studio sound
AND BROADCAST ENGINEERING
December 1983 £1.2

Microphones

When you're used to the best there is...

You would choose Soundcraft too. That's what producer/songwriter Pete Bellotte told us.

And he certainly is used to the best. After recording in Westlake Studios, LA, and other top studios on both sides of the Atlantic, Pete Bellotte chose Soundcraft for his personal studio in Surrey, England.

"I needed the absolute freedom of a studio at home – but I also wanted the same high quality I was used to, so I could produce master tapes without additional overdubbing at a later stage.

"I had used Soundcraft consoles before in the States, and I was told by my engineers how good the 'sound' of Soundcraft desks really was. So the choice was simple.

"My only guidelines in selecting the equipment were space and quality. That's why I spent a fortune getting the accoustics just right, having Westlake monitors fitted by a team flown in from the States, a Lexicon reverb unit – and a Soundcraft 2400 console with the new Series 760 multitrack.

"Once you're used to the best there is, you'll never want to compromise. And that's why I chose Soundcraft."

Soundcraft

The Producer's choice

Soundcraft Electronics Limited, 5-8 Great Sutton Street, London, EC1V 0BX, England. Tel: 01-251 3631. Telex: 21198.

Soundcraft Electronics USA, 1517 20th. Street, Santa Monica, California 90404. Tel: (213) 453 4591. Telex: 664923.

Soundcraft Canada Inc. 1444 Hymus Blvd. DORVAL, Quebec Canada H9P 1J6. Tel: (514) 685 1610 Telex: 05 822582.

EDITORIAL
Editor: Richard Elen
Deputy Editor: Keith Spencer-Allen
Production Editor: Ann Horan
Production Assistant: Linda Fieldhouse
Consultant: Hugh Ford
Secretary: Carrie Love

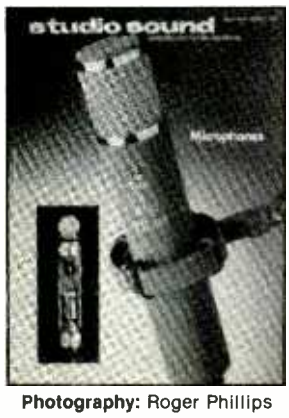
ADVERTISEMENTS
Group Exec Manager: Phil Guy
Assistant Manager: Martin Miles
Sales: Linda Gubby
Secretary: Audrey Slatford
Production: Jacky Thompson

Editorial and advertising offices:
LINK HOUSE, DINGWALL AVENUE, CROYDON CR9 2TA, GREAT BRITAIN
Phone: 01-686 2599
International: + 44 1 686 2599
Telex: 947709

A LINK HOUSE PUBLICATION

DECEMBER 1983
VOLUME 25
NUMBER 12

Cover: Two aspects of AKG's 'The Tube'



Photography: Roger Phillips

studio sound
AND BROADCAST ENGINEERING

CONTENTS

FEATURES

PRODUCT REFERENCE

REVIEWS by Hugh Ford

(l) Soundfield control unit used by John Whiting (r) Mike Hedges mic placement on Budgie's drum kit

Advice, instruction, back-up support. These are the key words in HHB's digital service philosophy.

We feel that with technology this advanced and innovative, these factors are more important than ever before.

We keep a full range of Sony digital audio products, from the low-cost PCMF1 processor to the DAE1100 editor and PCM1610 processor needed to make your CD compatible masters, and of course the CDP101 Compact Disc player.

Additionally, we can supply the video recorders you need, in both U-matic and Betamax formats, and advise you on which machines suit your needs best.

Our comprehensive rental service now includes all these products, delivered and installed, and with full instruction on their operation from trained, experienced personnel.

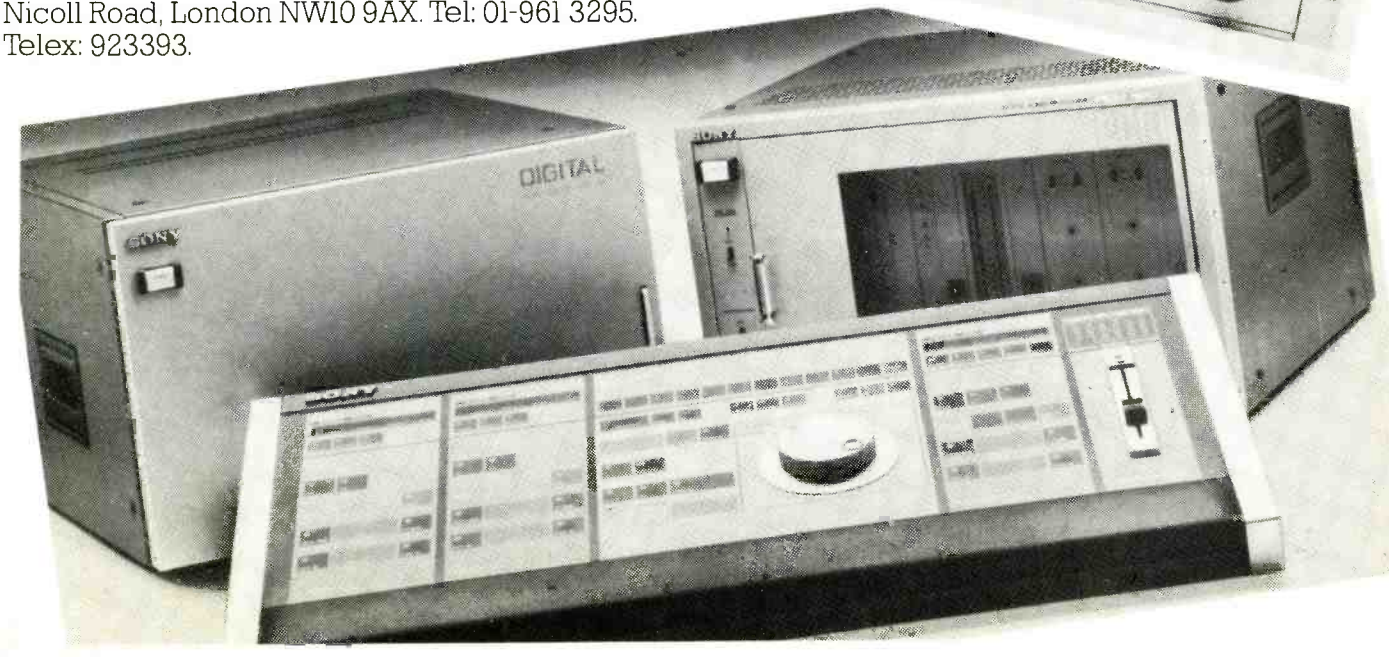
We can also offer a fully-equipped in-house editing and transfer facility.

So whether you need to buy or rent, or just find out what all the excitement is about, surely it makes sound sense to contact us – HHB the Number One Name in digital service.

DIGITAL?

HHB!

HHB Hire and Sales, Unit F, New Crescent Works, Nicoll Road, London NW10 9AX. Tel: 01-961 3295. Telex: 923393.



studio sound

AND BROADCAST ENGINEERING

STUDIO SOUND is published on the second Friday of the preceding month. The magazine is available on a rigidly controlled requested basis only to qualified personnel (see back page for terms) or for an annual cost of **£14.00** UK, **$40 US** surface mail, **$75** US airmail **£20.25** overseas surface mail or **£32.50** overseas airmail to non-qualifying readers or where more than two copies are required in a studio or small organisation. *All* subscription enquiries, including changes of address (which should be *in writing* and preferably including an old address label or at least the 7-digit label code) should be made to the **Subscription Department, Link House, Dingwall Avenue, Croydon CR9 2TA, Great Britain.**
Studio Sound and Broadcast Engineering incorporates Sound International and Beat Instrumental.
US mailing agents. Expediters of the Printed Word Ltd, 527 Madison Avenue Suite 1217, New York, NY 10022. Controlled Circulation postage paid at New York, NY.
Total average net circulation of 14,307 per issue during 1982. UK: 5,865. Overseas: 8,442. (ABC audited)
Printed in England

ABC MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

EDITORIAL

Digital integrity

There is more to 'digital labelling' than the areas I have looked at in previous editorials. Not only is there the misleading fact of *CDs* being produced with 'digitally mastered' labels when they are actually original analogue recordings (not to mention some of such discs saying 'A digital recording' on them from time to time), there are also some even naughtier practices going on. The one thing you can say about marking analogue-derived *CDs* 'digitally mastered' is that it is true; while it isn't complete, it isn't *exactly* lying. 'Digitally mastered from an original analogue recording' would not be lying at all. These other cases are considerably more serious. Try these for size.

An American record company makes an album which is at least *mixed* to stereo digital, if nothing else. The digital master is used to cut an analogue disc on a conventional lathe. The record is released in the US with a 'digitally mastered' or 'digital recording' flash on the sleeve. Meanwhile, someone, somewhere, has taken the digital master, copied it on to 15 in/s analogue several times, and sent the copies to other countries, where it has been mastered normally and released. The foreign sleeves also say 'digital' on them. True or false?

A digital album is recorded in a studio. The studio prepares an analogue 15 in/s copy so that the guys in the record company office can hear it. Time comes for the cut and they grab the nearest handy tape—the analogue one—thinking that the *U-Matic* cassette is the promotional video. The album is cut from the 15 in/s copy and released, marked 'digital'. True or false?

An analogue recording is to be re-issued. The record company takes the master and has it copied to Sony *1610*. The cassette is taken to the cutting room and used to cut the album. On release, the record sleeve says 'digitally re-mastered'. True or false?

The fact is, record companies don't know what 'digital' means yet. And neither do the consumers, completely (although they may sometimes know more than the record companies). And some record companies *do* know about digital and they do things like the above deliberately, perhaps . . .? Let us give them the benefit of the doubt. In the studio side of the business, we stand a reasonable chance of being able to help. SPARS in the States have made proposals for a labelling scheme (the 'Digital Certification' program); *db* magazine has covered the subject (January 1983) and, of course, so have we; and the APRS is actively looking into the area. While I personally feel that the present SPARS proposals are a little too basic, and may have difficulties in being accepted, and the pictograms on the January cover of *db* were so overcomplex as to be totally unrealistic, the basic concept is an excellent one. Interested parties should look at the above sources: especially record companies, because they are the people who will get taken to court, just like the record company which issued electronically-reprocessed mono recordings as 'stereo' and lost a huge amount of money.

In Britain, we have the benefit of the Office of Fair Trading, Trading Standards offices, and the Department of Trade and Industry's Consumer Advice division. And there are consumer groups and magazines in most countries where the problems are going to arise. Basically, being honest and telling the whole truth will help record companies to avoid expensive legal actions; *and* it will help sales. Why the latter? Because *CD*, for example, is an excellent archiving medium. What better medium to release definitive, classic analogue recordings? While the less discerning consumer will today wonder why a given disc sounds duff (and will blame the *CD* medium, so hurting sales), in a future labelled world, he would see that it was only digitally mastered, and know that he has the closest possible approach to the original, analogue, material.

At which point, I would like to make my own contribution to the suggestions already mentioned. I like the SPARS approach of dividing the recording process into recording, mixing and mastering and labelling them A or D, so, for example AD/D would have been recorded analogue, mixed to digital and cut to *CD*. But I do wonder if this scheme fits all the requirements. Plus, one may be superfluous: the mastering label. If it was a *CD*, the answer would be D; if it was a vinyl disc, it would be A *by definition*.

For the rest, let's consider the parts of the normal recording chain: from the mics (or whatever); into the desk (A or D); into the multitrack tape machine (A or D); into the desk (A or D); on to the master tape (A or D) and thence to the cut (A or D: label optional). I think we do not wonder about digital mics because by the time *they* arrive, there won't be a bit of analogue left in the place. If you have them, you'll have all the other necessary equipment because they might be the most difficult things to make but not the most expensive.

The five stages (one optional) above describe those parts of the chain which can differ audibly between today's studios. My modification of the SPARS idea then is to use A or D as they do, but define the four stages rather than three, adding the optional mastering label after a slash. For example: AADD/D = analogue recording console, analogue multitrack, digital mixdown console, digital master. It is also a digital disc, but you knew that by looking at it!

I leave it to the others to tell me whether in the long run an ADAD/D will be as good, or worse than, a DDDD/D (see October's Editorial). But I offer the 'recording, multitrack, mixdown, master/cut' system for consideration—and due modification.

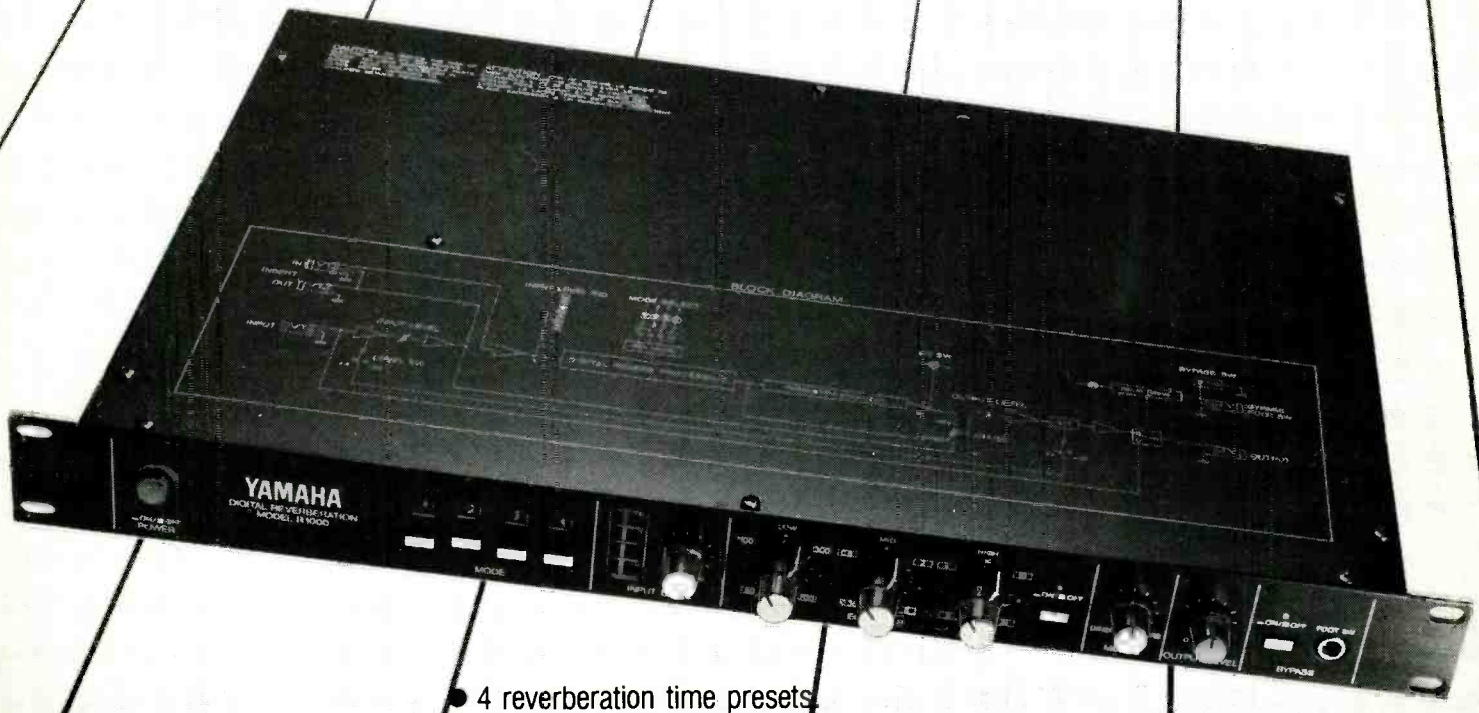
Richard Elen

YAMAHA'S R1000 DIGITAL REVERB

Digital reverb is accepted throughout the professional audio industry as representing the state of the art.

The R1000 brings digital performance to both the musician and the engineer, on stage and in the studio, for less than the cost of many spring devices.

It's pure fairy dust, and at £493.00 inc. VAT, it's going for a song.



- 4 reverberation time presets.
- 3-band parametric equalisation.
- 75dB dynamic range.
- Front panel or footswitch bypass unit.
- Insert loop for additional signal processing.
- Direct/reverb mix control for in-line operation.
- Eq in/out switch with LED indication.
- Compact 19-in. rack mounting.

YAMAHA

Yamaha Musical Instruments, Mount Avenue, Bletchley, Milton Keynes, Bucks, MK1 1JE
Tel: (0908) 71771. 24 hour Ansaphone: (0908) 649222.

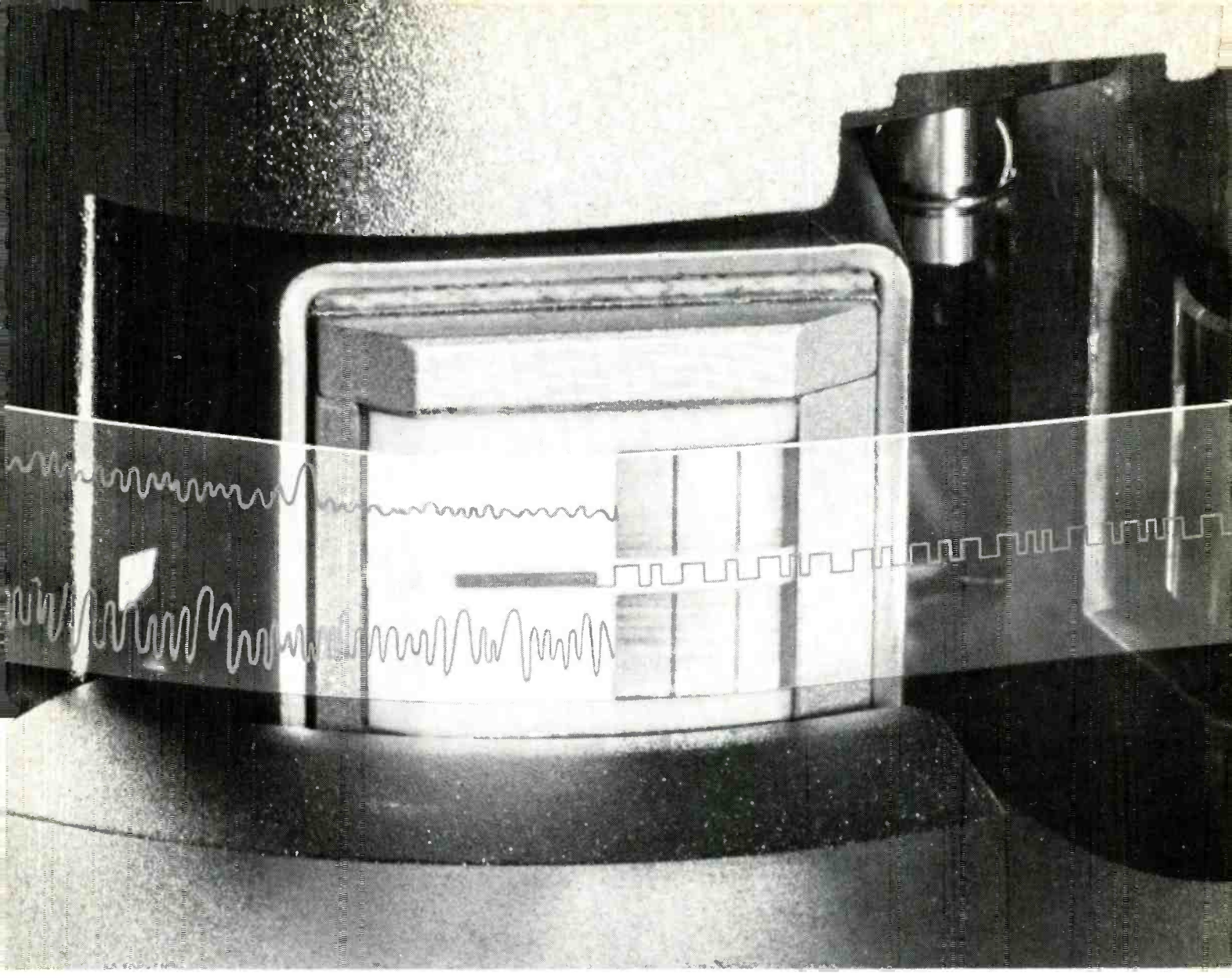
Whatever the event~ we're great mixers...

Combining top mechanical and electronic engineering with optimum size and weight the AD 145 Pico Mixer range is ideal for almost every occasion. Just take a look at these facilities

- Battery/Mains operated
- Phantom and AB mic. powering
- Mic. and line level inputs
- Hi-Pass filters
- 3 Band EQ.
- EQ by-pass
- P.F.L.
- Conductive plastic faders
- 1 or 2 Meters
- Talkback
- Cue facilities

Audio Developments Ltd., Hall La., Walsall Wood, Walsall, West Mid. WS9 9AU
Telephone: Brownhills (0543) 375351 Telex No: Audev G 338224

Audio DEVELOPMENTS
Sounds Perfect Every Time



TOTAL SEPARATION AND PERFECT TIMING.

These are the innovative features that place the microprocessor-controlled Studer A810 way ahead in the science and art of analogue recording.

The A810 incorporates a specially-developed time code system, utilizing a new combination head arrangement to input SMPTE code data on a 0.35mm wide central track between the audio channels on a ¼" tape. Two 'combi-heads' are employed, on either side of the audio record and reproduce heads. One head contains the time code reproduce gap and the audio erase gap; the other has the time code erase gap and time code record gap. Because the heads are totally separate, audio/code crosstalk rejection is better than 90dB.

An integral digital delay automatically compensates for the problem of audio/code time offset – at all speeds. During recording and playback, this delay holds the time signal until it is in exact synchronization with the audio output. Tapes can be spliced in the normal way without fear of removing SMPTE data.

Not only does this novel A810 time code system eliminate the need for a multi-track recorder when synchronizing stereo audio programs with video tape recorders, but it is also ideal for a variety of other applications: film audio editing, TV – simulcast, broadcast automation systems, A/V system control, and slow-speed logging.

And the A810 offers a host of other advanced features including: fully-programmable functions; a revolutionary memory system for electronic alignment parameters and different tape formulations; quartz-referenced capstan speed control with +/– readout; and many other monitoring and control options.

Just write or 'phone for full technical details.

Studer A810. A quantum leap.

STUDER
INTERNATIONAL AG
CH-8105 Regensdorf Telephone (01) 840 29 60

STUDER REVOX AMERICA INC Nashville Telephone (615) 254-5651
STUDER REVOX S A R L Paris Telephone 533 5858
STUDER REVOX CANADA LTD Toronto Telephone (416) 423-2831

F.W.O. Bauch Limited

49 Theobald Street, Boreham Wood, Hertfordshire WD6 4RZ
Telephone 01-953 0091. Telex 27502

The Professional Revox.

The PR99 has been developed from the highly successful B77 in order to meet the stringent demands of the recording and broadcasting industries. The PR99 offers the professional these important features:

1 Raised deck plate for easier editing
2 Improved tape start
3 Tape dump
4 Two-way self-sync with automatic sync/input switching
5 Balanced line inputs and outputs
6 Calibrated or uncalibrated level adjustments
7 Manual or remote control operation, with fader start

The Revox PR99 is available in several versions: mono or stereo 3¾/7½ ips NAB or 7½/15 ips NAB or IEC. And being built to Studer precision, the PR99 achieves exceptional performance and reliability but now at an easily affordable price.

For more information on the PR99 phone or write for a catalogue.

STUDER REVOX

F.W.O. Bauch Limited

49 Theobald Street, Boreham Wood, Hertfordshire WD6 4RZ
Telephone 01-953 0091.

MUSIC LAB
TOTAL STUDIO SUPPLIES

MIXERS

ALLEN & HEATH

21 Series	
621	425.00
1221	520.00
1821	665.00
2421	835.00
System 8	
12/8/2	1095.00
16/8/2	1270.00
16/16	1495.00
16/4/2	1150.00
EX-8	535.00
Syncon B	
B12 8/24	4028.00
B24 20/24	8695.00
B36 32/24	13150.00
B48 44/24	16648.00

BELL

24/16/2 Mixer	3600.00

ALICE

ML3	220.00
828/828S	795.00
1228	1025.00

TAC/TOTAL AUDIO CONCEPTS

TAC 10/4/2	2100.00
TAC 16/8/2	3248.00
TAC 8 Channel Extender	992.00
TAC 1682/16	3819.00

STUDIOMASTER

8/4	574.00
12/2c Mixer	607.00
16/4/2 Mixer	743.00
16/4/2 Mixer including Flight Case	210.00
16/8/2 Mixer	1026.00
16/8/2 Mixer including Flight Case	1094.00
16/16 Mixer	
16 Monitor	1316.00

EXPANDER UNITS

12/2c & 16/4/2 Add on Units	169.00
16/8/2 Add on Unit	182.00
Patch Bay Fits 12/2c 16/4/2 16/8/2	189.00

AMEK

BC 01 8/4 Mono Inputs	2857.40
BC 01 8/4 Stereo Inputs	4113.40
M1000 24/8/2 SR	9420.00
M1000 24/8/2 RM 8 Channel Monitor Mix	9970.00
Angela 28/24 In Line Console	14925.37
M2500 36/24 VU Meters	33296.00
M2500 28/24 VU Meters	28936.00
M2500 36/24 LED Meters	37326.00
M2500 28/24 LED Meters	32966.00
M3000 28/24 VU Meters	59284.00

SOUNDCRAFT

Series 15S	
12/2 12 Input /2 Output	1725.00
16/2 16 Input /2 Output	2025.00
20/2 20 Input /2 Output	2425.00
Series 200	
8/4 Channel Console	950.00
16/4 16 Channel Console	1350.00
24/4 24 Channel Console	1750.00
Series 400B	
16/4/2 16 Channel Console	2500.00
24/4/2 24 Channel Console	2770.00
32/4/2 32 Cahnnel Console	4000.00
Series 800B	
16/8 16 Input Console	4950.00
24/8 24 Input Console	6250.00
32/8 32 Input Console	7500.00
40/8 40 Input Console	9500.00
Series 1600	
16/8 16 Input, 8 Buss, 16 Monitor	4950.00
24/8 24 Input, 8 Buss, 16 Monitor	6500.00
24/8 24 Input, 8 Buss, 16 Monitor & Patch Bay	7500.00
32/8 Input, 8 Buss, 16 Monitor	7500.00
32/8 32 Input, 8 Buss, 16 Monitor & Patch Bay	9500.00
Series 2400	
24/16 VU 24 Input/ 16 Output	12500.00
28/24 VU 28 Input/ 24 Output	17500.00
28/24 LED	19500.00

TASCAM

Model 1 8/2	99.00
Model 2A 6/4	195.65
Model 30 8/4	650.00
Model 35 8/4	1125.00
M35 Expander	999.00
M09 4/2	130.43
M15B 16/8	4325.00
M15B 24/8	4999.00
M16 16/8	5999.00
M16 24/8	6750.00
Model 50 12/8	1755.00

YAMAHA

MQ 1202 12/2	805.00
MQ 1602 16/2	1092.00
RM 804 8/4 Recording	628.60
RM 1608 16/8 Recording	3400.00

TAPE MACHINES

TASCAM

234 4 Channel Cassette	504.34
22-2 2 track	346.96
52 2 track	1400.00
22-4 4 track	739.13
34 4 track	781.74
44 4 track	1300.00
38 8 track	1600.00
58 8 track	2700.00
85/16B 16 track	6900.00
244 Portastudio	595.65
122 Master Cassette	375.00
133 3 Channel AV	465.00
32 2 track	694.78

SOUNDCRAFT

SCM 762-24 2" 24 track autolocater remote	12900.00
SCM 762-24X 2" 24 track standard remote	11950.00
SCM 762-16 2" 16 track autolocater remote	10600.00
SCM 722-16X 2" 16 track standard remote	9650.00
SCM 381-8 1" 8 track	5250.00

SONY

Sony TCD5M Cassette	270.00
Sony TCD5 Pro Cassette	380.00
PCM F1	950.00

UHER

4000 Report Mono	387.00
4200 Report 2 track	446.00
4400 Report 4-track	446.00

REVOX

B77 Standard	637.00
B77 High Speed	652.00
B77 Low Speed	652.00
B77 Super Low Speed	714.00
PR99 Standard	935.00
PR99 High Speed	935.00
PR99 Mono	935.00

STUDER

B67 3 Speed 2 track	3222.00
B67 3 Speed VU 2 track	3534.00
A80/RC 2 track	5913.00
A80 VU 16 track	16903.00
A80 VU 24 track	23126.00

YAMAHA

MT 44 4 Channel Cassette	304.00

TIME DELAYS/EFFECTS

AMS

DMX 15-80S Stereo Main Frame	2365.00
DMX 15-80 SB Broadcast Version	2315.00
102 ms Delay Cards	130.00
408 ms Delay Cards	390.00
1.638 Seconds Delay	1170.00
Second Output for DMX 15-80	275.00
Pitch Change Option (Per Channel)	475.00
RMX 16 Free Standing Digital Reverberation	4500.00
Dm 2-20 Stereo Phaser/ Flanger	575.00

DELTA LAB

ADM 064 Deep Notch Flanger Doubler	215.00
ADM 256 ¼ Second Delay Effectron	340.00
ADM 310 Digital Delay Line	449.00
ADM 512 Programmable Super Time-Line	560.00
ADM 1024 1 Second DDL Effectron	399.00
ADM 2048 Programmable Super Time-Line	699.00
ADM 4096 4 Sec 15 KHZ Echotron	530.00

LEXICON

PCM 42	1184.00
Prime Time II	1816.00
Super Prime Time 960	2907.00
Super Prime Time 1.92	3108.00

KORG

SDD 3000 Programmable DDL	758.00

IBANEZ

HD 1000 Harmonic Delay	300.00
DM 500 Digital Delay	220.00
DM 1000 Digital Delay	260.00

MXR

Digital Delay Line	1196.00
Digital Time Delay 320ms	475.00
Pitch Transposer	907.00
Pitch Transposer Display	268.00
Pitch Shift Doubler	408.00
Flanger Doubler	338.00
Digital Time Delay 1 Second Delay	535.00

ROLAND

SDE 2000 Digital Delay Line	434.00
SDE 3000 Digital Delay Line	452.00
Dimension D	270.00

URSA MAJOR

Space Station	1843.00
8X 32	3900.00

VESTA

SF-010 Flanger/Chorus	239.13
MDL-1400ms Delay Line	125.00

YAMAHA

E1005	186.96
E1010	243.48

REVERBERATION

ANALOGUE

Vesta RV1	195.00
Vesta RV II	235.00
Great British Spring	200.00
Klark Technik DN 50	425.00
Klark Technik DN 50LA	435.00
Master Room XL 121	384.00
Master Room XL 210	688.00
Master Room XL 305	1265.00

DIGITAL

Lexicon 224	6630.00
Lexicon 224X	9315.00
Ursa Major Space Station	1843.00
AMS RMS 16	4500.00
Yamaha R 1000	406.00

POWER AMPLIFIERS

AMCRON

D75 2 x 80 W. 4 Ohms	350.00
D150A 2 x 140 W. 4 Ohms	435.00
DC300A 2 x 300 W. 4 Ohms	675.00
PSA2 2 x 400 W. 4 Ohms	1060.00

QUAD

303 2 x 45 W. 4 Ohms	136.00
405-1 2 x 100 W. 4 Ohms	213.00

STUDER

A68 2 x 100 W	790.00

B.G.W.

75		25W	265.00
150		50W	405.00
250D		100W	560.00
250E		100W	
with LED's			608.00
750C		225W	800.00
750B		225W	
with LED's			860.00
6000		100W	
Proline			405.00
7000		200W	
Proline			550.00
320B	---- ----	100W	
Commercial			585.00
620B	---- ----	200W	
Commercial			795.00

YAMAHA

P 2050 2 x 45 W. 8 Ohms	230.00
P 2100 2 x 95 W. 8 Ohms	348.60
P 2201 2 x 230 W. 8 Ohms	502.60
P 2200 2 x 230 W. 8 Ohms VU Meters	558.60
PC 2002 2 x 240 W. 8 Ohms	646.80
PC 2002M 2 x 240 W. 8 Ohms VU Meters	683.20
PC 5002M 2 x 500 W. 8 Ohms VU Meters	1979.00
PC 1002 2 x 100 W. 8 Ohms	439.60

STUDIO MONITORS

J.B.L.

4401	255.00
4312	730.00
4411	850.00
4430	2120.00
4435	2835.00
4612 PA Monitor	750.00

TANNOY

Dreadnought	4000.00
M 1000 Super Red	1540.00
M 2000 Buckingham	1600.00
M 300 Classic	1540.00
SRM 15X	1140.00
SRM 12X	680.00
LRM 12	610.00
SRM 10B	550.00
Stratford	120.00
K3808 Super Red Kit	760.00
K3838 Classic Kit	760.00

VISONIK

6000	100.00
7000	115.00
8000	146.00
9000	204.00
SUB 3 (each+	105.00

AURATONE

5C	55.00
5RC	78.00

A.K.G.

LSM 50	50.00

U.R.E.I.

Time Aligned 811	2242.00
Time Aligned 813	2836.00
Time Aligned 815	3184.00

YAMAHA

MS 10 Self Powered 20W	208.80

NOISE GATES

Ashley SC 33 Stereo	339.25
Accessit mono	44.95
Psionic 4 channel	399.00
Vesta MNT 1 MON	71.00
Rebis RA 201 mono	71.00
Scamp 5100 stereo	240.00
Valley People Keepex II mono	364.00
Drawmer Dual Gate DS 01	275.00

COMPRESSOR/LIMITERS

DBX

DBX 160X	322.00
DBX 165A	503.00

MXR

Dual Limiter/Compressor	395.00

U.R.E.I.

LA - 4	364.00
1178 Dual Peak	648.00

AUDIO & DESIGN

F 769X-R Vocal Stresser	1025.00
Gemini Easyrider	460.00

ASHLY

SC 50 Mono	289.77
SC 55 Stereo	470.00

VALLEY PEOPLE

Gainbrain II	364.00
Dynamite Mono	339.00
Dynamite Stereo	566.00

ORBAN

418A Stereo	790.00

REBIS

RA 301 Stereo	435.00
RA 203 Mono Module	129.00

SCAMP

Scamp S01 Module	267.00

DRAWMER

DL 221	325.00

MICROPHONES

A.K.G.

D 58E	30.00
D 80	21.74
D 109	34.00
D 130E	45.00
D 190E	45.00
D 310E	45.00
D 320EB	62.00
D 330EBT	99.00
D 1200E	62.00
D 12E	113.00
D 202E1	123.00
D 222EB	104.00
D 224E	179.00
D 900E	123.00
C 451E	89.00
C 451EB	114.00
C 452EB	114.00
CK 1 Capsule	59.00
CK 1S Capsule	69.00
CK 3 Capsule	59.00
CK 5 Capsule	110.00
CK 8 Capsule	110.00
CK 9 Capsule	137.00
CK 22 Capsule	63.00
C 414EB	379.00
C 414/P48	409.00

BEYER

M 201	87.00
M 260	83.00
M 400	73.00
M 300	42.60

NEUMANN

KM 841	163.00
U 47	435.00
U 87	445.00
U 89	498.00

SHURE

SM 57 LC	78.00
SM 58 LC	100.00
SM 59	116.52
SM 10A	82.00

SENNHEISER

MS 416	99.00
MD 421U	104.90
MD 441U	145.00
K3U Pre-amp	51.90
ME 80 Super Cardioid Capsule	56.80
ME 88 Gun Capsule	75.90
MKH 416TU	236.70
MKH 816 TU	302.10

COUNTRYMAN

EM101 9-50v	189.00
Em102 9v	156.00
EM202 9v	120.00

EQUALISERS

KLARK TECHNIK

DN 22 x 11 Graphic	525.00
DN 22/TX 2 x 11 Graphic (balanced)	613.00
DN 27A 1 x 27 Graphic	525.00
DN 27A/TX 1 x 27 Graphic (balanced)	569.00
DN 30/30 2 x 30 Graphic	845.00
DN 300 ⅓ Octave 30 Band	540.00
DN 301 ⅓ Octave 30 Band Attenuation EQ	565.00
DN 332 ⅓ Octave Stereo 16 Band	450.00
DN 360 ⅓ Octave Stereo 30 Band	845

TASCAM

GE 20 2 x 10 Graphic	150.43
PE 40 4 Band/4ch Parametric	208.70
PE 20 Parametric	97.39

Consult Music Lab for unbiased advice on all aspects of your Professional Audio requirements, including:-

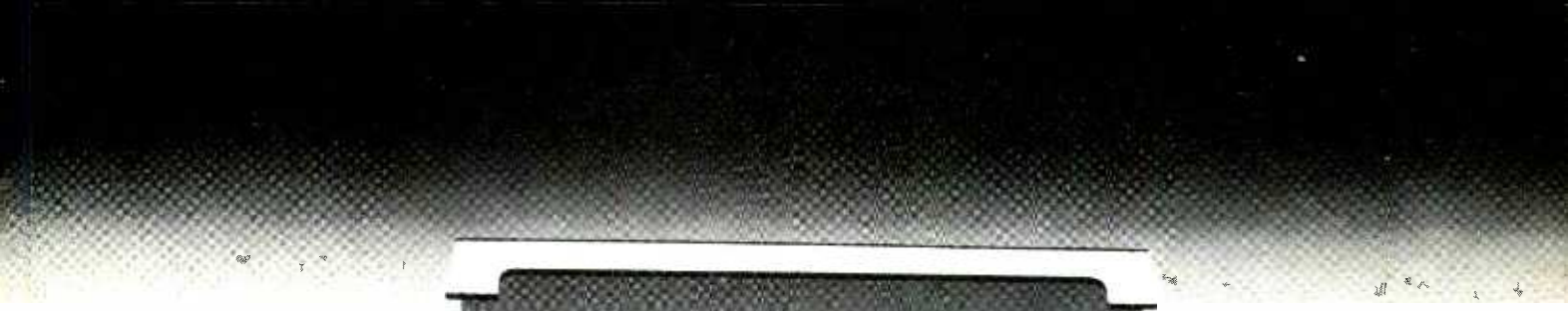
1. Equipment Sales – hardware and accessories.
2. Professional system design and installation by our highly experienced engineers.
3. Full after sales back up from our in-house Service Department.
4. Competitive pricing and fast delivery.

For personal attention please call Music Lab Sales on 01-388 5392.

MUSIC LAB

PRICES EX. V.A.T.

72-74 EVERSHOLT STREET, LONDON NW1. TEL: 01-388 5392.



THE MORE-AFFORDABLE 948.

From the makers of the world's finest broadcast turntables comes the EMT 948, a direct drive unit that embodies the proven circuitry and reliability of the EMT 950 in a compact format.

Featuring almost instant start (0.02 secs), stop and reverse cue; motor-driven tone-arm lift and integral amplifiers, the EMT 948 has a new shock-absorbing system and pick-up illumination.

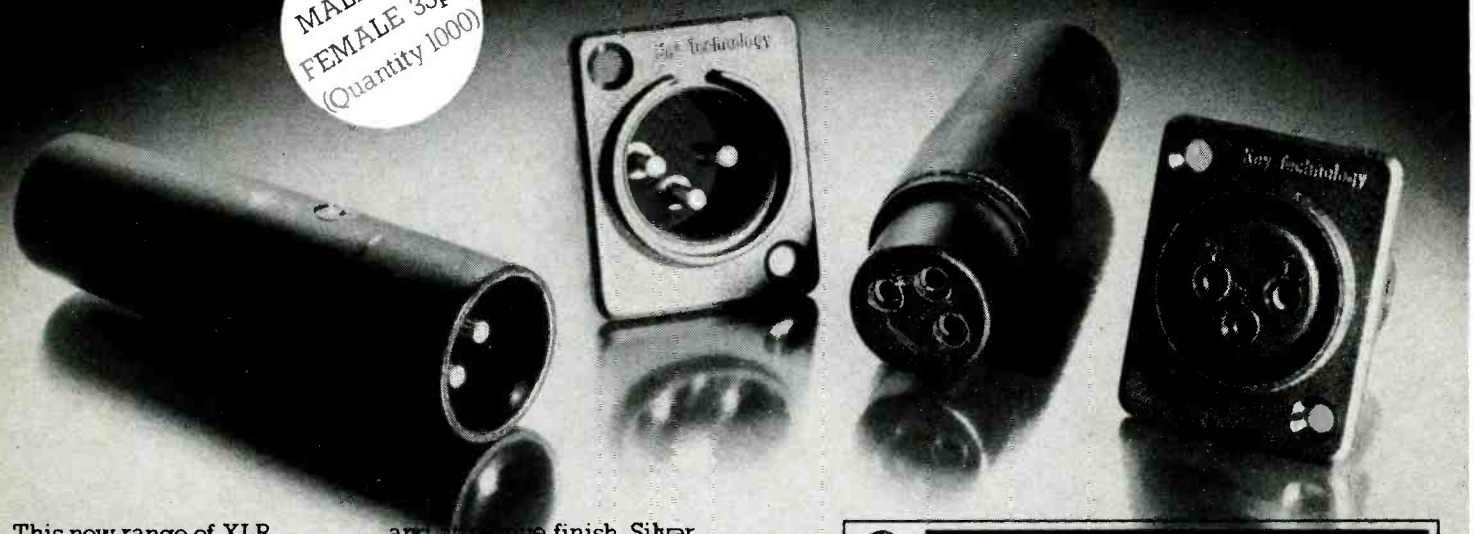
Available for use with a standard 47k-ohm cartridge, the EMT 948 is an integrated system ready to drop straight into a desk-top. The EMT 948 brings excellence within greater affordability.

For further information contact F.W.O. Bauch Limited.

EMT FRANZ GmbH
Postfach 1520, D 7630 Lahr. Tel 07825-1011. Telex 754319. Franz D

F.W.O. Bauch Limited
49 Theobald Street, Boreham Wood, Hertfordshire WD6 4RZ
Telephone 01-953 0091. Telex 27502

LOW COST XLR CONNECTORS



This new range of XLR connectors fill a demand in the audio industry for a high quality, inexpensive range of British made components. The chassis sockets are rear and front mounting, with a P.C.B. mounting socket also available. Made from glass-filled-nylon for a durable and attractive finish. Silver plated pins give low contact resistance and excellent solderability

The line connectors have been carefully designed with ease of assembly in mind, and good cable retention.

