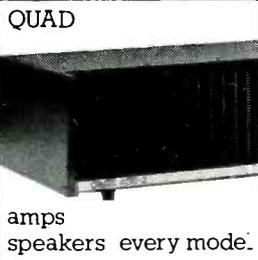
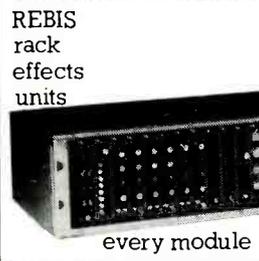
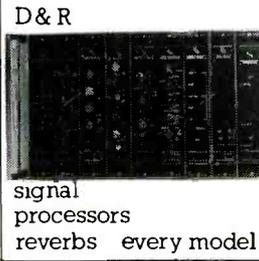
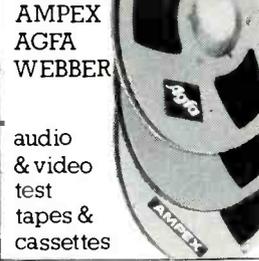
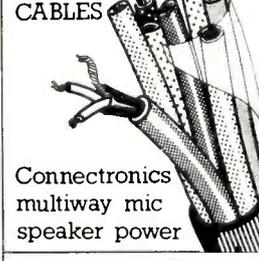
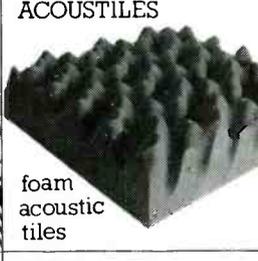
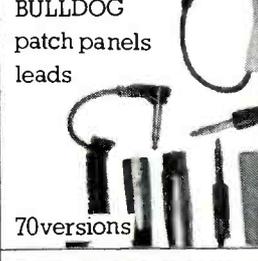
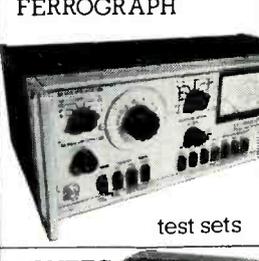
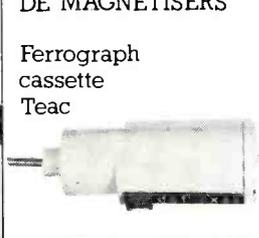
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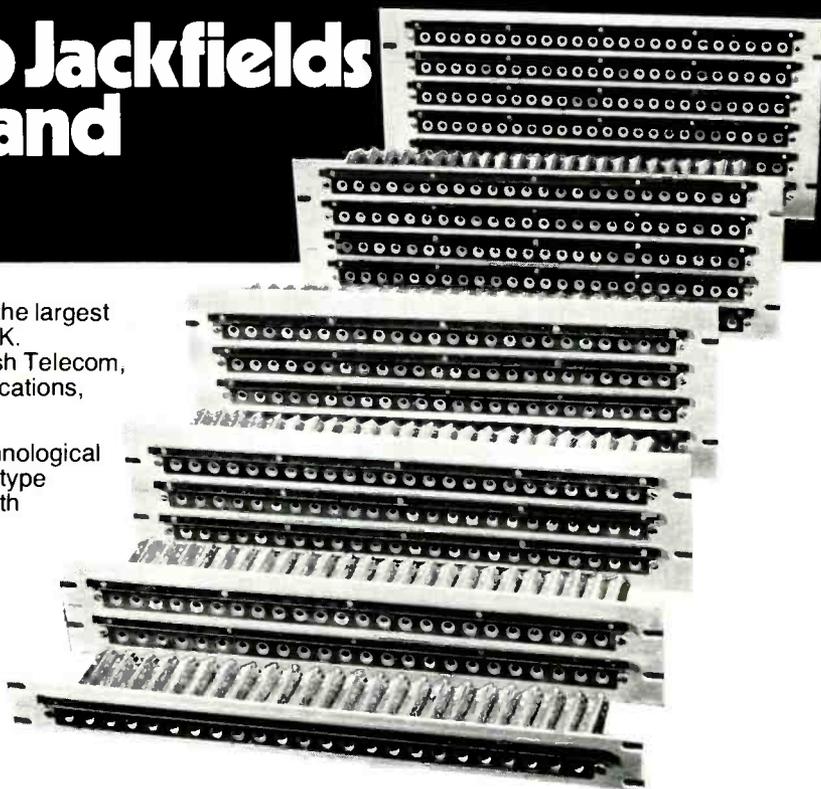
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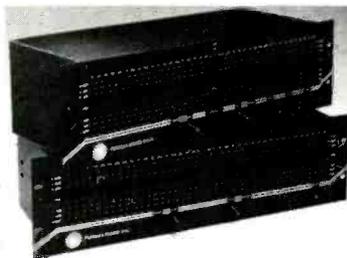
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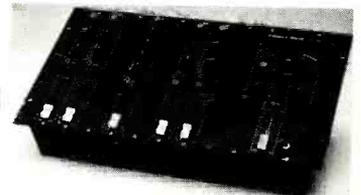
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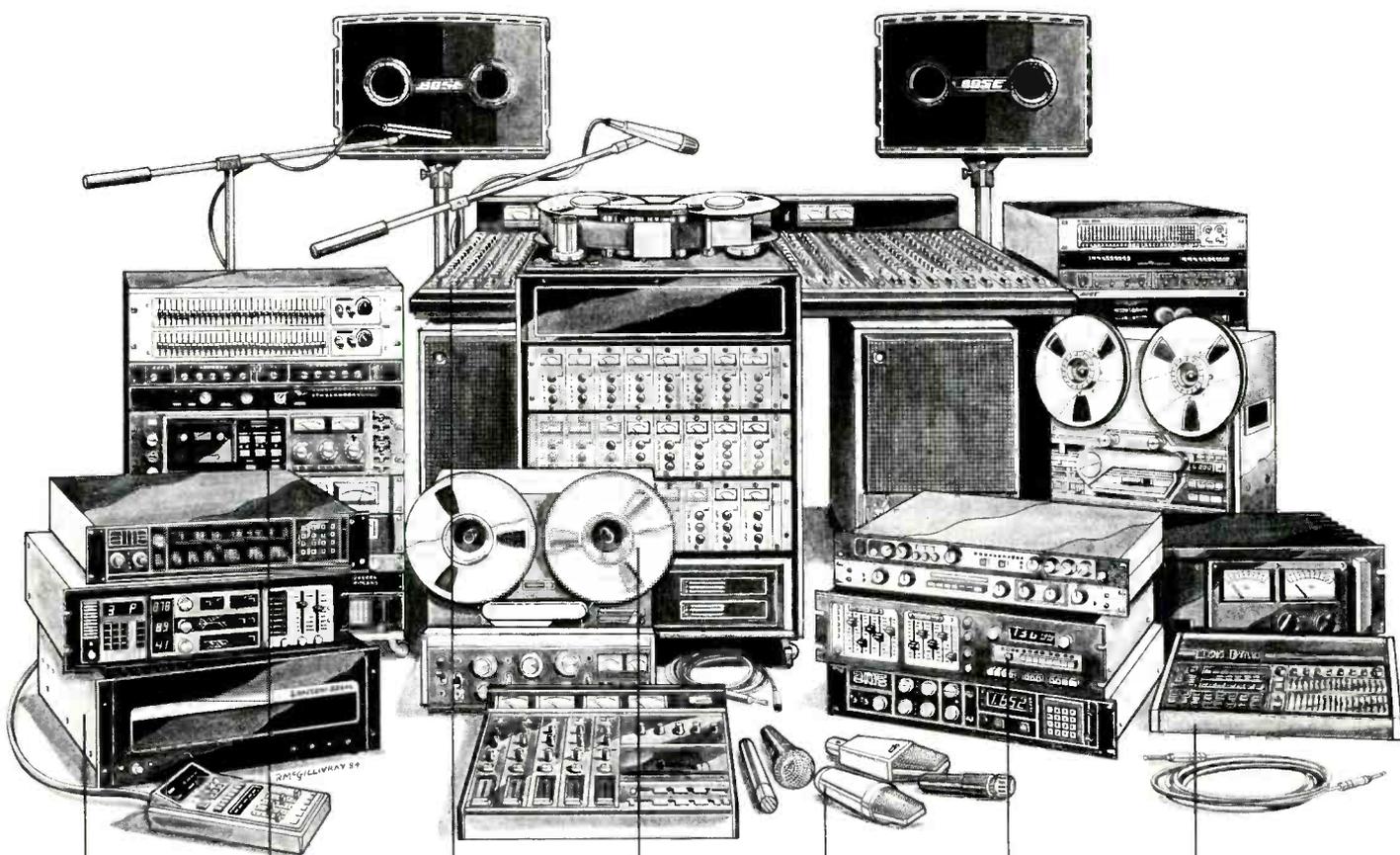
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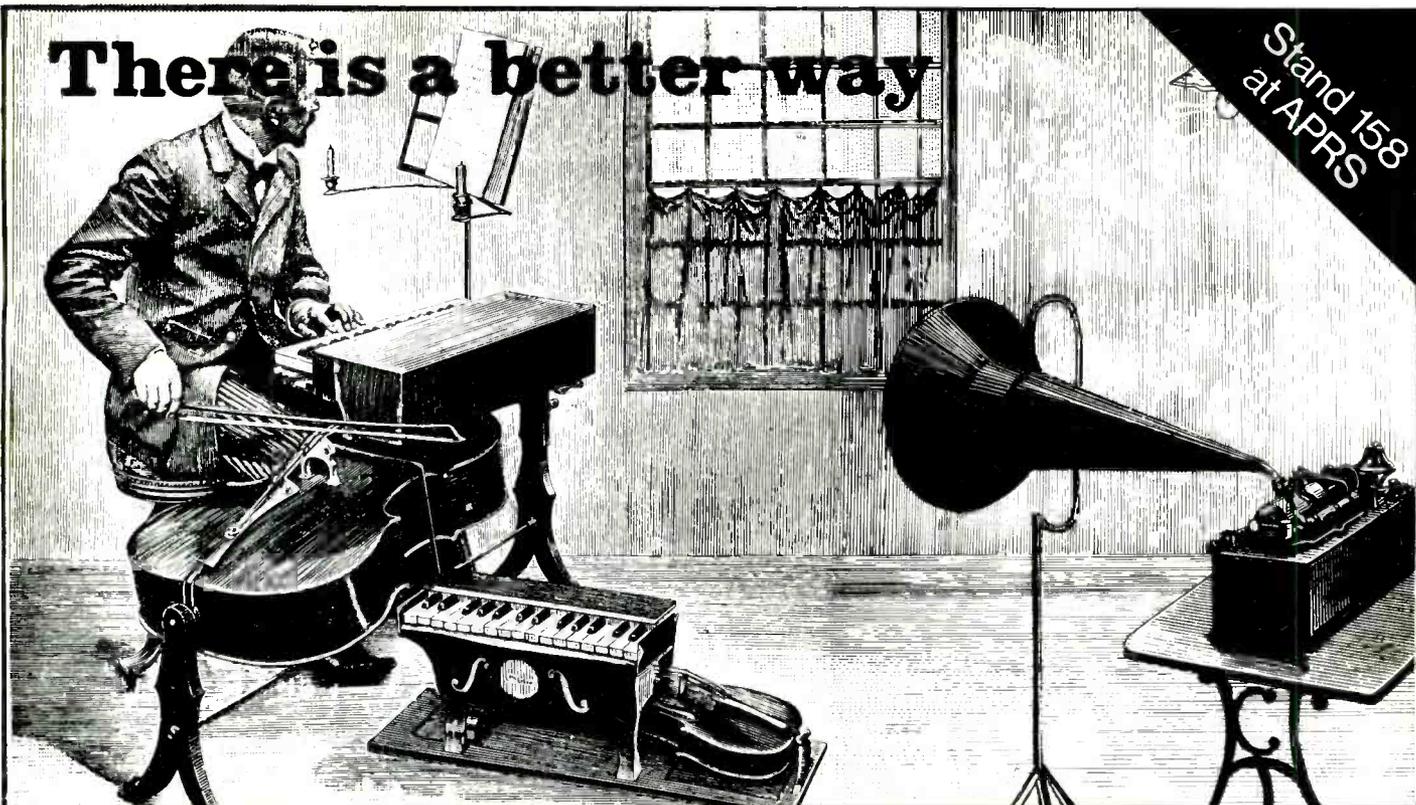
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The SM81 has been quite a shock to me, not only from when I first tried it out, liked it, and decided to buy a pair, but also a year later when I discovered from the brochure that the mic. was an electret.

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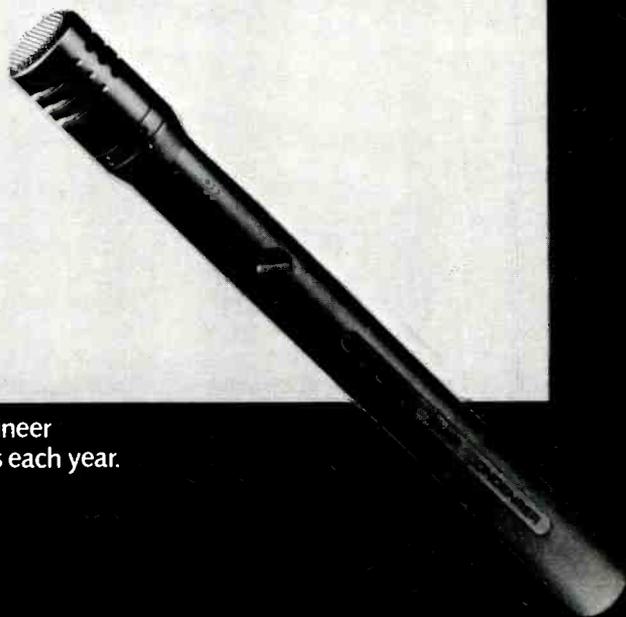
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Tony Faulkner
Audio Engineer

VAT No 225514681



Tony Faulkner is a leading freelance independent recording engineer based in London who records around 50 classical music albums each year.

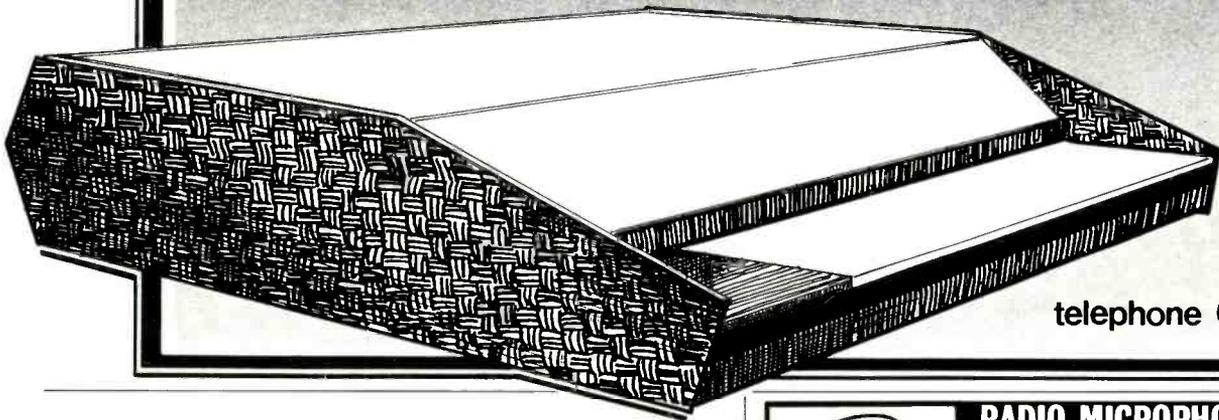
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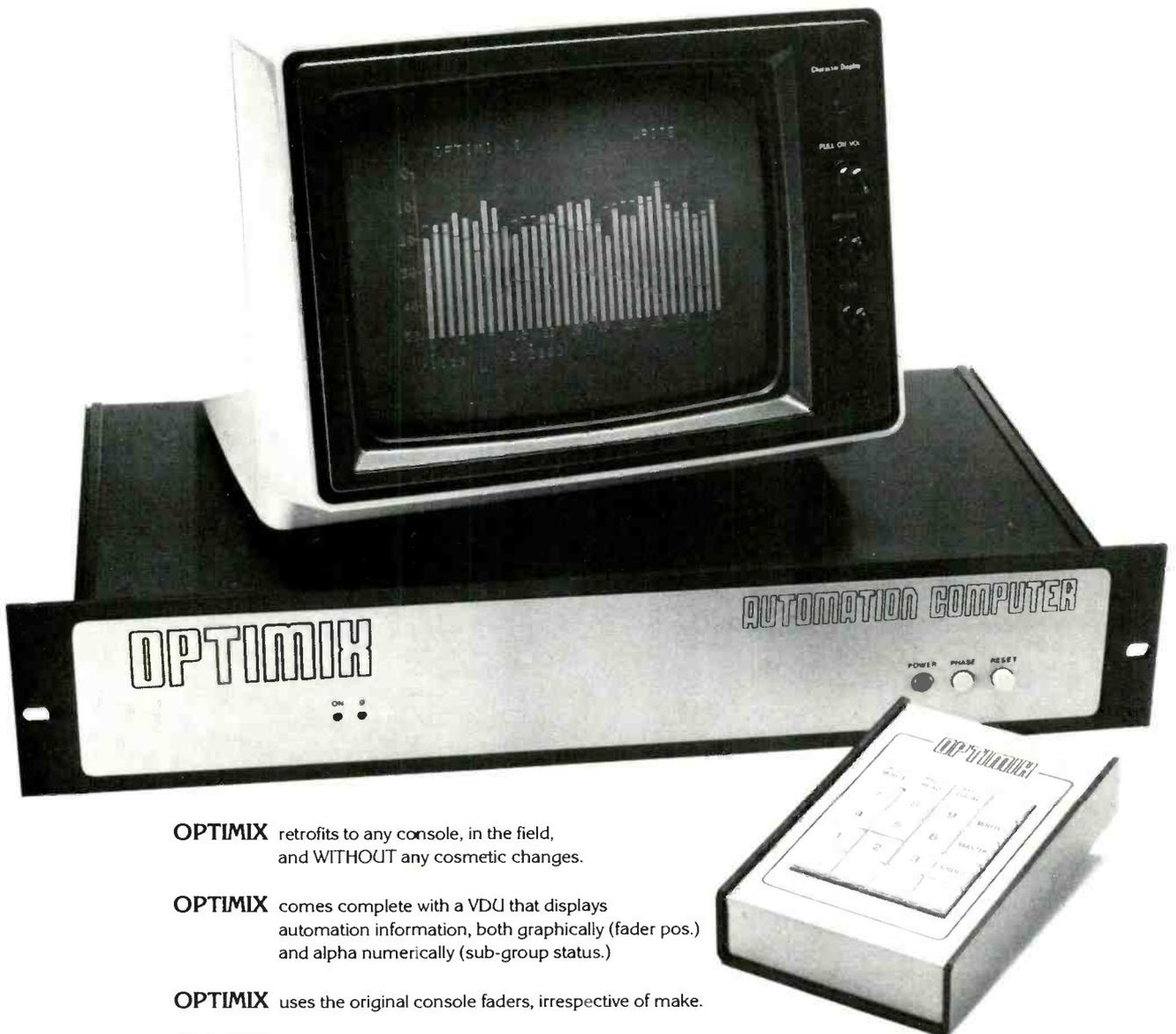
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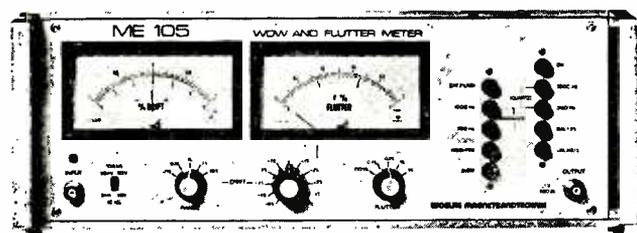
PSIONICS NG-4 Mk II 4-Channel Noise Gate

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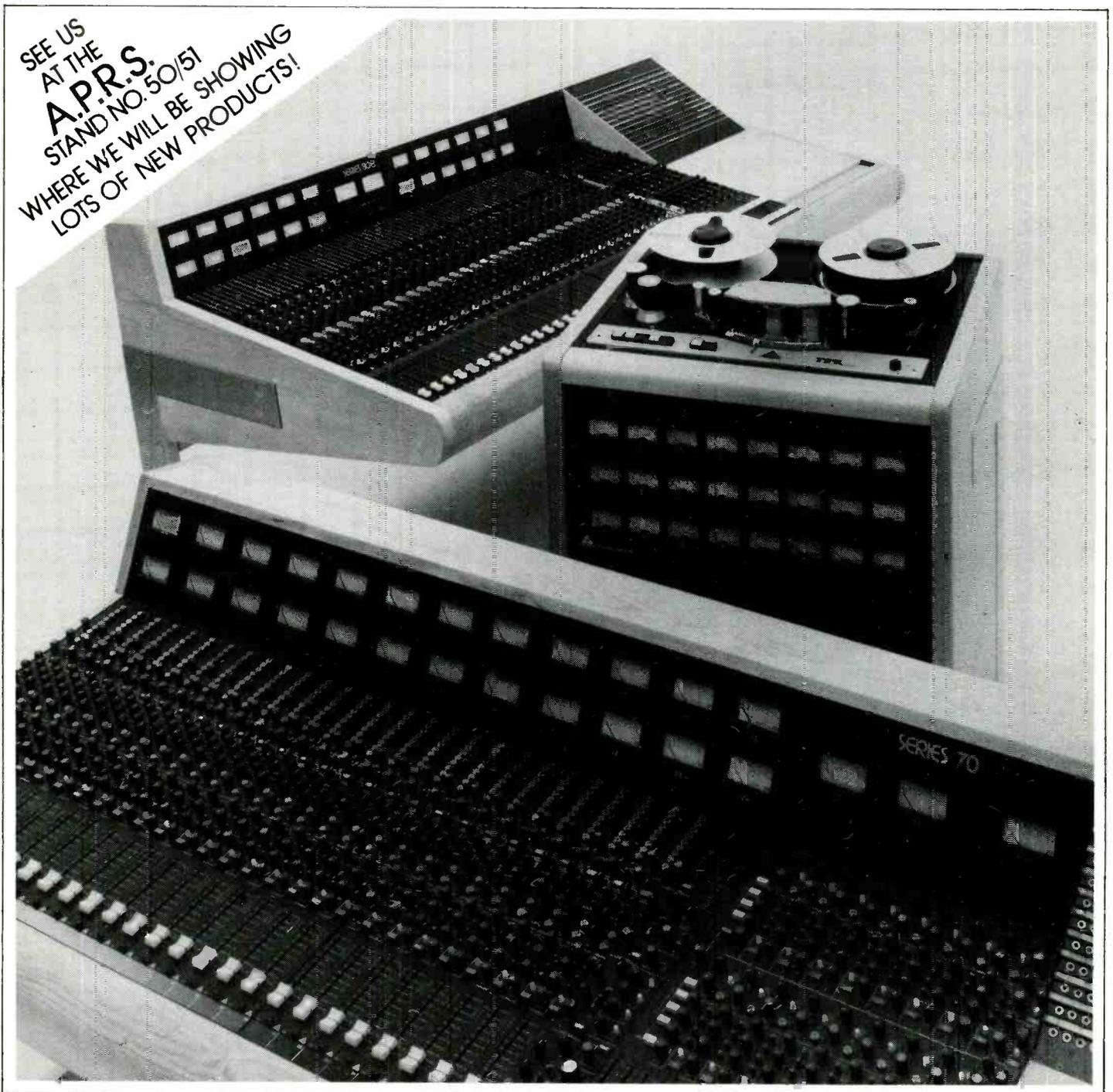
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For the committed professional there is one word that represents the highest standards in studio hardware - Trident.

The Series 70/Series 80B consoles and TSR machine are production engineered to the quality you associate with Trident. Off the shelf or customized you've never been able to buy a Trident for less.

Using the TSR multitrack machine as the foundation of the system, Trident packages cover advanced recording for the producer's studio up to full industry standard.

The range consists of TSR 16 and 24 track machines, supplied with remote controls and full auto locator at a price that foreign imports can't match.

The Series 80B is a 32 input, 24 group/monitor console, and the Series 70 is a 28 input, 16 group 24 monitor console. Both desks are fitted with a fully professional patchbay, 4 echo returns with EQ, and have the facility to use the monitor section as further inputs on remix.

Your limit isn't 32 inputs, Trident's engineers will design you an individual 56 input console at a price which will impress your bank manager.

So don't mince words - say Trident.



Trident Audio Developments Ltd.
Shepperton Studio Centre Shepperton Middx. TW17 0QD, U.K.
Tel: Chertsey (09328) 60241. Telex: 88139282 (TRIMIX G)
Trident (U.S.A.) Inc. 652 Glenbrook Road, Stamford
Connecticut U.S.A. Tel: 203-357 8337



DIARY DIARY

Developments, training, awards, addresses

Audio & Design and Calrec US & UK agreements

Audio & Design Recording Ltd and Calrec Audio Ltd have concluded an agreement whereby Calrec acquires a substantial stake in the USA subsidiary Audio & Design Recording Inc based in Seattle. As part of the same agreement Nigel Branwell, formerly vice president of the US corporation becomes president. The company name is also to be slightly changed to reflect the Calrec involvement and will now be known as Audio & Design Calrec Inc.

There have also been changes in the UK. A joint

marketing arrangement has been agreed and business for both companies will now be transacted through Audio & Design Calrec Ltd from a new address. Howard Smith, former joint MD of Calrec, becomes MD of the new company retaining a non-executive directorship on the Calrec board.

Audio & Design Calrec Ltd, Unit 3 Horseshoe Park, Pangbourne, Reading, Berks RG8 7JW, UK.
Audio & Design Calrec Inc, PO Box 786, Bremerton, WA 98310, USA.

BGW & Nakamichi joint venture

BGW Systems and Nakamichi have announced a joint venture which will allow for the development of new products and improved marketing. Under the agreement, BGW Systems Inc will provide expertise in design, development and marketing of professional, commercial and MI products as well as certain manufacturing capabilities. Nakamichi will provide R&D funding, tape recorder technology and volume

manufacturing capability from its various plants in Japan.

The first joint effort will be BGW's marketing of the Nakamichi professional digital audio processor model *DMP 100* to top studio and broadcast dealers. Other products proposed for joint development and manufacture include professional audio cassette systems to be distributed by BGW. In addition Nakamichi will assist BGW in the international marketing of their products.

People

● Following a reshuffle at Vitavox Group, sales company DSN (Marketing) Ltd has changed its name to Vitavox DSN Ltd. Neil Young continues as sales director specifically for MOD and export; marketing manager Eric Sawkins has additional responsibility for sales to Essex and East Anglia; Phil Neighbour and Jane Wright will cover north Thames and music industry, and south Thames and south of England respectively.
● Quad-Eight/Westrex have announced the appointment of Lance E Strickler as manager of the digital/analogue R&D department. Lance has been with Quad-Eight since January 1982, involved in digital design having previously acted as a consultant in several diverse industries. Present Quad Eight

R&D includes the development of an intelligent digital fader and associated automation systems intended to offer control and accuracy beyond any existing systems.

● Solid State Logic have announced that Andre M Bourget has joined the company as international marketing manager. He was previously with Studer International where he was head of the marketing department.

● Antony David has been appointed sales co-ordinator at Solid State Logic, Stonesfield, England. He was previously with technical liaison.

● Pilkington Fibre-optic Technologies have recently appointed John Oliver to the position of sales manager. He was previously with the optical division, Chance Pilkington Ltd.

Digital console at the BBC

Following five years of collaboration with Neve Ltd of Cambridge, the BBC have begun acceptance tests on the world's first commercially available all-digital sound mixing desk. (See *Studio Sound* October 1983.)

The 48-channel console is to be fitted in a specially constructed radio OB vehicle: the sides can be expanded using hydraulic rams opening the room to 3.7 m wide, and

provision has been made to include analogue and digital tape recorders as well as multitracks. Two modified *LS5/8s* provide monitoring.

Based on the COPAS (computer processor for audio signals) channel processor developed by the BBC's research dept, the console offers real-time delay for echo effects, and comprehensive signal routing in addition to the usual facilities.

Awards for Soundout and AMS

Soundout Laboratories of Surrey and Advanced Music Systems of Lancashire have won the Queen's Award for Export Achievement 1984.

Started in 1973, Soundout initially manufactured disco and musical equipment. The company expanded with the industry boom in the mid-70s and in 1979 had a turnover of £500,000 with a 50% export base. This lead was lost and the company underwent internal changes and switched to making mixing consoles.

Over the last three years turnover has increased to around £1 million and 90% of the business is export.

AMS began life in 1976 with a specific interest in digital audio processing systems. The company considers research and development important, and in 1982 formed AMS Numerics to market a high powered hand held computer—the Datasafe. Their audio products can be found in many parts of the world in recording and broadcast applications.

Forthcoming events

- June 13 to 15
APRS Exhibition, London, UK
- September 21 to 25
International Broadcasting Convention, Brighton, UK
- September 25 to 27
AES Convention, Melbourne, Australia
- October 8 to 10
AES 77th Convention, New York, USA
- November 29
Sound Broadcast Equipment Show, Birmingham, UK
- March 1984 AES
Convention, Hamburg, West Germany

Address changes

● John H Roberts, president of Phoenix Systems Inc has announced that his company has relocated from Manchester, Connecticut where they shared space with Phoenix Audio Laboratory Inc, to new premises in Tolland, Connecticut. Phoenix Systems still retains the same phone number. Phoenix Audio has expanded in the newly freed Manchester space. The full address is now Phoenix Systems Inc, 71 Old Farm Road, Tolland, CT 06084, USA. Tel: (203) 643-4484.

Training

Introduction to Disc Cutting is the title of a course being run by Tam Studios in London during the summer. Simple theory will be covered during the 2-day period as well as hands-on experience and the cutting of two lacquers, and practical information will be offered to suit participants.

To be held on 26/27 June and 21/22 August, the course will provide an appreciation for engineers, producers and plating/pressing personnel; disc cutting will be covered in more detail in later courses.

Tam Studios, 13a Hamilton Way, London N3 1AN. Tel: 01-346 0033.

360 Presents the Best Acoustic Instrument Sounds in the World



Introducing a keyboard that doesn't synthesize its sounds – it duplicates real ones. Imagine strings with the rich sound that only the best acoustic instruments have. Now you can have them, and almost any other sound you can think of. We've recorded a whole catalog of instruments in the studio and stored them on digital memory chips. They're as real as the master tapes they're made from. Now you can cut your album, score your film, or perform live with some of the world's most impressive sounds.

The 360 Digital Keyboard is eight voice polyphonic, and holds up to thirty-two instruments. You can even play two instruments at once – two under each key, or divided by a player-selected split point. We've included vibrato and pitch bend wheels, filtering, and an expression pedal so your performance can really come alive.

Choose your favorite sounds for the 360 Keyboard at the time of purchase. Get

as many or as few as you want, it's always expandable, and you can add new instruments yourself at any time. Check our current Available Instruments List to find out what's deliverable now.

The sound of the 360 Digital Keyboard is unlike any other because we use full-length notes (some are eight seconds long) with no looping, no audible transpositions and no synthesized envelopes. L.A.'s top session players are called for our sessions, and we engineer their performances under tightly controlled studio conditions.

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1 Wallace Way, Hitchin, Herts SG4 0SE
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Telex: 826967

360 Systems

DIARY DIARY

Agencies, contracts

Studiofile correction

In the Studiofile section of the March 1984 issue, it was stated that The Fallout Shelter studio in St Peter's Square, London had originally been designed by Sandy Brown Associates. We have been informed by Sandy Brown Associates that they have no record of designing the original studio when it was known as Island Studios, nor any of the subsequent updates.

We apologise to Sandy Brown Associates for this statement which we published in good faith and hope that this has not caused any difficulties. There are apparently now no staff left at the studio who were present in the early days and the truth is difficult to ascertain. If anyone knows who did design the original studio, we would be pleased to complete this correction.

Agencies

● Atlantex Music have recently been appointed the UK agents for Apex Systems, Symetrix, Oberheim and 360 Systems.

● Elliott Brothers have been appointed distributors for Harrison Information Technology products which will include a full range of MOS-FET power amplifiers.

● Audix Ltd has been appointed UK agent for Altec Lansing. They will be distributing a number of Altec products that were previously unavailable in the UK. Audix, in turn, have awarded the Midland area distributorship to C & S Electromusic of Northampton. Audix Ltd, Station Road, Wenden, Saffron Walden, Essex CB11 4LG, UK. Tel: 0799 40888.

● C & S Electromusic, Hamilton House, 66 Palmerston Road, Northampton NN1 5EX, UK.

● Theatre Projects Services

Ltd (Sound Sales) has been appointed the UK distributor for the RCF range of loudspeakers and drive units. They will be stocking the full range including re-cone kits and diaphragms. Theatre Projects Sound Sales, 10 Long Acre, London WC2E 9LN. Tel: 01-240 5411.

Contracts

● Audio Kinetics have recently installed two *Q.Lock* synchroniser systems in Limehouse Studios, London and Bray Studios, post production for Gerry Anderson's *Terrahawks*.

● 20th Century Fox have installed a Harrison *PP-1* sound console in their new Los Angeles post-production studios. The console is 18½ ft long and there are 216 inputs with three mixing positions.

● FWO Bauch have recently installed a Neumann *VMS 82* Direct Metal Mastering disc cutting system at EMI Abbey

Road Studios. This is the first DDM suite in the UK and reflects EMI's worldwide DDM commitment. Virgin Records also have a *VMS 82* system on order for the disc cutting suite at the Townhouse Studios.

● The Digital Entertainment Corporation have recently supplied Mitsubishi digital systems to Lion Share Studios, Hollywood; United Western, Hollywood; Future Disc Systems, Hollywood; Criteria, Miami; Woodland Sound, Nashville; and engineer/producer Tom Vicari.

● Klarion Enterprises have supplied a studio package to Choi H Meen & Co, Port Moresby, Papua New Guinea, increasing their capability from 8- to 16-track. Equipment installed includes: Otari *MTR-90-16* with autolocator; Soundcraft *1600 24/8*; dbx *160Xs* and *180*; Deltalab *Effectrons*; Fostex amplifiers and headphones; Auratones; and Fostex and Schoeps mics.

The Desired Effect



The studio effects hire service 01-708 0483 (24 hrs)



The power behind the greatest disco in the world.

When the time came to choose the amplifiers for The Hippodrome, Peter Stringfellow again chose Amcron.

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He knew he needed high power, sonic excellence and – with this sort of work-load – very high reliability.

He also knew that Amcron met all of these requirements.

Surely if Amcron is good enough for such a demanding application, then you owe it to yourself to make Amcron your first choice too!



HBB HIRE & SALES, UNIT F, NEW CRESCENT WORKS, NICOLL ROAD, LONDON NW10 9AX. TELEPHONE: 01-961 3295. TELEX: 923393.
AUDIO AND VIDEO CONSULTANCY TO PETER STRINGFELLOW BY GREENWICH AUDIO SERVICES.

NEW PRODUCTS NEW PRODUCTS

Equipment, modifications, options, software

Trident t.i.l. console

Shown for the first time at the Paris AES show was a completely new console from Trident, the *t.i.l.* (work it out). This is an in-line type console construction based in a standard 36-way mainframe with a design that Trident describe as avoiding the confusing status changes that are normally associated with in-line consoles. This is partly achieved by the ability to route all or any combination of the eight auxiliary sends on each channel to either the input or monitor section of the console. Also it is possible to switch the equaliser completely into the monitor section or just the high and low sections, or the two swept mid sections. This means that during mixdown it is possible to use 66 line inputs, all with EQ (including the echo returns).

Other features include six

echo returns; 360-way patchbay as standard; automatic line switching under remix mode; 4-band EQ plus swept highpass filter on each input; short throw faders on monitor sections; fader reverse on monitors; electronically balanced inputs and outputs.

The styling of the *t.i.l.* follows the 'traditional' Trident look although we understand that there will be a bargraph display type option available which will break with the standard Trident analogue VU meter bridge.

Trident Audio Developments Ltd,
Shepperton Studio Centre,
PO Box 38, Studios Road,
Shepperton, Middlesex
TW17 0QD, UK. Tel: 09328
60241. Telex: 8813982.

USA: Trident (USA) Inc, 652
Glenbrook Road, Stamford, CT
06906. Tel: (203) 357-8337.

New telcom c4 units

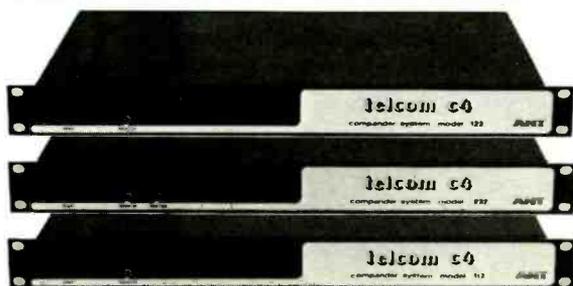
ANT Nachrichtentechnik have introduced *telcom c4* noise reduction units in 19 in rack mount single U form in a new range of three models that differ only in the number of *c4* channels they contain. Due to the nature of the *telcom* system there are no alignment controls required and all record/playback switching functions can be under recording machine control. There are front panel LEDs to indicate operation mode in addition to facilities to place the units under remote control. The units have electronically balanced lines between the recorder and transformer balanced between the units and the console. The model numbers indicate the number of channels so the *Model 231* has one, the *232* has two and the *233*, three.

Two further units have also

been introduced. The *Model 122* is a similar type of unit to the three already described but is playback only. Inputs and outputs are transformer balanced. Intended applications for the unit include broadcasting and mastering studios. A further encode only unit is also available.

Model 112 S is also available although this is intended for satellite applications and has different *c4* compression slopes—1:2.5 instead of 1:1.5. **ANT Nachrichtentechnik GmbH, Linderer Strasse 15, 3340 Wolfenbittel, West Germany. Tel: 05331-83 364.**

UK: Audio & Design Calrec Ltd, Unit 3, Horseshoe Park, Pangbourne, Reading, Berks RG8 7JW.
USA: Solway Inc, PO Box 7647, Hollywood, FL 33081.
Tel: (305) 962-8650.



Studer digital 2-track

Just prior to the Paris AES convention, Studer showed their prototype for a digital 2-track recorder based on the DASH format. It was stressed that the unit was a prototype although the finished item should look very similar. The transport has been specifically designed for the requirements of digital audio and is really the basis for the machine. Close examination of the control panel will reveal the standard Studer *A80* control panel but this is just part of the prototype aspect of the machine and the new panel under design will incorporate items such as a thumb wheel. Single stack heads will cover all 12 tracks of the DASH format for ¼ in tape and the recorder has been designed for 2- and 3-head configurations with one or two reproduce heads for read-after-write in all recording modes including editing.

A separate DA-Box containing all the digital audio circuitry is positioned under the deck and this allows the recorder to be configured for

the table top use. The digital circuitry is apparently based on radically new developments aimed at compactness and reliability. Different approaches have been taken in data recording, error protection, editing, cueing and D/A conversion.

The machine is at present being prepared for production and will be available within a year. Target price is estimated at \$20,000 and the recorder will be supported by a full line of peripherals.

Studer have also announced that a multichannel recorder that will use the same deck and similar digital circuitry is in development. It will also be 32-track although still DASH compatible.

Willi Studer AG,
Althardstrasse 10, CH-8105
Regensdorf, Switzerland.
Tel: 01-840 29 60.

UK: FWO Bauch Ltd, 49
Theobald Road, Boreham
Wood, Herts WD6 4RZ. Tel:
01-953 0091.

USA: Studer Revox America
Inc, Elm Hill Pike, Nashville,
TN 37210. Tel: (615) 254-5651.

MOLINARE CHOSE AMEK...



PHOTO: Litrack Patchfield

- Complete M2500 client list:
- Buckskin Studios, L.A.
 - Broadcast Assistors, L.A.
 - Studio 19, Frankfurt
 - Radius Studio, Milan
 - Audio Affects, L.A.
 - Tonstudio Stroher, Innsbruck
 - Axent Recorders, Sydney
 - Universal Recorders, Johannesburg
 - Discos de Centro America, Guatemala City
 - Central Recorders, Sydney
 - Cream Studio, Frankfurt
 - Castle Sound Studios, Edinburgh
 - Post Sound, L.A.
 - Genesis, Guildford
 - Studio Ramses, Paris
 - Music Works, London
 - N'Koussu Productions, Gabon
 - Clan Strumenti Musicale, Milan
 - The Garden Studios, London
 - EPX Studios, Burbank, L.A.
 - Gooseberry Studio, London
 - Omega Productions, Dallas, Texas
 - Roxon Records, Stuttgart
 - Revolution Studios, Manchester
 - Melodija, Moscow, (2 consoles)
 - Molinaire, London
 - Studio d'Aguesseau, Paris
 - Forum Studio, Rome
 - Tienjin Radio, P.R. China
 - Xian Film Plant, P.R. China
 - Feedback Studios, Aarhus, Denmark
 - West End Studios, Munich
 - Studio 150, Amsterdam
 - Pepperoncino Studio, Milan
 - Blackwing Studios, London
 - Vince Clarke's Splendid Studios, London
 - Livingston Studios, London
 - Paramount Pictures, Hollywood
 - Titania Studio, Rome (2 consoles)
 - Wanshoushi Concert Hall, Beijing, P.R. China
 - Studio Davout, Paris
 - Sri Siam Production Co., Bangkok
 - Guangxi Radio, P.R. China
 - Fonglin Productions, Singapore
 - P T Remacko Productions, Djakarta
 - Tonstudio Heinz, Vienna
 - TV Asahi, Tokyo
 - Sunrise Studio, Tokyo
 - Son Soleil Studio, Montreal
 - The Ranch, New York
 - China Leasing Co., Shanghai
 - Pollicino Studio, Rome
 - Peter Music, Milan
 - EDI Video, Milan

The extensive range includes:
 Custom consoles for film and video post-production and edit suites;
 M3000, M2500 and ANGELA multitrack recording and video production
 consoles; M1000 broadcasting and general purpose system; BC01
 portable broadcast mixer.
 From Total Audio Concepts: MATCHLESS multi track/multipurpose
 console; 1682 system; 168/FB Foldback system; TAC 1042.

In the U.S.A.:
Amek Consoles Inc
 10815 Burbank Blvd
 North Hollywood, CA 91601
 tel: (818) 508 9788
 telex: 662526

Head Office and Factory:
Amek Systems & Controls Ltd
 Islington Mill, James Street
 Salford M3 5HW, England
 tel: (061) 834 6747
 telex: 668127

NEW PRODUCTS

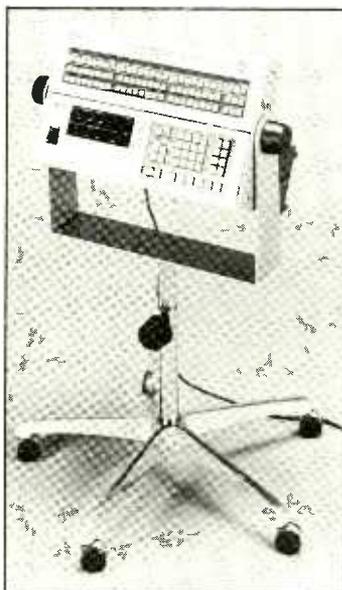
NEW PRODUCTS

Equipment, modifications, options, software

Remote Sony PCM control

Sony have released a remote control system for their *PCM-3324* 24-channel digital multitrack recorder. The new *RM-3310* controls the recording functions as well as synchronisation of additional multitrack machines. The interface of two *PCM-3324s* creates a full 48-channel system for example, and the control set-up can cope with up to 15 recorders.

The *RM-3310* comprises two modules—a rack-mounted audio control unit and a system-control box which can either be stacked or used on a desk top. The system allows remote operation of Rewind, Fast Forward, Play, Stop, Record, Rehearse, and Editstop, with full status indication. Autolocate functions include cue point location, location with variable pre-roll and automatic repeat, allowing easy and rapid punch-ins and edits. A 10-key pad and memory provide up to 100 cue points. Settings can be rehearsed and then executed with great accuracy, tracks being merged via electronic crossfading.



UK: Sony Broadcast Ltd, City Wall House, Basing View, Basingstoke, Hants RG21 2LA. Tel: 0256 55011. Telex: 858424.

UK: Feldon Audio Ltd, 126 Great Portland Street, London W1N 5PH. Tel: 01-580 4314. Telex: 28668.

USA: Sony Corporation of America, 9 W 57th Street, New York, NY 10019, USA. Tel: (212) 371-5800. Telex: 424595.

Electro-Harmonix record/reproduce

Electro-Harmonix have announced *Instant Replay*, the latest addition to their range of digital percussion equipment. The new unit allows a drummer to accent his playing with any type of sound, from a guitar or keyboard chord to vocals, glass breaking or even car horns!

The sound in question is recorded and stored in the unit's memory, to be recalled at any time via a pulse from

the supplied 'External Trigger' sensor pad. Replay pitch is adjustable and the loudness corresponds to the strength of the beats used on the trigger itself. Other features are AC operation and a jack which can phase-lock with the frequency-out from most synthesisers.

Electro-Harmonix, 27 West 23rd Street, New York, NY 10010, USA. Tel: (212) 741-1770.

Audio tape from Zonal

Zonal has developed a new audio tape for the broadcast and music recording fields. The new tape, designated type numbers *610* for standard play and *611* for long play, will initially be available only in ¼ in format. This tape is in addition to the existing range

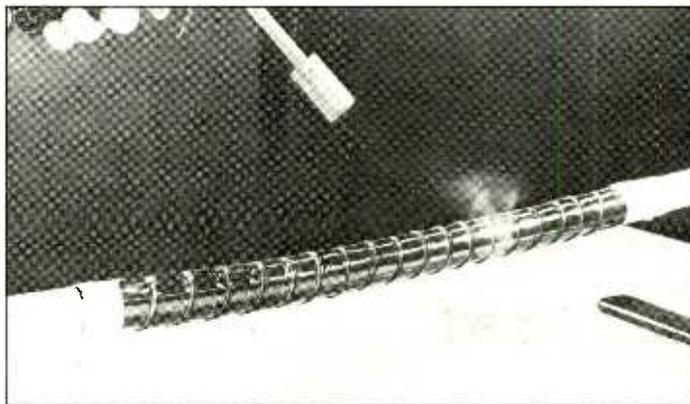
of high output tapes *675* and *676*. Zonal also have cassette pancakes, video cassettes and audio cassettes made by their associate company Magna in West Germany. Zonal Ltd, Holmethorpe Avenue, Redhill, Surrey RH1 2NX, UK.

3M heat reactive tape

'Quick, easy and permanent' is 3M's description of their type *6000 Heat Reactive Tape*, which is intended for use in the repair of damaged cable sheaths. The tape is a 2 in wide adhesive-coated heat-shrink plastics material which is applied over the area concerned and then heated to form a tight, waterproof, yet flexible bond that will not loosen, crack or corrode with

time. The tape is available in 25 ft rolls or as part of a complete repair kit comprising a torch head, handle and regulator, striker, sheathscuff and tabbing tape in a rugged carrying case.

TelComm Products Group, 3M United Kingdom PLC, 3M House, PO Box 1, Bracknell, Berkshire RG12 1JU, UK. Tel: (0344) 26726.



Fane bass-reinforcement

Fane have announced a new 24 in bass driver, the *Colossus 24E*. Primarily intended for professional stage PA, the unit is also suited to theatre installations. Although normally geared to the sub-200 Hz area, the usable range extends up to 1.2 kHz. The cone is a rigid cellular foam construction driven from

a 4 in Fibreglass-based voice coil and a 10.45 kg APS ferrite magnet structure. SPLs of 101 dB can be achieved over the intended range with the output maintained to below 20 Hz in an appropriate enclosure.

Fane Acoustics Ltd, 286 Bradford Road, Batley, Yorkshire. Tel: 0924 476431.