Connectronics

CONNECTRONICS LIMITED
20 Victoria Road
New Barnet Hertfordshire
EN4 9PF England
Telephone: 01-449 3663/4044
Telex: 8955127 SGAL G

CONNECTRONICS CORPORATION
652 Glenbrook Road
Stamford
CT. 06906 U.S.A.
Telephone: (203) 324 2889
Telex: 643678

A Sound Investment for Video and Broadcasting

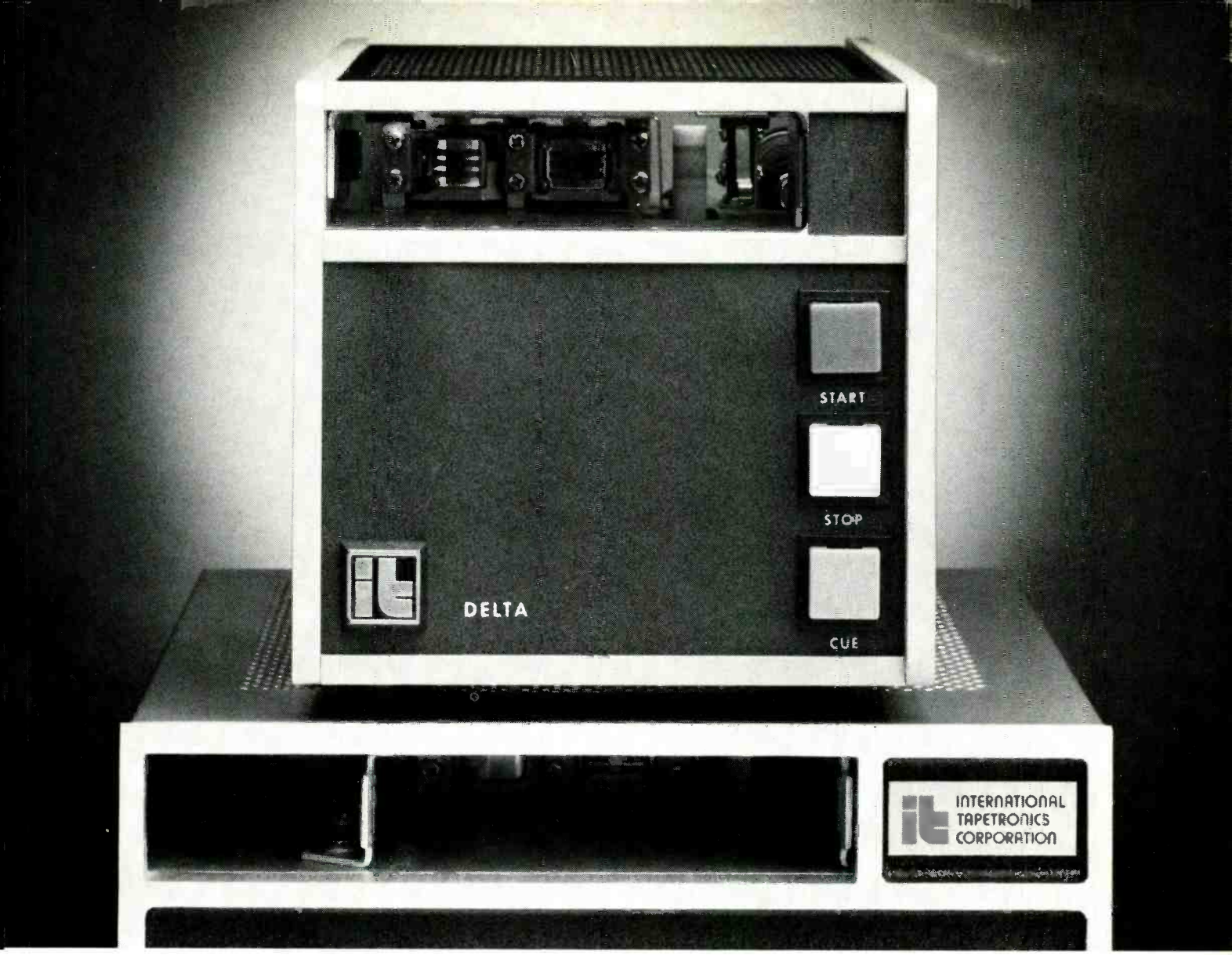
* General purpose stereo or monomixer.
* Fully modular in construction. Range of modules for Broadcast Video or Film use.
* Long throw plastic conductive faders standard.
* Sweepable Mid EQ/ 100Hz – 10KHz standard.
* Adjustable peak l.e.d. indicator on PPM and VU meters.
* Three standard frame sizes 12-18-24 module widths.

* Two large illuminated VU's as standard (PPM's as option) on rear meter bridge, which houses the Cue Loudspeaker and 6 digit stopwatch/ clock (hours-mins-secs).
* Note: stereo Line of Phono input modules are same width – 45mm – as Line/Mic module.
* Transportable for mobile use, or drop through mounting for fixed installations.

The Chilton CM2 and CM4 audio mixing console

CHILTON
EVERYTHING WE DO IS JUST THAT LITTLE BIT BETTER

Magnetic Tapes Ltd, Chilton Works, Garden Road, Richmond, Surrey.
Tel: 01-876 7957 Telex: 912881CW



WHY CHANGE A WINNER?

Now, a new generation of cartridge machines is available from ITC: the Delta Series. It represents a major advance in practical technology for the studio, and it took time to develop. Because significant breakthroughs don't happen overnight, especially when they have to supersede such a well-proven and dependable workhorse as the Premium Series.

So the Delta Series had to be something special. And it is. The culmination of extensive and intensive research and development over the past few years, the Delta Series is an electronically and mechanically superior range of machines – more compact, with improved performance, incorporating a host of new operating features, and realistically priced!

Of modular construction, Delta Series units are easy and convenient to align and service. Sound quality is optimum, with minimal flutter and smooth frequency. New features include: a microprocessor-controlled digital cue tone detector; a positive cartridge guide system; high-speed cue as standard; high-accuracy crystal-referenced servo capstan motor drive with a ceramic shaft; new low noise amplifier design; space saving fit three compact Delta Series into a 19" rack.

The Delta Series has been rigorously tried-and-tested in the field with outstanding results; for more information, just write or 'phone.

ITC. Sound quality.

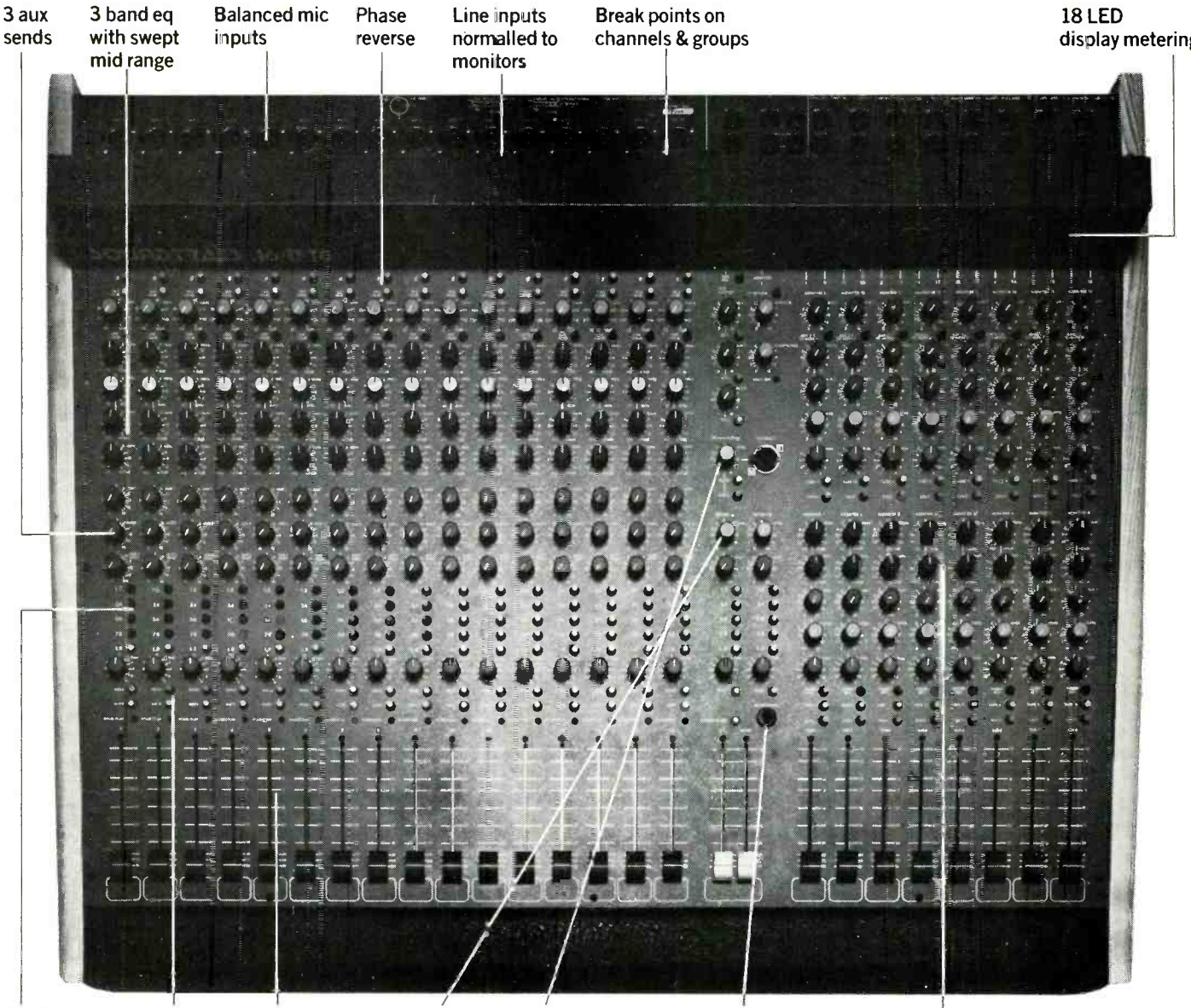
International Tapetronics Corp.,
2425 South Main Street,
Bloomington,
Illinois 61701, USA

F.W.O. Bauch Limited

49 Theobald Street, Boreham Wood, Hertfordshire WD6 4RZ
Telephone 01-953 0091, Telex 27502

Soundtracs 16/8/16 mixing console

At last a professional mixer for budget installations



Can be used as extra inputs on remix.
Mons 1-8 with EQ,
Fader Reverse & Solo.
Aux 1 on all Monitors for F/B
Aux 2 & 3 Switchable between Monitors

Features

16 mic inputs with 3 band eq and 3 aux sends and long fader when recording

24 line inputs with 3 band eq, 3 aux sends and long travel fader when mixing

Semi modular construction

External power supply (low noise)

48 Volt phantom power for condenser mics

Studio and Flightcase versions available

Unlike other mixers in the £1,000 to £2,000 price range the Soundtracs wouldn't look out of place with a professional multi-track machine such as the Soundcraft. The unique feature of the 16/8/16 Soundtracs is the ability to reverse 8 of the group and monitor faders, with eq on all monitors giving a full 24 inputs on remix all with eq, long fader and solo.

Soundtracs 16/8/16 with Fostex B16
£4,400 + VAT

Soundtracs 16/8/16 with Soundcraft 16 Track 1"
£8,000 + VAT

Don Larking audio sales

29, Guildford Street, Luton, Beds
LU1 2NQ Tel: Luton (0582) 450066
TLX: 825488

Turnkey is first for all Soundcraft systems

"Nobody knows Soundcraft better"

Complete systems featuring the Otari MTR90 Workhorse also recommended.
We offer highly competetitive prices on package systems.
Call us for full details or a quotation.
Nobody knows Soundcraft better

Challenger Plus

When the 2400 Series console was introduced, Soundcraft challenged the likes of MCI (Now MCI Sony) with more for less. And in true Soundcraft tradition these consoles became best sellers. When the 760-24 track recorder arrived, the added plus of a tape machine, resulted in an unbeatable multitrack system for the new generation of commercial studios. All the features demanded by both producers and engineers, in one package from Soundcaft. Challenger Plus continues its success. Normally we can deliver working systems from stock. Full design, installation and backup service are available. Prices start from £23,000.

"Experience is the key. Turnkey's commitment to our products has resulted in a stream of highly successful installations over the years.

They are the experts at putting Soundcraft systems in and making them run. And at keeping them that way.

For complete studio design, supply and installation service, we thoroughly recommend that you contact Turnkey
Nobody knows Soundcraft better".
Steve Gunn
Soundcraft Ltd.

Steve Gunn

Full range of Soundcraft Magnetic products available. Usually from stock.

Full specifications of all Soundcraft products on request

Eight track, by the Book

Soundcraft's original venture into tape machines was eight track. The 381-8 remains as the only truly compact one inch eight for the most demanding applications. Mated with the 400 Series console, the system offers professional standard compatability, very fast electronics and the widest possible dynamic range without need for noise reduction.

We can supply this system, by the book, from £7,199, plus full installation, etc, as required.

turnkey ***"Nobody knows Soundcraft better"***

The 200 Series is also suited for many PA and budget multitrack applications.

"Our technicians specialise in various fields. Their skills extend through pre-delivery checks, installation, comissioning and full backup.

We undertake callout service as well as regular maintenance contracts. Close contact with the factory means we tackle and solve any problem, fast.

Nobody knows Soundcraft better".

Duncan Crundwell
Turnkey Technical Manager.

Soundcraft Vision Systems.

If you belong to the minority of audio engineers who believe that the quality of sound with vision should match the picture, then the 200 Series modular console may well be your answer. It's built to Soundcraft standards of quality, meaning that both reliability and performance conform to the stringent requirements of video recording studios. Consoles offer up to 24 inputs, mount conveniently in any location, and the price brings the quality of Soundcraft within reach for any video application. Customisation, installation and interface available. Prices start from under £1,000.

"Our service only begins with the supply of all Soundcraft audio products. (mostly from our stock)

We also supply and deliver, on time, all of the ancillaries that help to make a studio work.

Add to this our Turnkey Two studio design service, experienced installation and backup, and you have a complete service of studio supply that no-one can beat.

Nobody knows Soundcraft better"

Garry Robson
Turnkey Sales Manager.

The Outstanding, Fifty Fifty Systems

Price is not the only reason why eight track is such an attractive proposition for production recording. The track count is plenty enough in many cases, easy to work with, in particular as used in self-op installations. Packaging the Soundcraft Series 400B with the Otari 5050 eight track, shows three distinct advantages. There's the economy of half inch, the bother free reliability of both brands, and the fastest and yet most comprehensive operating features in their class. Find out more about the Fifty Fifty systems from Turnkey, from just £4,999

This is a custom console. We can supply with up to twenty four input modules. Please call us for full information. Specialised mods are also possible on request. Nobody knows Soundcraft better

Other multitracks also available

Rock Bottom Producer System

The concept of the original Soundcraft Producer System was more than just offering advanced production facilities at a price.

Great emphasis, as always, was placed on providing a quality sixteen track system with a high standard of operational reliability. As well as offering the sixteen on two or one inch Soundcrafts, we also offer the Rock Bottom Producer package which includes the Tascam 85-16B. In our experience, this is the only competitively priced multitrack to come up to both the quality and reliability standards of Soundcraft. Producer Systems at Turnkey, start from £11,700

For full information on any Soundcraft product contact us at

turnkey

Brent View Road
London NW9 7EL
Phone 01-202 4366

"I thoroughly recommend Otari from Turnkey"

When a producer has triple platinum amongst his credits, and also owns his favourite studio, you can be sure that any upgrade is to the very best.

Application of these production skills and the audio quality of the very latest technology, add up to the success of Surrey Sound Studios.

The recent upgrade is to Otari, both multitrack and stereo mastering.

From Turnkey. A total service of supply, design, installation and backup commitment.

We congratulate Surrey Sound on their studio upgrade and for choosing Otari from Turnkey.

Call us about Otari and studio system design.

We are building the next generation of studios.

turnkey

Brent View Road, LONDON NW9 7EL. Telephone; 01-202 4366 Telex; 25769

We turn heads..

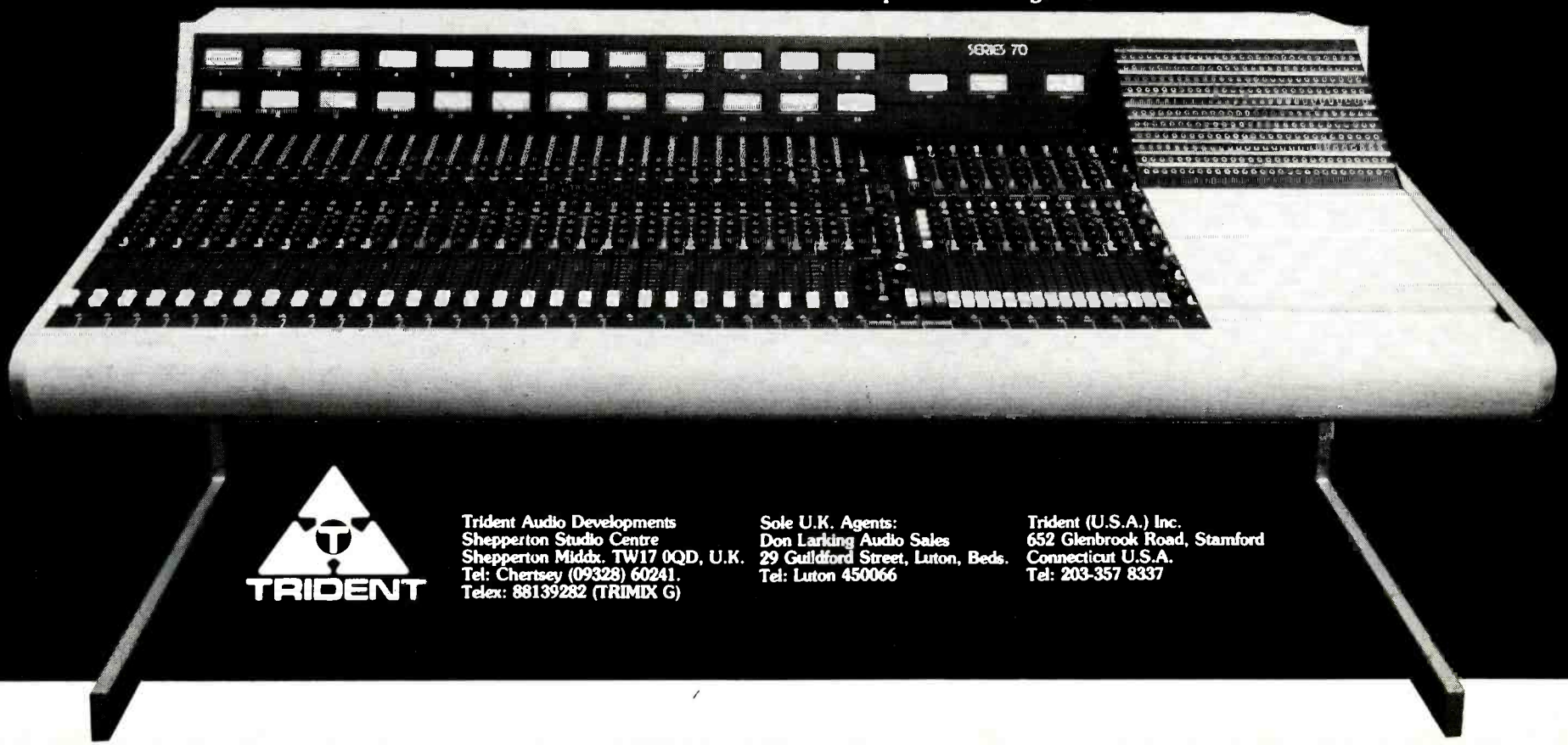
. . . and the new Series 70 from Trident Audio Developments is certainly stopping everyone in their tracks. It's versatile, it's compact, and the price is very right. Painstakingly and ingeniously designed with the 16/24 studio producer/engineer in mind, this mixing console will be attracting a lot of attention. With it's superb Series 80 styling the Series 70 is configured as a 28-16-24 frame with an additional 4 way echo return. An 8 way monitor module gives you full 24 track monitoring facilities.

The many excellent features include:

- 16 GROUP OUTPUTS AND SEPARATE STEREO MASTER OUTPUTS
- LONG THROW FADERS ON BOTH INPUTS AND OUTPUTS
- MONITORING FACILITIES INCLUDE, MONITOR PAN, MONITOR LEVEL, AUX SENDS AND MUTE FOR EACH GROUP OUTPUT/MACHINE RETURN
- FULL SUB-GROUPING FACILITIES
- V U METERS (LED PPMS AVAILABLE ON REQUEST)
- 4 AUXILIARY SENDS CHANNELS AND MONITORS
- 16 MONITORS ROUTABLE TO REMIX GIVING MAXIMUM 48 LINE INPUTS DURING MIXDOWN

Quality and value from Trident you are used to, but we are always searching for more. Here it is! Call us for more information.

We'll keep heads turning. . . .



TRIDENT

Trident Audio Developments
Shepperton Studio Centre
Shepperton Middx. TW17 0QD, U.K.
Tel: Chertsey (09328) 60241.
Telex: 88139282 (TRIMIX G)

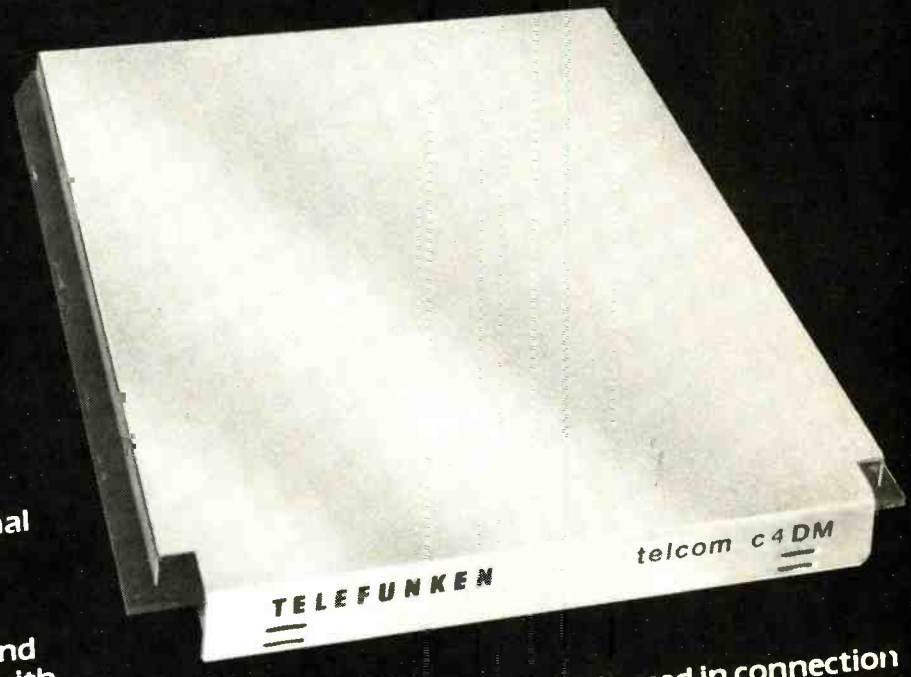
Sole U.K. Agents:
Don Larking Audio Sales
29 Guildford Street, Luton, Beds.
Tel: Luton 450066

Trident (U.S.A.) Inc.
652 Glenbrook Road, Stamford
Connecticut U.S.A.
Tel: 203-357 8337

The Analog Bites Back...

The telcom® challenge to Professional Digital Recorders

telcom c4DM challenges professional digital recording systems to offer for the same price:
Half the dynamic range, comparable Servicability, Similar standardisation and interchange ability.
Last but not least the telcom quality of natural sound.
Take an existing analogue recorder (two track or multi-track), add telcom c4DM and listen to the results!
telcom c4DM is the exceptional compander. Only this noise reduction system surpasses digital without the cost of completely new equipment and problems usually associated with implementing new technology.
telcom c4DM creates improved headroom, and high frequency resolution; lower distortion from tape, better crosstalk attenuation plus a 30dB gain in dynamic range.



telcom c4DM is used in connection with ATR's, VTR's and line satellite transmission.
telcom c4DM in its new format will fit your standard noise reduction frame.
Find out more about telcom and how you can make the telcom test.

Audio+Design Marketing

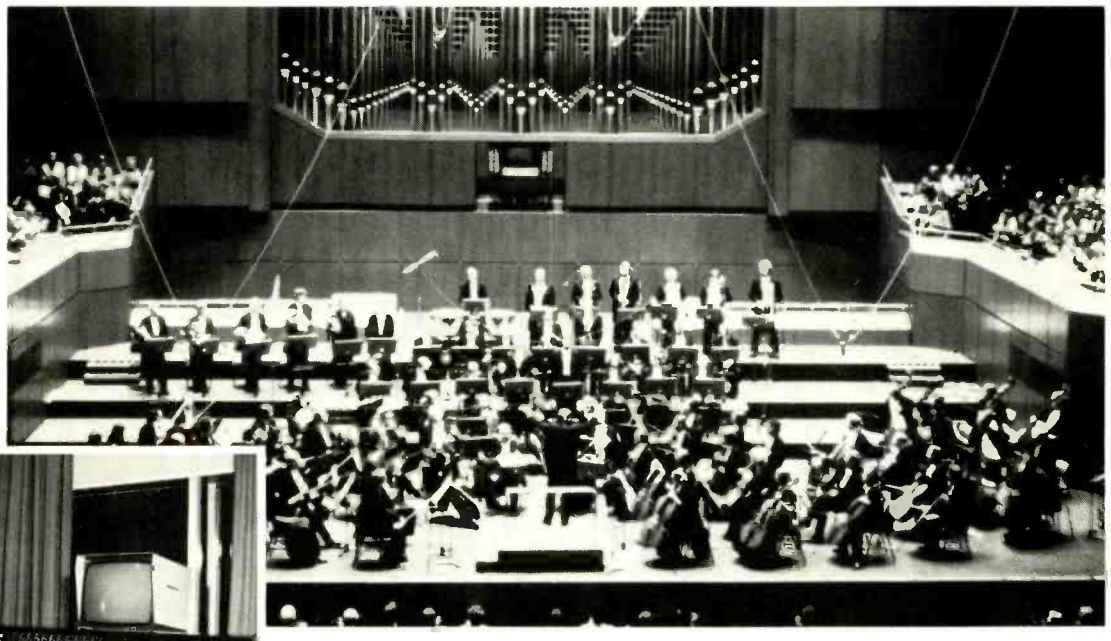
Audio & Design Marketing is a division of Audio & Design (Recording) Ltd.
16 North Street, Reading RG1 7DA Tel: Reading (0734) 53411
Telex: 848722 Grams: SCAMP, READING

TELEFUNKEN

ANT Nachrichtentechnik
Lindener Str. 15 D-3340 Wolfenbüttel
Phone (05331) 83-1 Telex 95651 antd

When you hear this orchestra live and in Hi-Fi,

ANT 8227E WAK



ANT is also in the play.

The highest quality the present-day technology can provide is required when transmitting high-grade orchestral performances. The numerous studio facilities, system components and completely furnished outside-broadcast vehicles delivered by our company fulfill these requirements.

We were right from the start active in the development of sound-broadcast and studio technology and made our technical contribution in these fields. Also today, sound-studio technology remains on of the most important areas of activity of our renamed company, whose equipment you knew until now under the label of TELEFUNKEN.

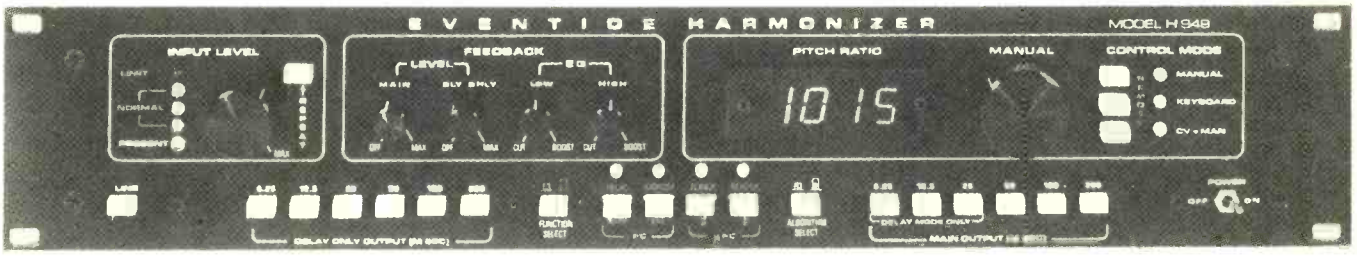
Other activity areas of ANT Nachrichtentechnik in Backnang, West Germany, are:
multiplex systems – radio-relay systems – telecommunication cable systems – communication satellites and earth stations – special communication systems.

Reasons enough to maintain the connection with us.

ANT Nachrichtentechnik
Gerberstrasse 33
D-7150 Backnang
Telephone (07191) 13-1 · Telex 724406-0

ANT
Nachrichtentechnik

You hear it on thousands of albums and singles and on countless tours. Yet each time it sounds different, because this one unit gives you the most ways to express your musical creativity: True pitch change. Digital delay. Chorusing & A.D.T. Flanging. Echo and reverb effects. Time reversal and repeat... and much more. It can even expand and compress time! You can control it manually, with a keyboard, or even with a computer. Artists and engineers all over the world demand its legendary performance and dependability. It all adds up to this – nothing else you can buy does so much, so well as the Eventide H949 Harmonizer.



Haven't you done without it long enough?

Or if your budget's really squeezed... Take a look at Eventide's H910 Harmonizer

Marquee Electronics

U.K. DISTRIBUTOR

90 Wardour Street,
London W1V 3LE.
Telephone: (01) - 439 8421
Telex: 894278 Entec G

Showroom at 10 Richmond Mews

FACT..

IF STUDIOSPARES CATALOGUE IT STUDIOSPARES STOCK IT.

ORDERS PROCESSED WITHIN THE HOUR!

FACT..

STUDIOSPARES MAINTAINS THE UK'S LARGEST COMBINED STOCKS OF TAPE & CASSETTES CABLES & TEST GEAR ACOUSTICS & ACCESSORIES LEADS

THE INDUSTRY'S MOST COMPREHENSIVE FREE CATALOGUE

AKG SENNHEISER dynamic condenser lavaliere	QUAD amps speakers every model	REVOX B77 PR99 B710 every recorder	DBX noise reduction compressors every model	TANNOY monitor speakers 7 models
REBIS rack effects units every module	CROWN PZM & amps	AURATONE monitors 3 models	ALICE	SPENDOR BBC broadcast monitors
D & R signal processors reverbs every model	PENTAGON digital & audio cassette duplicators	AMPEX AGFA WEBBER audio & video test tapes & cassettes	MXR signal process every studio model	THANDAR 7 models
CABLES Connectronics multiway mic speaker power	ACOUSTILES foam acoustic tiles	LEADER oscillators chart rec scopes millivolt DVM etc 16 models	BULLDOG leads 70versions	FERROGRAPH test sets
G.W. INSTRUMENTS scopes oscillators DVM's UVM's etc	PLUGS adaptors sockets audio video	DE MAGNETISERS Ferrograph cassette Teac	I.T.D audio digital duplicating 20,000 in stock	PANTEC digital & analogue meters

16 Stucley Place Hawley Crescent
Camden Town London NW1 6NS
Acounts/Admin 485 4908 Orders 482 1692

1 Minute Camden Town Station

STUDIO SPARES STUDIO SPARES STUDIO SPARES

new products

Tascam 234 Syncaset

Tascam have announced a new 4-track cassette recorder in rack mount form. The *234* is fully compatible with the portastudio cassette formats and will be rather less in cost than those models. It allows recording on any combination of channels at the same time. The rear panel has inputs suitable for use with mic/instruments together with a coarse trim pot, and line in and out sockets. Front panel features include VU meters, peak level indication, input level control and a dual-concentric output level/pan control for providing a stereo output for monitor or cue use. Noise reduction is provided in the form of dbx that may be switched out. The *234* has return-to-zero and memory functions. There is also provision for record and transport remote.

Teac Corporation, 3-7-3 Naka-Cho, Musashino, Tokyo, Japan. Tel: (0422) 53-1111.

UK: Harman Audio UK Ltd, Mill Street, Slough, Berks SL2 5DD. Tel: 0753 76911.

USA: Teac Corporation of America, 7733 Telegraph Road, Montebello, CA 90640. Tel: (213) 726-0303. ▼

Soundtracs CM 4400

Soundout Laboratories have a new addition to their mixer range, first shown in a prototype form at the Eindhoven AES convention. The *CLM 4400* is a modular console with microprocessor-controlled routing. The mixer is available in five different frame sizes and may also be purchased with the frame only and the modules added as required. The frame sizes vary from 16/8/2 to 32/12/2.

Each input channel has one routing switch and the microprocessor allows the channel to be routed to as many sub-groups as there are in the console and the stereo master bus. Additionally, the auxiliary returns are all assignable to the sub-groups and masters. There are four ways to interrogate the system: press the routing switch on each channel or the aux return and the sub-group master it is routed to will display via an LED; press the sub-group or master and the channels or aux returns routed to it will illuminate LEDs; the input/sub-group assingments can be displayed on a TV monitor; or via a video output to a video display with a keyboard.

Each sub-group is a stereo pair and each monitor section of the sub-group can be switched to a tape return allowing, with the two aux returns per sub-group, 24-track monitoring.

Specification: mic input: electronically balanced 7 kΩ; max input: 0 dB with pad, +30 dB without pad; pad attenuation: 30 dB; gain range: +20 dB to +60 dB; slew rate: 10 V/μs; equivalent input noise ref 200 Ω 20 kHz bw: −127.5 dBm; line input electronically balanced 10 kΩ; max input +30 dBm; trim range: −10 dB to +20 dB; protection: to withstand ±50 V; channel low pass filter: −12 dB/oct 50 Hz or 200 Hz; equalisers: 4-band all ±15 dB HF 12 kHz, M1 500 Hz-10 kHz, M2 50 Hz-1 kHz, LF 50 Hz; between channel crosstalk: −80 dB 1 kHz, −70 dB 10 kHz; mic/line crosstalk: −85 dB 1 kHz, −80 dB 10 kHz; sub-group output: transformer balanced; max output level: +22 dBm; frequency response: −2 dB 25 Hz to 25 kHz; output impedance 50 Ω; meters: 30 element LED peak response; distortion: IM and harmonic less than 0.015% 100 Hz to 10 kHz; mix noise: 28 inputs and 16 tape returns mixed at unity gain −74 dBm ref 20 kHz bandwidth. 0 dBm = 0.775 mV.

Soundout Laboratories Ltd, 91 Ewell Road, Surbiton, Surrey, KT6 6AH. Tel: 01-399 3392. Telex: 895173.

USA: Soundtracs Inc, 262a Eastern Parkway, Farmingdale, NY 11735. Tel: (516) 249-3669.

Loft Model 400

Loft have announced the *Model 400* which is a 4-channel feed-forward limiter/noise gate. Each channel contains controls for noise gate threshold (infinity to 0 dBV) limiter threshold (−12 dB to +12 dBV) and limiter attack/release time (1 ms to 1 s). To aid adjustment of the gate and limiter thresholds, both have LED indication. Each channel also has a phase reverse switch.

The *Model 400* is a rack mount unit using 1 U rack space and is standard with balanced inputs and jack plugs. Other versions are available with *XLR* sockets and recessed front panel controls.

Specification: Input impedance: 40Ω; output impedance: 600Ω; max input level: +24 dBV; max output level: +12 dBV (max limiter setting); THD below limiting: less than 0.01%; THD above limiting: less than 0.1%; frequency response: 20 Hz to 20 kHz +1 dB; noise: −90 dB A weighted.

Loft Professional Audio Products, Phoenix Audio Laboratory Inc, 91 Elm Street, Manchester, CT 06040, USA. Tel: (203) 649-1199.

Pilkington PPM 16/ADS

First shown in pre-production form at APRS 83, the *PPM 16/ADS* made by Pilkington Fibre-optic Technologies under licence from the BBC, is a multiplexer designed to allow analogue control, digital and switch data to be transmitted simultaneously over a single optical line. The design of the unit is such that the functions of the multiplexer can be changed and mixed easily.

The basic system consists of a 19 in 6 U rack package fitted with power supply, master multiplexer and card spaces to accommodate 16 channels. Each operating input must be used with a channel card to organise and address all dafa to and from a complementary interface card. The interface card sits between the parameter to be transmitted and the channel card and organises the data into a form which can be transmitted through the channel card. The interface cards are designed to be used for just one type of data input.

The unit has an asynchronous RS232 or RS422 port, the interface being switch selectable. One data channel can be transmitted by each interface card with the maximum data rate on each channel being 2400 kbit/s.

The unit has the ability to accept full duplex analogue data in the range 0-5 V and DC-20 Hz. The analogue values are converted to 8-bit resolution.

Each switch interface card installed can accommodate 256 switch conditions although it would normally be configured to accommodate 128 switch contacts and transmit definite open or closed states. Associated with each switch card there will be a number of switch coder cards to provide address codes. The absolute worst case response time is less than a second with 4,096 switches on the system. In the event of a transmission failure, both analogue and switch cards store the last received value in on board memory.

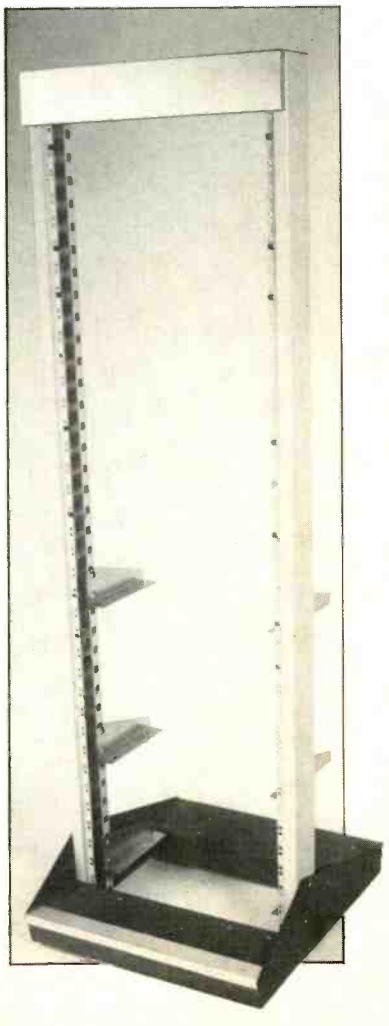
The advantages offered by this system Pilkington claim include secure remote operation of studio equipment, distances greater than 1 km between local and remote units and the fact that optical cables offer easy installation with no break-through into nearby programme cables.

Pilkington Fibre-Optic Technologies, Glascoed Road, St Asaph, Clwyd LL17 0LL. Tel: 0745 583301. Telex: 61291.

ETL open racks

Enclosure Technology have introduced three heights of *Laboratory Rack* to their range and these are now available ex-stock. These racks are metal frameworks for standard 19 in systems but with easy rear access. The framework design has been kept simple but ETL claim that it retains the strength of an enclosed 4-corner cabinet. Chassis support runners are available to clip into the vertical members and support units requiring it. Three heights are available with 25, 36 and 42 U capacities and all versions are on castors.

Enclosure Technology Ltd, Unit G Southampton Airport, Southampton SO2 2HG, UK. Tel: 0703 614533. ■



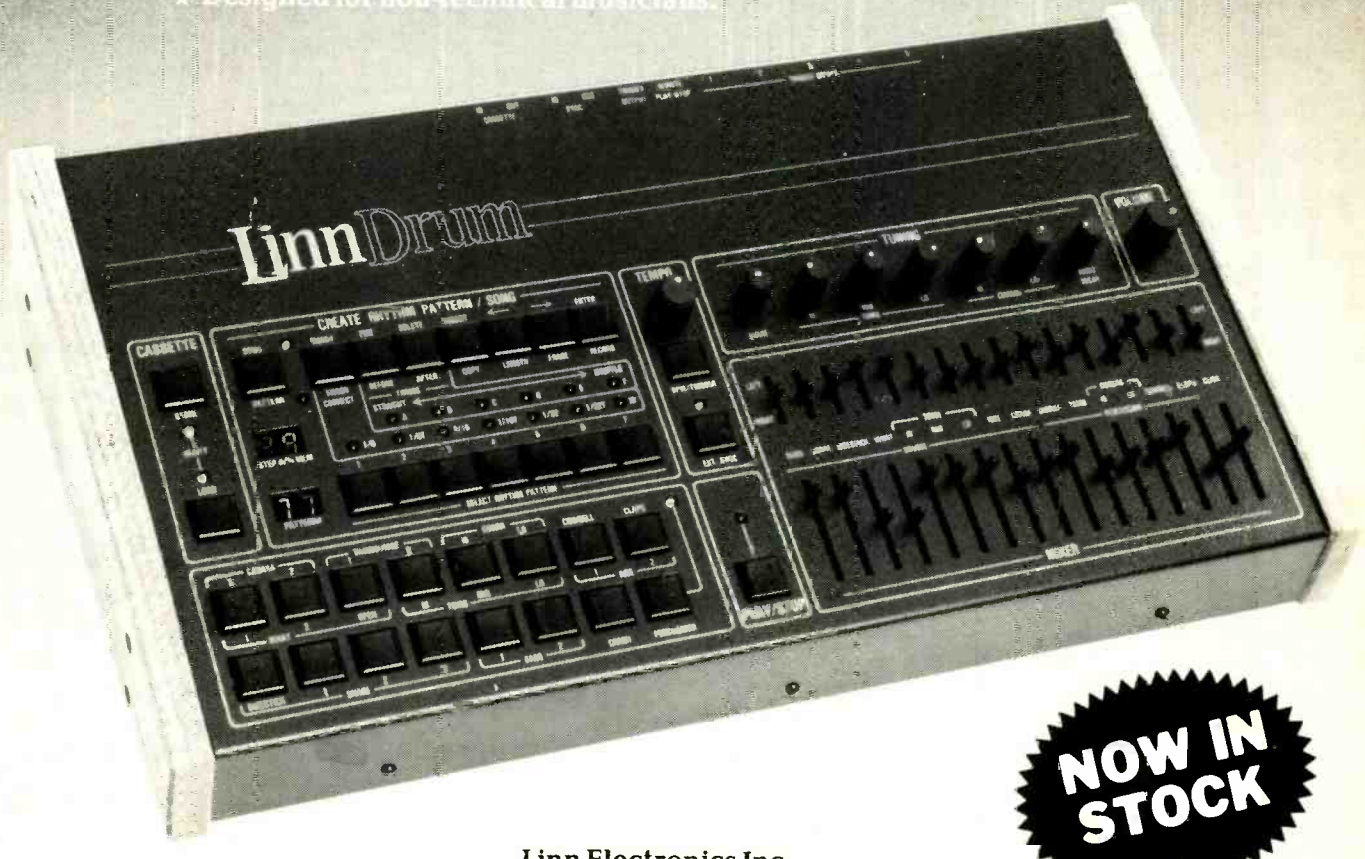
The best gets better!

LinnDrum

successor to the much acclaimed LINN LM1

The playable drum computer featuring:

- ★ Real drum sounds of studio mastering quality stored digitally.
- ★ Crash and ride cymbals, bass, snare, sidestick snare, open and closed hi hat, cabasa, tambourine, 3 toms, 2 congas, cowbell and hand claps.
- ★ 49 rhythm patterns – all programmable in real time with adjustable error correction.
- ★ Stereo mixer with volume and pan sliders, plus separate outputs.
- ★ Dynamics, song structure, time signature and "human rhythm feel" are all programmable.
- ★ Drums tunable by front panel controls or control voltage inputs.
- ★ Drums may be externally triggered by drum synthesiser pads or any audio source.
  Will sync to tape/sequencers/synthesisers.
- ★ Programmed data is retained with power off, or may be off-loaded to cassette.
- ★ Drum sounds are user changeable.
- ★ Designed for non-technical musicians.



NOW IN STOCK

Linn Electronics Inc.

Distributed by:

Scenic Sounds Equipment Limited

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

studiofile

Eastcote, London

Horses and aircraft spares may not seem to have much in common, let alone anything to do with sound. But both played their part in the history of ex-Blockhead Chaz Jankel's studio in Ladbroke Grove.

Built inside old stables used for manufacturing interior mouldings for 'old planes', Eastcote could be described as a classic example of sound recording in the old tradition, with modern equipment. You won't find sculpted rocks, *Total Recall* or shag pile carpet at Eastcote. But you will find all the essential hardware with a number of extras, a staggering array of instruments, hand-tailored acoustics, and an informal atmosphere.

The studio is split into distinct areas with bright, standard and dead acoustics, forming an arc around an unusually panoramic control room window overseeing all three.

Engineer Philip Bagenal met Chaz Jankel after studying architecture. "I wanted a mix of art and science," he says. But his interest in music and recording took over and he opted for sound engineering. "It's a blend of high technology and witchcraft really," he says. "There's a lot more scope for inventiveness and spontaneity—you can create a strange chemistry just with musicians passing through—but it's important to retain a discipline."

Philip built a basic studio in Chaz's house using a Teac 4-track, where they demoed *Aino Correda,* subsequently made into an international hit by Quincy Jones. After that Chaz got a deal with A&M Records and wanted to build a proper 24-track studio. All the familiar inducements were there—a studio would allow complete control over his music, provide a good investment, and offset tax.

"A&M were very polite with us," says Philip, "but to be honest, some of the initial sessions weren't very good from an engineering point of view. We also had a tendency to spend too long on things.

"I can remember one instance where it took me two months to mix one track. Two months! The time just ticked away because we treated the studio as a free facility. The truth is that any studio, whether it's your own private place or not, costs money to run and you've got to give yourself targets to make it work efficiently."

For the first year Eastcote was indeed just a private studio for Chaz, and such lessons were learned during that time. But for the past nine months the studio has been operating as a commercial facility going out at £300 per 10-hour day. But its retained a homely feel and unpretentious decor.

"A lot of studios spend vast amounts of money on an impersonal and almost institutional environment," says Philip. "The danger is that the music can become clinical and 'safe'. Some of the producers working in these environments seem to use the sort of approach you'd adopt on a building project," he adds knowingly.

"Most engineers are familiar with the situation where the demo ends up with a better feel than the finished master. We try to minimise the distraction from the environment and recording process as much as possible, so that the music doesn't become stale in long drawn-out sessions," says Philip.

Out in the studio, the live end has a parquet floor with brick walls and a curtained mirror.

"Fortunately for us the building wasn't built square," says Philip. Tuned absorbers are scattered at random around the walls, producing a room that was "great for horns and percussion." After hearing a recorded example, I felt inclined to agree.