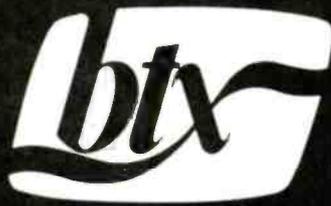
Sescom stereo power amp

Model *SH-1* is a new stereo power amp from Sescom. Packaged in a 1¼ in rack mount enclosure, it is intended to provide economical powering of small control room monitors. Power output is a modest 20 W/channel (both driven) for <0.1% THD at 1 kHz. Input sensitivity is 0.25 V for rated output, noise -93 dB below rated output,

and frequency response ± 1 dB across 20 Hz to 20 kHz.

Used in conjunction with Sescom's *SHB-1* headphone junction box, the *SH-1* is also suitable for driving multiple headphone sets. Sescom Inc, 1111 Las Vegas Boulevard North, Las Vegas, NV 89101, USA. Tel: (702) 384-0993.





now totally in synch

If you are involved in: video post production, automatic dialogue replacement, multitrack recording, film transport synchronisation or effects assembly, the BTX Softouch can make you money by making life easier.

The BTX range of integrated synchronisation, editing and timecode products offers friendly automation to the Artist, Producer and Studio Engineer.

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- Building-Block System Design
- Universal Interface without sacrificing performance
- Clear user prompts in any language
- Wild machine control
- 100 Loop memory



Scenic Sounds Equipment Ltd.

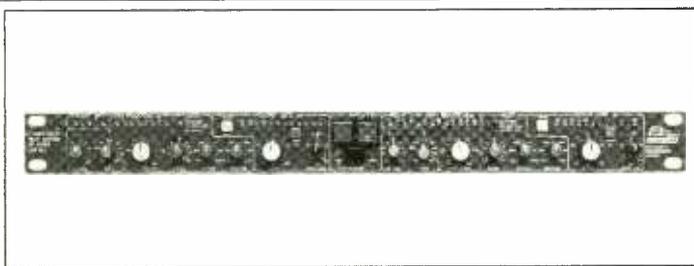
97-99 Dean Street, London W1V 5RA. Telephone: 01-734 2812/3/4/5. Telex: 27 939 Scenic G.

France Harman France 01-876-1144 • Sweden Intersonics 08-744 5850 • Germany Harman Deutschland 07131 4800
Holland AEG Telefunken 20-5105 473 • Italy Audio Equipment 039-836 767 • Belgium Inelco 02-2160160

NEW PRODUCTS

NEW PRODUCTS

Equipment, modifications, options, software



Brooke Siren dynamics processor

The *DPR 402* is a unit first shown at the Paris AES which is described as a dynamics processing range. In a rack mount single U format there are two channels of compressor limiter, de-esser and peak limiter. The flexibility of the design allows all these facilities to be used at the same time or separately. Connections to the rear barrier strip allow side chain insertion, internally fitted pre-emphasis strapping, conversion of the compressor section to an expander and other frequency conscious compression effects. The compression ratio is adjustable from 1:1 to infinity with variable and auto positions for attack and release controls. The de-esser section is frequency selectable

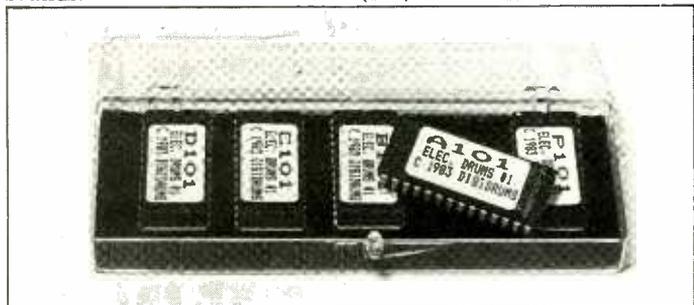
from 700 Hz to 20 kHz broadband or HF with the additional facility of split band limiting using the de-esser filters of both channels. The peak limiter has a variable threshold with switchable fast/slow dynamics. Each channel has an LED meter for gain reduction and output level. It is possible to monitor the side chain insertion signals and the channels are stereo linkable. The *DPR 402* has XLR-type input/output connectors with electronically balanced inputs. **Brooke Siren Systems Ltd, 213 Sydney Road, London N10 2NL, UK. Tel: 01-444 7892. Telex: 912881. USA: Klark Teknik Inc, 262A Eastern Parkway, Farmingdale, NY 11735. Tel: (516) 249-3600.**

Digidrums chips

New for users of the E-mu Systems *Drumulator* are a variety of plug-in EPROM chips which replace the standard set to create whole new vistas of drum and percussion sounds. Each set comprises five such chips and the currently available range includes electronic drums, African percussion, jazz drums, latin percussion, heavy rock drums, sound effects and analogue drum machine sounds. A Simmons/

Synthesiser trigger set provides eight programmable trigger outputs via the *Drumulator's* direct outputs. Each set includes a 'program' chip which contains software to permit longer, sustained sounds to be achieved. This chip also increases the song storage capacity to 64.

Digidrums, 100 South Ellsworth, Ninth Floor, San Mateo, CA 94401, USA. Tel: (415) 579-1514.



Tandberg Series TD 50 recorders

With the *TD 50* series, Tandberg have finally entered the professional tape recorder scene after some 50 years of involvement in audio electronics. Three versions are available, all based on the same basic transport. This comprises an all-new design whereby all the mechanical components are mounted on a 10 mm thick Alcoa plus aluminium alloy base plate (this having the properties of high tolerance machining suitability and excellent recovery from extreme stress or shock). The main motor itself is a 3-speed direct-drive type, quartz governed but with pitch control. Microprocessor/opto-electronic sensors look after the spool motors, handling speed and torque.

Headblock is also mounted on Alcoa plus alloy and is instantly replaceable with the removal of a single screw, orientation being via three locating pins. Tape path has been calculated by computer to provide low modulation noise and minimise tape stress. The block incorporates a pushbutton tape cutter. Only two tape guides are used, these being made of solid ruby to close tolerances.

All audio circuitry is discrete, no ICs being used in

the signal path. Capacitor count has been kept down to a minimum and the design is based on wide open loop configurations. Bias, level, EQ and mono/stereo switching are all controlled by the microprocessor. All the electronics are located on readily accessible modular, plug-in circuit boards.

Editing is also under microprocessor control, with multiple search and cue functions combined with a real time counter for rapid location. Tape dumping is also easily achieved.

The three versions are: *TD 50 E* (editing)—transport with reproduce only electronics and monitor amplifier/speaker; *TD 50 B* (broadcast)—same, but with complete record/reproduce electronics; *TD 50 SM* (studio master)—standard transport with separate VU control console mounted above it.

Tandberg A/S, PO Box 53, N-2007 Kjeller, Norway. Tel: (472) 71 68 20. Telex: 11886. UK: Tandberg Ltd, Revie Road, Elland Ltd, Leeds LS11 8JG. Tel: 0532 774844. Telex: 557611.

USA: Tandberg of America Inc, 1 Labriola Court, Armonk, NY 10504. Tel: (914) 273-9150. Telex: 137357.

LinnDrum new features

Linn Electronics has announced several new features for the *LinnDrum* programmable digital drum machine. These include an increased synchronisation flexibility allowing the *LinnDrum* to directly sync to most popular sequencers; single step programming allowing the user to step through rhythm patterns note-by-note when programming or editing; and an increase in the number of steps available in song mode from 99 steps to 250.

New options include a memory upgrade, increasing the capacity from 2,600 events to over 5,200 events. Also

many new sounds have been added to the library of alternate sound chips. There are now over 60 different conventional drum sounds available and more than 50 different musical sound effects, such as dog barking, gun shot, glass break, bass guitar and human voice, etc.

Linn Electronics Inc, 18720 Oxnard Street, Tarzana, CA 91356, USA. Tel: (213) 708-8131.

UK: Scenic Sounds Equipment Ltd, 97-99 Dean Street, London W1V 5RA. Tel: 01-734 2812. Telex: 27939.

UK: Syco Systems Ltd, 20 Conduit Place, London W2. Tel: 01-724 2451. Telex: 22278.



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Syco Systems Ltd. 20 Conduit Place London W2
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The Fairlight CMI, the UK's top selling computer musical instrument.

This year's annual exhibition of the Association of Professional Recording Studios is to be held slightly earlier than usual: June 13, 14 and 15. The venue remains the Kensington Exhibition Centre, Kensington, London. Visitors will notice that the exhibition has grown considerably from last year due to pressure for more stand space. To accommodate this demand, a second floor has been added. Visitors who remember the rabbit-warren-like problems of the Connaught Rooms location of some years ago need not worry that the situation is becoming similar. Registration will be on the lower floor and a single lift ride will take you between the two floors. Entrance is by business card.

Our preview of the exhibition concentrates principally on the new items on display, although where known a general guide to the other contents of the stands will be given. This preview was compiled from information available at the time of writing although in terms of development of new products, two months is a long time and there may be some changes.

A

● **ACES:** items from the wide range of products including 16, 24 and 2-track tape machines, mixing consoles, noise reduction, power amplifiers, graphic equalisers, spring reverber systems and other accessory units. ● **Advanced Music Systems (AMS):** a complete range of digital audio processing systems including all the latest software and hardware updates. On demonstration will be *DMX 15-80S* stereo delay with dual pitch changers, which in max configuration will give 33 s at 18 kHz bandwidth, and is available with a new system for external triggering of data in Loop Editing System as well as a de-glitch module. The *RMX 16* digital reverb will be demonstrated with a new memory expansion module, the latest software including a chorus and echo program, the latest versions of *NONLIN* and *REVERSE* software, and the first APRS showing of the transfer of new programs by light pen and remote terminal. Finally the *A/V Sync* audio delay video sync compensator will be on show. ● **Agfa:** full range of audio and video recording tapes and cassette products. ● **AKG:** featured items will be a new generation of ultra-linear capsules *CK61-ULS* and *CK62-ULS* designed for *C460* preamplifier. Other items include *C568* short shotgun condenser, *D451* intercom mic and several custom built models. Also Amix range of sound equipment. ● **Alice:** examples from the many ranges of Alice consoles designed principally for broadcast type use. ● **Allen & Heath Brenell:** featured will be the *Inpulse One* digital drum computer, *System 8* consoles, the new *SR M 18-6* monitor mixer; the *MBI Series 12* broadcasting mixer and the *MBI Series 24A* broadcast console system. ● **Amek Systems:** models from the full range of Amek and TAC consoles including the *M2500* console with DC subgrouping, VCA faders and automation, the *Angela* console now available with add-on automation, and the *TAC 1682* system of PA and recording consoles. TAC will also

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Keith Spencer-Allen previews items on show at June's APRS exhibition

feature the *Matchless* multipurpose console with 24 buses and an in-line monitor section. ● **Ampex:** wide range of audio, video, professional tapes and audio and video cassette formats. ● **Applied Microsystems:** their complete range of tape control and timing products including the *Spin Time* add-on tape timer, the *CM50* autolocator, and the *I-CON 24* which is a *CM50* stretched to include 24 record select keys and four monitor select keys which are multiplexed to the multitrack. The *CM50* and *I-CON 24* may be upgraded to provide a simple synchroniser package.

● **Atlantex Music:** the full range of MXR equipment with the featured item being the new digital reverb system, also full product ranges from Ashly, Whirlwind, Belden, and for the first time products from Symetrix, Oberheim, 360 Systems' digital keyboard and Aphex.

● **Audio Developments:** will be demonstrating their range of compact mixers featuring three new items: the *AD062 Multimixer* with some interesting variations; the *AD145 Pico* mixer in 8-input version; and the *AD160* semi modular ENG mixer. ● **Audio & Design:** wide range of products including the A&D modified Sony *PCM701*. This will be available in three stages of 'professionalism'—*Section One* has electronically balanced audio interface with ganged attenuators, *Section Two* has digital input/output interface with NTSC/PAL standard switching, copy prohibit and pre-emphasis off, *Section Three* will include the *1610* digital interfaces and remote switching of rear panel functions. Also on show will be the *Complex 2* using update VCA design. Finally the new *Scamp S31* compressor/limiter and the *S30* expander/gate will be demonstrated. ● **Audio Kinetics:** will be showing *MasterMix* console automation which can be interfaced to most consoles with complete

Allen & Heath's Inpulse One



retrofit packages available; the established *Q.LOCK* synchroniser with *OPTION 64* user-definable control routines and *Q.SOFT* application software control packages; and the latest addition to the product range *TIME-LINK*, a timecode reshaper to clean-up waveform and to allow timecode standards conversion allowing restriping of incorrectly timecoded tapes in real-time. ● **AudioMedia:** full range of cassette C-0s both welded and screwed in an extensive range of colours including five metalised colours; the range of *SP* and *XK* duplicating tape will be demonstrated through equipment supplied by Bruel & Kjaer. Samples will be accompanied by a print-out verifying frequency response and drop out count.

● **Audio-Music Marketing:** the full range of Yamaha pro-audio and recording products with wide range of mixers, speakers, power amplifiers, graphic equalisers analogue delay, and 4-track recorder. Featured will be the *REV-1* comprehensive digital reverb and the *YS2600* digital delay together with the lower priced *R1000* digital reverb and *D1500* digital delay. ● **Audio Services:** details and examples of new and secondhand equipment available.

● **Audio Systems Components:** sound broadcasting products including *Minx 3* into 1 mixer, ASC version *PR99* tape machine, ASC *Versa* trolley, ASC/Technics *SP10*, and *Quadrak 19* in rack for *Quad 405-2*. There will also be a selection from distributed ranges including Marti radio link equipment, Durroughs signal processing equipment and full details of other ranges of equipment supplied as dealer. ● **Audio Techniques:** no information received.

● **Audio Video Marketing:** will be showing the latest versions of the Ferrograph *Series 77* tape machines intended to replace the *SP7S* for professional and industrial applications. The established *RTS2* and *ATU1* audio test sets will also be displayed. In the way of microphones, AVM will show the full range of Milab microphones featuring the new *VIP 50* which is a multi-pattern condenser with switchable mic and line level outputs.

● **Auditronics:** products from the Auditronics range of recording and broadcast consoles and the programmable equalisation system. ● **Audix:** the first public showing of *Access*, a new system with particular relevance to the broadcasting field. It will be demonstrated operating between the two Audix stands. Also on display will be the range of mixing consoles including the *MXT 1200* fully modular system. The Altec Lansing range of products will also be shown.

B

● **BASF:** full range of professional recording tape of all widths, cassette products and computer floppy disks. Featured will be new studio tape.

● **FWO Bauch:** will be showing products from the following manufacturers—Studer, Revox, Neumann, EMT, Albrecht, Klein + Hummel, Harrison, UREI, Lexicon, Valley People, MRL, Switchcraft, Gotham, Ivie, Transco and Europa Film. ● **Bel Marketing:** will be launching the *BD60* and *BD80* digital delay lines. The *BD60* has four equally

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spaced outputs with an internal mixer while feedback can be from main or auxiliary delays. The *BD80* follows on from the *BD60* with features including a Truncating Facility (editing), synchronised record and playback with a memory expandable to 16 s. Also on display will be the complete range including mixing consoles, noise reduction and audio effects. ● **Beyer**: the complete range of Beyer microphones, headphones, radio microphone system and a wide range of accessories.

● **Branch & Appleby**: extensive range of replacement heads for most popular tape machines. Particular items on display will include ¼ and ½ in heads with centre track timecode, low cost 16- and 24-track heads for 3M machines, 4-, 8- and 16-track heads for Teac and range of 1 in video audio heads. Also shown will be film heads from 8 mm to 70 mm gauge. ● **Bruel and Kjaer**: will have a selection from their range of precision test equipment although the featured item will be the range of studio microphones *4003*, *4004*, *4006*, and *4007* with accessories.

C

● **Cadac**: range of services including after sales and updating on Cadac consoles, custom built in-line consoles, console design, and design and construction of ancillary equipment.

● **Calrec Audio**: will be showing a 48-channel control panel of a digitally controlled assignable mixing console. The unit will include all the control functions necessary for this size of console and will demonstrate the speed and flexibility of operation. Examples of the modular

range of *M Series* rack mounting mixers together with the full range of Calrec microphones including the *Mk IV Soundfield*.

● **Canare Cables**: very wide range of cables from mic to multiway with cable drums, stage boxes and wide range of accessories. ● **Canford Audio**: showing a selection from their large range of studio and broadcast sundry equipment and supplies. ● **Cetec**: featured will be the Gauss *Series 2400* high speed tape duplication system. This system is now available with Dolby *HX Pro* duplicating ability. ● **Clyde Electronics**: range of broadcast orientated products including *Alpha Series* modular mixing console, *Delta Series* pushbutton news mixer, *CEDUB* rack mount dubbing mixer and a selection from their range of PCB assemblies including mic amps, VCAs, peak limiters, distribution amplifiers, etc.

● **Connectronics**: range of cables using conductive thermo-plastic screens including *Musiflex*, *Studiflex*, *Rockflex*, *Quadflex*, *Phonoflex*, *TP36-7* multiway and *Multipair* for multichannel control signal use; a range of low cost *XLR*-type audio connectors; and the *Stand-Off* mic shock mount system that attach to the instruments being recorded. There are models that replace conventional stands in many applications. ● **Crow**: The Enertec range of professional tape machines and details of the other product ranges including OB vans, Tentel tape tension gauges, Barco monitors and other broadcast related products.

● **C-Tape Developments**: tape contact transducer mic system in variety of models with first APRS showing of

APRS PREVIEW

restyled casing and redesigned electronics. ● **Cunnings Recording Associates**: will be exhibiting their *Studio 8* tape machine incorporating several new features for ease of editing. Also Pilot Tone Synchroniser and Pulse Rate Converter.

D

● **Dolby**: will be showing the full range of standard professional products featuring new additions, models *362* and *372* noise reduction units and the model *380* module for VTR noise reduction installation. ● **Drawmer Marketing**: on demonstration will be the *Multi-Tracker DMT 1080*, *DL221* compressor/limiter, *DS 201* dual gate; and the dual expander/compressor *DL 231*.

E

● **Eardley Electronics**: the new Neutrik *X Series* of compact size 3-pin connectors. Also launched will be a number of new accessories including mic goosenecks. The stand will also have a range of pots and switches suitable for audio use. ● **EDC Elkom Design**: range of radio mics and transmitter/receiver systems including the *Cygnus* range, the *Minkom* and *Sirius* systems. ● **Elliott Bros**: details of studio equipment servicing, installation service, and power amplifiers from HIT. ● **EMO Systems**: range of stage and studio ancillaries which include DI boxes, mic splitters, disc preamps and power distribution systems.

F

● **Feldon Audio**: will be exhibiting equipment from Sony—digital recording systems including the *PCM 701 ES* and the A&R professional version, the range of mics, the high speed cassette copiers and the *TCD 5PRO* cassette recorder; Ursa Major range of digital reverb systems with the new *323 Stargate*; Eventide *Harmonizers*, broadcast delay and digital signal processor; Lyrec 24-track and 2-track, *Fred ¼* in editing machine, high speed cassette duplication equipment; Audio & Design range of signal processors; Inovonics *Model 500* acoustic analyser and the Quad-Eight range of mixing consoles. ● **Film-Tech Electronics**: will be showing their range of *Compact* portable audio mixers designed primarily for film and video work, full range of accessories including cable testers, headphone amplifiers, battery testing and discharge devices. New products include *Compact 8-2* production mixer and a location replay amplifier. ● **Formula Sound**: the full range of products including *QUE-4* studio foldback system, graphic equaliser/analysers, *PM-80* modular production mixer and *SE1* system equaliser. There will also be details on services offered such as the design, manufacture and installation of audio and allied equipment for applications including studios, theatres, mobile and static sound reinforcement systems. Details also of a sister company offering lighting and production expertise.

● **Fraser-Peacock**: details relating to the audio cassette and video cassette duplicating services including products

from certain manufacturers with associated products. ● **Future Film Developments**: a selection from their wide range of products including connectors, cables, patchfields, mic stands, DI boxes, wiring aids, tools, cabinets, racks, cable winders, etc. There will also be equipment on display from Genelec, RTS Systems and Stellavox.

G

● **g.t.c.**: will be demonstrating synchronisation between a VHS recorder as master and a Teac 8-track ½ in slave using the *Editon* synchroniser and longitudinal timecode. They will also be showing ¼ in centre track timecode interlocking a U-matic video recorder as slave.

H

● **Harman Audio**: from Tascam the complete line up of professional cassette decks including the *122B* stereo, *133* 3-channel and *234* 4-channel, a new, medium cost rack mount stereo cassette deck *225*, the complete range of the new Tascam *40 Series* tape machines and new balanced versions of the *50 Series*. The new *M50* mixer will be shown for the first time. From JBL will be the range of studio monitors. The *CADP* computer program which allows quick effective sound reinforcement cluster design, will also be running. ● **Hayden Laboratories**: will show the complete range of products from Nagra-Kudelski, Sennheiser, AEG-Telefunken and Denon Professional. Digital products from AEG-Telefunken will include the Mitsubishi/Telefunken 32-track recorder and editing system, and the Denon *DN 3000F* professional Compact Disc player. Nagra SMPTE timecode recorders will be shown for the first time as will new headphones and microphones from Sennheiser plus a new miniature radio receiver and infra-red transmission equipment. ● **HHB**: the full range of Amcron power amplifiers, test equipment and PZM microphones with particular emphasis on the new *Delta Omega 2000* power amplifier; speaker units from Gauss, range of digital products from Sony including *PCM-F1* processor and *SL-F1* video recorder and a selection of other products that they distribute. ● **Hill Audio**: selection of products from the *DX* range of power amplifiers, the *J Series 3* sound reinforcement and recording consoles, the *Series 3* monitor console, the low-cost *B* series module console. Featured items will be the *DX 3000* power amplifier capable of delivering 3000 W in bridged mode into 4 Ω, and the *Multimix* range of compact rack mounting mixers available in three formats. ● **HW International**: the complete range of Shure microphones, and accessory products including the new *AMS* automatic microphone system. Also the Alpine range of cassette machines.

I

● **Industrial Acoustics**: will feature a graphic display of selected turnkey studio projects to illustrate the technical, functional and aesthetic advantages of the IAC approach to studio construction. IAC use *Moduline*, an acoustic panel system which provides a flexible alternative to traditional building materials. It is also possible to

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dismantle, reassemble, extend or refurbish the system once erected.

● **International Musician:** a range of musician orientated magazines. ● **ITA:** have two stands. One will show a small number of important products specifically of interest to the major studios, the other will display the full range of equipment supplied by ITA including Amex *Angela* consoles, Otari *MTR* series and 360 Systems digital keyboard.

J

● **James Yorke:** details of high speed cassette duplication services and custom wound blanks; details of the tape products which they now manufacture and lastly information on their recording services. ● **John Hornby Skewes:** will be showing the Audio Technica range of microphones including the *Artist* and *Pro* Series and the new *Performance* range. Also on display will be JHS products including digital and analogue echo units known as *Digitec* and *Echotec*, in addition to a wide range of cables and plugs.

K

● **Keith Monks Audio:** featured will be new 60 W MOSFET PA amplifier together with mic stands, boom arms, accessories, and other peripheral studio products. Other new products will include *CD50* 'baby' cable drum, the phase tester and impedance meter, the *LS1/8* amplified monitor. ● **Kelsey Acoustics:** featured will be two new products from Psionics range, the *EQ4 Quad Band* parametric equaliser with individual access for EQ bands; and the *AD4 Quad* automatic direct injection package featuring signal level sensing. Also *NG4 Quad* noise gate and *Missing Link* cable/patch tester. Also Carver *P M 1-5* power amplifier and selection of other connectors, transformers, mic stands, etc. ● **Key Technology:** a range of inexpensive audio connectors. Chassis sockets are rear and front mounting with a PCB mounting version. Line connectors were designed with ease of assembly and cable retention in mind. Made from glass filled nylon with silver plated pins.

● **Klark-Teknik:** featured item will be the new *DN 780* digital reverberator/processor. The design approach has been to achieve high performance at a relatively modest cost. They will be organising demonstrations at an outside facility and enquiries should be made through the stand. Also on show will be the *Series 700* digital delay lines, the *Series 300* graphic equalisers, *DN60* real time spectrum analyser updated with standard data interface and *RT60* analyser.

L

● **Lennard Developments:** will be exhibiting the products of two German companies with whom they have been associated for over 15 years. Woelke Magnetbandtechnik's products on display will include wow and flutter meters, some of their professional recording heads range and the new floppy disk and Winchester drive heads, and from Auviv-Asona, the well established cassette labeller and, to be shown for the first time at an APRS, the *2005* semi-automatic cassette winder.

● **Libra Electronics:** Libra has recently

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acquired the agency for Dod and MB. Products from both manufacturers will be shown: from Dod the new range of cost-effective digital delays and a rack mount mixer together with signal processing equipment and graphic equalisers; and from MB a wide range of microphones and headphones including a range of boundary mics.

M

● **Marquee Electronics:** will be exhibiting Eventide products including the *SP 2016*, JBL studio monitors including the *4430*, the complete range of Rauch amplifiers, Gold Line spectrum analysers, the *Drawer* range and introducing *Studio Innovations*. Full details of all Marquee services will also be available. ● **Michael Stevens & Partners:** Rogers monitor speakers in standard and powered versions; Turner power amplifiers; own-manufacture, budget, angle mic stands; and 10-memory autolocator for Tascam *40* and *50 Series* tape machines. There will also be details available of the company's activities which include complete design and installation service for studio, theatre, broadcast or PA applications. ● **Midas:** will include the *TR System* of consoles for theatre use, the *PR System* for live sound, the *PR40 Auditorium Sound* console for comprehensive live use and the associated *Auditorium Stage Monitor*. ● **Mike Fraser Film Services:** the *CAT* automatic precision recording tape splicer and more recent additions to the range offering simpler facilities or different cutting angles. ● **Modutec:** as the largest manufacturer of analogue meters in the USA, the APRS is the launch of the products into Europe. They will be showing a selection from a range of VU meters that conform to US standard C-16.5-1954 that are available in 25 case sizes and other VU-type meters that are available in over 45 case styles. ● **Mosses & Mitchell:** large range of audio jacks and jackfields meeting BT and BBC specifications including miniature sockets that can be used in custom jackfields. ● **Music Labs:** featured new items will be the *Scheck Audio CD 32 Multilevel Analyser*, the *Daub* range of professional power amplifiers, and the *Mini Doc* and *Doctor Click* synchronisers for computerised musical instruments. For the first time at APRS, Music Lab Hire will be exhibiting with details of its hire service. Also showing will be Cable Technology who will be showing the Klotz range of professional audio cable, splitter boxes, multiway stage boxes and a new range of high quality audio leads with gold connectors.

N

● **NEAL:** models from the full range of NEAL recording and broadcast studio cassette recorders including the dual deck recorders of the *600 Series* and the established *300 Series*. ● **Neve:** will launch a new mixdown and post-production automation system, *NECAM 96*. This will incorporate features of *NECAM I* and *II*, a new high speed 'Feather Touch' precision motor driven fader, an intelligent roll-back feature,

and an improved software operating system. The system will be shown operating with an *8128* console. Also there will be examples of Neve's latest developments in digital audio. ● **NSF Reverb:** mechanical reverberation systems with the featured item being a low-cost compact reverb plate.

O

● **Otari:** will be exhibiting the *MTR-90-II* multitrack in 24-track form, the *MTR-12* series including the $\frac{1}{4}$ in and $\frac{1}{2}$ in master recorders, and the *MX5050* series. On the duplication side, the *DP80* 64x high-speed system will be shown for the first time, in addition to the *DP4040 Series* in-cassette copier.

P

● **Pangbourne Musical Distributors:** featured on the stand will be a wide selection of products for all sectors of the professional audio and video tape and accessory market. Featured will be Brady splicing and editing tapes including cassette leader splicing tape, conductive and cueing splicing material for stereo carts; multitrack width splicing tape; video cassette splicing and sensing tapes; specialist products for data, digital and cine-cueing use. Ampex products will also be shown together with a range of C-0s and bulk cassette products. ● **Penny & Giles:** will exhibit their wide range of conductive plastic studio faders, joystick panpots and rotary faders. ● **Philip Drake Electronics:** items from the range of intercom/talkback equipment including *The Comprehensive* computerised communication system for broadcast and related markets; the *600 Series* studio intercom; the *Mini Mobile* talkback system; *The Callbox* talkback for OB use; *The Commsbox* ring intercom unit; jackfields, self power PPM unit; and the *7000 Series* of audio amplifiers for all applications. ● **Playback Studio:** as suppliers of audio and video tape in reel-to-reel and cassette formats, Playback will show products from Maxell, Fuji, TDK, Sony and Ampex. ● **Professional Recording Equipment Co:** full range of Leavers-Rich tape machines and bulk erasers, Pacific Recorders *Tomcat* cart machines, Garner and Weircliffe bulk erasers, Capitol Magnetics NAB carts including new AA4. Also items from the newly acquired Sound Technology measuring equipment distributorship. ● **Pye TVT:** as the broadcast company of Philips, will be exhibiting CD mastering equipment including the CD-Subcode Processor/Editor *LHH 0425* which provides a reliable way of generating and editing PQ cue code data. A professional CD player, the *LHH 0502* comprising a modular system of CD drives, keyboards and a control unit will also be demonstrated. The Adams-Smith *2600* modular tape synchronising system will be shown with new remote panels.

R

● **Raindirk:** examples from the Raindirk range of multitrack recording consoles and broadcasting consoles. ● **Rebis:** The complete *RA200* series of rack mount signal processors, redesigned versions of the standard rack mount equaliser, and the *Omega* multitrack console. ● **RE Instruments:** dual-channel audio

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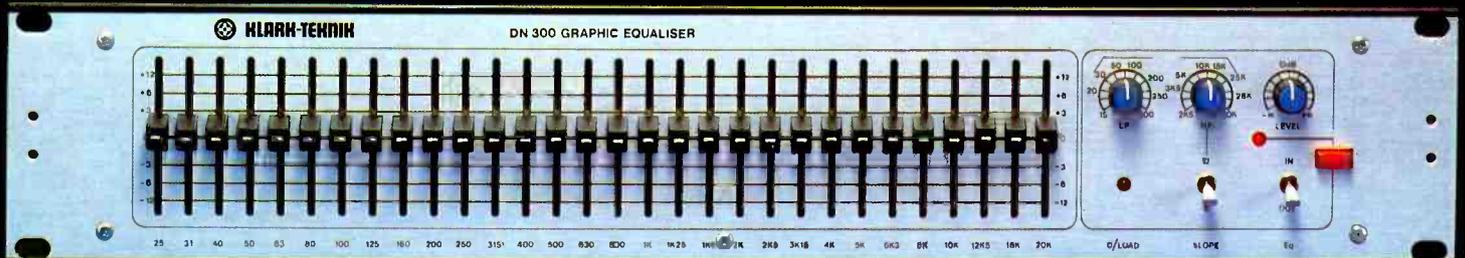


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analyser *RE201* which enables parameters such as TMD, IM, TIM and DFIM to be measured fast and displayed on own CRT. ● **Roland**: the Roland rack system including power amplifiers, signal processors, preamplifiers, new digital delay lines, in addition to a selection of recently introduced synthesiser/computer instruments.

S

● **Scenic Sounds**: will be showing the products of Amber, Auratone, btx, Countryman, dbx, HH, Editall/Xedit, Lexicon, Linn, MicMix, Orban, Publison, Schoeps, Valley People, and White Instruments. Major demonstrations will be mounted of the btx *Softouch* automation/synchronisation system, the Lexicon *200* and *224X*, dbx *700* series digital processing system, and hopefully the new Kurzweil digital keyboard.

● **Shuttlesound**: will be launching a number of new Electro-Voice products including the *BK 1* microphone, *EVT 4500* E-V Tapco reverb unit, *ELX-1* broadcast mixer, *DL Series* of chassis speakers, *FR12-2* and *FR15-2* speaker systems, a permanent installation version of the *100S* and the powered Sentry *100A*.

● **Sifam**: shown for the first time will be the prototype of a dual movement PPM with concentrically mounted pointers which has been designed for a major broadcasting organisation. Also showing will be the full range of other audio metering products, some electrical metering products and the range of control knobs.

● **Solid State Logic**: complete range of audio consoles with three new developments—a synchroniser controller; a programmable equaliser and the *SL688V Stereo Mix Matrix*.

● **Sonifex**: a selection of broadcast NAB cartridge equipment including the *Micro HS* series of cart machines available in a range of formats, the new *CQ* series of inexpensive cart machines, the *CQ HSE* autosplice finder and a range of housings and frames for the racking of recorder or player units.

● **Sony Broadcast**: comprehensive selection from equipment range. New items include *AVS-500/AVP-500* audio/video synchronising system; the *WRT-87/WRR-87* portable OB RF system; the complete Compact Disc mastering system; two *PCM-3324* digital multitracks running under *RM-3310* remote controller; and the new modular Compact Disc player *CDP-3000* under *CDS-3000* controller.

● **Soundcraft**: full range of products including console series *2400*, *1600*, *200* and series *760* multitracks. New products include *SAC 2* stereo on-air broadcast console; *SA* range of power amplifiers; *TS 24* in-line console; Series *20* microprocessor mastering recorder; and a low-cost console series known as the *600*.

● **Soundtracs**: featured will be two new series of consoles—the *T series* for live sound or 4-track use available in 8-, 16- or 24-track formats with four or six subgroups; and a range of in-line consoles in 8-, 16- and 24-track formats using techniques developed for the *CM4400* to offer solo in place, instantaneous record, mix down or tape monitor at the press of a button. All inputs have sum mode to double the number of inputs. Also displayed will be *S series Monitor*, *Omni*, and the *CM4400*

APRS PREVIEW

linked to tape machine with timecode for time synchronisation of audio in mixdown or video use.

● **Surrey Electronics**: full range of products including stereo disc and mic amplifiers, distribution amplifier, moving coil preamp, peak programme meters, illuminated PPM boxes and Ernest Turner meter movements, broadcast monitor receiver, *Stabilizer* and frequency shifter, peak deviation meter and chart recorders.

● **Swisstone (Rogers Monitoring)**: will be showing two BBC designs, the *LS3/5A* miniature monitor and the *LS5/8* bi-amplified monitor. It is hoped to show a new BBC design, the *LS5/9* compact monitor. In addition Rogers will show the *Studio One* monitor and the *Studio Two* or *PM510S2* active/passive design for higher power handling. For stage/studio use, there will be a preview of a new wedge foldback monitor with high efficiency and power handling.

T

● **tam**: will have examples from the complete range of disc cutting equipment previously made by Ortofon of which they have now taken over manufacture and repair. There will also be details of the complete disc cutting systems that can be supplied, training courses, disc cutting services, cassette duplication, etc, and some accessory items such as mic storage baskets and 'helping hands'.

● **Tandberg**: having recently formed a professional division of the parent company, there are a number of new products including the *TD 50* series $\frac{1}{4}$ in tape machines in three main versions all with *RS-232* interface; a new series of professional cassette decks based on two main versions, and the existing range of products including *TCCR 530* computer controlled cassette recorder, *TD 20* logger, *3000 Series* of amplifiers and tuners, *TES* telephone enhancement system, *TCD 600 Series* high speed cassette duplicators, and *TPT 3011* programmable control tuner.

● **Tannoy**: will be exhibiting the new *Wildcats* range of live sound speaker units, the Dual Concentric studio monitor ranges and the new Tannoy *SR840* power amplifier. This is a 250 W/channel MOSFET unit intended for both live sound and studio applications.

● **Tape Automation**: high speed audio duplication equipment including loop bin master transports with reel-to-reel slaves, cassette winders, video cassette loading systems with optional computer interface.

● **Technical Projects**: wide range of products including command communications systems, headsets, audio test equipment, acoustic test equipment, IQS FFT spectrum analyser card for Apple II, HME wireless mics, *Multipan*, DI boxes, disc amplifiers, station routing matrix, LED meter displays, distribution amplifiers, and details of their custom design service.

● **3M**: full range of audio and video recording tape.

● **Thorn EMI (Capitol Magnetic Products)**: cassette tape in pancake form, *Audiopak* NAB cartridges, cassette production sundries, and featured will be the new *Apollo* lacquer master which is claimed to offer many advantages in performance over

previous types.

● **TRAD**: will be showing their usual selection of used studio equipment and special offers.

● **Trident Audio**: featured will be the new *t.i.l.* in-line multitrack console. This is the first in-line type console to be manufactured by Trident and has a number of interesting features such as the ability to route up to eight aux sends to either monitor or input sections of the console as well as the complete, or parts of the, channel EQ. Available in frame sizes up to 36 channels with standard Trident styling. Also on display will be *Series 80B*, *70* and *Trimix* consoles and the *TSR* multitrack tape machine.

● **Turnkey**: very wide range of products including Fostex, Accessit, and many other items supplied by Turnkey as dealers. Also details of Turnkey 2 studio design services.

● **Tweed Audio**: a custom designed DC controlled broadcast console system manufactured for the BBC and due to be installed in Bush House. The complete system comprises two consoles with all audio electronics remotely located in racks. The system is open to modification for all requirements. There will also be full details of Tweed custom design facilities.

U

● **Uher**: will be exhibiting the Uher *CR160* portable cassette recorder for the first time along with the full range of their portable products. The *CR160* is equipped with Dolby B and C. The ASC range of studio and industrial tape machines and cassette decks will be on demonstration as will the Visonik *David* range of miniature high power speakers.

Z

● **Zonal**: magnetic recording tape ranges including $\frac{1}{4}$ in *675* standard play, *676* long play; the new *610* and *611* standard and long play tape; *200 Series* acetate magnetic film; *800 Series* polyester magnetic film and the new *900 Series*; audio cassette pancakes and the full range of finished magna labelled cassettes; and accessories such as audio leader and magnetic film spacing.

As for the past two years, **Don Larking Audio Sales** will be organising the Over The Road Show at the Kensington Town Hall on the same days as the APRS with opening times of 1 till 6 on the 13th and 10 till late on the 14th and 15th. Equipment being demonstrated will include the Soundcraft 2-track tape machine, the Soundtracs *CM4400* console, the Trident *t.i.l.* mixing console, equipment from Fostex, Teac, AMS, Bel, Drawmer, Applied Microsystems. Britannia Row will be setting up a complete 46-track video post production suite in the middle of the hall. There will also be a number of other exhibitors.

Back at the APRS **Studio Sound** will have a stand from which we will be distributing free copies of the magazine and showing other related publications such as sister magazines *Broadcast Sound* and *Professional Video*. This is of course *Studio Sound's* 25th anniversary year and we would be pleased to discuss any aspects of the magazines with visitors. Both editorial and advertising staff will be around the exhibition and can be contacted through the stand. □

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When we launched the RAUCH PRECISION X900/FET earlier this year, it was in response to a call from our customers in studios, clubs, theatres and touring sound companies for equipment that was ultra-reliable, structurally 'bullet-proof', and with a performance that equalled or bettered existing designs. We're pleased to say that X900's specification has impressed them to such an extent that we've had to double production.

At the same time we have been incorporating a number of improvements in detail as a result of 'user feedback', and as a result of an unscheduled 'drop-test' performed for us by an enthusiastic overnight delivery driver from the tail-board of his truck! The only damage: a gain pot and the function switch smashed, both of which were delivered, fitted, and the unit installed, within 15 hours. In case it happens again, we've up-rated the mechanical specification of the X-RANGE's pots and switches.

This same combination of ultra-reliable electronics and exceptionally tough mechanical packaging can be seen in our two new products introduced last month. The RAUCH PRECISION X500/FET is a conservatively-rated 200+200 version of X900, develops the same brilliant RAUCH PRECISION sound quality, and has ample headroom to power compact studio monitors or to drive the high-mid/high sections of bi- or tri-amped systems. And as a logical extension to the RAUCH PRECISION X-RANGE of power amplifiers we have built the Q22/41 electronic crossover system, probably the most flexible and highly-specified 1-unit active ECO currently available.

Like X900, both X500 and Q22/41 are covered by the RAUCH PRECISION SERVICECARD system that

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APRS '84
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TURNKEY in
POWER BLOCK
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THE

NEUMANN STORY

By the time Georg Neumann came to set up his own company, Georg Neumann GmbH, in 1928, German national radio had already been on the air for five years. Broadcasting house, as such, was the Vox building near Potsdamer Platz in Berlin, where more often than not the studio centre-piece would be a microphone mounted in a large steel ring, and bearing the name 'Reisz'.

The Reisz microphone was the product of Neumann's earlier collaboration with his employer, Eugen Reisz, and is now recognised as an historic piece of sound engineering. Set in a block of marble, this transverse current carbon microphone modulated an applied DC voltage of 12 V. It had an internal resistance of 250 Ω and an effective output voltage of approximately 2 mV/ μ bar. With a linear frequency response between 50 Hz and 1 kHz it had an excess of 10 dB up to 4 kHz, which increased to approximately 15 dB at 10 kHz. Not quite what we would call an ordinary microphone these days.

Neumann, however, was not one to compromise. The microphone was indeed a breakthrough, yet despite their achievement he and Reisz were soon to part, with Neumann forming his new company to pursue the idea of making mass-produced microphones, based on the principle of the capacitive transducer. As condenser microphones had only so far been produced in the laboratory this was not considered to be an entirely feasible proposition.

The *CMV 3* was the first ever mass produced condenser microphone, far superior to the Reisz microphone, and it gained recognition under the nickname of the 'Neumann Bottle'. Between 1928 and the end of World War II the Bottle's design remained virtually unchanged, during which time it became firmly established as the standard for studio use and was used extensively in the 1936 Olympic Games in Berlin.

By 1928 Neumann had spread his

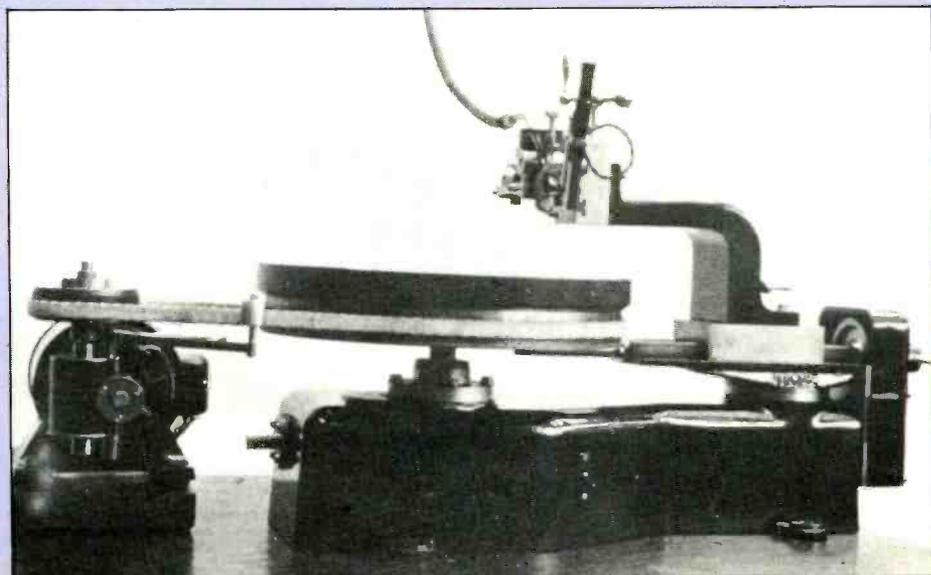
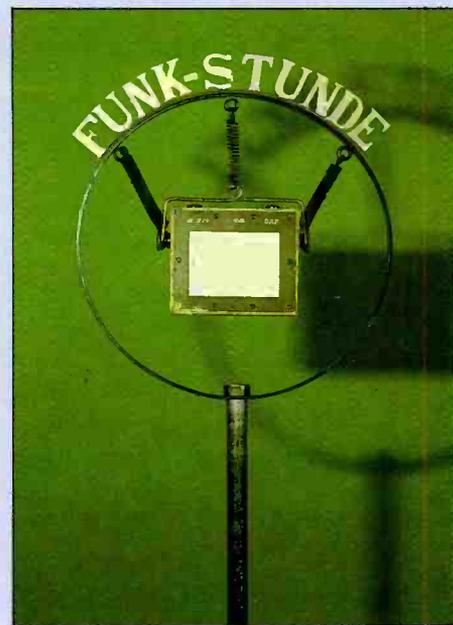
The development of this major microphone manufacturer is outlined by Ernst Weiss

attention to other aspects of studio engineering, such as record making. It was his interest in record technology that was, in fact, the real reason for the split with Eugen Reisz. His enthusiasm and Reisz' opposition were stirred by a commission from Neumann's friends in England to build a machine for cutting records. This machine was to become the basis for Georg Neumann & Co's secondary line of products.

The earliest disc cutting machines were belt driven. The head was moved forward by a spindle, which was itself

Right: The Reisz mic named after Neumann's former employer. Funk-Stunde was one of German Radio's early broadcasts
Below: An early example of Neumann's belt-driven disc cutting machine

driven via a worm gear and a further gear from the base of the turntable. The obvious parallel between this configuration and the modern record playing deck is particularly significant



when it is considered that by 1930 Neumann had already made the transition from belt drive to direct drive with the motor acting as a direct extension of the turntable spindle.

Throughout the '30s and early '40s the company began to take on a recognisable shape. Diversification brought continued innovation, ranging from electro-acoustic measurement techniques to cinema gongs to standard linear microphones, which operated in narrow bands between 30 Hz and 16 kHz.

Neumann also developed a pistonphone for calibrating both standard and pressure microphones. The pistonphone generated a sound pressure which could be controlled optically with great accuracy within the 20 Hz to 600 Hz range via the movement of a piston which displaces a given volume of air. The amplitude of the piston was observed through a



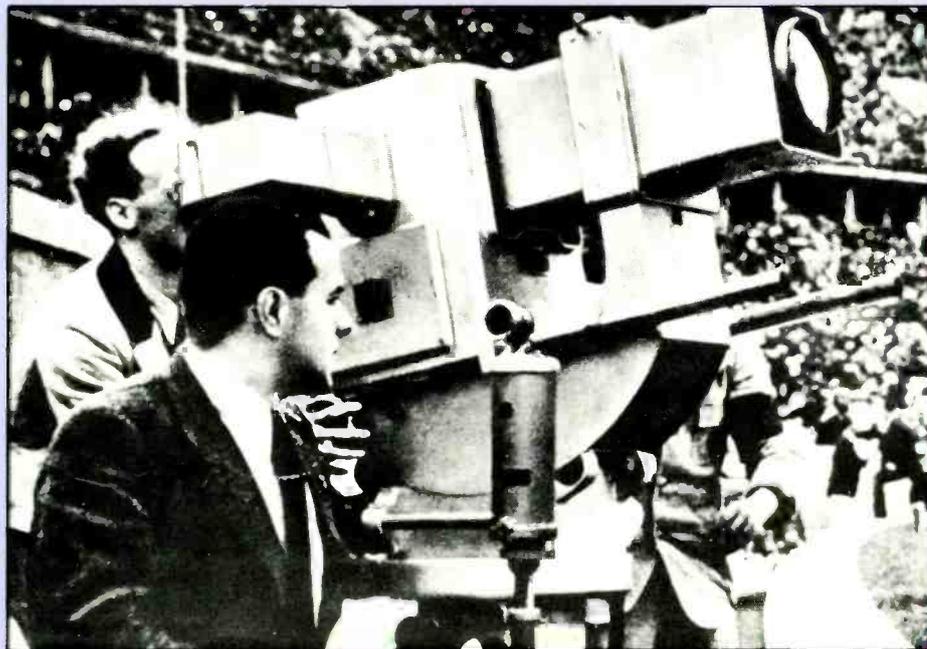
microscope, enabling the microphones to be calibrated to an exceptionally high degree of accuracy.