The middle section houses an immaculately polished Steinway grand (with duster) plus a wealth of electronic keyboards betraying the musical inclinations of the studio's owner. These include a Clavinet, Fender Rhodes, Hammond organ, Oberheim *OBX* (with an 8-voice out at the moment), PPG digital synth, Roland *Juno*, Wurlitzer, and even an old upright piano. Rolls and rolls of rockwool lie above the suspended ceiling, yet the area has a pleasantly restrained acoustic to it, rather than the dead as a doornail fashion of years gone by.

The third section, nearest the exit, has a noticeably different feel for vocal work. And what's this? Handle-less dustbin lids on the walls?

"That's a little experiment of mine which seems to work. I don't know if you've ever tried to buy dustbin lids without the bins, but it's not easy," says Philip, who eventually tracked down a bin-maker and bought the lids before the handles were riveted on. "I was going to mould solid wave breakers out of plastic using one master lid, but they were difficult to make and very heavy," he adds.

The relatively large control room ("useful for overdubs") uses more conventional ply-faced, semi-cylindrical wave breakers mounted vertically and horizontally on panels, with a raked tongue and groove ceiling behind the Trident *Series 80* desk. The multitrack is an Otari *MTR-90*, with Studer *A80 RC* (½ in) and Leevers-Rich stereo machines. Plus a Sony *PCM-F1*.

"The *F1* is a really useful machine, despite the fact that it only costs about £1,400," says Philip. "We sometimes use it for mastering, and a lot of other studios have them so it's easy to exchange tapes. But you can also 'stretch' a 7 in single into a 12 in club mix with the *F1*. Basic tracks are repeated and extra material added, without the quality loss that would normally result.

"Similarly, you can repeat choruses anywhere in a recording, and use it to add effects recorded outside. An extra bonus is that producers and musicians can take a copy home and play it on their own Betamax VCR with a PCM adaptor."

A 15 in pair of Tannoy *Reds* beam down from recesses above the control room glass, with a 12 in pair available for studio playback. "I wish Tannoy would put better crossover pots in their monitors," commented Philip. "They're very coarse and tend to shake out of adjustment—I have to line them up regularly when a few more pence on components would solve the problem."

But like 99% of all known studios, Eastcote also uses a pair of small monitors on top of the desk. The amazing thing is that they don't carry the legend 'Auratone'. What's going on here, I wondered.

"At the moment we're using a pair of Yamaha *NSM10*'s, which came over about six months ago and are really taking over from Auratones," says Philip. "We've also got some JBL *4343*'s, and some Visonik David mini-monitors. The minis are good for simulating the 'boom tiss' syndrome of a hi-fi with treble emphasis, bass emphasis—and probably loudness—in circuit."

It didn't stop there. "If necessary we can play through an old portable cassette speaker, and we've also got an original Roberts radio with a special filter to simulate AM reception. Back in the depressingly unreal world of studio excellence, Eastcote uses a pair of 27-band graphic EQs feeding H/H MOSFET amps.

Three plates and a Lexicon *224* provide reverb, while the tricks dept boasts the usual stuff plus an ADR *Panscan* which counts beats (eg claps) and pans on the required pulse, with a number of other variable settings.

The studio recently finished Chaz Jankel's third album called *Chazablanca*, released in early August. Six tracks were recorded at Compass Point, but so many overdubs happened at Eastcote that only two can really be called Compass tracks now. After pre-releasing *Without You* as a single, a second single is due out on September 23rd called *I Can Get Over It*.

Anyone who remembers the *Chazanova* album (another Ian Dury title suggestion) will be fascinated to know that the start of hits *109* and also *Glad to Know You* (which sold a very large number of 12 in singles in the USA) was the sound of a *Claptrap* through various devices. "I don't use that so much now," says Chaz.

Recently Eastcote has been busy with a band called Safari No-Go (Phonogram). "They're a 10-piece German band with a sort of cabaret and highlife funk/dance style," says Philip, "and great fun to work with."

That's just as well. Our Phil had been up all night mixing when I visited Eastcote in the mid-morning. That merciful device which even stops engineers from working, the Master Power Switch, was off for all of a quarter of an hour while I had a nose around. "Oh well, better do some work, I suppose," said Philip, and I bade him goodbye. What was that about the glamorous life of the recording engineer? 32▶

Eastcote Studios, 249 Kensal Road, London W10, UK. Tel: 01-969 3739. **Richard Dean**

An amazingly versatile, fully programmable Digital Drum Computer...

The MXR Drum Computer. With a full complement of features and functions, it rivals the performance of a high-cost system—at an affordable price. And it's simple to use.

• 12 real drum sounds, digitally recorded in memory: Kick, snare, rim shot, toms 1, 2 & 3, hi-hat open and closed, crash cymbal, claps, block, and bell • Individual level controls and outputs for all voices • Capacity: 100 patterns of up to 99 beats each, 100 songs • 2000 drum beat memory • Seven accuracy levels from 1/8 notes to 1/32 triplets • Infinitely variable time signatures • Tempo adjustable from 40 to 250 beats per minute • Built-in click track (metronome) • Four shift levels for human feel • Pre-panned stereo outputs • External trigger for all voices plus accent • Tape/sync interface • Memory-tape interface • External tempo capability • External voice expansion • Exclusive MXR one-year *full* warranty

MXR

...the musician/engineers

MXR Innovations, (Europe)
1 Wallace Way, Hitchen, Herts.
England SG4 0SE
Phone 0462 31513

MXR Innovations, 1 Wallace Way,
Hitchin, Herts. England SG4 0SE

☐ **Please send me information on the MXR Drum Computer.**

SS-11

studiofile

Feedback, Denmark

Denmark, a hitherto unknown studio territory for this writer, proved rather interesting. Although on the face of it studios must be fairly similar worldwide, each country has its own particular advantages and disadvantages peculiar to itself, not least of all Denmark.

Feedback studios are situated in Aarhus, Jutland and is one of surprisingly many 24-track studios in this small country. In true Scandinavian style, the rooms are very attractively finished with a great abundance of natural pine.

Feedback belongs to the founder members of the rock band Gnags, who are currently one of the top bands in Denmark—at the time of our visit they had been in the top 10 for 20 weeks running. The studio has grown up by the familiar route of initially being a rehearsal studio and demo place for the band, starting out with just two Revox machines 10 years ago.

In 1975, some rebuilding took place and it became 16-track based around a Danish desk—NP Elektroakustik—but was still primarily for the band's own use. Last year, however, it was decided to turn 24-track and go into business in a big way. This was the beginning of a great deal of research, planning and building which the rather large staff threw themselves into with a will.

The result is a very professional outfit. The building itself used to be a carpenter's workshop and is all on one level with direct access from the driveway for loading and unloading gear. The rooms were completely gutted and rebuilt on the 'room within a room' principle, and both the control room and the recording area are very large, with the studio itself being on the live side.

It was planned so that the acoustic could be varied through use of carpeting and curtaining but the one engineer we spoke to—Jens Nielsen (one of seven)—said that he had never done this as he found the room perfect as it is.

The floor consists of floating paving stones covered in pine. The ceiling had to be raised and treated with only a minimal amount of traps. The rear wall and one side wall consist of wooden panels mounted directly onto three layers of chipboard. The other two walls also have rock wool treatment and throughout baffles were hung inside the walls. The wooden panels are interesting in that they are all separated to avoid sound travelling round the room and the panelling consists not of solid pieces of wood but of approximately 3 in wide planks placed on the diagonal with gaps in between. During the course of building, an acoustician from the Technological Institute was called in and recommended the optimum gap for the best acoustic. So although the overall effect is fairly live, the separation is deemed to be 'incredible'.

One portion of the room is actually designated 'live' and has a stone floor. Although this is intended for drums and the like, Jens will often use the whole room for his drum sound.

Work is at present in progress on an isolation room off to one side of the studio. This room is again very large, and although much had already been done, it had still not been decided whether this should be a really dead room or simply another room where the acoustics could be varied to function as a separate room.

The control room is of slightly older vintage, having been built in the 1978 reshuffle. It is, however, along the same lines. The ceiling had to be raised and angled, bass traps placed in the rear section. Similarly, the walls have received the same treatment except for a small section, roughly 4 ft square on the side walls next to the monitors which are of Danish stone (well, that's what we decided to call it in the end since nobody knew what it was). This is the only thing that Jens has any reservations about, and he is of the opinion that after a few more of their democratic engineers' debates, it may well be removed!

The centrepiece of this room is the Amek *M2500* desk—the first Amek to be installed in Scandinavia. Amek took a great deal of trouble to make sure that everyone fully understood the desk, and the installation took place with no problems whatsoever. The only extras they asked for were some more patch strips and both VU and PPM metering.

The machine they went for was Otari *MTR 90 Mk2* with which they have also had no problems. The other tape machines are a Revox *A700*, two *A77*s, a *B77* and a *B67* in console. The cassette machine is a Nakamichi *LX5*. The studio is equipped with a generous array of ancilliary equipment which includes an AKG *BX20* reverb, the Danish TC Electronics *2240* parametric equaliser, DI boxes by TC Electronics, Gelec and NTP, Roland *Dimension D*, AMS *RMX16* digital reverb. The AMS has proved very popular through its capability to store 99 programs. This means that all the engineers are allotted 13 programs each which is useful, and as Jens said, they can then have a sneak look at what each other is doing!

Going down the racks, the next item was one of many that 'O.T.' (Ole Toft—maintenance engineer extraordinaire) has made for the studio, a set of noise gates which were required when Steel Pulse booked in to do an album with Karl Pitterson producing. Next comes dbx *165* compressor/limiters, 3 NTP (that Danish company again) compressor/limiters, and Orban Sibilance Controller, Klark Teknik *DN70* Digital Time Processor, 2 Klark Teknik *DN27* Graphics and a Roland Chorus Echo.

Monitoring is on JBL *4333*s and *4311*s, supplemented with some B&W *DM12*s and a pair of Auratones. Each engineer will then bring his own set of 'personal' monitors for reference.

The microphone collection consists of Neumann *U87*s; AKG *C451*s, *D12, C34, 414 & 535EB*s; Shure *SM57*s & *58*s; Sennheiser *421* and *441*s; Bruel & Kjaer's new microphone and some Amcron *PZM*s. Headphones are by Beyer and AKG.

The studio has access to excellent hiring facilities and believe they can get hold of virtually anything very quickly.

The team of engineers is headed by Kaspar Vorbek who, having studied electro engineering for eight years is the expert acoustician and therefore played a big part in planning the studio. Jens Nielsen is a drummer who has been with the studio since its inception and has grown up with the equipment as it arrived. Ole Lauritsen started out as Gnags' live engineer and thus became involved in the studio. He was also the main driving force behind the development of the studio. Laus Jaspersen is also a musician playing bass, keyboards and more. Gis Ingvardsen is 'a really experienced guy', having been a freelance engineer for over 10 years, with a foundation of technical qualifications as well. At one stage he had his own amplifier company which, sadly, went broke. Last but not least is O.T.—Ole Toft, maintenance engineer and wunderbar builder of gadgets. Among his achievements is a massive patchbay for the 16-track desk which could do everything imaginable, and clearly impressed the other engineers greatly. On the administration side there is studio manager Henrik Kjaergaard and Jacob who also conducted us round.

The question of how a studio can keep so many engineers was left largely unanswered. The sources of work are considerably less than they are in the UK. The country is so small that the quantity of records you need to sell to top the charts is also small. Albums cost perhaps only marginally more than they do in the UK, so the bands do not have much money to splash out on recording. The studios cannot charge more than other European studios as they are not offering anything more. Feedback rates are around £25 an hour.

But the main obstacle to making money is that years of Socialist governments have kept commercials away from the broacasting media. Advertising work is non existent. Although a conservative government has recently come into power, it seems unlikely that things will change, at least in the near future. There is a lot of resistance to the idea from the population as a whole, as I found out when I tried to discuss it with some of the people I met.

As for broadcast work in general, there are very strong unions which mean that only the engineers employed by the radio and TV stations may record broadcast material. It is only the most popular bands who can get away with insisting on having their own engineers' work sent out.

Thus the work for the studios is extremely limited. Possibly one of the reasons a studio is able to sustain a large staff is that in Denmark there is a minimum wage for every person, no matter what they do, of about £4 per hour. Each person will belong to a union of some description, and by paying, for example, in Jens' case, around £28 a month to the union, your monthly wage will be made up to the national minimum. He belongs to the Musicians' Union, and they are not there to fight his battles for him necessarily, but simply to make sure that he earns enough to live on.

Another result of the socialist government is that if you are unemployed for more than a period of 6 months, the government is obliged to find you a job. And more often than not it is a suitable job, which the government pays you to do. In this way Gnags' record company, which is part of the studio complex, will often have a handful of people working for them who are being paid by the state.

The whole complex is fronted by the main house which is also undergoing the rebuilding treatment. It is at present occupied by the record company and the studio administration offices. The top floor is in the process of being converted into a self-contained apartment for visiting bands. There is plenty of other accommodation available in nearby farm houses, and summer houses as well as a variety of hotels.

Getting to the studio is no problem. They are only five minutes' drive from the city centre and even will collect from the stations and airports—Copenhagen seems to present no problems for bands who decide to fly into there as opposed to Aarhus airport.

Being so close to the city centre means that food and entertainment are not exactly lacking. You certainly find out how the other half lives!

Tak for sidst Feedback.

Janet Angus.

Feedback Recording, Haraldsgade 27 DK. 8260 Viby J, Denmark.

Introducing The Compellor,™ the most revolutionary audio processor in the world. It thinks, adapts and delivers three separate functions – simultaneously. ☐ Its control circuits are actually an analog computer which has a single VCA for minimal signal path to give you simultaneous compression, leveling and peak limiting. ☐ You just set The Compellor™ once and its three separate functions work together harmoniously to deliver a loud and clean sound. The kind that audio engineers have always wanted but which wasn't available before. ☐ The Compellor™ provides complete dynamics control, smooth inaudible compression, increased loudness, freedom from constant gain riding and the desired density – all automatically. ☐ This smart, versatile audio processor is extremely cost effective and thoroughly functional for broadcast pre-processing, microphone control, audio production, tape duplicating, live sound and even film dubbing. ☐ What's more, you'll find The Compellor™ works perfectly with the Aphex Aural Exciter.™ ☐ With The Compellor™ working for you, everyone will feel compelled to call you what we call it. Genius. ☐ Experience The Compellor™ today. Contact your nearest Aphex dealer.

GENIUS

AUSTRALIA
East Coast Audio Sales, Melbourne

AUSTRIA
AKG, Vienna

BELGIUM
Trans European Music, Dilbeek

CANADA
Manta Electronic Group, Toronto

DENMARK
SC Sound, Taastrup

FINLAND
Nores Oy, Helsinki

FRANCE
Reditec, Neuilly Sur Marne

GERMANY
AKG, Munich

GREECE
Omikron, Athens

HONG KONG
Audio Consultants, Kowloon

ITALY
M. Casale Bauer, Milan

JAPAN
Matsuda Trading, Tokyo

NETHERLANDS
Audioscript, Loosdrecht

NEW ZEALAND
Hawkes Bay Agencies, Napier

SINGAPORE
Auvi Private

SPAIN
Neotecnica, Madrid

SWEDEN
A B Betoma, Solna

SWITZERLAND
Audio Bauer, Zurich

TAIWAN
Linfair Engineering, Taipei

UNITED KINGDOM
AKG, London

® Aphex Systems Limited ▫ 13340 Saticoy St. ▫ North Hollywood, Ca. 91605 ▫ (213) 765-2212 ▫ TWX: 910-321-5762

The producer series

Ralph Denyer

Mike Hedges

Mike Hedges is a recording engineer and record producer who has acquired considerable skills as well as an individual approach in the space of five years. It was during 1982 that he began to consolidate his already considerable reputation in the studio with chart singles and albums with the Associates, Wah, Siouxsie and the Banshees and the Creatures.

He is experimental in his approach, using a wide range of recording techniques. His work tends to sound fresh and is ideally suited to the bands he works with, particularly Siouxsie and the Banshees and the Creatures. The latter is, of course, Siouxsie in tandem with the Banshee's drummer and percussionist, Budgie.

Ralph Denyer spoke to Mike during the recording of the Banshees' album to follow *A Kiss In The Dreamhouse* which he engineered. He's engineering *and* co-producing the new one.

MIKE had a colourful-sounding life before becoming involved with the recording industry at the age of 24. He went to school in Africa, attended public school at Leighton Park, England, acquired a handful of O and A levels, worked as a lab technician, researcher, built and repaired cars, was a bricklayer and then managed a squash club.

Mike was managing the squash club when, during a conversation with Geoff Heath of the Heath Levy publishing conglomerate, he happened to mention that he would like to do something different and more interesting. Heath knew that Morgan Studios were looking for tea boys and explained the time-honoured traditional progression from tea boy to assistant recording engineer to fully-fledged engineer.

"I just had the desire to do something different. I never thought of being a recording engineer until the idea was suggested to me. It seems a bit unfair on people who spend years trying to get into studios, going on the Tonmeister course and things, but I didn't pre-plan it, it was just something that happened. I just feel for those people who spend years just trying to get into any studio, then get into one which is not particularly good, get bad training and the studio closes anyway so they're still out of work."

This was during 1979 and Morgan studios had not responded to the lull in the recording industry. They were quite well staffed with several tea boys, assistant and full engineers all under the command of studio manager and chief engineer, Martin Levan.

At the time the Morgan hierarchy was still operating with policies which sound a shade Dickensian in the cost-effective 80s. Junior staff, like little boys were to be seen and not heard. Mike was aware that just one word out of place would result in instant dismissal. Though he by no means enjoyed this aspect of his early work in recording studios, he now appreciates the value of the experience.

"It was only five years ago, before the slump in the industry, that studios had several tea boys and tape-ops. It was a rat race and everyone had to do their utmost to get there first, there was such intense competition. Now it's the opposite, most studios don't even have tape-ops and the ones that do, the tape-op is virtually assured of an engineering job no matter what he does. He doesn't have to be that good at it. So immediately, you've lost all the tape-ops being experimental and trying all the unusual things they can think of, trying to prove they are better than the others. That doesn't happen anymore. I think the whole standard of engineering is starting to drop."

In just 18 months, Mike made the grade to full recording engineer status. At times, chance seemed to be on his side. After only one week as a tea boy, staff shortages resulted in him filling the gap for a tape-op on a session. He nervously tried to look as though he knew what he was doing and managed to get through. Throughout these early days, Mike had the guidance of Martin Levan and has great respect for the man.

"I wouldn't have learned so quickly from anyone else. If it hadn't been for him, I wouldn't be at the stage I'm at now. Martin is still one of the best engineers I've ever heard, including all the modern engineers."

Mike cites guitarist Gary Boyle's *Electricglide* album as an example of Levan's work.

"The sound on that album is absolutely stunning. At first I learned by asking Martin questions and copying him exactly, or at least I copied the techniques that I understood. That put me in good stead and I managed to come through my first sessions as an engineer without any complaints.

As those first engineering sessions came within months of his introduction to recording studios, Mike was only able to pick up so much from Levan and by no means claims that he was well versed in all aspects of recording before, once again, being rushed in to fill a breach in the staff of the studio.

"I don't know what it's like for most engineers but on those first sessions, I didn't really know what I was doing. I didn't know how the board worked properly. I knew how the tape machines worked through being a tape-op and I'd done a bit of maintenance so I could line them up.

"I remember being terrified on my first session. I had trouble getting any sound out of the desk at all. I was pushing faders up and down and covering up by blagging, talking about something else. Luckily, the miking technique that Martin had taught me was so good that I actually managed to get quite a good sound fairly quickly. The problem was that I was pushing the faders up and down without knowing if they were on mic, line or whatever.

"Pressing buttons just trying to get a sound out of it for the first 20 minutes. At the same time I was talking to the producer about something totally irrelevant to try to cover up the fact that I didn't know what I was doing."

At one point towards the end of the time he spent working at Morgan, Mike was at a stage where he was ready to walk out. Disagreements with the studio hierarchy were at the root of the problem.

"If it hadn't been for Martin, I wouldn't still be in the business. I regard myself as still well off his standard. I've never really attained his standard in terms of pristine sounds and things. Now I've moved away from pristine sounds and gone for something of my own.

"My values have changed so that a sound or effect which might technically be regarded as wrong by some people might sound great to me. The only thing that still matters is technical limitation. Obviously, there are technical limits to what you can do."

Mike pointed out that it wasn't only technical tricks of the trade that he picked up from Levan.

"Getting on with the client is just as important as miking technique. Martin is incredibly easy to get on with, he's very easy going. I think that is the most important thing about being a successful engineer—not producer so much—is being able to get on with people and to see their ideas. Not to think, God what an idiot, he doesn't know what he's talking about, I'm not doing this.

"It's like a public relations job. Sure, you have to know how the equipment works but at the same time you are going to have very close working relationships with people. You're stuck in the studio with them for up to 16 or 18 hours a day. You can't have *any* tension there. You've got to put up with people even when you don't agree with what they're saying or doing. Basically, to get on in this business as an engineer, you have to be able to get on with *anyone* and be able to do anything."

So is he a naturally tolerant and easy going soul?

"Not naturally, I have in fact got a vicious temper. Obviously, I do blow occasionally but more when equipment won't work than with people. But I enjoy my work so much that I don't often lose my temper. I do have a bit of a reputation with some of the bands I've worked with for being a bit of a bastard. But that's more a case of getting heavy to get something done and very rarely arises."

So it was towards the end of the 70s that Mike was beginning to spread his wings as an engineer—the time of punk and soon after, the new wave.

Most of the record companies had initially welcomed both with about the same enthusiasm as they would a tarantula crawling up between the bedsheets. One man who saw a great many possibilities in that situation was Chris Parry. In an A&R capacity Parry was directly involved in (if not totally responsible for) Polydor Records signing of a number of punk acts. They included the two most sustaining and successful, the Jam and Siouxsie and the Banshees. With Vic Smith he co-produced the Jam's first three albums and then the relationship ended. Parry started his own Fiction Records in office space he rented which was part of the Morgan Studios complex. His first signing was the Cure. Parry's real passion was for the record business, getting music on vinyl and doing deals.

During 1979 Parry said:

"I decided to take the Cure into Morgan Studio 4 which I knew and liked. I got a young engineer called Mike Hedges who I got on with. He was just starting as an engineer and it was a good relationship right from the start.

"He was fresh and keen to become an engineer. He wasn't terribly experienced which is a good and bad thing. I think it was better inasmuch as he took chances and did things differently, playing around with different echoes and stuff. And he's a *creative* engineer; he thinks about what is going on and comes up with ideas."

Parry produced and Mike engineered on the Cure's first album *Three Imaginary Boys*. Mike certainly was all the things Parry said. Recalling the period, Mike wonders if the fact that he was not a fully trained engineer—and was therefore paid relatively little—enabled the studio to give Parry a cut-price rate and that was also a factor. Certainly, Chris Parry is not a man with a reputation for liberally throwing money about. No matter. The relationship flourished.

Mike worked with Parry's subsequent signings, the Associates and the Passions. Concurrently he was in demand, having gained a reputation for being an engineer with an ear for the music of the day. He stuck to working mainly with young bands, a rare exception to the rule being an Alex Harvey album.

Chris Parry became more absorbed with running the business end of Fiction as well as the affiliated publishing. Mike stepped in for his first co-production, the Cure's *Seventeen Seconds* during 1980, the group's Robert Smith being the other half of the production team.

The next phase of Mike's career included the opening of the Playground, a recording studio which he had been conceptualising for some time. His idea was simply to design and build a studio which would be ideal for the type of band he enjoyed working with. Both they and Mike were, generally speaking, happier in a brighter, more reflective acoustical environment with an atmosphere that wasn't akin to that of a dungeon with tape machines. Ace acoustician Andy Munro was recruited. His design work achieved precisely the acoustic qualities Mike wanted. The studio had a very light, unoppressive atmosphere and was so easy to work in that invariably musicians would discover it was much later than they thought every time they looked at the clock. The Playground period was a dynamic one for Mike. Certainly, the fact that he was the engineer was the factor attracting most of the clients. But once there, they invariably loved the studio. Within a year or so, the Associates, Bauhaus, Skids, the Creatures, Siouxsie and the Banshees and others had sampled the studio's delights.

Unfortunately for Mike he was about to learn a lesson about finance, the hard way.

"The biggest mistake I ever made was, as usual, working in the studio a hundred hours a week and totally forgetting about the financial side, having nothing to do with it. And not realising until a year later than financially, it had been very badly run. The whole thing was falling apart although it was one of the busiest studios in London. I think it was booked virtually every day during the first year and the couple of days it wasn't, were for maintenance.

"As a musical venture it was incredibly successful, it was an excellent studio. It was very well designed by Andy Munro—an excellent design.

"On the first Creatures track, I think it took about two minutes to get the drum sound. It was literally a bass drum mic with two overheads with no EQ. No work involved at all. It still sounded liver than studios five times the size, because I worked closely with Andy and said I wanted it ultra-live.

"Early on when I was first explaining the idea to him, I'm not sure that he actually *said* I was crazy, but he came pretty close. I decided to have it live and deaden it down if we needed to, which is a lot easier than trying to do it the other way around."

Mike won't be drawn into discussing the demise of the studio in any detail. If the rumours that circulated at the time are to be believed, the intrigue behind the scenes at the Playground would have made great material for a film script.

At one point it looked as if the initial problems could be overcome, but then personal tragedy struck. Mike's partner, Mike Jay, became very ill and sadly, died. The situation became irretrievable and the studio folded. Although Mike Hedges was the technical, conceptual and creative driving force behind the project, amazingly, he was never given an often-promised directorship and had to threaten to withdraw his labour, even to get paid as an engineer. This did not deter him from assuming responsibility for some of the financial aftermath.

On the recording side, Mike has many happy memories of working at the Playground with his favourites, the Creatures and the Banshees, as well as others.

"The Associates got their own unique sound out of that studio, which was very good for them. Billy MacKenzie, particularly, had very high standards which I believe was one of the things that made me the producer I am today. He would want a particular sound which was technically almost impossible, but we'd go at it for days, really working. We would get the sound he wanted no matter what it took and I really enjoyed that. If I hadn't worked with the Associates, I think I would have ended up as a far more MOR style of producer. MOR must be easier, working to a formula. Working with them was total chaos but it worked."

During the period when Mike was promoting the Playground he was basically the only engineer. So the studio had the added attraction of an up-and-coming engineer/producer with a good reputation. He was quite happty to go into the studio with a number of bands and to "see what happens". He was happy to contribute far more than could reasonably be considered as the accepted input of an engineer. Thus acts such as Bauhaus and Thomas Dolby had his production and creative engineering expertise

36 ▶

without having to shell out a few points.

Did Mike agree that during that period he had contributed far more than would normally be contributed by a studio engineer?

"I would agree with that, not trying to make myself out to be better than I am or anything. Financial considerations did not come into it *at all*. I was earning enough to live off in production advances, I was comfortable. So, whether I was getting paid for doing something was totally unimportant. I wanted to work with things that were new to me and that offered me new experience, and that was the best way of doing it."

For some time, Mike had wanted to work with Siouxsie and the Banshees. He admired the group for their general attitude to making music and the end results they came up with. Siouxsie and Budgie decided to have a little fun in the studio without the pressure of being part of a successful band and all that that entails. Five days in the Playground with Mike resulted in the Creatures EP *Mad Eyed Screamer* which went on to do well in the singles chart. Not bad for a singer and drummer just having a little fun. Mike was given nice credits as engineer, his distinctive recording techniques clearly evident on the record.

"It came about by me saying to them to come and try the Playground *and* me. I did *Mad Eyed Screamer* for free, personally; I didn't get any remuneration for that at all. I was quite happy to do it, obviously for the experience. It was an unusual thing to do. They got an incredible rate on the studio as well, the whole thing—for five days—came to £1,500, which is very good for four tracks in a brand new studio like the Playground."

Suddenly Mike was attracting a lot of attention. The Playground had a full bookings diary and Mike had to phone round for time in other studios to meet the demand for his talents. The Creatures, the Associates and Wah all made the singles chart.

"Once I started to have so called 'real hits', record companies did start to sit up and take notice. But still, I've never been any record company's golden boy. I don't have the right sort of attitude for a start. I'm not the right sort of person, not being a *pop* producer as such."

At this time Mike's association with the Cure came to an end. This had nothing to do with the group or their music. Mike simply felt it was time he got a better royalty, Chris Parry wouldn't agree to pay it so Mike pulled out. Mike's disappointment about no longer working with the Cure was compensated for when the Banshees went to try out the Playground and suss out Mike.

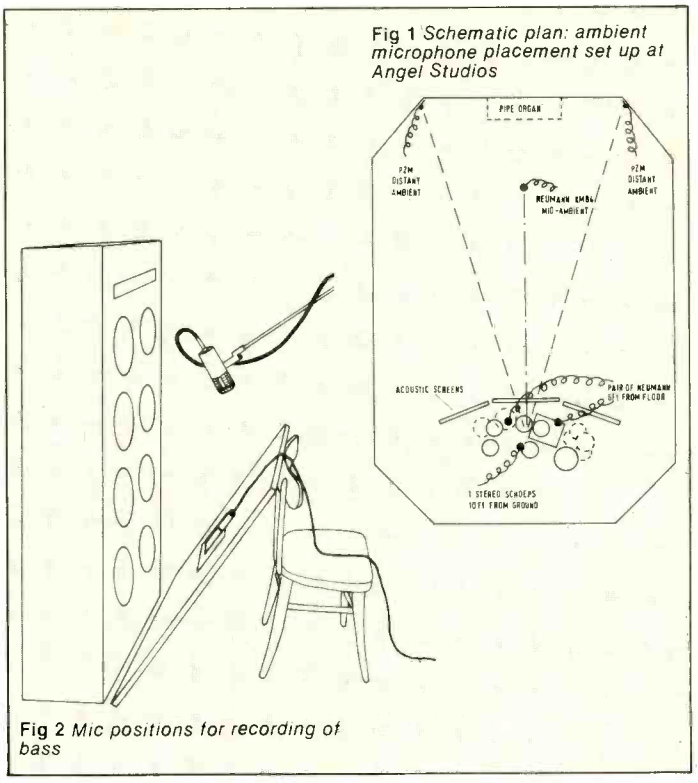


Fig 1 *Schematic plan: ambient microphone placement set up at Angel Studios*

Fig 2 *Mic positions for recording of bass*

"Even though Siouxsie and Budgie knew me, the Banshees is an altogether different project. It was the main band and far more serious, not being a pet project."

The result was the album *A Kiss In A Dreamhouse*. Everyone was extremely happy with the album and it was agreed that Mike should co-produce the next one.

When I visited Angel Studios, Mike was at work engineering and co-producing (with the band) the new Siouxsie and the Banshees album, having engineered on the previous *A Kiss In The Dreamhouse*. They were getting close to the point where all the rhythm and percussion tracks had been recorded. I'm sure that many experienced recording people would have been a little surprised if they had walked into the relatively vast and impressive Studio One and seen Budgie's drum kit set up predominantly at one end of the main studio rather than in a 'booth'.

Mike and Budgie said that the placement of acoustical screens around the kit shouldn't be regarded as too important.

Budgie: "They are quite good if someone comes over to talk to me, they can lean on them, they're just the right height for that."

There are, by the way, several spacious booth-type areas, a couple of them larger than many studios. Some were in use for bass guitar, guitar, piano and other instruments but others were vacant. The microphone placement in the main studios provides the clue. Mike is out to make maximum use of the acoustical environment. To say that he uses ambient miking extensively would be an understatement. Although many people think of him as being a very modern electronic sort of an engineer/producer, he in fact has a passion for true acoustical effects as well as those achieved by signal processing. The close miking was set up in a fairly familiar manner—one microphone to each of the two snare drums, two side toms, one floor tom, one bass drum. Then there were two overheads about 8 ft from floor level (see **Fig 1**).

But it was the ambient microphones that were more interesting, or to be more precise, their placement. A stereo Schoeps was situated about 12 ft above floor level and directly above the kit, then a single Neumann *KM84* several feet from the kit at a height of about 16 ft. Finally, taped to the cornice at the top of the two angled walls most distant from the kit, were two Crown *PZM* pressure zone microphones. These last two microphones obviously provide the longest delay possible within the studio walls and what Mike calls "the most extreme effect."

He went on to explain that he uses vastly differing amounts of acoustical reflections and delays, depending on the music.

"For example, you could have close mics on an intro, mid-ambient for the verse, the full distant ambience for the chorus and back to mid for the verse."

He did, however, hasten to add that this particular microphone set-up was not a standard or singularly magical one that they use every time on Budgie's kit with the Banshees or Creatures though it can be considered as being typical of Mike's style. By the time they were next in the studio, the miking would almost certainly be different, depending on the music being recorded and the acoustics of the studio. Natural ambience is likely to be a feature but nothing is absolutely certain with Mike, or Budgie as a Creature or a Banshee.

Of course, this type of multiple miking eats up tracks on a multitrack tape at an alarming rate. But by the time overdubs are beginning to fill up tracks, Mike is beginning to get ideas on how he will want the drums to sound on the final mix-down. He then starts to either bounce-down or erase unwanted tracks in the usual manner.

"So you wipe what you don't need and bounce down what you do. Either or. This way you do end up with a different drum sound for different tracks, subtly different, so it is not a *massive* difference."

At the Angel, Mike had mentioned to me that he was eagerly trying to get his hands on the first Parabolic *PZM* microphone to arrive in the UK.

"To have a *PZM* that you could position anywhere in the room would be ideal for me. So instead of having to put it on a nearby surface or existing wall, you could just stick it wherever you want. At the Playground I used to use something similar to the parabolic but it wasn't a dish. It was a sheet of perspex that I just used to move around with a *PZM* stuck to it. That was *really* useful. Same idea as we are using for the bass guitar with the Banshees."

Moving on to this miking set-up on the bass was very interesting. Earlier Mike had explained that by using the *PZM* mounted on a board in conjunction with a Neumann *U47*, he could achieve an almost infinite variety of sounds (see **Fig 2**).

"The Neumann is actually quite high in relation to the amp, higher than you'd normally have it. It's quite high up in the air. The sounds from the two mics are drastically different. You switch from one to the other and the sound is almost not that of the same bass. The combination of the two is again different because of the phase relationship. It's not easy to set up. It takes quite a bit of moving them around to get something that's in phase between the two mics when the levels are equal. I tend to get an equal level on both mics and then get them as near to perfectly in phase as I can. Then you have the option of switching one out of phase and slowly mixing it in

38 ▶

'The Master's Multitrack'

To help you master your multitrack needs, the revolutionary Fostex 16-track tape machine has arrived at HHB.

The B16 offers full 16-track recording on ½" tape and built-in Dolby C noise reduction, all for around £3,000.

To complement this breakthrough in recording technology, we recommend the Allen & Heath System 8 mixer, which provides all the facilities you'd expect on an expensive studio console, but at a fraction of the price.

To make things easier for you, every system we sell comes complete with all necessary cabling included in the price, and what's more we'll throw in a couple of hours of instruction, if you need it.

We also carry stock of all the other important recording tools to complete your system: mastering machines, DDL's, pitch transposers, reverb, drum machines, compressor/limiters, noise-gates, equalisers, amplifiers, monitors, headphones, microphones and tape.

All from a large number of manufacturers* to give you maximum flexibility within your budget.

Our demonstration studio allows you to see and hear our entire range of quality audio products and our friendly team will give you the help and advice you need to master multitrack recording.

HHB

HHB Hire and Sales, Unit F, New Crescent Works, Nicoll Road, London NW10 9AX. Tel: 01-961 3295. Telex: 923393.

*ALLEN & HEATH · AKG · AMCRON · AMEK · AMPEX · BEYER · BSS · DBX · DELTALAB · DRAWMER · ELECTROVOICE · EVENTIDE · FOSTEX · GAUSS · IBANEZ · JBL · KLARK TEKNIK · LEXICON · LINN · MXR · NEUMANN · REVOX · ROLAND · SENNHEISER · SEQUENTIAL CIRCUITS · SHURE · SONY · STAKRAK · TAC · TANNOY · UREI · VALLEY PEOPLE · YAMAHA

Access, Barclaycard and American Express. Finance arranged.

'Dolby' is the registered trademark of Dolby Laboratories.

with the other to get various effects. Of course that starts to cause cutting problems. But that's not my problem, it's the cutting engineer's problem."

For the first time during the interviews, I detected a lack of enthusiasm in Mike's voice. Earlier he had mentioned that he doesn't actually have a record player at home. I asked if he got heavily involved with the cut as a general rule?

"I don't know anything about cutting, I don't know how to get it on to disc."

Then does he just go along to the cutting session and say when it sounds right?

"Most of the best cutting engineers, for example Aron at the Master Room is very good, in that you give him the tape and he basically cuts it well. You don't really have to say a lot. Obviously, you can say that you don't like this, it's making the voice a little sibilant, or it's doing this or that. And some things that he's not as worried about, obviously, *you* worry about, some of the subtleties that he's not involved in. He's mainly concerned with getting a good, clean, loud cut onto disc. A lot of it now, I tend to leave to the band to see what they think of the cut."

Is that because, as far as Mike is concerned, the creative process is over by this point?

"Yes, that's right. Between us and the whole band, they play it on all their individual systems and argue or discuss it among each other. That is actually a very good way of doing it. I find it very difficult to come out with the acetates and then wander around listening to it on different systems. Obviously some people are brilliant at it. I have a lot of difficulty deciding because it sounds so different on different systems, which is something you always try to avoid when you're mixing, but it does still sound different. And of course, it is incredibly important after spending weeks recording and mixing, you don't want it totally destroyed on the cut."

Returning to the drums for a moment, a couple of other interesting techniques were being employed, though as to whether the signals would actually be used eventually was anybody's guess. For one, Budgie donned the Sennheiser dummy head microphones, the main feature of using them in this way being that the centre of the stereo image depends on which direction the drummer happens to be looking in.

Then, gaffer-taped to the drum sticks were a pair of small Sony microphones, the result being that the drums or cymbals actually being played are picked up more than the others.

At £187.46 including VAT, the

MKE 2002 dummy head set receives Mike's unqualified endorsement as an extremely cost-effective piece of equipment. Another interesting application they were playing around with was to tape the headset (again, not using the dummy head itself) to the top of the grand piano in a slightly splayed position. Mike enthused about the effect which places the listener virtually right inside the piano.

"The Sennheiser dummy head is great for anything. And at the price—considering that you can pay £1,800 for other makes—that's a pretty big difference. As a dummy head, obviously it's not as specialised as the Zuccarelli, it's not as devastating. But the stereo is very good. Taped to the piano and spread apart, in the middle of the piano it gives a brilliant sound. The impression is of your head being inside the keys.

"The effect when Budgie wears the headset when he's actually playing the drums is good as well. Mostly cymbal and top kit come through but at the same time we're doing the effect with the mics on the drum sticks which didn't have enough top kit. The cymbals were rubbish off them because there was no space, obviously. They were gated quite close, each drum stick had its own gate. But the combination of the dummy head stereo spread of the cymbals and the incredible stereo spread of the sticks played individually—which ever stick he used it would come out left, right, no matter where he's playing it. So the same tom hit with both sticks would go left, right, left, right, sort of thing. The combination of the two is superb. We're using it on something on the album, I don't know what yet. And the headset, the whole kit is swinging side to side at random. It sort of turns your stomach almost—it's great.

"Very nice mic, the Schoeps. Very nice applications in that it does give quite a point source of sound. Even the omnidirectional ones give a very clean, precise sound. If you want something with a lot of separation and a lot of clarity to it, the Schoeps are very good. Particularly for orchestral instruments; they are superb on violins and things, a lovely sound. But there again, I like *PZM*s on most things as well. And Neumanns, so it's difficult to define in black and white terms."

Mike had told me that a great deal of Siouxsie's vocals on the *A Kiss In The Dreamhouse* album had been recorded with valve mics.

"I'm still trying to buy a valve Neumann *U47* but they're hard to find. I've been trying for ages. Some vocals don't sound that good on valve mics. Obviously some vocals don't sound good on some mics..."

Some vocals don't sound good on any mics?

"Yes, that's true. It's not until an engineer uses a valve mic in several applications—I don't think he'll realise, there's nothing definite.

"You can say that it's warmer but it's not *definitely* warmer. On some things it's not. You can say that it's brighter but some valve mics are incredibly dull. Because it's got a valve in it, it does tend to control peaks, not only level peaks but frequency peaks as well. Sibilance is cut down quite drastically with a valve mic. Maybe it's the way I use it, I don't know. *I* find sibilance is cut down.

"On a loud vocal when you're not using a limiter—because of the way they work—valve mics tend to limit loud peaks. You do get occasional distortion when the vocal is too loud but valve distortion is quite pleasant on vocals as well as anything else. People like valve distortion on a lot of things. Particularly if it is a hard vocal, that slight edge the valve gives it is pleasant. So I quite like that characteristic in valves.

"I would say my favourite mics are Neumanns. I could quite happily do a session with only Neumanns. Schoeps tend to be far more specialist. It's a difficult quality to describe, a sort of 'built-in clarity' to the sound. If you record something on Schoeps, for some reason it tends to be clearer. It is actually a clear sound, maybe not a totally natural one. Again, that's a very aesthetic quality to try to describe. The sound off the Schoeps mics at Angel Studios is very good indeed."

What would Mike say to someone who might have a different approach to recording and challenge the validity of a miking set-up that might only be used once and then forgotten?

"I think that any engineer—rather than producer—who does the same things constantly, working to the same formula, must get bored with the job very quickly. 'This is a bass guitar. I do this to bass guitars.'

"That must be a really terrible way to work. As far as playing with effects is concerned, I get very involved with the job of the whole process of recording music. I wake up in the morning and think: If I put this sound through this effect and then put that through something else, what will it sound like?

"And I can't wait to get into the studio and try it. Half asleep at night I'll think of something I've been working on and think of something new to try the next day. I used to forget most of these ideas but I've started writing them down now and most of them work."

One inventive technique of Mike's has been very successful though it utilises a piece of equipment not usually associated with recording, a strobe light. In a darkened studio, they have been using a stage type of strobe, in exactly the same way as a car mechanic uses one to get an engine's timing correct. When Budgie didn't make any attempt to get in sync with the flashing strobe, his sticks appeared to stop in mid-air. When he played in perfect sync with the strobe, his sticks were visible at the moment he struck the drums.

"The strobe has been incredibly successful, Budgie loves it now. It's something I thought of a while ago but never got round to trying out. And the effect is incredibly constant. Budgie-type drumming—which is *real feel* type drumming but with machine consistency—is great. There is also a track that we've done on which the strobe is adjusted so that it speeds up. That works incredibly well as well. It's a very even speeding-up effect."

Mike's abilities and experience are such that he now goes into the studio with the capability to use whatever recording techniques he feels are appropriate for the music being recorded. He doesn't have a set of rules or

40 ▶

POWER

LEXICON's *NEW* 224X with LARC

Its only limit is your imagination

Only Lexicon's 224X does it all. And now the 224X comes with LARC—the key that gives you easy access to the *total* capabilities of the most powerful processor in the world.

LARC (Lexicon Alphanumeric Remote Console) tells at a glance where you're at . . . which *family* of programs you're into . . . the *specific* program selected . . . plus the variations *within* the program. They're all spelled out on LED displays. And, with LARC, you can now store your setups on audio cassettes.

Superior controls. Decay time in two frequency bands . . . crossover . . . high-frequency rolloff . . . apparent listener position . . . predelay . . . internal chorus . . . diffusion. And early reflections provide exceptional control over the initial sound.

Dynamic decay. Special signal processing capabilities can change reverb time in response to program dynamics.

Comprehensive delay effects. The most extensive set of time-delay functions available. Put in a vocal track and get out six independent voices. Create phasing, flanging, and, repeats in a single pass. Put in a rhythm track and get out syncopated chords. Use up to six separately adjustable delay taps, with up to 1860-ms delay, each with high-cut and low-cut filters tunable from 170 Hz to 19 kHz.

36 nonvolatile memories. All parameters of setups can be stored in memory for instant recall—and can be archived on cassette tape.

Unique Split Reverb/Effects

Achieve two levels of effects simultaneously—either two reverberations or reverberation combined with effects.

Each input can be processed independently, with different effects, and for each input there are stereo outputs. Split reverb puts the processing capabilities of two systems into one. Only Lexicon has it.

Unparalleled Sound Quality

Unquestionably the best! Lexicon digital reverberation programs are the most mature in the industry, repeatedly acclaimed by users and reviewers.

Full 15-kHz bandwidth, 84-dB dynamic range, and less than 0.07% distortion.