It was during the course of this widening development work that Neumann made his most important contribution to modern electrical engineering. In 1947 he developed a process by which nickel-cadmium batteries could be made without the excessive formation of oxygen and so totally gas tight—an invention that has direct links with virtually every modern electronic gadget. Flash units, hearing aids, cameras, cassette recorders, pocket radios, etc, all rely on minute nickel-cadmium batteries, whose availability is the result of this development. They have also become a critical element in space travel as a portable power source.

One of the by-products of Neumann's process were stability cells, containing a cathode consisting essentially of cadmium, cadmium oxide and a nickel anode. These cells have a comparative capacitance of 100 to 160,000 μF at a frequency of 50 Hz, according to the size of the cell, and Neumann was able to use them to stabilise the heating voltage for condenser microphones. Their outstanding filtering capacity was extremely useful for filtering the heating current, particularly for directly heated tubes.

In retrospect, 1947 was a prolific year for the Neumann company. On top of one major discovery the company launched the microphone that has probably had the greatest influence in the development of modern studio microphone technology. The *U47* was the first switchable pattern condenser microphone. Its impact, especially in

Left: The CMV 3 capacitor mic was widely used until the end of World War II
Below: The CMV3 in use at the Berlin Olympic Games. The cameraman here is Walter Bruch who went on to invent Telefunken's PAL colour TV process



America, was such that the dominance of RCA's ribbon microphone as the studio standard was eclipsed.

The *U47* had a double diaphragm capsule. Both diaphragms could be polarised in the same direction or neutralised with respect to the centre electrode, so that the omnidirectional and cardioid characteristics were adjustable. A 'special' was also produced, in which the diaphragms could be polarised back-to-back with respect to the centre electrode, so that it was possible to switch between cardioid and figure-of-eight directional characteristics.

Other models appeared in 1949 and 1950, both bearing some notable progress. In 1950 the *M50* featured a pressure capsule embedded in acrylic glass to give an outstanding omnidirectional pattern. But this was perhaps a small development compared to its predecessor, the *M49*, which was the first microphone that could be remote-switched.

Neumann's work on the *M49* coincided with a similar invention by an engineer called Grosskopf, of the Central Laboratory of the Nordwestdeutscher Rundfunk in Hamburg. Here, one microphone diaphragm was fixed in the opposite direction to the centre electrode while the other one received a capsule bias which could be varied via a potentiometer. This made it possible to switch the characteristic smoothly from omnidirectional, via cardioid, to figure-of-eight.

But it was Neumann, who somehow managed to acquire the patent for this, that went on to produce the first remote-switchable microphone, the *M49*. Soon there were numerous versions being launched by his competitors, all of course made under licence from Neumann.

In Europe during the '50s the two most important developments in channelled sound were undoubtedly the upsurge of television and the arrival of stereophony, both requiring their own specialised microphones.

By 1953 Neumann was meeting the demands of television companies for smaller, less obtrusive models with a selection of condenser microphones only 21 mm in diameter. A choice of omnidirectional or cardioid models were available, plus a switchable model which combined omnidirectional, cardioid and bilateral characteristics.

To record in stereo naturally called for two microphones placed in such a manner that their time/amplitude response was coincident. The ideal solution therefore was to mount two capsules in one housing. In 1956 Neumann produced the *SM 2*, which was to remain the only stereo microphone in the world for many years.

During the course of the next two and a half decades the potential for realistic sound reproduction offered by stereophony generated intensified research in the recording world,

THE NEUMANN STORY

particularly in acoustics technology. For the laboratories one of the first breakthroughs was the arrival, in 1956, of Neumann's *P2* attenuation recorder, the first factory produced logarithmic-display level recorder. This became the standard measuring equipment in acoustic testing laboratories for many years, notching up worldwide sales in the process.

In the studio, one of the most interesting developments in recent years, is the *kunst kopf*, or dummy head—an attempt to reproduce the circumstances under which sound is received and broken down inside the human head. An effigy made by Neumann, and answering to the name of *KU 81*, sported two capacitor microphone amplifiers in the rear of the head, with angle brackets to flange the microphone capsules and coupling to the outer ear. The ear was a precise replica (particularly the ear pinnae) of the human ear, made of a plastic with very similar mechanical properties to human flesh. The microphone capsule would be accurately positioned where the eardrum is normally placed.

The advantages of dummy head recording are already well documented and are recognised in drama and special effects recording applications.

While the results of such exercises at Neumann GmbH can be chiefly related to advances in its condenser microphone technology, the company remains very much involved in the manufacture of disc cutting equipment, as well as the more directly associated field of complete sound mixing systems.

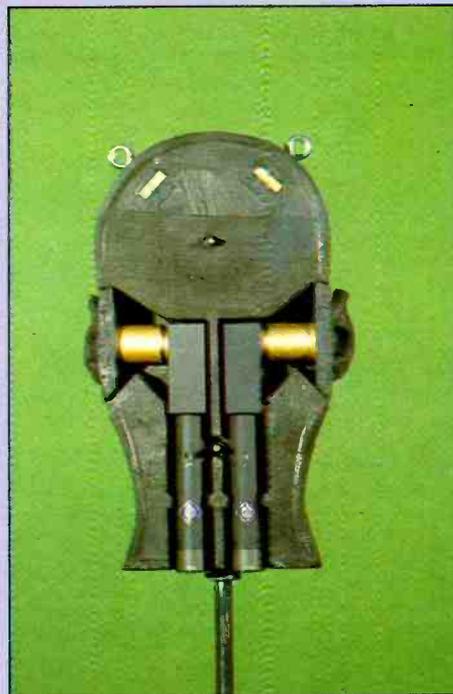
Apart from permanent studio installations, Neumann mixer units are extremely popular for live recording purposes. Significantly, there is one in virtually every theatre in Berlin, in radio stations, and the German band Boney M have one installed in their private studio.

On cutting equipment, however, the headaches are of a different kind. With up to 550 W/channel now available, a cutter head can be at great risk. It must withstand a maximum working temperature in the coils of 200°C, necessitating expensive electronic safety devices.

The Neumann feedback system, which ensures that the cutter head receives a flat frequency response in the transmission range, comprises an additional magnet and coil system between the cutting stylus and the drive coil. The 0.1 mm wire used for the drive coils is pressed into a 0.07×0.14 mm format to give the



Going under the name of *KU 81* the latest dummy head developed by Neumann contains two capacitor mic amps. The ear is made of material which has very similar mechanical properties to human flesh



The *SM 2* produced in 1956 was the first ever stereo microphone and the only one in use for many years

winding forms a higher dissipation factor, allowing current densities of more than 1,000 A/mm².

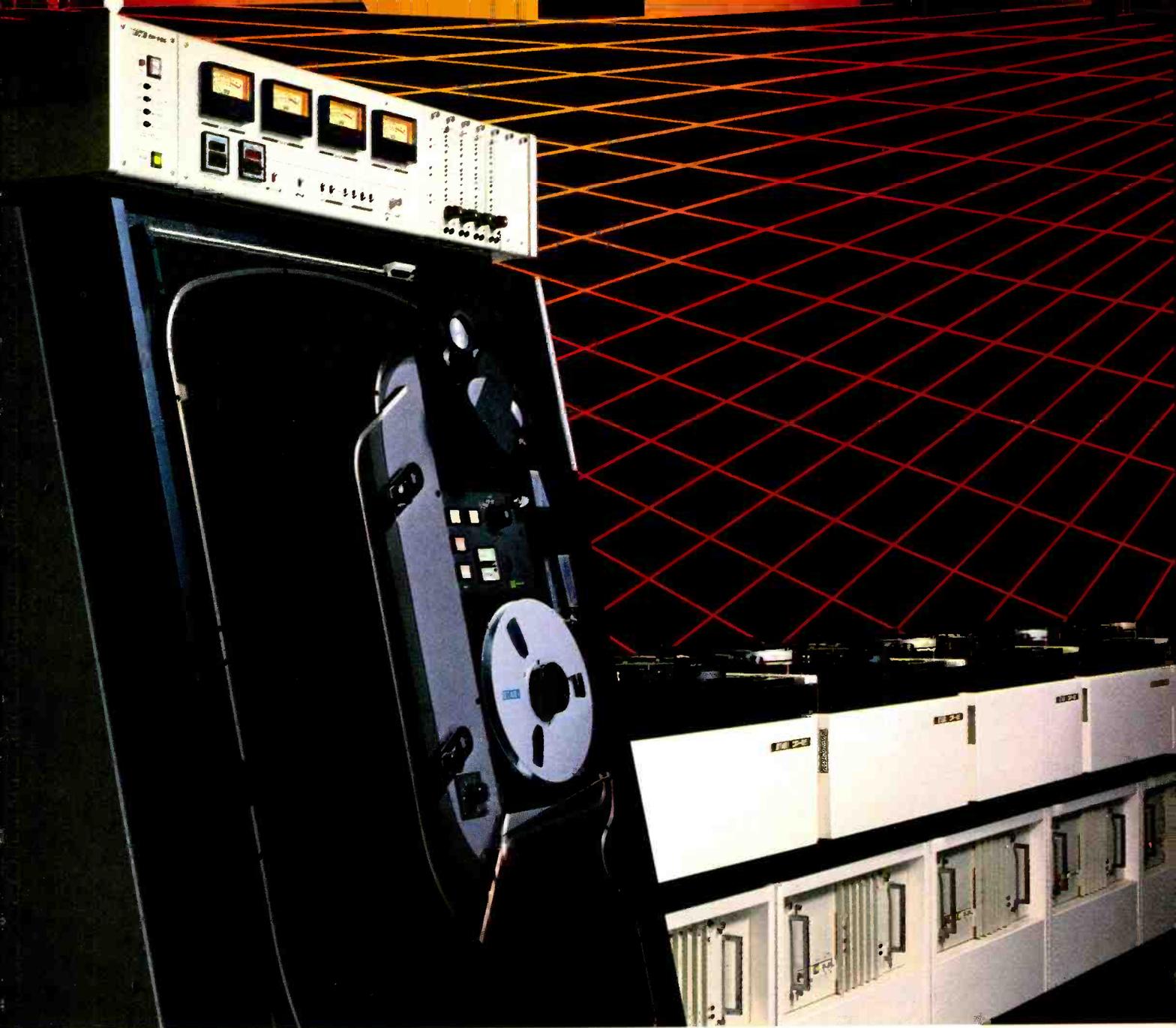
The natural resonance of an electrodynamic moving coil system of this kind lies roughly in the logarithmic centre of the audibility range, ie around 1 kHz, and the incorporation of a feedback coil causes the cutter to create and deliver a precise feedback voltage which corresponds to this resonance. This feedback voltage is fed, phase-inverted, to the drive system



The first switchable pattern condenser mic, the *U 47*, became more popular than RCA's ribbon mic which at the time predominated in studios

and the frequency response of the cutter is thus linearised.

The performance of the condenser microphone, now manufactured in an extremely wide range of models, remains largely reliant on the precision engineering involved in



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capsule production.

The common centre electrode found on a double diaphragm capsule contains a large number of critical drill holes, some of which are blind. The depth of these blind holes determines the volume of air trapped behind the diaphragm. This volume, which inhibits the movements of the diaphragm, determines the transducing capability of the condenser microphone.

The dimensions of the holes, and their accurate machining becomes even more crucial when the electrode is produced in two halves. With this design the two halves of the capsule can be electrically connected, and similarly separated, by means of an isolating intermediate layer, thereby making it possible to switch the directional characteristic with the available polarisation voltage.

Another type of capsule, the *KK88* from the *KM88* microphone, uses pure nickel as the diaphragm material—0.0007 mm thick (0.7 micron).

To smooth the surface of the electrodes two different processes are employed. For microphone capsules whose surface lie on one plane a lapping process can achieve a surface flatness of 0.3μ and a plane parallelism of $\pm 1 \mu$ between the front and the back of the electrode. In some cases a capsule's surface may be in two planes. This may be because the distance between the diaphragm and the electrode has already been determined by the second plane of the electrode. In such cases the finishing is performed on special lathes.

After lapping or lathe finishing, the holes must be deburred, followed by a visual inspection using a powerful microscope.

Diaphragms are made from a 6.3 micron thick polyester foil, such as Mylar. This is first attached to brass rings, then put into a container which holds it while gold is applied under vacuum to a uniform layer 300 Angstroms thick (0.03μ). The external diameter of the capsule is approximately 34 mm. The diaphragm is fitted approximately 40μ in front of the electrode and is 6.3μ thick. When a sound pressure of $1 \mu\text{bar}$ is applied the diaphragm movement is no more than 10 Angstroms, or 1 nm. By comparison, the wavelength of violet light is 400 nm.

The mechanical advantages being achieved under these microscopic proportions is best put into perspective by illustrating thus: if a microphone capsule were to be given a scale on which the amplitude for $1 \mu\text{bar}$ were represented by 1 mm, the capsule under manufacture would have to have a diaphragm spacing of 40 m, and the

diameter of the capsule would be more than 30 km.

On assembly of the capsule aluminium foil spacer rings, 40μ thick are attached to the middle and the edge of the electrode. The lead-in contact for the polarisation voltage is fitted in the centre. This is an assembly device that enables the capsule to be directly connected to a test instrument, with which the capacitance is measured and the mechanical strength of the diaphragm tested. This is done by measuring the change in the basic capacitance after the polarisation voltage has been applied.

So meet the operating conditions encountered in the studio the microphones are subject to testing throughout their manufacture. The capsules alone undergo more than 50 different tests before final assembly. A small Pitot tube, for instance, tests the correctness of the directional characteristic.

Since the very beginning in 1928 Neumann condenser microphones have always operated on a low frequency

circuit, with the capsule consequently acting as a very high-impedance generator, rendering it highly sensitive to moisture. And as moisture represents one of the most common operational hazards of a warm recording studio, Neumann has paid great attention to all aspects of insulation.

Quality control devoted to this aspect includes a moisture chamber, in which capsules are placed until both the diaphragm and microphone body are dripping wet. Even under these conditions insulation resistances to the order of $20 \times 10^6 \text{ M}\Omega$ are measured in the capsules.

Another test is to cool the microphones to fractionally above freezing point then place them in a chamber with 100% humidity, at a relatively high temperature. The spontaneous moisture formation that follows infiltrates not only the capsule but the entire electronic circuitry. It would have to be an extremely uncomfortable studio to recreate such conditions to say the least, but just in case, every type of Neumann condenser microphone has passed the test. □



Some examples of Neumann's range of microphones today

Above: The U 87 condenser mic is switchable between polar, cardioid and figure-of-eight responses

Above right: the modern U 47 is still popular in studios throughout the world
Below right: Internal detail of the U 87

A better mic - no strings attached



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STUDIO FILE

STUDIO FILE

Ambiance is a relative newcomer to the studio world having been running for about two years. Owned by Nigel Bates—musician and, more recently, producer—it offers some quite remarkable and unusual facilities. Because Nigel is very interested in electronic music he has acquired a collection of instruments and equipment which would make the most contented superstar turn at least faintly green.

The studio itself is of average size, and has been put together very expertly not least of all because the family business is sound proofing. The building is an old warehouse which was surrendered to the parent company Komfort as a bad debt and Nigel managed to persuade them that a studio was a good idea.

It was an enormous job to convert the building from warehouse and offices to the plush comfortable studio it is now. The ground floor consists of a main recording area with isolated live room, the main control room, a secondary control room which houses all the synthesisers, a reception area, a lounge area and kitchen, and shower, etc. Upstairs has become a dance studio with all the normal facilities associated with that. So the building has certainly been put to maximum use.

The recording area is long and thin with different acoustical properties as you go through, starting with the live area at the control room end and becoming increasingly dead towards the back of the room. The walls are non-parallel and the back end of the room is very dead with a 5 ft wide trap in the ceiling. Opening the door out on to the car park you can see the way the walls have been built up to between 2 ft and 3 ft thicknesses using a stud and track system with hanging Fibreglass strips (they ended up using 150 rolls of Fibreglass to do the whole building after an initial order of about 50!). Starting from the bare brick, the walls were built up with absorbent plasterboard, different thicknesses of Gyproc with the Fibreglass on top and the whole thing covered with hessian.

Above the false ceiling, the ceiling proper "goes all over the place sloping up and down, and the gap in between is filled with Fibreglass and Rockwool baffles". The studio lighting is then sunk into the ceiling tiles. The upright Challen piano sits on a small area of parquet flooring on one side wall.

Ambiance Studio, Sussex

The partition between the live and dead area is a new design from the parent company Komfort and it is called the *Komplete Partition*, and Nigel says that it works extremely well.

The live room itself is approximately 12×14 ft with a floating parquet floor and pine wood panelling on the walls. About 8 ft of one of the side walls is more live than the rest, and this was apparently done on a whim, but it also apparently seems to work!

Behind the wood these walls have had much the same treatment as those in the main area, only on a lesser scale.

The control room window consists of two separate walls with Fibreglass in the middle and 80 sheets of plasterboard, broken up with three sheets of glass of different thicknesses and finished off with a hardwood surround. On either side of the window there are Bang & Olufsen *Beovox P50* speakers for talkback/playback.

Although the control room works very well soundwise, this is the only area of the studio Nigel isn't so happy about

because of its size. It is approximately 16 ft by 14 ft, and when you are spending most of your time DI'ing in the control room it would be nice to have a bit more room. Once again the walls are non-parallel. The ceiling is liberally furnished with bass traps and the back wall is absorbent with a bass trap behind it. The absorbent surface stops things reflecting back on to the engineer. In contrast, the side and front walls are reflective—the side wall having a wool strand covering and the front pine, both on top of solid plasterboard walls. "Yes, the control room is pretty flat EQ-wise," states Nigel very positively, qualifying this with the fact that all the rooms were measured carefully after completion in order to spot any mistakes. "We've got a very clean, clear sound at Ambiance."

The studio monitors are Tannoy *Little Reds*, and these are mounted in angled plasterboard columns on either side of the window: "and they're the right distance from the desk. You know what I mean." The columns stop about 2 ft below the ceiling. Also mounted up

here is a TV monitor so that you can see what is going on at the back of the studio if you've got bad eyesight.

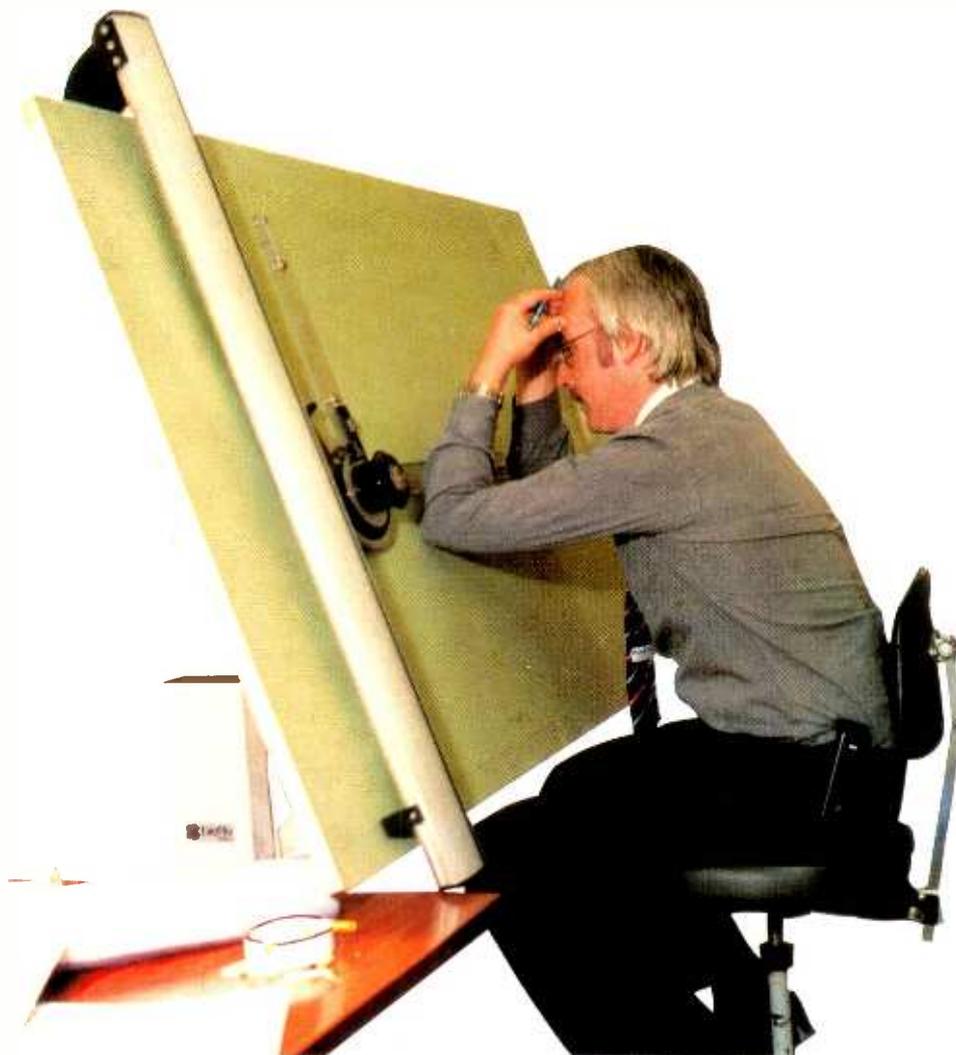
The studio has gone through a few equipment changes, partly because at one stage Robin Scott (of M) was involved. Since he was spending so much time at the studio himself he persuaded them to lease his desk and machine (an Allen & Heath *Syneon B* and Soundcraft *2400 Series* mixing console with 28 inputs; a Soundcraft 24-track machine with an additional 16-track headblock running at 30 in/s with Applied Microsystems autolocator and a Studer *B67* for mastering. There is an assortment of other tape machines including a Revox *PR99*, a Sony *PCM F1* system as well as Teac and Sony cassette machines. Reference monitoring is done on either Auratones or Visonik *Davids*.

Mr Bates delights in collecting electronic gadgets as well as instruments and the outboard equipment collection is suitably impressive. Going down the racks you start with a Quantec

Synthesiser room, connected by tie lines to control room



To Harrison, MCI, Studer, SSL and the rest – Back to the Drawing Board chaps!



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STUDIO FILE

STUDIO FILE

Ambiance cont'd. . .
Room Simulator (link this up to the Fairlight *CMI* and you can have endless hours of fun). This has been a very popular acquisition. "With the Quantec there is no need for an echo plate because it can simulate one brilliantly. I can get any sound of any room I want with that thing. I quite often record everything in the live room and just get the room sound I want on the Quantec."

Next are two *AMS DMX 15-80S* stereo delay pitch shifters (with de-glitch cards giving 1.6 s delay); an *Eventide 949 Harmonizer*; a *Bel BF20* stereo flanger; a *Bel BA40* flanger/delay; a *Polyfusion Prographic* which is a programmable computerised graphic equaliser: "This is very quiet. You turn up the top end and there's absolutely no hiss. It's sometimes difficult to tell if it's working! It's got 64 memories and remote control which enables you to change the sound as you are going through the song. It's great."

Further effects units include four dbx *165* compressors, *Rebis* noise gates and 16 *Rebis* compressors; a *Rebis* de-esser; an *AMS RMX16* digital reverb; dbx *2020* computer graphic/spectrum analyser; and a *Master Room* reverb.

When approached on the subject of microphones, Nigel dragged out a great sea chest full of the things and we found *Neumann* a *U87* and a *U47* valve mic, *Electro-Voice RE20*, *Sennheiser 441s*, *Schoeps CMTS 501U*, *AKG D12s*, *451s*, *222s*, *202s*, *310s* and *D90s*, *Beyer M160NCs*, *M201NCs* *Calrec CM105 OCs*, *CB20Cs* with *CC50* capsules, *Shure SM81s* ("They're great these, use them for everything—piano, hi hats, cymbals. . ."), *SM57s* ("These are so great they get nicked all the time"), and finally, spotted clinging to the walls of the live room—a pair of *Milab MP30* boundary mics.

Crossing the corridor brings you to what has become Nigel's second home. This is where all the electronic goodies can be found. It is quite a small room (12x14 ft), made smaller by the fact that it is jammed full with every conceivable type of synthesiser. Pride of place must go to the *PPG Wave* system which is the only complete one of its kind in the country, incorporating the *2.2 Expansion Voice Unit*. "It is a 16-track recorder with 12-bit sampling and the system may be used as a normal synthesiser as well. It

can use 16 sampled sounds. You can build wave tables on the screen in order to copy sounds and change sounds."

But for those dedicated Fairlight lovers, never fear—he's got one of those too! Use of either monster will cost a client £300 a day with operator.

Use of the other keyboards is free and there is a choice of a *Roland MC4* ("That's like a big calculator"), *Yamaha CS40M* and *CS60s* a *Roland Jupiter 4*, *Roland CSQ600*, *Roland SH09* and *RS09s*, *Roland MC202*, *CR78* and a *Drumatix* (alright, they're not all keyboards. Just testing). There is also a *Linn LMI* drum computer. Monitoring in this room is once again on *Tannoy Little Reds* and there is a *Soundcraft 200* series 16/4 desk for mixing.

This room is tied in to the other two so that anything may be used anywhere. Acoustically they have endeavoured to make it sound like anyone's living room and to this end have simply covered the walls in cork wallpaper.

If you're stuck for amps you will find here a *Roland JC160* and a *Cube* as well as a small *Roland 250w* PA System.

And if it's instruments you're

after there's a choice of *Fender Jazz Bass*, *Roland Guitar Synth*, *Alembic Bass*, a lovely *Stick Bass*, loads of pedals, and a whole mountain of percussion instruments.

If you get bored with all this, all you have to do is go along to the kitchen, knock up a meal in the microwave, pour yourself a cup of coffee from the machine and put your feet up in front of the television or hi-fi system. Or maybe take a shower? Why not?

Mr Bates is now the house engineer. While the place was getting going there was first *Simon Humphries* who recently left to go to the *BBC* having first recorded an album for *Djalenga* on *Albion Records* which was voted best ethnic record of the year in the *Sunday Times*. He was followed closely by *Norman Mighell* (ex-Basing Street, I seem to remember) who was there for six months until he emigrated to Australia at Christmas.

Ambiance gets a lot of work in from *Chappells—Colin Townes*; *Dave Skinner* (ex *Roxy*) who came in with *Tina Cross*. Then there is *Robin Scott*, of course, who spends his life there. The last few months has been spent working on his latest album due

for release in the Spring following a world tour. Other recent visitors included *Drumatis'* *Chris Payne* and a handful of local bands, but on the whole, business tends to come from further afield, and quite often abroad.

Nigel's dream? To take what he's got, except maybe for the control room which he would swap for a larger one, move it out to a farm in the country and endeavour to provide younger, poorer bands with the sort of facilities that they just couldn't possibly afford normally. It all sounds very idealistic, but then, he's already achieved much in such a short time.

And the expansion goes on. *Ambiance* have just formed a label and publishing company.

About 30-odd miles from London and in a fairly big town, it is an interesting facility offering an unusual and wide choice of equipment and gadgetry as well as plentiful coffee, and I would like to thank them for being interviewed at the crack of dawn (well almost).

Janet Angus

Ambiance Studio, 1-5 Gordon Road, Burgess Hill, Sussex. Tel: (04446) 45163.

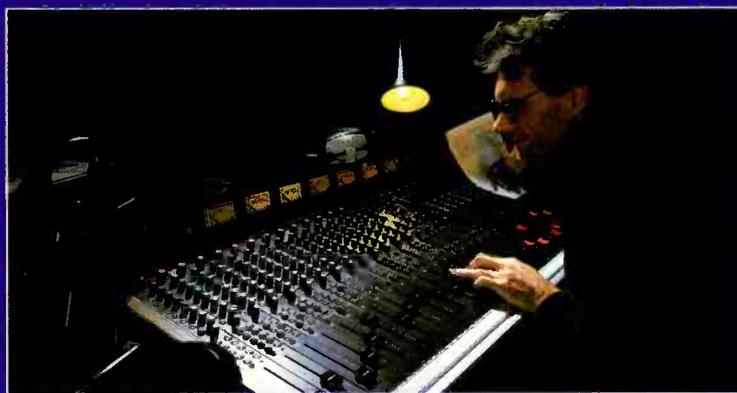
Control room, Ambiance



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STUDIO FILE

STUDIO FILE

Berry Hill certainly attracts the individualists: the community itself, Valley People and now, Treasure Isle Recorders.

Following a hard-worn route well known to many independent studio owners, Fred Vail and Dave Shipley decided that having their own studio was the best way to go. One of the reasons for this was that a large percentage of their work was in their own productions. After many trials and tribulations, plus a certain amount of financial wheeling and dealing, the new Treasure Isle studios emerged from the quiet suburbia of Berry Hill.

The land and adjoining house was built in 1979 with the idea that some day a small studio could be built on to the house and if not—the investment was still a good one. As things have turned out, the studio is neither small nor insignificant and has the distinction of being the first studio to be built from the group up in Nashville for quite some time. On the face of it the risks were quite high, what with the music industry lacking direction and hard times lurking just around the corner. Also, did Nashville need another studio? The answer was 'yes' if qualified by saying that there was room for the type of studio that Treasure Isle represents.

Rather than being state of the art (a rather vague term at the best of times), it is a fully fledged top class studio that has got its priorities right. Equipment can always be changed any time finances permit without problems but changing the premises can be another story altogether. Here Treasure Isle have shown good sense by investing heavily in the building itself and taking full advantage of the possibilities offered by being able to build from scratch. It was realised that an acoustic designer would be needed to translate the owners' ideas into practical realities and this was found in the person of Richard Lee from Criteria Studios (who also designed Compass Point in the Caribbean). Listening to the specification of Messrs Vail and Shipley, especially on what they wanted as a listening environment, Lee found that the *LEDE* concept would suit them well.

The new building consists of main areas, viz: entrance lounge and bar/kitchen, hallway with toilet facilities, jacuzzi and gym, control room, studio, vocal booth and maintenance room. In addition there was a rooftop

Treasure Isle Recorders, Nashville



Control room, with Richard Stevens mixing and Jeff West producing



Studio with drum booth

terrace that can be used as a relaxation area in sunny weather. In order to take advantage of all possibilities, all the rooms as well as the terrace have been installed with microphone lines meaning that instruments can be recorded just about anywhere in the building. The large lounge would certainly serve as an excellent isolation room for a brass section, for instance, though the bar might remain a bit of a temptation!

One of the advantages of being able to build from the ground up—and also one of the more

unusual features of Treasure Isle—was that Richard Lee was able to incorporate all the different wall angles into the basic shell of the building, rather than build a conventional 'box' and construct the acoustical form inside it. This means that with the exception of the front wall (lounge and hallway area) there isn't a straight surface in the place! The outer walls were constructed from 12 in concrete blocks filled with sand and whereas the interior treatment saved the carpenters some problems the builders had some

headscratching to do. As well as defining all reflective angles from the start, this method of construction also simplified the internal finishing as it meant that studding could go straight on to the walls and the various acoustic materials attached without problem.

Entering the control room from the lounge, one is greeted with an impression of space that makes quite a contrast to the habitual low compression type ceiling control rooms. The room measures 24x22 ft with a 13 ft ceiling meaning that there is plenty of room to move about as well as room for the sound to develop. Design is along strict LEDE lines and at the time of my visit was awaiting the test procedure in order for it to be certified. Cosmetically the room is attractive while remaining suitably low-key, the dead-end having fabric over the absorbent material on the sidewalls and Sonex panels on the front of the monitor bridge. The rear, or live-end, is faced with pine panelling and features a multitude of angles calculated to focus the reflections back to the listening area. The rear wall has a large soffit under which are parked the tape machines and the above space is utilised for cupboards. A good idea, it keeps things tidy.

The basic floor is concrete and floating with the two levels of parquet tiles built on to it. The raised level starts from the console to the rear and permits better vision of the studio through the already large control room window. The floor in the dead-end is naturally thickly carpeted. As well as the main studio window, there are side windows (one each side) giving on to the lounge and the vocal booth.

The Trident *Series 80* console is situated in the dead-end of the room, the rear of the desk just coming up to the dead-live dividing line. Configuration of the console is 32/24 with the recorders being a Studer *A80 MkIII* 24-track, *B67* 2-track and high speed *A80 ½* in master recorder. Twenty four plus two channels of Dolby A are available should noise reduction be required as well as the same number of dbx *cat 22* compatible cards should preferences differ. Cassette copies are looked after by a Nakamichi machine.

The monitor system was designed specially for Treasure Isle and can be loosely described as being based on Westlake and Augspurger designs. They are 2-way designs with twin JBL *2235* 15 in woofers and TAD

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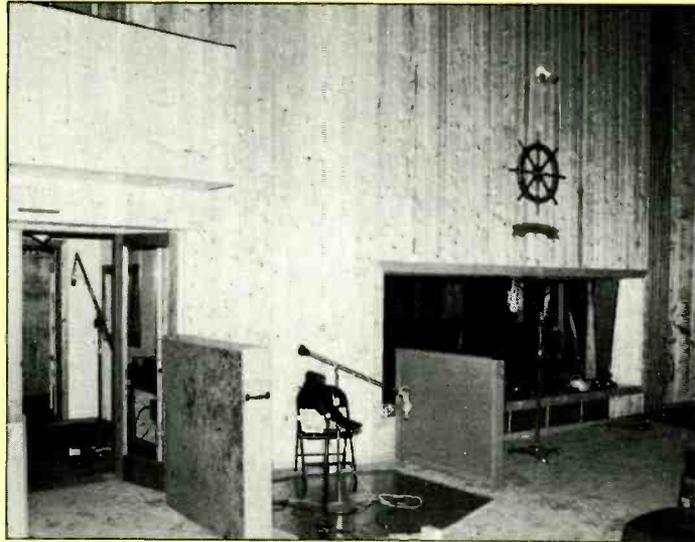
STUDIO FILE

Treasure Isle cont'd. . . driver/Northwest Horn for the mids and trebles. Contrary to usual practice, the horn is mounted underneath the woofers. The drivers are aligned physically for proper phase/time relationships and this was set up in a rather novel way. The horn was mounted so that it could be slid back and forth. Programme was then fed into the system over the octave covering the crossover frequency (800 Hz) while the horn was moved. With the units out of phase a sort of 'burbling' sound could be heard so the horn was adjusted for minimum phase interference and fixed into position. It just goes to show that ears are still valid as test gear!

Power for the monitors is provided by a UREI 6500 for the bass and a Quad 405 for the top end. White 1/3-octave equalisers are used in the system but are set virtually flat, the room having turned out as the designer intended. Secondary monitoring in evidence was a pair of Tannoy SRM10Bs driven by a Quad 405 and Auratones powered by a Studer A68. Other speakers that can be pulled out include JBL 4311s, E-V Sentry 100s, and Big and Little Reds.

Two attractive wooden racks house the outboard gear and effects, these being positioned at the right of the console so they form an L and are thus within easy reach. Processing equipment includes a nearly full Audio & Design Scamp rack with parametric equalisers, automatic pan unit S24 ADT de-esser, S01 compressors and dual gates. Moving on we find UREI 527A graphics, 1176, LA4 and LA3A compressor/limiters, BG 644 compressors, Eventide H949 Harmonizer, Lexicon Prime Time and Super Prime Time, dbx 160 and over-easy compressors, A & D Vocal Stresser and a stereo Aphex processor. Reverberation and echo effects are provided by an AKG BX20, Sony DRE 2000 digital reverberator with up to 50 memories, Cooper Time Cube and an Ecoplate.

In addition to the electronic reverbs, Treasure Isle has its own 2,000 cu ft live chamber with tiled floor. This is installed over the hall area and provision has been made to fill it with up to 6 in of water! The idea here is to obtain the famous 'wet' reverberation sound that is supposed to have been used on some of the Alan Parsons Project cuts. (Engineers who do spelaeology might know of this effect when exploring underground lakes.) At the time



Studio with vocal booth on the left

of my visit the room had yet to be launched, or should I say sunk, so I will have to check back in the near future to see how things have turned out. However, it is good to know that people are still experimenting with physical sounds and not just relying on electronics.

The studio is entered from the lounge and once again the first impression is one of space. This is hardly surprising as the room measures 30x42 ft with a maximum ceiling height of 24 ft. As with the control room, the wall angles were predetermined by the basic structure and just needed interior treatment straight on to the walls. The studio is divided up into live and non-resonant areas with a large, central drum booth. In fact, it would be more true to say drum room as it is the largest in Nashville, measuring 14x12 ft with a 13 ft ceiling. With five windows the booth has excellent visual communication with the whole of the studio and control room and succeeds in the aim of having a big, open drum sound isolated from the other instruments.

The décor of the studio is on the same theme as the control room with fabric covered Fibreglass for the absorbent areas and pine panelling for the reflective parts. The live area is at the entrance end of the studio and measures approximately 17x30 ft and consists of panelling on the walls and ceiling with a parquet floor. Here the suspended ceiling is at its highest before curving down to the deader areas. However, as mentioned previously, there are no parallel surfaces anywhere, which makes for a lively sound

without unwanted resonances. The live area is perfect for strings, etc, but all options are open. Both the studio and drum booth floors are concrete and floating, each one being isolated from the other. Away from the live area the floor is covered with thick carpeting (which can be rolled back if necessary) and there is an abundance of movable rugs for further modification of the acoustics. There were also some quite hefty separation screens. The ceiling is acoustically dead and covered with fabric apart from the pine panelling for the string area.

In keeping with the studio's name, the nautical aspect has not been forgotten as can be seen with the ship's wheel placed over the control room window. Various brass nameplates that were found in a ship chandler's in New Orleans are fixed in various strategic positions around the studio, an example of which being the drum booth door which has a plate marked 'Headroom'. Is this a reassurance for tall drummers or...?

The other side of the studio from the entrance door finds the double glass doors leading into the vocal/isolation booth. Furnished like a comfortable lounge (complete with sofa and coffee table) even the most energetic vocalists will find enough room to flail about in, while the more laid-back characters can literally follow their inclinations. The room also provides a pleasant environment for soloists who can play without feeling cramped. Visual contact with the studio and the lounge is good.

The booth also has access to

the control room to save trotting round the other side. This same door leads to the maintenance room as well as to stairs leading up to a first floor office. The office also has a balcony that gives on to the studio and makes quite a good conductor's rostrum.

Instruments available in the studio at the time of my visit were Linn drum machine, 360 Systems synthesiser, Hammond B3 plus Leslie, Rhodes, Pearl drum kit and a 1917 vintage Baldwin grand piano.

The studio has a comprehensive selection of microphones from AKG, Shure, E-V, Neumann, Fostex, Crown (PZM), Sony, RCA. Models include C12s, 414s, U47s, SM5s, with some RCA 33s bringing up the vintage department.

Treasure Isle had also got hold of some of the new Bruel & Kjaer studio microphones and engineer Richard Stevens (who was showing me round) already thought they were overall the best microphone in the place.

The size of the studio makes it eminently suitable for getting a 'big, open sound'. Conceived primarily for rock though the studio is, Treasure Isle does not intend to specialise and all types of music are more than welcome. The great advantage of the studio is the high ceiling which allows the sound to develop, or breathe (and this is true for both control room and studio) which is not something you can forge with effects, no matter how good they are. So, turn it up and let it roar!

Richard played a recent recording and I must say that the general feel was very English! When I commented on this, Richard seemed to be very pleased as he said that that was the type of sound the studio wanted to go for. The imaging in the control room was very stable and precise, with high level monitoring being clean and punchy without being aggressive. The recording itself certainly had a big sound to it with a lot of physical presence and also sounded uncluttered.

Opened in September 1982, Treasure Isle has attracted clients from both in and out of Nashville and looks set for a fair weather voyage to success. The digital era is not being forgotten either and considerations are underway for the installation of a 3M or Mitsubishi in the very near future.

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BACK TO BASICS

It's getting so it's impossible to talk about the recording industry without the computer-as-a-creative-tool entering the discussion. The little monsters are all over the place—in mixing consoles, digital synthesisers, drum sequencers, editors, transport synchronisers, computerised mastering and audio/video effects units. Surprisingly enough, however, the use of automation in the business end of the studio industry has been lagging behind. A recent industry survey (*Pro Sound News* March 1984) indicated that while some 90% of professional recording studios are using computers somewhere in the audio/video chain, only 65% have data-processing equipment for the office-management side of their operation.

The recording industry, it seems, is no different from the rest of the commercial world when it comes to modernising the way it does business. Whereas we might all have heightened high-tech consciousnesses regarding buying new toys for the engineers to play with and the clients to drool over, the invasion of automation in the way we do our day-to-day business has been somewhat slowed by such mundane factors as computer phobia, trepidation about changing business practices, or just plain inertia.

Those of us who know something about computers and software may be reluctant to jump in because we don't want to take the time to learn and adapt to our own needs such powerful and complicated general-purpose business programs as *VisiCalc*, *dBase II*, or *WordStar*. Perhaps if easy-to-use, comprehensive software, expressly designed for studio owners and managers, were available, more of us would be enthusiastic about allowing micros to take over our booking, scheduling and accounting chores.

That's what a small, Nashville company called MetroGnome is hoping. MetroGnome, the result of a collaboration between Larry Keith, a Nashville songwriter, session singer and independent publisher, and Mark Augelli, a computer systems engineer who counts among his accomplishments designing aircraft wings for AVCO, has released several

Paul Lehrman tells us that computers do more than just make beautiful music.

business-software packages designed to be used by a wide variety of music-industry types.

MetroGnome's products break down into two categories. Available on single floppy disks and selling for \$149 are the 'personal' programs, like *Tour+*, a scheduling and accounting program for the travelling musician; *Writers+*, which keeps track of an individual's song catalogues, royalties, lyrics and the vocal characteristics of available singers; *Pickers+*, a scheduling, accounting and inventory program for bands and session players; and *Labels+* a generator of custom labels for cassettes or reel tapes. Currently, these programs are available for the Apple II, the IBM PC and the TRS-80 Models III and 4. Versions for the Commodore 64 will be out soon, and Augelli says the company is now looking at ways to implement the systems on machines that run CPM and on Apple's new *Macintosh*.

The other category consists of two multi-disk 'professional' programs for the Apple IIe and the IBM. One is *Catalog+*, a program designed to help publishing houses keep track of royalties, expenses, promotion lists, staff and song catalogues. It was Augelli's and Keith's first program, released in April, 1983. The other is *Sessions+* a comprehensive filing system for the professional producer or recording studio owner.

Both programs are 'templates': customisations of a commercially available general-purpose database program called *DB Master*, produced by a Californian company known as Stoneware. MetroGnome has taken the original *DB Master* disk (which is part of each software package, and the only disk in the bunch that is not copyable), and designed data files for it appropriate to the user's needs. Customising a database is hard work, especially for a computer novice, but it only has to be done (if it's done right) once. *Sessions+* can save quite a

hassle for the studio owner who wants to get his operation on to a computer quickly, but at a price: by itself, *DB Master* sells for \$400 for the Apple and \$600 for the IBM, while MetroGnome's customisations raise the prices to \$895 and \$1195 respectively.

Following standard database organisation, MetroGnome has divided *Sessions+* into several modules: equipment and tape inventory; directories of talent, clients and suppliers; and studio operations. The last breaks down further into session logs, rental logs and maintenance records. Each individual file within a module or submodule can contain quite a lot of information—an individual session log file can have as many as 25 entries, covering time spent and rate, personnel, song titles, technical data, equipment rentals and complete accounting data from the date of original billing to accrued finance charges. The bottom line on each file—the balance due—is calculated automatically.

The other modules are similarly thorough. The tape library file includes the usual client, producer and technical information, as well as space for what happened to the tape after it left the studio, and who authorised its removal. The equipment directory keeps track of model and serial numbers, as well as purchase price and salvage value, and can automatically calculate depreciation. The rental submodule keeps records of who used what rented equipment when, and who's paying for it. The maintenance file differentiates between routine and 'trouble report' maintenance chores, and keeps track of what they cost.

The program can sort through the collected data and print out custom-formatted reports. Readouts from the sessions log can be arranged by date, producer, company, client, engineer or record company, as well as complete studio schedules. It can also spit out invoices, statements and overdue notices, and can keep track of payments. Reports can be arranged to fit on standard business forms, and names and addresses in all of the files can even be printed out as mailing

BACK TO BASICS

labels, so that if the studio has an announcement to make—perhaps it has just opened another room, hired the hottest engineer in town, or been awarded a gold record—it can let all of its customers, suppliers and contacts know about it with the minimum of fuss. Several levels of password security are used throughout the system to prevent unauthorised access to the files.

One important feature of the program (which was somehow never mentioned in the preliminary manual on *Sessions+* that I received) is that it is possible to use the original *DB Master* diskette to create custom data files that have no connection with the ones supplied by MetroGnome.

Both *Sessions+* and *Catalog+* are available for either the Apple or the IBM in diskette or hard-disk versions. There is no extra charge for the hard-disk format, and MetroGnome's Augelli says that a user planning to upgrade to a hard-disk system should be able to transfer the data files from his long-suffering floppies without much trouble.

I had the opportunity to test out the most primitive version of *Sessions+*,

the Apple diskette version, which contains no fewer than 14 single-sided 5¼ in floppies. (On the IBM, which can pack data more tightly, the program uses eight disks.) Besides the *DB Master* disk, each module uses two disks: a 'utility' disk, which contains the file and printer formats for the module, and a data disk. Typically, a single data disk can handle between 250 and 300 entries, and the system is expandable—when a disk is full, the program prompts the user to insert a blank disk, name it 'Volume 2', and keep going. Augelli says that about half a dozen such volumes can be created before the amount of data to be searched through gets so large that the program slows down beyond the threshold of most people's patience.

The floppy-disk version of the program can be set up to use any reasonable number of drives. I used two, but things would have gone faster had I had a couple more—or even better, a Winchester hard-disk drive. In the floppy version, there is a lot of disk-swapping: once a module is chosen, the utility disk for that module must be loaded, and then the master disk is replaced with the data disk.

Doing any kind of sorting requires a blank disk to be inserted as a 'scratchpad', and then removed. Changing modules requires taking everything out and putting the master disk back in. The situation was made somewhat more confusing by the fact that the names of the disks that the screen display called for to be inserted at various points didn't quite match the labels on the disks themselves.

Sessions+ is specifically designed to be used by someone totally unfamiliar with computers. This has advantages and disadvantages. Obviously, for the computer-shy office worker, having such a helpful system can serve to minimise any initial trauma. In the hands of a more experienced operator, however, the power and friendliness of the system is something of an annoyance, in that it tends to slow things down. Of course, it could be worse—one of the reasons the company chose *DB Master*, according to Augelli, was for its relative quickness. "With some Apple database programs," he says, "you can go out and play 18 holes while you're waiting for it to find something." To this writer, it seems marginally faster than *VisiFile*,

.....

 ***** STUDIO SESSION LOG *****

SESSION DATE: 83-02-07

PRODUCER: CRAIG DEITSCHMANN

ARTIST/JOB: HICKORY FARMS

BILL TO: BBD&O

P.O. NUMBER: 08-8746

STUDIO: A

ENGINEER: MIKE BRADLEY

SONGS RECORDED: 1.
 2.
 3.
 4.
 5.
 6.

TECHNICAL NOTES:

***** STUDIO TIME *****

RECORDING/OVERDUB HOURS: MIX HOURS:

***** MATERIALS USED *****

2" TAPE REELS: 1/2" TAPE REELS: 1/4" TAPE REELS:

***** ENGINEERING TIME *****

NUMBER OF REGULAR HOURS: NUMBER OF OVERTIME HOURS:

RENTAL ITEMS USED:

***** DUB ROOM TIME *****

COPY ENGINEER:

HOURS:

DUB ROOM HOURS:

***** TAPE COPIES *****

2" TAPE COPIES: 1/2" TAPE COPIES:

1/4" TAPE COPIES: CASSETTE TAPE COPIES:

PRODUCER SIGNATURE/INITIALS: _____

.....