Unmatched Versatility

Hall, Plate, and Room/Chamber algorithms, including a Small Room program for subtle acoustic enhancements and film/video work. More than 30 preprogrammed variations (with more to come).

An Investment in the Future

Your investment in a 224X with LARC is an investment that will pay big dividends today—and tomorrow. Your initial purchase price buys you all software updates, subject only to a small media charge.

Look into the Lexicon 224X digital reverb/effects system with LARC*. Compare it with anything else on the market. You'll find this superb system is, by far, the most powerful of them all.

*Field conversion is available for owners of existing 224X systems. Contact Lexicon.

Lexicon

Lexicon, Incorporated Waltham, MA USA TELEX 923468
In U.K.: Scenic Sounds Equipment, 97-99 Dean Street, London W1V 5RA ● tel 01-734-2812
Export: Gotham Export Corporation, New York 10014. Telex: 129269.

modus operandi to which he always adheres. This, as he explained, has not always been the case.

"When I first started engineering, every session I did—tape-opping, assistant engineering as well—I would worry and have pre-session nerves. Well, I think you should, if you haven't, your are too confident. And for a long time—all the way through my first couple of years of engineering—I was quite nervous on every session, thinking it was going to be difficult. And it's only relatively recently that I've started to be less nervous before a big session like when I have a big orchestral line-up doing an overdub or something. I don't feel totally confident ever, simply because there are so many things that can go wrong, you have to watch out for all of them.

"I'm not worried about doing a very drastic effect very early in the recording of a song. Because if everyone likes the effect, you get used to it very quickly. If everyone thinks it is a great effect, it's very rarely that you actually go off it. If you monitor an effect without actually recording it, every time you set up the mix again and you've got to re-do it, the chances are—especially if you move studios—you'll never get exactly the same effect back again. Especially if it was a particularly good effect, not just one simple unit. So it's pretty good to commit yourself early on."

Mike thinks that it is frequently better to commit yourself in this way, particularly if the mix looks like being a complicated one. Otherwise you may not be able to see the wood for the trees.

"You leave yourself with so much to sort out, that you don't think of the overall, which is the most important thing.

"The more difficult the mix is, the less you can actually apply yourself to the overall thing.

"It's not that you can't apply yourself to making the track good but the less you can actually think about the *overall* thing. You can almost do a mix—if it is extremely complicated—and finish a track without actually hearing the overall. You've really just listened to the individual effects and things, which is not really a good idea."

Of course, this type of problem is now being alleviated by the use of computers and semi-automation.

"Oh, yes. That's the advantage of computers. If you can—on a computer desk—put all your foldbacks, sends and things through a channel and then use the channel for the level to the sends, you can end up with a mix which actually plays itself. Not all computer desks have enough channels, but if they do you can just sit back and listen which is really great. I really enjoy that.

"And the best thing about computer desks is that when you are using a particularly difficult effect you can do it 20 times until you get it exactly right—especially things that involve flangers and repeats—you can get things exactly right and it's there permanently.

"The computer does it exactly the same every time. Of course, computers do take a certain amount of adventure out of mixing. If you do it differently every time and don't manage to get it right—especially with something that is particularly finnicky—you never know *exactly* what you are going to get. Computers do take away that excitement. What's it called?"

Chance?

"Yes, chance. Although you don't have that with computers, because you've got a far more methodical approach, you can do things that you couldn't possibly do otherwise. Multiple fades in and out, several things fading in and out at the same time, things like that. Unless you have four people sitting at the board you can't possibly do it. It often takes a bit longer to do a computer mix because you are programming the mix without learning it, sort of thing. I swear by it."

Mike is now a firm believer in computer mixing. His first flirtation with the technology was when he co-produced the Cure's *Seventeen Seconds* album with the group's frontperson Robert Smith. Mike also—as is now usual for him—engineered the record. The album was recorded around 1980 at Morgan using a Harrison console with the Allison *65K*. For a time he then had reservations about using the technology.

"For a long time after *Seventeen Seconds*, I didn't use any computers at all. I thought it was a bit clinical and a bit *nice*. So I decided not to use them. It is only recently, now that things are starting to get far more complex, that I am starting to really enjoy computer mixing.

"I don't think anyone has really explored computers in recording to their full yet. I haven't heard anything mixed on computer that really uses it to the full.

"The new thing coming out that I find fascinating is equalisation controlled by computer, so that during the mix, the EQ on things like the echo returns, actually changes during the mix. To me, that is really exciting. Not only having changes in levels and effects, but also the entire EQ changing during the progress of the mix, changing gradually or drastically. Programmable EQ is a fantastic idea. Not like the *Total Recall* on the Solid State Logic that just remembers where they are. I think Auditronics have brought one out. Also I think SSL are putting in processing like that, I saw it at the APRS. That to me is very exciting, I want to buy an Auditronics."

Continuing on the same subject, Mike went on to say.

"A simple piece—piano and vocal perhaps—could sound amazing with a constantly changing sound. It's something you can't really imagine until you hear it, but I'm sure it's going to be fantastic."

One of the areas in which Mike excels is in the use of sound processing equipment. His techniques can range from using equipment in the way the manufacturer intended it to be used, to using it in ways they would not be likely to have even dreamt of. His original ways of thinking take him into an area where basic recording technique and signal processing blur into each other.

"You can use a gate on something like a bass drum to give the bass guitar a little bit of extra push as the bass drum hits. That gives the bass guitar a little extra surge, which is mixed in with the original bass signal. It does give quite a bit more punch."

I asked Mike if he could give some specific examples of techniques on particular records.

"Things like *Cascade,* one of the Banshees tracks, all the overheads on the drum kit, were put through noise gates which were keyed by a backwards cymbal. When the backwards cymbal came in which was into the choruses, the drums got liver and liver until the ends of the choruses, and then closed down again to very tight. And the drum kit itself, apart from the overheads, was all very gated as well, which was all quite staccato and percussive. All the sort of ambience between the sounds was cut out. There are thousands of things you can use noise gates for."

Mike continued, enthusing about some of his favourite pieces of equipment, including Valley People's *Gain Brain* and *Kepex II*. In fact on a previous occasion, he had told me he could quite happily do a session with *Kepex* and *Gain Brains* without really missing flangers, phasers and the like.

"The amount of effects you can come up with are incredible. You can actually key *Gain Brains* to compress as well. You can have a *Gain Brain* on an instrument that, for example, that you only want between the vocal but just about between every word of the vocal, especially if the vocal is drawn out, particularly between lines in the vocal. When the vocalist is actually singing the *Gain Brain* compresses the vocal down hard so that it is quiet. You can adjust the release for the instrument so that it will shoot up between lines or whatever. So the instrument is suddenly uncompressed as the vocal stops and then as soon as the vocal comes back, it jumps back down again. Obviously it is not so much a musical effect so much as an *effect* effect. It works well."

Was that an effect he'd use with the Creatures or Banshees, as their music is a weave of textures and layers?

"There is a certain amount of it. The one thing that wouldn't apply to the Banshees would be the use of noise gates to make things sound tighter. It's not tightness we really go for, it's a textures thing.

"We have, on several Banshees tracks, used compressors keyed by other instruments so that as the sound of one instrument dies away, the other rises up behind it. And if you do that with several instruments, the effect is quite pleasant.

"*Slowdive* was done like that. The rhythm strings on *Slowdive* were actually keyed and *Gain Brained* from the lead vocal. So as the lead vocal stops, the *dit-dit-dit* strings fade up, and then back down again as the vocal comes back in. The longer the vocals are out, the louder the strings get because they are on a very slow release. So it's like a long automated fade-in.

"There is no point in using an effect for the sake of it. They should be used to enhance something that somebody is doing, to bring out or accentuate. In general, effects should be used to enhance rather than detract. Occasionally, effects for shock value can work really well, some people use those very successfully.

Mike finds most American music "beautifully recorded" in a technical sense but sadly lacking in creative terms.

"If the snare drum doesn't sound the way that snare drums have sounded for the past 10 years, it's not a snare drum at all, it's wrong. Almost all the Americans put an effect on something and, in general, it will be so subtle that only other engineers and musicians will pick up on it. I don't think there is any point in putting on effects that are incredibly subtle. They are never noticed by most people. The subtleties come from the overtones of the instruments themselves. The ringing on the drums, that is the kind of subtlety that should be left as it is. And effects should enhance things and obviously, should not be too polite. I hate prissy little effects, nice little things."

"Nowadays, natural acoustic instruments—like cello, harpsichord and things—tend to be used because they're unusual, almost as a strange effect. Whereas a few years ago they were the natural instruments, now they're the odd ones. Strange." ■


NEUTRIK
connectors
SWISS
Sole Agent UK
Eardley Electronics Ltd
Eardley House 182-184 Campden Hill Road
Kensington London W8 7AS
Telephone: 01-221 0606 Telex: 23894

An original always remains a classic...

The LinnDrum is the original digital drum machine. But from this concept several competitive 'alternatives' have emerged. These 'alternatives' are not really competitive, in fact they've simply established the LinnDrum as the standard by which others are judged. That's why professional musicians still prefer the LinnDrum.

It's the classic.

It's the classic because of its longer, crisper sound; its flexibility and ease of operation; its large library of user-changeable plug-in drum sounds; and its custom sound-chip service for your favourite kit sounds.

Sixteen different drum sounds are available each with their own output, volume fader and pan control. Additionally it offers a 2600 event memory with 98 patterns and 49 songs and programmable dynamics. Five trigger inputs allow you to trigger all the drum sounds from drum synthesiser pads, tape tracks or any audio source. A special programmable trigger output facilitates the rhythmic programming of external synthesiser sounds and the tempo display shows beat-per-minute of frames-per-beat.

These are some of the features that make the LinnDrum the original and special enough to be the classic.

Just like blue suede shoes.

Syco. We are today.

Syco Systems Ltd. 20 Conduit Place London W2
telephone 01-724 2451 telex 22278 SYCO G

Who's Dolby Surround revolution?

Carl Levine

BACKSTAGE in Toronto's Maple Leaf Garden, The Who are making last minute preparations for their final North American concert. The Who have licensed all video rights to Twentieth Century-Fox Telecommunications Inc, except for closed circuit pay per view rights, that have been purchased by Campus Entertainment Network (CEN) adding a $pecial $ignificance to their historic performance. The Who leave their dressing room and approach the stage as the SRO crowd screams wildly, shaking the floor of the arena.

The excitement of the Maple Leaf Garden is shared in 38 venues from New York to LA where crowds ranging from 1,000 to 6,000 Who fans are in attendance. Reacting as if the large video screens were Roger Daltrey, Pete Townshend, John Entwistle and Kenny Jones in the flesh, the CEN locations have the aura, aroma and electricity of a live rock'n'roll extravaganza.

Across Canada, viewers turn on and tune in to an ad hoc network of 16 Canadian over-the-air TV stations working with a second network of local FM stations for a free network syndication of the concert with simulcast stereo. In the United States, approximately 200,000 cable and subscription TV sets, that are being charged between $10 to $15 for the live pay-per-view rock concert, are also surrounded by Who fans in every state, except Alaska. A stereo audio signal to 60 US FM radio stations is also being provided by DIR broadcasting.

Just outside Maple Leaf Garden, five video and audio trucks, with specific design features for this occasion, represent the nucleus of a carefully assembled configuration of equipment worth over $5 million. A hand picked production team of 144 are ready to test their creation of the most complex live stereo transmission to date.

It's now 10:05pm, EST. The Who are on stage ready for their final North American Concert. A thunderous ovation is heard as Roger Daltrey approaches the microphone and Pete Townshend straps his guitar on his shoulder. The director calls, "Take 7" and in homes throughout North America and in 38 CEN locations with multi-kW sound systems, Who fans see the group on stage and hear the thunderous ovation from Maple Leaf Garden. From the opening song, *My Generation*, it is clear that this audio visual presentation is a well executed, carefully prepared documentation of a live event. The nine Ikegami *HL 79A* cameras have been placed to provide a variety of angles including a view from an on stage crane looking out into the enthusiastic crowd, long cover shots and tightly blocked cuts of the performers.

The audio mix combines the crowd's enthusiasm with the band's hard driving sound, to capture the essence of a rock'n'roll concert. Rather than depend on processing the live stereo sound, the sound mix relies on miking. The bass and guitar are miked from a distance and the drums use a snare-bottom mic, a cymbal mic, a kick drum mic sealed and suspended inside the drum and a stereo pair of *U87*s (one between and the other a few feet in front of the cymbals and toms). Except for an AMS stereo delay line used for some vocals and guitar solos, a basic complement of audio equipment is utilised.

The live stereo transmission went as planned. Except for a two-minute signal loss at the beginning of the concert for some Canadian viewers, due to a routing switcher being inadvertently turned off, the audio and video presentation to all other venues was flawless. The half million dollar production of The Who's concert proved that the technology required for an international broadcast of live stereo sound for television audiences in clubs, theatres and at home is a reality.

The Who's final North American concert represented a revolutionary approach to the technical presentation and marketing strategy of live musical entertainment. In fact, the telecast was an experiment of the technology required to provide entertainment for the video generation of the '80s. The Who experiment answered many questions regarding the technical capabilities of landline and satellite distribution of a stereo audio simulcast with live broadcast video to wide screen and home television viewers. The project also gave preliminary indications of costs, viewer reaction, potential sales, profits and losses related to marketing a major music act via stereo video. The live stereo audio mix and the home video version's remixed Dolby surround sound raised the controversy regarding the future of the relatively new Dolby process. Will The Who's final North American Concert cause a revolution in the techniques of transmission and the type of sound required by video generation audiophiles?

Preparation key to technical success

The Who have always been pioneers in utilising video to expand their live presentation. In 1979 they were the first group to have a close-circuit video shown of their live Chicago concert. Jack Calmes, producer of The Who's Final Concert, recalls.

"The local radio stations guaranteed that we could sell 30,000 more seats. Using Telco lines instead of satellite distribution, like we did in '82, we sold out 10 theatres in the Chicago area. The kids were reacting to the screen, with quality sound, as if they were at the live concert. The group was happy with the result."

In fact, Calmes was so pleased with the results, he sold his interest in Showco to his partners and developed World Show Vision Network. Calmes' concept was to put together 10 to 15 high resolution touring video units, consisting of 30 × 40 ft screens with 20,000 W sound systems broadcasting in Dolby surround sound four channel using *CP 50* decoders, creating a new touring format for major artists.

By 1982, when The Who returned to America for their farewell tour, pay-per-view cable television and wide screen TV projection could be distributed via landline to literally the entire western hemisphere, Europe and Australia. Although satellite distribution of sports events, like the World Cup and championship boxing, or special occasions like the Royal Wedding, were common, live telecasts with accompanying high quality sound were in their infancies.

Veteran engineer/producer Glyn Johns worked with the band in England, prior to the tour, and created PA and recording microphone configurations. Johns also toured America with the band and shared the responsibility of mixing the house sound with Jack Maxson, president of Showco.

Johns recalls, "I haven't been on tour since the '60s with the Stones. It was a novelty. I did the PA for the first time and enjoyed the experience tremendously. The sound crew became extremely familiar with every note which was the key to the live broadcast. The idea of a band like The Who doing a live satellite broadcast is great and should be pursued."

On the first date of the tour in Washington DC, 'Black Pete', the 35 ft straight job audio truck of Record Plant (New York) Mobile arrived. The heart of the vehicle reflects chief engineer, David Hewitt's, experience as a builder of race cars. The custom Peterbilt chassis, 3500 cc diesel, 13-speed

engine with air track suspension is built to meet the demands of 500 mile overnight hauls required for touring acts. Black Pete virtually eliminated the need for piggy back trucks and allowed the Record Plant to record approximately 20 concerts on the tour. The mobile truck is also carefully designed to provide the highest quality sound on location.

The 6 in sound-proof walls in the Record Plant truck are lead sandwiched with pile wood, sound board sheet and a rough cut Walnut finish. The truck contains Ampex *MM-1200* 24-track ATRs and a custom-designed API console with 44 inputs, 44 outputs and 24 mix buses. Each channel has a model *560* Graphic equalizer and there is also a 48 channel Jensen splitter. Black Pete's interior was designed by recording studio builder, Jim Fal.

Glyn (Johns) wanted his own monitoring system for the tour. "We built custom speakers based on Altec *Bi Reds,* driven by Bryston power amps, and also built a new overbridge and tuned the room," Dave Hewitt recalls. "The entire operation had a massive group of professionals and there were virtually no problems. All tours should be like this one."

"The Who originally considered using another director, but Richard Namm had a much better technical grasp of what was needed to make the video look good and to handle a project of this magnitude. That was what swayed the balance, producer Calmes recalls. "Namm knows a tremendous amount about equipment. Since we basically had to assemble the system to do the show, we needed a director who could pay attention to technical detail, which is exactly what Namm did."

Richard Namm, president of Professional Video Productions, a subsidiary of Professional Video Services (PVS) in New York was selected to direct The Who's final concert because of his experience directing live music. His credits include the first satellite-delivered cable TV concert, "The Charlie Daniels Band", and the first feature-length concert on MTV, "Live Infidelity—REO Speedwagon in Concert".

"One reason why Toronto's live show went so smoothly was because the nucleus of the crew provided a direct feed for the Eidophor video projection unit used at several of The Who's earlier live concerts on the tour," Namm suggests.

Last December, Namm and a crew of 10 went to Texas and taped The Who's concerts at the Houston Astrodome and The Cotton Bowl in Dallas. Namm reviewed the Texas tapes with his assistant director, John O'Connell, for literally every movement by the group including lighting and stage cues. While reviewing the tapes, Namm was also busy on the telephone, ironing out technical details, long distance, with Glen-Warren Productions Limited, Toronto.

"I approached this like any other production. I did my pre-production planning and took into consideration all aspects of video, audio and communication between members of the crew. We did our pre-production down to the last detail, allowing for failures and production changes. I did a block diagram of the in's and out's of the system and had no doubts that it would work," Angelo Caldana, mobile engineering supervisor for Glen-Warren relates.

It took six Glen-Warren engineers three days to construct and modify the vehicles for the Toronto shoot. "Big Blue", a 43 ft mobile teleproduction trailer, contains a custom 24 × 6 × 2 Ward-Beck audio console, with four premixes and four auxiliary buses on each channel, served as operation control for the shoot. A Ryder *301* was specifically designed to house all the video recorders and another truck was designed to house an ADDA *Still Store* device, a two-channel Quantel and two playback VTRs.

On Monday, December 15th, the entire stage area (minus the band's equipment/road gear, sound and light) was erected in Maple Leaf Garden, only to be dismantled at 5pm on Tuesday, for the scheduled hockey game. Prior to dismantling the stage, Keith Kevan, the video sight coordinator, supervised proper colour coding and diagramming of the entire area.

On Wednesday, just before midnight and as soon as the ice was removed from the rink in Maple Leaf Garden, 14 technicians from Glen-Warren began setting up the equipment for "The Who—The Final Concert." By Thursday afternoon there were 40 employees from Glen-Warren, 30 video technicians from New York, nine sound engineers from The Record Plant and Showco, nine technicians from Wold Communications to handle the satellite uplink and 30 stage hands. In addition, The Who's road crew (12 people for lighting, six for staging and eight for sound) were preparing for the event.

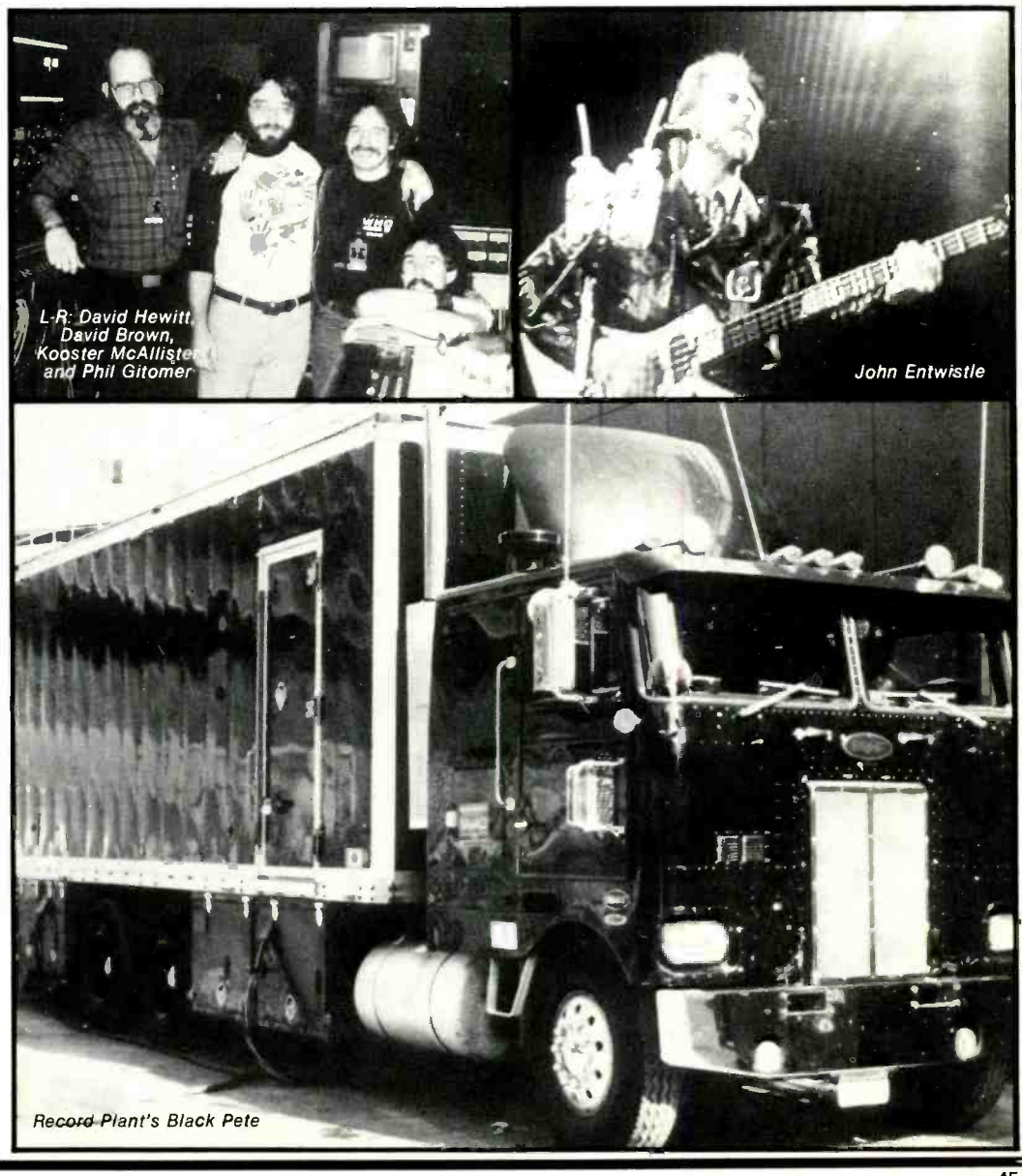
"David Brown (maintenance) was freed up to take care of the video tie ins. We fed Glen-Warren with two sets of left, right and mono audio. David set up a multiline that carried stereo audio, switched video, time code and vertical drive to feed signal back from the video truck," David Hewitt, Record Plant's director for the shoot reveals.

"To soften up the signal for broadcast and the 1 in the video, we added a stereo limiter across the bus. One inch video and satellite links can't handle head room the way a console can," Hewitt explains.

On Thursday night, The Who's penultimate North American concert was videotaped. Record Plant recorded a 15 in/s Dolby four track recording with stereo left, stereo right, 59.94 and SMPTE, for the video shoot. A 1 in Type C tape of the Thursday night performance was delivered to the uplink site in New York on December 17th, the day of the live feed. This tape, with stereo audio on Tracks 1 and 2 and mono on Track 3, was started synchronously with the start of the Segment A live feed and served as a back-up if all live Toronto feeds failed. All involved were quite pleased that the 1 in master of The Who's performance was only needed for post production of the edited versions for cable, cassette and disc.

Live distribution

"The transmission path for the live feed was probably the most 46 ▶



L-R: David Hewitt, David Brown, Kooster McAllister and Phil Gitomer

John Entwistle

Record Plant's Black Pete

Who's Dolby Surround revolution?

complicated to date. A tremendous amount of coordination was needed to provide service to CEN and Fox simultaneously on two satellites, Westar IV and Westar V, in addition to the other satellites that were also employed for the Canadian feed (Anik C3) and the Toronto to Buffalo feed (Anik D1)," Richard Wolfe, vice president for Twentieth Century-Fox Telecommuncations explains. "The signals included video and three audio channels—mono, Dolby stereo left and Dolby stereo right. In addition, Dolby stereo audio was transmitted on the Wold SCPC service on Westar III, to feed all FM radio simulacast stations. The Canadians were excellent and did a first class job of uplinking the signals," Wolfe concludes.

Since the live broadcast involved multiple feeds and signal users, Wold Communication was given total network coordination to ensure compatibility for all video, audio or telephone transmission service involving the event. Due to international agreements special arrangements had to be made for the transmission path. Wolf cites an example of how this affected the US feed.

"The quality on the landline was superior to the satellite signal, so we used it as the primary link, rather than the backup as intended. Since Canadian regulations allow portable uplinks to operate at relatively low power, the signal does not saturate the transponders on the satellite and the signal-to-noise ratio suffers," Wolfe explains.

A high powered uplink from the concert would have permitted exclusive satellite distribution; however, instead a double uplink transmission was used. The video, stereo audio and mono signals from Maple Leaf Garden were carried to Wold Communications in New York City on a microwave/cable landline via Niagara Falls. From New York, the signal was sent out over four uplinks.

The 60 FM stations organized by DIR Broadcasting received their stereo signal from either a National Public Radio downlink or from portable dishes or AT&T lines provided for the broadcast. Videonet of Woodland Hills, California was responsible for providing the receiving dishes and personnel for the portable downlinks at the 38 CEN locations. The pay per view cable homes received a mono audio feed on their TVs and had to listen to the FM broadcast for stereo sound, the common delivery system for pre-recorded simulcast concerts.

Technically the live distribution was a tremendous success. Financially it was a flop. According to a CEN spokesperson, "We needed more than 100 locations for the live concert to be a success. Since we had less than half of that, we knew the event would be an economic loss. However, we did average 1,700 people per location making it profitable on a building by building basis. Of the two million Subscription Television homes in the United States, only 12 per cent of the pay TV customers paid the $10—$12 fee to receive The Who's final concert. Despite the financial losses the live transmission was viewed as a success.

"We're pleased with the results. Pay-per-view is still in its infancy and will grow," Phillip Myers, vice president of Twentieth Century Fox claims. In fact, Twentieth Century Fox is looking into backing another pay-per-view event in late '83 or early '84. The spokesperson for CEN also agrees, despite a financial setback from the event. "Large screen theatrical video with high quality sound was proven to be a success. The consumers found The Who's concert to be an enormously qualitative experience. The audience bled into the screen and participated as if they were at the live event. If the audience was neutral it would have been a failure.

Surround Sound remix for home video

"Dolby is like a good housekeeping seal of approval. Four channel Dolby surround sound had not been used for live telecast and we wanted to be the first," Richard Wolfe vice president engineering and video technology of Twentieth Century Fox candidly remarks. "Glyn Johns was not comfortable mixing in surround sound, so we let him out of that part of his contract for the live concert, and deleted the Dolby logo from the live telecast. We insisted that the home video version be remixed with Dolby surround sound to be compatible with our home product (90 per cent of Twentieth Century Fox movies have surround sound) and to enhance the audio quality," Wolf states.

Glyn Johns, who remixed the home and cable version at his own studio with a Studer *A800* and personally designed desk, relates:

"I was contractually obliged to use surround sound. Dolby supplied the equipment. Designed for use in a cinema it is excellent and marvellous. For use in the home it is a digression." Johns explains his feelings about the disadvantages of Dolby surround stereo for the home. "There is a tremendous amount of leakage from the signal in the front to the back. It reduces the stereo and the size. I refused to do the live concert in Dolby surround sound because I couldn't see 97 per cent of the people putting up with a signal that less than 3 per cent of the people could receive."

Wolfe disagrees strongly with Johns' opinion of surround sound.

"The ambience from the rear channel gives the listener the feeling of being there. It is a psychological effect. The rear channel makes you part of the performance. The whole essence is that we use the latest technology with music." Wolfe also feels, "it is even more important to have at least 3 or 4 channels for large screen live music performances. If you do not use a centre channel, a solo singer or instrument in the centre of the screen will have audio coming from either left or right edge."

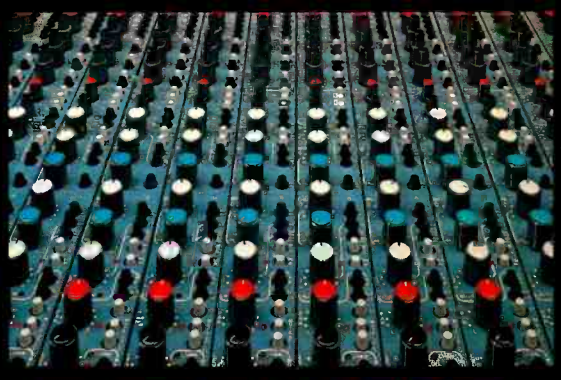
The jury is still out on Dolby surround stereo for live music performances. Consumer awareness of the process is just developing in the United States. Sony's stereo Beta VCR system, introduced this year, the 150,000 home laser disc units and the new CED disc system, are capable of providing surround sound in the home, however the penetration of high fidelity video units is extremely limited. In addition, a decoder system is required to receive the full surround sound effect. Surround Sound Inc, Marina del Rey, Calfornia, is one of the manufacturers of the decoder, a *CV 360* retailing from $299 to $499.

"By the end of 1983, 10,000 consumer decoders will be sold, and by the end of '84 the number will be 36,000," predicts Sherry Zeitler, director of marketing for Surround Sound Inc. It is also reported that Jensen will build the surround sound decoder into future TV component systems. By making the decoder standard in home video monitors, manufacturers might force a demand for new sound mixing on future music television programmes.

"The Who's final concert is a milestone from a technological standpoint. Notwithstanding the lack of 4-channel audio for the live performance, technically the program was a tremendous success," says Wolfe and adds, "the pay-per-view aspect of the experiment was not as successful, from a financial point of view, but that will change as the number of STV homes increases over the two million mark. However, the cable TV version which premiered on HBO was very well received and the home video version is selling very well. The overall project was definitely a success," Wolfe concludes.

The Who's Final North American concert clearly redefined the technical expectations for audio transmission of a live telecast. The home video version of the experiment utilised a new Dolby technique, which might change the way engineers mix sound and consumers listen to music in the future. The British just might have started another revolution in America. ■

ANGELA 28/24 at Sanwa Video, Osaka, Japan



ANGELA 28/24 at Castle Audio, Dallas, Texas

AMEK "ANGELA"

Most of our competitors have a simple technique for designing their consoles. Using inferior, penny-pinching electronics and mechanical construction, they disguise the relative sonic inadequacy of their product by creating a seductive, cosmetic appearance.

Only one manufacturer consistently uses another approach. AMEK. All our consoles are built to the same standard of total excellence. Our belief, after ten years of console building, is that the only long-term future for this company lies in maintaining a standard the others never have reached, and are moving further away from every year in their drift towards mediocrity.

'ANGELA' has the characteristics expected of an AMEK console: Matchless acoustic transparency; a totally musical equalizer with a proper bass response; inexhaustible routing possibilities. The steel chassis, hardwired TT jackfield, gold-plated edge connectors and rigid PC motherboard do not speak of anything less than our perfectionist attitude towards our products. All this is now possible for a price far more modest than previously associated with our consoles.

'ANGELA' is available in a very wide range of configurations, from 16/16 through to 62/48. VCA Faders, with DC subgrouping and the AMEK 'MULTIMIX' computer are standard options. As the ultimate product in its price-performance category, can you afford not to know more?

AMEK CONSOLES INC
11540 Ventura Boulevard
Studio City, CA 91604
U.S.A.
Telephone: (213) 508 9788

AMEK SYSTEMS & CONTROLS LTD
Islington Mill, James Street
Salford M3 5HW, England
Telephone: 061-834 6747
Telex: 668127 AMEK G

letters

CD questions

Dear Sir, Congratulations on your very professional journal. As an audio engineer and audiophile, which sometimes seems incompatible, there were two articles in your July issue which drew my attention.

(1) Studiofile: Sear Sound, New York

At last there's somebody who really cares about sound quality of the recordings, and I believe they do it the right way. Tube sound still seems best to me, and to a lot of audiophiles. This may sound antiquated, but I could convince myself in many comparative listening tests of pre and power amps, and I'm not nostalgic at 29 years old. The main problem of poor sound quality lies, in my opinion, in the total lack of correlation between things we hear and things we measure.

(2) Inside Compact Disc

I was very surprised, if not shocked by the poor information provided especially in Table 1: Comparison of systems. I think that this information, probably quoted from a manufacturer's leaflet, is totally misleading.

'Groove length'—what for? The systems are totally different.

'Frequency response'—with which phase shift? The CDs seem to be unacceptable for most audiophiles.

'Signal/noise ratio'—Please don't forget that you cannot use the whole 90 dB on CD, as hard clipping occurs beyond maximum level; so there is at least 10 dB of headroom to be left. On the other hand, S/N is not a measurement for signal dynamics, for the ear is able to distinguish signals which are 10 to 20 dB within the noise floor.

'Distortion'—at which level, which frequency? Which harmonics are measured? You probably refer to maximum level at 1 kHz, very rarely met in reality.

It might be an interesting fact for the readers to know that one of the main problems with PCM recording and reproduction—a total lack of ambience and low level information—is due to the very poor distortion figures at low levels (due to linear A/D and D/A conversion) and mainly containing those annoying high order harmonics. Especially if you consider that both the analogue recording and reproduction medium, and the human ear have very low distortion figures, mainly containing 2nd and 3rd order harmonics, at these levels.

Yours faithfully Andreas Manz, Ana Piferrer, 16-D-1, Barcelona 23, Spain.

Richard Elen replies: Many thanks for your positive comments about the magazine. As far as 'Tube Sound' is concerned, we feel that good amp quality is more a function of design than what the active devices are. There is a lot of rubbish talked on both sides of the fence: we tend to believe that while there are some very nasty transistor amplifiers, there have also been some pretty appalling valve ones! Particularly with modern developments in solid-state power devices, notably power FETs, there is little excuse for making a 'bad' amplifier, where in the past many designers fell down by thinking they could take valve designs, turn the voltage rails down and invert them, fiddle the values a little and end up with a good germanium transistor amp. But then, what is 'good' and 'bad' in monitoring? As a recording engineer, I tend to be more concerned with what the system is like to work with rather than what sort of barriers the electrons have to cross in the course of their work. If it sounds right (and right in other rooms) then it probably is right.

I think you slightly miss the point of the July article on CD. Remember that many studio engineers are operationally brilliant but may not know too much about the numbers involved—indeed some people would say that technical competence gets in the way of good recording engineering—again, if it sounds right, it is right. The technical article was in the August issue.

What I'd like to know is where this missing ambience and low-level information is. I've certainly heard early vinyl discs cut from digital masters, and heard the results of no dither and cutter-head resonance: now generally absent from modern discs. I have also heard the most wonderful recordings of organ music on CD where the recording was crystal clear but lacking in ambience mainly because someone must have popped the mics down the tubes to record the organ—this, it seems to me, is the result of appalling mic technique, revealed by the digital process in all its unimaginable nastiness, or at the very least a valiant attempt by an engineer to eliminate that ghastly noise the church makes.(?)

I would not go so far as to blame digital media for bad mic technique. Neither would I blame Edison's Phonograph for not being up to modern standards. I do think that some of the earliest digital recordings did suffer from some nasty faults, often caused by the ordinary analogue cutting head being unable to cope. They were often more technical curiosities than serious attempts at fidelity. Even today, new technologies take time to develop, and while we may criticise marketing men in the hi-fi companies for some rather excessive claims about digital, we need to view the technology itself, in our professional world, with a little more care. Sometimes the ordinary engineer in the studio may do better to listen and criticise what he or she hears, rather than attempt to play a numbers game which may be somewhat irrelevant to the art of recording music.

Digital authenticity

Dear Sir, Very strong feelings seem to be developing amongst many people about the origin of recordings released in the CD format. Your readers will surely agree that the function of a record is to reproduce, as closely as possible, in the listening room the sound of a performance by musicians in a studio, concert hall, etc.

In very general terms there are two stages in making this reproduction possible. The live sound is recorded on to tape and this tape recording is transferred to a more convenient medium for use in the home—usually in the form of a disc or to a lesser extent, a cassette.

There are two methods available for recording on to tape—analogue or digital, both of which have certain advantages and disadvantages; both of which have their advocates and champions. Now we have this same choice of method of recording the signals on to disc: the analogue LP or the digital Compact Disc.

The Compact Disc has removed two of the most serious faults which to most people can come between the listener and the music, namely surface noise and inner groove distortion. The sound of the original tape will now be heard more clearly, and it is for the buyer to decide whether what is heard on the disc is satisfying or not. I would suggest that the vast majority of the record buying public would be unable to detect whether the original master tape is digital or analogue. It must be admitted that very good and very bad recordings exist in both forms. The presence of the magic words 'Digital Recording' is no guarantee of quality, just as the absence of these words does not guarantee a bad recording.

Surely we should welcome the introduction of the CD because it enables us to get closer to the original recording, not take issue with the record companies because they are giving us the possibility of hearing analogue recordings, in many cases better than ever before. For me the method by which the original master tape was made is only of academic interest and I do not see why a record company should be obliged to disclose this.

Yours faithfully, Roy Emerson, Independent Record Producer, 80 Darwin Court, Gloucester Avenue, London NW1 7BQ.

Buss or bus

Dear Sir, I was irritated to find, in the recent article by my colleagues Ted Fletcher and Steve Dove, the word 'buss' appearing consistently, and appalled to discover that their original, correct, spelling 'bus' had been altered to conform with your 'house style'.

Reference to the OED shows 'buss' to be a middle-ages word for 'kiss' (cf French baiser, Latin basiare, basium). The correct word, sir, is 'bus', the slang abbreviation of omnibus: serving several objects at once—bar, wire etc, in electricity, through which whole current passes. The plural of bus is buses.

It would be interesting to discover the origin of this mis-spelling—no doubt, like other debasements of the English language, it can be traced to the American influence, though I note with relief that db *magazine gets it right (even if their logo is wrong). So does Hewlett Packard.*

As Link House is an English company, I believe, sir, that your house style should embrace correct English, and not sloppy usage, however general it may appear to be.

Yours in hope of repentance, John L Andrews, Alice (Stancoil Ltd), 38 Alexandra Road, Windsor, Berks.

Richard Elen replies: As it happens, we were already investigating this one, and came to the same conclusions. We have implemented the change in style and you will no doubt notice the correct usage in future issues. I'm afraid we can't offer you any repentance because we discovered it too!

CD mastering

Dear Sir, The article by Chris Hollebone in the July issue on the subject of Compact Disc mastering provides important information for producers and engineers preparing CD product.

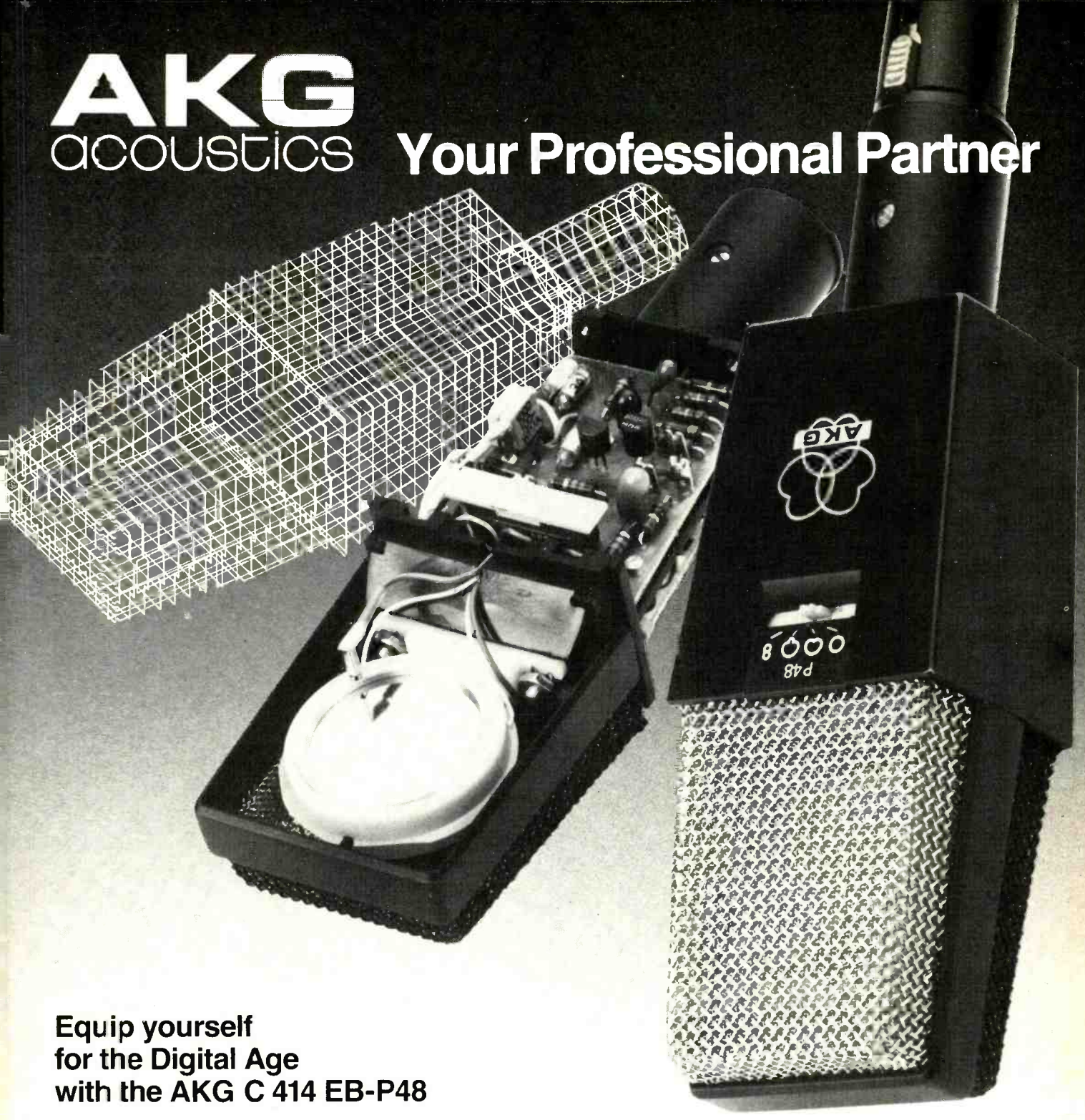
One piece of information missing in the article is that the Sony PCM 1600 digital audio processor with 44.1 kHz sampling is completely compatible with the Compact Disc mastering process, with no further processing being required by the PCM 1610. Sony has gone to great efforts to promote their newer processor, neglecting to include the use of their earlier and much more expensive units.

In addition the article states that producers wishing to release both Compact Discs and conventional LPs will have to prepare both digital audio and analogue audio master tapes. As the many LPs produced from digital masters attest, an analogue master tape is unnecessary for disc mastering and detrimental to the sound benefits gained from digital recording.

Yours faithfully, Van Webster, Digital Sound Recording, 607 North Avenue 64, Los Angeles, CA 90042, USA. ■

AKG acoustics

Your Professional Partner



Equip yourself for the Digital Age with the AKG C 414 EB-P48

The C 414 EB-P48 is the latest development in a long line of famous AKG large diaphragm microphones, all employing the acclaimed CK 12 one inch dual diaphragm capsule. The electronics of the new C 414EB-P48 are a completely new departure, and the key to the digital-level performance of the microphone.

The C 414EB-P48 features:

- Large, one-inch dual-diaphragm system
- Four different polar patterns selectable on the microphone
- Pre-attenuation (0, −10, −20 dB) and bass attenuation selectable on the microphone
- Exceptionally wide dynamic range
- Low inherent noise
- For 48-volt phantom powering only, with less than 1 mA power consumption

Send this coupon for information about AKG products

- ☐ **HEADPHONES**
- ☐ **MICROPHONES**
- ☐ **PICK UPS**
- ☐ **REVERB UNITS**
- ☐ **TIME DELAY UNITS**

Name _____

Street _____

Town _____

Postcode _____

AKG®

AKG Acoustics Ltd.
191, The Vale, London W3 7QS
TF: (441) 7492042, TX: (51) 28938 akgmic g

ADV 297/1/E

product reference

Microphones

AKG (Austria)
AKG GmbH, Brunhildengasse 1, A-1150 Wien. Tel: 43222 95.65.17 0. Telex: 131839.
UK: AKG Acoustics Ltd, 191 The Vale, London W3 7QS. Tel: 01-749 2042. Telex: 28938.
USA: AKG Acoustics Inc, 77 Selleck Street, Stamford, CT 06902. Tel. (203) 348-2121. Telex: 84451121.

Wide range dynamic, electret and condenser microphones with accessories.

ALTEC LANSING (USA)
Altec Lansing Corp, PO Box 3113, Anaheim, CA 92803. Tel: (714) 613-7717. Telex: 655415.
UK: Rank Strand Sound, PO Box 51, Great West Road, Brentford, Middx TW8 9HR. Tel: 01-568 9222. Telex: 27976.

Dynamic, electret and condenser microphones mainly for live use.

ASTATIC (USA)
Astatic Corp, PO Box 120, Conneaut, OH 44030. Tel: (216) 593-1111. Telex: 980712.
UK: Thomas Sweeting & Stringer Ltd, Shaftesbury Works, Shaftesbury Road, Romford, Essex. Tel: 0708 45756.

Range of dynamic microphones.

AUDIO-TECHNICA (Japan)
Audio-Technica Corp, 2206 Naruse, Machida, Tokyo 194. Tel: 0427-22-7641. Telex: 2872-357.
UK: John Hornby Skewes & Co Ltd, Salem House, Garforth, Leeds LS25 1PX. Tel: 0532 865381. Telex: 556167.
USA: Audio-Technica US Inc, 1221 Commerce Drive, Stow, OH 44224. Tel: (216) 686-2600.

Wide range of dynamic and electret microphones with accessories.

B & K (Denmark)
Bruel & Kjaer A/S, DK-2850 Naerum. Tel: 02 80.05.00. Telex: 37316.
UK: Bruel & Kjaer (UK) Laboratories Ltd, Cross Lances Road, Hounslow, Middlesex TW3 2AE. Tel: 01-570 7774. Telex: 934150.
USA: Bruel & Kjaer Instruments Inc, 185 Forest Street, Marlborough, MA 01752. Tel: (617) 481-7000.

Instrumentation microphones and condenser music recording microphones.

BEYER (West Germany)
Beyer Dynamic, PO Box 1320, D-7100 Heilbronn. Tel: 071 31.82.348. Telex: 728771.
UK: Beyer Dynamic (GB) Ltd, 1 Clair Road, Haywards Heath, Sussex RH16 3DP. Tel: 0444 451003.
USA: Beyer Dynamic Inc, 5-05 Burns Avenue, Hicksville, NY 11801. Tel: (516) 935-8000.

Very wide range of ribbon, dynamic and condenser microphones with accessories.

CALREC (UK)
Calrec Audio Ltd, Hangingroyd Lane, Hebden Bridge, Yorkshire HX7 7DD. Tel: 0422 842159. Telex: 51311.
USA: Audio & Design Recording Inc, PO Box 786, Bremerton, WA 98310. Tel: (206) 275-5009. Telex: 152426.

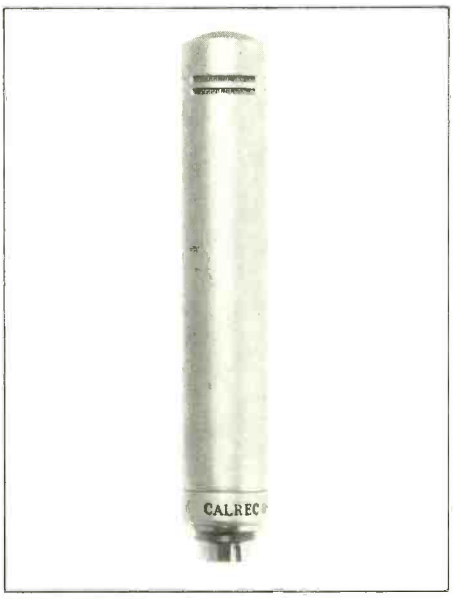
Wide range of condenser microphones.

COLES (UK)
Coles Electroacoustics Ltd, Pindar Road, Hoddesdon, Herts EN11 0BZ. Tel: 099 2466685.

Range of ribbon microphones.

COUNTRYMAN (USA)
Countryman Associates Inc, 417 Stanford Avenue, Redwood City, CA 94063. Tel: (415) 364-9988.
UK: Scenic Sounds Equipment Ltd, 97-99 Dean Street, London W1V 5RA. Tel: 01-734 2812. Telex: 27939.

Miniature microphones designed to be fitted close to sound source.



Calrec CM 602D

CROWN/AMCRON (USA)
Crown International, 1718 West Mishawaka Road, Elkhart, IN 46514. Tel: (219) 294-5571. Telex: 810-295 2160.
UK: HHB Hire and Sales, Unit F, New Crescent Works, Nicoll Road, London NW10. Tel: 01-961 3295. Telex: 923393.

Wide range of microphones using the 'Pressure Zone' principle.

C-TAPE (UK)
C-Tape Developments Ltd, Transducer Laboratories, 73 High Street, Aldershot, Hants GU11 1BY. Tel: 0252 319171. Telex: 858623.
USA: C-Tape Developments Inc, PO Box 1069, Palatine, IL 60078. Tel: (312) 359-9240.

Range of contact transducers using condenser principles.

EAGLE (Japan)
UK: Eagle International, Precision Centre, Heather Park Gate, Wembley HA0 1SV. Tel: 01-902 8832. Telex: 922131.

Range of dynamic and electret microphones mainly for live use.

ELECTRO-VOICE (USA)
Electro-Voice Inc, 600 Cecil Street, Buchanan, MI 49107. Tel: (616) 695-6831.
UK: Shuttlesound Ltd, Unit 15, Osiers Estate, Osiers Road, London SW18 1EJ. Tel: 01-871 0966. Telex: 27670.

Very wide range of dynamic and electret microphones with accessories.


Neumann U47 FET

EPM (Canada)
RD Systems of Canada Ltd, 2 Thorncliffe Park Drive, Unit 28, Toronto, Ontario M4H 1H2. Tel: (416) 421-5631.
UK: John Page Ltd, Wesley House, 75 Wesley Avenue, London NW10. Tel: 01-961 4181. Telex: 24224.

Range of microphones with parabolic reflector fittings.

FRAP (USA)
FRAP, PO Box 40097, San Francisco, CA 94140. Tel: (415) 431-9350.
UK: Peavey Electronics (UK) Ltd, Unit 8, New Road, Ridgewood, Uckfield, Sussex TN22 5SX. Tel: 0825 5566. Telex: 957098.

Range of contact transducers.

IMAGE DEVICES (USA)
Image Devices Inc, 1825 NE 149 Street, PO Box 61-0606, Miami, FL 33181. Tel: (305) 945-1111. Telex: 519358.

Miniature electret microphones.

MB (West Germany)
MB-Electronic GmbH, Postfach 60, Neckarstrasse 20, D-6951 Obrigheim. Tel: 06261/62031. Telex: 466132.
UK: Rank Strand Sound, PO Box 51, Great West Road, Brentford, Middlesex TW8 9HR. Tel: 01-568 9222. Telex: 27976.

Wide range of dynamic, electret and condenser microphones and accessories.

52 ▶

Q·LOCK

THE INIMITABLE SYNCHRONISER

If you're thinking of setting up an audio post production suite, you should be putting Q.LOCK as the heart of the system. Q.LOCK's control of video, audio or film machines allows the engineer to concentrate on the performance, not on the equipment. Easy to operate, with interfaces to virtually all tape transports, Q.LOCK can handle all the routine tasks of machine control, and offer precise synchronisation.

The experience of hundreds of Q.LOCK users has led to specialist software control packages for applications such as Video Audio Post Production (VAPP), Sound Effects Assembly (SFX) and Automatic Dialogue Replacement (ADR), whilst the new Options control software permits the operator to configure operational routines to his own requirements through the Q.LOCK control keyboard. Containing its own multistandard timecode generator, readers, autolocator functions, automatic record functions, and supplied complete with the necessary interfaces, interconnecting cables and connectors, Q.LOCK is the complete control synchronising system.

We want to discuss your requirements.

Contact us for further details of how Q.LOCK can help you.

1983

U.K.: **AUDIO KINETICS (U.K.) LIMITED,** Kinetic Centre, Theobald Street, Borehamwood, Hertfordshire WD6 4PJ England. Tel. 01-953 8118 Telex 299951 (Kintek G)

U.S.A.: **AUDIO KINETICS INC.,** Suite 209, 4721 Laurel Canyon Boulevard, North Hollywood, California 91607. U.S.A. Tel. 980 5717 Telex 230 194 781

AUDIO KINETICS

WORLDWIDE AGENTS AUSTRALIA: Magna-Techtronics Ltd., Artarmon. Tel. 438 3377. CANADA: Gerr Electro Acoustics Ltd., Toronto. Tel. 868 0528. DENMARK: S.L.T. Copenhagen. Tel. 34 1284. FINLAND: Studiotec Recording Equip. Espoo 60. Tel. 514133. FRANCE: 3M FRANCE, Paris. Tel. 6161. GERMANY: 3M GERMANY, Neuss. Tel. 2101141. ISRAEL: Kolinor Ltd., Tel Aviv. Tel. 263298. ITALY: Audio International, Milan. Tel. 7384751. JAPAN: General Traders Ltd., Tokyo. Tel. 291 2761. NETHERLANDS: Heynen BV, Gennep. Tel. 8851 1956. NEW ZEALAND: Videx Systems Ltd., Glenfield. Tel. 444 6087. NORWAY: Siv. Ing. Benum, Oslo. Tel. 442255. SOUTH AFRICA: Eltron Ltd., Johannesburg. Tel. 29 3066. SPAIN: TELCO, Madrid. Tel. 231 7840. SWEDEN: Ercotron AB, Stockholm. Tel. 756 7355. SWITZERLAND: EMT, Wettingen. Tel. 26 05 50

product reference

Sennheiser MD 211N

MILAB (Sweden)
CTAB, Knutsgatan 6, S-26500, Astorp. Tel: 042 515 21. Telex: 12442.
UK: Audio Video Marketing, Unit 21, Royal Industrial Estate, Jarrow, Tyne and Wear NE32 3HR. Tel: 0632 893092.
USA: Camera Mart Inc, 245 West 54th Street, New York, NY 10019. Tel: (212) 757-6977. Telex: 12078.

Wide range of dynamic, electret and condenser microphones and accessories.

NEUMANN (West Germany)
Georg Neumann GmbH, Charlottenstrasse 3, D-1000, Berlin 61. Tel: 030 251-4091. Telex: 184595.
UK: FWO Bauch Ltd, 49 Theobald Street, Boreham Wood, Herts WD6 4RZ. Tel: 01-953 0091. Telex: 27502.
USA: Gotham Audio Corp, 741 Washington Street, New York, NY 10014. Tel: (212) 741-7411. Telex: 129269.

Wide range of condenser microphones with accessories.

PANASONIC (Japan)
Matsushita Electric Ind Co Ltd, PO Box 51, Osaka Central 530-91, 1006 Oaza Kadoma, Osaka, 571. Tel: 06 908-1121. Telex: 63426.
UK: National Panasonic Ltd, 308-318 Bath Road, Slough, SL1 6JB. Tel: 0753 34522. Telex: 847652.
USA: Panasonic Co, 1 Panasonic Way, Secaucus, NJ 07094. Tel: (201) 348-7000. Telex: 710-992 8996.

Range of dynamic and electret microphones.

PEARL (Japan)
UK: Pearl Music Ltd, 29 North Acton Road, London NW10. Tel: 01-961 5055.
USA: Pearl International, 408 Harding Industrial Drive, Nashville, TN 37211.

Range of dynamic and electret microphones.

PEAVEY (USA)
Peavey Electronics Corp, 711 A Street, Meridan, MS 39301. Tel: (601) 483-3565.
UK: Peavey Electronics (UK) Ltd, Unit 8, New Road, Ridgewood, Uckfield, Sussex, TN22 5SX. Tel: 0825 5566. Telex: 957098.

Dynamic microphones for live use.

RWO/FOSTEX (Japan)
Canada: Interlake Audio Inc, 680F Dobble Street, Winnipeg, Manitoba R2K 1G4. Tel: (204) 668-0248.
UK: Bandive Ltd, Brent View Road, London NW9 7EL. Tel: 01-202 4366.

Range of dynamic microphones for studio application.

SANKEN (Japan)
Sanken Microphone Co Ltd, 2-8-8 Ogikubo, Suginami-ku, Tokyo 167.

Export: Pan Communications Inc, 5-72-6 Asakusa, Taito-Ku, Tokyo 111. Tel: 03-871-1370. Telex: J27803.

Range of condenser microphones.

SCHOEPS (West Germany)
Schalltechnik Dr-Ing Schoeps, Spitalstrasse 20, D-7500 Karlsruhe 41. Tel: 0721 42016/42011. Telex: 7826902.
UK: Scenic Sounds Equipment, 97-99 Dean Street, London, W1V 5RA. Tel: 01-734 2812. Telex: 27939.
USA: Posthorn Recordings, 142 W 26th Street, 10th floor, New York, NY 10001. Tel: (212) 242-3737.

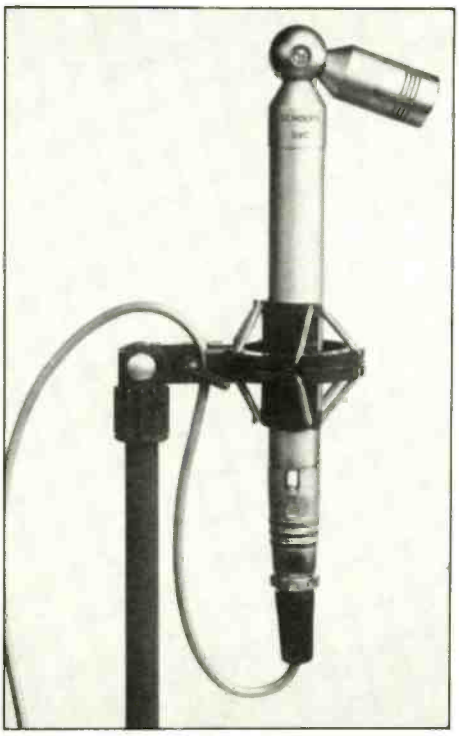
Wide range of condenser microphones and accessories.

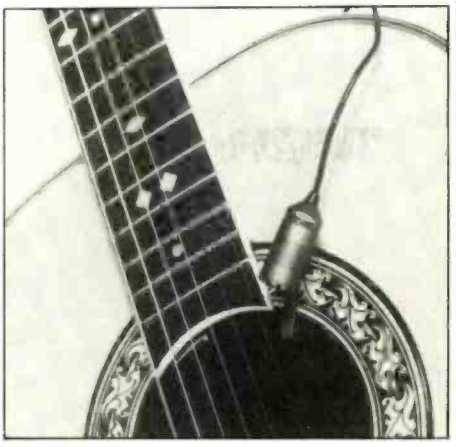
SENNHEISER (West Germany)
Sennheiser Electronic, D-3002 Wedemark 2. Tel: 05130 8011. Telex: 0924623.
UK: Hayden Laboratories Ltd, Hayden House, Chiltern Hill, Chalfont St Peter, Bucks SL9 9UG. Tel; 0753 888447. Telex: 849469.
USA: Sennheiser Electronic Corp, 10 W 37th Street, New York, NY 10018. Tel: (212) 239-0190. Telex: 421608.

Wide range of dynamic, electret and condenser microphones and accessories.

SHURE (USA)
Shure Brothers Inc, 222 Hartrey Avenue, Evanston, IL 60204. Tel: (312) 866-2200. Telex: 724381.

Schoeps GVC





Shure SM17

UK: HW International, 3-5 Eden Grove, London N7 8EQ. Tel: 01-607 2717.

Wide range of dynamic and condenser microphones and accessories.

SONY (Japan)
Sony Corp, PO Box 10, Tokyo Airport, 149, Japan. Tel: 03 448-2111. Telex: 22262/24666.
USA: Sony Corporation of America, 9 W 57th Street, New York, NY 10019. Tel: (212) 371-5800. Telex: 424595.
UK: Sony Broadcast Ltd, City Wall House, Basing View, Basingstoke, Hants RG21 2LA. Tel: 0256 55011. Telex: 858424.
UK: Feldon Audio, 126 Great Portland Street, London W1N 5PH. Tel: 01-580 4314. Telex: 28668.

Wide range of dynamic, electret and condenser microphones and accessories.

SUNN (USA)
Sunn Musical Equip Co, Amburn Industrial Park, Tualitin, OR 97062. Tel: (503) 638-6551.

Dynamic microphones for live use.

TURNER (USA)
Telex Communications Inc, 9600 Aldrich Avenue South, Minneapolis, MN 55420. Tel: (621) 884-4051. Telex: 297053.
UK: Canadian Instruments and Electronics Ltd, Harris-Bass House, Station Road, Ilkeston, Derbyshire DE7 5TX. Tel: 0602 302331. Telex: 377755.

Range of dynamic microphones and accessories.

WRIGHT (USA)
Wright Microphones, 2093 Faulkner Road NE, Atlanta, GA 30324. Tel: (404) 321-3886.
UK: Bandive Ltd, Brent View Road, London NW9 7EL. Tel: 01-202 4366.

Electret microphones. ■

Eventide Clockworks

The Eventide SP 2016 programmable effects processor:

The most versatile audio processing instrument ever developed is now available: EVENTIDE, with over a decade of leadership in digital audio effects again advances the state-of-the-art with the SP2016 Programmable Effects Processor. In a single 3½" rack mounted device, EVENTIDE has engineered the most powerfully versatile digital processing system ever employed in an audio component.

FEATURES OF THE SP2016:

REVERB
At your fingertips is a wide variety of reverb programs with operator control of all parameters plus superb audio spec. performance and reverb quality. The SP2016 accepts EVENTIDE's new software "Reverb Library" Roms, a growing collection of plug-in programs.

DIGIPLEX® ECHO
The SP2016 provides EVENTIDE's Digiplex echo, our digital version of multiple-head tape echo. Exclusive features include incredibly stable operation, giving literally hours of decay time with no noise build-up.

CHORUS EFFECTS AS YOU'VE NEVER HEARD THEM BEFORE
ADT takes on a whole new meaning. "D" can now stand for dozens, not just double! Each voice can vary randomly in time, amplitude and space.

FULL BANDWIDTH DELAY
16kHz: 0 to 1.6 sec. delay in 25 microsecond steps.
8kHz: 0 to 3.2 sec. delay in 30 microsecond steps.

SELECTIVE BAND DELAY
The first in a series of dramatic new effects exclusive to the SP2016. You can separate the signal into a number of frequency bands and independently delay each band up to 3.2 seconds.

FLANGING AND PHASING
Quality and control features far surpassing existing devices.

CLASSICAL DIGITAL LINEAR PHASE FILTERS
For PA, crossovers and EQ. Design filters to your specifications using the IEEE-compatible remote controller.

FULL STEREO OPERATION
2 in, 2 out.

PROGRAM SOFTWARE SUBSCRIPTION SERVICE
The SP2016's digital circuitry is so powerful, we've yet barely tapped the ultimate capabilities inherant in the Programmable Effects Processor. EVENTIDE continues to develop new and exclusive effects for the SP2016. Not just updated and refined reverb programs (although we will offer these, too) but totally new and unique effects. Because the SP2016 is a fully programmable system, we can supply these new effects (as well as revisions) as they are developed via convenient plug-in modules. They will be available individually or through our program software subscription service. The SP2016 is obsolescence proof.

SELF-TEST FEATURE
The most extensive self-test capabilities of any pro-audio product ever! Should a problem develop, the SP2016 will spot it and even pinpoint the part number of the suspect I.C.

U.K. Distributors

FELDON AUDIO

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

MARKET RESEARCH -

the study of consumer needs and preferences:

External PSU, phantom power, phase reverse, 16 track monitoring. Cue, Dim on talkback, 3 Aux sends on channels and monitor. 2 returns Meter bridge, oscillator inject points. Direct outputs. Normalised inputs. Fader reverse Slate. . .

16-8-16
- the result of market research.

SOUNDTRACS

affordable quality

Soundout Laboratories Ltd.
91, Ewell Road, Surbiton, Surrey KT6 6AH, England.
Telephone: 01-399 3392. Telex: 8951073 / SNDOUT / G

business

BARRY FOX

Video recorders

Relations between the Common Market and Japan are getting progressively worse. Earlier this year Brussels set a limit on the number of video recorders the Japanese could sell into Europe. The Japanese were particularly upset because the deal effectively put a very low ceiling on the number of kits of parts which they can send into Europe, for assembly by European workers in European factories. The video limits were imposed after Philips and Grundig complained to the Common Market that they couldn't sell enough of their own *V2000* video recorders. Now the same thing is happening with *Compact Disc*.

The Electronic Industries Association of Japan has taken the unprecedented step of producing a booklet underlining the absurdity of Philips' request for the tariff on *Compact Disc* players imported from Japan into Europe to be doubled, from 9.5% to 19%.

"The *CD* system is the product of joint development between engineers from the EEC and Japan," says the booklet, "raising the import tariff could irreparably harm the future development of this system as well as smear the record of co-operation which has been achieved so far." They aren't wrong.

In 1979, Sony joined forces with Philips on *Compact Disc* development. Error correction was improved and the coding standards raised from 14 bit to 16 bit. In 1980, Sony and Philips produced the prototypes which pushed the system through to standardisation in Japan. Matsushita chose *Compact Disc*, instead of AHD from its own subsidiary JVC. Every other Japanese manufacturer followed and the Telefunken mini-disc, along with AHD, bit the dust. Without Sony's help, and especially the personal crusade of Sony's charismatic boss Akio Morita, *Compact Disc* wouldn't now be on sale.

In reward for the company's initial development work, Philips gets a royalty on every disc sold, as well as a royalty on the players. But that isn't enough for the Dutch Company. They also want a large chunk of the player market. At a financial conference, Philips director Gerrit Jeelof said that the company has been worried about the threat of *Compact Disc* players coming in from Japan for sale in Europe at 'absurdly low prices'. Hence the plea for a double rate tariff on Japanese players, even though Japan has already eliminated the 4.9% tariff on players coming in from Europe and the US is sticking at 4.7%.

Heaven knows, anyone in Europe with half a brain wants to see jobs created or even saved, in what is left of our ailing electronics industry. If Philips succeeds in getting the Common Market to hike the price of Japanese *Compact Disc* players artificially, on top of the price hike caused by the strong Yen currency, then it may temporarily guarantee some extra sales of Philips players and secure some jobs. But in the long term Philips has made a dangerous move. Whether or not the tariff is doubled, the Japanese are angry. The companies, like Sony and Matsushita, which supported the *Compact Disc* system early on, feel betrayed. The gloves are now off.

At the moment there's a waiting list for some *Compact Disc* players. But next year, when they are in plentiful supply and the selling gets tougher, the Japanese will pull out all stops to wipe Philips off the audio map, just as they've done with video. Now that the spirit of co-operation—that got *CD* off the ground—has been evaporated by the Philips tariff move, watch out for an acceleration of *CD* developments from Japan. Budget players, car players, portable players, still picture video players, miniature players for miniature discs and broadcast studio players; they'll start pouring in from Japan while Philips still futzes around with a no-frills domestic system and prototypes like the cardboard mock-up of a car player which Philips proudly showed in Berlin recently. By the end of the decade only a few people will remember that it was Philips who originally invented the system.

And what has Philips to say about all this? Two years ago, as an economy, Philips in Britain shut down its efficient corporate PR department. There's now only an occasional corporate comment on anything. I asked Philips why it wasn't putting its own side of the picture, if there was one. A week or so later the company issued a 4-page corporate whine. Significantly there's no mention of the royalty which Philips earns on every *Compact Disc* and player sold by all licensee companies, including the Japanese. When quizzed, Philips refused to talk figures. But we know that it's a 3 US cent royalty on every disc sold and the royalty on players is in the area of 3 to 5%. As a yardstick, JVC takes a 3.5% royalty on every VHS recorder made under licence.

Most surprising in the Philips whine is the claim that the call for an increased tariff came not just from Philips and Grundig but from 11 Philips licensees in Europe, lobbying their trade body, The European Association of Consumer Electronic Manufacturers. "These European companies have made and intend to make heavy investments in *Compact Disc* technology and see their potential markets being threatened," says Philips. So who are these eleven licensees who want the tariff on *Compact Disc* players raised? I asked Philips. The answer was more than a little surprising. Only four of the 11 are hardware companies: Studer-Revox, Bang and Olufsen, Grundig and Thomson of France. The other seven are software companies: PolyGram, Nimbus, Toolex-Alpha, Sonapress, Forward Technology, PR Records and MPO Records. I wonder how many people working for these software companies know they are lobbying for a higher price on the players which people must buy to play their discs?

Listening standards

Most record companies have been through the problem of a pop star who rejects the master mix, or test pressing because his home hi-fi has a blunt stylus. Decca had exactly the same problem 20 years ago, when they recorded *The Ring*. The late John Culshaw tells the story in his book *Ring Resounding*. After a batch of Vienna recordings were finished, and edited, Decca sent singer Birgit Nilsson a test pressing in New York. She was horrified, because her voice was inaudible over the orchestra. Decca couldn't persuade her to listen in a studio, because she was sure they would fix the sound artificially to fool her. So they bought the singer a cheap portable gramophone which she took back to her hotel room to play the test pressings again. They sounded fine and Decca got clearance to release the recording. Almost certainly the famous singer's New York gramophone had its stereo pickup wired out of phase, so that centre front voice was partially cancelled leaving only the random phase of orchestral spread.

A few years ago in Britain there was a budget ballet record. A lady complained that her pickup kept skipping the grooves. There was nothing wrong with the disc she sent back but the company gave her a new one. She complained again. And again. Finally she turned up on the company doorstep with her latest faulty pressing. It played perfectly on an office gramophone. "That doesn't prove anything," said the buxom ballet enthusiast, "it only skips grooves when I'm dancing."

One of the early Tony Hancock records carried a note on the sleeve suggested by Hancock himself. 'For best results clean this record with a fine emery cloth.' Inevitably a 13-year-old sent in an emeried disc, complaining that it sounded worse now he'd cleaned it exactly as instructed. Vowing never to put another joke on a cover, the customer relations department took pity on the child and sent out a new copy. "Thanks for the record," came back a letter in spidery hand. "PS: I'm really 31 and I'll bet you never put another joke on a record sleeve."

Time warp synchronisation

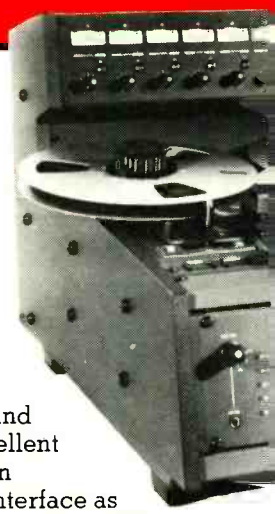
Say goodbye to badly dubbed films, where the actors' speech obviously does not match their lip movements. The Polytechnic of Central London has developed a time warp system which doctors a post sync recording so that it matches the original sound track, and thus lip movements.

Most modern feature films now rely on at least some post synchronised dialogue. The sound recorded on location is often unclear so that the actors must re-record their words in a studio while watching themselves on screen. It is a time consuming and expensive business because only a few actors have mastered the art of accurate post synchronisation.

According to the new system, unveiled at a BKSTS conference in London earlier this year, the actor watches the screen and repeats the dialogue in loose synchronism. Up to five minutes of speech at a time is converted into 16 bit digital code and recorded on an 84 megabyte magnetic disc memory. A spectral analyser compares the waveform of the fresh speech with the waveform of the original sound recording made when the sequence was filmed. The analyser produces 100 data signals a second, which pin-point any discrepancies between the original and fresh recordings. On replay of the fresh recording these different signals are used to control a digital time warp process, which compresses or stretches the signal bit stream from the disc so that it matches the original. The inventors of the system, which they call *Wordfit*, claim that because the time warp circuits act on 10 ms packets of sound, synchronisation is accurate to ±20 ms and this error is indetectable. The overall effect of warping is not noticeable, and certainly far preferable to the awful sight and sound of sloppy post-syncing. ■

OTARI DP 4050

Highest quality and reliability from the world's leading manufacturer. Cassette or reel master. DP4050C2 is expandable to max. of 11 slaves.



OTARI MkIII-8

The only truly professional ½" 8-track. Based on the well-proven 5050 transport, the MkIII-8 is a microprocessor-controlled recorder offering facilities and performance normally found only on 1" machines. Excellent ergonomics for one-person operation, synchronizer interface as standard, all audio functions remotable. Autolocator available also.

OTARI DP 2700

DP 2700. An automatic loader for blank or recorded pancakes. Will wind any length precisely. One operator can run up to 3 machines. Reliable and attractively priced.

Why it

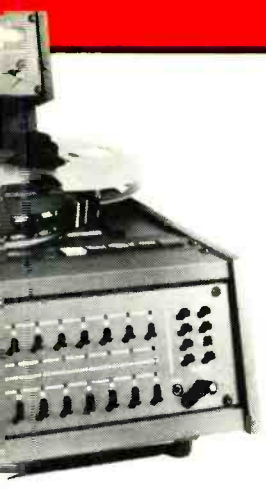
ITA for

If you are considering investing in the finest equipment, make sure you will enjoy the best back-up facilities for sales and servicing.

Otari's superb range of multitrack and mastering recorders, tape duplicators and winders, represent the highest levels of technology, quality and reliability. Thoroughness in design and manufacture guarantees consistent performance throughout their long life.

I.T.A. has been handling Otari equipment, for over 10 years. No-one else has the experience and resources to support the product to the same degree. Our new showroom has the full range on working demonstration

ITA, 1 Felgate Mews, Studland St. Londor



OTARI MTR90-II

The MkII MTR90 is now accepted as *the* 24-track, and is to be found in some of the world's most prestigious installations. Unique transport system under total computer control gives the smoothest possible operation. Totally gapless and silent punch-ins and outs. The MTR90 MkII offers too many advanced features to be listed here; ask for a demonstration in your studio and you won't want to see it leave!

OTARI MX5050 B2-II 2 TRACK

A fully professional and rugged ¼" 2-track recorder, the B2-II has become, like its predecessor the 5050B, the best-selling 2-track in the USA. Read Keith Spencer Allen's "hands-on" review in the September "Studio Sound" to find out why. Better still, come and see the B2 working in our demonstration room. Excellent performance and well-packed with sensible features.

OTARI MTR12 Series

Probably the most advanced analogue recorders in the world, the MTR12 Series now accept 12" reels, giving 24mins playing time at 30ips. Computer-based transport gives an extraordinarily versatile and easy-to-use machine, completely modular, excellent accessibility. Available for demonstration in your studio in a variety of formats, including ½" 2-track.

nust be OTARI

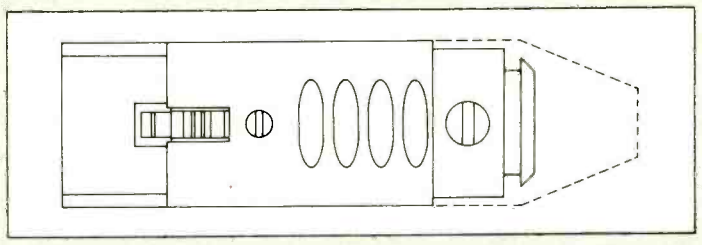
and the MTR Series are available for demonstration in your own studio. Early delivery is offered on all models.

From the user's point of view, a supplier's commitment to their product is more important after installation rather than before. Our approach to after-sales maintenance is five-fold. 1) The training and experience of our engineers. 2) Quick response time. 3) Availability of appropriate technical material. 4) Understanding the requirements of each customer. 5) Substantial inventory of spares for all current models. All five factors have to be fulfilled to provide the complete service. We know Otari — so talk to the specialists!

W6 9JT. Tel: 01-748 9009. Telex: 21879

A loudspeaker connector at last? proposals for a standard

Ken Dibble



The question of XLR/3 usage in the audio industry was discussed at some length in 'Standard—What Standard' (Studio Sound, February 1982) and a number of problems highlighted. Subsequent correspondence has shown that the 'Pin Two Hot' brigade, ie those now complying with the IEC and British standard, appear to be gaining ground. So far—so good.

This article develops one of the points touched on at the end of that article, namely the matter of loudspeaker connectors. As will be seen, some recent correspondence from Australia has brought this topic to the fore.

WITHOUT doubt, the unofficial 'industry standard' practice is to use the male version of the *XLR/3* as a loudspeaker output facility from a power amplifier and an *XLR/3* female receptacle as the input to a loudspeaker enclosure. This approach is in widespread use throughout studio and live sound industries and it is common practice to find equipment manufacturers fitting connectors in this way to proprietary power amplifiers and loudspeakers as standard equipment.

Certainly, there is a degree of logic to commend such an approach. After all, convention in the use of the *XLR/3*-type connector requires that the audio signal comes out of pin contacts and goes into socket contacts, so all we are talking about is an extension of the standard BS/IEC low level signal practices into loudspeaker wiring. And of course, it offers the inherent advantage of obvious differentiation between power amplifier inputs and outputs, thereby rendering inadvertent wrong connection highly unlikely. Unfortunately however, it is not quite that simple.

There is no way a loudspeaker circuit can be considered in the same terms as a low level signal circuit, especially when the very high power ratings of modern professional amplifiers are taken into account. A loudspeaker circuit is essentially a power circuit and will therefore come within the scope of the various British and international electrical safety standards, and in the UK, is likely to be subject to the Home Office Electrical Equipment (Safety) Regulations, 1975. In the application of these Regulations, the Department of Trade will acknowledge compliance with BS415, the 'Specification for Safety Requirements for Mains Operated Electronic and Related Apparatus for Household and Similar General Use' as full compliance with the Regulations as far as equipment coming within its scope is concerned. BS415 is similar to, but not identical with, IEC65 and the Department of Trade point out that compliance with IEC65 may not necessarily ensure full compliance with BS415 and may not, therefore, meet the requirements of the Regulations. So clearly, it is BS415 that we should be concerned with here.

Section 9, sub-section 1 clause 1 of BS415 clearly states that a '... part or terminal contact is not live if ... the current measured through a non-inductive resistance of 50,000 ohms does not exceed 0.7 mA (peak) AC or 2 mA DC and moreover ... for voltages between 34 V (peak) and 450 V (peak) the capacitance does not exceed 0.1 μF.' A rider adds: 'For frequencies above 1 kHz, the limit of 0.7 mA (peak) is multiplied by the value of the frequency in kHz, but shall not exceed 70 mA (peak).'

If you do your sums, it works out that a power amplifier rated at 150 W/4 Ω will develop a peak voltage of 34.6 V and a peak current of 0.69 mA under the above stated conditions. Therefore, the output terminal of any power amplifier capable of delivering more than 150 W into a 4 Ω load would clearly be treated as 'live' under BS415 and would have to be shrouded and/or shuttered in such a way to satisfy the 'standard finger test' as defined by the Standard.

There is no way that the male *XLR/3*-type connector will satisfy the 'finger test', therefore, any power amplifier rated at 150 W/4 Ω or greater which is fitted with *XLR/3*-type loudspeaker output connectors will be in contravention of BS415 and will not meet the requirements of the Regulations. Clearly then, the current 'industry standard' practice cannot be condoned—rather, it should be actively discouraged.

In power engineering, the convention is that 'volts come out of holes', not from pin contacts, which of course, is the reverse of the *XLR/3* standard usage. In recognition of this, two years ago the BBC internally directed that in the absence of an alternative suitable connector, all PA equipment kits would be fitted with an *XLR/3* female socket as the amplifier loudspeaker output connector and with the *XLR/3* male as the loudspeaker cabinet input connector—exactly the reverse of the unofficial 'industry standard' practice. However, as this meant that power amplifiers would then have *XLR/3* female connectors for both input and output connections, the input receptacle was changed to male—totally contrary to the BS and IEC standard! So if you should come across a BBC spec amplifier, watch out, the chances are it is wired back-to-front!

Surely, if an organisation the size and with the technical credibility of the BBC is sufficiently frustrated in their search for a reliable loudspeaker connector that they have to resort to using an established connector system in a way which is quite contrary to British and International Standards in order to comply with the safety regulations, then something is wrong. Despite the many hundreds of connector types available on the market, none are able to offer the necessary degree of mechanical strength and durability combined with the required electrical characteristics. Many organisations have spent several years searching for just the right connector, some have even got as far as being proposed for adoption as a British or IEC standard, but all have been thrown out after close scrutiny by those experienced in connector usage. Yet far from recognising this yawning crevasse in the marketplace, the connector giants have chosen to ignore the requirement.

A new contender?

Enter the author's correspondents from the southern hemisphere.

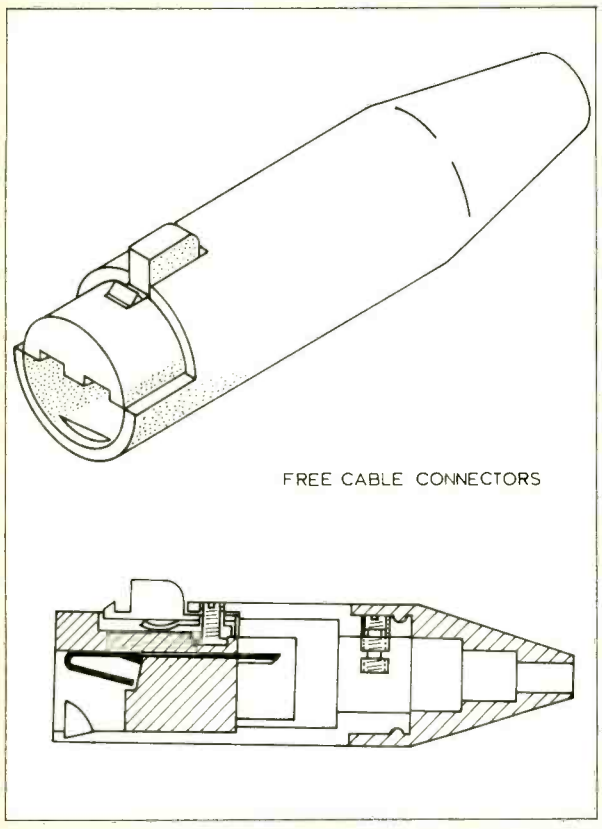
Mr Robert Grunberg of Audio Supply and Systems Engineering Services in Double Bay and Mr Mike Dixon of Dixon Design & Development in Woollahra, New South Wales, would seem to have been faced with the same problem. As a result, they have teamed up to design a connector, which, in their view, is likely to meet all the design criteria and which, if accepted by the industry, is likely to meet the requirements for IEC standardisation.

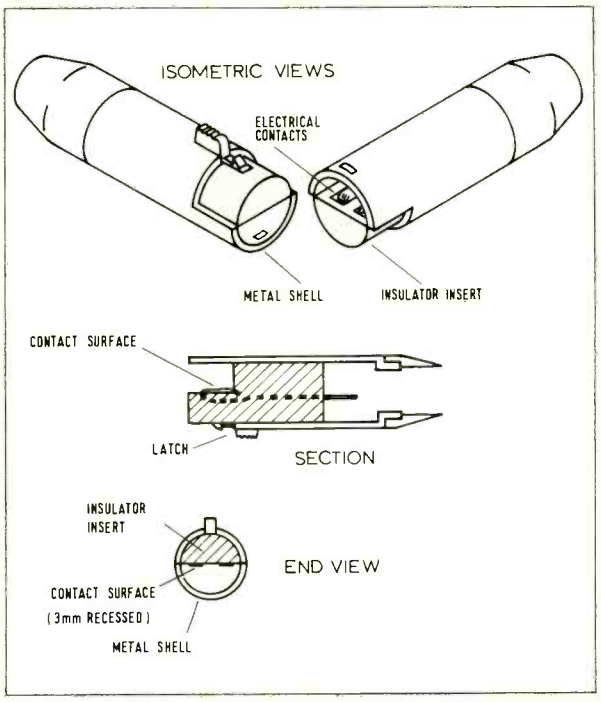
The patented design shown in the diagrams is totally original in concept and highly practical ergonomically. It appears to embody all the benefits of the *XLR* family whilst at the same time, avoiding all the encumbrances and, on paper at least, seems to fit the bill. The primary points of note are:

- The connector has a robust, die-cast metal shell of similar size and proportions to the present *XLR/3*-type connectors.
- Solid polycarbonate insulator insert with embedded slide/wipe flat leaf contacts is common to both free cable and chassis mounted versions.
- True hermaphroditic design means that the same connector is used at both ends of the cable. Only the housing is changed for the chassis mount version, and this is used as the amplifier loudspeaker output connector

60 ▶

A loudspeaker connector at last? proposals for a standard





and as the loudspeaker input receptacle. Therefore, cables can be used either way round with assured continuity of phasing throughout the system.

- Latching mechanism fitted to cable-end component only, which avoids protruding tabs on chassis mounted versions and provides a normal single latch at the fixed receptacle end and a greatly improved double latch at the interface of an in-line pair.
- Single captive screw retains both insulator insert and latching mechanism.
- Single captive screw cable clamp with rubber boot accommodates cables up to 10 mm diameter.
- The same design in simplified form, without heavy duty cable entry/clamp or latching mechanism and with moulded plastic housing, can be used as a domestic hi-fi loudspeker connector. It would also be electrically and mechanically compatible with the professional version.
- Total incompatibility with any known connector at present available with immediate visual identification.
- A small number of relatively simple parts means economic manufacture in quantity.

Comment—offered and invited

It should be realised that such a connector is not at present commercially available. At the time of writing, there is only one prototype model in existence and this is in the designer's studio back in Australia, so we only have Messrs Grunberg and Dixon's drawings and explanations on which to make an assessment.

The object in publishing the details at this early stage is to invite comment on the proposed design from the practitioners of the professional audio industry worldwide. In order that reaction can be properly gauged, anyone with any comment to make, either on the need for a purpose designed loudspeaker connector, or on the design published here, is invited to contact the author and designers via *Studio Sound*.

In particular, the originators of the design would like to hear from bulk users of loudspeaker connectors in order to strengthen their approaches to the major international connector manufacturers. Currently, negotiations are in progress with Neutrik in Switzerland and ITT-Cannon in Australia, but progress is slow due to the natural reluctance of the manufacturers to commit financial resources to tooling and setting up of production lines, for an item with an unknown demand. As the majority of prospective users are already using the *XLR/3* in one form or another anyway, the introduction of a new connector would only reduce demand for a product which is already in mass production in huge quantities and for which the capital investment has already been written off. One might find a more enthusiastic reception to such a proposal in a manufacturer who does not already have a vested interest in the perpetuity of the *XLR/3*? So please, let's hear from you if you're interested.

For what it may be worth, the author is of the opinion that the design has everything to commend it and that it is by far, the most feasible of any proposal yet offered. The designers have responded to the one or two initial reservations with satisfactory assurances on all points raised with just one exception—its ability to meet the 'standard finger test' required by BS415 and IEC65 in its present form, but it would be necessary to have a sample to hand to establish this point.

One of the originators' primary objectives is that the design be suitable for adoption as an international standard loudspeaker connector. Assuming that Messrs Grunberg and Dixon are able to get the design into large scale commercial production, and that it finds acceptance by the industry generally, it is highly unlikely that it would be considered as an international standard unless it complied with the requirements of IEC65, with any national variations (eg BS415 in the case of the UK) and with any national regulatory legislation (eg the Electrical Equipment (Safety) Regulations in the case of the UK) of the many countries represented on the IEC.

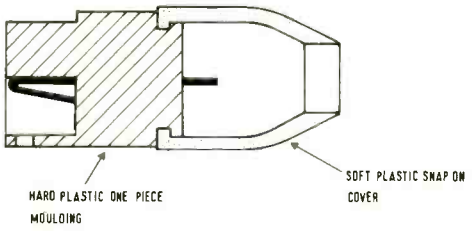
Here is an opportunity of a lasting solution to this age-old problem which has caused so much confusion in every offshoot of the pro-sound industry for so long. Many organisations have committees working on this problem and unless there is some co-ordination, we will find that each sector of the industry will start to adopt its own oddball system—of which the conflicting use of the *XLR/4* by the ASCE and the ABTT, and the new BBC practice are prime examples—which will end up in total chaos. The *XLR/3* as a low-level signal connector came up from total obscurity to probably becoming the most widely adopted international connector practice of all time. Surely, as an international industry, with half the problem solved by the *XLR/3*, there is everything to gain and nothing to lose by completing the standardisation process by the adoption of an internationally acceptable loudspeaker connector as well.