 ***** SESSION INVOICE *****

INVOICE DATE: 14-Feb-84

FILLED TO: RCA

P.O. NUMBER: 68544-83

FOR RECORDING SERVICES ON: 83-01-25

PRODUCER: HAROLD SHEDD

ARTIST/JOB: ALABAMA

STUDIO TIME CHARGE: 750.00

MATERIALS CHARGE: 30.00

OUTSIDE ENGINEERING CHARGES: .00

RENTAL ITEMS CHARGE: .00

DUB ROOM CHARGE: 25.00

TAPE COPY CHARGE: 39.00

TOTAL AMOUNT: 844.00

AMOUNT IS DUE IN FULL BY: 83-02-28

*** A COMPLETE RECORD OF ALL CHARGES IS AVAILABLE UPON REQUEST ***

***** THANK YOU *****

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BACK TO BASICS

an excruciatingly painful program to work with, but at least with the *DB Master* it is far more difficult to make serious mistakes.

While the Apple version of *DB Master* is written in BASIC, the IBM version (which I did not try out) is written in Pascal. According to Augelli, this, coupled with the fact that the IBM is inherently a faster machine, makes that machine's version considerably more efficient to use. Another advantage of the IBM version, he explains, is that it allows array searching: for example, if you want to find out who engineered a particular session, you can just input the date of the session or any other pertinent information, and ask the program to search for the engineer's name—it's not necessary to first search for the whole file and then find the information in it yourself. It also provides a certain amount of text-editing capability, so that it can produce things like form letters. "And it looks better," Augelli adds.

Sessions+ and its brethren are a

welcome addition to the arsenal of tools available to music-industry pros. But coming up with a useful product is one thing—getting the word out to prospective customers is something else. For a company as young as MetroGnome, it's to be expected that it will take some time for its products to have an impact. At the time of writing, only about a dozen systems have gone out, mostly to studios and publishers in the Nashville area, and Augelli reports that the University of Denver is looking to implement it into its curriculum in music management. Last summer, Passport Designs, the Californian company known for the *Soundchaser* computer music synthesiser and, more recently, its MIDI (Musical Instrument Digital Interface) software, announced that it was going to be the exclusive distributor for MetroGnome's products. To make their partnership more visible, the two companies shared a booth at October's AES convention.

The deal went sour within a few months, however. According to a spokesman for Passport Designs, MetroGnome's products require too much customisation on the part of the

user to make them commercially viable, but Augelli maintains that they just didn't know how to market them. In the meantime, MetroGnome has signed a regional distributor in New York, and is negotiating with others in Los Angeles, San Francisco and London. It also appears that Passport Designs will, after all, take on the product line on a regional basis.

Whether any of the programs are right for you depends on a number of factors. Certainly, if what used to be your acoustic chamber is now a storage room for old paperwork, then putting all of that on disk with *Sessions+* can be a great help. If your accounts are complex and your records have to be fanatically accurate, the system will keep all the information right at hand, and always correct. At least in the Apple floppy-disk version of the program, however, searching for a particular piece of information can be a slow process. But there's no denying that MetroGnome has a good idea, and a good start. □

MetroGnome Inc, 602 West Iris Drive, Nashville, TN 37204. USA. Tel: (615) 298-4948. In the UK, for further information contact ITA, 1 Felgate Mews, Studland Street, London W6 9JT. Tel: 01-748 9009. Telex: 21879.

```

14-Feb-84          MAINTENANCE RECORDS SAMPLE DATA          Page 1
Date 83-04-09      Scheduled? N                               Item 1
Equipment TRIDENT CONSOLE SERIES 80
Location STUDIO A
Category
Description COFFEE SPILLED INSIDE CONSOLE; FADERS 1, 2, 3, 4 ARE
STICKING; CLEAN UP BLOOD FROM EHSUING ATTACK ON CULPRIT
Date Resolved 83-04-09
Resolution VALLEY AUDIO SERVICE CALL
Cost 234.00
  
```

```

14-Feb-84          SESSION LOG SAMPLE DATA          Page 1
Session Date 84-01-27                                     Item 27
Studio A          Time 2 PM
Producer BOB MONTGOMERY
Artist/Job JANIE FRICKE
Payment Resp. CBS                                       P.O. number 80901
Engineer GENE EICHELBERGER
Technical Specs
Song #1 HE'S A HEARTACHE
Song #2 PASS ME BY
Song #3
Song #4
Song #5
Song #6
Studio Rate 125.00
Rec./Overdub Hours 5          Amount 625.00
Mix Hours 5                   Amount 625.00
Studio Time Total 1250.00
2" Tape Quantity 1           Rate 125.00          Amount 125.00
1/2" Tape Quantity 1         Rate 75.00           Amount 75.00
1/4" Tape Quantity 2         Rate 25.00           Amount 50.00
Materials Total 250.00
  
```



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mixing console manufacturers etc.
Distribution nationwide

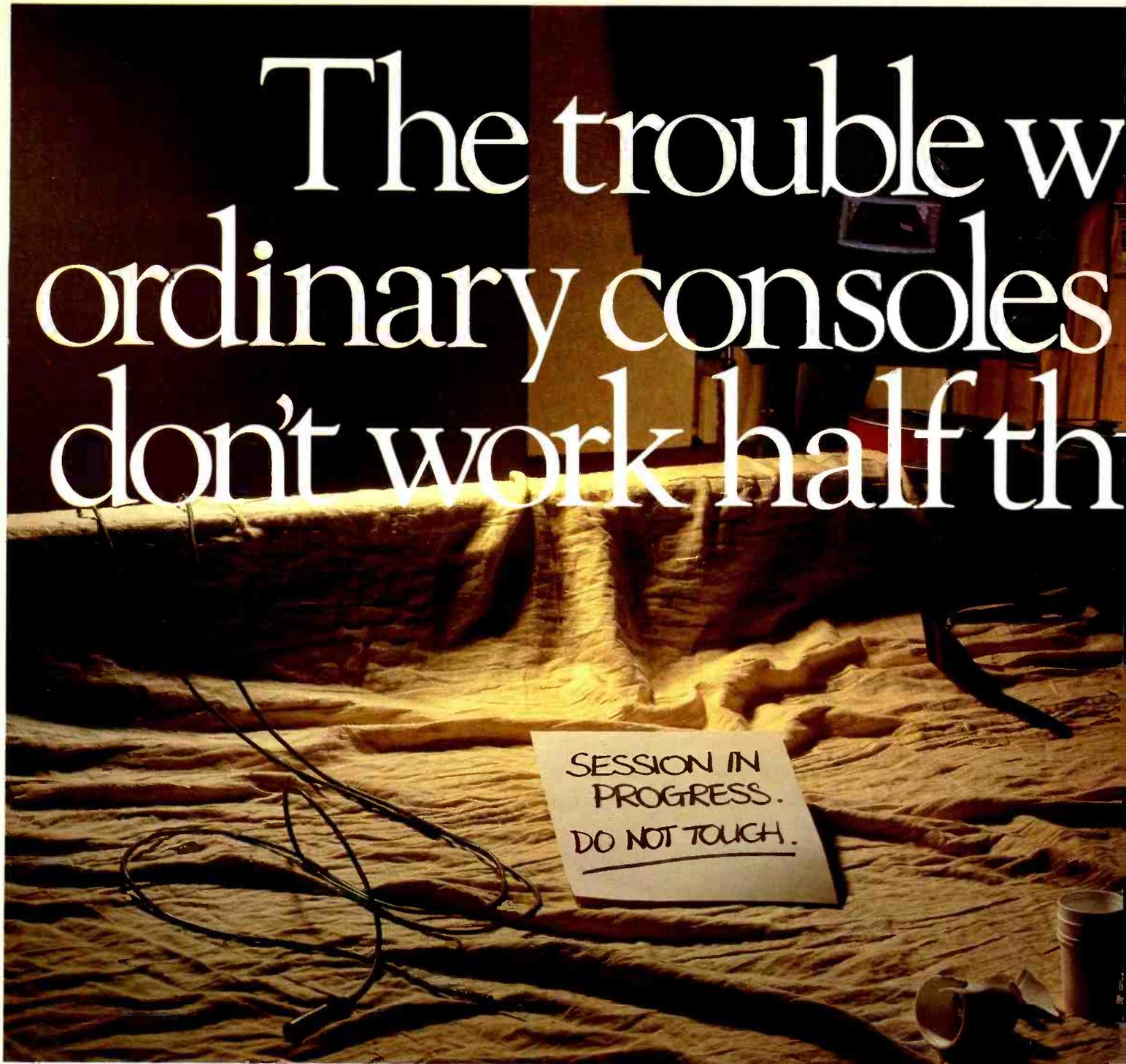


Sole Agent UK

Eardley Electronics Ltd

Eardley House 182-184 Campden Hill Road
Kensington London W8 7AS
Telephone: 01-221 0606 Telex: 23894

The trouble w ordinary consoles don't work half th



It's a situation that every studio manager recognises. A client has been in, done some work, and departed to return some time later. Expecting to find the desk as it was left.

Of course, the engineer could always note down all the settings and then reset the desk. But that's extremely time consuming and not entirely reliable.

So, usually, the studio has to stand idle between sessions. Keeping the customer happy, but not keeping the money coming in.

At Solid State Logic, however, we've developed a rather more practical solution to this dilemma. We call it the Total Recall System.

Total Recall is completely independent of all audio

paths and allows the console settings to be permanently stored on floppy discs within a few seconds.

So, at the next session it takes only minutes to reload this information, check it on the colour video monitor and return the console to its original settings.

The same thing can be done at the end of each mix



With
is, they
e time.

to save time at a later re-mix. And engineers can even store their personal EQ and dynamics settings and create their own libraries on floppy disc.

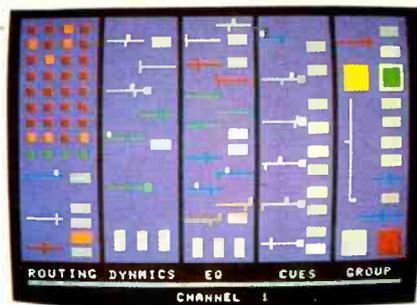
Total Recall is just one of the functions of the SL 4000 E's on-board computer. The computer will record all the details of a session – title entries, track lists, cue points, dynamic mixes, synchroniser information and so on – and store them on a floppy disc.

These unique facilities give the Solid State Logic Master Studio System several important advantages.

It allows the manager to keep his studio working, and earning, for the full 24 hours a day. Because even the most complex set-up can be precisely reproduced in about 20 minutes before the start of a session.

It saves the engineer wasting precious time and lets him concentrate on the creative process, from tracklaying to over-dubbing through to mixing. Because the studio computer speeds up everyday tasks like autolocation, drop-ins, mixing and synchronisation.

And it gives producers and musicians real flexibility and continuity. After recording in an SSL studio, they can return there (or to any other computerised SSL studio in the world) and continue work with absolute accuracy and the minimum of fuss.



Yet the computer is simplicity itself to operate. Even inexperienced assistants and tape-operators will soon master its basic functions. While feed-back from studios with SSL systems shows that more advanced expertise is acquired quickly and naturally with use.

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Solid State Logic Inc., P.O. Box 200 Milan, Michigan, 48160, USA.
Tel: (313) 439 8866. Telex 230504. SSL MLAN. Facsimile (313) 439 8516.

PRACTICAL SOUNDFIELD

The use of the *Soundfield* microphone has been extensively chronicled for classical music. With rock and popular music the situation is quite different. There are few reasons why this should be the case other than a lack of familiarity with uses outside of surround sound. Ralph Denyer spoke to Jerry Boys, one of the few non-classical engineers with some experience of the *Soundfield* within the recording studio.

The polarisation of the classical and popular music recording worlds is quite clearly illustrated through examination of the use of the Calrec *Soundfield* microphone since it became available during 1978 designed as a high quality Ambisonic surround sound microphone with alternative standard stereo and mono modes.

Surround sound devotees and equipment reviewers have been enthusiastic—about the realism of the microphone, when used Ambisonically or in more standard recording. And so here we are six years on. The mic is used extensively in the recording of classical music in stereo and for Ambisonics. Yet its use in rock and other forms of popular music has been almost nil. Almost: one *Soundfield* was bought by Abba's Polar Studio and a second has just been acquired by Marcus studios in West London.

Jerry Boys is studio manager of Livingston studios in North London. He also engineers there and at other studios when Livingston is fully booked, and recently worked on a solo album for Mark King, bassist with Level 42, at Marcus. The studio had a Calrec *Soundfield* microphone on loan from the manufacturer and offered Jerry the opportunity to try it out on his session. King was playing both drums and bass guitar.

As Jerry explains, the availability of the Calrec was quite opportune. "We were after something a bit different. We wanted to stay away from the current *LinnDrum* or gated snare drum ambience type of sound but we didn't want a dead sound. Something exciting, big and wonderful all the same, without resorting to gated plates or anything of that nature. And this is something I inherently believe in in recording—using microphones to record naturally."

Jerry firmly states that he is an engineer who still believes that acoustic instruments, or electric instruments that are played through an amplifier, in other words anything that is not recorded by direct injection, should sound good in the studio before any attempts to get the sound on tape are made.

"It pays to get a good sound in the studio and maybe improve it a bit but basically, you want to start off with something good in the first place."

Working towards the end result of achieving a big but natural drum sound, not surprisingly, Mark and Jerry decided to start out with relatively big drums. They hired a Gretsch kit with large wooden shells and an 8½ in deep Ludwig metal snare. They tuned the heads fairly tight to give high pitches without going to the extreme and losing body. The only damping down was on the bass drum, all leading to a very ambient sound in the first place.

The kit was close-miked in a fairly conventional manner with an AKG *D12* on the bass drum, a Neumann *KM84* top and bottom on the snare, Shure *SM 57s* on three side-mounted toms and two floor toms, and a pair of AKG *414s* about 2 ft above the two cymbals.

Most of the experimentation was with the ambient miking. Jerry compared a cross coincident stereo pair of mics, a pair of Crown *PZMs* and the Calrec *Soundfield*. He positioned the crossed pair

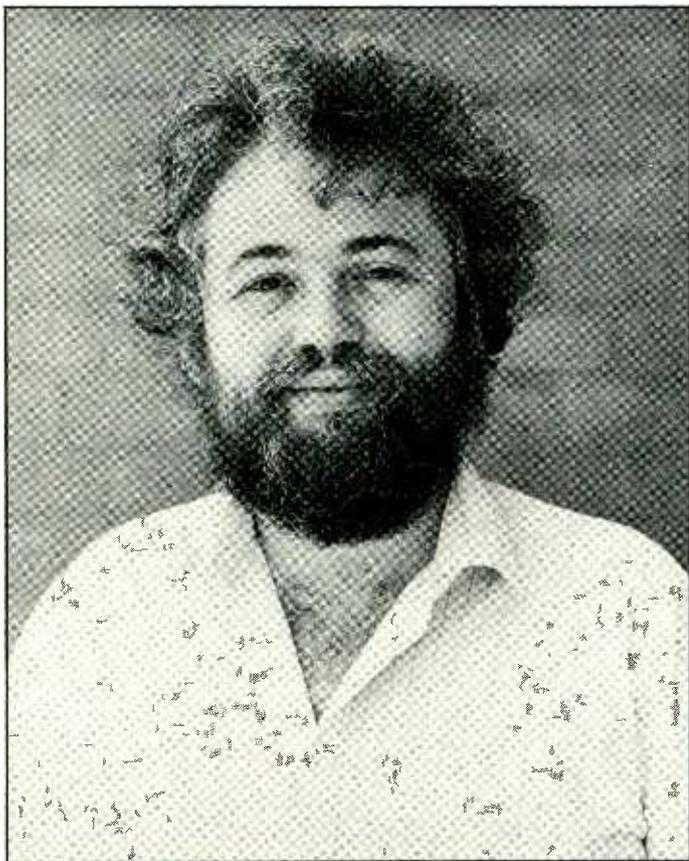
between 6 and 10 ft away from the kit, with the *PZMs* placed at similar distances.

The *Soundfield* was tried in various positions but eventually settled in a central placement some 10 ft away from the kit, using the microphone's control unit to point slightly to the drummer's right (King uses a right-handed kit set up) as well as pointing down slightly towards the bass drum in the stereo mode.

"I chose the *Soundfield* instantly because it sounded natural. It sounded pretty much like the kit did acoustically. I extended the extremities. I put on a bit of bottom and top end just to give the sound a bit more 'upfrontness'. But basically, it sounded like a drum kit. I placed the mic in front of the kit about 10 ft away and then played with it."

When used for Ambisonic recording, all four of the microphone's capsules, which are configured in a tetrahedral array are employed. In the stereo and mono modes only three capsules in a triangular formation are employed, the back one not being used.

The signals from the microphone go to a control unit which can be used to select information and effectively control the polar patterns of the capsules. The apparent position of the microphone in relation to the sound source can be varied from the control unit without physical movement of the microphone. The width of the stereo image can be adjusted between 0° (mono) and 180°. The control unit also allows adjustment of the apparent horizontal as well as vertical image position. This gives the



Jerry Boys

same kind of control achieved by tilting a microphone or using a crossed pair up-and-down or from side-to-side.

"I used the up-and-down and side-to-side controls but not a lot. Mainly the up-and-down because it seemed to move your centre. As you pointed it down, you began to lose a bit of the cymbals because it was actually looking below the level of the cymbals. Not dramatically, but enough to be worth playing around with."

And varying the apparent microphone-to-sound-source

distance?

"In my experience, the effect wasn't dramatic. It was appreciable. It didn't change from an inch to 20-feet away, but it made a difference. It was very useful.

"I very much liked the sound and it became a feature of our drum sound. In fact, so much so that we hired the microphone for a second week. And when we returned again, to finish off backing tracks, we hired it yet again. Everyone who came into the studio always remarked on how nice

the drum sound was. We felt that the sound from the *Soundfield* was an inherent part of this.

"The *Soundfield* was used entirely for ambience and we used quite a lot of it in the mix. Then it gave us a very light airy sort of sound without it sounding like a big overly ambient drum sound. Not to say that's not right in certain places but for this we wanted to be able to hear every detail of what Mark was playing and yet for it to sound big. And it did. I was very impressed with it."

After some experimentation Jerry settled for a stereo image spread of around 110°.

"I had it somewhere slightly wider than 90°. I played around with it until the stereo image sounded the way I wanted. I did use that quite a lot. That was useful. In fact it was the most useful of the controls."

Jerry did try the full 180° stereo image but found it too stereo and too ambient for the application. With regard to the control of the polar pattern characteristics, he used slightly less than the full cardioid setting. He settled for mixing B-format stereo as opposed to A-format (discrete channels) which allows use of some of the image controls during mixing.

"I'd rather make the decisions there and then because I think that if you leave too much until later, there is a danger of forgetting what you were thinking of."

The fact that the *Soundfield* microphone appears to have been invented, manufactured

and marketed primarily as a piece of Ambisonics surround sound equipment does not deter Jerry from considering it solely for its applications as a high quality microphone for everyday use in the studio, withstanding its high price tag.

"At no time did I record it 4-channel. I looked at it purely as a stereo microphone and liked it for its inherent sound qualities, not because of its Ambisonics applications. And I think it is a very valid piece of equipment.

"If I am working on any future records and I want any sort of ambience on the drums and the budget's reasonable, I would certainly have it in again automatically as a standard piece of equipment."

Though Jerry did not have any criticism of the performance characteristics of the microphone, he did reserve judgement with regard to physical considerations in a rock context. Housing four capsules, their mountings and a heating element to prevent condensation, the mic is obviously larger and heavier than those commonly in use.

"It is very bulky, which is a disadvantage. You have to put it on a big stand for a start. Trying to mic up something like an acoustic guitar is a bit of a pain in the neck."

So fundamentally, Jerry's praise was for the microphone's performance when used to record drum ambience.

"It's the first microphone that I've used where you can walk out of the studio into the control room and what you hear coming out of the monitors is vaguely similar to what you heard acoustically. I'm not saying it is identical

PRACTICAL SOUNDFIELD

but it is as close as I've ever heard. In my opinion, the sound from most microphones bears no resemblance to what you hear acoustically. Even the best ones. It is not a case of what a drum kit sounds like acoustically. You definitely have to learn, it's a question of what it will sound like and translate into in the control room. It will be different. With the *Soundfield*, the sound was much closer to how the kit sounded acoustically."

In general, Jerry agreed with the praise showered on the *Soundfield* microphone by Peter Carbines (*Studio Sound*, September 1982) with regard to stereo performance, while at the same time pointing out that in rock music "the typical bass-humping of cardioids on closely miked speech" is generally thought of as desirable. In fact, Jerry found that when he tried the microphone in mono as a vocal microphone—in a rock context—bass-humping was not particularly evident.

"In rock'n'roll, that's one of the aspects (of cardioid microphones) that you exploit and actually want."

He went on to muse that perhaps the lack of this characteristic was at least partly why he had found the microphone less successful as a mono vocal mic. The recording was perhaps just too honest.

"We did try it on a few things apart from drum ambience—acoustic guitar, bass guitar and vocals. I think it was alright on acoustic guitar, not very successful on vocals though it might suit a different voice. It just didn't seem to have bite to it. A bit too nice. On the bass amp it did actually sound quite interesting in that it recorded



Calrec MkIV Soundfield microphone and control unit

the sound fairly accurately again, but for our particular usage it wasn't relevant. But I suspect that on occasions on electric guitars—again as an ambient mic—it would be useful."

A degree of experimentation with piano led Jerry to think that—once again as a supportive ambient mic—there are possible valid applications when a good natural acoustic sound is wanted.

"If you are in a fairly live studio, it gives air to the sound without clatter. It's the total opposite to a Pressure Zone Mic sort of approach to ambience. It doesn't hype the sound at all. It gives a nice feeling of being in a room rather than an anechoic chamber sort of thing.

"You can use quite a lot of the signal as well and it gives a nice gentle stereo image as well which is very nice."

Considering that hiring in of rack mounting sound processing and other equipment costing more than the *Soundfield* is almost

casually accepted as the norm by people in rock music, why could it be that they have virtually ignored the microphone?

"I think it's because it doesn't give you any obvious 'whiz bangery'. This is the thing. People will pay for things that go whoosh or make a funny noise."

Jerry feels that one reason why the *Soundfield* has gone virtually unused outside the recording of classical music is that it has been hidden under a blanket of surround sound technology and says that in truth, that is why he himself hasn't got round to trying it out before. Also reviews have tended to reinforce this image of a piece of equipment only of interest to specialist recordists.

"I think that most people in rock'n'roll don't know what Ambisonics is and they're not interested by and large. Rightly or wrongly, they see anything coming from this field and they think of it as an esoteric airy-fairy piece of equipment that has no

relevance to real life in the studio. And I think that's Calrec's fault for not realising the potential of their equipment. If they tried hard, they could sell a lot of them. It's their marketing that's wrong, not their equipment.

"Just the fact that it is used for drum ambience alone is justification enough for wanting to have one because that's a very important part of your basic sound. To me, it's the most exciting microphone I've heard in years. It's the first time I've heard a 'different' microphone that actually does something different, better, and something that I wanted."

Jerry expressed that he would be interested to see how well the microphone would stand up to regular studio use. Its considerable weight could be significant if it were accidentally dropped. Also he found that running the cables through the control room door was a bit of an inconvenience, though Calrec can supply optional extra cables to overcome the problem via five studio XLR-3 balanced tie lines. Marcus have now bought one of the microphones with the extra cables.

Jerry only had the use of the microphone for between two and three weeks and so obviously experimentation was limited. Also, when he was using the microphone, he had no idea that he would later be asked to recall his experiences for *Studio Sound*, and so a certain amount of head scratching was involved. He agreed that something closer to six months might be a realistic period in which to explore the microphone's full potential within the context of rock and popular music. □



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LETTERS LETTERS

Letters should be marked 'For Publication' and sent to the Editor at the Croydon address on page 3

Surrounded

Dear Sir, This letter is in response to your update on Surround Sound in the February issue. (So much safer a subject than analogue vs. digital, wouldn't you say?) Let me preface all of my remarks by introducing myself as a recording engineer in all media (radio, TV, discs, film) as well as a lover of orchestral (classical) music played back on such as a Linn Sondek turntable and any number of fine loudspeakers including Quads, Symdex, Snell, and

others. If my name rings a bell it is probably because I was the workshops chairman at the November AES Convention; I also gave a lecture/demonstration at one workshop on the use of an ambience extraction system to enrich the sound of stereo television.

At the convention I briefly spoke with Michael Gerzon, who said (and I hope I do not misquote him) that the use of this type of ambience extraction system does not conflict with Ambisonics inasmuch as the former is a more

primitive system not capable of accurate directionality in the rear channels. I agree with Dr Gerzon's statement but would like to make a case for the ambience extraction system, which I will refer to as 'Madsen's' for the balance of this letter. Madsen's system as I define it is L-R plus approximately 30 ms of delay, feeding one or more rear speakers. You may already be familiar with Madsen's well-researched paper. (October 1970 AES Journal.)

First, some reaction to your article. In your second paragraph you state that the SQ/Tate system formed the basis of the 'Dolby Stereo' system in motion picture theatres. This is somewhat misleading because the only element of the Tate/SQ system currently employed by Dolby Laboratories is the Tate directional enhancement circuitry, further modified by Dolby Labs to make it sound 'less conspicuous'. I regret that a reader of your article may get the incorrect impression that the SQ matrix is used in the theatre system (officially called Dolby MP Matrix). Actually, Dolby's surround channel is derived through simple L-R matricing and further processing which I will explain in a moment. I can see how it is easy to confuse the issue because the decode box marketed by Fosgate does use SQ, but is capable of decoding the cinema material because SQ is reasonably downward compatible to L-R (the cinema material has only a mono rear channel).

Furthermore, I would be careful about using MCS Review (an amateur and consumer-type journal) as a source for technical information. Fosgate's rather commercial literature also misleadingly upgrades Tate's role in the theatre matrix; they do not mention the existence of the delay in the theatre nor the lack of one in their box. My best informant on the story behind the story has been Bill Mead at Dolby Labs in California.

In the home, which has no need for a centre speaker, two methods work quite well on cinema material: (1) L-R plus delay (Madsen): or (2) Fosgate's SQ with Tate enhancement, set to the 'Cinema' position, which means 'forward biased'. One could also go to extremes and completely replicate the full Dolby MP Matrix in the home, which would require an L-R matrix plus Tate directional enhancement plus delay plus a modified Dolby B in the rear channel; but that is a bigger mouthful than I care to eat. When listening to Fosgate's box compared to a Madsen system, my ears tell me that the SQ is more easily fooled when phase errors creep into the videotape or

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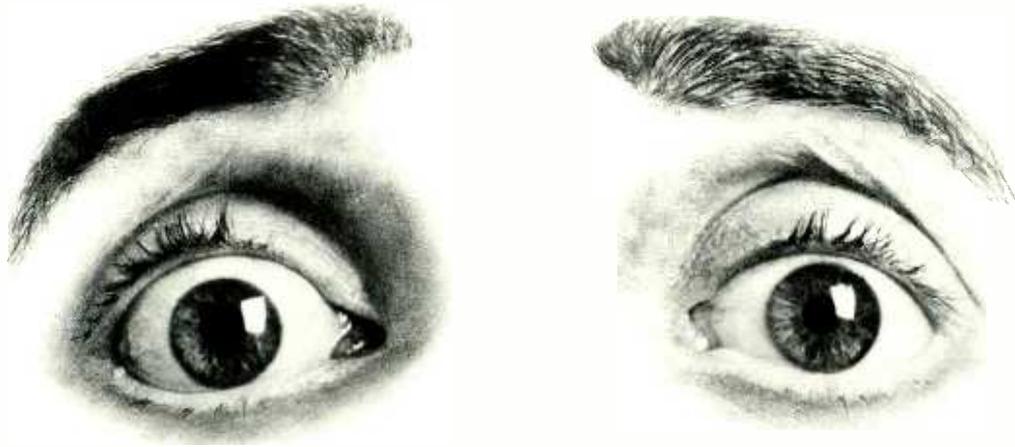
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LETTERS LETTERS

videodisc, so I prefer listening through L-R plus delay (Madsen).

Next in your article, you remark that SQ has come a long way and refer to a potential dialogue between Gerzon and Willcocks. Well, also not being a mathematician of Gerzon's stature, I prefer to relate to listening experiences. The listening judgments must also be divided into three types of material:

- (1) music engineered for 4-channel playback (with a matrix), and containing intended 'discrete' sources in the rear channels (eg antiphonal choirs, or instruments; electronic music) or 3-channel cinema material with discrete engineered surround sounds;
- (2) music engineered for 4-channel playback (with a matrix) and containing ambience or reverberation in the rear channels;
- (3) music engineered for 2-channel playback but auditioned for purposes of ambience extraction or recovery when played back over a 4-channel system.

First, I can tell you that when listening to SQ encoded material, especially music arranged for discrete sounds in the rear (type 1), the SQ/Tate system (Fosgate Box) sounds very good, probably good enough for 95% of critical ears. The other 5% includes myself, when listening on the finest of stereo systems; Fosgate would probably call us the lunatic fringe. Fosgate's best performance is with material type 1, and I almost forgive its faults on this material since front to back separation is the most important criterion with type 1. This pretty much leaves the Fosgate box as best for videotapes and videodiscs. With 4-channel discrete music and with cinema material, there is good separation and a reasonably accurate front soundstage.

However, most non-video material, as you know, is type 2 or type 3. With the latter material, I have found Fosgate to give consistently good front-to-back separation, but slightly deteriorate the stability of the front stage. Even more important to me, Fosgate/Tate plays with the quality of the ambience in the rear in order to keep the front stage stable. The ambience 'takes a dive' on the attacks of notes in the front. Now this is a much more subtle effect than with the earlier 'logic' systems employing gates. Tate does not employ gating and it is relatively hard for most untrained ears to hear its faults, masked as they are by the front stage material. As a comparison I say that the faults of the Tate are somewhat easier to hear than the faults of 14-bit undithered digital audio, for example.

Which leads us to Madsen's system.

Madsen's original paper does not talk about L-R, but adding the L-R matrix not only increases front-to-back separation, it creates a system quite similar to the Dolby MP matrix (minus Dolby B and minus Tate enhancement). It is also the same as Dynaquad (Hafler) with delay added, so you can see that the idea is far from new. Nevertheless, the new Madsen (or Hafler/Madsen, if you prefer) satisfies me and many other critical people listening to material types 2 and 3. I listen to my stereo with a Madsen box connected at all times and find most classical music and much pop to be greatly enhanced, including music which I recorded originally in 2-channel. The system responds to the ambience already on the tape or record, ie music recorded in a dead room sounds dead, yet miraculously, when changing records to wetter material, the rear speakers come to life of their own accord. It is possible to adjust the rear channel level and get an effect exactly like turning up the reverb send knob on a recording console. Try that with any other system!

Naturally, Ambisonics (which I regrettably have not heard) or SQ/Tate will play back material intentionally recorded for 'discrete' performance. But I submit that a far larger percentage of music contains either encoded or serendipitous ambience ready for retrieval through the much simpler Madsen approach. If you would like to listen to a Madsen system, try pointing your rear speakers up at the ceiling, thus enhancing the diffusion and ambiguity desirable in the rear. Keep your front speakers as you normally would, for the Madsen approach will not deteriorate the front image at all (if you do not exceed the Haas-defined limit of rear speaker decibel level).

I also have been using the same Madsen box for cinema material and am not personally bothered by the decreased separation compared with the Tate, next to my delight at Madsen's ability to reveal hidden ambience present in music and other sounds on the videodisc.

I can also recommend a commercially-produced box that performs well technically and has both L-R and delay. The \$150 kit is sold by: Phoenix Systems, 91 Elm Street, Manchester, CT 06040, USA. Model P-25-DL. But certainly if you are intrigued enough to try the system, you can whip up an L-R matrix and hook it to an existing delay line. I think you will discover Madsen recovers the missing half of stereo material!

Yours faithfully, Bob Katz, 248 E. 90 St. 3B, New York, NY 10128. □

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MONO, STEREO OR AMBISONIC?

The business of recording sound commercially is so serious (because of its financial connotations) that those of us at the sharp end tend to view the whole thing in a grossly irreverent manner. Monitoring is just sticking up a huge loudspeaker driven by a suitably lunatic power amplifier for the purpose of checking that the tape was laced right side out on the machine—and so that the character known as the producer can pretend to listen out for the most artistic take and decide where his edit points are going to be.

In the old days when machines were more like washing machines and the standard monitor was the dreaded *Tannoy Red* driven by glowing tubes under a pile of melting acetate tape, that was about the beginning and end of it; the march of technology now demands extremes of sophistication, even to the point where it has become important to appreciate the *quality* of the recorded results of the artistic types on the other side of the glass. Monophonic monitoring was delightful: no real restraints on where to place the loudspeaker, no monitoring position, little necessity to modify the acoustic environment in the control room, just lots and lots of power and a system that didn't send you deaf after six hours of Beach Boys clone sounds.

Reality?

Stereophonic sound was demonstrated successfully in 1932 by that extraordinary personality Blumlein (who invented more electronic wizardry than anyone else before or since). The early experiments were based on a first principle approach to the way we

In this episode Ted Fletcher goes in search of phantom images

hear, and the way we expect to hear any sound—in other words, what we now call binaural recording. His name lives on in the Blumlein pair, where a coincident pair of microphones are arranged to sense the complete width of the sound field. But how does one listen to stereo properly? The history of the answer to that question is crushingly boring and paved with a catalogue of systems, weird devices and hype. The true answer has evolved over the years, and the true technology is still not with us yet.

The definitive answer to monitoring (or listening to) stereo sound is that the sound shall emanate from two points in space and that the listener shall be positioned at a point that produces the third point in an equilateral triangle with the sound sources.

In 1984 this does not sound too difficult, the reality however, is far from easy and is met about as often as a Tory in the Kremlin.

UNTWISTING ALL THE CHAINS THAT TIE THE HIDDEN SOUL OF HARMONY (*Milton*)

In researching for this diatribe (yes, it is sometimes approached seriously!) some practical experiments were carried out—listening to some pre-recorded and some specially recorded material in mono, stereo and ambisonic formats. (Here comes the deadly serious bit folks.) During this slight but careful research, an interesting effect came to light that

induced sitting and looking at the ceiling and thinking carefully about the way the human mind (the ear/brain combination) hears directional information.

The pan-pot we all know and love, splits a mono signal into two, and drives signals that are identical in all respects except amplitude, to a pair of outputs. This gives a reasonable directional image and a combination of such images produces the sort of 'stereo' that our Lords and Masters (the record buying public) have come to accept and expect to hear.

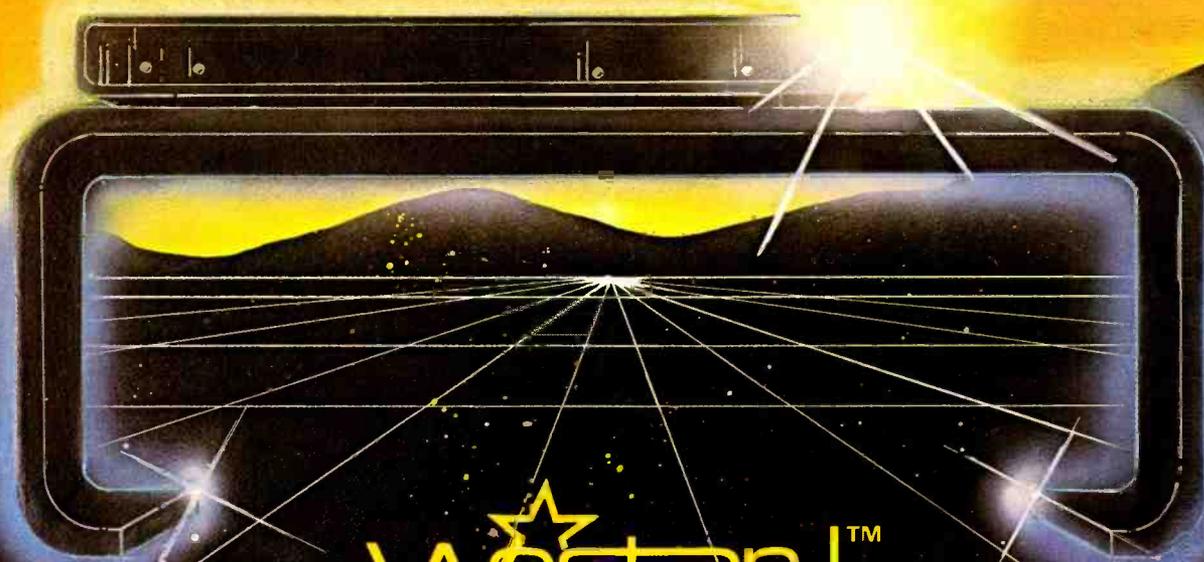
The coincident pair of microphones (totally contrary to the thinking of quite eminent sages of the industry) produces roughly the same results, but without the phase anomalies associated with multi-mic techniques. The image created is purely based on amplitude—how can it be otherwise when the heads are coincident?

Real stereo can only be created by injecting the exact sound into each ear that that ear would receive at a live performance; ie a dummy head recording replayed via high quality headphones. So why is there such a great divide between the conventional commercial way of recording and the purist correct way? Stand by... the question is about to be answered by a description of that silly little bit of research founded on an inkling of understanding, and proved by a 7-year-old.

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A PERSONAL VIEW OF PSYCHOACOUSTICS

and talented friend) and the stamping ground of one Richard Elen (the same but more boistrous). The event was the demonstration of Ambisonics to Steve Dove and myself. We duly arrived to be greeted by a control room decked in Tannoy's. The early demonstrations were less than satisfactory due to matching errors between the front and rear arrays. The problem being that the front pair were Tannoy *Super Reds* and the rear pair, more elderly *Reds*. Unfortunately their phase characteristics seemed to generate an audio battleground. The effect was one of total loss of image—even complete disorientation at the sides of the sound field. A thought crossed my mind—there is no startling error in amplitude information across the spectrum in that area—therefore it has to be a

positioning in the front part of the field.

It was much later that we found that the phantom violin was nothing at all to do with Ambisonic reproduction; the effect is actually there in the Queens Hall!

The mono compatibility of Ambisonics recordings (and indeed the stereo compatibility) is less than convincing in such practical tests. It is reasonable to say that all the material we listened to that night was compatible in that listening to it without the advantage of the decoder was still pleasant and devoid of horrors, but the resultant stereo imaging would have been better had the original recording been made using conventional techniques. This sweeping statement is hotly disputed by our

fool the brain into ignoring the amplitude information and work entirely on the time elements.

The equipment was reset to play back the same recording to a pair of small loudspeakers but with a simple digital delay-line with variable delay included in one side. Dan the guinea pig was then asked to stand in the middle (sort of piggy in the middle) and, with absolutely no prompting, was asked to point to where his voice was coming from. No prizes for guessing the results; a time delay of 1 ms offsets the sound distinctly towards the undelayed side, but (and this is the odd bit) the effect gets progressively more apparent until the delay reaches 4.5 ms at which point the sound gets odd and jumps out the window! Listening to the effects with my own cloth ears, the image shift is so startling that one immediately suspects a failure of the delay channel—but no; a quick burst of channel off shows that all is well, it's the old grey matter that is telling lies.

If human beings had one ear in the middle of the forehead, we wouldn't have all this trouble

gross phase anomaly. (Of course it's obvious).

Richard then re-rigged the whole control room with point source monitors and we settled down to listen with bated breath and unbiased (?) ears to the Culwreck Soundfield mic impressed on to Stoney F1 and re-created via the monitor section of the Snurdruff.

It has to be said that the results were impressive without being enthralling. In the centre of the field, the image placement was adequate to the front, but decidedly iffy to the rear. The sides were there—but not there sometimes. The whole edifice gave the sonic appearance of being vaguely holographic and decidedly lacking in substance.

At this point we were joined (having almost fallen apart) by the Sage of ambience, Dr Geoff Barton, who suggested that we turn the lights off. With some trepidation and suspicion of intentions this was agreed to, and the Queens Hall in Edinburgh was transported to Maidenhead by the action of one light switch.

The removal of the visual stimulus was dramatic to say the least, the effect was that the front images hardened to reality while the sides and rear moved outwards to embrace what we all knew were sound treatment and brick walls. However, even with this new-found reality things were not absolutely right: a solo violin playing roughly at stage centre was well in place, but also created some extraordinary phantom images at rear mid-left! This effect came and went, seemingly dependent upon a combination of frequency and left/right

reversed Elen who insists that direct A/B listening tests in stereo and Ambisonics are equivalent to comparing a power boat and a sports car—they are so intrinsically different that no comparison is possible. The fact that the sound field in Ambisonics is theoretically radial while stereo is linear between the speakers further complicates such tests. Let's just leave it that, there are horses for courses.

Are you phasing the right way?

Dan is seven years old. Having a rock star brother and a dad who makes mixers, a little of the business is being rubbed off all the time. Our experiment combined trying out a pressure zone mic selling in the local store for about the same as a round of drinks, and an investigation into how the brain really perceives direction.

Dan needed little persuasion to demonstrate his reading ability in the studio at Havoc House, the results were recorded direct in wonderful 16-bit, in parallel on to two channels. The resultant recording was understandably clean and beautiful, the image when replayed via the standard playback speakers being faithfully in the centre (just to prove the absolute phase and to look for gremlins).

When a person is listening to a point source of sound—say another human voice to one side of him—the sound obviously comes from only one place, but affects the ears differently: the closer ear hears the sound first. The experiment was to attempt an artificial creation of time delay and to

The millenium in stereo

Ever felt like re-inventing the wheel—and then finding that nobody uses them any more? Time domain panning is not new. Perhaps it hasn't been tried in quite the controlled way that we did it but the response from Transatlantic Steve was typical: "What happens in mono—who wants to listen to a comb filter?" It's true, it produces rotten mono pictures, but used carefully and in moderation, the stereo images are startling!

Don't forget that true dummy head recording does suffer from this comb filter effect by definition—the only way to achieve absolute mono/stereo compatibility is to use coincident microphones and lose effects generated by distance/phase.

It would seem that we have got to the crux (or one of them) of stereo monitoring, by the circuitous route of Ambisonics. The trouble lies in compatibility and by definition, if we want it to sound right in mono, then the way we do it now is right.

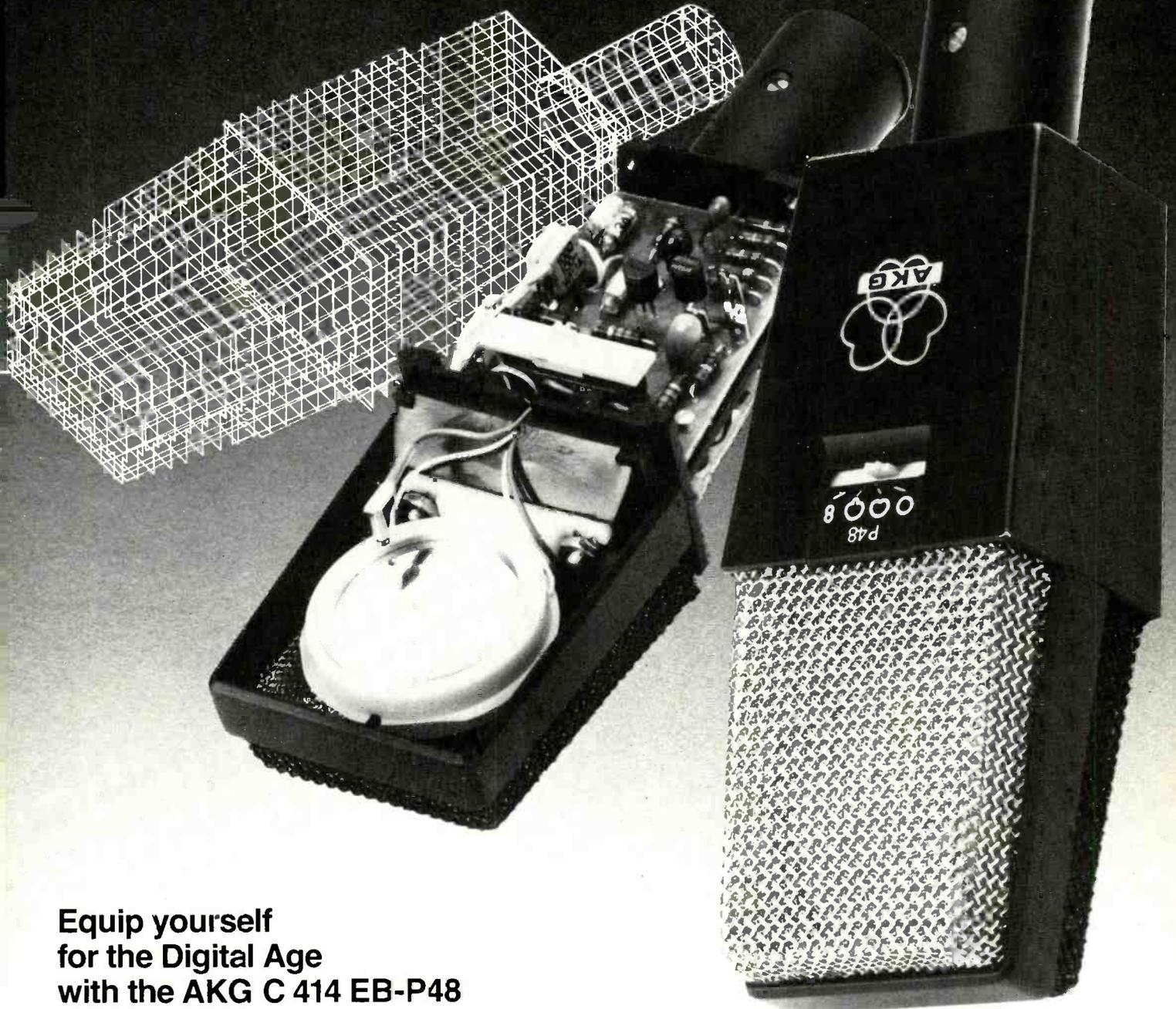
Bearing in mind that orchestral recording is only listened to critically in stereo (or Ambisonics), it would follow that some phase errors introduced by the sound field system or the dummy head are acceptable—so why not use them? But for pop music where the last gram of selling potential has to be wrung from the final mix, it would seem that such degradation of quality would be unacceptable. Is this a Luddite attitude?