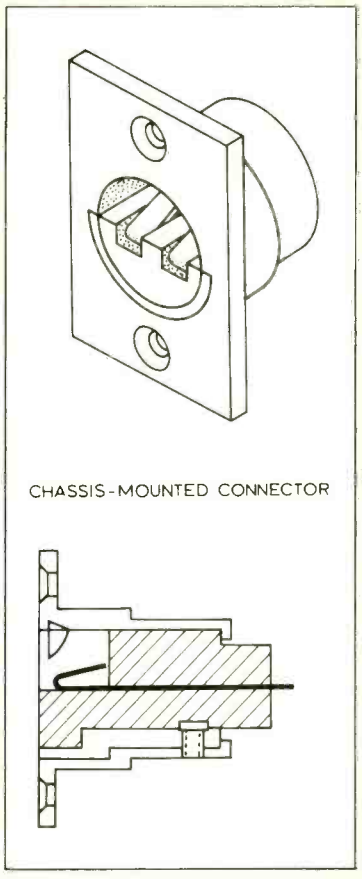
The proposal herein presented may or may not provide the answer. But let's at least take it seriously by treating it with the respect it so obviously deserves. In any event, let's make sure we get an industry standard, not a fragmented hotchpotch with all the hassle that will entail, just because we cannot communicate effectively between ourselves.

So let's hear from you—at least it's a move in the right direction. ■

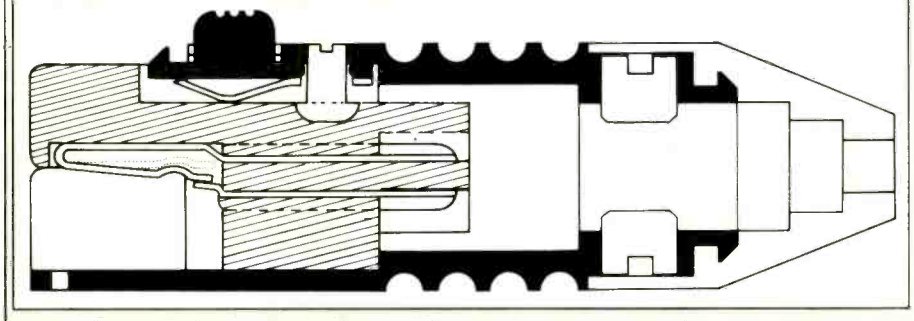
LOW COST VERSION FOR THE CONSUMER MARKET

A non-professional model without the latching mechanism is possible with a one-piece plastic moulding of the whole line plug or panel mount socket(s). This version would still be compatible with the professional type connectors.





PROFESSIONAL AUDIO POWER CONNECTOR



Matchless skill in equalisation

Klark-Teknik Research is setting a new standard for equaliser stability — and now the company's diverse experience of world markets has produced very different versions for very different needs, all using the same five-year warranted, state-of-the-art thick-film-engineered microcircuit filters.

Typical is the DN360 with thirty ⅓ octave filters to each channel for the most exacting applications, while the DN332, with sixteen ⅔ octave filters per channel, is a perfect match for many good modern sound systems — without outstretching most budgets.

Both are built to the same high standard with features such as electronically balanced inputs and subsonic filters as standard.

Frequency response ±0.5dB 20Hz-20kHz
Equivalent noise <−90dBm
Distortion <0.01% THD @ 1kHz

KLARK TEKNIK

British designed, British made

**The reliability of MELF micro-electronic filters gains a 5-year solid-state parts warranty for all Series 300 equalisers.*

For full colour brochure contact Klark-Teknik or your nearest distributor *(list available on request).*

Manufactured by Klark-Teknik Research Limited Coppice Trading Estate, Kidderminster DY11 7HJ, England. Telephone: (0562) 741515 Telex: 339821

Klark-Teknik Electronics Inc. 262a Eastern Parkway, Farmingdale, NY 11735, USA. Telephone: (516) 249-3660

Distributed in the UK by Autograph Sales Limited Stable 11, British Rail Camden Depot, Chalk Farm Road, London NW1 8AH. Telephone: 01-267 6677

Fibre optics for the studio

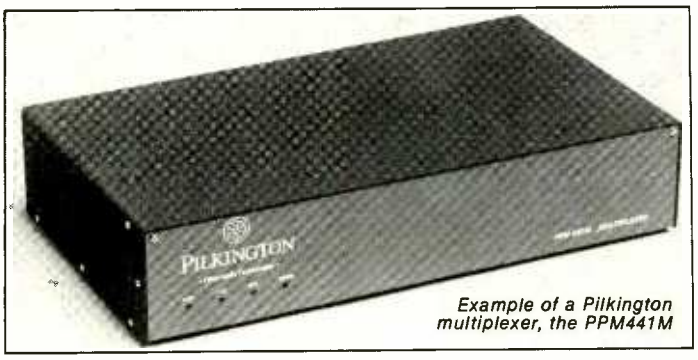
John Ashall
Pilkington Fibre-optic Technologies

In the August issue of *Studio Sound*, Barry Fox discussed the comparative merits of optical fibre and copper co-axial cables in the sound industry. Much has been said about the possibilities offered by fibre optics in transmitting television and radio programmes, but there is another area in which they are making considerable headway: the transmission of control data.

For their size and weight, optical fibre cables can transmit a lot of information very quickly. They are simple to connect, secure and inexpensive. Most importantly, they are free from interference, both from outside sources and, when multiplexed, from other data being transmitted simultaneously. Thus signals controlling the operation of equipment—tape machines, amplifiers, mixers, lights, cameras, etc—can be carried along the same line, at the same time, as programme transmissions without interfering with them. This article looks at this operative side, and shows how recent advances in fibre optic technology and the associated electronics packages are likely to have significant effect on sound engineering.

The efficient transmission of data to a network control point is a prime consideration for an organisation such as the BBC, where at any given time it may be necessary to call up the status of switching conditions or transmitter availability around the country. For convenience, this information should be accessible via a desktop keyboard display unit. At any one time, a considerable amount of data will be coming in from a variety of sources.

Optical fibres can carry a great deal of information up to the control display unit by multiplexing the data lines—the fibres usually used for this purpose have a capacity of 50 Mb/s at 1 km. In effect, it is the electronics rather than the fibre capacity that limits the flow of information, as the fibre carries data at a faster rate than the terminal equipment can read it. Even so, with the computing lines using a standard *V24/RS232C* interface, modern equipment can currently handle up to 32 lines simultaneously at full speed, using only a single optical fibre for each direction of transmission. That brings a lot of data up to the control desk.



Example of a Pilkington multiplexer, the PPM441M

The other advantages of using optical fibres for this type of application include the absence of interference and the maintenance of technical earth integrity. Digital information can be run along the same line as programme data without interfering with the latter, and the absence of any hard electrical connection between the control desk and the data source means that the earths cannot get mixed.

An area where fibre optics have a particularly bright future is in outside broadcasting. At large open-air events such as sports meetings, for example, the problem of where to locate large, heavy sound trucks can be a major concern—Newmarket racecourse after a heavy downpour is not the ideal site for a sound truck. The sound desk itself, however, is usually small enough to go in a vehicle the size of a small van or Land Rover. Using optical fibre cables, the sound truck containing all the heavy equipment can be parked at a convenient spot several hundred metres away. All the control functions can be handled at the desk, and all the data, programme and control, can be transmitted along a single, rugged, lightweight optical cable, leaving the audio functions—switching, compressing, equalisation and the like—to the 'off-site' sound truck.

The cable weight consideration is crucial. This sort of set-up would not be easy using copper co-axial cables. Very large parallel lines would be needed—thick audio cables, one for each track, and separate control lines as well. The sheer weight and unwieldiness of the cables means that they are only practicable over very short distances. The data can all be carried over an optical cable weighing only about 18 kg per km—and, contrary to popular belief, the cost of a fibre optic cable of this sort of length is low (£1.50 per metre reinforced cable, £1.00 per metre light duty).

The face of concerts, too, will change with the increasing use of fibre optics. To some people, maybe, the atmosphere of a rock concert would not be the same without miles of cable festooned around the stage, up the walls and across the balconies, without slave amplifiers everywhere and a huge control panel taking up a dozen of the best seats in the house. A single optical fibre cable running from the stage to the control surface can carry the same amount of information. Much of the switching, re-routing, audio control and so on can be handled by the solid state electronics and the control surface itself can be much smaller.

The fact that fibre optic cables can be linked into a data system via an absolutely standard interface obviously enhances their usefulness. As we have seen, the speed with which large quantities of data can be transmitted places the limitations on the electronics at the end of the fibre. The future development of fibre optics in sound engineering, as in most other areas which use them, therefore lies in the increasing sophistication of the associated electronics packages. Manufacturers of optical fibres are discovering that it is not enough just to supply cables: increasingly, they need to develop their expertise in electronics, both hardware and software. Pilkington, for example, came into the field as a manufacturer of optical fibre—a natural step for one of the world's leading glass makers. Now they can have a specialist company, Pilkington Fibre-optic Technologies, designing and making a wide variety of electronics and interface packages, opto-electronic data and monitoring systems, and full signal transmission sub-systems. Though they still manufacture fibre optic cables, the actual fibres are made elsewhere: the emphasis is on complete packages.

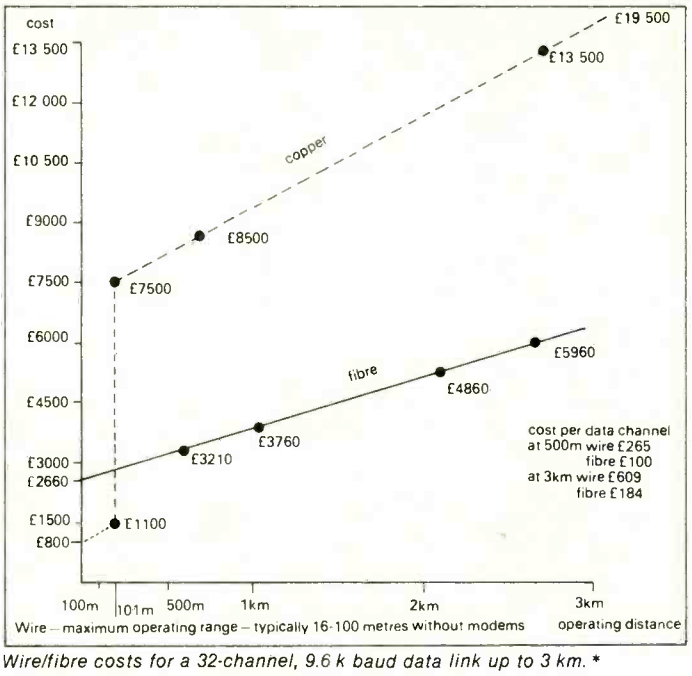
The new fibre optic data multiplexing systems now available are making a considerable impact on data communications in a great many fields. Units for synchronous and/or asynchronous transmission are designed to make full use of the high speed, high integrity transmission capabilities of optical fibres.

The latest optical fibre multiplexing package to be launched is a specialist unit, initially developed at the BBC, primarily for sound studio applications, although it is equally well suited to a wide range of process control applications where a number of switches can be multiplexed along a single optical fibre together with analogue data. Now manufactured as the *PPM 16/ADS* Multiplexer by Pilkington under licence from the BBC, this unit can transmit simultaneously, over a single optical line, digital and switch data as well as analogue control information from faders, potentiometers and so on. Its design is based on a common back plane bus, allowing the functions of the multiplexer to be changed and mixed easily.

The *PPM 16/ADS* has 16-channel capacity, and any channel can handle any function. The bus-based system comprises a power supply unit, input/output port to the optical line, a master multiplexer card and two further cards per channel. Of these, one is a channel card, standard to all channels, which

organise its functions, addresses data and performs various sub-multiplexing routines. The other is the interface card, which sits between the parameter to be transmitted and the channel card, organising the data into a form which can be transmitted through the latter.

The choice of interface card depends on the type of input/output required for each channel. An *RS232C/RS422* card links the channel directly with the interface port, transmitting one data line at a rate of 2.4 kb/s. An analogue control card interfaces up to eight analogue signals to the multiplexer. Full duplex analogue data, in the range 0 to 5 V and DC to 20 Hz, can be accepted. Analogue values are digitised to within 8-bit resolution, and total transmitted accuracy is to within 1%. A switch interface card can accommodate up to 256 switch conditions, usually configures as 128 switch contacts either open or closed. Address codes are provided by switch coder cards.



Wire/fibre costs for a 32-channel, 9.6 k baud data link up to 3 km. *

In a typical simple operation shown recently to the sound engineering industry, the *PPM 16/ADS* (which, incidentally, will drive normal co-axial lines as well as optical fibres) was used for the remote operation of an 8-track tape deck. The programme output from the tape was fed into switch matrix cards, with switch mixing down to two channels. The output was sent to two voltage control amplifiers, controlled via analogue lines.

The package can of course be used for a far more complex operation than this, controlling a large number of machines. The BBC are shortly to install a large network based on the *PPM 16/ADS* to control from a central point in Broadcasting House units in BBC local radio stations throughout the UK, as well as tape machines within Broadcasting House. Four master stations will be put into operation, and around 50 remote units. The system will allow 24-hour access to the network, with conventional keyboard operation allowing tape machines in each location to be turned on and off and 'tweaked' in the correct timing and switching sequence.

The advantages of such a system are obvious, greatly reducing the chances of human error inherent in instructions dependent upon exact timing, and allowing considerable flexibility in controlling the network. In the BBC operation, it will greatly facilitate patching-in to other transmitters, switching in to the Radio 2 network when the local station goes off the air, and feeding programme and control data to and from stations around the country.

Without getting too deeply involved in the optical fibre *versus* copper cable debate, it is plain to see that for certain applications at least, the coming-of-age of fibre optic technology offers considerable possibilities in the control of broadcast and studio sound. As in so many technologies, the spin-offs are increasingly important, and the developments in electronics prompted by fibre optics are bound to have significant repercussions in the sound engineering industry even when they are linked to co-axial cables.

It is no exaggeration to say that a revolution is under way in this industry. Fibre optic cables allow a degree of control in certain applications previously undreamt of. The multiplexing advantages of devices such as those discussed here will, over the next few years, become more and more apparent. The increasing sophistication of sound control technology offers a flexibility that is bound to create new possibilities within the industry. ■

* Reprinted with kind permission of Systems International July 1983.

diary

Future Film move

Central London based Future Film Developments have moved to new premises in Wardour Street, slightly more than a stone's throw from their previous home. The new premises will have facilities for a large showroom, trade counter, and demonstration room and sales office. They will also be increasing the number of products that they presently handle. Additional new premises outside London for storage and assembly of products will, they hope, help them maintain a larger stock, hence reducing the lead time that appears to be an increasing problem for some cable manufacturers.

Future Film Developments, 114 Wardour Street, London W1V 3LP. Tel: 01-434 3344.

People

● Harman (Audio) UK has appointed Dave Hunt as service manager.

ACES—all change

From November 1st, 1983 AC Electronic Services will be known as ACES (UK) Ltd. They have also moved and their new address is Featherbed Lane, Shrewsbury, Shropshire SY1 4NJ. Tel: 0734 66671. Telex: 35188.

Microphones book availability

In the August issue we reviewed a book entitled *Microphones—technique & technology* by Norbert Pawera. We have since been informed that this book is available from AKG Acoustics, Brunhildengasse 1, 1150 Wien, Austria as well as from all their representatives and specialised dealers.

New company to market Leevers-Rich

A new company has been formed to market the Leevers-Rich range of products as well as the products formerly handled by Leevers-Rich in the UK on an agency basis including Pacific Recorders & Engineering Corporation, Garner, Capitol Magnetics and RB Annis. Managing director of the new company is Tony Costello and the company name will be The Professional Recording Equipment Company Ltd being based at 319 Trinity Road, London SW18 3SL, UK. Tel: 01-874 9054.

Tape Duplication Symposium?

As a continuation of his article in *Studio Sound* on tape duplication, author Mike Jones is considering organising a symposium on 'Technical advances within the cassette duplication industry' and would be pleased to hear from any readers who would be interested in attending such an event. It is intended that such a symposium would cover all aspects of cassette duplication from tape and C-0s to loading, finishing, packing and include materials, mastering, production methods and quality control.

Mike says that there is currently no specialist forum where the duplicating industry can exchange ideas and opinions, or where papers on new developments can be presented. It is hoped to hold the first event prior to the spring AES. Mike would also like to hear from individuals or manufacturers who would be interested in presenting papers.

For further details write to Mike Jones, 19 Glenloch Road, London NW3 4DJ, UK.

Address changes

● Industrial Tape Applications (ITA) have moved to new showroom premises and are now located at 1 Felgate Mews, Studland Street, London W6 9JT. Tel: 01-748 9009. Telex: 21879.

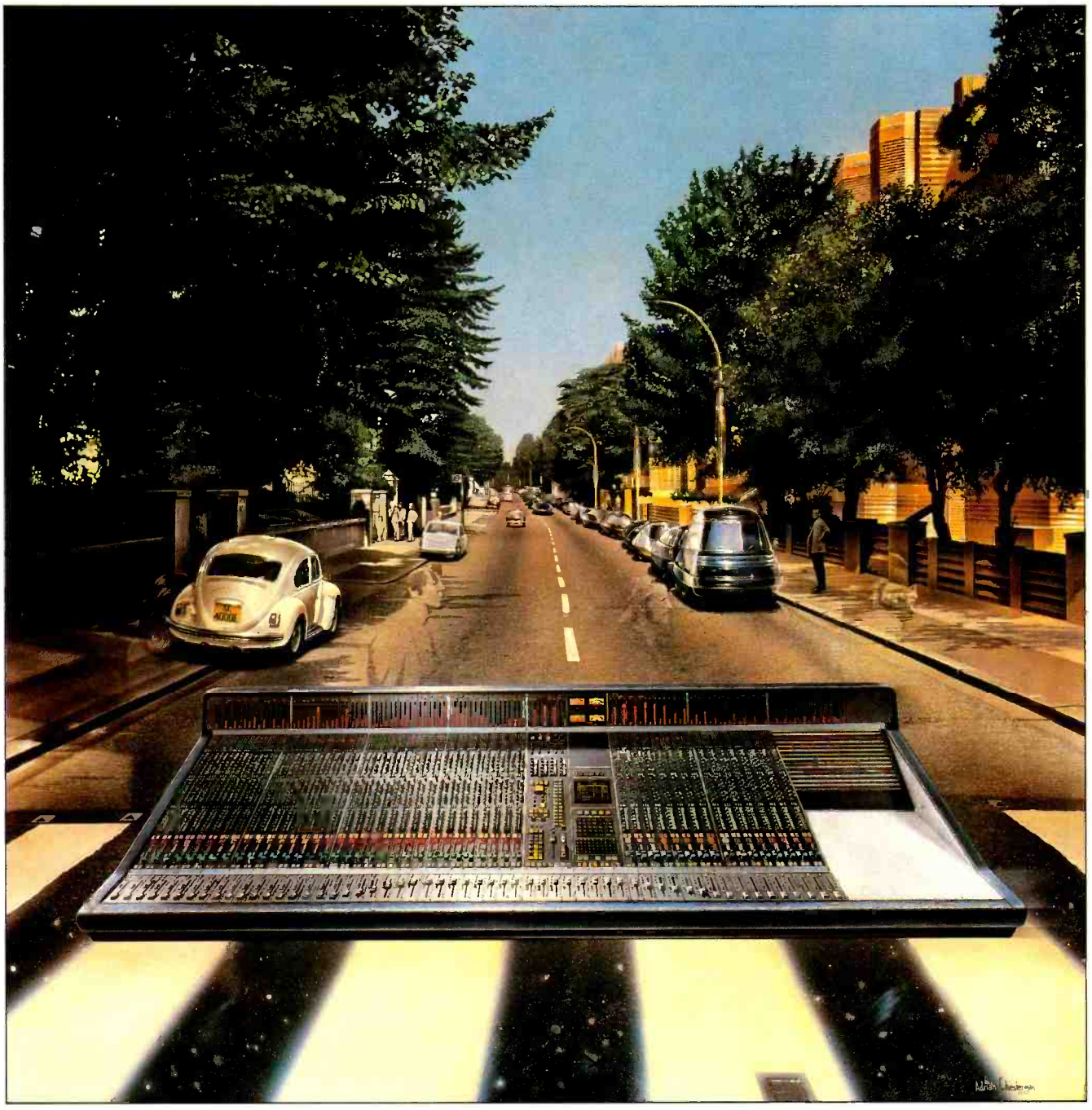
Agencies

● Ursa Major Inc have appointed new firms as domestic sales representatives: Givan-Flanagan Associates of West Boylston, MA for the six New England states; Lienau Associates Inc of Columbia,MD for southern New Jersey, eastern Pennsylvania, Delaware, Maryland, Virginia and District of Columbia; RL Graham Associates of Leawood, KS for Missouri, Iowa, Kansas and Nebraska; Meyer, Ross & Fleming Inc of Burlingame, CA for northern California, northern Nevada and Hawaii.

● Crown International has appointed two new representative companies for their range of products. They are Kodo Associates of Minneapolis, MN for Minnesota, North and South Dakota and western Wisconsin, and Promark Associates for north California and northern Nevada.

Prom-Audio, an associate company of Special Audio Products, has been appointed as importer and distributor for Fostex in The Netherlands. In addition they will be handling products from C-Tape, Annis, Accessit and dbx. Prom-Audio, Marius Bauerstraat 233c, 1026 AK, Amsterdam, The Netherlands. Tel: 020-141749. Telex: 10018

● Sony Broadcast have appointed Singleton Productions of Barcelona as MCI dealer covering Spain , all Spanish Territories, Andorra and Portugal. Since 1978, Singleton Productions had a similar arrangement with MCI prior to their acquisition by Sony. Sony have also announced that further dealership appointments will be made in the next few months completing the service and support of MCI products in Europe. ■



CONTINUING A TRADITION OF EXCELLENCE.
THE SSL SL4000E SERIES MASTER STUDIO SYSTEM ARRIVES AT ABBEY ROAD, STUDIO 2, SEPTEMBER 1983.

Solid State Logic

The Calrec Soundfield– as a stereo microphone

John Whiting

FOR the fortunate few, ambisonic recording with a Calrec *Soundfield* microphone has resulted in a quantum leap in listening pleasure which is even more dramatic than the advent of stereo. But alas, the available hardware for B-format decoding is expensive and the commercial software non-existent. The industry had its fingers badly burned in the abortive launch of 'quad' on the domestic market and, in the present state of the economy, no one is prepared to introduce another system, no matter how superior it may be to the jumble of code letters which perished in the alphabetical free-for-all.

Stereo is what most of us must live with in the foreseeable future. The ambisonic fraternity, in a commendable spirit of compromise, came up with UHJ, a method of collapsing ambisonics into stereo in such a way as to permit its decoding back into ambisonics by means of an inexpensive 'black box' and four-speaker dispersion. Splendid! A small catalogue of UHJ discs is now on the market, and perhaps someday . . .

But in the meantime, critical response to this hybrid system has been less than euphoric. There have been murmurs that UHJ heard in stereo is rich but ambiguous: side information may be precisely positioned but centre images bob uncertainly about like small craft in the wake of an ocean liner. The ambience of a large hall may sound like a sophisticated digital reverb whose circuits haven't quite been worked out. Engineers who have been instructed to use the *Soundfield* in conjunction with the UHJ encoder have frequently been dissatisfied with the system and use it only under duress.

Resistance is intensified by the fact that a satisfactory ambisonic perspective is usually achieved from a more distant point than for coincident-pair stereo. And there is a school of thought which maintains that the *Soundfield* must be placed in a position which could be occupied by a member of the audience. This conveniently ignores the fact that near the floor of a particular hall may not be the ideal vantage point even for a pair of ears. The *Soundfield* is a microphone, not a sacred totem, and its location needn't be determined by human anatomy and the laws of gravitation.

What is perhaps the most natural stereo microphone ever devised has been judged by its performance under less than ideal conditions. The usual stereo pair, whether discretely packaged or in a single body, relies on acoustic labyrinths and asymmetrical capsule positions which produce low frequency roll-off, frequency beaming or spurious lobes, and even the closest proximity of conventional capsules yields high frequency information which is out of phase above approximately 1,500 cycles. How often, for instance, can you precisely locate a crotale or even a piccolo?

The *Soundfield* however, from a tetrahedral array of four sub-cardioid capsules, derives a B-format matrix of three figure-of-eight signals, plus an omni signal, which are remarkably regular and coincident over the entire frequency spectrum. These in turn can be combined into two stereo signals which retain their accuracy, no matter what polar pattern or angle of incidence they are made to simulate. As a bonus, dominance and elevation controls can be used to tilt or reposition the microphone instantly and by remote control, within usefully wide parameters.

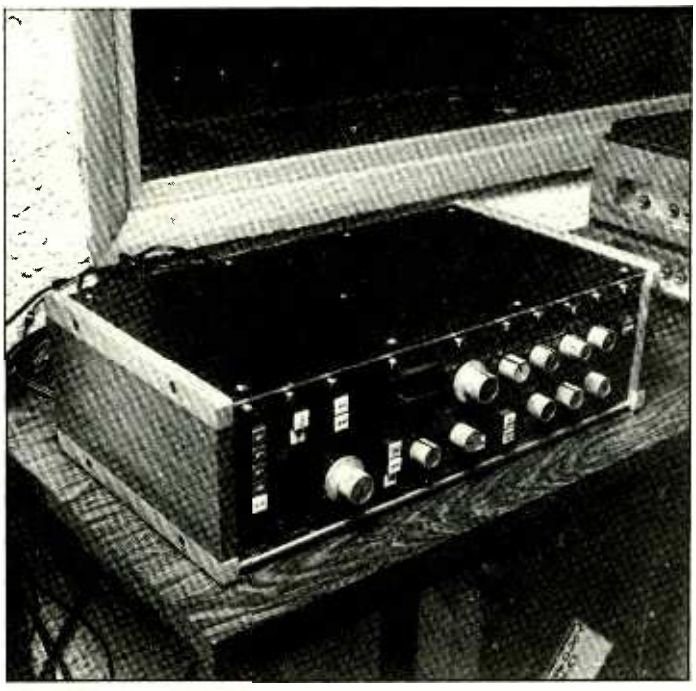
All this has been said many times and in great detail in a number of technical articles. But how many engineers who have had the *Soundfield* system thrust upon them, have had the opportunity to discover for themselves what this really means in practice without the intervention of the UHJ encoder? In the latter case, the dominance control wreaks havoc with ambisonics, stereo spread is uncontrollable, and elevation is of course inoperative because the necessary Z signal is missing.

Without UHJ, one has a whole catalogue of options in addition to those already mentioned. For instance the ambisonic configuration, through a mixer, can be collapsed straight to stereo. This results in some sacrifice of precision, though not as noticeable, as in UHJ format. But under certain circumstances the advantages can outweigh the disadvantages.

I recently had to record a large symphony orchestra in a very reverberant hall. The problem was compounded as the orchestra, because of limited performing space, was strung out in a long narrow configuration which extended forward into the audience area. Normally this would have meant multi-miking or else a move far back into the hall, with no control over ambience. But with the *Soundfield* I was able to hang the microphone *above* the orchestra, mixing the front and rear ambisonic signals to stereo and using the upward dominance control to fine-tune the ambience.

Similar problems arise in recording any spatially distributed event, such as antiphonal brass choirs or electro-acoustic concerts. A simpler though less flexible approach is Blumlein's classic M-S configuration of omni plus and minus figure-eight. This can be elegantly achieved by recording from the W and Y outputs and subsequently mixing in the usual M-S manner. Given the right acoustic and truly coincident signals, the depth and precision are quite spectacular. It is, after all, the *Soundfield*'s germinal concept. ▶

Calrec Soundfield control unit



Once in a blue moon.

Only once in a blue moon does a company with an established track record, reject successful design principles and start again from scratch. Harrison have. The new 4 series consoles offer a completely new concept in console design combining creativity with advanced technology and deep understanding of the music business.

The major result of this new concept is a range of mixing consoles which give the studio Harrison quality and features at a price you associate with lesser consoles.

For details of the range of MR4 and TV4 Harrison Mixing consoles contact:
F.W.O. Bauch Limited.

Harrison

F.W.O. Bauch Limited

49 Theobald Street, Boreham Wood, Hertfordshire WD6 4RZ
Telephone 01-953 0091, Telex 27502

Soundfield stereo

Because it is a coherent image, a *Soundfield* stereo recording doesn't take kindly to the addition of spot mics. (Apparently ambisonic mixing, as described in September's *Studio Sound,* has cleared this hurdle.) At a recent session for Unicorn with the London Sinfonietta at St John's, Smith Square, I had to record Oliver Knussen's Symphony No. 2, which includes a soprano soloist. Voices with an orchestra, even a small one, are always a problem—placed next to the conductor, they tend to sound as if they were somewhere in the middle of the winds.

On this occasion I decided to try something I've been doing for several years with this orchestra in live concerts: discrete sound enhancement by PA. AKG *C451*s, with *CK22* capsules, 20 dB pads and foam windscreens provide a close-mic vocal pickup which is virtually pop- and blast-proof, as well as being very crisp and accurately detailed—a little goes a long way. In conjunction with a Stellavox mixer and Bose *802* speakers they provide an almost perfect enhancement system, since the slight upper-mid drop in the Bose speakers compensates for a corresponding lift in the mics. So I cradled a single Bose at the soprano's feet, facing up at the mic on axis with the singer. As I slowly brought up the fader, I could hear her moving up through the orchestra until she reached a point just in front of the first chair strings. The level of reinforcement was low, so there was not colouration and, because she was very closely miked, the meter barely twitched during orchestral tuttis, indicating that there was no unwanted reinforcement of adjacent instruments.

In a subsequent session for the same record, for soprano and three very loud clarinets, the voice was given added presence by miking from in front and overhead at a 45° angle and placing the singer on a 2 ft high platform. With this approach, as opposed to the *Soundfield*'s usual low, distant position, any small difficult ensemble can be balanced in a similar way.

The biggest operational advantage of the *Soundfield* is, alas, effectively unavailable for commercial recording in this digital era. Anyone who has used it in B-format will already have discovered the incredible luxury of deciding, post-session, what configuration to use and where to place it! Location monitoring is rarely ideal and often, back in the studio, one realises that the recording is a bit too dry or reverberant, a little too wide or too narrow. But in B-format the options are still open: nothing has been determined except balance and even this can sometimes be fudged without detrimental side effects.

Unfortunately, 4-track digital recording isn't yet a viable alternative. But a couple of machines exist (though very few people in this country have seen them) and there are rumours that others are on the way. In the meantime I have been making documentary recordings of concerts in B-format on two NEAL 4-track cassette recorders, one of them a custom-built double speed version which produces quite remarkable results. Recording live concerts, one rarely has the time to fiddle endlessly with mic placement or even to change location during the programme. With B-format I can arrive at the last minute, set up the mic in a plausible spot, and subsequently reduce to a stereo mix which would have taken up a substantial amount of precious rehearsal time. Assembly line recording without convenience food results! And cassette recording is not such a compromise as one might think; at its best it produces a quality which is analogous to 35 mm photography.

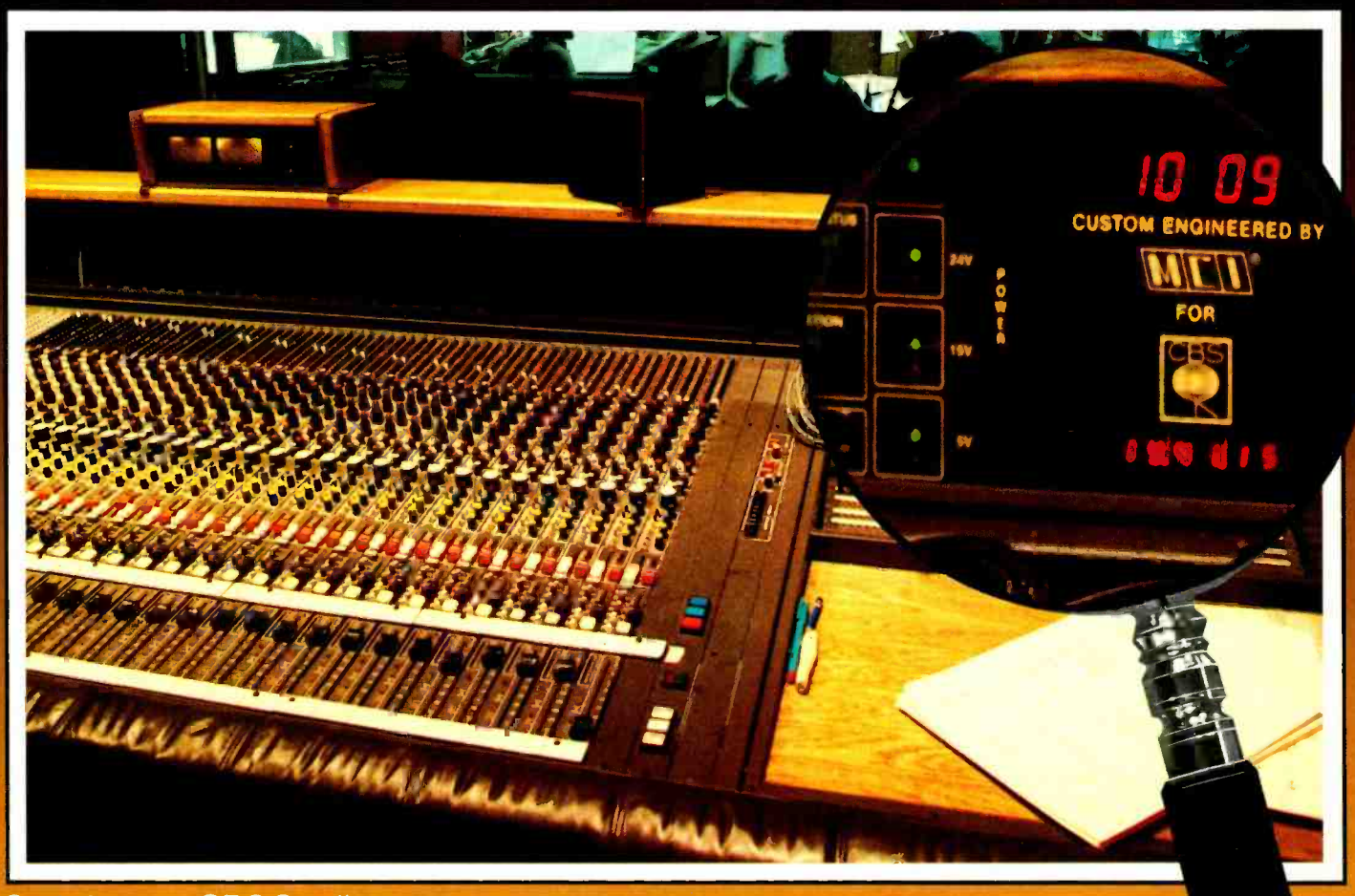
My growing collection of B-format cassettes has become the most important teaching aid in my course on recording techniques at Morley College. In a few minutes I can run through a gamut of alternatives which it would otherwise take me all day (and hundreds of pounds in session fees!) to accomplish. For a recording engineer, 'ear training' normally takes years—professional musicians won't sit and play for hours while you learn to distinguish instantly between hyper-cardioid and figure-eight! After 30 years in the business, I've probably learned more about coincident pairs in the last year, since acquiring my *Soundfield*, than in the previous 29.

Any sound engineer will confirm that what works on paper rarely works on location. Polar patterns are fragile and elusive: the more one relies on mechanical sound traps and other systems of acoustical traffic regulation, the more one loses or inadvertently amplifies as the frequency spectrum attempts to negotiate the obstacle course which clever designers have put in its way. And so the experienced engineer works with a whole stable of mics, using those whose deficiencies are least apparent in a given application. But what a difference it makes to work with a microphone which receives all its signals straight from their sources! One can experiment boldly with polar patterns and angles of incidence, confident that the entire frequency spectrum will obey instructions.

One final suggestion: the next time you're called on to engineer a UHJ recording, connect your monitors to the stereo output of the *Soundfield* control box, switch to stereo and listen to the orchestra packing up for lunch. It may be a revelation. ■

Author's note: my thanks to Mike Skeet of Whitetower Records, who triggered this article and whose experience has substantially contributed to it.

MCI Custom Made Mixers- professional recording engineers score every time!



Seen here at CBS Studios

JH-800 Console

JH-110B-14-2VP

JH-24-24

MCI manufacture a complete range of professional mixing consoles and reel-to-reel tape recorders.

For further details, consult your local distributor.

Sounds Superior.

SONY Broadcast PRO-AUDIO

Sony Broadcast Ltd.
City Wall House
Basing View, Basingstoke
Hampshire RG21 2LA
United Kingdom

Telephone (0256) 55 0 11
International +44 256 55 0 11
Telex 85 84 24

Microphones

part one: conventional types

Hugh Ford

The electroacoustic tests on all the microphones were divided into two tasks, measurements in an anechoic chamber and measurements in the laboratory.

In the anechoic tests the frequency response was plotted at a constant sound pressure level of 74 dB SPL (20 dB below 1 Pascal) as determined by a Bruel and Kjaer type *4165* measuring microphone calibrated with a Bruel and Kjaer type *4420* pistonphone. With the microphone under test and the measuring microphone placed near to each other 1 m from a Bower and Wilkins type *801* loudspeaker on the tweeter axis, the sensitivity was determined at 1 kHz.

For the frequency response tests the sound pressure level was kept constant using the reference microphone to drive the compressor loop in the oscillator. The results were plotted on a Bruel and Kjaer *Level Recorder* using a paper speed of 3 mm/s and a pen speed of 50 dB/s.

With the oscillator switched off the microphone noise was measured A-weighted and CCIR-weighted both using a true RMS meter and a quasi-peak meter to CCIR recommendations.

The final test under anechoic conditions was to plot the polar diagrams. This was done at 125 Hz, 1 kHz and 10 kHz with an appropriate ⅓-octave filter in circuit to eliminate the effect of turntable motor noise.

In the laboratory the microphone's impedance was measured at 100 Hz, 1 kHz and 10 kHz by feeding the microphone with ⅓-octave white noise and noting the output voltage drop when the microphone was loaded into 600 Ω. This test was done to reflect the likely change in apparent frequency response when the output of the microphone is fed into a load likely to produce a significant voltage drop within the microphone varying with frequency.

Using standard 48 V phantom powering (with a 6.8 kΩ resistor in each leg) the current consumption was measured with battery drain being noted where appropriate.

Sensitivity to external magnetic fields was determined by placing each microphone in a 1 Oe 50 Hz field and noting the resultant filtered 50 Hz output in terms of equivalent sound pressure level.

Finally the subjective sensitivity to handling noise, wind noise and pop sensitivity was noted with and without windshields where provided.

AKG C414EB/P48

AKG C414EB/P48

This twin capsule capacitor microphone is finished in matt black except for the dull chrome 'working end' of the grille. It is supplied in a sensible plastic case complete with a windshield and a very good stand adaptor.

To the front of the microphone a 4-position slide switch selects the desired polar diagram between omnidirectional, cardioid, hypercardioid and figure-of-eight. Two similar switches to the rear offer 10 dB or 20 dB input attenuation and switch in a highpass filter at 75 Hz or 150 Hz. Within the base a 3-pin *XLR* locking plug provides the audio and phantom powering connections with the microphone drawing 0.92 mA at 48 V with a 12/48 V version being available.

The measured frequency response was similar in the four directional patterns with the highpass filters offering 12 dB/ octave attenuation below 75 Hz or 150 Hz.

The polar diagram in the omnidirectional mode showed a rather large high frequency loss at ±90° which also appeared in the cardioid mode where the front to back ratio was 15 dB at medium and low frequencies. The figure-of-eight response and noise performance, however, was good.

As with most capacitor microphones the sensitivity to wind noise was high without the windshield which itself was most effective.

Overall this is a good microphone where the option of several polar diagrams is desired.

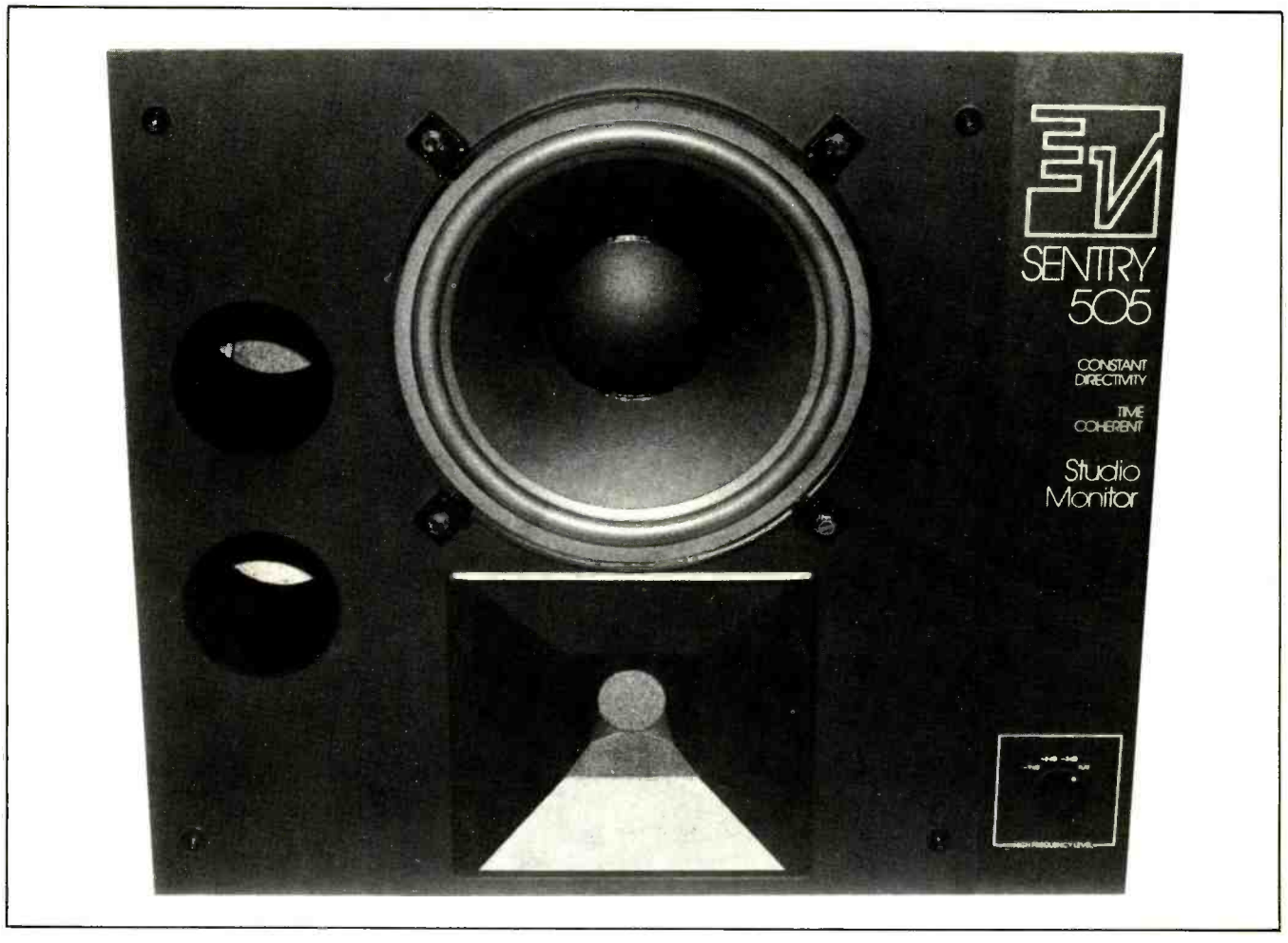
AKG 'The Tube'

This large microphone offers remote control of the polar diagram which may be varied in nine switched steps between omnidirectional through cardioid to figure-of-eight. To quote the manufacturer, this microphone 'has been recreated to meet the demand for the "tube sound"' and in fact includes a double triode amplifier in the microphone body. This is connected to the control/power unit by 10 m of cable equipped with 12-pin *Tuchel* connectors.