If human beings had one ear in the middle of the forehead, we wouldn't have all this trouble. □

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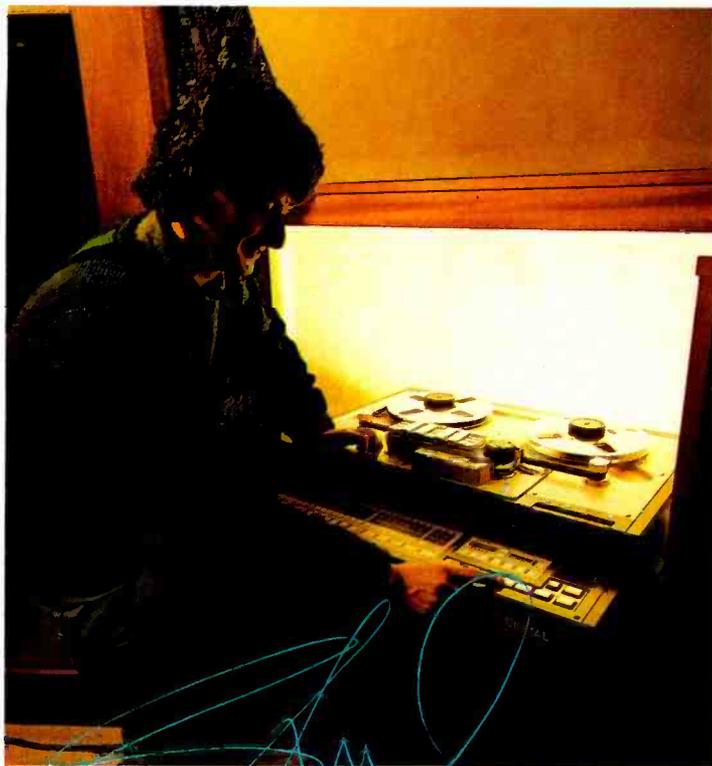
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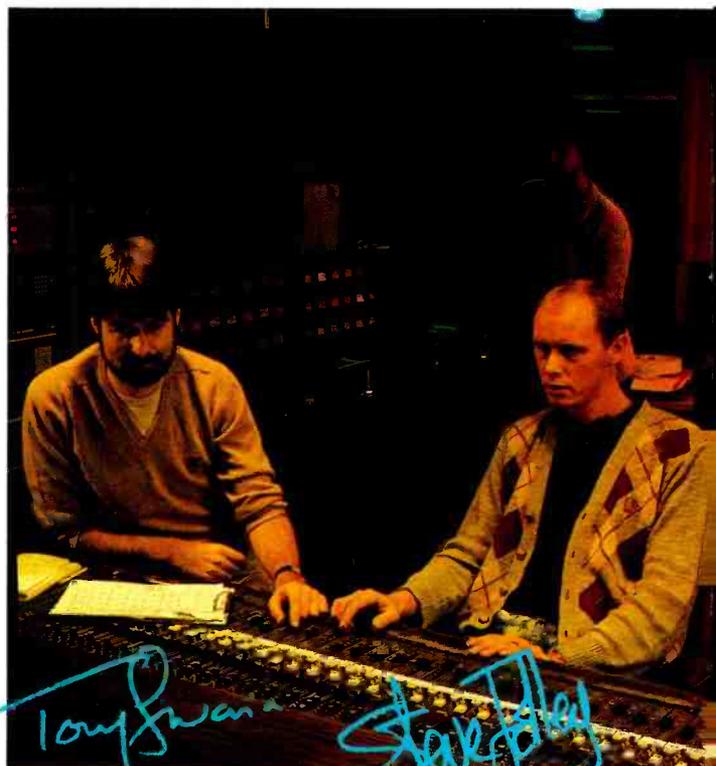
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MICROPHONES

There is a great deal of activity in the world of microphone development at present. Spurred on by the results potentially obtainable from digital recording systems and the availability of new materials and measuring techniques, manufacturers appear to have almost universally introduced new models. Only those manufacturers who started their development work well before the current situation actually have their new models available now, although many more are poised for release in the near future.

There are one or two other points that may also have a bearing on the new work being done. With the increasing use of electret materials for lower end microphones, studios have come to expect good quality from fairly low cost microphones that are also compact. There has to be a very good reason for them to continue to use mics which are three times as expensive and sometimes of far greater physical dimensions. Hence some new, more compact, higher performing models. There are also several small microphone manufacturers beginning to make themselves felt and these are also forcing some of the established makers to 'get serious' about their products. One final point—recording studios are by nature fairly conservative about their new equipment purchases and nowhere has this been more true, than in the microphone cupboard. It would have been very unusual to have

Keith Spencer-Allen considers developments some of which show that there have been some important changes in outlook

found a microphone manufactured by any other than the established six or seven names.

By looking at the Studiofile features, personal experience and the feedback that we get here at the magazine, we believe those days are gone. Record producers appear to have become far more open minded and are prepared to consider other choices in mics. It used to be possible to measure the worth of a studio by how many Neumanns they had, in much the same way as Arabs bought wives with sheep and goats. Possibly the introduction of a 'knobbly metal plate based on a seemingly unlikely principle' so changed everyone's preset ideas of what a mic should look like that it has become a little easier for other manufacturers with different ideas to get a hearing. The result of this is that we still have a lot of Neumann mics in most studios (and rightly so) but also models from a dozen other manufacturers. A healthier situation altogether.

There has, however, been one change among manufacturers and that is a slight nervousness about their new models. To achieve a significant quality improvement, prices have had to rise and there seems to be a reluctance on the part of manufacturers to get fully behind a new microphone until the recording industry has expressed a favourable reaction. This became very obvious when we tried to obtain review samples of certain microphones we felt worthy of review. Our efforts have recently paid off, however, and there will almost certainly be some form of microphone reviews carried in the magazine later this year.

One of the most surprising things to happen recently was the emergence of a German manufacturer of microphones previously unknown to us even though they have a wide range of microphones and accessories. The products of MB-Electronic GmbH can largely be divided into two areas—low cost dynamics and electrets, and condenser systems for studio use. There are four dynamic mics, with a fifth being a minor variation on a standard model. The electrets are largely pencil type mics with cardioid patterns, although the *PMB E 370* is hypercardioid in response. It is possible to fit the capsule from this mic on to the other two electret mics in this range, making it about the lowest cost interchangeable system available.

The condenser microphones are arranged into two series: the *640* and the

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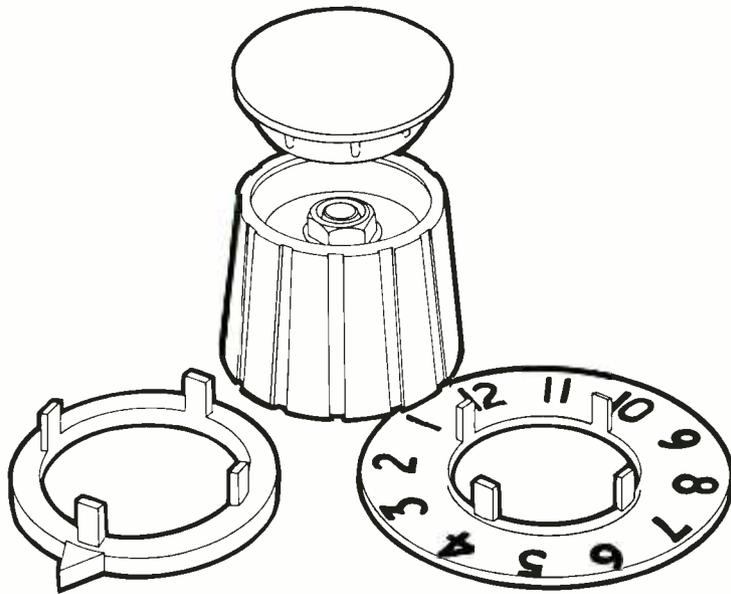


PMB-Q from MB



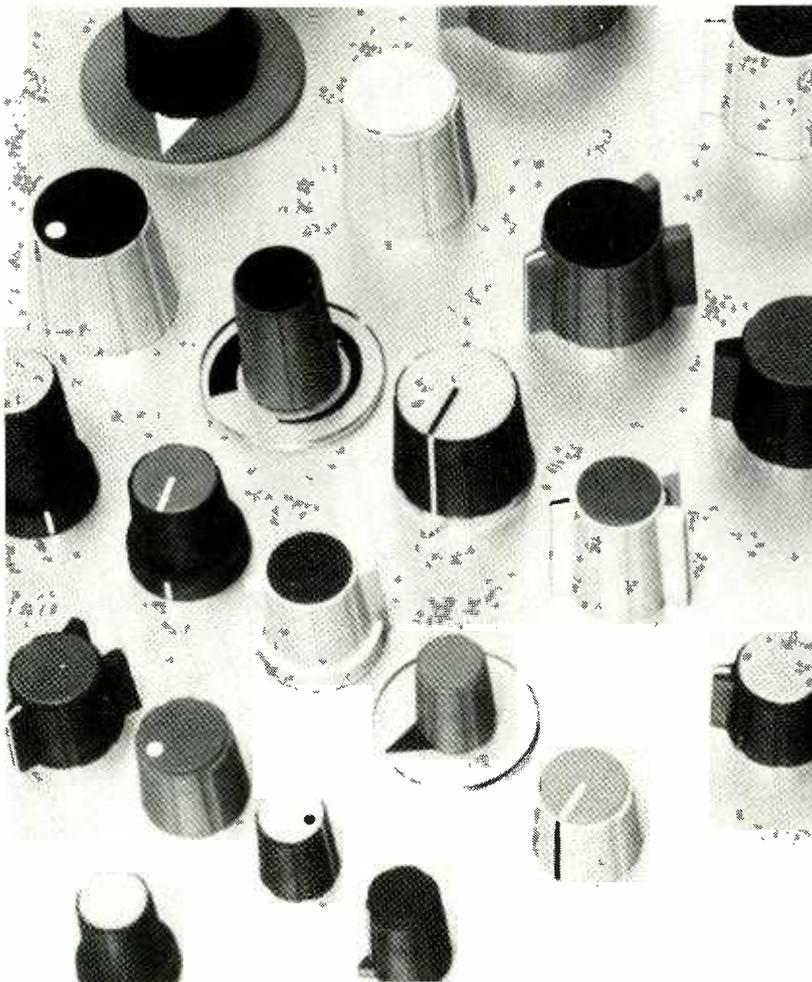
MB Electronic's OSS-II-BO





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MICROPHONES

648. The 640 series, more fully known as the *PMB C 640*, are electret-type condensers that will run on 48 V phantom power or can be self-powered with an internal battery. There are five interchangeable capsules offering omnidirectional, omnidirectional linear, cardioid, cardioid highly sensitive and cardioid damped responses. The preamplifier section has a 10 dB pad switch under the capsule housing. The *PMB C 648* series is similar in many ways but runs on phantom power only. There is the same range of capsules and accessories, although there is no provision for a switched 10 dB pad and so a special pad unit is supplied that fits between the capsule and preamplifier. Both of these ranges are available as stereo pairs.

Perhaps the most interesting of the MB mics is the *PMB-Q*. Described as a 'stereo-quadro' mic, the *PMB-Q* was developed especially to be used as 'a main mic, stand-by and soloist mic for stereo recording in XY and MS as well

as in quadro'. The mic consists of four capsules mounted on the end of two transverse arms positioned at 90° to each other although the upper arm is rotatable $\pm 30^\circ$. All the outputs are taken discretely from the mic to a control box which will give either 'XY-quadro' or MS stereo with full control of the MS width. Without hands-on experience it is unclear what the unit is fully capable of although it appears to be an interesting approach.

Finally there are some boundary type mics *OMS-BO* which use a circular metal plate with the capsule positioned facing the plate and *OSS-II-BO* that actually has two capsules on the same plate with a semi-circular Jecklin disc between them. MB also make a Jecklin disc for use with their standard condenser range of mics. We don't believe that there is any US distribution of these mics at present and although there was a slight hiccup in the UK distribution this has now been rectified.

While on the topic of four channels, it

is worth mentioning that the *Mk IV* version of the Calrec *Soundfield* mic is now available. The most significant change being the specification and in particular, the noise figures which Calrec claim to be better than 17 phons for a stereo cardioid output.

The Sanken microphone *CU-41*, reviewed in the December 1983 issue, has been creating a great deal of interest and has proved popular with a number of engineers although there are still not enough of the units available from which to draw any real experience. At present they are in the process of organising worldwide distribution so this situation may change. The *CU-41* is not the only microphone Sanken manufacture, although as the top of their range they feel it is the only one they wish to export at present.

Milab have a new top of the range mic in the form of the *VIP 50*. Information

MB's OMS-BO



Electro-Voice Model 370

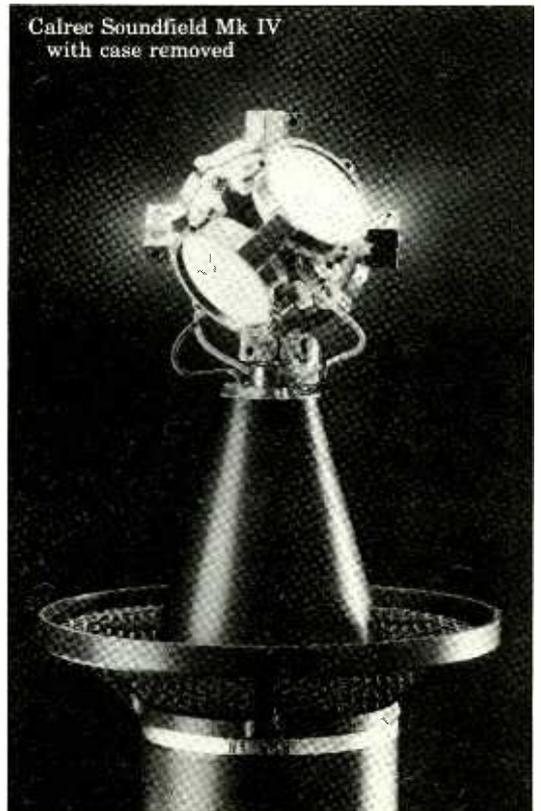
Milab VIP-50



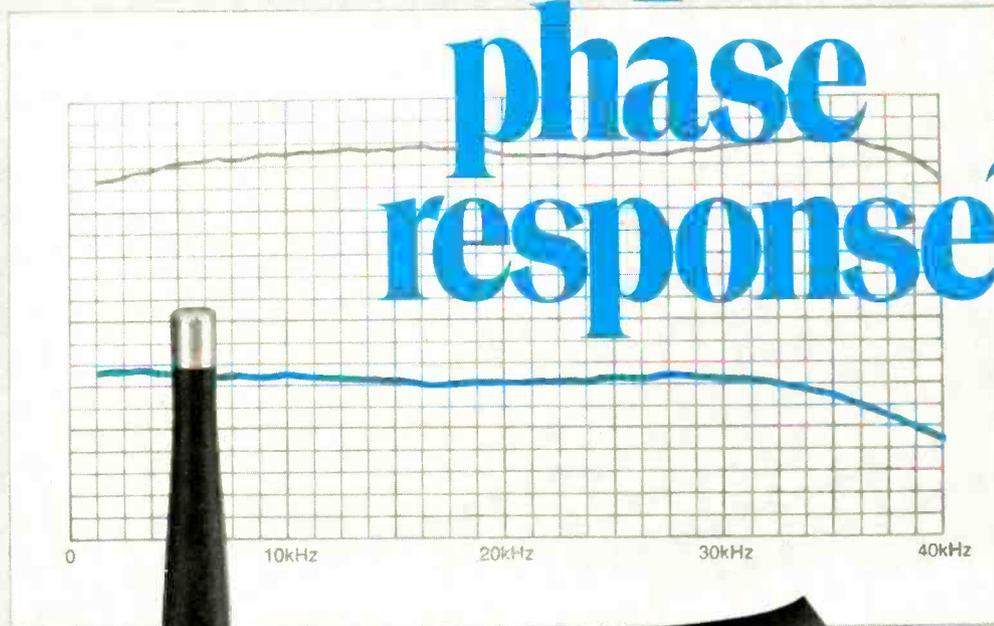
Sanken CU-41



Calrec Soundfield Mk IV
with case removed



How important is microphone phase response?



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01-570-7774
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MICROPHONES

on this unit is also fairly limited but it does have variable polar response and switchable mic/line level. This feature follows on from Milab's experience with the LC-25 which was originally available only in line level. Line level outputs from a high quality mic are a good idea although practically it is not that easy for studios to just plug such a mic in as they require phantom power on their line level console inputs. As a result they didn't prove that popular but with a choice of mic and line level, it is possible to use mic level until the advantages of line level operation become obvious.

Neumann have continued to make progress with the acceptance in major studios of the TLM 170 microphone. It is always difficult, if you manufacture a microphone that is considered an industry standard, to replace it with a new model, as you almost have to start all over again. Its smaller size and flexibility are definitely an advantage.

Bruel & Kjaer have had a good response to their first ventures into recording microphone manufacture although they did receive some criticism from certain quarters that the mics sounded too bright. If you study the response curve which is really quite flat, you will see a slight treble lift at one point, although this is measurably quite small. It would appear from this that the flatter the response achieved, the more the ear picks up on minor deviations even though these would be unnoticeable

in a less flat microphone. Manufacturers who strive for flat frequency responses right across the spectrum may find they are making a rod for their own backs. Studio use of B&K mics would almost certainly increase if they could design a directional/cardioid mic to complement the omnis although a large number of engineers are finding useful applications for the omni type of mic particularly for vocal work and other overdubs.

There has been a considerable resurgence of interest in ribbon microphones. We have been recently receiving a number of calls about Reslo—do they still exist and can anyone still repair the mics? Also a number of distributors have picked up on the Coles (ex-STC) 4038 and at a recent AES Convention one foreign distributor was describing the mic as perfected after 30 years of design!

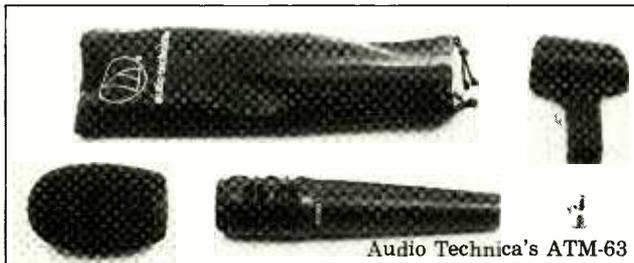
PZM and boundary type mics are continuing to make progress and there are an increasing number of companies now manufacturing them or items very similar. These include Crown/Amcron, E-V, Milab Sennheiser, Beyer, Schoeps, MB and several other low cost units. It is quite noticeable how different they all sound. Crown have introduced a number of new models recently such as the 12 SP and are suggesting its use as a handheld type of mic. They have also introduced

accessories to make mounting the PZMs on larger panels easier. There are also accessories now available for increasing the directionality of the mics for specific applications.

While on the subject of non-standard units in microphone terms, C-Tape have a new electronics package to accompany the C-ducer contact mics which they claim reduces the need to be quite so precise on tape positioning, improves the LF response and gives a general all round improvement.

Another area where many new mics are being announced is that of vocal mics for stage use. New models are available from Beyer (MC 734 condenser type); Audio-Technica (ATM63 dynamic); Electro-Voice (PL 68 dynamic); Shure (SM87); Fender (D Series three dynamic mics) and Peavey (Celebrity).

Possibly one of the most unusual mics introduced for many years is the JVC Super Beam. This is a unit designed to fulfil the same function as a gun mic but looks to be the opposite. It consists of a large number of capsules in a straight line mounted in a gently curved housing of about 4 ft wide. The operator holds a pistol grip mounted below the bar on top of which is mounted the control electronics. The precise operating principles are not given but we assume they are a combination of phase and perhaps delay electronics. For all its strange appearance, it does sound natural while still being very directional.



Audio Technica's ATM-63



Fender D Series



Bruel & Kjaer 4004



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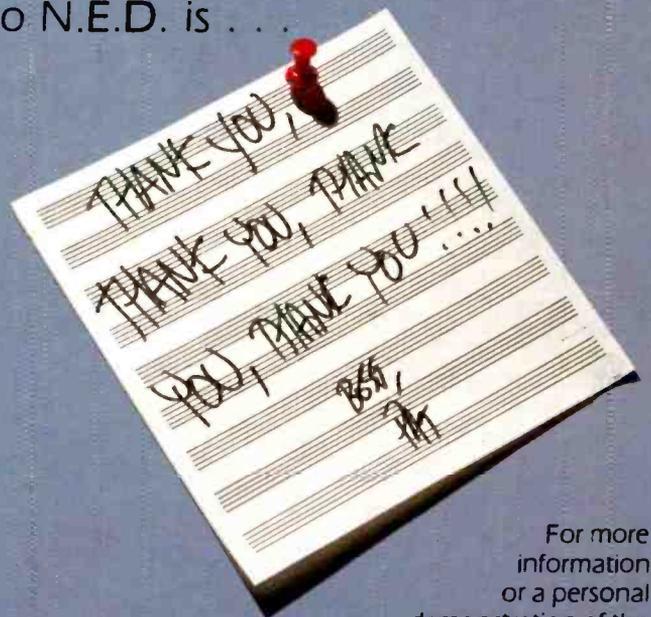
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INTERNATIONAL DIGITAL PROJECT

"Working in the digital domain requires an adjustment, a re-education of our ears," notes Jerry Barnes, veteran recording engineer and current president of SPARS in the United States. "The biggest change is allowing yourself to believe that the machine will record higher levels and more dynamic range than you're used to hearing. Yet as soon as you hear the first playback, you realise that all that sound and quality is there."

Jerry Barnes' comments stem from his experiences on a recent international project he completed with two Mitsubishi X-800 32-channel digital recorders (one each in London, England and Hollywood, California), 51 members of the Concertante Ensemble of London, and a 120-voice chorale from Azusa Pacific University (Azusa, California).

Every year, Barnes does two to four album projects with the university. In the spring of 1983, he suggested to Dr Gary Bonner, the dean of the school of music, that they should consider an album of classical and baroque material, and recommended a collaboration with an orchestra in London that specialises in such performances. As a result of that meeting, Bonner began the necessary fund raising, while Barnes looked into the studio and recording arrangements.

Jerry Barnes' first choice for an English studio was Abbey Road. "That's the only place I wanted to work," says Barnes. "It's famous for not only the Beatles' recordings, but also the very large orchestral sessions that were done in Studio One with the great conductors like Sir Thomas Beecham, Sir Malcolm Sargent, Leopold Stokowski, and so many more."

Because the project was scheduled between Christmas and the New Year (1983)—traditionally a slow period for the recording business—the 30-year-old Concertante Ensemble of London, and Abbey Road were both available. Through Tore Nordahl, president of Digital Entertainment Corporation of Danbury, Connecticut and representative for Mitsubishi in North America, Barnes managed to secure the use of a Mitsubishi X-800 32-channel digital recorder, which AEG-Telefunken shipped to London especially for these dates; "The Mitsubishi is really the only digital machine I would have considered, because I planned to record the 51-piece orchestra in London, and then

In the last few days of 1983, a quite unique recording project was started involving an orchestra in London, a choir in Hollywood and two digital multitrack machines. Tony Ryder follows the project from conception to mastering.

return to United Western Studios (Hollywood, California) to overdub the 120-voice chorus. As it turned out, I needed almost all of the 32 tracks that the machine offered."

The day before the scheduled start date, Gary Bonner, Jerry Barnes and Don Neufield, an associate at the University who co-produced the project with Barnes, arrived in London. However, the shipping company didn't deliver the digital recorder until 9 pm that evening. "I was a little worried when I first walked into Abbey Road and the Mitsubishi machine wasn't there. But the recorder was set up, checked out and ready to go on time. The X-800 performed flawlessly."

Barnes attributes a large proportion of the success and productivity of the English sessions to the staff at Abbey Road, including Ken Townsend (studio manager), (engineer) Eric Tomlinson, and the engineering crew of Alan Snelling, Mark Vigars, and Ian Grimble. "They enabled me to accomplish so much in such a short time. The crew set up the studio for me. And because Alan records in that room all the time, he took care of the mic selection and placement."

Marriage of the old and new

These particular sessions were a unique blend of past, present and future recording technology and techniques, combining classical miking methods, vintage Neumann valve (tube) microphones, a multitrack analogue console, and the 32-channel digital recorder.

The Ensemble was picked up using three mics, all recorded at equal levels.

Overhead left and right (assigned to console channels 13 and 16, respectively) were both Neumann M-49s about 15 ft in front of the orchestra and 15 ft in the air. A stereo Neumann SM-69 (channels 14 and 15) was centred over the conductor's head, and also approximately 15 ft above the floor. "The SM-69 provided a slightly different, more expansive sound than did the two mics that were to the left and right. I found that by using equal amounts of all four pickups panned hard left (the left M-49 and the left side of the SM-69) and hard right (the right M-49 and the right side of the SM-69), I got the very best natural re-creation of the orchestral sound."

In addition, microphones (run through console channels 1-12) were positioned over each orchestral section to gain a bit more presence on the individual instrument groups when needed. "The acoustics of Studio One are such that just the four primary pickups in front of the room probably would have been adequate. But we sprinkled a few close fill mics around as backups, because we had the extra tracks. If we had been going direct to 2-track with the chorus present in the classic figuration (the choir elevated and well behind the orchestra), we probably would have eliminated the fill mics, because all those extra microphones would have taken away from the overall presence. As it turned out, we were able to use the ambient orchestra tracks for nearly the entire mix."

The analogue console

Interestingly, the custom-built analogue board in Studio One was put together quite a few years ago by the engineers at EMI, Abbey Road's parent company. Yet Jerry Barnes feels that the sound was perfect for this project. "The studio planned on having a new console installed by April 1984, but I'm glad we got to do the date on that one. It has a marvellously warm sound to it. We were using all tube mics in the room, and we had the perfect marriage of analogue and the latest state-of-the-art technology. It just proves that much of the older equipment still works well, and sounds even better when used in a current, contemporary mode."

The most noticeable operational improvement, according to Barnes, was the amount of output that the Mitsubishi machine would accept. The classical and baroque music provided a

wide dynamic range of programme material from very soft, delicate passages to crashing tympani and loud brass. When recording in the analogue domain, the engineer has to take those extreme variations of level into consideration in one of three possible ways: reduce all the levels, thus losing the softer parts below the noise floor; constantly ride the fader positions up and down; or put some sort of compression in the circuit, which destroys the dynamics. "We didn't have to do any of that with this digital machine. Once we found the optimum levels, we just let the music play itself, and the integrity of the dynamics was maintained."

Safety precautions

Because the project was to be recorded in two stages (music in London and voices overdubbed in the States), certain safety precautions were adopted to minimise the possibility of catastrophe.

(1) A 24-track analogue recording was made at the same time as the digital recording, because there was no second X-800 digital machine in England. Those analogue copies were left at Abbey Road Studios. "There's no particular purpose to them now, because the digital tape is here (United States) and in perfect condition," says Barnes.

(2) Although the orchestra was quite familiar with the material to be recorded, which averaged eight to 10 minutes in length per piece, Dr Bonner isolated and rehearsed the most difficult sections prior to recording to ensure that everyone's interpretation was the same. Then two or three takes for each piece were laid down just for insurance. In addition, smaller segments were re-recorded for touch-up

purposes. "Some takes we loved for the feel," remembers Jerry Barnes, "but a couple of little passages were not quite right. In those cases, we deliberately recorded some intercuts instead of going all the way through the entire selection from the top. One eight-minute Handel piece, for example, was difficult, because there were drastic rhythmic variations over the course of the composition. We simply recorded intercuts for those troublesome sections and inserted them in the appropriate locations during the editing process."

(3) When the London sessions were completed, Barnes hand-carried the digital copies back to the States, and kept them under his seat in the airplane. "They never left my sight; nor did they pass through the X-ray machine at the airport. Airline officials claim that X-rays don't harm the tape, but I don't want to be the first to disprove that."

Voices overdubbed in US

Once back in Hollywood, Jerry Barnes settled into Studio 1 at United Western Studios to overdub the 120-voice chorale with a modified Harrison console and a second X-800 digital recorder supplied by Digital Entertainment Corporation. "This approach to recording may be a 'first.' Typically, the same digital recorder follows the artist from studio to studio doing, for example, the background tracks in Miami, vocals in New York, and sweetening in Los Angeles. To the best of my knowledge, this is the first time that someone has recorded the basic tracks in one country and returned to the States to use another machine to complete the project."

Remarkably, Barnes reports absolutely no problems with

alignment, crosstalk, or the other negative conditions normally associated with recordings started and continued on two different tape machines. In fact in both London and Hollywood, they just turned the X-800 on, let it warm up and started recording. "The preparations that generally take a lot of time to get a session underway were not a consideration with the Mitsubishi."

To record the chorale group, Barnes arranged the four vocal sections in a diamond shape. Sopranos were distributed around one corner of the diamond, while the tenor section was located directly opposite them along the other corner. An AKG C-24 valve stereo mic (console channels 17 and 18) in a figure-of-eight pattern was placed equidistant between them and raised to about 15 ft above the floor. The alto section occupied the third quadrant, and the bass, across from them, composed the fourth. "The positioning was sort of arbitrary," explains Barnes. "I always use the diamond shape, but occasionally the altos may be across from the sopranos and the tenors across from the bass. There is no right or wrong way, but one of those variations always works for me."

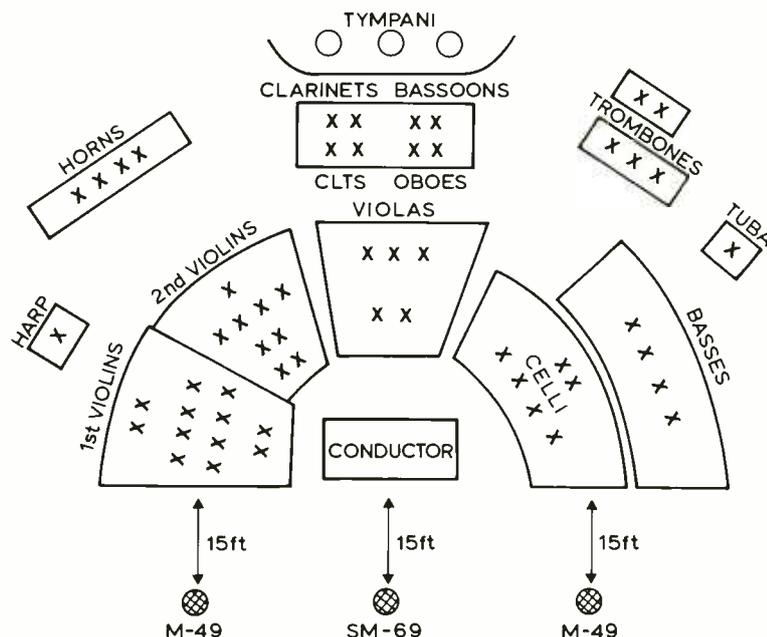
As in London, every section received a close mic—a Neumann U-87—for additional presence if needed. These four microphones were assigned to channels 19, 20, 21 and 22. The remaining tracks (23 to 32) were used as spares for supplementary vocal performances, because Barnes had only one orchestral take per song to work with. "If we wanted to record a short phrase or replacement part with the chorus, but didn't want to do it as a punch-in on one of the primary tracks (17 and 18), the 10 remaining tracks gave me the luxury of keeping the original takes that we thought were good enough, and also afforded the opportunity to record alternative, and hopefully better, sections. Then I could mix those into the final version, or use whatever pieces I needed to build the final.

"And I do want to point out that the punch-in capability of the X-800 is shockingly fast," continues Barnes. "I was able to punch in and out of situations that I would never have attempted on analogue."

Headphones for cue system

Of course, doing any overdub demands the use of some kind of cue system to ensure accurate entrances, tempo and pitch. But when 120 people are to be overdubbed at one time, the problems are compounded many times over. While some engineers prefer to send the cue through some monitor speakers in the studio, Jerry Barnes felt that the leakage from such a procedure would degrade the quality of the overall recording. Instead, he chose to feed approximately 75 pairs of headphones, and distribute them

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according to user preference. "I probably do eight to 10 large choral projects a year with various groups, and they all seem to respond better if there are headphones. We don't try to put them out for every person, because some people are not studio singers and don't relate to the phones. One guy might absently-mindedly start swinging his set around in the air, and they feed back into the microphones. It's best to give headphones just to the people who want them."

All the cue sends were mono through single-ear headphones, except for the stereo mix to the conductor. Dr Bonner wanted to hear a perspective of the chorus versus the orchestra in his headset rather than a simple cue. "I've also done projects with similar large groups where I've put only two small cue speakers in front of the conductor, played the intro, and turned the monitors off altogether once they got into the piece. The chorus was essentially singing a cappella, but the conductor was hearing the mix through high-quality phones. Of course, keeping everybody on pitch sometimes becomes a battle, but a good choral organisation should be able to do that. However, if you don't have the time, headphones seem to be the fastest."

Another consideration is what to do during a cappella section, when the chorus must arrive at a precise musical point where the orchestra starts playing again. Obviously, without some sort of cue, the chances are slim that voices and instruments will be exactly in sync. Barnes has found an effective way to furnish an accurate tempo guide. "Having a musician, like the concertmaster, play the soprano or some vocal part through the capella parts provides adequate reference for the chorus during the overdubs without being rigidly locked to a click track. However, if you have 75 headphones floating around, you risk having some violin leakage, which you don't want. In that kind of situation, I constantly solo the choral tracks to see if any leakage is occurring, especially with digital where the noise floor is so low. For this project, the leakage was virtually nil."

Barnes goes on to explain: "This is not the easiest way to make a record, and some people would argue that the final result is not authentic. But if it's the only way you can do the project, the main objective is to make the overdubs sound like they were done at the same time as the orchestra. The conductor has to be hip to what's going on and listen very closely. And the singers have to be willing to trust totally in the conductor's ability."

Ambience variations

For any large project recorded primarily with only a couple of microphones, room ambience plays a major role in determining the sonic outcome. Obviously, the ambience at

INTERNATIONAL DIGITAL PROJECT

Abbey Road Studio is different than the room sound at United Western. While Jerry Barnes reports having had no trouble matching those two qualities artificially, he does admit that the process did take some time.

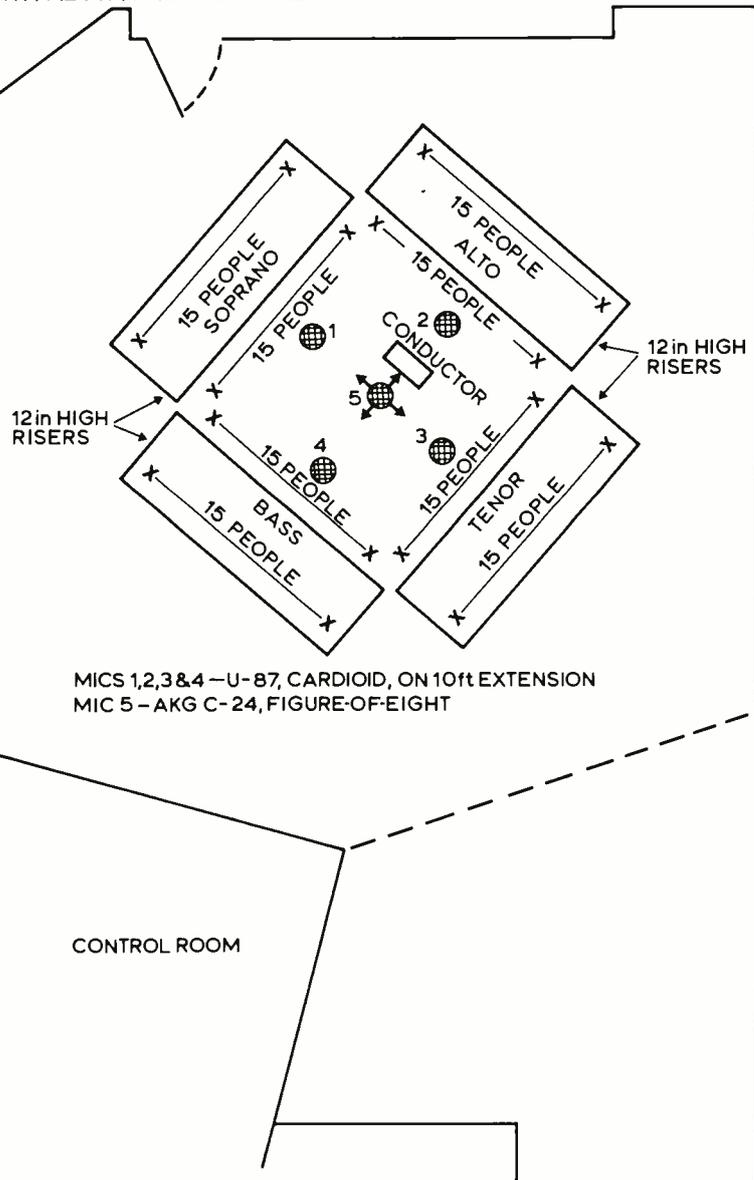
Barnes didn't know the exact decay time of Abbey Road's Studio One, so during mixdown he chose the amount of reverb pretty much by feel. "I cued myself using various parts of the orchestral performance, such as the end of a piece played fortissimo or some type of chord with a quick release, which gave me the chance to

hear fairly well the natural decay of the room. Then I simply tried to match the choral part at that very same spot. The whole process was a matter of trial and error. I didn't feel the need to add anything artificially to the orchestra, because it had a natural warm sound to it already."

Unfortunately, the room's natural echo doesn't show up that obviously on some of the softer vocal passages. Because the feel needs to be more intimate in those instances, matching the choral tracks to the orchestra was really a section by section task. "I tried not to make the chorus sound too artificial by overcompensating with the echo," says Barnes. "However, I probably did have slightly more delay on the chorus than the orchestra. This

Seventy-five pairs of single-sided headphones were distributed amongst the members of the choir. The mix was called mono cue 1, and contained the orchestra only. The conductor had a set of AKG 240 stereo headphones with an overall stereo mix that included both the orchestra and the chorus. (This mix was identical to the one coming through the control room monitors.)

STUDIO 1 AT UNITED WESTERN STUDIOS
- MITSUBISHI DIGITAL SESSIONS
WITH AZUSA PACIFIC UNIVERSITY CHORALE



type of music needs to exhibit a cathedral-like atmosphere, and the choral parts would have sounded too stark and too dry if there wasn't some trailing off of the echo send."

According to Jerry Barnes, the fact that he was working in the digital domain made the matching process much easier. "The music reproduction is so clean that you can select and work with the echo percentages much more precisely. You don't have to select echo with the consideration that the analogue medium and the tape itself will affect the signal. What goes in comes out."

For such a complex project, Barnes utilised the *NECAM* automation system on board the Neve 8108 console in United Western's Studio 3.

Although *NECAM* requires SMPTE timecode to lock the tape machine to the mixing computer, he didn't have to lose one or more of his audio tracks to record the control data. The Mitsubishi *X-800* provides five auxiliary tracks especially for timecode or sync pulses. In fact, two *X-800*s can be locked together in that way to provide the full 64 audio tracks.

Two-track editing

Jerry Barnes did none of his editing on the 32-channel *X-800*, but chose instead to mix to the Mitsubishi *X-80*

INTERNATIONAL DIGITAL PROJECT

digital mastering recorder, a 2-track reel-to-reel machine. The fixed-head design features tape rocking and razor-blade editing capability. "Digitally, I can make as many copies as I want without any generation loss, so the simplest approach for me was to do my editing on the 2-track. When the masters were all assembled, I did a digital-to-digital transfer back to two open tracks on the *X-800*, 32-channel recorder. From there I made as many final digital 2-track copies on the *X-80* as I wanted. For me, the less equipment I have to use, the better. To do all the editing, I needed only two machines, and the finals sounded as good as the original recordings."

Disk mastering was done digitally from a Mitsubishi *X80A* at Future Disc in North Hollywood, by cutting engineer Steve Hall, whose previous clients have included the Knack, Nick Gilder, Pat Benatar, Aretha Franklin, Jermaine Jackson, Donna Summer and Rod Stewart. The 2-track master tape was run through a computerised Cybersonics *DRC-202* console to a Cybersonics lathe and *DSS 821* Ortofon cutting system (green head). Although the cutting was

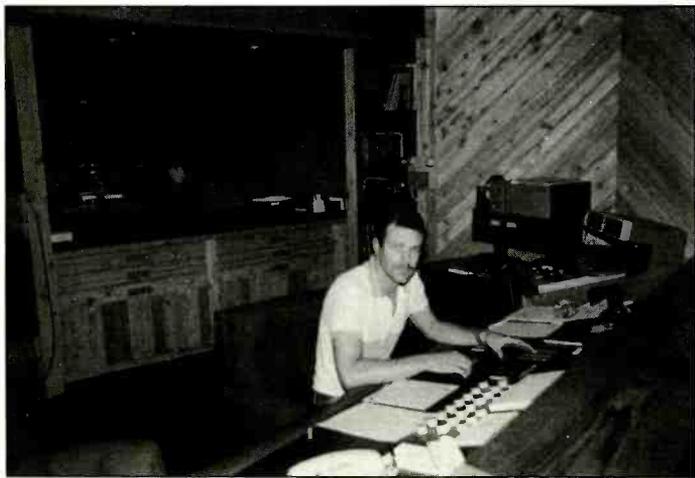
characterised as being 'pretty straight ahead,' Hall points out that he had to pay closer attention to details than he normally would if the master tape had been analogue. "Subtleties are more obvious, when recorded digitally," he points out, "and the settings and adjustments were much more critical. I also had to be more careful handling the digital tape, because it's much thinner and, therefore, a bit more fragile than analogue tape."

Evaluation of the digital recording experience

When comparing digital with analogue, the primary aspect to consider is the absence of tape noise or noise build up of any kind. "I've heard people say that digital sound is harsh and brittle, and gives you ear fatigue rapidly," says Jerry Barnes. "I haven't experienced that. The sound is just pure. Instruments like a piano or woodwinds suddenly sound the way you always knew they sounded live. But we've convinced ourselves over the years that the quality of analogue is only as good as sound reproduction gets. Digital adds no colouration; what goes in comes out. The clarity and feel of the dynamics are there without artificially creating them. For me, it's going to be very hard to go back to analogue." □

Engineer Steve Hall at Future Disc in North Hollywood, California

Jerry Barnes at United Western's Neve 8108 in Studio 3



Jerry Barnes in United Western's Studio 3 with Mitsubishi X-80



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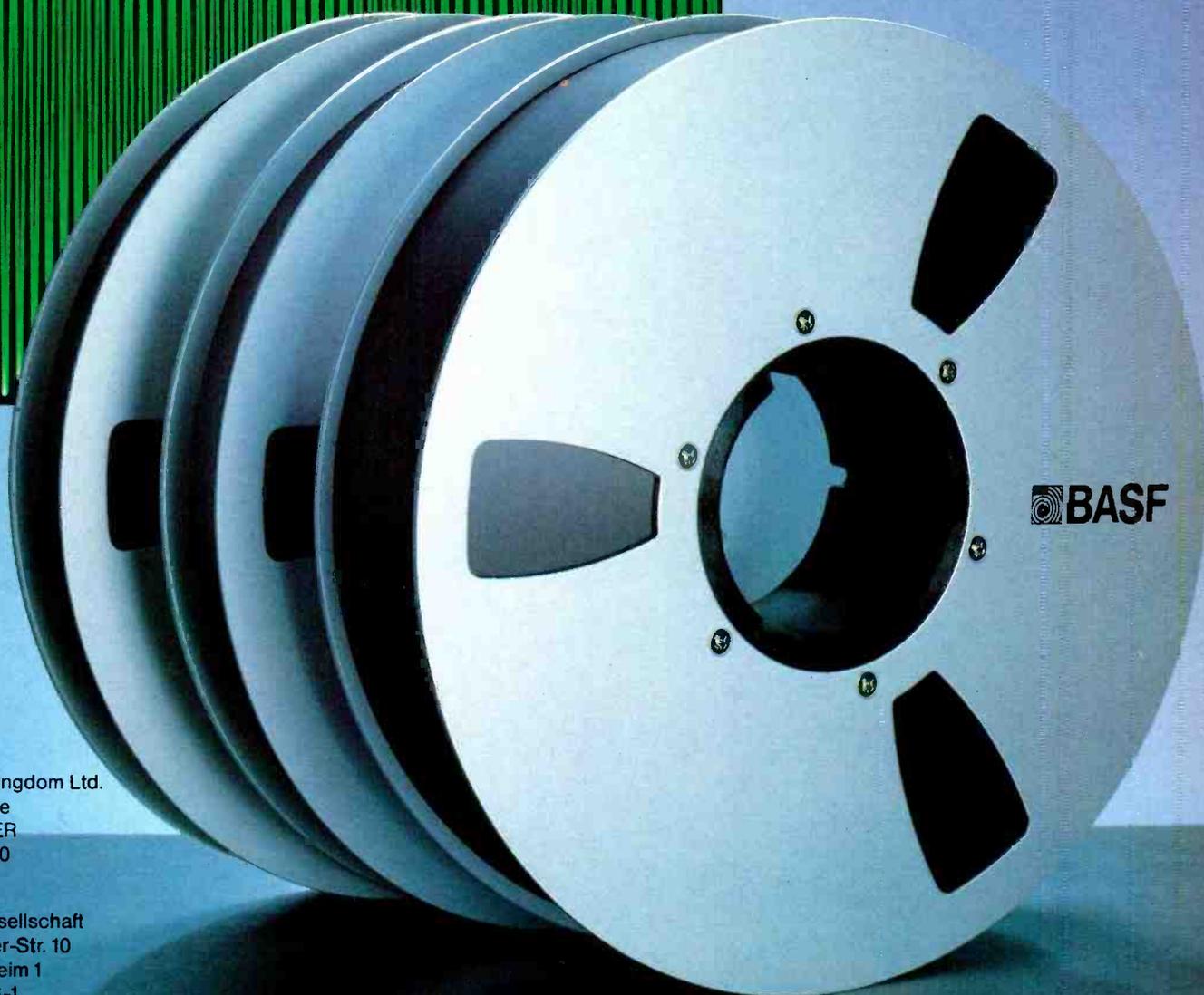
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RUNDGREN

ON

VIDEO

"Music video has gone to the formula of beautiful women and violent acts designed to keep the listener involved long enough so the name of the band registers. Video clips are really commercials that the record companies couldn't get away with if they were really commercials. The advertising code would never permit the soft core pornography and violence that appears on video clips," criticises Todd Rundgren, rock star, musician, audio producer and video director. Rundgren—who has been involved in video projects since the mid '70s, in addition to his numerous recording credits with Utopia as a solo artist and as a producer—is hopeful that 'videos' will evolve beyond their current stage.

"There must be at least 40 bands dressed up in leather and studs smashing their guitars. The clips present shock images that are so repetitive, they are no longer shocking. Don't people get sick of looking at that?" he asks.

Rundgren is obviously tired of the stereotypical music videos being presented on MTV, its 300 or so music video clones on cable, syndicated and broadcast TV, and in the discos of the '80s, video clubs. Although Rundgren and Utopia videos appear on many of these conventional outlets, he is also exploring new venues and distinctive approaches of producing and marketing for this rapidly developing medium of audio visual entertainment. In keeping with his independent, innovative approach to sound recording, Rundgren is approaching video in a unique manner.

There's no place like home for production

Todd Rundgren's recording credits are quite extensive. He has recorded some 16 solo LPs, has scored with a string of hit 45s, including *Hello It's Me*, *I Saw The Light* and *We Gotta Get You A Woman*, and has performed as the front man with the group Utopia for seven years. In

In an interview with Todd Rundgren, Carl Levine describes how Rundgren has adapted the promo video to match his own unique approach to video and music

addition he has produced albums for artists like Hall & Oates, Patti Smith, Cheap Trick, The Tubes, Alice Cooper, Shaun Cassidy, Psychedelic Furs and Meatloaf's multi-platinum debut LP. Since breaking into the music business as an 18-year-old, fronting the group, Nazz, Todd has developed a reputation as an innovative individualist.

A key ingredient in Rundgren's non-conformist approach to producing records is working at home, in Bearsville, New York, a rural community approximately 120 miles north of Manhattan. "I've been recording in my own studio for the past 10 years. I can't work under the pressure of a clock. I want certain things in a certain place. Walking into a facility you just don't get that. So in order to work effectively I built my own studio at home."

The studio contains: a 24-track Neotek Series 2 console; Ampex MM 1200 tape machine; Studer B67 ½-track; Lexicon 224X digital reverb unit; Lexicon Super Prime Time digital delay; two Eventide 910 Harmonizers; UREI 1178; two UREI 1176s; Klipsch Hearesy monitor speakers and a host of Soundcraftsman dual 10-band equalisers. In addition there is a fair number of synthesisers, including: Synergy; Korg Poly 6; Sequential Circuits Prophet 5 and an Emulator. He also has Valley People Kepex and Gain Brains, as well as two Eventide Instant Flangers and Roland vocoder. For percussion there is a Linndrum and Drumulator, to

accompany an assortment of guitars and a baby grand piano which is recorded using a variety of high end microphones including U87s and M49s.

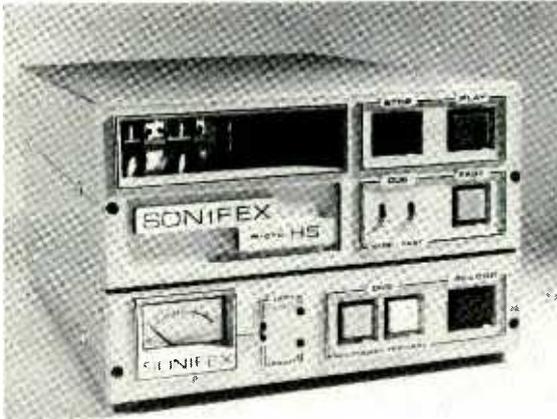
Rundgren applies the same home grown approach to video production. "I've been involved in video for my own personal experimental purposes since 1975, way before it became a popular promotional tool. When I got into the financial position, I started acquiring video equipment and putting it in my house in upstate New York. There was no one to run the equipment but me because I wanted to know what was possible. I was doing experimental video mainly with classical and electronic music," Rundgren recalls.

In 1979 he built Utopia Video Corp six miles from his house. "I developed the video facility because of the way I'm used to working. I never thought that I would be able to fully occupy the video studio because there's too much overhead. I'm not involved in the day-to-day running of the studio. The only thing I want is that it is there when I need it. What happens the rest of the time is of no concern to me."

Rundgren's personal projects only account for approximately 10% of Utopia Video Corp's work. The facility is used extensively by music video clients including television programmes like, *Night Flight*, *FM TV* and *Radio 1990*. The facility contains Convergence 103 editing, three Sony BVH 1 in VTRs two CEI studio cameras, a Vidlab coloriser, a Vital switcher with SqueezeZoom, an Ultimatte, Rutt/Etra, Spectre and Stiller synthesisers, a 16-track audio board and 2-track ATRs.

"We can generally complete 90% of our editing with the hardware that is here and then we book time in the city (New York) to complete a project," Woody Wilson, Utopia Video technical engineer relates. "There is also no need for an extremely sophisticated sound system at the video studio because most audio comes in finished. The complex audio system is at Todd's house," Wilson adds. ▸

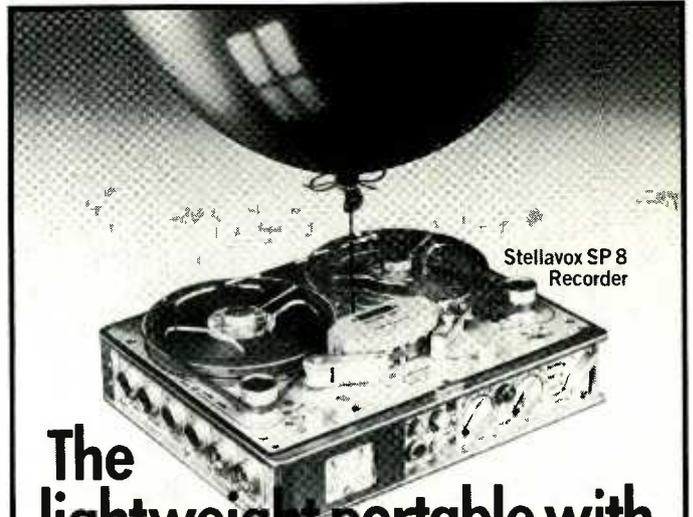
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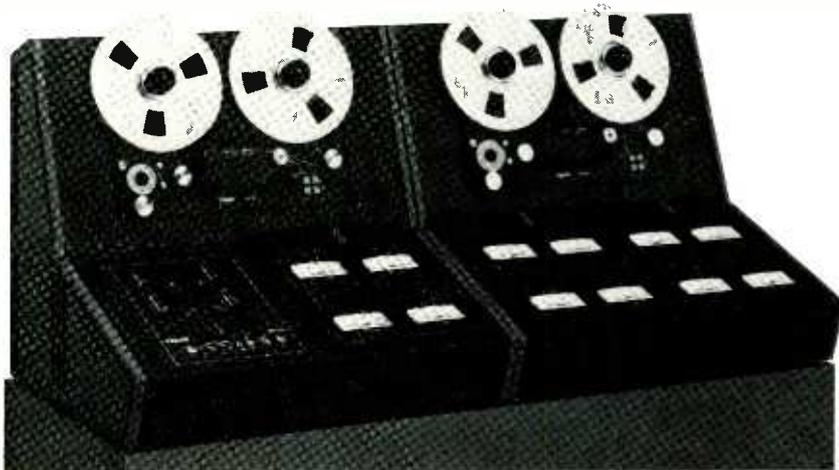
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RUNDGREN ON VIDEO

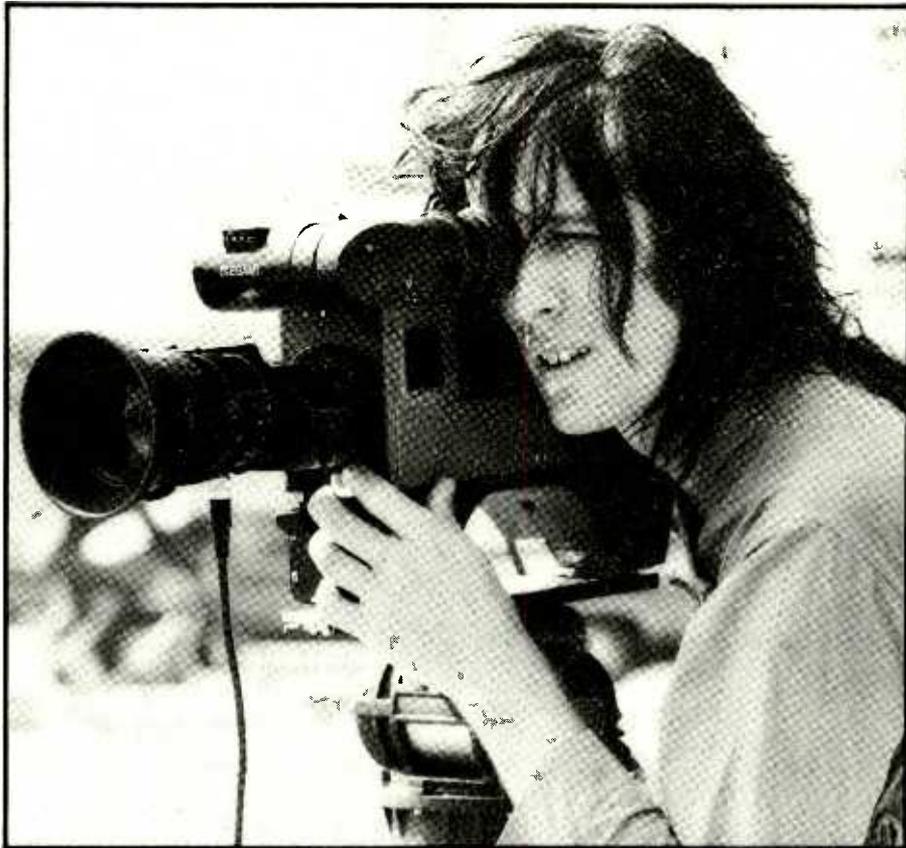


Photo: Lynn Goldsmith

Utopia Records—a visionary scheme

In a bold stroke of independence, Utopia created its own record label, Utopia Records. Under a unique agreement, with Jem Records' Passport label, the band members themselves will create, finance, and work in conjunction with Jem's national staff to set up the entire promotional campaign, including radio, TV, advertising, publicity, poster and all other marketing aspects of Utopia Records. Jem which until now has mainly been involved in the distribution of imported records, is currently expanding into the area of distributing new releases from American bands, as well as distributing Sony's Video 45s. The interrelationship Utopia, Jem and Sony have developed could be a harbinger of the cross promotion possibilities that will exist between audio and video sales in the future.

Utopia Records' first release this past January was *Oblivion*, the group's eighth album. Besides promoting the LP on AOR stations and a late spring tour, a cross promotion audio video campaign is being waged. Records and cassettes of *Oblivion* include advertising inserts of the Utopia and Rundgren Video 45s. Sony paid for the inserts, which include a toll free telephone order number, and also helped to underwrite the video production of *Crybaby*, the single and promotional clip off the album. Sony also reissued its Video 45, *Utopia Sampler*, with the new *Crybaby* clip included.

Like other promotional video clips, *Crybaby* was made available to MTV and the 300 other music video television programmes on cable, syndicated and network TV. In addition, a 12-city MTV

'Promotional video is more practical than mounting a whole tour, but it's no less of a headache.'

advertising campaign was waged in Utopia's strongest domestic markets. The target cities—Los Angeles, Gotham, Atlanta, Boston, Philadelphia, Minneapolis, Dallas, Chicago, Cleveland, Detroit, St Louis and San Francisco—were selected by a computer analysis of the band's previous record sales.

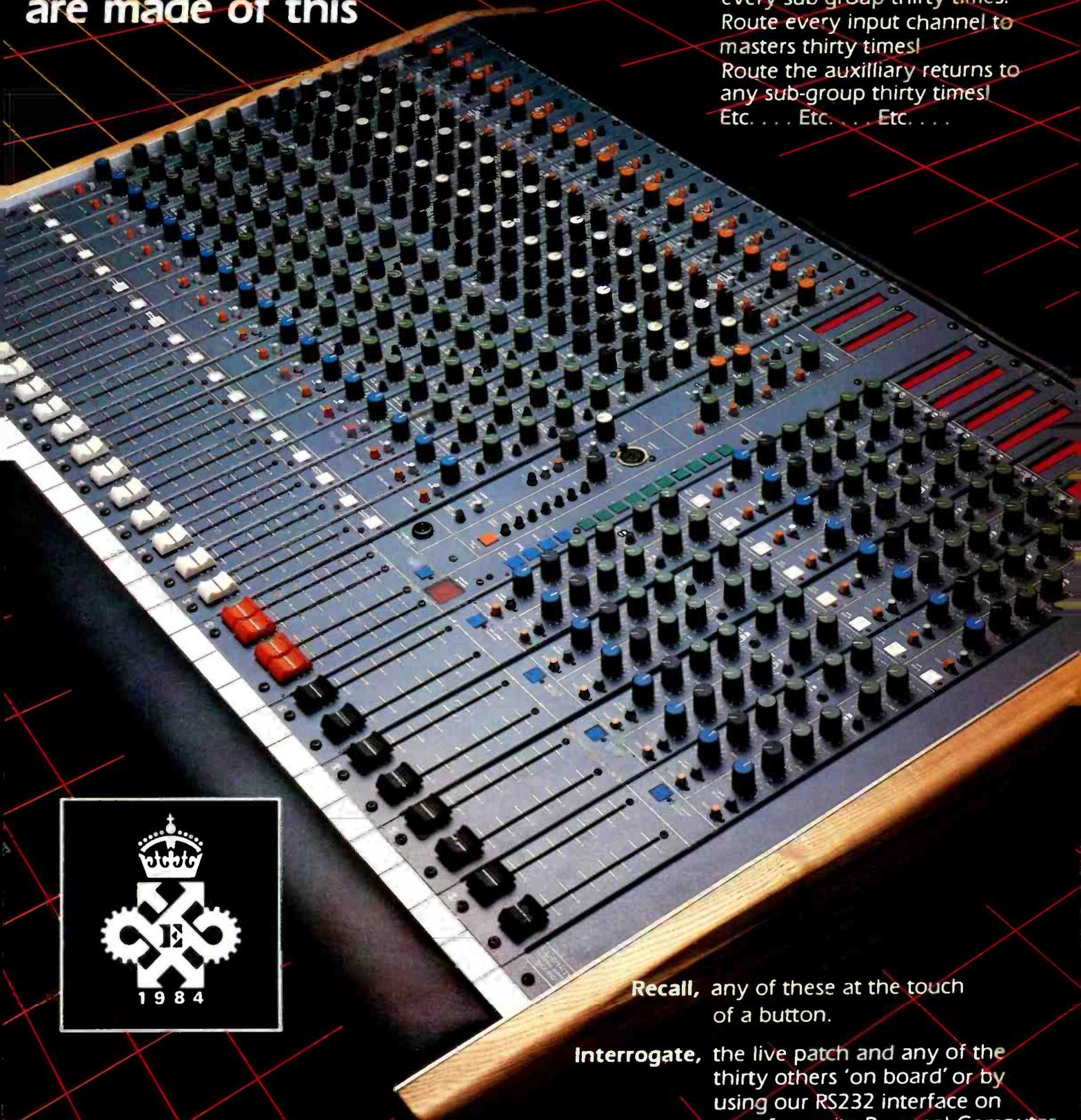
Although Rundgren (whose solo efforts do not fall under the Utopia Records/Jem agreement) is critical of promotional videos, he has not lost perspective of their value. "When we first put Utopia together we figured we'd rather be the Monkees and have a TV show, than go on the road all the time. That seemed to be the ideal way to promote your records," the video veteran muses. "We've always had an aversion to touring. Anything to supplant touring is welcome because individually we can accomplish more off the road than on the road. Promotional video is more practical than mounting a whole tour, but it's no less of a headache," he notes.

Pre-production of the *Crybaby* video took place during the last week of December. Film production and video post production was accomplished during the first two weeks of January. By the end of the month *Crybaby* was distributed as the promotional video clip, right on the heels of the release of *Oblivion*. In addition, Utopia also mounted modest tours in early 1984.

Utopia is an appropriate name to describe the relationship between the four individuals who make up the group. Rundgren, Roger Powell, Kasim Sulton and Willie Wilcox all share in songwriting, lead vocals and have communally produced all eight of their albums. Keyboardist Powell has been responsible for numerous technological breakthroughs in synthesiser sound, including the creation of computer programs allowing a single microcomputer to control several synthesisers at once. He recently presented a paper at the Audio Engineering Society on that topic. Kasim Sulton is also a multi-instrumentalist, and although only 24, he is a veteran of the new wave movement in New York City. Powell and Kasim have both released solo albums and work with other groups. Drummer Willie Wilcox's credits include laying the backbeat for Lionel Hampton and the Darryl Hall/John Oates band. He too, is involved in several solo projects and has been concentrating on his own songwriting. Wilcox is presently designing and constructing a digitally oriented studio in his own home. For the four individuals in Utopia, the relationship appears to be an ideal perfect social order, especially for the audio/video market of the '80s.

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RUNDGREN ON VIDEO



Photo: Lynn Goldsmith

Videos should move on to EPs

"Promotional video clips just don't give you enough time to make a coherent statement. For me the ideal is to do extended video and evolve to larger thoughts," Rundgren suggests. "Perhaps *Thriller* is a precursor to something advantageous. It is extended and basically OK. However, it is extremely padded and is 10 minutes worth of sensationalism. In reality it's a million dollars worth of commercial," Rundgren critically remarks about Michael Jackson's feature video.

Rundgren has also produced an extended video. "Channel 4 in England commissioned me to do a personal overview of my own life. The advantage of the Channel 4 project was, instead of a shotgun approach, I was given 80 to 90 minutes to work out a concept that people could get involved in. I prefer to work on things where you have space to be serious. Four minutes of music video does not provide that space."

The 81-minute extended music video *The Ever Popular Tortured Artist*, appeared on Channel 4 in England during last winter and at the time of writing there were no plans for its American release. The project was shot, mainly on video, but with some film, over a four month period in 1983. The soundtrack consists of an LP's worth of tunes, with supporting symbolic visual metaphors representing phases of Rundgren's life. The autobiographical skits range from sepia toned scenes of his childhood, to a 60 second look at the 'tortured artist' attempting to get through a tunnel during a period of depression.

"Approximately 30% of the footage was shot on-location, and the majority was shot in Todd's studio upstate. There was nothing elaborate about the location sound. Some MOS and some ambient sound, but otherwise the location audio was relatively straightforward," reports Michael Huss, of Huss/Michels Associate (HMA), director of photography for *Tortured Artist* and *Crybaby*.

Utopia Video technical engineer, Wilson agrees. "Although some of the location shots required lip sync and

'I never could stand Top 40 radio. Now we have Top 40 video. We've come a long way around to get nowhere.'

audio, the key to the final audio was in the mixing on to the final 1 in video master, which was completed in our own facility."

Rundgren was extremely enthusiastic about *The Ever Popular Tortured Artist*, which reportedly cost approximately \$120,000 to produce. "Channel 4's charter stipulates that they do programming that is innovative and unusual. The project gave me a greater range of freedom and special effects," Rundgren reflects.

When asked whether *Tortured Artist* would be released domestically, Rundgren responds, "Conceivably it will be made available in the US, but right now there are no real outlets for video EPs in this country."

Sounding off

"I was already making videos with classical and electronic music when it became *de rigueur* to make videos to go with your records. For me, it simply became a process of translating a personal style into a pop medium, which was something I hadn't been involved in previously. I still feel that pop music is limiting," Rundgren bluntly states.

"When you do a promotional clip, it is designed to promote a particular song, generally the single from the album. Singles are usually picked because they are simple and accessible. Ultimately the single will not be the song with the lyrics that are the best for visualisation.

So when it gets down to rendering to video terms, the lyrics are so pedantic and stupid, you're almost constrained to figure out another idea, even if it's completely obtuse and abstract, in order to make the visuals successful and still get the song exposed to people.

"I never could stand Top 40 radio. Now we have Top 40 video. We've come a long way around to get nowhere. I'd like to see people become saturated with MTV type programming and move on a little. Although there will always be people interested in Top 40 programming and that's fine.

"Marketing home video is in the experimental stage now. To a certain degree it's kind of brave on Sony's part to get involved in such an aggressive promotion of an unproven concept. We've had relatively good success with our Video 45s, but it's an unqualified success. All of our Video 45s (except *Crybaby*) were produced four or five years ago and then collected on the 45s. The problem with home video now is that the clips are promotional clips which have been produced for another reason. If the concept is successful, hopefully material will be generated for the home market," Rundgren predicts.

What direction would Rundgren like to see music video take? "Whatever it is, it should at least be different from what everyone else is doing. There's nothing earth shaking about singing bugs, but even if it is stupid, at least it's different," Rundgren suggests, making reference to Utopia's *Feet Don't Fail Me Now* video.

"Most musicians don't consider video as an integral part of their work. They hire a director to handle it. I have a familiarity with the equipment because there's a studio in my house. I sometimes even operate the camera. However I became involved in video as a separate art form, but now people view it as something inextricably joined with record promotion. In 1983 music video has taken a step backwards," Todd Rundgren concludes.

For Todd Rundgren, the current state of affairs in music video is certainly not a utopia, but that's not preventing him from taking an innovative approach with this new form of entertainment. □

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SENNHEISER — THE PERFORMERS



The 1984 European AES convention was held in Paris at the Palais des Congres which proved a quite satisfactory venue for most purposes. The papers were presented in the Salle Bleue at one end of the complex. This was a superb conference hall with full projection facilities, good speech acoustics, fully variable lighting and most important for long sessions, very comfortable roomy seating.

There were 57 papers presented, of which approximately 42 are available as preprints. The papers were divided into eight sessions arranged by subject matter with topics being Loudspeakers; Microphones; Digital Processing; Studio Technology; Measurements and Instrumentation; Room Acoustics and Sound Reinforcement; Psychoacoustics and Electronic Music; and Digital Recording. As is our normal policy, we have picked a few of the more interesting and relevant papers to report on.

Loudspeakers

The first paper in this session came from M Ojala and P Huttunen of the Kone Corp and the Technical Research Centre of Finland. Continuing recent papers on the interface between amplifiers and loudspeakers, 'Input Current Requirements Of Loudspeakers' described the impedance measurements made at the terminals of several high quality commercial loudspeakers, their mathematical modelling of the results and the synthesis of an electrical circuit equivalent to the speakers. Computer simulation was used to find worst case excitations using non-sinusoidal and non-periodic audio signals. It was reported that currents of up to 10 times that of the rated nominal value of the speakers

AES 75TH CONVENTION SUMMARY OF PAPERS

Keith Spencer-Allen highlights a few of the many papers presented at the Paris convention

were sometimes drawn. (no preprint available)

Messrs Kaizere, Op De Beek and De Wit of the Philips Research Laboratories detailed the function of a computer program for the optimum design of crossover filters in a multiway speaker system. It is able to allow for power handling variables of the individual drivers, the minimum impedance of the overall system while minimising the desired and actual responses of the speaker systems. Part of the function of the program requires measured details of the SPL, sound power level and input impedance of individual drivers. (preprint 2057)

S Kinoshita and S Terauchi of the Pioneer Corporation detailed the development of a Beryllium ribbon tweeter. Using 'new' materials such as Beryllium together with new techniques allowing the possibility of using the material in ribbon form, it has been possible to produce an HF unit with a frequency response of 5 kHz to 120 kHz, high efficiency and high power handling capacity. The additional improvements in transient response obtained makes the design of practical interest for digital monitoring. The ribbon type loudspeaker has been considered as potentially one of the best HF type components due to its

simple mechanism with the speaker producing a sound directly from the current applied to the conducting ribbon set in a magnetic field. Lack of suitable materials prevented acceptable power handling and efficiency. This HF unit was to be found in the company's products on demonstration within the exhibits area. (preprint 2098)

There then followed three papers detailing design, or aspects of design related to enclosures. A Carrion-Isbert presented a paper that gave the results of an analysis of enclosures with filling material. This then led to a program that allows the designer to calculate enclosure volume and amount of filling material to obtain a desired response with a specified driver (preprint 2058). J A M Catrysse and F Vermote of the Katholieke Industriële Hogeschool presented a method for computer aided design of a bass reflex system (preprint 2059) while J Kergomard of Laboratoire D'Acoustique Faculte De Sciences presented a study on the response of a vented-box speaker system at very low frequencies. (preprint 2060)

Microphones

There were three papers presented in this session that were of particular interest. D

S Jagger from Calrec outlined the recent developments and improvements in *Soundfield* microphone technology. A lot of the paper was based around the *Mark IV* model and its modifications over previous models. (preprint 2064 although availability remains unconfirmed)

B Beckmann from Sennheiser Electronic outlined the principles behind the design of a directional boundary layer type microphone. A 'standard' omnidirectional boundary layer mic would have the capsule mounted flush with or nearly flush but opposed to the hard boundary surface. The proposal is to mount a pressure gradient capsule so that its axis is parallel to the boundary. It is then apparently possible to create a number of directional type response patterns. (preprint 2065)

The last paper of the session was presented by Andre Walton of C-Tape Developments in which he outlined the principles and main applications of the *C-ducer* system. Particularly interesting were the new applications that have been found for the system in non-recorded audio. (preprint not available)

Digital processing

T Takegahara and K Nakabayashi from the technical research laboratories of the Japanese Broadcasting Corporation, NHK, gave a paper that described practical and experimental work to determine the influence of the quantisation number and sampling frequency on the sound quality in particularly signal-to-noise and bandwidth. The paper also discussed ways of determining the optimum figures for these digital parameters in a digital transmission system of a set transmission rate. (preprint 2066)

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Enertec created a great deal of interest within the exhibition halls with their prototype digital console. It was therefore logical that there would be papers from Enertec staff such as P Faleur who detailed the operation of two programs for micro computers that were developed for the design of high performance filters for anti-aliasing and smoothing functions in A/D and D/A conversion. The first program performs the synthesis operation while the second permits analysis and simulation of the networks obtained with allowance for the practical common sources of error. (preprint 2068)

In a paper entitled 'A Digital Audio System For Broadcast and Pre-recorded Media', C Todd and K Grundy of Dolby Laboratories described the background, advantages and practical applications of Adaptive Delta Modulation, a system that they have developed for broadcasting applications. The paper also included basic constructions for a professional encoder and a domestic decoder. (preprint 2071)

Studio technology

Under this heading, there was a wide range of subjects presented. A short paper by M Williams, a French consultant, described a practical approach to determining the sound characteristics of a spaced pair of cardioid microphones. Methods of predicting the results achieved in terms of stereo image were described for various spacing and mic angle values. (preprint 2072)

H Kuhm of Sennheiser presented a paper describing the current state of the art in radio microphones (preprint 2073) while B Hertz of Danmarks Radio/TV delivered a paper covering what he referred to as electro magnetic compatibility or the problems of RF sensitivity within audio equipment including the earthing and interconnection philosophies current. (no preprint available)

K Farrar of Calrec described the functions and capabilities of a digitally controlled assignable mixing console for broadcast and recording studios. The basic control concepts would be similar for digital or analogue audio but Calrec at present feel that digital control of analogue signal is a more viable route. The console system allows for up to 128 input channels and a variety of output permutations. Channel facilities may be controlled on

AES PAPERS

one or two independent assignable control panels. The physical console itself is fairly compact with card frame racks remotely situated. Complete, partial desk settings may be copied, compared, stored and recalled. There is full memory back-up of console settings without mains power. There is a full discussion of the types of controls possible for use with such a system including shaft encoders, etc. This is a very interesting paper with many good ideas. (preprint 2074)

The design of the lathe for cutting Direct Metal Masters was the subject presented by O Kern and Dr W Busse of Neumann. Such a lathe has to have a substantially more powerful design to cope with the requirements of cutting copper than lacquer and the danger of instability and resonances within the cutting head and system. (no preprint available)

Final paper of the session was from H Henriksen and D Popescu of Danmarks Radio/TV and covered the design of their new studios which have fully variable acoustics designed for multitrack recording. Features include sliding mirrored walls, remotely controlled ceiling louvres in front of traps, and the future installation of an ambiophonic system in the rhythm studio. This studio is generating a lot of interest and the paper contains some worthwhile design points. (preprint 2075)

Measurements and instrumentation

The most relevant paper in this session was presented by A Perman of Bruel & Kjaer and covered 'simple' ways of tape machine calibration including phase measurements. This is a simple method using 2-channel FFT analysis that allows the effective removal of wow and flutter from phase measurements. (unfortunately no preprint available)

Room acoustics and sound reinforcement

A pair of papers were presented by E J Volker (with W Teuber on the first) of the Institut fuer Akustik und Bauphysik, Germany, concerning monitoring and the design of control rooms. At recent AES conventions, they

presented papers detailing experiences gained from the opportunity to build four different types of control room within the same physical space. Listening tests were conducted on different types of music and the results were fully tabulated.

In the paper 'Proposal for a Standard Control Room', they draw on their experiences and present outlines to suggest standards for control room design with regard to acoustics and the monitoring loudspeakers. The aim appears to be to achieve a consistency in results from different monitoring environments without having to familiarise oneself with the room. They therefore make fairly broad recommendations plus the unusual suggestion that maybe control rooms should have RTs of 0.2 s and the precise reverberation time be controlled electronically by introducing artificial reflections that can be more precisely controlled, using 40 speakers with different delays that produce levels of 3 to 6 dBA under the level of the main monitors. (preprint 2081)

The second paper 'Monitoring Speakers for Control Rooms', summarises the experiences gained from the use of three different monitors within the different monitoring environments that they built. Findings presented include equalisation practice and positioning. (preprint 2080)

Digital recording

The first paper in this session came from Reiner Oppelland, a German Tonmeister and was titled 'How Do You Modulate A Digital Recording?' He started by assuming that we were talking about 16-bit PCM systems and although this system has a maximum calculated dynamic range of 98 dB we are probably talking about an effective dynamic range for the recording engineer of 50 dB plus an unknown figure of dB for the system headroom. This latter figure is usually decided by the equipment manufacturer although there has been a degree of compatibility now with a general acceptance of 10 dB above the standard studio level of 6 dBm. We are however still left with the problems allowing accurate measurement of the signal level over such a large dynamic range. The author covered some other

measurement systems and then described a modified bargraph PPM suitable for PCM use. (preprint 2090)

Werner A Deutsch and Anton Noll of the Austrian Academy of Sciences gave a paper summarising their work so far on the restoration of historic recordings using digital signal processing. The material they have been working on was largely acoustic recordings made in the early 1900s. They found that with these very early recordings the problems are different from recordings made commercially in a studio in the 1920s. There are three problem areas—impulse noises such as scratches and clicks; frequency domain problems caused by resonances, etc; and the continuous broadband noise. It was found that for impulse noises, there was no easy and satisfactory way of removing these noises in real time and the best method was for the operator to identify them and replace the distorted frame with another as autocorrection was not sonically that pleasant. By careful study of the reproduced audio spectrum over a period of time and comparing the recording to known characteristics of the recorded subject it is possible to identify unwanted system resonances. The problem of background noise has been tackled with two noise reduction systems that are suitable for different types of recordings and decided by the signal to noise ratio existing. The work is far from complete and the paper presents only a brief summary of the present position. (preprint 2091)

With the first showing of the Studer DASH-format digital 2-track at the Convention, it was natural to expect a paper from Dr Roger Lagadec, H P Girsberger and C Brandes of Studer on the design of the machine, its implementation of the DASH format and other practical aspects. (preprint 2095)

Dr Roger Lagadec also presented another paper entitled 'New Concepts in Digital Audio Editing' in which an approach to digital editing was suggested that in some version could combine the ease of tape splicing with the freedom and flexibility of electronic editing. Referred to as 'Jump Editing' and uses the labels format suggested in a paper by Lagadec and McNally at the previous AES convention. The full implications of this system are outside of the scope of this report and I suggest referral to preprint 2096. □

The proof is in the listening.

The surprise is in the price.

The New Orban Model 412A Compressor/Limiter

The new 412A Compressor/Limiter is Orban's entry into the general-purpose level control sweepstakes—it's designed to make you, the audio professional, the winner! Available in mono (412A) and stereo (414A) versions, it's loaded with features that most other low-cost units don't offer—but the real proof is in the *listening*. We invite you to compare its natural, transparent sound to any other compressor/limiter you might know or use. After you do, we feel confident you'll make it *your* essential AGC. Contact your Orban dealer for a demonstration, and find out how affordable Orban-quality processing can be!

Performance Highlights

- Streamlined, straightforward front panel offers the most-demanded user controls, including ATTACK TIME, RELEASE TIME, RATIO, and THRESHOLD. These wide range controls permit extremely natural sound or special effects.
- Exclusive Orban feedback control circuitry (adapted from our popular 424A Gated Compressor/Limiter/De-Esser) achieves remarkably transparent sound.
- User controls interact intelligently to simplify and speed setup, and to prevent errors.
- Peak limiting and compressor functions are crosscoupled to eliminate potential pumping and modulation effects.
- THRESHOLD control with 20dB range allows user to determine the level at which gain reduction first occurs, without changing below-threshold gain. Ideal for sound reinforcement applications.
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- Illuminated, true peak-reading GAIN REDUCTION meter is more accurate and readable than LED displays.
- GAIN REDUCTION OVERLOAD lamp warns of control circuit overload due to a demand for G/R which exceeds the range of the VCA.
- Hard-wired system bypass switch for fail-safe protection.
- Side-chain externally accessible for special effects such as frequency-selective limiting.
- Active-balanced, floating input and output interfaces easily to any system, balanced or unbalanced.
- Proprietary Class-A Orban VCA features very low distortion and noise.
- Stereo 414A has STEREO COUPLING switch to permit either stereo or dual-mono operation; an unlimited number of units can be wire-coupled to track $\pm 0.5\text{dB}$.
- All-metal chassis with RFI suppression on input, output, and AC leads.



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CASE HISTORY

BACKGROUND: Jacob's is a residential studio in a beautiful Surrey country house offering both analogue and digital multitrack recording.

PROBLEM: How to upgrade the analogue facility to offer the highest possible quality product alongside the digital product?

SOLUTION: The Otari MTR series of recorders was the natural choice for owner Andy Fernbach. ITA supplied both MTR90-II 24-track and MTR1 2-2 master recorders.

RESULT: Andy is more than satisfied that his decision to go Otari – from ITA – was the right one. Both machines have amply demonstrated that their brilliant sonic performance, the simplicity and elegance of operation, and their total reliability justify Otari's growing reputation with professionals.

The Otari MTR90-II is being recognised by more and more studio owners, engineers and producers as THE multitrack.

ITA have been associated with Otari for nearly 12 years and with the MTR90 since its inception. Our knowledge of these superb machines is second-to-none.

All the machines in the MTR range are available to serious users for evaluation in their own studios. If you haven't had hands-on experience of them yet, call Mick Boggis now and arrange a demonstration.

ITA UPDATE

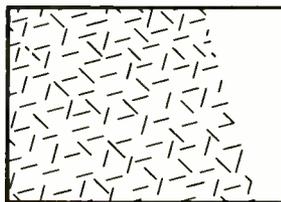
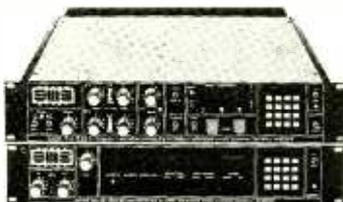
ALL-BRITISH DIGITALS

The AMS range of digital signal processors needs no introduction. These units have rightly earned the reputation of being easily the most cost-effective products of their type, and they're BRITISH! (Comparable units now typically cost double).

The RMX16 digital reverberation system comes with 9 standard user programs which may be modified in terms of pre-delay, decay time and h.f. and l.f. response to simulate virtually any imaginable hall, plate or room. There are also special programs which produce reverberation characteristics not found naturally, but which can be used to startling effect.

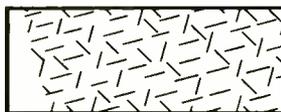
The DMX15-80S dual delay/pitch/changer offers two totally independent channels of delay and/or pitch/shifting (up to 2 octaves). The new de-glitch card makes the pitch-shift just about the smoothest yet. Unlike cheaper DDLs, the AMS gives you 90dB dynamic range and 18kHz bandwidth at ANY delay time. The unique Loop Editing facility opens up whole new areas of creativity; real drum sounds can be triggered by electronic drums, etc.

Full information on all the AMS range available NOW from Mick Boggis.



MXR 01 DIGITAL REVERB

The 01 is MXR's first venture into reverb units, and the unit is worth waiting for. The 01 is fully programmable in terms of decay time, pre-delay and damping. The 9 memories come "factory-loaded" with parameters to simulate various rooms, plates, etc, which remain in memory even after user-modification. 3 of the memories have a "dynamic" reverberation feature where the decay time is varied according to the programme content, minimising the "clutter" effect a fixed decay time can produce.



360

SYSTEMS

This state-of-the-art digital keyboard is NOT a synthesiser. It does not attempt the synthesis of real-instrument sounds, instead, the full-pitch range of these sounds are digitally recorded in ROM.

The 360 Systems combines the utmost simplicity in operation with the most realistic re-creation yet of real-instrument sounds. This extraordinary realism is achieved by multiple sampling techniques which make allowance for the variation in harmonic content with pitch that is a natural consequence of real-instrument construction.

A full library of ROMs is available. This is an instrument for the serious working musician, writer and arranger. Please ask or call for a demonstration, the sound will astonish you. (So will the price).

Available NOW from ITA.



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IN HAMMERSMITH**

BUDGET 16-TRACK

The Fostex B-16 is simply a unique product – no other 16-track gets close to it for price. Without doubt, the best-engineered product yet from Fostex, the B-16 demonstrates that 16 tracks on 1/2" tape really is feasible!

We have it on permanent demonstration with the Soundtracs 16/8/2 mixer – an excellent combination – but will be pleased to discuss alternatives such as the AHB System 8 or the TAC 16/8/2. All these fine mixers are readily available from ITA, and we can offer an attractive package deal on whichever system you prefer.

Only ITA can give you such a choice; we are the budget system experts. Call Alan Entwistle for more details.

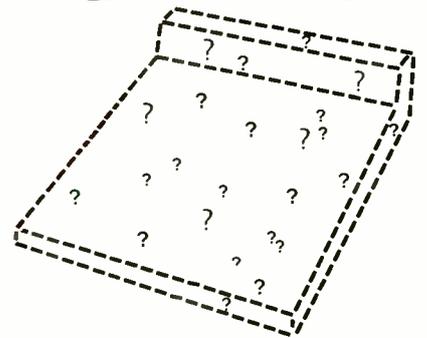
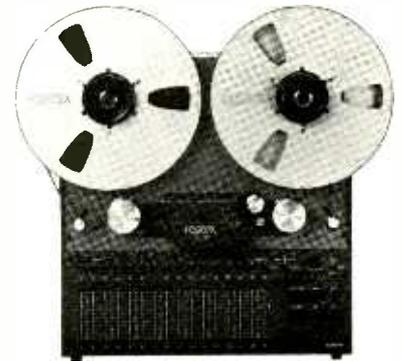
AMEK/OTARI

In particular, the marriage of the Otari MTR90-II multitrack recorder to the Amek Angela multitrack console.

The Angela console is an excellently engineered in-line 24-track console offering a wealth of facilities and tremendous flexibility in operation. Full electronic balancing, phantom power, an audibly superior eq section, 6 auxiliaries, dedicated subgroups and LED bargraphs as standard are just some of the reasons why the Angela has become one of the most popular mid-range consoles available.

The Angela – in fact, the full range of Amek/TAC consoles – are now available from ITA. We feel that the Amek/Otari combination is easily the most cost-effective solution – at around £40,000 for a full 24-track system – to be found today for those upgrading, or starting a new studio.

Full details and prices of any of the consoles in the Amek or TAC ranges now available from Mick Boggis.



CASSETTE DUPLICATION

This new modular system from Otari gives a significant improvement in the quality that can be achieved with in-cassette duplication.

The new DP4050-OM reel-to-reel master is a separate unit which can accept 3 3/4" or 7 1/2" ips masters, and you can add to it up to 28 cassette slaves. A DP4050-C1 cassette master unit can easily be interfaced into the system.

As it's Otari, the same consistent quality will be maintained long after other copiers have packed up, and servicing requirements are minimal.



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BUSINESS BUSINESS

Barry Fox investigates the facts behind the industry news

Cinema surround sound

Although the story of how the cinema got surround sound is recent history, it is already very confusing, and in danger of being re-written. In the beginning, 10 years ago, Dolby Labs suggested the use of a modified A encoding format to clean up the sound of optical film tracks. Traditionally these have been heavily equalised, with HF boost, to compensate for the HF roll-off that is used in cinemas. The roll-off, or so called Academy Curve, was adopted to curb the horrid sound of hiss that you get from a worn or dirty optical soundtrack. The equalisation often causes overload distortion. By cutting hiss by 10 dB, Dolby freed the cinema industry of the Academy Curve, opened up the top end, and cut back on distortion.

Around 1976, Dolby took the idea a stage further, and split the mono track into two to give left and right stereo. In a cinema you need the dialogue firm at centre front, so a derived centre sum signal was used with gain-riding. This lifted the level of dialogue over the music spread.

The idea of surround sound in the cinema is of course old, dating back to *Fantasia* in the '40s and then multitrack wide screen films. The idea of encoded surround sound from a stereo track, was born with the Barbra Streisand film *A Star is Born*. At that time Dolby used domestic QS decoders, made by Sansui, with an Eventide delay for the rear channels. This delay helps keep the dialogue at centre front. At this time there was a licence agreement with Sansui to use the QS matrix. The QS system had previously been used by others, for the film *Tommy*, which had matrix stereo surround and discrete centre front. Of course this hybrid format could only be achieved with a magnetic track and it never caught on. Dolby, working with optical stereo, progressed from domestic Sansui decoders to the professional Dolby SA series. These had QS decoding with a delay line for the rear. The biggies, that made a name for Dolby stereo, were *Close Encounters* and *Star Wars*. They all used QS decoding with front centre gain-riding and a bucket brigade delay line for the rear.

Around 1977 or 1978 Dolby's customers wanted more separation. Ben Bauer of CBS suggested using the SQ system with Tate chips. These use a sophisticated gain-riding technique to enhance directional decoding. Dolby Labs rejected SQ, because of the

perennial problem of front-back separation. But they were interested in the directional enhancement offered by the Tate chips. So Dolby engineer Craig Todd, designed what is now the standard Dolby stereo surround matrix. It's diamond shaped, with right, centre front and left, plus mono surround at the rear. It's a modification of the well known regular matrix from which QS was derived. All Dolby stereo films and systems are now based on Craig Todd's matrix (called MP for motion picture) with Tate chips to enhance directional decoding and delays for the rear channel sound. Other refinements like bass enhancement are bolt-on ideas. In a large cinema with a large screen, extra stacks of speakers at inner left and inner right will sometimes handle only low frequencies to give bass extension.

Laservision v CD

It's no secret that the *Laservision* videodisc system is bombing on the domestic market. Originally it offered longer life, better sound quality and better picture quality than videotape. On the debit side you need a disc player as well as a video tape recorder, and you have to turn the disc over halfway through a full length feature film. Long life only matters when a programme is played over and over again, eg when it's hired out to a string of different customers. Disc rental hasn't taken off in Britain because shops aren't prepared to make the necessary capital investment when there are so few potential customers. In the jargon, the 'player park' is too small. Modern video tape recorders produce pictures, which at least on the small screen, compare very favourably with *Laservision*. Often the limiting factor is the original source tape or film, not the video carrier. That leaves sound.

Neither Philips nor Pioneer, the two firms selling *Laservision* in Britain, have ever really made capital out of the sound quality available from the FM stereo soundtracks on a *Laservision* videodisc. They have talked about sound quality, but done little or nothing to demonstrate it. They have also done nothing to take advantage of the fact that *Laservision* discs often have surround sound buried in the stereo soundtrack. Almost every major new film these days is in Dolby stereo, with encoded surround sound. The encoded surround information is carried through on to the videodisc or

video tape issue, whether anyone wants it or not. So it's there for the decoding. Even an old pre-Dolby stereo film or a Dolby stereo film without surround (like *Apocalypse Now*) will produce good surround sound when replayed through a synthesiser that spreads the stereo image in a horseshoe. In America, Pioneer is selling a sound processor that does just this trick. In Britain there is already one available: the Minim Ambisonics domestic decoder with 'super stereo'. On surround sound video discs it works a treat, spreading music and effects wide but leaving dialogue hard and firm at centre front of the screen, where it belongs. But try talking to the Philips and Pioneer management about surround sound. More accurately, don't bother.

All the signs are that it is now too late for *Laservision*. Both the domestic video formats, VHS and Beta, have developed a system for encoding FM stereo sound in the video waveform. These are the so-called VHS and Beta hi-fi systems now going on sale around the world (including the UK). Sound quality is as good as FM radio or *Laservision* FM, and quite close to the quality of Compact Disc. The anti-digital brigade might even say it's better.

Without doubt, *Laservision* has a big future for industrial use, for instance inter active programmes and data storage, often with the two uses combined. On the domestic front, which is what is most likely to interest studio engineers, the real hope comes from Pioneer's development of a solid state laser disc player than can be used for both Compact Discs and videodiscs. This takes us full circle, back to the late '70s when Philips decided that *Laservision* videodisc and Compact Disc digital audio disc should be of quite different standard, and not aimed at the same player park.

Until now all *Laservision* players sold have used gas lasers. Why you may ask can Compact Disc digital audio disc players use solid state lasers which are obviously much cheaper, smaller and more convenient? The answer is in spot focusing. The picture and sound signal on a *Laservision* videodisc is analogue. If the laser spot is not finely focused, then it will read at least two turns of the spiral track at the same time. This will produce audible and visible crosstalk. For Compact Disc, focusing is less critical. Digital cross talk is ignored unless the spurious bits overwhelm the intended bit stream. Tighter focus needs a shorter wavelength. So far it has been difficult to produce a reliable solid

BUSINESS BUSINESS



state laser with a short wavelength at a reasonable price. Pioneer now seems to have cracked this problem.

Obviously it's much easier to track all disc sizes, from Compact Disc to *Laservision*, if the tracking head carries a solid state laser, rather than a complicated mirror arrangement to focus a gas laser beam. So watch out for a combined Compact Disc and videodisc player before long. Watch out after that for a *Laservision* disc that has a digital soundtrack, in addition to the conventional FM soundtrack. Already there are *Laservision* discs which carry a sequence of still pictures, each with around 30 s worth of digital audio. This plays out of a buffer as the still is displayed. The Pioneer idea is for real time digital audio alongside real-time video, coming off an otherwise standard *Laservision* disc. It's a logical extension of the single player idea previously rejected by Philips.

Metric v imperial

Why, you may ask, did German companies AEG Telefunken and BASF choose a tape speed of 30 in/s, and a tape width of ¼ in, when they first developed their system half a century ago? Why should German engineers work in imperial inches rather than metric centimetres?

Continentalers have in fact used imperial measurement for many years. Old German plumbing used to be with ½ in pipe. Plasterboard was sold on the Continent in 6 ft sheets. Sometimes a metric size, as now imposed on reluctant British builders, actually started life as an imperial measurement. But that isn't the reason why Telefunken and BASF chose 30 in and ¼ in.

The original tape speed, 50 years ago, was 1 m/s. It was reduced to 78.5 cm/s in 1936. This was the result of using a capstan diameter of 10 mm and a synchronous motor running on 50 Hz mains at 1500 RPM. Use πd and round off the decimal result. After the war the Americans interpreted this as 30 in/s 'plus a little bit'.

The original tape width was 6.5 mm, which lasted until the end of the war. Then the Americans interpreted it as ¼ in, 'plus a little bit'. From then on, measurement talk changed from metric to imperial. The tape recording industry power base switched from Europe, to America and Britain. In Japan the American occupation ensured the widespread use of imperial

measurements. Only later did metric countries like Germany get back into the recording business. They then started to quote the metric equivalent of what had become the imperial standard. In Britain the Government decided we should go metric. Some British magazines have a rigid policy that all measurements have to be quoted in metric. But *Studio Sound* still prefers to use imperial measurements because in real life the industry talks in inches, not centimetres.

So all down the line there has been rounding up and down as measurements are converted backwards and forwards. The errors don't matter in print; 76 cm is a nice round equivalent of 30 in/s. But the difference, per second, is highly significant. Do you know the exact speed at which all your tape machines are running? Are they all running at exactly the same speed? Try checking one day. By the way, if you work from the original design, the correct tape speed for a '30 in/s' machine comes out as 78.53981634 cm/s, and '¼ in' tape comes out as exactly 6.5 mm wide. But the original design is not the correct starting point.

At the recent IERE conference on magnetic recording in Southampton, I took the opportunity of talking with some of the tape firms visiting from all round the world. Ampex, the firm which made the first audio tape recorder in the USA after the war, feel confident that the speed adopted was 30 in/s. The metric speeds now quoted by Ampex are a translation from that original imperial standard. Continental firm, Schlumberger, quotes tape speeds only in metric, but says these are derived from imperial Ampex origins. Inevitably in some translations to metric, there will be rounding up or down. So the golden rule is this. If you are calculating anything from a tape speed, start from in/s even if the machine speed is quoted in centimetres. You will then only come unstuck if the designer has worked from a metric translation of the original post-war imperial standard (or the original pre-war standard, which is highly unlikely).

After the Southampton conference I rushed back to London, for what could well be the last ever screening of the original BBC TV version of *1984*. This was televised twice in 1954 and caused an uproar. In those days there was no videotape. The two broadcasts were truly live but one of them was filmed, by the then-traditional system of pointing a film camera at a high quality TV screen. The film recording

still exists and although it cannot be televised, it can be shown on special occasions for instance at the National Film Theatre. But not any more. An American gentleman whose name I prefer to forget, bought the rights from George Orwell's widow four days before she died. He is now making a modern film version and has the right and intention to stop all future screenings of the BBC original. Such is life in the film business!

What has all this got to do with metric and imperial measurements? Well, in the wonderful BBC version of *1984* the most prophetic of all sequences has actor Wilfred Brambell going into a bar and asking for a pint of beer. "Can't have it," says the barman, "it's a litre or half litre or nothing."

That's one of the few areas in which the Great British Public has held out against metrication. You can still buy a pint of beer in Britain. The other area is in tape. Nothing can stop studio engineers talking in 'in/s'. And as the historical record shows, they are in fact right to do so.