The complete unit is supplied in a very solid alloy case consisting of the microphone head, the connecting cable, the control/power unit plus a windshield and rubber shock mount. At the side of the brown tubular case is an input attenuator switch which can be operated with a pointed object to provide 10 dB or 20 dB attenuation with internal slide switches allowing the amplifier gain to be increased by 10 dB. Releasing three screws gives access to the interior of the microphone where all the audio electronics are mounted on two small printed circuit boards with the valve being suspended on a flexible mounting.

AKG 'The Tube' 72 ▶

...IN CONTROL



The new Studio Monitor from Electro Voice. Designated the Sentry 505 and conveniently developed as a Quarter Space, time aligned system.

SHUTTLESOUND

SOLE U.K. IMPORTERS AND DISTRIBUTORS OF Electro-Voice

UNIT 15 OSIERS ESTATE OSIERS ROAD LONDON SW18 1EJ
TEL 01-871 0966 TELEX 27670 SHUTSO G

This Monitor has been designed to utilise the accentuations produced by location at the ceiling/wall corner and not produce an unnatural low frequency performance.

Bruel and Kjaer 4004

Bruel and Kjaer 4003

The power unit/control unit has at its front a mains power on/off switch with a green LED power indicator, the 9-position rotary polar pattern switch and a 3-position switch used to insert two highpass filters. To the rear of the small tough unit is the fixed 2 m long power lead, a 12-pin *Tuchel* connector for the microphone and an *XLR* plug for the balanced audio output.

Powering can be from 110 V or 220 V according to the setting of internal solder links with the secondaries of the power transformer being fused. One of these fuses has two positions so as to act as a transformer tap changer for the valve's DC filament supply which has to be compensated for voltage drop when long microphone cables are used. I find it unsatisfactory that there is no external indication of this setting.

The only audio components in the power unit are the highpass filter with the directional pattern being affected by varying the DC polarisation voltage on one of the microphone capsules.

Reference to the polar plots shows the high frequency performance off-axis to fall rather rapidly in the omnidirectional mode with the figure-of-eight performance being good but the cardioid response rather unbalanced to the rear.

Reference to the frequency response plot in the omnidirectional mode shows significant deviations in the high frequency area with the highpass filters being rather similar to each other. In the cardioid and figure-of-eight modes the high frequency response improved with the two plots being similar.

Whilst not being the very quietest of microphones, in other respects 'The Tube' came out well but some care may be needed when using long cables in view of the fairly high output impedance at high frequencies.

Bruel and Kjaer 4003 and 4004

Newcomers to the field of studio microphones Bruel and Kjaer have for many years been at the top of the field so far as measuring microphones are concerned—indeed a number of studios have used ½ in Bruel and Kjaer measuring microphones for recording. It is therefore logical that Bruel and Kjaer should now produce a series of four different omnidirectional studio microphones following their interesting investigations into overall microphone performance using time delay spectrometry.

Something like 10 years ago I tried examining the response of microphones to an electrical spark discharge and found very significant differences in the waveform from different microphones. The advent of time delayed spectrometry now allows the delayed responses to be analysed in addition to measurement of the phase performance and other parameters which cannot be determined under steady state conditions. These techniques are described in a Bruel and Kjaer applications note 'Evaluation of Studio Microphone Performance Using Time Delay Spectrometry Techniques' by Philip White.

Basically, the current range of four models includes two types of microphone. Types *4003* and *4006* are high sensitivity microphones having very low noise whilst types *4004* and *4007* are high intensity microphones capable of handling very high sound levels such as those found close to or within instruments. Naturally the latter types have an inferior noise performance in view of their 12 mm diameter when compared with the 16 mm diameter of the high sensitivity types.

All four types employ a pre-polarised capacitor-type transducer with a preamplifier within the microphone body which is finished in matt black with an inbuilt connector. The microphones are supplied in a wooden case including a windshield and versatile stand adaptor.

The difference between the models of each type is that one is designed for use with straightforward 48 V phantom powering and is equipped with an *XLR* connector whilst the other model must be used with the type *2812* power unit and is equipped with a special 3-pin (modified 4-pin *XLR*) connector being supplied with a 5 m length of lead to feed the power supply.

The *2812* power unit is a twin-channel unit for two microphones which connect at its front. It has individual slide switch attenuators giving 6 dB or 12 dB attenuation, a red power-on LED being included. To the rear the audio outputs are at electronically balanced *XLR* connectors. Mains power is supplied via a 2-pin connector which, annoyingly, is not compatible with IEC type connectors.

Within the power unit the standard of construction was excellent with a clean layout and full component identifications the unit adjusting automatically to 100-127 or 200-240 V operation.

Reference to the polar diagrams shows both microphones to offer an exceptionally good omnidirectional performance with the type *4003* rear performance being outstanding. Similarly the frequency response of both types was very flat with the plotted deviations possibly being attributable to the anechoic chamber rather than the microphones.

Two protective grids are supplied with the *4003*'s normal grid offering a flat response under free field conditions. Fitting the alternative grid gives about 5 dB boost on axis at high frequencies as shown in the plot, this increasing presence in diffuse sound fields where the source microphone distance is large and reverberant components are present.

As shown in the tabulated data the *4003* is a very sensitive microphone with the unit being capable of driving a peak of 32 V—thus caution is needed not to overload desk inputs!

This microphone is extremely quiet with the measured performance of 17.8 dBA being very difficult to achieve in view of noise from distant traffic, the microphone almost certainly being better than the measured figure.

Remarkably the noise performance of the *4004* high intensity microphone is not far short of many conventional mics. In other respects the Bruel and Kjaer's faired well but there is the small matter of the many pounds/dollars/etc. required...

Milab DC-96

The *DC-96* is a fixed pattern cardioid condenser microphone designed for standard 48 V phantom powering. As standard the microphone is supplied in a foam lined cardboard box complete with a windshield, stand adaptor, shock mount and cable. Options include a proper carrying case and mains or battery power supplies.

Being a neat microphone finished in matt black with an integral *XLR* plug the unit can be readily mounted as stereo pairs with the 'working end' of the microphone grille being finished in satin chrome on the steel mesh.

Reference to the polar diagram plot shows the microphone to have a good performance over ±60° from the front but with a rather limited front-to-back ratio. The plotted on-axis frequency response can be seen to be good as is the noise performance, however, in some applications the high sensitivity to external magnetic fields could be troublesome. 74 ▶

"Our artists demand the best, so do I -Apollo Master Discs."

Malcolm Davies
Chief Mastering Engineer
PRT Studios, London

"There's no doubt-Apollo Master Discs give the quietest cut available through conventional techniques."

"The Apollo has all the pluses mastering engineers look for."

We designed into the Apollo lacquer all the features the mastering engineers have been asking for: better flatness, less noise, clean cutting, longer stylus life, better uniformity and consistency. Ultimately, the Apollo results in better records.

"Absolutely flat."

All aluminium blanks used for the Apollo are micropolished using a process originally developed for magnetic computer disks. This multi-step process resurfaces the aluminium blanks and creates a fine finish, free from defects and with an improved flatness.

"Free of ticks and pops."

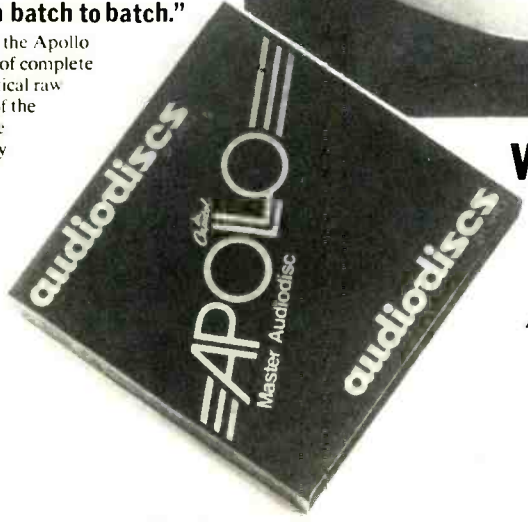
Our elaborate lacquer manufacturing process insures that all particles and gels which could cause cutting problems are removed. Moreover, the new formulation resists lacquer buildup on the stylus, thus reducing groove wall scoring and loose debris in the groove, which contribute to ticks and pops.

"Least abrasion."

The unique Apollo formulation reduces the cutting friction when contacted by the heated stylus. This results in lower abrasion, thus extending the stylus life. And, of course, the formulation does not use any abrasive ingredients in the first place.

"Very consistent from batch to batch."

The excellent consistency of the Apollo lacquer masters is the result of complete control we have over the critical raw materials and the blending of the formulation. In addition, the extensive process and quality control methods assure the maintenance of tight manufacturing tolerances.



We've Mastered the Master.

Capitol
APOLLO™
Master Audiodisc.

Capitol Magnetics Products
European and Middle East Sales Office
Alma Road, Windsor, Berkshire SL4 3JA, England.
Telephone: Windsor 59171. Telex 847241

Milab DC-96

Current consumption was low with a nice constant output impedance and overall good performance. Overall this is an unobtrusive microphone with a sensible general purpose performance.

Sanken CU-41

The name Sanken will be new to most readers, however the Sanken Microphone Company Limited have been in business in Japan for over half a century. The current development is in conjunction with NHK, the Japanese broadcasting authority equivalent to the BBC.

The *CU-41* is a twin capsule cardioid microphone, one capsule handling low frequencies and the other high frequencies. Designed for standard 48 V phantom powering the solid brass body is fitted with a gold plated *XLR* plug, the complete microphone being finished in satin chrome.

A shock mount is available, but none was supplied at the time of this review. The handling noise performance was, however, good.

Inspection of the polar diagram shows this microphone to be something exceptional—a really text book performance with negligible frequency response deviations over ±110° from the front and a 25 dB front to back ratio at 1 kHz. Similarly the frequency response is very flat, the plotted deviations probably being associated with the anechoic chamber.

A further benefit is that the microphone noise is extremely low and as such was difficult to measure with any accuracy as it is difficult to obtain an adequately low background noise.

Sanken CU-41

Overall the *CU-41* is a really excellent microphone with the only possible criticism being its rather large size for some applications.

76 ▶

MANUFACTURER'S SPECIFICATIONS

	AKG C414/48	AKG 'TUBE'	B+K 4003	B+K 4004	Milab DC-96	Sanken CU-41
Pattern	Variable	Variable	Omni	Omni	Cardioid	Cardioid
Transducer	Condenser					
Sensitivity	10 mV/Pa	10 mV/Pa	50 mV/Pa	10 mV/Pa	8.0 mV/Pa	7.0 mV/Pa
Self noise	18 dBA	22 dBA	17 dBA	26 dBA	17 dBA	15 dBA
Frequency range	20 Hz-20 kHz ±2 dB	30 Hz-20 kHz ±2.5 dB	10 Hz-20 kHz ±2 dB	10 Hz-40 kHz ±2 dB	20 Hz-20 kHz —	20 Hz-20 kHz ±1 dB
Maximum SPL	138 dB	128 dB	154 dB	168 dB	146 dB	140 dB
Impedance	⩽150 Ω	200 Ω ±25%	<30 Ω	<30 Ω	200 Ω	150 Ω
Connector	XLR	SEE TEXT			XLR	XLR
Powering	48 V	110/220 V	SEE TEXT		24/54 V	48±6 V
Weight	140 g	680 g	150 g	150 g	200 g	582 g

MEASURED PERFORMANCE

	AKG C414/48	AKG 'TUBE'	B+K 4003	B+K 4004	Milab DC-96	Sanken CU-41
Sensitivity	7.0 mV/Pa	11.0 mV/Pa	49.0 mV/Pa	10.3 mV/Pa	7.6 mV/Pa	7.0 mV/Pa
Self noise						
A-weighted RMS	20 dB	22.5 dB	17.8 dB*	24.3 dB	19.2 dB	17.4 dB*
CCIR RMS	26.5 dB	29 dB	20.3 dB*	32.3 dB	25.7 dB	23.4 dB*
CCIR quasi-peak	30.4 dB	33 dB	24.8 dB*	35.8 dB	30.2 dB	26.5 dB*
Impedance						
100 Hz	45 Ω	130 Ω	<5 Ω	<5 Ω	100 Ω	110 Ω
1 kHz	25 Ω	103 Ω	<5 Ω	<5 Ω	150 Ω	70 Ω
10 kHz	96 Ω	300 Ω	<5 Ω	<5 Ω	120 Ω	120 Ω
Current at 48 V	0.92 mA	0.6 mA	14 mA	14 mA	0.48 mA	4.2 mA
Output for 10 Oe						
Equivalent SPL	92 dB	70 dB	<68 dB	<68 dB	117 dB	<64 dB
Wind noise	Good**	Good**	Very Good		Good	Medium
Handling noise	Medium	Very Good	Good	Medium	Medium	Good
Pop sensitivity	Very Good				Medium	Good
Weight	290 g	600 g	130 g	130 g	205 g	550 g

*Limited by background noise
**With windshield—poor without

MANUFACTURERS AND AGENTS

AKG
AKG Akustiche u Kino-Gerate GmbH, Brunhildengasse 1, A-1150 Wien, Austria.
UK: AKG Acoustics Ltd, 191 The Vale, London W3 8QS.
USA: AKG Acoustics Inc, 77 Selleck Street, Stamford, CT 06902.

B & K
Bruel & Kjaer, DK-2850 Naerum, Denmark.
UK: Bruel & Kjaer (UK) Ltd, Cross Lances Road, Hounslow, Middx TW3 2AE.
USA: Bruel & Kjaer Instruments Inc, 185 Forest Street, Marlborough. MA 01752.

MILAB
Creative Trade Club AB, Knutsgaten 6, S-265 00 Astorp, Sweden.
UK: Audio Video Marketing Ltd, Unit 21, Royal Industrial Estate, Jarrow, Tyne & Wear NE32 3HR.
USA: Camera Mart Inc, 245 West 54th Street, New York, NY 10019.

SANKEN
Sanken Microphone Co Ltd, 2-8-8 Ogikubo, Suginami-ku, Tokyo 167, Japan.
Worldwide marketing agent: Pan Communications Inc, 5-72-6 Asakusa, Taito-ku, Tokyo 111, Japan.

Sony PCM-3324

-24 track Digital Audio Recorder with a great track record!

Seen here at Advision

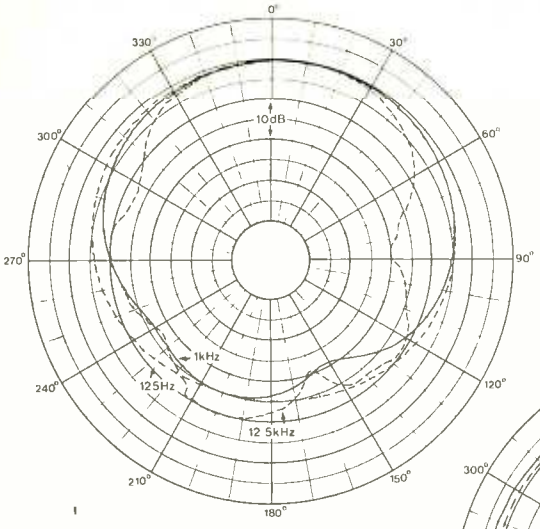
- 24 digital tracks, 4 analogue tracks (Time Code, Control and 2 Audio) – **all on ½ inch tape.**
- Economical tape consumption compared to analogue equivalent.
- Unmeasurable crosstalk between channels.
- Full punch in/punch out with cross-fade at every point.

Sounds Superior.

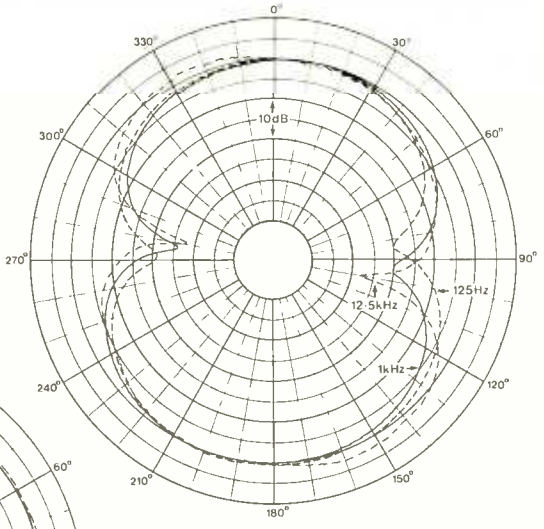
SONY Broadcast PRO-AUDIO

Sony Broadcast Ltd.
City Wall House
Basing View, Basingstoke
Hampshire RG21 2LA
United Kingdom

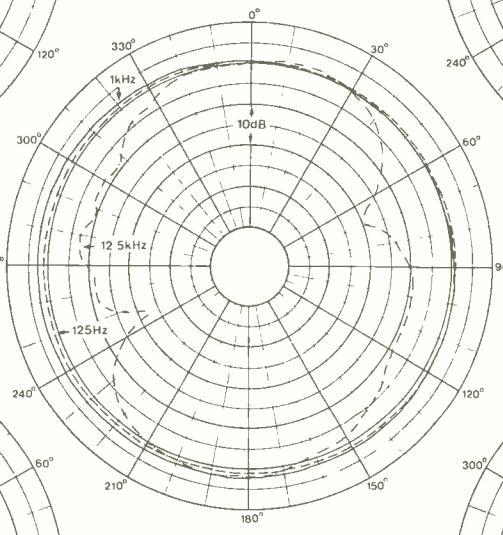
Telephone (0256) 55 0 11
International +44 256 55 0 11
Telex 85 84 24



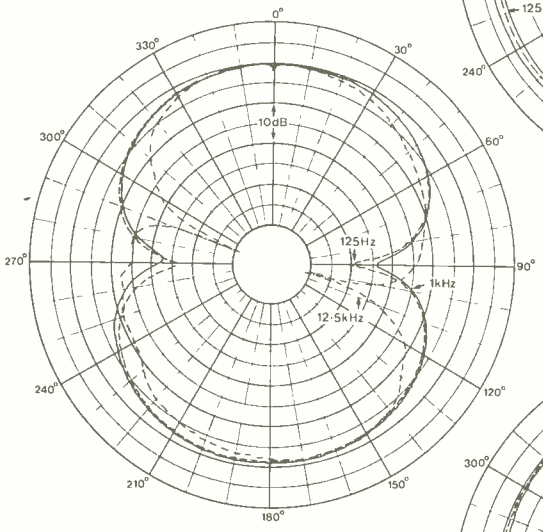
AKG C414 CARDIOID



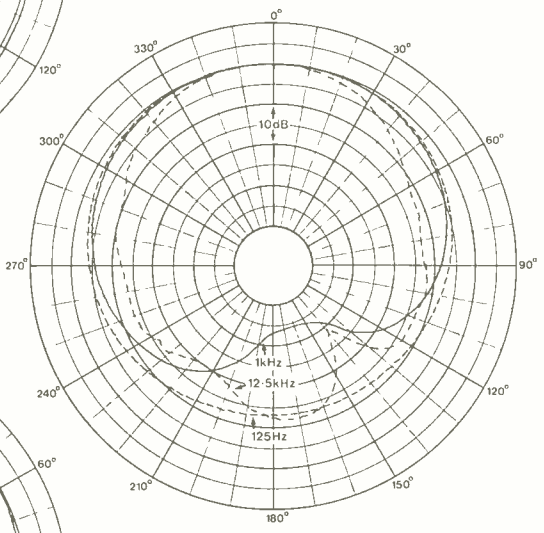
AKG C414 FIG-OF-EIGHT



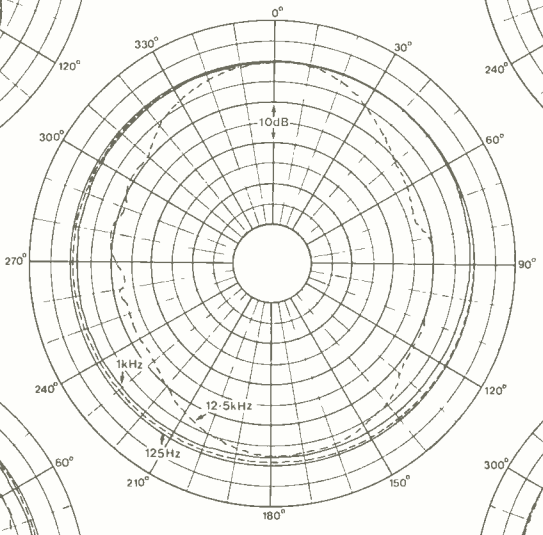
AKG C414 OMNI



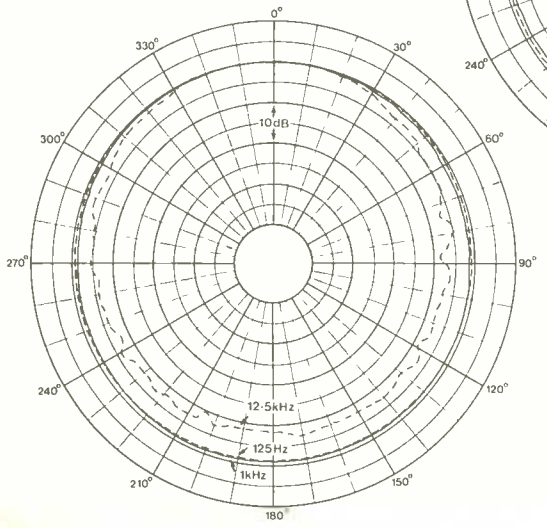
AKG TUBE FIG-OF-EIGHT



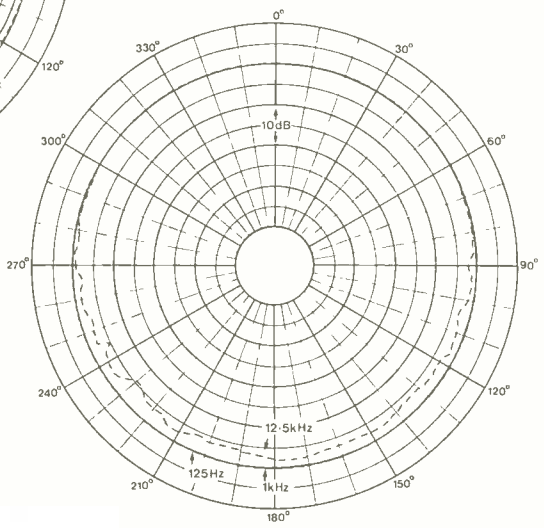
AKG TUBE CARDIOID



AKG TUBE OMNI



BRUEL & KJAER 4004



BRUEL & KJAER 4003

78 ▶

WITH 40 YEARS' EXPERIENCE IN THE DESIGN AND MANUFACTURE OF SEVERAL HUNDRED THOUSAND TRANSFORMERS WE CAN SUPPLY:

AUDIO FREQUENCY TRANSFORMERS OF EVERY TYPE

YOU NAME IT! WE MAKE IT!

OUR RANGE INCLUDES

Microphone transformers (all types), Microphone Splitter/Combiner transformers. Input and Output transformers, Direct Injection transformers for Guitars, Multi-Secondary output transformers, Bridging transformers, Line transformers, Line transformers to G.P.O. Isolating Test Specification, Tapped impedance matching transformers, Gramophone Pickup transformers, Audio Mixing Desk transformers (all types), Miniature transformers, Microminiature transformers for PCB mounting, Experimental transformers, Ultra low frequency transformers, Ultra linear and other transformers for Valve Amplifiers up to 500 watts, Inductive Loop Transformers, Smoothing Chokes, Filter inductors, Amplifier to 100 volt line transformers (from a few watts up to 1000 watts), 100 volt line transformers to speakers, Speaker matching transformers (all powers), Column Loudspeaker transformers up to 300 watts or more.

We can design for RECORDING QUALITY, STUDIO QUALITY, HI-FI QUALITY OR P.A. QUALITY. OUR PRICES ARE HIGHLY COMPETITIVE AND WE SUPPLY LARGE OR SMALL QUANTITIES AND EVEN SINGLE TRANSFORMERS. Many standard types are in stock and normal dispatch times are short and sensible.

OUR CLIENTS COVER A LARGE NUMBER OF BROADCASTING AUTHORITIES, MIXING DESK MANUFACTURERS, RECORDING STUDIOS, HI-FI ENTHUSIASTS, BAND GROUPS AND PUBLIC ADDRESS FIRMS. Export is a speciality and we have overseas clients in the COMMONWEALTH, E.E.C., U.S.A., MIDDLE EAST. etc.

Send for our questionnaire which, when completed enables us to post quotation by return.

SOWTER TRANSFORMERS

Manufacturers and Designers

E. A. SOWTER LTD. (Established 1941), Reg. No. England 303990

The Boat Yard, Cullingham Road, Ipswich IP1 2EG, Suffolk. P.O. Box 36, Ipswich IP1 2EL, England.

Phone: 0473 52794 & 0473 219390. Telex: 987703G

The right angle at the right price

Our versatile angle microphone stand is suitable for microphones weighing up to ½ kilo, available with a choice of table or wall mount brackets. Price including VAT, postage and packing: £26.45.
Trade enquiries welcomed.

Michael Stevens & Partners

The Homesdale Centre, 216-218 Homesdale Road, Bromley, Kent BR1 2QZ (01) 464-4157

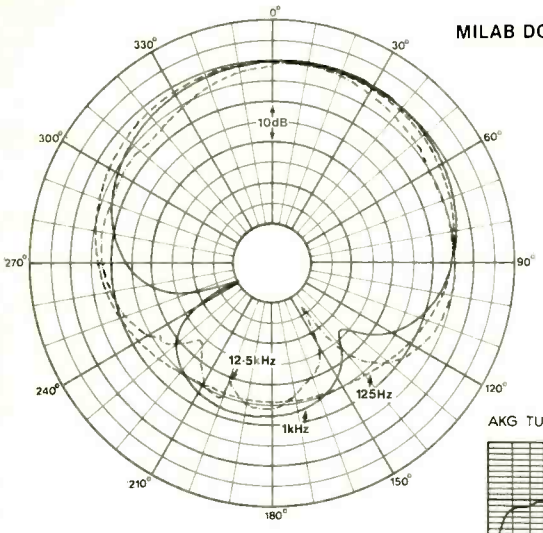
180° REVOLUTION

The MP 30 Pressure Zone Hemispherical microphone represents a significant breakthrough in microphone technology. All who use it confirm its freedom from phase interference distortion resulting in a purity of sound easily identifiable. This revolutionary design with a circular back plate for easy mounting, including dishes, is ideal for reproducing almost anything. Use it on the floor, inside instruments, hanging above musicians, on stage scenery, on podiums – in fact almost anywhere and you will be amazed at the results. No special adaptors are required. It operates on standard 48 volt supply. All in all, an exceptional product and you will be pleasantly surprised at the cost. Let the MiLAB Hemi-mike™ MP-30 improve your sound recording. To find out more contact Derek Roughton now.

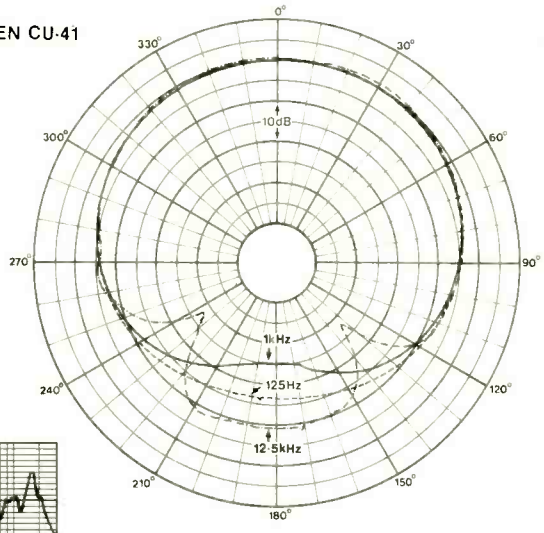
Audio Video Marketing Limited, Unit 20/21 Royal Industrial Estate, Jarrow,
Telephone: (0632) 893092/896233. Telex: 537227.
New Telephone No. from June 29th (091) 4893092/4896233.

AVM

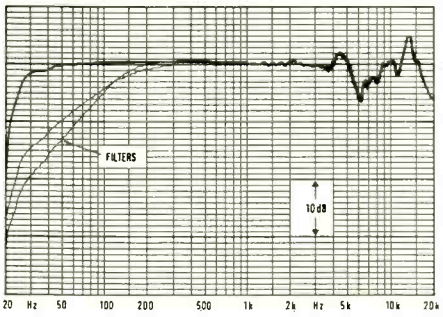
MILAB DC-96



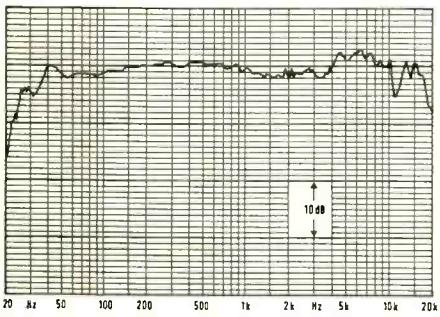
SANKEN CU-41



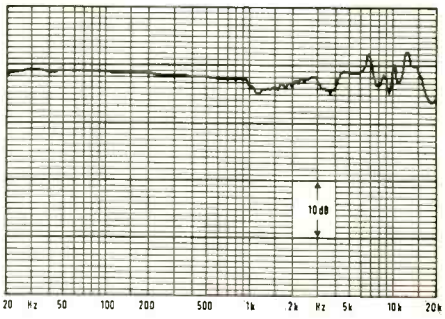
AKG TUBE OMNI PATTERN



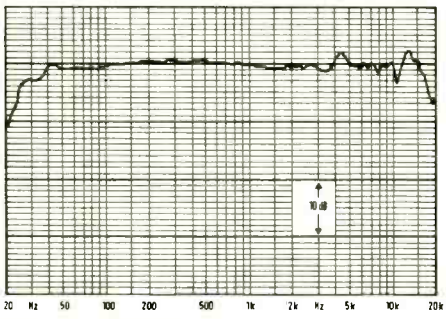
AKG TUBE FIG-OF-EIGHT PATTERN



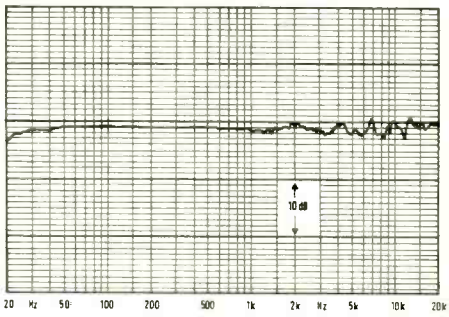
AKG C414 OMNI PATTERN



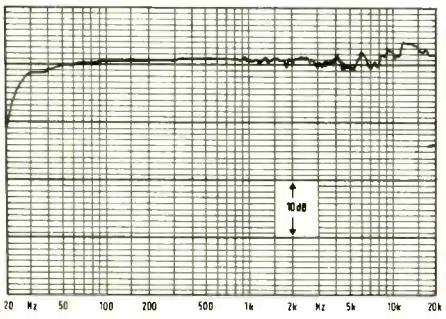
AKG TUBE CARDIOID PATTERN



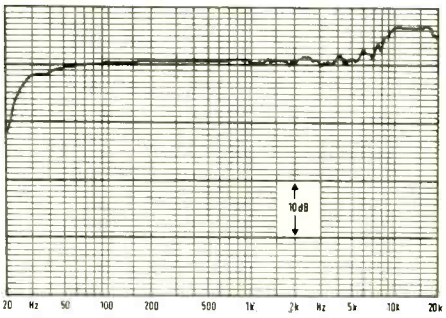
B&K 4004



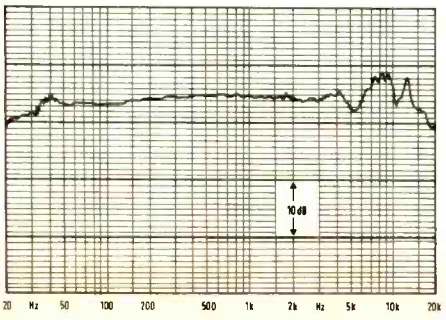
B&K 4003 SILVER GRID



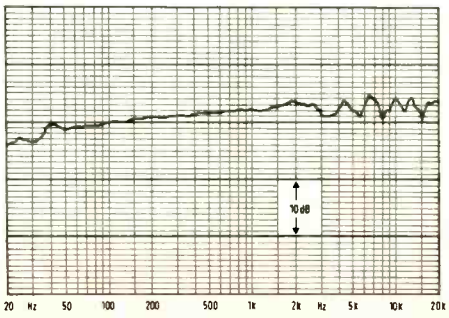
B&K 4003 BLACK GRID



MILAB DC-96



SANKEN CU-41



Synconfidence.

Shopping for a desk these days can be a chancy business. Limited budgets all to often mean limited equipment, limited performance – and limited potential for future expansion. It's a story that many smaller studios know to their cost.

Enter the SYNCON Series B – a mixer of unrivalled flexibility. Designed by AHB to grow with your studio, but with a minimum upfront capital outlay.

The in-line modular concept means that you can start with a basic 16 track format and, without factory modification, expand to a 44 input, fully automated console. For the 24 track user, the popular B36 (shown here) has 32 input/output modules, 24 track routing and 64 line inputs for remix.

The excellent design and superb sound-handling capabilities of the Series B puts it firmly in the Big League – but with a price tag that explodes the myth that a quality desk must necessarily set you back an arm and a leg!

We can confidently claim that the SYNCON Series B represents one of the best value-for-money deals in today's market.

SYNCON

AHB

ALLEN AND HEATH BRENELL LTD.

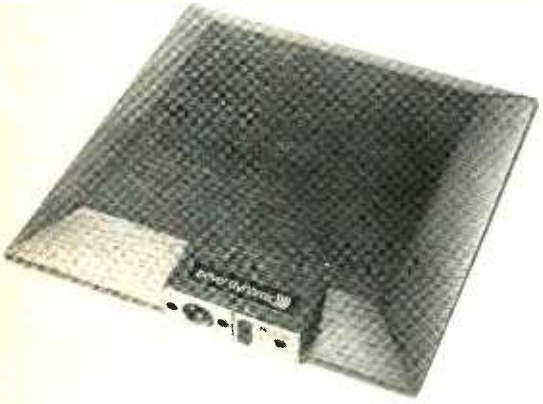
69 Ship Street
Brighton BN1 1AE
Tel. (0273) 24928
Telex 878235 MBIAHB G

Allen & Heath Brenell (USA) Ltd
Five Connair Road
Orange, CT 0477
Tel. (203) 795 3594
Telex 643307

Microphones

part two: boundary recording

Hugh Ford



The Beyer MPC-50

This microphone consists of a 220 mm square wooden flat, in the middle of which is recessed the capacitor microphone behind a 7 mm diameter grille. Fitted in one side is the *XLR* plug with an adjacent red LED power indicator and an on/off switch which only operates when the unit is battery powered as opposed to 48 V phantom powered.

In the base of the unit is a female stand bush with a small removable steel plate covering the battery compartment which accepts a PP3 size battery. Cleverly the battery cover is retained by magnets set into the wooden base with an adjacent compartment containing the electronics in a screened box. Current consumption when driven from an alkaline battery is only 4 mA—the same as that from phantom powering.

The frequency response was measured with the microphone mounted both vertically and horizontally in front of the sound source, it being seen from the frequency response plots that there is a 5 dB shelf introduced above 1 kHz when the microphone is mounted vertically.

As with other boundary microphones the unit is intended for wall or floor mounting, thus the polar diagram to the rear is not relevant in these circumstances, with the polar response to the front being reasonable.

The noise performance was satisfactory as were the other measured parameters but the microphone was extremely sensitive to handling (including the cable) and also sensitive to wind noise pickup.

Milab MP-30

The Milab *Hemi-mike* is a two-part microphone consisting of the transducer and a separate electronics section connected by 2 m of very thin flexible cable.

The transducer section consists of a 74 mm diameter alloy plate fitted with felt feet. Attached to the plate is a solid alloy skewed and truncated cone into which the capacitor microphone element is secured in the base. In the electronics department a small printed circuit board is secured to the *XLR* plug all of which is housed in a 110 mm long by 25 mm diameter tube.

Supplied with the microphone is a stand adaptor which clips on to the microphone's circular plate—the use of this adaptor was found to have a considerable effect upon the polar diagram at high frequencies.

The frequency response was measured with the microphone suspended by its lead in free air, the results for the microphone in a vertical and horizontal position being shown. As can be seen the microphone has a significant high frequency boost in both positions, the boost being extreme with the sound impinging at right angles to the plate.

Bearing in mind that the manufacturer recommends the microphone in front of or inside instruments, hanging or surface mounted, this characteristic and the polar diagrams are highly significant. Reference to the polar diagrams shows that without the stand adaptor the high frequency performance to the front is rather unbalanced with the presence of the stand adaptor in fact improving matters in one direction as positioned.

A note from the UK agent states that the high frequency response was intentionally raised and that a capacitor in the electronics unit may be removed to flatten the response—there is of course a compromise here depending upon the application.

Two samples of the microphone were decidedly noisy and far from the manufacturer's specification, another grouse being that the electronics unit was very sensitive to external magnetic fields. Whilst the unit was not particularly sensitive to wind noise, its sensitivity to 'popping' and to handling noise limits the potential applications.

Manufacturer's comment: The self noise of the *MP-30* depends upon the amount of high frequency boost—lowering the HF boost lowers the noise level. Originally the microphone had an almost totally flat frequency response and had a self noise of around 20 dBA. However, we decided to increase the HF response by some 10 to 12 dB and hence the self noise also automatically increased. A means of removing this effect would be the provision of a selector switch to control the amount of high frequency boost.

Schoeps BLM-3

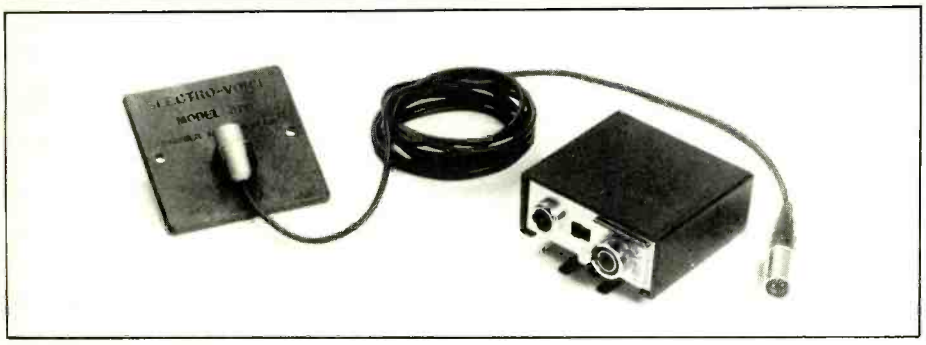
This microphone uses existing Schoeps microphone components including a proven studio capsule and a standard Schoeps *CMC*-type amplifier. Thus alternative versions are available for 48 V or 12 V phantom and 12 V parallel powering with either *XLR* or *Tuchel* connectors.

The embodiment of the microphone is a 200 mm square alloy plate finished in a crackle grey and drilled for scuring by two screws, the plate having a felt backing. The capacitor microphone element is mounted off centre and recessed into the plate with a diagonal slot in the plate, making room for the amplifier which screws into a microphone capsule type connector mounted on the plate.

This amplifier is a standard Schoeps unit in the form of a 116 mm long by 20 mm diameter tube which would normally be directly fitted with a microphone capsule on one end, the *XLR* plug being recessed in the other end.

Frequency response was plotted with the plate in free air both horizontally and vertically in front of the sound source, the latter position

82 ▶



giving a boost above 1 kHz and a less smooth response. Reference to the polar diagram shows this to be well balanced and symmetrical with the rear response not being significant when used mounted on to a boundary surface as recommended.

The electrical noise performance of this microphone was excellent with the unit having a high sensitivity and very low output impedance. In terms of other boundary type microphones the sensitivity to wind noise was reasonable with other parameters being to a good standard—this is certainly one of the best microphones of this type.

Electro-Voice CO 94/370

Originally marketed as a lapel-type microphone this model is now available with an adaptor plate for floor or wall mounting. The type *370* adaptor plate is a 64 mm square plastic moulding with a clip to secure the miniature microphone and two holes for screw mounting.

The 22 mm long by 10 mm diameter microphone is fitted with a 1.8 m thin flexible lead which plugs into the power/amplifier unit in the form of a small box-fitted belt clip. A second miniature *XLR*-type connector on the amplifier box forms the output for which a cable terminated in an *XLR* plug is supplied.

Powering may be by an internal PP3 size battery or from 8-50 V phantom or external DC sources. A slide switch between the connectors switches the battery power with the microphone drawing 3.4 mA from an alkaline battery. Unfortunately the on/off switch is very poorly identified so it is difficult to tell if the battery power is on or off.

Frequency response was measured end on with and without the supplied windshield without the adaptor plate and found to have a substantial high frequency boost which increased with the windshield in position, in both cases there being a notch just above 15 kHz. With the barrier plate in position the response exhibited similar characteristics when either horizontally or vertically mounted.

The polar response with the barrier plate was measured with the microphone both vertical and horizontal, being 'lumpy' at high frequencies in both positions.

Electrical noise was quite good but without the windshield the microphone was very sensitive to wind noise and also sensitive to handling noise. Overall this microphone may prove satisfactory for conference rooms and such applications and for lavalier/lapel use but I would not recommend it as a recording microphone.

84 ▶

MANUFACTURER'S SPECIFICATIONS

	Beyer MPC-50	Milab MP-30	Schoeps BLM-3	Electro-Voice CO 94/370
Pattern	Half spherical			Omni
Transducer	Condenser			
Sensitivity	20 mV/Pa	4.0 mV/Pa	20 mV/Pa	4.0 mV/Pa
Self noise	20 dBA	20 dBA	17 dBA	24 dBA
Frequency range	20 Hz-20 kHz	20 Hz-20 kHz	20 Hz-18 kHz + 2/ – 1 dB	80 Hz-15 kHz
Maximum SPL	130	120	130	141
Impedance	200 Ω	200 Ω	—	200 Ω
Connector	XLR	XLR	XLR/Tuchel	XLR
Powering	9 V batt 12/48 V	48 V	48/12 V or 12 V T	8-50 V
Weight	600 g	60 g	580 g	19 g

MEASURED PERFORMANCE

	Beyer MPC 50	Milab MP 30	Schoeps BLM 3	Electro-Voice CO 94/370
Sensitivity	25 mV/Pa	3.6 mV/Pa	26 mV/Pa	5.2 mV/Pa
Self noise				
A-weighted RMS	20.8 dB	31 dB	15.5 dB	24 dB
CCIR RMS	28.8 dB	39 dB	22 dB	32 dB
CCIR quasi-peak	31.8 dB	43.2 dB	25.5 dB	36.5 dB
Impedance				
100 Hz	170 Ω	230 Ω	20 Ω	400 Ω
1 kHz	40 Ω	90 Ω	<10 Ω	200 Ω
10 kHz	70 Ω	170 Ω	<10 Ω	30 Ω
Current at 48 V	4.1 mA	0.56 mA	4.0 mA	4.2 mA
Output for 10 Oe				
Equivalent SPL	<63 dB	100 dB*	<60 dB	94 dB*
Wind noise	Poor	Medium	Medium	Medium**
Handling noise	Very poor	Very poor	Poor	Poor
Pop sensitivity	Good	Very good	Very good	Good
Weight	750 g	60 g	600 g	15 g

* In both cases this performance refers to the separate amplifier and the microphone body was better than 60 dB
** Poor without windshield

MANUFACTURERS AND AGENTS

BEYER
Eugen Beyer Elektrotechsische Fabrik GmbH, Theresienstrasse 8, Postfache 1320, D-7100 Heilbronn, West Germany.
UK: Beyer Dynamic (GB) Ltd, 1 Clair Road, Haywards Heath, Sussex RH16 3DP.
USA: Beyer Dynamic Inc, 5-05 Burns Avenue, Hicksville, NY 11801.

ELECTRO-VOICE
Electro-Voice Inc, 600 Cecil Street, Buchanan, MI 49107, USA.
UK: Shuttlesound Ltd, Unit 15, Osiers Estate, Osiers Road, London SW18 1EJ.

MILAB
Creative Trade Club AB, Knutsgaten 6, S-265 00 Astorp, Sweden.
UK: Audio Video Marketing Ltd, Unit 21, Royal Industrial Estate, Jarrow, Tyne & Wear NE32 3HR.
USA: Camera Mart Inc, 245 West 54th Street, New York, NY 10019.

SCHOEPS
Schalltechnik Dr-Ing Schoeps GmbH, Spitalstrasse 20, D-7500 Karlsruhe 41, West Germany.
UK: Scenic Sounds Equipment, 97-99 Dean Street, London W1V 5RA.
USA: Posthorn Recordings, 142 W 26th Street, 10th Floor, New York, NY 10001.