Disappearing biography

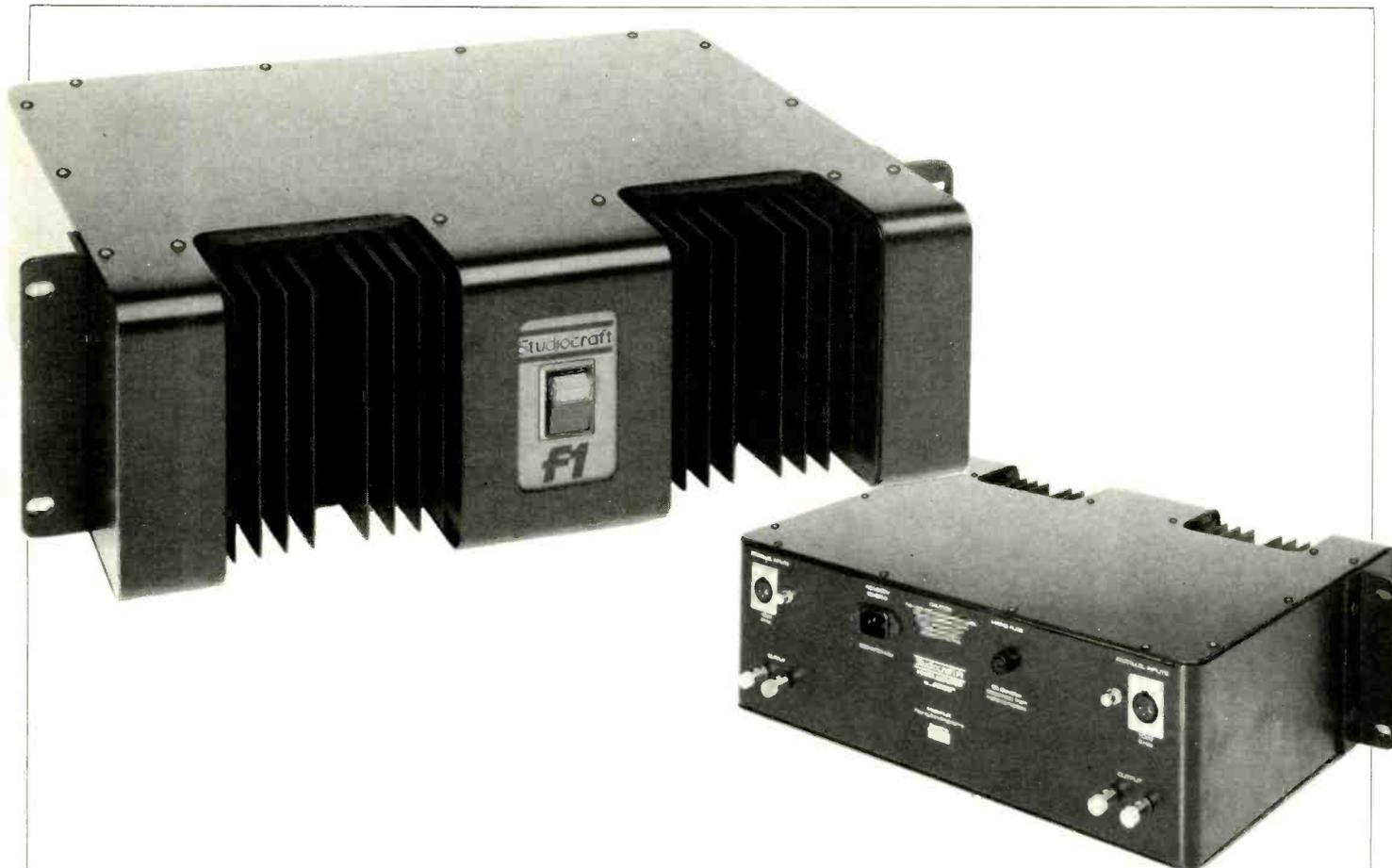
Remember Alan Blumlein, who invented stereo? There is still no biography on the man. Francis Paul Thomson has been writing one for 10 years now, we are told. In *Who's Who* for 1982 Thomson's entry lists books on banking and tapestry along with *A. D. Blumlein: Engineer Extraordinary*. Publication date is given as 1977 with Simon Blumlein, the inventor's son, bracketed as co-author. But all efforts at tracing a copy of this book, including asking Mr Thomson himself, have failed. So I raised it with *Who's Who*.

The next year in 1983, Mr Thomson's entry listed *Engineer Extraordinary: A Biography of Alan Dower Blumlein* as published in 1983, and with no reference to Simon Blumlein. But I could still find no trace of the book. So I queried it again with *Who's Who*.

The latest edition, *Who's Who* 1984, still carries an entry from Francis Paul Thomson. As in previous years there is reference to books published as far back as 1964. But this year there is a difference. There is no reference to any book on Alan Blumlein.

REVIEW REVIEW

Hugh Ford reviews a medium output power amplifier



STUDIOCRAFT F1

The Studiocraft *F1* is the smaller of two Bose power amplifiers manufactured in the UK for both hi-fi and professional use, the unit being provided with rack mounting 'ears' 3U in height. The form of mechanical construction is unusual with the sides and back being formed from a steel 'U' section. The two amplifier modules are secured to heatsinks which are bolted across the 'U' section to form the front of the amplifier which then consists of two finned alloy heatsinks with the mains circuit breaker at the centre.

The latter is mounted on a rather complicated structure formed from spot welded steel sections which include a screened box for the power supplies. The top and bottom covers plus part of the front panel take the form of a single steel 'U' section which is secured to the main frame by 28 Allen screws.

Other than the illuminated power on/off switch no controls are provided. To the rear the power input is via an

IEC connector with the 20 mm power fuse being properly identified but peculiarly placed in the neutral instead of the line feed. Audio inputs are paralleled at XLR sockets and phono sockets.

The uninsulated outputs at terminals/sockets on the standard 3/4 in

spacing have non-captive screw terminals which could easily be lost. Being uninsulated it would be easy to short the output terminals accidentally.

Within the review unit there was no sleeving on the parts connected to the mains supply, but the manufacturer intends to sleeve the power on/off switch and also modify the unsatisfactory mounting of the smoothing capacitors and some cable routing.

The single toroidal mains transformer and the smoothing capacitors are fully screened from the two amplifier modules at the front of the amplifier. Each of these consists of a single glass epoxy printed circuit board which supports all the amplifier components including the output devices which are bolted to the heatsinks.

No component identifications are provided with each module having an unidentified fuse which is so located that it is almost impossible to replace

MANUFACTURER'S SPECIFICATION

Input connections: one phono or XLR per channel.

Input impedance: 10 k Ω .

Input sensitivity: 1 V RMS for full output.

Output connections: binding posts with holes for 4 mm plugs.

Power output: (both channels driven) 120 W

20 Hz to 20 kHz at 0.01% THD at 8 Ω ; 200 W

20 Hz to 20 kHz at 0.02% THD at 4 Ω .

Power output: (bridged) 400 W into 8 Ω ; 600 W into 4 Ω .

Frequency response: +0, -3.0 dB 20 Hz to 70 kHz.

Hum and noise: better than 110 dB below full output.

Distortion: <0.01% 20 Hz to 20 kHz at 120 W.

Damping factor: >500.

Stability: unconditional.

Manufacturer: Bose (UK) Ltd, Trinity Trading Estate, Sittingbourne, Kent ME10 2PD, UK.

The Musical AMS



It's unusual that a piece of studio outboard equipment can be used as a creative musical tool. The Syco AMS package is now one such tool. It includes a four octave music keyboard which can be used to transpose anything stored in the "lock-in" memory up or down two octaves. Effectively this allows you to use the 15-80S package as a monophonic sampling keyboard with a bandwidth of 20-18khz and a maximum sample time of 30 seconds.

And our new cheaper memory prices make the package even more attractive. Of course when you're not using the 15-80S as a musical tool, you

can always use it for all those obvious effects like delay and stereo harmonising but we think you'll be just as interested by its new possibilities.

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REVIEW REVIEW

without removing the amp module.

Generally the amplifier is of sound mechanical construction, but in mobile use it would be desirable to protect the output terminals and the power switch. The standard of assembly and wiring is reasonable but certainly not to the highest standards.

Inputs and outputs

The impedance of both inputs was found to be 10 k Ω which was constant as no gain controls are fitted. The sensitivity of both inputs for an output of 120 W into 8 Ω was measured as 110/109 mV at 1 kHz—a very close gain match.

At the loudspeaker outputs the DC offset was steady at +5/+15 mV which is adequately low. Fig 1 shows the modulus of the output impedance versus frequency, the impedance being very low within the audio band.

Frequency response and noise

The overall frequency response of the two channels was closely matched, typically as shown in Fig 2 at 1 W

output into 8 Ω . The actual -1 dB points were at 8 Hz and 31 kHz falling to -3 dB at 3 Hz and 60 kHz. Clearly it is advisable to use a preamplifier with a highpass filter when using this power amplifier in order to offer loudspeaker protection.

Noise was measured in the outputs with the inputs open and short circuit with the good results given in Table 1 referred to 120 W into 8 Ω .

Whilst there was a slight increase in mains hum and its harmonics in the outputs when the inputs were shorted, this is not a particularly significant matter as shown by the unweighted noise figures.

Power output and distortion

For these measurements the amplifier was fed with a 240 V stabilised mains supply and loaded with 1% non-inductive resistors.

The power output at the onset of clipping of a 1 kHz continuous sine wave was identical for the two channels as shown in Table 2.

When driving into 2 Ω , a load which may be presented by some nominally

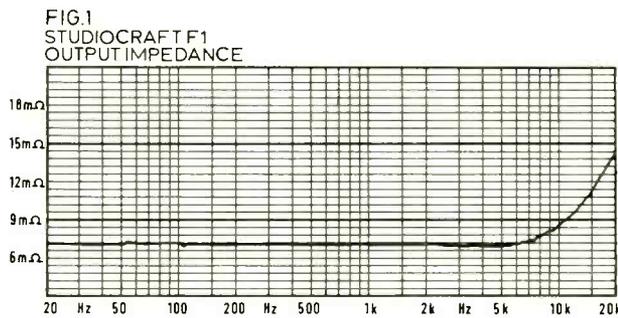
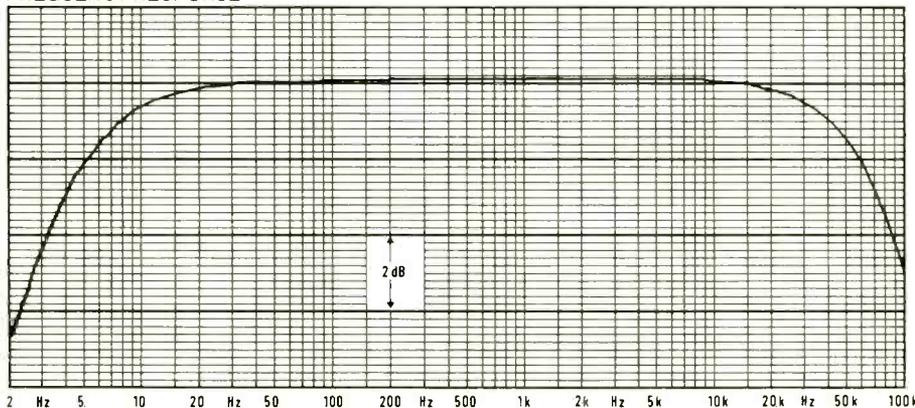


FIG 2
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FREQUENCY RESPONSE



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REVIEW REVIEW

FIG. 3
STUDIOCRAFT F1
HARMONIC DISTORTION 120W 8Ω

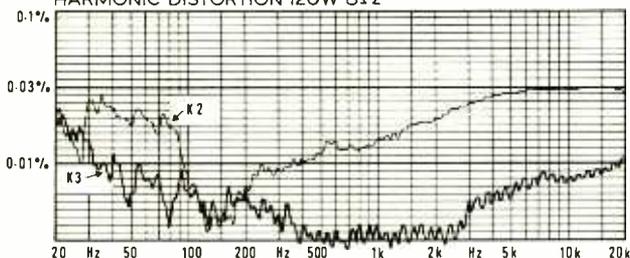


FIG. 4
STUDIOCRAFT F1
HARMONIC DISTORTION 200W 4Ω

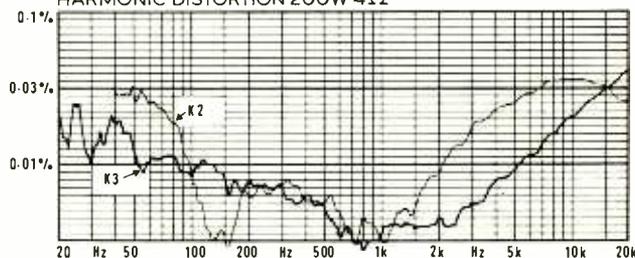


FIG. 5
STUDIOCRAFT F1
INTERMODULATION DISTORTION

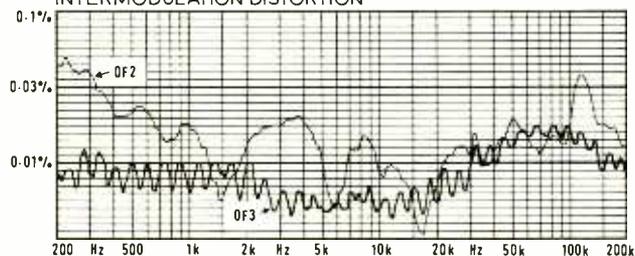
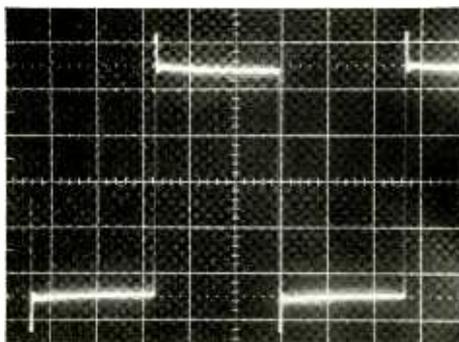


FIG. 6
STUDIOCRAFT F1
SQUAREWAVE PERFORMANCE



4 Ω loudspeakers, the amplifier could deliver a respectable 230/205 W for the two channels.

Whilst measuring SMPTE type intermodulation distortion the left amplifier channel blew its on-board fuse, with a replacement fuse also failing. Total harmonic measurements consequently had to be restricted to the right channel and are as shown in Table 3.

Whilst at low frequencies the distortion products were mainly of a harmonic nature, at high frequencies crossover products predominated in the form of spikes. Measurement of the individual second and third harmonics into 8 Ω and 4 Ω at the rated power output of 120 W and 200 W respectively produced Figs 3 and 4 with the performance of the two channels being similar. At lower power there was little change in distortion levels.

CCIF twin tone intermodulation distortion also remained constant with level, with similar results into 4 Ω or 8 Ω. Fig 5 is typical of this and exhibits an excellent performance close to the instrumentation residual. Measurement of intermodulation distortion to the SMPTE method showed a constant 0.03% into 8 Ω or 0.045% into 4 Ω irrespective of level below the rated power output. It was during these measurements that the left channel for some reason failed—

TABLE 1
Measurement method

	Left		Right	
	Open	Short	Open	Short
22 Hz to 22 kHz RMS	107 dB	113 dB	109 dB	111 dB
A-weighted RMS	112 dB	120 dB	114 dB	117 dB
CCIR-weighted RMS	106 dB	114 dB	107 dB	113 dB
CCIR-weighted quasi-peak	101 dB	108 dB	102 dB	107 dB

TABLE 2

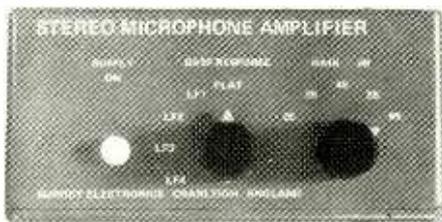
Both channels into 8 Ω
Single channels into 8 Ω
Both channels into 4 Ω
Single channels into 4 Ω

Power output
at clipping
155 W
170 W
220 W
260 W

TABLE 3
Total harmonic distortion and noise (right channel)

	100 Hz	1 kHz	10 kHz	20 kHz
200 W into 4 Ω	0.0035%	0.038%	0.045%	0.089%
20 W into 4 Ω	<0.005%	0.0083%	0.07%	0.012%
120 W into 8 Ω	0.008%	0.011%	0.027%	0.04%
12 W into 8 Ω	0.008%	0.012%	0.029%	0.04%

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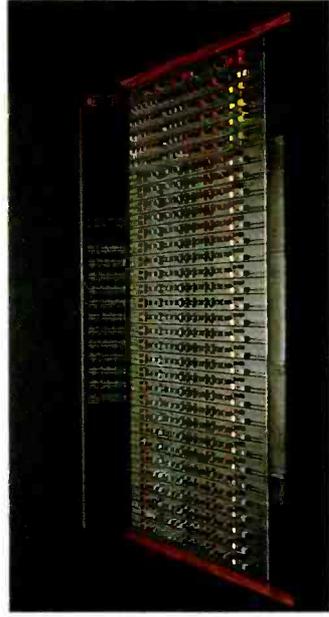
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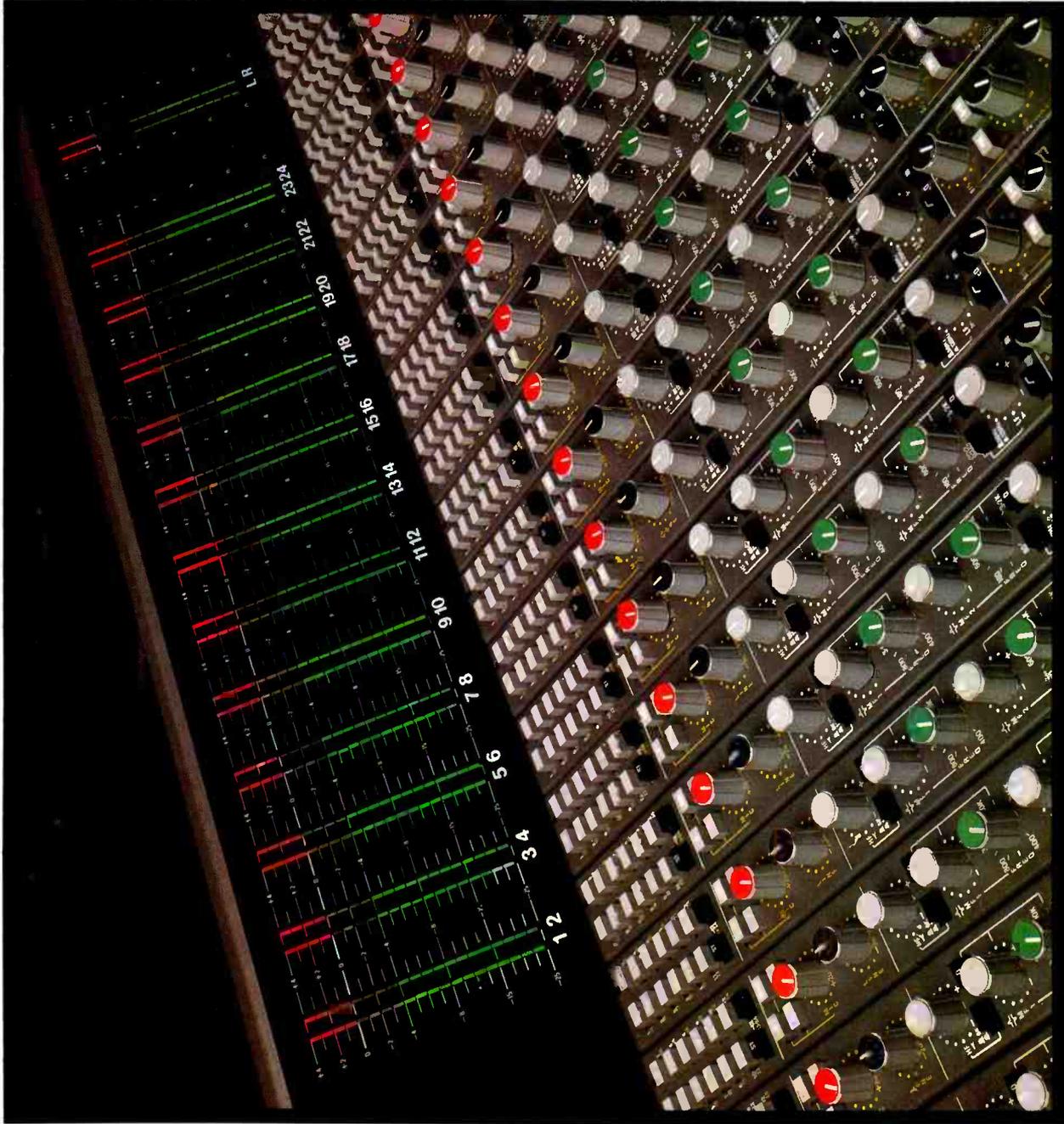
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REVIEW REVIEW

probably due to the failure of an output device.

Working into a resistive load the squarewave performance was free from distortion at 1 kHz with the results working in to 8 Ω in parallel with 2 μF being shown in Fig 6 showing slight overshoot without ringing.

Other matters

The rise and fall times of the amplifier were both 6 μs with the maximum slew rate being 40 V/ μs .

As shown in Fig 7 the phase shift within the audio band was minimal and at no time did the amplifier show signs of instability. Recovery from symmetrical or asymmetrical overload was without problems.

Fig 8 shows the crosstalk between channels to be minimal. Power consumption did not rise significantly when driving high levels at high frequencies with the amplifier running fairly hot when working hard.

Summary

This amplifier offers a generally good performance with a sensible power output for monitoring and the keen hi-fi enthusiast.

Bearing in mind that this review unit is not the production version, improvements can be made in a number of constructional features. The mechanical concept is however good whilst providing excellent shielding of the power supply components.

It was unfortunate that one channel failed during evaluation and I hope that this is a one-off event. \square

FIG.7
STUDIOCRAFT F1
PHASE SHIFT

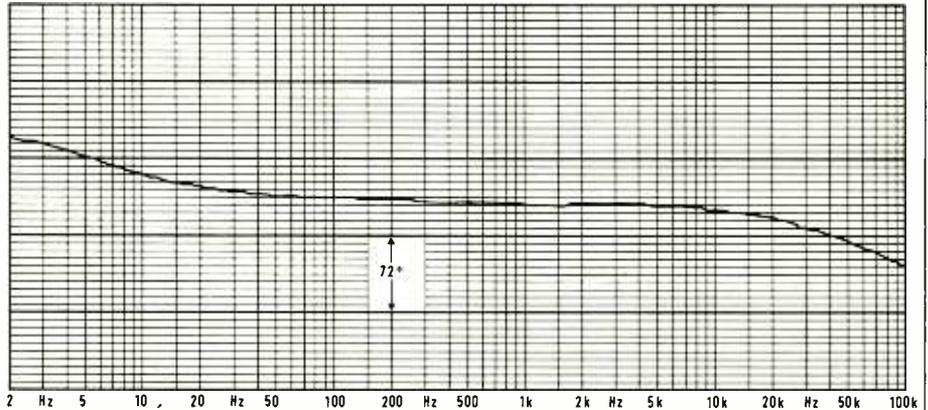
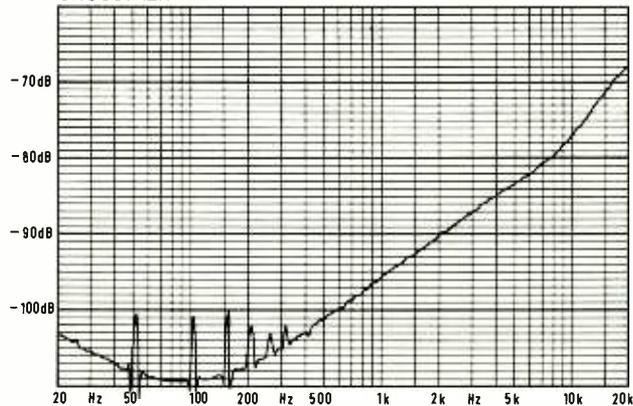


FIG.8
STUDIOCRAFT F1
CROSSTALK



When a manufacturer states that he reserves the right to change specifications, etc, without notice, it can mean a number of things. In our case it reflects a policy of continuing improvement and refinement and the *F.1* is a good example of this.

Some of the points raised by your review are remediable and indeed have already been remedied. From field experience we have noted other details and changed or added to them. There remain two weaknesses with the *F.1* design which we can do little about in the short term. The first is access to the interior—there are too many screws to undo. The second is access to the output fuses, which is time consuming. The best answer in both cases is for us to ensure that neither procedure is necessary by building in the highest reliability. This makes the failure of one channel during not-very-stressful testing rather embarrassing. The

Manufacturer's comment

guilty component, a 5 pence polyester capacitor, has been respecified and the rest of the stock taken out and shot at dawn. Our experience with the 100-plus units now in service confirms that we have arrived at a satisfactory formula. What we have changed since November when we built Hugh Ford's unit is as follows:

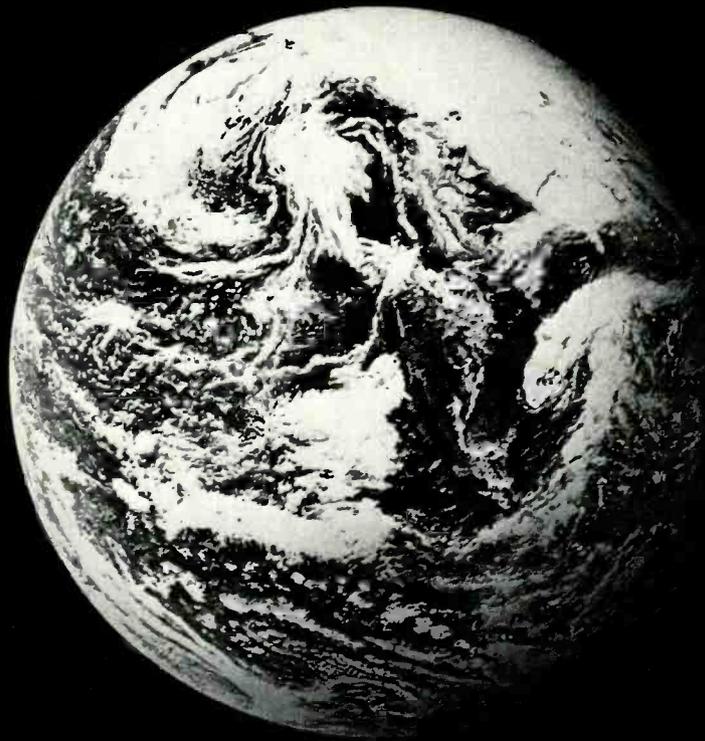
The transformer: we have found a new one that is not so sensitive to harmonics in the mains supply, does not saturate its primary windings and so does not hum. We have screened and tie-wrapped all the high level connections and changed the earthing arrangements. The cable routings have been revised and secured with extra grommets. The smoothing capacitors are rigidly mounted. The Zobel network has been redesigned to give better

LF performance. The speaker binding posts are protected by U-bars.

If it reads like a new amplifier, it's not, since the circuit design and concept are unchanged. We believe we started with an original design which gives outstanding audio quality and have adapted and improved it so that it will do this with extra reliability and user convenience. If we find another improvement tomorrow it will go in at once. If any of your readers has bought an *F.1* we will bring it up to current spec free of charge. Readers buying one in the future can also be sure that we would do the same for them where indicated. We set out to provide the best amplifier of its type in the *F.1* and we are determined that it shall be just that.

I am grateful for the opportunity to make these comments, and do thank Hugh Ford for his efforts and for the constructive criticism. Both are appreciated. \square

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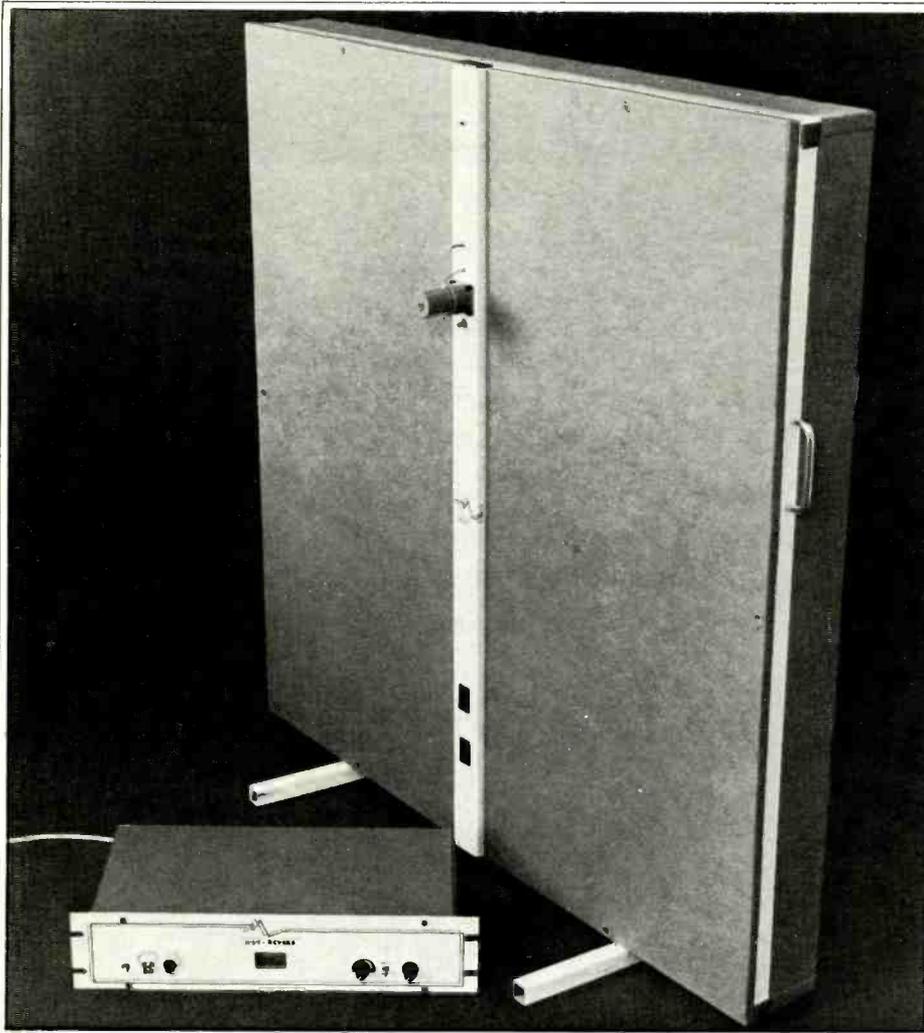
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REVIEW REVIEW

Keith Spencer-Allen looks at a reverb plate



The redesigned plate incorporates many of the points raised in this review

NSF REVERB PLATE

Since the patents covering mechanical reverberation plates expired a few years ago, there has been quite a number of plate systems offered for sale around the world. Very specific sound is generated by plates and when they were the only high quality artificial reverb system available their sound was popular. Since there have been alternatives—particularly electronic—plates have been quite readily pushed out of the back door by many studios as soon as the digital reverb enters the premises. In many ways, if you are an

afficionado of the plate there is very little to beat the real thing particularly when it otherwise means tying up a machine that costs three times the amount of a plate to produce that sound.

MANUFACTURER'S SPECIFICATION

Working mode: Horizontal or vertical.
Reverb time: 1 to 4 s, variable.
Input sensitivity: 30 mV max, unbal.
Output level: 2×0 dBm, unbal.
Noise: Better than -70 dBm, unweighted.
Frequency response: 50 Hz to 16 kHz, ±3 dB.
Dimensions: (whd) plate—39×39×5 in (uncased); 42×42×8 in (cased); control unit—19×4×9 in.
Manufacturer: NSF, 5 Station Road, Alcester, Warwickshire B49 5ET, UK.

NSF is a very small company manufacturing electro-acoustic effects units. They have a firm belief in the benefits to be gained from using the electro-acoustic and physical properties of materials to produce natural reverberation. The plate is a system they have been manufacturing for the last 18 months. It has been designed as a low cost unit and this is reflected in the finer points of design and styling although the device and the end sound are not compromised.

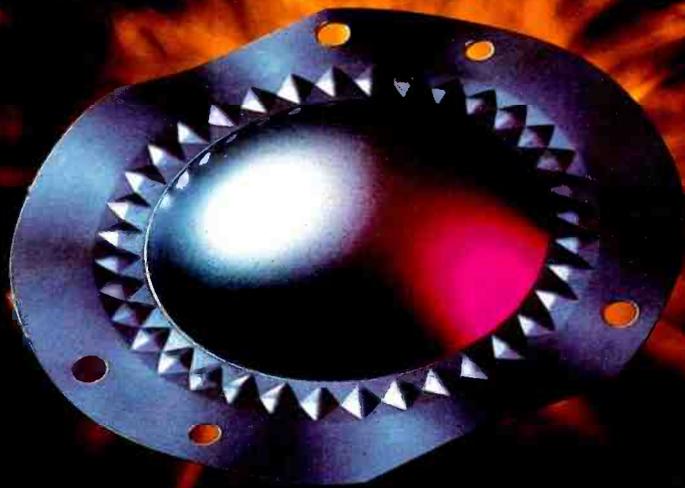
Physical construction

The plate comes in two main sections—the plate and the control unit. The plate section of the review unit is housed in a casing of chipboard (particle board). Sockets for unbalanced signal send and returns, and decay control are mounted in the middle of one of the sides. Removing eight screws from the top of the casing allows the frame and plate to be slid out. The internal construction is fairly simple consisting of a plate of titanium steel alloy with dimensions of about 3 ft square, tension mounted in a strong box-section steel frame. The tensioning is diagonally from the corners with threaded tensioning screws from the frame. The plate is further fixed by a threaded pillar that attaches to the centre post of the frame.

The drive unit is a moving-coil device with the coil mounted on the centre post and the moving-coil section with inverted cone attached to the plate about 4 in below the top edge. The threaded pillar already mentioned keeps the drive device aligned physically, ie the distance between the plate and the coil. Also mounted on the central pillar and below this threaded pillar is the damping mechanism. The damper drive motor is mounted on the central pillar and through a worm gear, drives a plate of 14×3 in covered in a fleecy fibre material into contact with the plate.

The pick-up devices are piezo types and these are situated symmetrically about the centre of the plate, two thirds of the way up the side and about 2 in in from the edge.

The manufacturers say that it is possible to operate the units out of the casing although I can really see no reason to recommend this practice as it renders the plate far more susceptible to external situations. They further say that it is possible to operate the plate while it lies on its side. This is actually possible and appeared to make no visible mechanical differences nor subjective performance change. ▸



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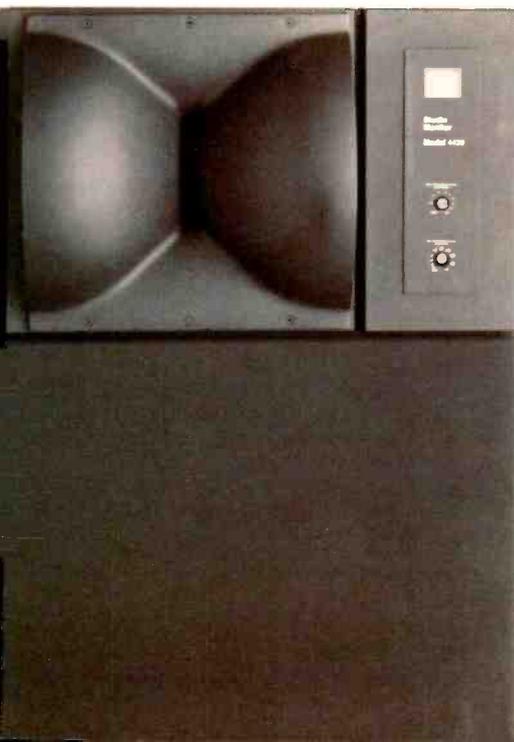
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REVIEW REVIEW

Supplied with the plate is a pair of cables for connection to the control unit. This is a simple 19 in rack mount 2 U unit containing the drive amplifier, return electronics and power supply. Front panel controls are simple with a small power toggle switch, power-on indicator and front mounted 3 A fuse holder. On the other side of the front panel are two controls—a rotary pot for the drive level and a two position toggle labelled normal and bright.

The rear panel contains five standard size jack sockets for sends and returns to the plate and desk as well as the input socket for the remote decay controller. The unit accepts a mono input although as standard, there are 'stereo' returns from the plate. These appear at the back panel in the form of a stereo jack socket which is not the easiest or most convenient of outputs for professional studio use. The power lead is captive and situated on the opposite side of the panel.

The only remaining piece of the system is a centre biased toggle switch which will lengthen or shorten the decay time of the plate depending how long the switch is held. This is mounted in a small die-cast box and would be ideal to mount within the console.

Installation

The plate was found to have a very low susceptibility to external sounds. For the review, the plate was mounted on a concrete base with a layer of thin carpet. Normal talking or walking near the plate had no pick-up although as you would expect, clapping or shouting were picked up slightly. This means that the unit is very tolerant of positioning although an initial test conducted in the control room to check that the unit was working was unsatisfactory as you would expect. I would rate the unit less fussy about positioning than most other plates that I have used. Because of the weight of the unit being quite easy for two people, it could be imagined to have transportable application at least in a studio. Maybe even outside the studio as well. There are no transit arrangements for the plate and even the rough handling manoeuvring the unit into the studio had no noticeable effect on the performance, when properly installed.

Operation

The input to the plate was driven from an auxiliary send and the output

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It is a speaker of high sensitivity that can handle 300 watts constant filtered random noise (a far more rigorous test than R.M.S. wattage) and peaks of up to 1,200 watts. These short duration peaks are all in music and this feature is therefore vital.

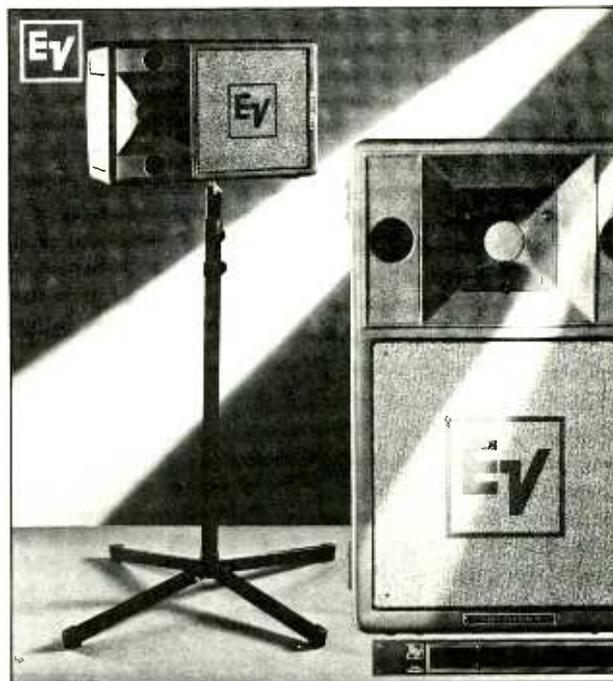
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REVIEW REVIEW

monitored to keep the send level below 0 VU according to the desk calibration. As recommended by NSF, the drive control was set at 11 o'clock and the testing with various signal sources then began. I think that it may be preferable to have a detented rotary pot for the drive control as there is no metering or input indication of the unit. With a detented control there is a degree of repeatability of the settings necessary with devices such as this. The alternative would be to remove the control knob and fit some form of preset control accessible through the front panel as this would protect against accidental or unauthorised twiddling. The outputs were taken to input channels on the console and panned left and right.

The remote control for the decay was held in the long position until the damper was completely clear of the plate. Tests were then started with percussion sounds from a multitrack tape source. Percussion is of course the weak point of most mechanical reverb systems as the transients start resonances within the system. The NSF was surprisingly able to cope with snare drums, tom-toms and even bass drums. Many plates react to a snare drum on long decay with a repeat—like echo that makes them unsuitable for this use when a lot of echo is required. The NSF did not 'take off' in the same way and this is perhaps best described by the sound character, of the unit.

Subjectively the HF was very bright shortly after the transient but died evenly but fairly quickly. The LF was longer in its decay time but was always under control—it never boomed. This meant that the reverb signal left at the end of the decay period was almost entirely mid range and sonically was therefore 'behind' the signal rather than being exposed at HF or LF. The sound on drums was actually very pleasant. It was however necessary to watch the levels from the desk as colouration increased on percussive material if you began to overdrive the plate. This was very evident long before there were any problems with overload.

The exposed decay, ie by stopping the tape in echo, sounded a little unnatural as it almost shimmered slightly although I don't really see that as an operational problem.

Using the remote decay controller it was possible to obtain about 10 different settings between the short and long positions of the damper. At the very short setting, I would describe the sound on drums as excellent in plate terms. The sound was more akin

to a natural room ambience with again the decay being behind the signal. The LF is very much under control even to the extent that you can feed a bass drum signal (registering peaks of 0 VU on the desk meters) into the plate and the sound did not mush even on long decay settings. If you should ever need the sound of cannons that is the way to do it—short of the real thing.

The control of the plate over the reverb signal is further demonstrated by panning during mixdown. If the echo return remains panned left and right but the original dry signal is panned to one side only, the reverb on the opposite side is left very exposed and is a good test of how natural the reverb sounds in relation to the original signal. Tests of this nature gave a good result with the quality of the reverb being 'part of the signal'—again due to the middle predominance in the decay.

Switching to the bright position on the control unit added a highpass filter that effectively removed the LF content of the reverb completely. I found myself operating in the normal position for most applications although when mixing on one occasion I used the bright position to remove the LF reverb, there being too much bass energy in the track anyway and it was beginning to muddy.

I tried the unit on a very wide range of signals and it acquitted itself quite well on most although by far its prime claim to fame must be with regard to percussion.

There were some criticisms that should be pointed out. The frequency distribution between the two sides of the return were not identical, one side being slightly brighter than the other. There was also a slight level discrepancy between the two returns as well. The first point was not noticeable behind a signal and the

only difference caused by the second point was that the return faders had to be slightly squiff. The noise level was quite acceptable by plate terms and was better than some I have used.

The written documentation with the unit describes ways of re-tensioning the plate to achieve other sound characters from the plate. With this being a relatively easy operation it does mean that different examples of the same plate may have a fractionally different sound and so it would be wise to find a unit that you like the sound of if you are the unadventurous type!

Summary

As I said earlier, NSF is a very small company and as such is able to react very quickly to outside comment. Most of the points mentioned at the time of receipt of this unit have already been incorporated within the design and I am assured by NSF that none of these alterations will modify the audio performance of the plate. The major changes lie in the cabinet surrounding the plate. This has been replaced by a lighter cabinet and I understand that it is now possible for one person to lift the plate.

I have not mentioned the price on the unit at all and it really didn't come up for consideration when testing—I was comparing it to plates in general. The fact that it costs about the same as the very cheapest digital reverb available right now makes it a very attractive proposition. I feel that there are things that a plate is still very useful for and a low cost item like this could complement a more expensive digital reverb very well. In performance terms I would rate the NSF plate very highly for percussion and quite acceptable for general use. Take a listen to where some parts of the old technology are headed. □

BROADCAST MONITOR RECEIVER 150kHz-30MHz



Reviewed in
Broadcast Sound
March/April

We have taken the synthesised all mode FRG7700M communications receiver and made several well thought out modifications to provide a receiver for rebroadcast purposes or checking transmitter performance as well as being suited to communications use and news gathering from international short wave stations.

PRINCIPAL MODIFICATIONS: * Radically redesigned front end stages yielding improved noise figure and overload levels, TOIP - 2dBm (originally -21dBm) * Balanced audio line output * Reduced AM distortion * Buffered IF output for monitoring transmitted modulation envelope on an oscilloscope * Mains safety improvements.

The receiver is available in free standing or rack mounting form and all the original features are retained: 12 memory channels, mains or battery operation option, IF bandwidths 2.7kHz, 6kHz, 12kHz, digital frequency and time display, timer for unattended recordings or external switching, advanced noise blanker, all modes including NBFM with squelch.

Stereo Disc Amplifier 3 and 4 * Peak Deviation Meter * Programme and Deviation Chart Recorders * Stabilizer * Frequency Shift Circuit Boards * 10 Outlet Distribution Amplifier * Peak Programme Meter Illuminated Boxes, Circuit Boards and Ernest Turner Movements * PPM5 Dual In-line Hybrid * Stereo Microphone Amplifier.

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at APRS 84 on the Audio
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True, the main purpose of any high-power amplifier is to pump out high-power sound, and in this respect the Yamaha PC2002M is up there with the best of them. But any amount of volume won't help if the sound reproduction is poor, prone to hum and noise, or just plain distorted.

And that's where the design of the Yamaha PC Series scores. For a start, we've used two large-area, side-mounted heat sinks, diffusing excess heat throughout the whole structure, doing away with noisy and potentially unreliable motor-driven cooling fans. And the excellent thermal dispersion is backed up by newly designed protection circuitry which senses the unlikely onset of thermal stress, as well as protecting against DC offset and excessive peak power levels.

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distortion - less than 0.05% THD at its conservatively rated full output of 240W + 240W into 8 ohms. A flick of a rear-panel switch transforms the PC2002M into a 700W Mono amplifier ideal for parallel full-range systems and the like.

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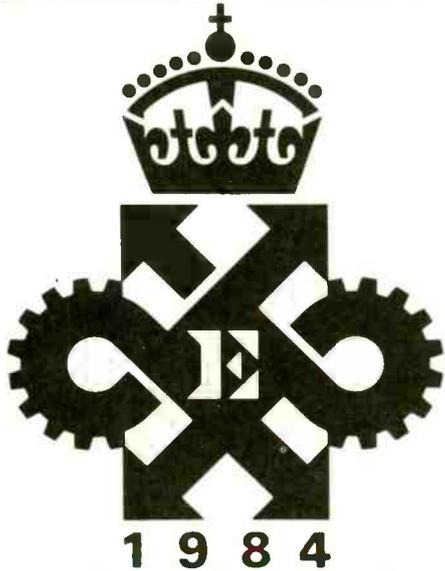
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ECHO TIMES

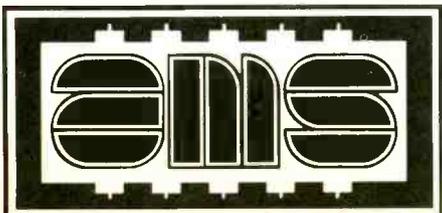


QUEEN'S AWARD

Advanced Music Systems are very pleased to announce that on the 21st. of April 1984 they were advised that they had won the Queen's Award to Industry. This award is made to fewer than 100 companies each year to recognise significant levels of export achievement. A.M.S. would like to take this opportunity of thanking all their overseas distributors whose individual efforts have resulted in this extremely prestigious award being bestowed on the company.

BKSTS Honour Founder Members of A.M.S.

Mark Crabtree and Stuart Nevison have been awarded the Charles Parkhouse Award by the British Kinematograph Sound and Television Society. The award is usually presented to a technician or technicians who have made a significant contribution in either the Laboratory or Sound Recording branches of the industry served by the Society. Mr. Crabtree and Mr. Nevison would like to thank the Fellows of the Society and members of the Honours Committee for recommending them for the award.



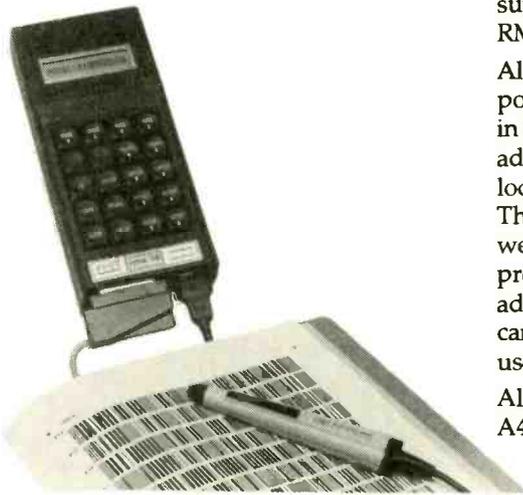
PROGRAMMES ON BARCODE

A.M.S. have continuously provided both hardware and software updates for their DMX range of digital audio processors as well as their RMX 16 digital reverberator. The latest update is an addition for the RMX 16 remote terminal being a bar code reading wand and associated software. The remote terminal already performs two functions, firstly providing remote

control of the RMX 16 using a normal jack cable. Secondly the remote terminal can store up to 99 user programmed settings in its own non-volatile memory allowing disconnection from one mainframe and transference of preset data to a second mainframe. By adding additional software to the remote terminal it is possible to connect a bar code wand and A.M.S. are already supplying new programmes for the RMX 16 in the form of sheets of bar codes.

Along with this new update comes the possibility of storing four programmes in the RAM of the remote terminal and an additional three soft programme locations in the reverberation mainframe. This new configuration means that as well as the standard nine factory set programmes stored in the RMX 16, three additional locations are available which can contain programmes of the user's choice.

All programmes will fit onto a standard A4 sheet of paper and the average time to load a new programme should be less than a couple of minutes. ■



PETER GABRIEL



Pictured (left) are Peter Gabriel and Larry Fast during a recent visit to A.M.S. To say Peter takes his A.M.S. unit everywhere with him seems a bit of an under-statement! Both Peter and Larry had taken time off from a very busy schedule to pass opinion on the latest A.M.S. software additions for the RMX 16 Digital Reverb and the DMX 15-80S DDL Pitch Changer. The couple have previously provided invaluable help with their comments, and this occasion proved no exception. ■

Product brochures available in different languages

Brochures describing the RMX 16 and the DMX 15-80S are now available in the following languages: English, Japanese, Swedish, German and French. These brochures are available from distributors in these particular countries, or directly from A.M.S.

PEOPLE IN THE KNOW

"There was a sax solo on the Hall & Oates album *Maneater*. There's a helluva' long repeat on it. It didn't have that there to start with. We were playing it through and I was frustrated because I didn't like the sax solo that much. I thought it needed more, it was so laid back. I thought: sod it, I'll completely fill in the gaps.

"So I got the old A.M.S. digital delay out, changed the sound a bit so that the repeat sounded as if it was coming from somewhere else and just stuck it in." Daryl and John thought the effect was great and said it was something they hadn't even considered.

Hugh Padgham. Studio Sound.

The quality of engineering design and sound is up to the highest standard, whilst the 18kHz bandwidth and 90dB dynamic range can only be gazed upon with awe. The only problem I can see with this machine is that I've got to give it back after reviewing it! *H.S.R. Magazine.*

Stuart Neale leaves the addition of effects to the sound man and his A.M.S.

One Two Testing on Kajagoogoo.

The A.M.S. Digital Reverb is a general all-round tool, and I've tried other manufacturers' equipment in the digital reverb line and I think the A.M.S. is the cleanest and most usable if you are only going to have one of those.

Ian Anderson from an interview in Home Studio Recording.

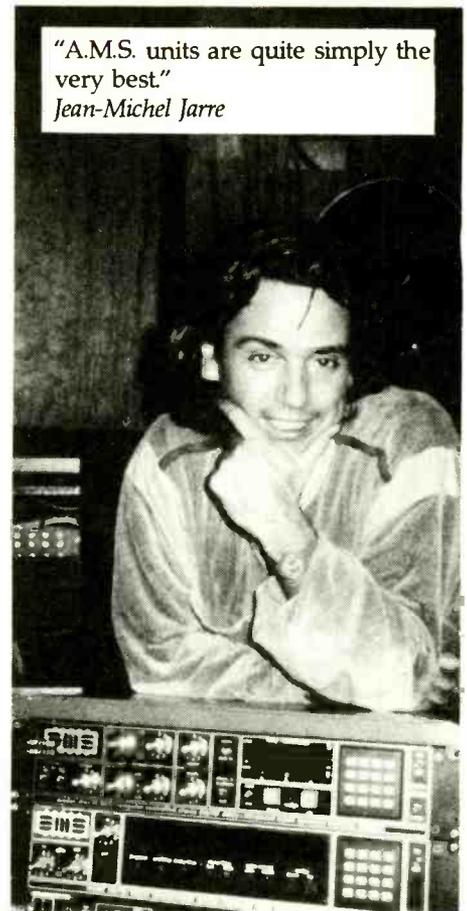
I don't think any of us ever got rung up by people saying: 'Do you fancy trying out a new piece of equipment?'

"A.M.S. have phoned me once or twice; actually they're a good company like that. When they were developing their digital reverb, they mentioned the drum sound we got on Gabriel's album. They thought we'd done that electronically with some device but it was just acoustic really. They wanted to include something like it. They've got ambience programs and backwards things now, which can sound quite like squashed compressed rooms and stuff.

Hugh, Padgham Studio Sound.

I was first introduced to digital audio by the A.M.S. digital delay line.

Gus Dudgeon in an interview in the Sony Compact Disc Owners magazine.



"A.M.S. units are quite simply the very best."
Jean-Michel Jarre



THOMPSON TWINS

The Thompson Twins have been around in different forms for quite some time but success really only came their way after a visit to Compass Point a couple of years ago and the release of their album "Quick Step and Side Kick". The latest album "Into The Gap" went straight to number 1 in the UK album chart and at the time of writing a single was steadily climbing the US charts. Tom Bailey greeted A.M.S.

from a sumptuous couch in the stars' dressing room before a concert in mid March.

T.B.: Oh hello, pleased to meet you. I've just been watching Steve Levine on BBC TV explaining how A.M.S. are revolutionising the recording industry with their DDL Pitch Changers – and I thought it was my secret!

A.M.S.: Tom, we've had an interest in you and the group since we read an article in a magazine where you discussed the "fantastic discoveries" you'd made in A.M.S. equipment.



T.B.: Yeh – we've been A.M.S. fans since the first day we used the gear. We couldn't believe it. We were recording at Compass Point and we went bananas over it. Originally there was just one unit between the two studios and every day it was a case of who would fight hardest to get it for their session. The "Quick Step And Side Kick" album is just covered in A.M.S. effects. The units are fantastic for predominantly synthesiser music when layering of track upon track can result in a finished product that is just a mush. By careful use it is possible to preserve the individual instruments and prevent the mush. Whilst out in Nassau I visited Robert Palmer at his home, when we went through to his front room there were even A.M.S. units there!

A.M.S.: That album was finished off at RAK wasn't it?

T.B.: Yes, we went out to Compass Point to work with Alex Sadkin but we didn't have enough time to finish so we came back to the U.K. I've got some photographs from Rak that I should send you of stacks of A.M.S. units that we had when we were mixing.

A.M.S.: Apart from the normal use of the systems did you make use of the lock-in and Loop Editing System on the DMX 15-80S?

T.B.: Oh yes. Successful musicians don't always have a lot of time to play around in

PHIL COLLINS

Amongst some of the first people to be asked to pass comment on an A.M.S. product were the English rock group Genesis. That first approach was made concerning the analog DM2-20 flanger. Now Genesis as a band, and separately as individuals, own different pieces of A.M.S. equipment. Phil Collins is probably one of the most respected rock drummers of our time and besides his key role in Genesis he has a very successful solo career and is also in great demand as a freelance producer.

A.M.S. met up with Phil at the Townhouse Studios in London shortly after his return from Montserrat where he had been producing the new Eric Clapton album.

P.C.: I've got to say straight away that the best thing A.M.S. have done for me is to allow me to reproduce studio sounds live. A.M.S. pitch changers are definitely the best around and of course they are in

the studios and it is pretty much left to the engineers to introduce us to things like LES. I now consider things like LES as part of the process of making music and for me there isn't such a thing as "back-room-stuff" that I don't need to know about. We've used LES to maximum effect on our soon to be released new single – "You Take Me Up" – all the machine noises are natural sounds trapped in the AMS edited and triggered. We are continually replacing drums by locked-in ones and the snare on the single "Hold Me Now" is a good example of that. One of the other things we seem to get good results from is when mixing 12" singles it is possible to lift bass or snare drums from the tape, lock them into the A.M.S. and then manually trigger them during the mix so we end up with drum beats in the mix that aren't on the multitrack.

A.M.S.: Does it affect the way you write songs having knowledge of such units as A.M.S. and the techniques that are possible with them?

T.B.: Yes very much so. We write directly onto 8 track tape and consider this as our demo. We build it up layer by layer and many times we won't bother trying to get "the great sound" because when we lock-up to the 24 track with the 8 track material we like we always know the A.M.S. equipment will be there – problem solved! ■

every studio I go in. I started to use the RMX 16 on my solo tour, I'd seen Showco using it and whilst playing around with Craig Shertz it became obvious that it could open up whole new areas and allow me to do things live that previously just hadn't been possible.

A.M.S.: Which songs in particular?

P.C.: "In the Air" was probably one of the first songs I used the RMX 16 on to maximum effect. After that songs like "Keep It Dark" and "Mamma" were songs that relied heavily on the drum sound and just couldn't have been done without the unit. The Nonlinear programme is my favourite as I'm sure you realise.

A.M.S.: But do you use the units in the studio – when you are producing yourself?

P.C.: Oh yeh! For instance doing this new

with the A.M.S. equipment it gives me a lot more scope.

A.M.S.: Do you write to percussive sounds?

P.C.: Oh yes and that is very important. The classic example being the track "Intruder" on Peter Gabriel's third album. That started with me sitting on the drums and Hugh Padgem playing around with compression and gates, which is now of course the Nonlinear sound. The effect of what Hugh was doing determined the rhythm and that just came naturally – boom boom chick, boom, boom chick. There wasn't a song at that time and I said to Peter that I would use it if he didn't want it, but as we all know by now it ended up as "Intruder". I've still got a 10 minute drum backing track to that at home! Interesting to see who was in on that session – there was me and Peter,



Eric Clapton album. I really don't think there is a track that doesn't have the A.M.S. reverb on it. It is particularly good for getting a very big sound out of a snare drum. I also like the small room sound – it really does sound like a small room with a mike in it.

A.M.S.: Why did you choose to own a couple of A.M.S. units yourself?

P.C.: Well when I record I start at home with a small 8 Track. Because I only have a small room I've tended to work with drum machines and the like. Now I can do what I like doing which is playing the drums hard and in conjunction

Hugh, Steve Lillywhite and even Nick Lornay I think.

A.M.S.: There is obviously a Phil Collins sound now. How does that affect you?

P.C.: It's very nice because I get asked to do all sorts of things. When I ask people if they know what they are getting they say of course – the Phil Collins drum sound. That is good because it's a starting point and there are allsorts that can be done with equipment like the A.M.S. units. Anything that allows a producer to muck around with perspective is great and that is really what A.M.S. lets you do. ■



Steve Levine

Steve Levine has just won the U.K. producer of the year award and is particularly noted for his work with Boy George and Culture Club. He owns what must be the largest memory A.M.S. digital audio processor in the world having over 25 seconds of memory.

Steve Levine: As far as I am concerned it's not just consoles that should be available "customised" – it should be everything, particularly systems like the A.M.S. I like having a rapport with manufacturers or suppliers because I also like having the first of anything new. You may lose the odd day here or there by experimenting with new pieces of equipment but the end result is always worthwhile.

A.M.S.: You certainly seem hell-bent on doing everything you can to ensure you get the ultimate quality product into the

hands of the customer – even to the extent of owning your own Sony digital multitrack machine! How does that affect your choice of digital audio processors?

S.L.: Well put it this way I never use anything other than A.M.S. I haven't used anybody else's delay lines or harmonisers for over 2 years. I've even been in a couple of sessions when for one reason or another there were no A.M.S. units around – I'd rather do without than have to use any other system!

A.M.S.: What about the RMX 16 reverb, how much use does that get?

S.L.: Well as you can see my technique of recording is normally D.I. to the digital multitrack. It is very important to give the material the feel that it isn't D.I. and one of the easiest ways is to add the feel of a room by means of the RMX. It is particularly important on material from the Fairlight because the addition of programmes with very short decays can

really separate the different sounds. Again I think the unit is definitely quieter than other units I've used, like the Lexicon, which is so important because it is even possible to hear desk noise on the sort of things I work on. With George's voice, I use tube mike and put the reverb on as we go – that really gives a pleasant sound.

A.M.S.: Tell me a little more about your recording technique.

S.L.: O.K. Even with the digital it's quicker for me to record all my backing vocals onto a spare piece of tape – mix them on to a Sony F1. and then dump them into the DMX 15-80S and edit to exactly what I need. I can then use the Fairlight to trigger the A.M.S. 80S exactly on the bar when I need that particular vocal. So the length of the chorus is determined by however much memory I have! This is a dream for me – it is absolutely brilliant! ■

DISTRIBUTORS WORLDWIDE

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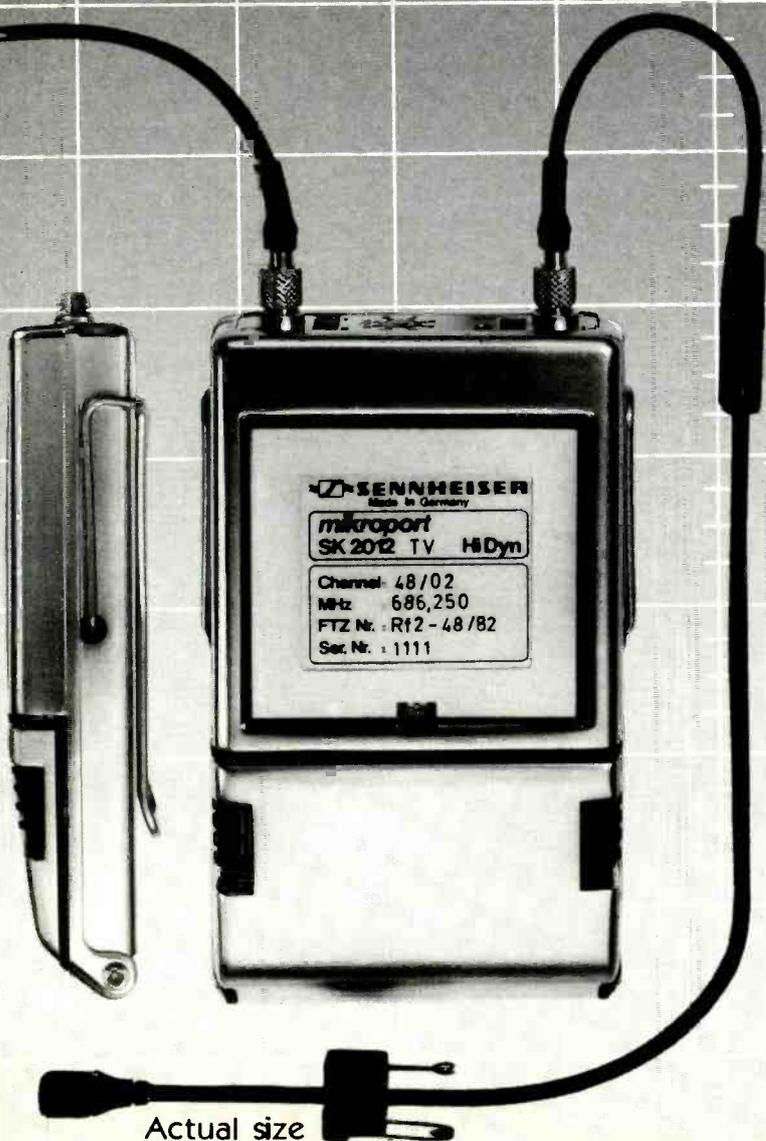
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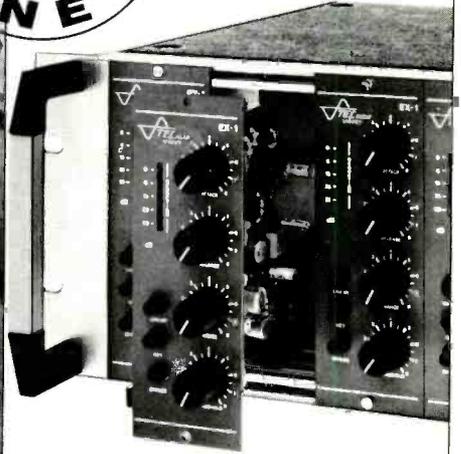


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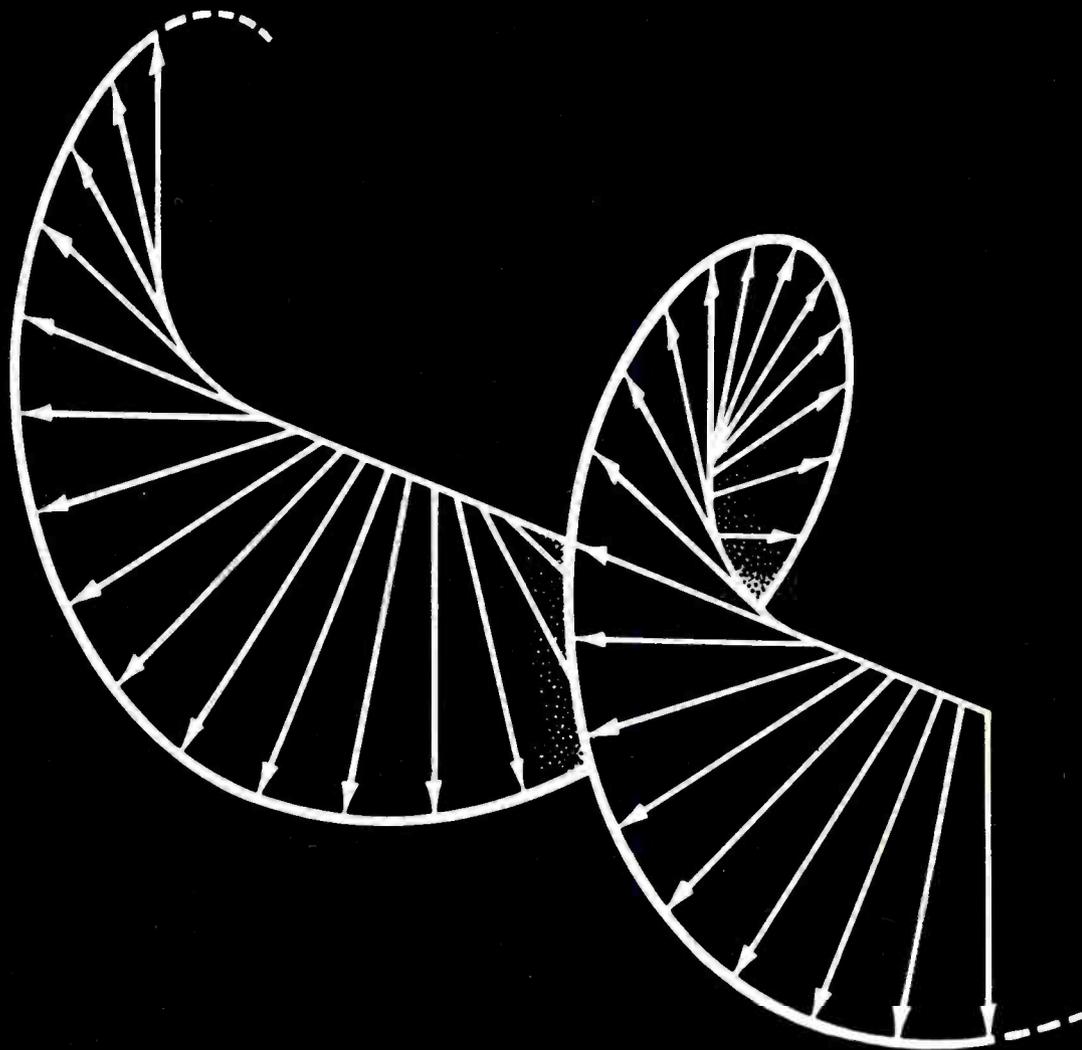
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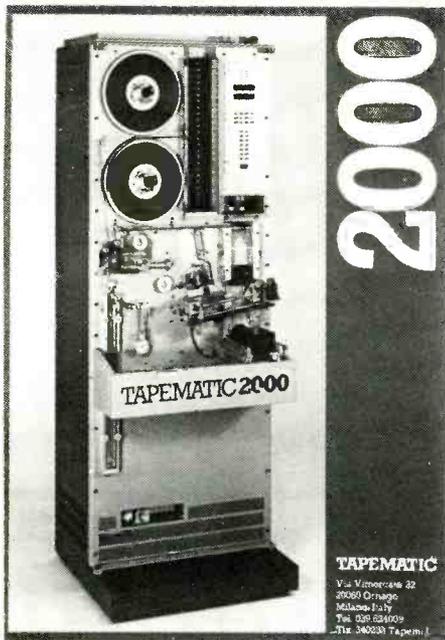
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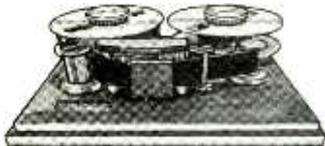


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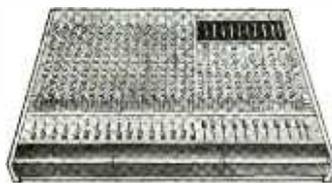
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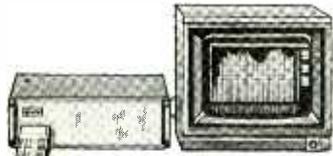
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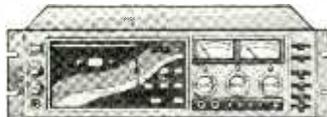
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 AKG C451EB Pre-Amp
 AKG CK1 Capsule
 AKG CK5 Capsule
 AKG D12E Dynamic
 AKG D202E I Dynamic
 AKG D222EB Dynamic
 AKG D224E Dynamic
 Beyer M160 Dynamic Hypercardioid Ribbon



HEADPHONES

Beyer DT100
 Beyer DT48
 Sennheiser HD222
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AMS DMX 15-80S Stereo Mainframe
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 Eventide 1754M 2560mS
 Klark Teknik DN701 3 Outputs each 0 1700mS
 Lexicon PCM42
 Lexicon Prime Time II 960mS
 Lexicon Super Prime Time 969mS



DIGITAL PROCESSORS

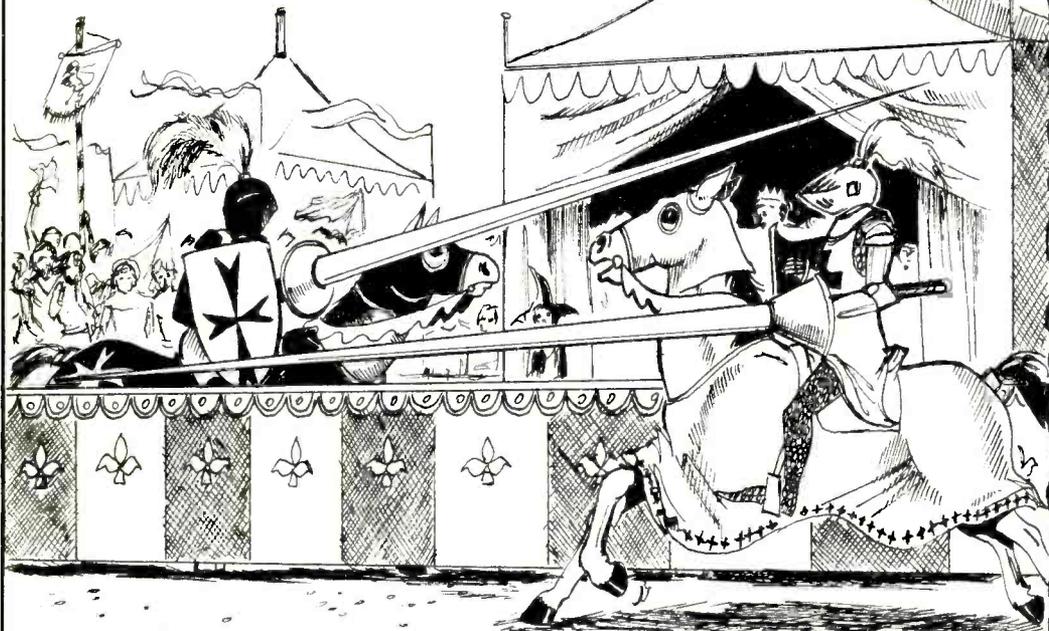
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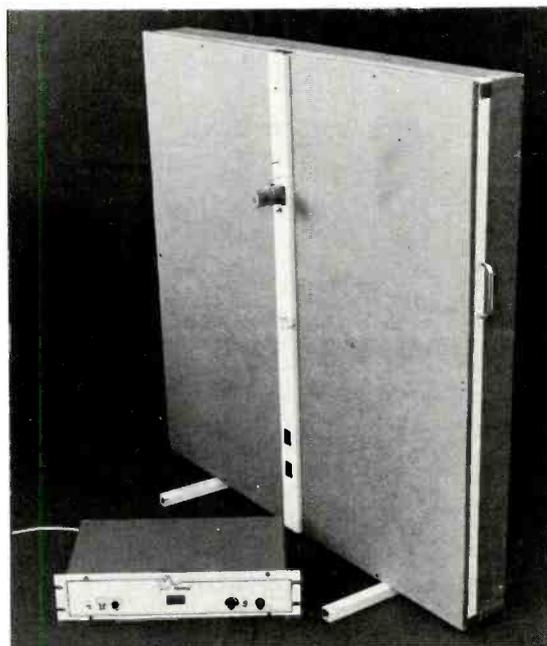
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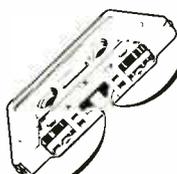


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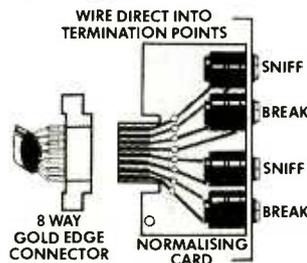
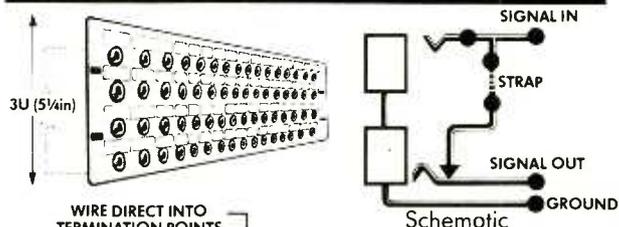


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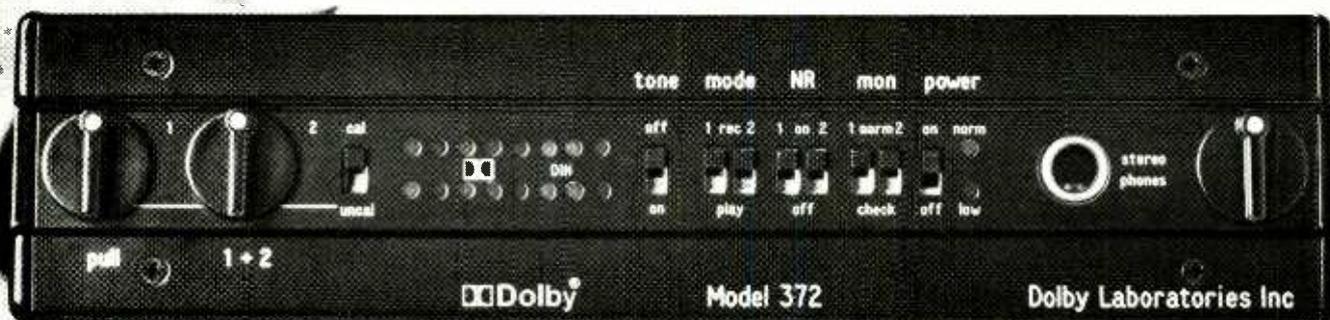
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A portable 2 channel professional
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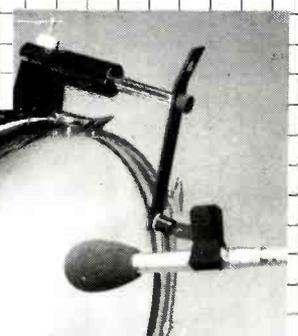
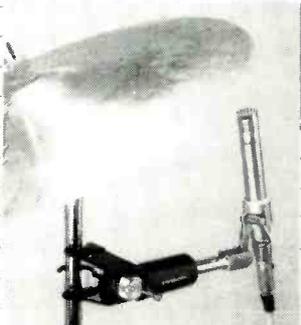
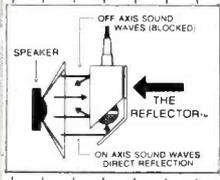
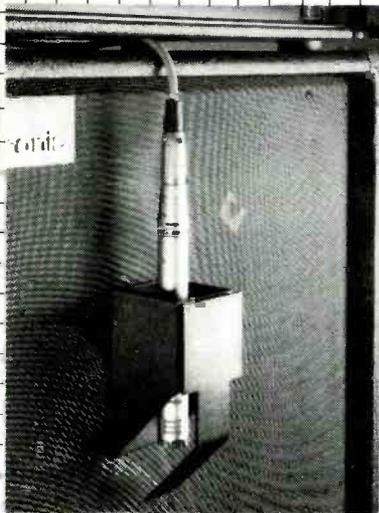
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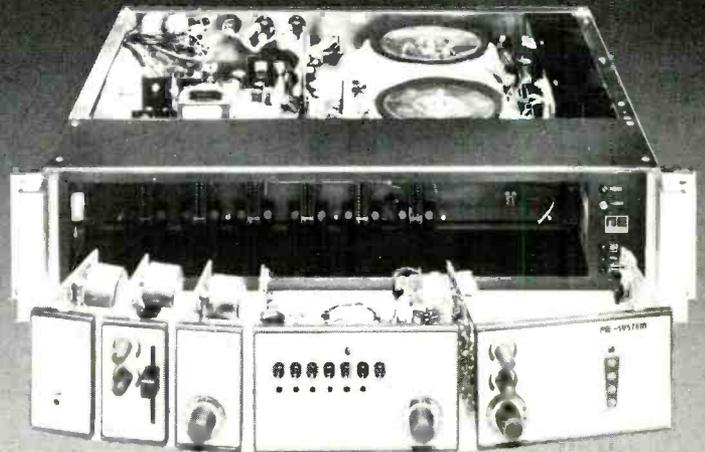
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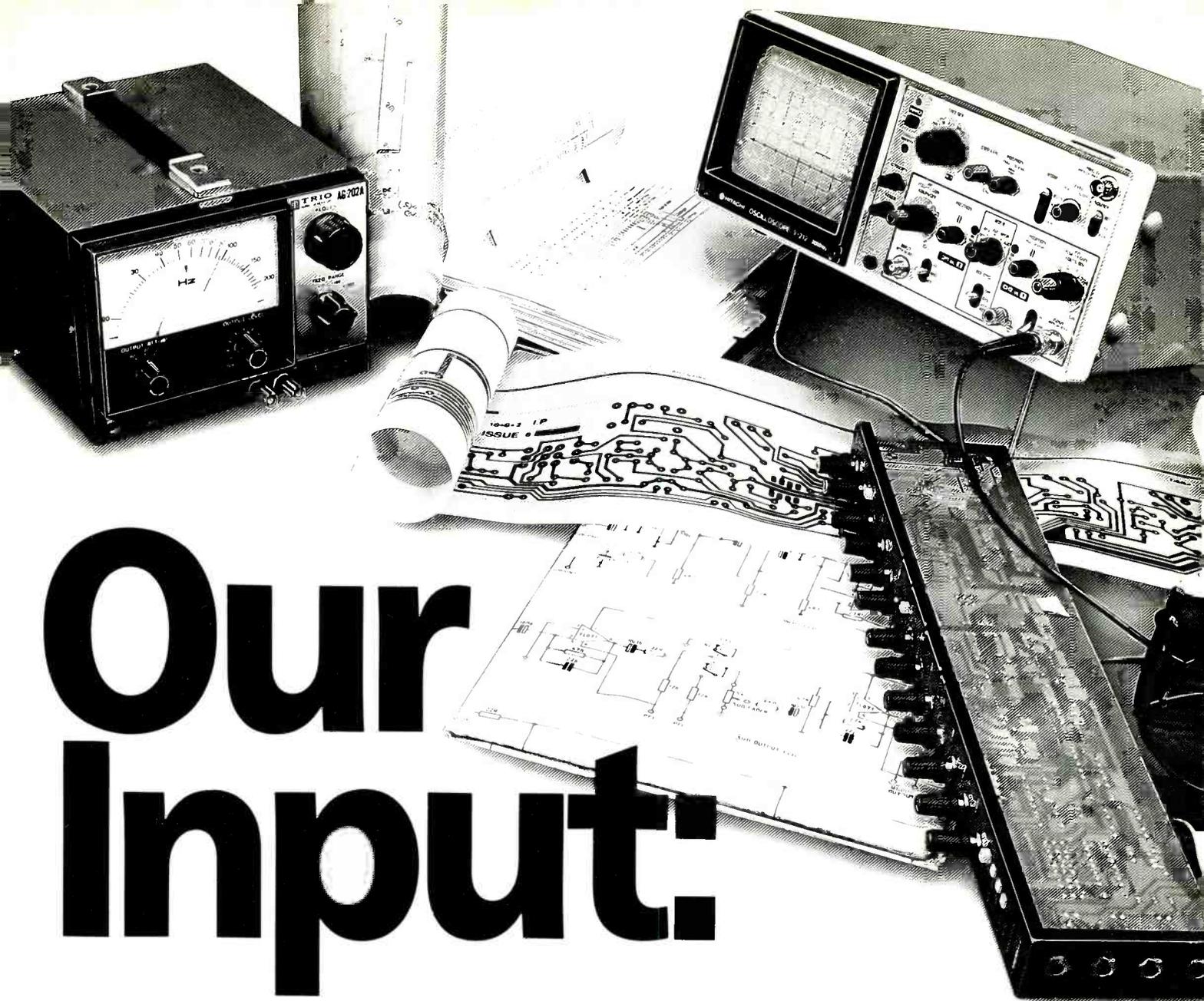
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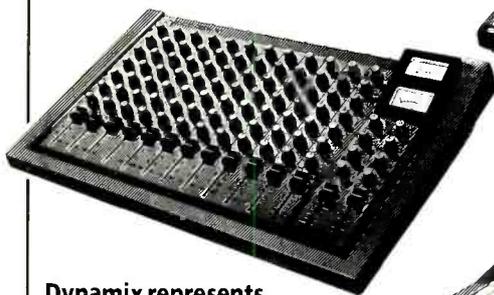


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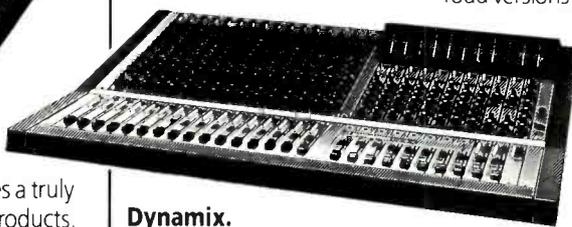
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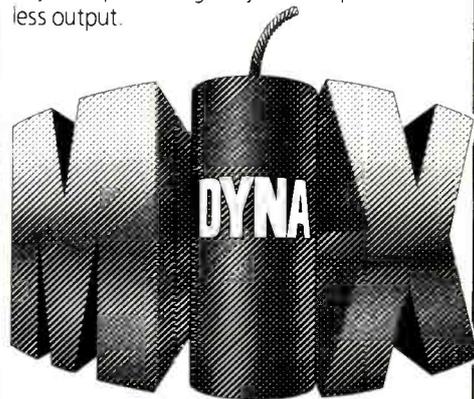
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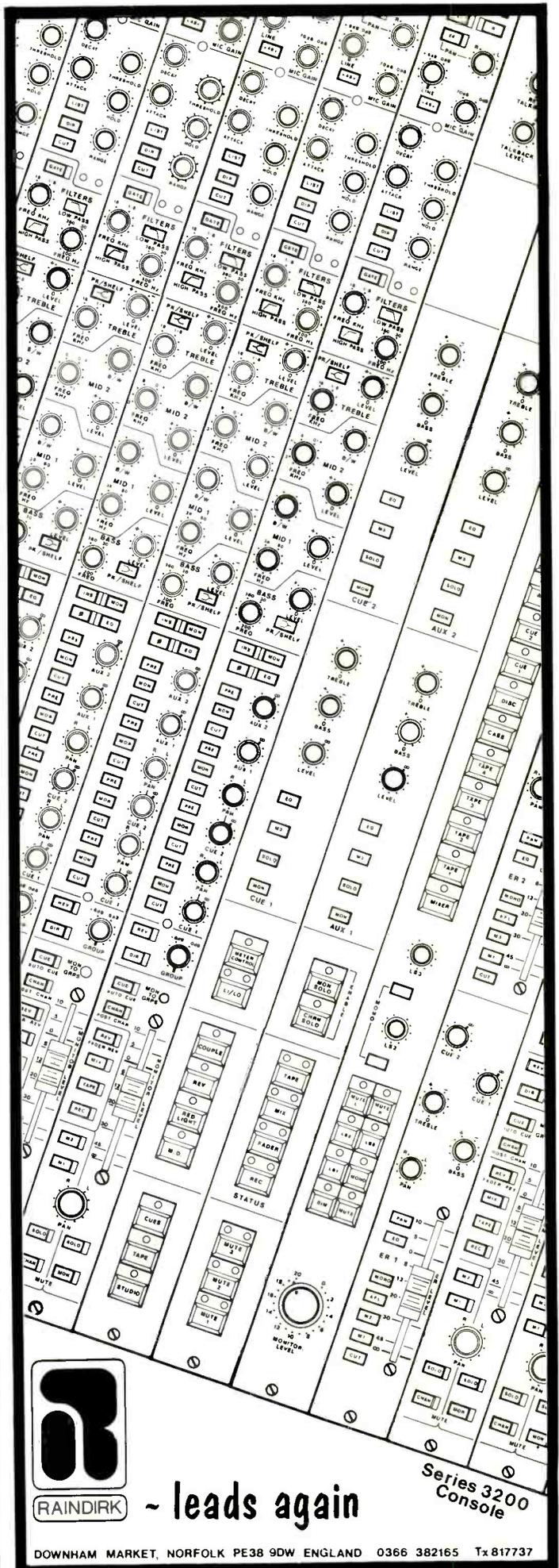


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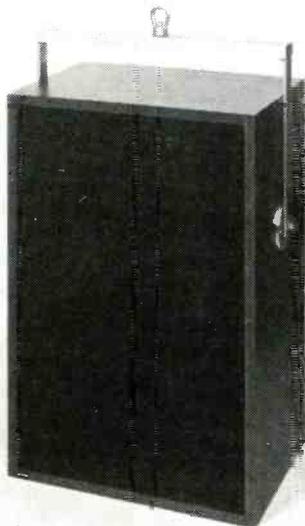
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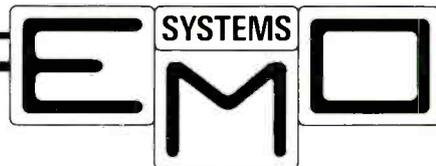
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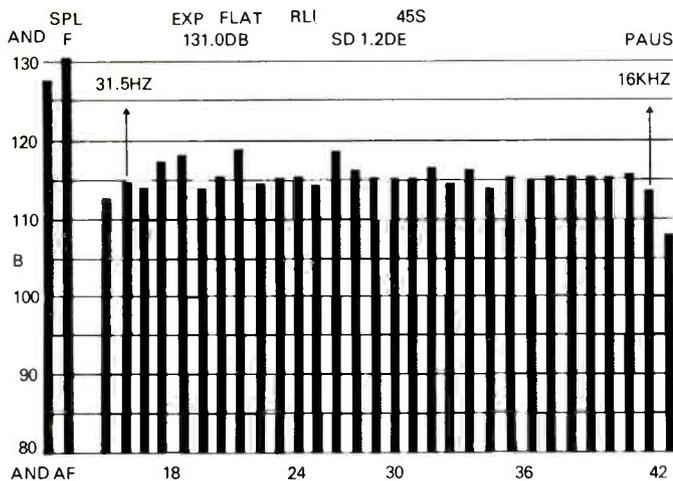
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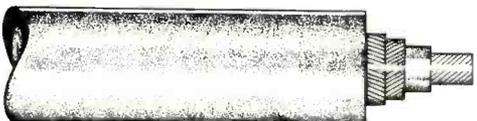
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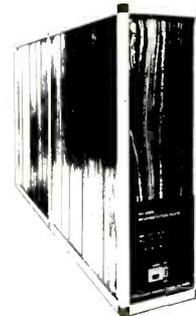
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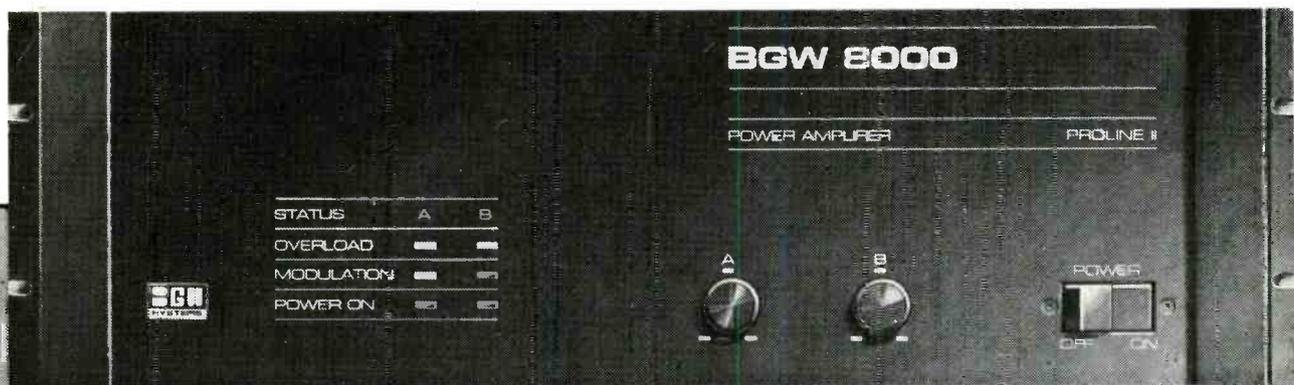
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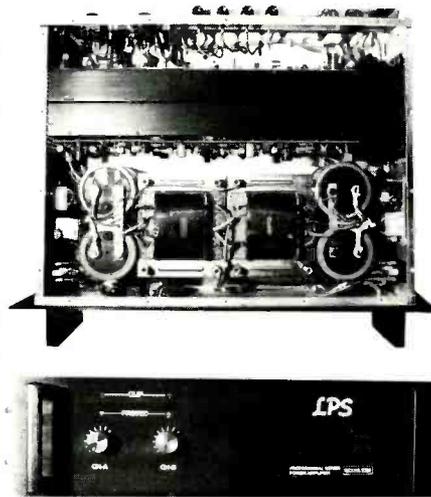
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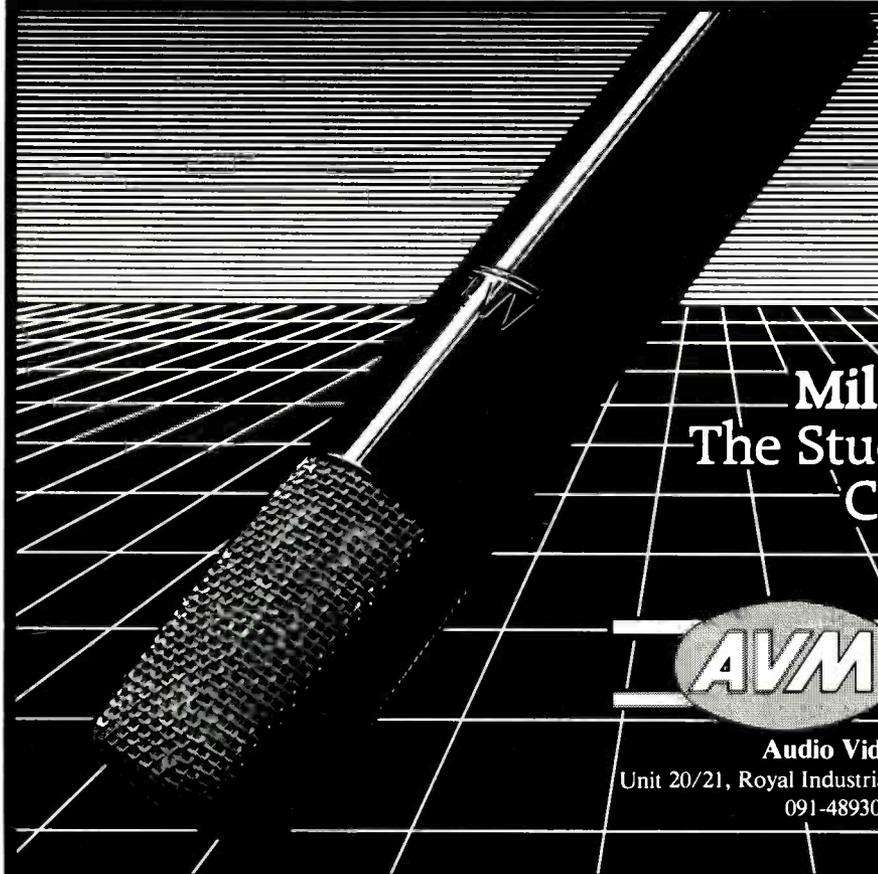
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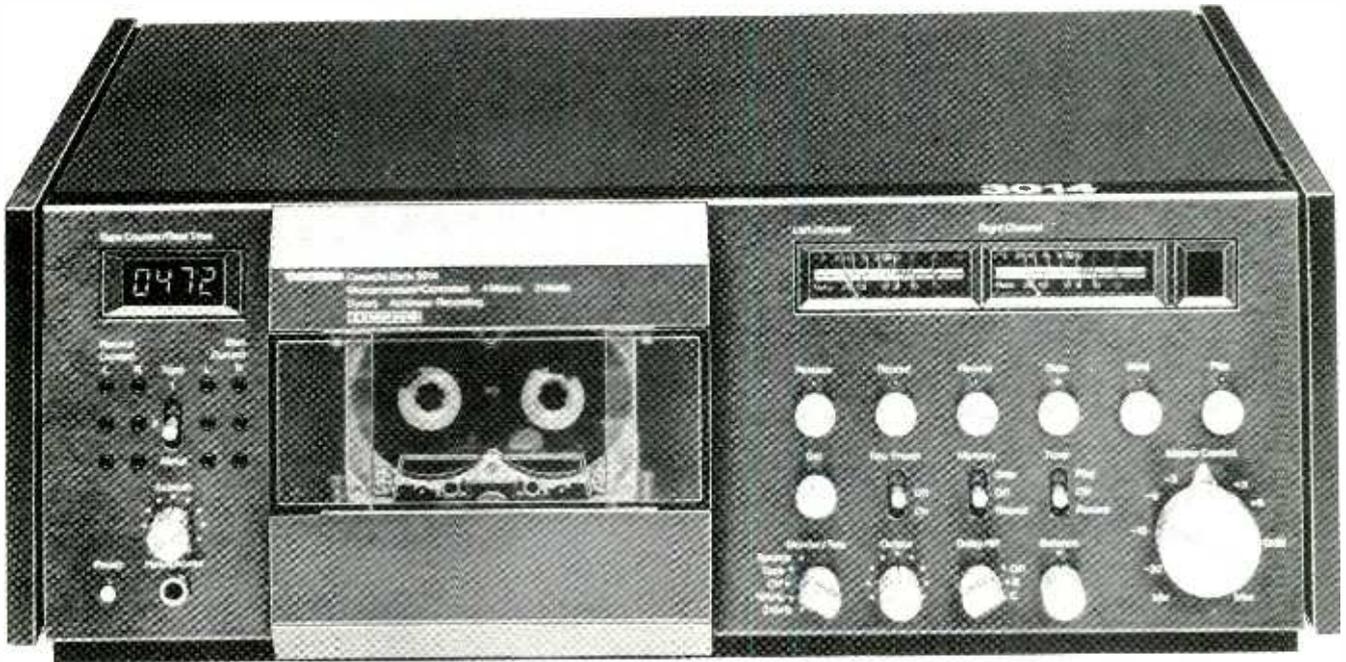
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KEEN, capable young man, 19, seeks position in video/sound production. Adaptable and eager to learn. Some experience in photography and sound work. London based. Ring Jimi on 0525 372484.

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The logo for Hill Audio, featuring the word "Hill" in a stylized, white, rounded font. The letters are thick and have a slight shadow, giving them a three-dimensional appearance. The background of the entire advertisement is a high-angle, close-up photograph of a vintage audio mixing console, showing rows of faders, knobs, and buttons.

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