AMPEX GRAND MASTER® 456

Confidence is what you buy in Ampex Grand Master® 456. Confidence that lets you forget about the tape and concentrate on the job.

That's because we test every reel of 2″ Grand Master 456 Professional Studio Mastering Tape end-to-end and edge-to-edge, to make certain you get virtually no tape-induced level variations from one reel to the next. The strip chart in every box of 2″ 456 proves it.

No other studio mastering tape is more consistent.

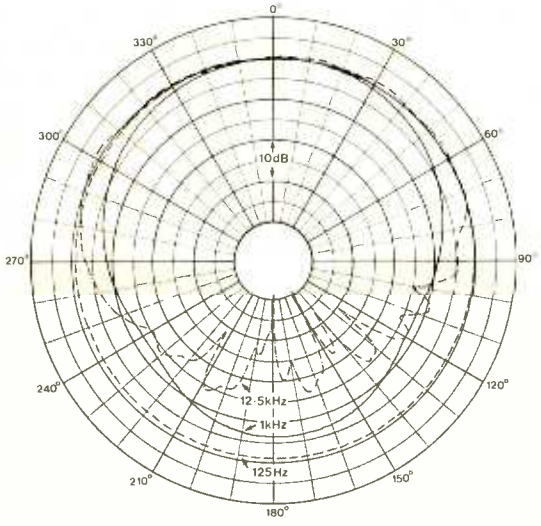
No other mastering tape is more available, either. With Ampex Grand Master 456 you have the confidence of knowing we stock our tape inventory in the field. Close to you. So we're there when you need us.

Confidence means having the right product at the right time. That's why more studios choose Ampex tape over any other studio mastering tape.

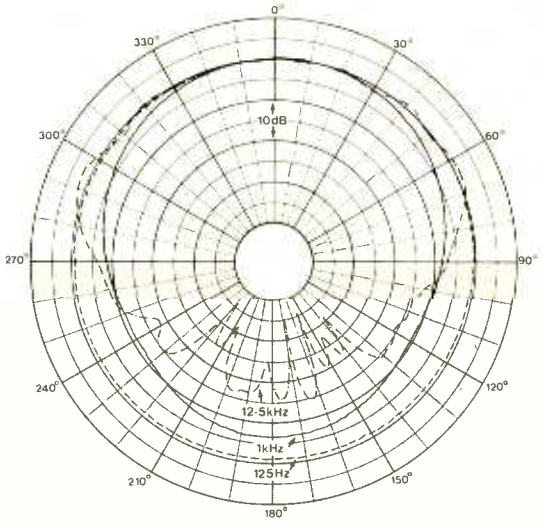
AMPEX

Ampex Corporation • One of The Signal Companies

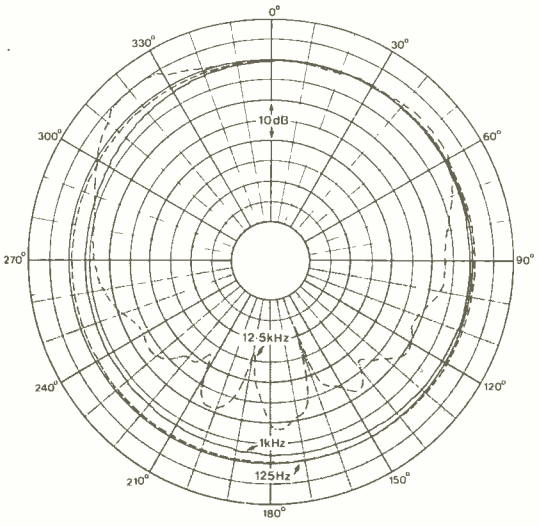
Ampex Corporation, Magnetic Tape Division, 401 Broadway, Redwood City, CA 94063, (415) 367-3809



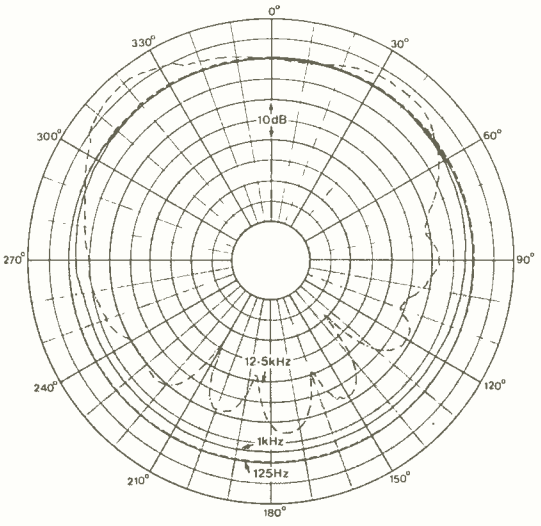
BEYER MPC-50



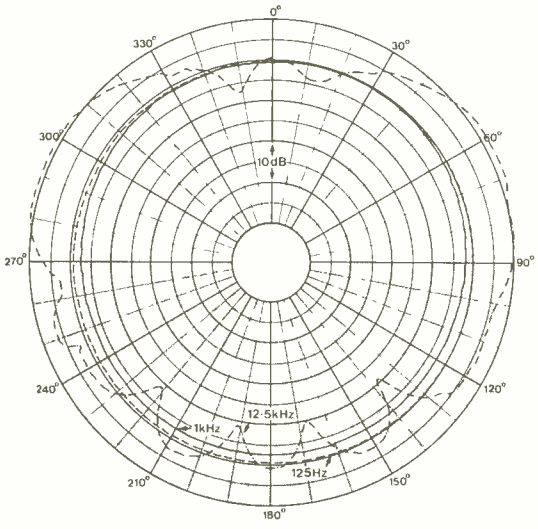
SCHOEPS BLM-3



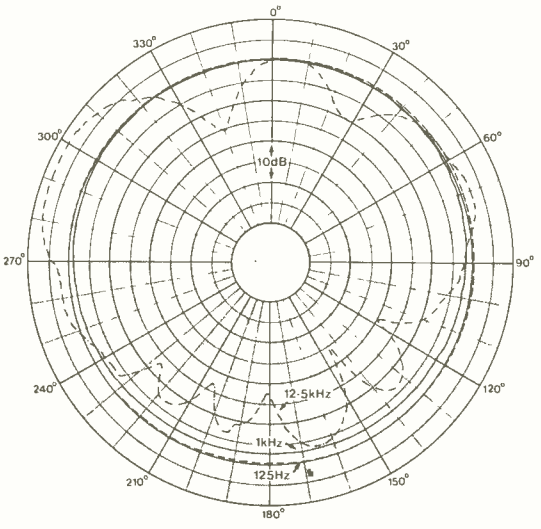
MILAB MP·30 WITH STAND ADAPTOR



MILAB MP·30

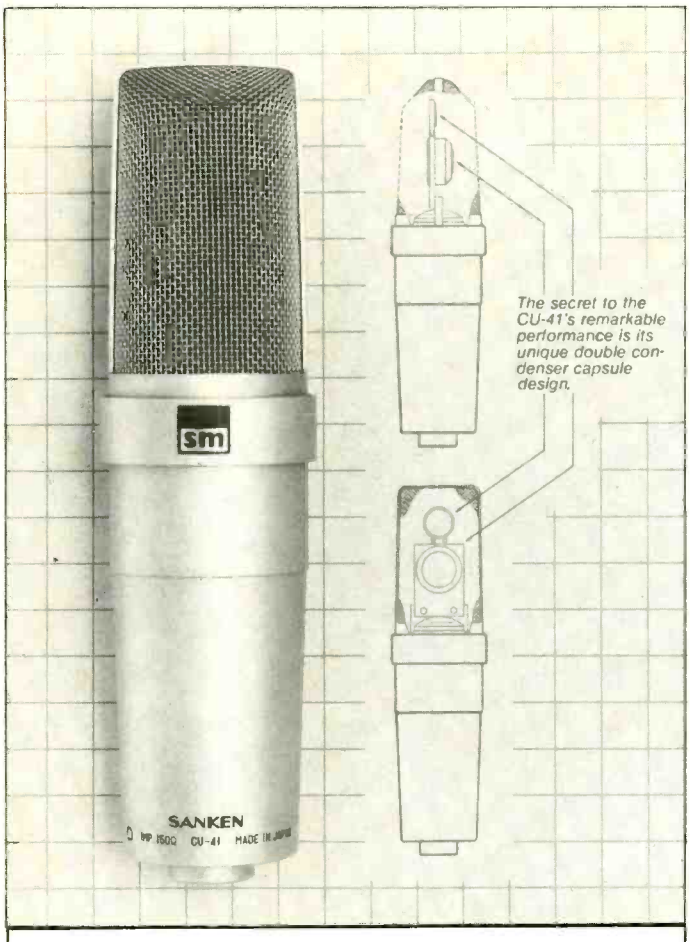


ELECTRO·VOICE C094/370 VERTICAL



ELECTRO·VOICE CO94/370 HORIZONTAL

87 ▶



The secret to the CU-41's remarkable performance is its unique double condenser capsule design.

PERFECT TRANSPARENCY!

At last, a microphone that's good enough for digital recording. And super, of course, for analogue.

Sanken Microphone Co., which for more than half a century has been famed in Japan for creative excellence in microphone technology, proudly announces its latest and most exciting breakthrough. It's the CU-41 two-way condenser (cardioid) microphone, an astonishing instrument that gives you perfect transparency: frequency response is flat from 20 Hz to 20 kHz, inherent noise level is less than 15 dB, and dynamic range is 119 dB. The CU-41 is one of the first microphones in the world that will allow you to realize the full potential of digital audio recording. And it will also, of course, give you truer analogue masters than you've ever had before. For more information on a microphone that could very well change your professional life, write today to the address below.

sanken

Japan's most original microphone maker

Sole export agent: Pan Communications, Inc.
5-72-6 Asakusa, Taito-ku, Tokyo 111, Japan
Telex J27803 Hi Tech/Telephone 03-871-1370
Telefax 03-871-0169/Cable Address PANCOMMJPN

STURDY DURABLE VERSATILE STANDS

FOR MICROPHONES, LOUDSPEAKERS, LIGHTING

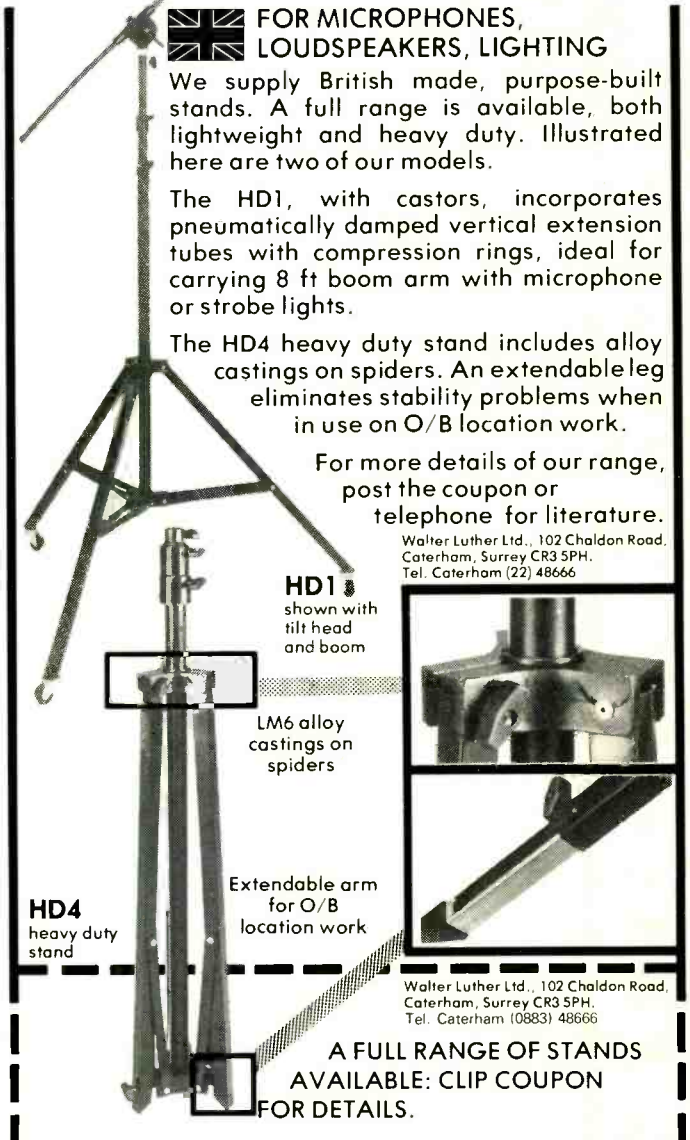
We supply British made, purpose-built stands. A full range is available, both lightweight and heavy duty. Illustrated here are two of our models.

The HD1, with castors, incorporates pneumatically damped vertical extension tubes with compression rings, ideal for carrying 8 ft boom arm with microphone or strobe lights.

The HD4 heavy duty stand includes alloy castings on spiders. An extendable leg eliminates stability problems when in use on O/B location work.

For more details of our range, post the coupon or telephone for literature.

Walter Luther Ltd., 102 Chaldon Road, Caterham, Surrey CR3 5PH. Tel. Caterham (22) 48666



Walter Luther Ltd., 102 Chaldon Road, Caterham, Surrey CR3 5PH. Tel. Caterham (0883) 48666

A FULL RANGE OF STANDS AVAILABLE: CLIP COUPON FOR DETAILS.

NAME _____

ADDRESS _____

WALTER LUTHER LTD

...but why an Omni?

Because you told us that if you had your preference based on sound quality alone, you'd choose an omni over any shaped-pattern microphone available or imaginable.

Because after 25 years making the world's most accurate instrumentation microphones, all omnis, we knew we could make an omni for music and speech with a sound quality superior to any shaped-pattern microphone from anywhere.

And, finally,

Because in the Bruel & Kjaer 4000 series, we offer you an omni that neatly solves virtually all the application problems that drove you to use a shaped-pattern microphone in the beginning.

The next time you choose a microphone primarily for sound quality, make it the new Bruel & Kjaer 4000 series.

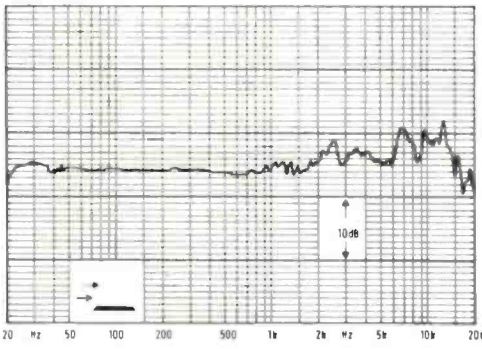
For complete information and evaluation units, call your local B&K sales office or contact:

Bruel & Kjaer Instruments, Inc.
185 Forest Street
Marlboro, MA 01752
(617) 481-7000
TWX: 710-347-1187

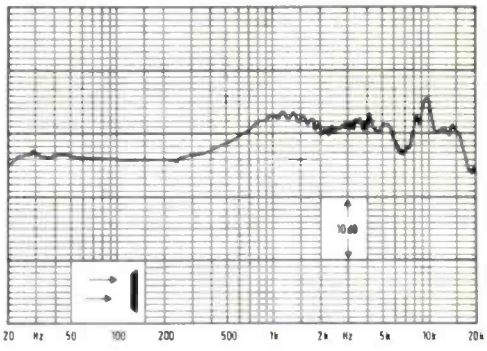
Bruel & Kjaer (UK) Ltd.
Cross Lances Road
Hounslow, Middlesex TW3 2AE
01-570-7774
TELEX: 934150 bk uk g

World Headquarters: Naerum, Denmark. Sales and service in 55 countries around the world.

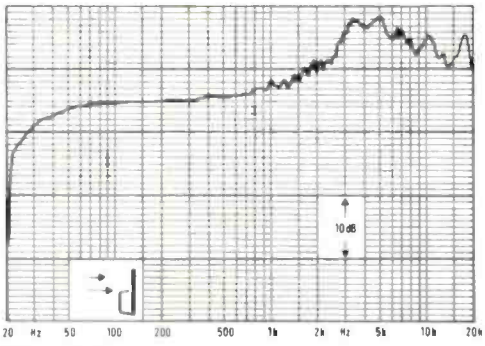
BEYER MPC 50



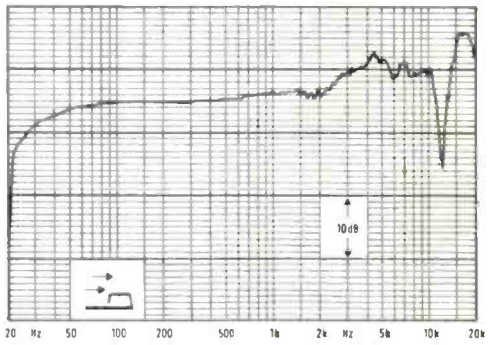
BEYER MPC 50



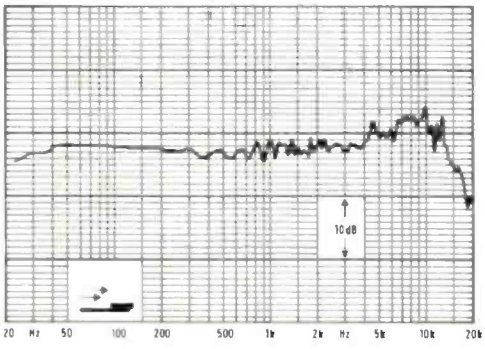
MILAB MP30



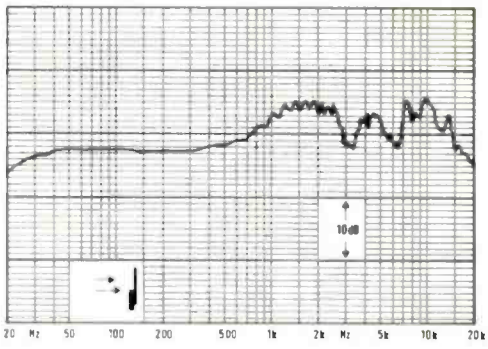
MILAB MP30



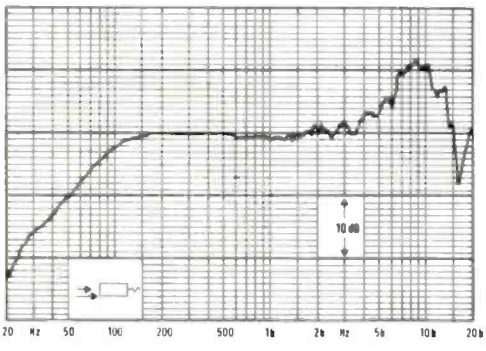
SCHOEPS BLM3



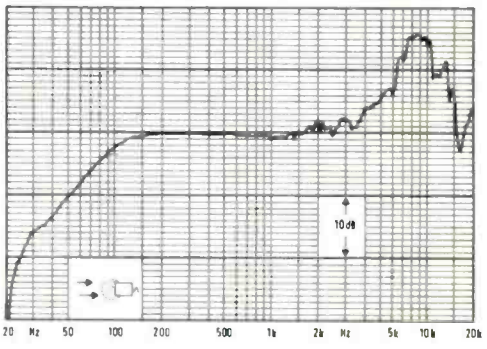
SCHOEPS BLM3



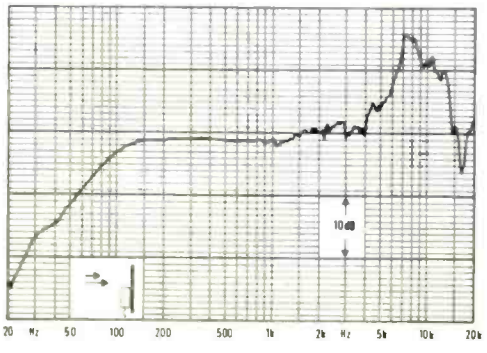
ELECTRO-VOICE CO94



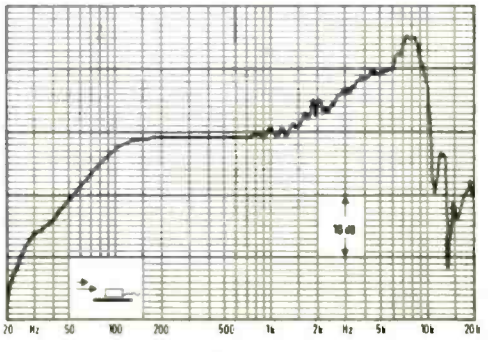
ELECTRO-VOICE CO94 WITH WINDSHIELD



ELECTRO-VOICE CO94/370



ELECTRO-VOICE CO94/370



Get your hands on the beautiful Fostex X15

The Fostex X-15 Tracker represents the ultimate in portable recording.

At last we have true 4 track recording on cassette, with multitracking further facilitated through track bouncing.

The X-15 features EQ; monitor section (level & pan); as well as remix facilities.

This machine is truly portable not only in its size, but also the fact that it comes supplied with its own battery pack enabling you to just sling it over your shoulder and take off. Use it anywhere!

And if you do want to plug it in at home, you can get the separate mains power supply unit.

All this for a mere £299 inc. What more could anyone want?

Fostex A8

The A8 ¼" 8 track machine is just one item in the extensive range of home recording equipment currently coming out of the Fostex camp.

Make up your own 8 track packages from the full range of machines, mixers and audio processors in stock in our 8 track demonstration studio.

Soundtracs 16/8/16 Mixer

EXCLUSIVE

Brand new from Soundtracs, and continuing a policy of extremely good quality partnered with very accessible pricing.

With this mixer, low budget professional multitrack home recording has really arrived.

It looks the part and certainly carries it out. Features include 3 band EQ, 100mm Long Throw Faders, 3 auxiliary sends, LED metering, plus capability to use the monitor channels as further inputs on mixing. Come and try it for yourself. You'll love it.

Trident Series 70

One of the new Trident mixing consoles which are exclusive to DLAS. This mixer is the ideal instrument for the producer/engineer having been designed specifically with this beast in mind. It comes in many different configurations – full frame size being 28/16/24 with full patchbay.

Soundcraft Multitrack Machines

Bring 24 track within reach

The Soundcraft Multitrack Machines have created a mini revolution all their own. The pricing has enabled studios everywhere to realise their ambitions of professional multitracking.

They are Europe's largest selling machines and come highly recommended.

All this and more is waiting for you to come and try it out. Call us today.

Revox B77

One of the many Revox and Studer machines which we supply. The Revox B77 is a fully professional stereo machine, complete with built-in Varispeed, and you would be hard put to set foot in any professional recording studio without immediately sighting one of these.

A very high quality versatile machine and well worth a look.

Bel BD60 DDL

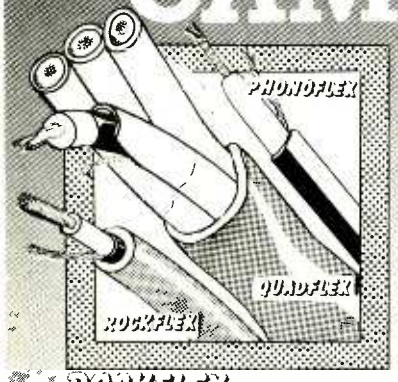
NEW

Another exciting new effects unit from Bel, and the first in a line of Bel digital processors. The BD60 offers an amazing 2 seconds delay at full bandwidth and 4 separately timed outputs. Most of all, you won't believe the price.

Don Larking audio sales

29 Guildford Street, Luton, Beds.
Telephone: Luton (0582) 450066

OUT OF THE BLACKNESS CAME FORTH COLOUR!

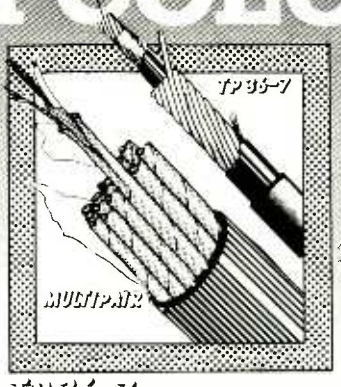


MUSIFLEX

- Faster wiring — no braiding to prepare
- 11 High-visibility Colours
- Tough, flexible P.V.C. jacket
- Conductive thermo-plastic shielded
- For: Microphones, Data Transmission, etc.

STUDIFLEX

- Available in 1 and 8 pairs, other configurations to order
- Conductive Thermo-plastic Shield
- Fast Preparation Time
- Fully colour coded — high visibility colours
- For: Studios, Audio, TV, Control etc.



AVAILABLE IN THE FOLLOWING COUNTRIES:

HOLLAND
WEST GERMANY
FRANCE
SOUTH AFRICA
JAPAN
AUSTRALIA
NEW ZEALAND
CANADA

ROCKFLEX

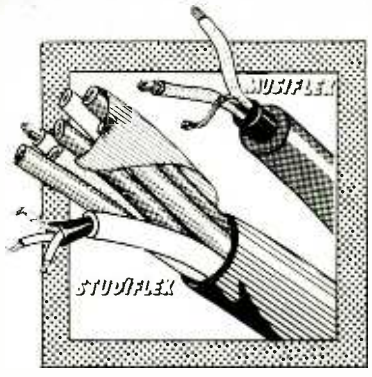
- High flexibility
- Low Capacitance — Musical Instrument Cable
- Conductive Thermo-plastic Shield
- High Speed Assembly
- Many bright colours
- For: Guitars, keyboards, effects, patching etc.

QUADFLEX

- Extra-low capacitance audio cable, (4 x Phonoflex)
- Conductive Thermo-plastic Shield
- High-speed preparation
- For: Audio sends and returns, Hi-Fi, effects rack feeds, etc.

PHONOFLEX

- Extra-low capacitance audio cable
- Conductive Thermo-plastic Shield
- High-speed preparation
- For: Audio, Hi-Fi, HiZ Mics, effects racks patching etc.



TP 36-7

- Conductive Thermo-plastic shielded multicore
- Sends and returns separately shielded (36 sends and 7 returns)
- For: P.A. Cable Systems ('Snakes')

MULTIPAIR

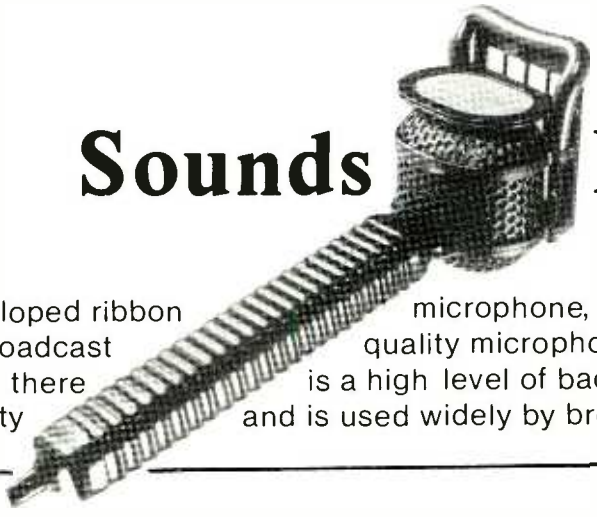
- Aluminium foil-shielded mylar wrapped, melinex taped
- High-flexibilty soft PVC jacket
- Fully colour-coded jacket to determine number of pairs
- Available in many configurations 1,6,11,15,19,27,31 and others on request.
- For: Audio, Data, Control, Switching, Light control, P.A., Snakes, Installation etc.

Connectronics

UNITED KINGDOM & WORLD EXPORTS
CONNECTRONICS LIMITED
20 Victoria Road
New Barnet Hertfordshire
EN4 9PF England
Telephone 01-449 3663
Telex 8955127 SGAL G

UNITED STATES OF AMERICA
CONNECTRONICS CORPORATION
652 Glenbrook Road
Stamford CT.06906 U.S.A.
Telephone (203) 324 2889
Telex 643678

Sounds Perfect!

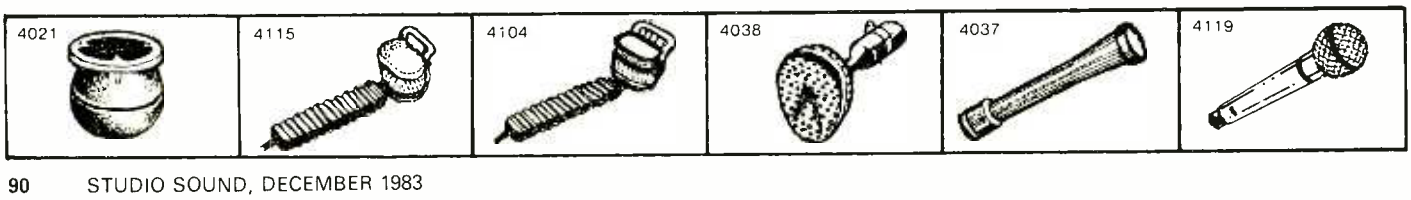


The famous 4104 STC developed ribbon microphone, now distributed by Seasim Controls Ltd. This robust broadcast quality microphone is ideally suited for outside broadcasting where there is a high level of background noise, it has an excellent record for reliability and is used widely by broadcast networks.

Other microphones in the range include the superb 4038 studio ribbon microphones with a BBC specification making it an outstanding choice for the orchestral hall as well as the broadcast and recording studio. Other microphones in the range are featured below and full details, prices etc. are available on application from.

Seasim Controls Ltd

The Paddocks, Frith Lane,
Mill Hill, London NW7 1PS.
Telephone: 01-346 9271 Telex: 21189 Cables: Seawave London



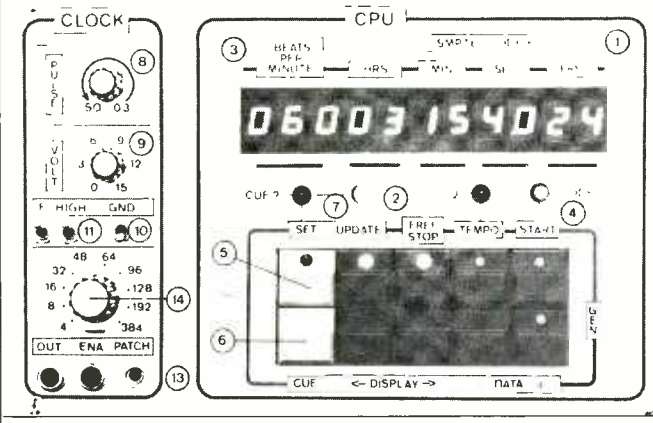
SMPTE READING CLOCK SMPTE READING CLOCK SMPTE

SRC

SYNCHRONISES ANY DRUM COMPUTERS AND SEQUENZERS TO SMPTE CODE

REMEMBERS START AND CUES

SOLVES ALL SYNC PROBLEMS TODAY AND TOMORROW



CPU: 1 SMPTE code writer/reader ± 1 octave **2 FREE MODUS**, working on internal clock or clockinputs (see modules) **3 TEMPO** 30–255 BPM, step 1 **4 START TIME** setable in hrs/min/sec/frs **5 CUE POINT** setable in smpte **6 DROP IN CUE-BOTTON** with **METRONOME FLASHER** for online cue setting; press and all outputs will be enabled on the next metronome beat and cue time will be stored! **7 UPDATE** for printing and shifting cue point **MODULES: CLOCK 8 PULSE** 0.3 ms → square **9 VOLTAGE SWING** 0 → ± 15V **10** cuts neg. voltage **11** first edge high or low **12** enable high or low **13** patch for the **SRC** clock delay **14 CLOCK-COUNTER** 4, 6, 8, 12, 16, 24, 32, 48, 64, 96, 128, 192, 256, 384, 512, 768
DELAY clock delay 1 → 64 ms ± any frames alows also to sync ahead
OUT fixed outputs for Linn, Oberheim, Roland, and others
IN reads Linn, Oberheim, Roland, and others

Friend Chip Albrechtstr. 37 A 1000 Berlin 41 Tel. 030/792 84 02

THE PLAYBACK STUDIO

41, Windmill Street, London W1P 1HH
Tel 01-637 8392 (Off Tottenham Ct Rd)

Large stocks Free delivery in London
Phone for Quotation

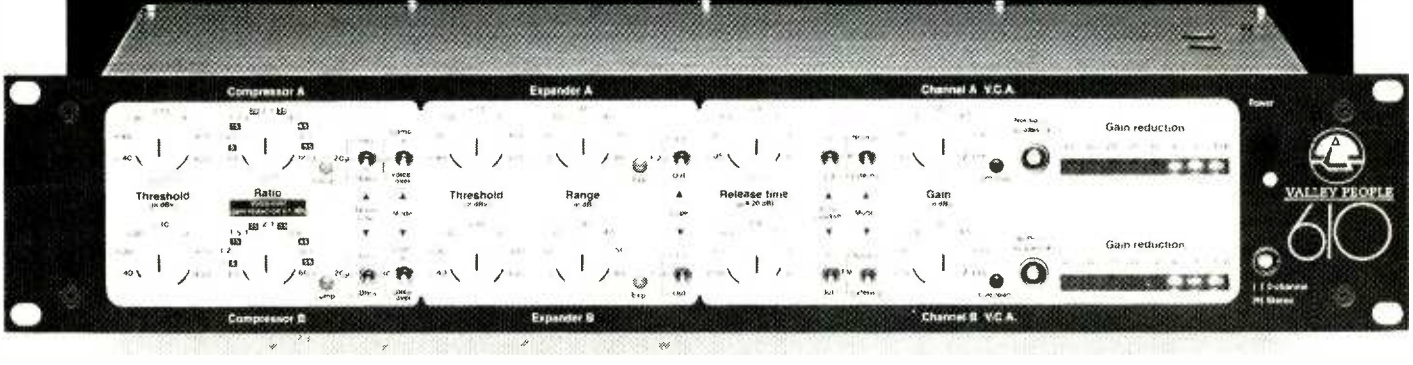
DO YOU CUT TAPE? . . .

. . . Now you can concentrate solely on editing

'CAT' The world's only automatic splicing systems for the editor

Sole UK Distributors: **Mike Fraser (Film Services) Ltd, 225 Goldhawk Rd, London W12 8ER. 01-749 6911**

It knows when to keep quiet.



The new all-in-one Model 610 compression/expansion unit from Valley People gives you the ultimate in control. Both compression and expansion are continuously adjustable, and important new features increase flexibility and high performance.

- ☐ Transition between compression and expansion is imperceptible.
- ☐ Visual warning indicates when signal levels approach clipping.
- ☐ Easy interconnection for stereo processing.
- ☐ Two channel operation.
- ☐ In the interactive expanded compression mode, you can compress the audio signal to reduce dynamic range whilst using the expander to reduce any residual noise 'pumped up' by compression.

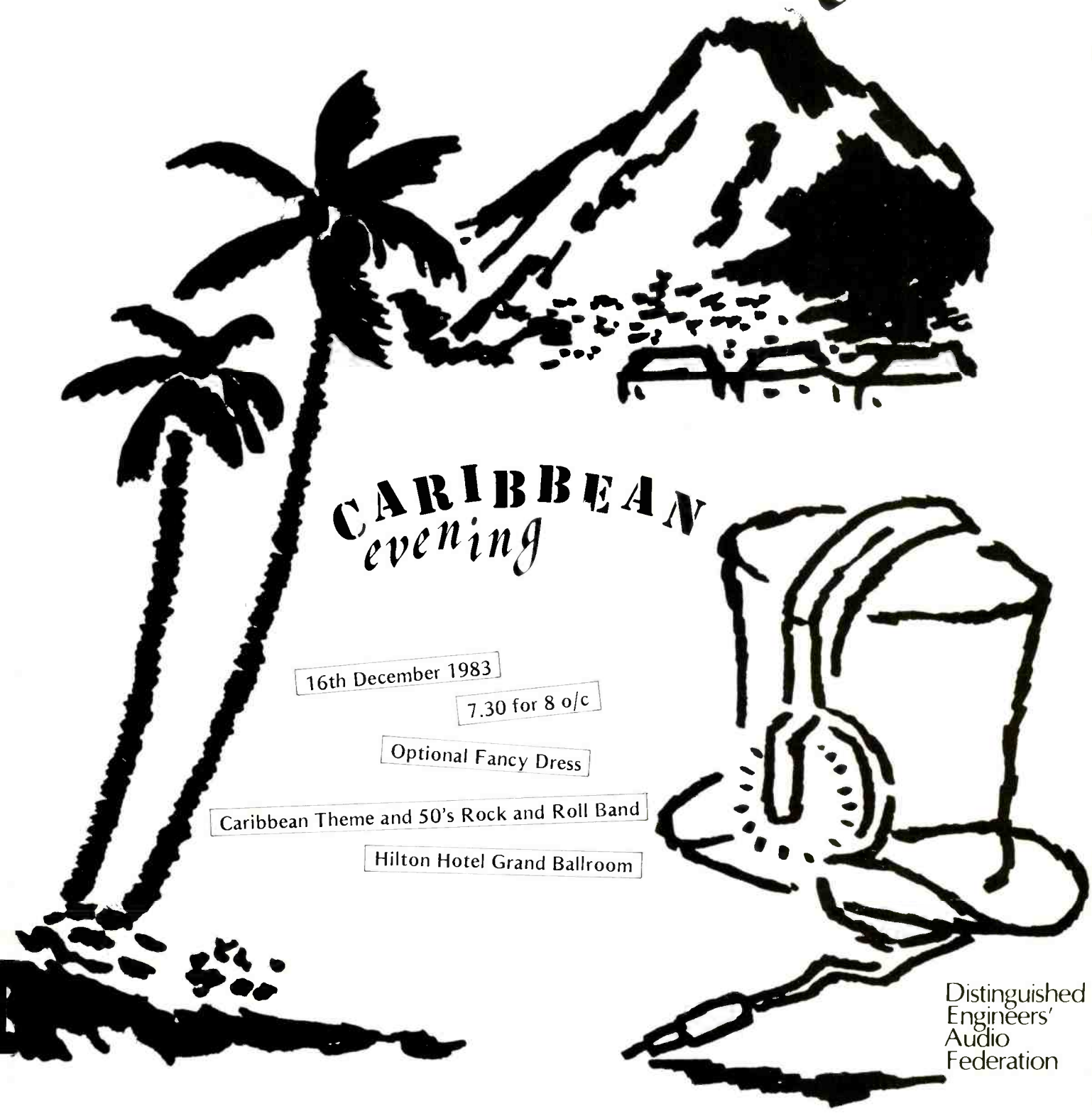
Just write or 'phone for full details:

Valley People Inc., Nashville, Tenn 37204
International distribution by
Gotham Export Corporation, New York.
Telephone (212) 741 · 7411

F.W.O. Bauch Limited

49 Theobald Street, Boreham Wood, Hertfordshire WD6 4RZ
Telephone 01-953 0091, Telex 27502

D.E.A.F. Ladies Night '83



CARIBBEAN evening

16th December 1983

7.30 for 8 o/c

Optional Fancy Dress

Caribbean Theme and 50's Rock and Roll Band

Hilton Hotel Grand Ballroom

Distinguished Engineers' Audio Federation

Gillian Meeson or Susan French

22 St. Georges Road

St. Margarets

Twickenham, Middlesex

01 - 892 7979

Cheques payable to DEAF

Book early!!

£23 per ticket

CLASSIFIEDS

Advertisements for this section must be pre-paid. The rate is **43p** per word, minimum **£10.75**. Box Nos. **£2.50** extra. Semi-display rates on application. Copy and remittance for advertisements in **FEBRUARY** issue must reach these offices by **6th DECEMBER** addressed to: The Advertisement Manager, **Studio Sound**, Link House, Dingwall Avenue, Croydon CR9 2TA. Cheques made payable to Link House Publications (Croydon) Ltd. **Note:** Advertisement copy must be clearly printed in block capitals or typewritten.
Replies to Box Nos. should be addressed to the Advertisement Manager, Studio Sound, Link House, Dingwall Avenue, Croydon CR9 2TA, and the Box No. quoted on the outside of the envelope. The district after Box No. indicates its locality. **SEX DISCRIMINATION ACT 1975:** No job advertisement which indicates or can reasonably be understood as indicating an intention to discriminate on grounds of sex (e.g. by inviting applications only from males or only from females) may be accepted, unless (1) the job is for the purpose of a private householder or (2) it is in a business employing less than six persons or (3) it is otherwise excepted from the requirements of the Sex Discrimination Act. A statement must be made at the time the advertisement is placed saying which of the exceptions in the Act is considered to apply.

The attention of advertisers is drawn to "The Business Advertisements (Disclosure) Order 1977", which requires that, from 1st January 1978, all advertisements by persons who seek to sell goods in the course of business must make that fact clear. From the above date, consumers therefore should know whether an advertisement relates to a sale by a trader or a private seller.

SERVICES

CASSETTE DUPLICATING from 38p 1-1/hi-speed. "SSP were very good quality, the best value for money." — Sound International, July 1981. Simon Stable, 46, Westend, Launton, Oxon. Tel. 08692 2831. (H)

MUSIC SUITE. High quality low cost real time cassette duplication from 31p. Labels and Inlay cards. Blank cassettes. For price list phone 099389 8196. (L)

VIF INTERNATIONAL will remanufacture your AMPEX or SCULLY (Ashland/Bodine) direct drive capstan motor for US $200. Average turn around time 2-3 weeks. For details write to PO Box 1555, Mountain View, CA 94042, USA. (D)

THE COMPLETE SERVICE. Disc cutting (masters and demos), pressings, sleeves, cassettes, labels. Fixed and mobile recording studios. Free brochure. TAM STUDIO, 13a Hamilton Way, London N3. Tel. 01-346 0033 (F)

PROFESSIONAL BRAND custom cassettes wound to any length. Top quality tape in screwed c-zero at budget prices. Professional Magnetics Ltd., Cassette House, 329 Hunslet Road, Leeds, LS10 1NJ. (0532) 706066. (M)

14p FOR A CASSETTE TAPE (grey, assorted lengths). Over-runs 10p. Make your own 5p each. Details of special offers from Selecta Sound, Romford. 04024 53424. (M)

CHROME CASSETTE TAPE wound to your requirements—C30—40p, C12—33p, C50—43p. Selecta Sound, 18 Balmoral Road, Romford 04024 53424. (M)

REAL-TIME CASSETTE COPIES direct from your ¼" master or cassette—no minimum order. Up to C62 18p each, up to C92 28p each plus cost of cassette. Selecta Sound, 18 Balmoral Road, Romford. 04024-53434 (from London 49-53424). (M)

TOP QUALITY LOOP BIN CASSETTE DUPLICATION, any amount from 200 to 200,000. Back to you in days, not weeks. C60—50p. Ring John Smailes 04024 53424. (M)

C120—NO PROBLEM. Just call Selecta Sound. C12—23p, C50—33p, C62—38p, C92—50p, C-100—60p, C120—78p. All with black-screwed c-zero and good quality tape. (M)

MAXELL UDXLII cassette tape wound to short lengths on top quality c-zero. C10—30p: C15—34p: C30—45p. Selecta Sound, Romford. Telephone 04024 53424. (M)

LABELLING MACHINES, ¼" lube tape, endless cassettes, Ampex reel tapes, c-zero, bulk cassettes tape plus much more from Selecta Sound, Romford. Contact John Smailes. (M)

SELECTA SOUND—phone John Smailes anytime 04024 53424 for a quotation or sample of exact length cassettes on Agfa, BASF, EMI or Maxell tape. (M)

SERVICES

Revox & Uher Sales & Service

16mm sound 35mm slide projectors, open reel and cassette recorders, amplifiers, etc., serviced and repaired. Bell & Howell, Elf, Ferrograph, Revox, Tandberg, Uher, approved service agents.
PHOTO ACOUSTICS LTD., 255A St. Albans Road, Watford, Herts. Tel: 0923 32006. Entrance in Judge Street.
58 High Street, Newport Pagnell. Tel: 0908 610625.

Photo Acoustics Ltd

SPEEDY **REVOX** SERVICE

Plus **TEAC, NAGRA, UHER.** Large spares stock held
Approved **REVOX** modifications undertaken
A personal service by experienced engineers.
plus collection and delivery

34 Danbury Street, London N1 8JU
Telephone 01-359 9342 (24 hours)

RAPER & WAYMAN

ADVERTISERS

AN AD OF THIS SIZE COULD RELAY YOUR SERVICE FOR AS LITTLE AS £31.50.

FOR FURTHER DETAILS RING LINDA AT STUDIO SOUND ON

01-686 2599, ext. 567.

TANNOY SERVICE

We have an extensive stock of Tannoy spares and exchange units and offer a prompt, efficient service including delivery and collection. We perform B & K analysis on all units to factory set specifications.

For all repairs, contact the factory accredited service agents: Elliott Bros. Ltd.

ELLIOTT BROS. (Audio Systems) Ltd., 9 Warren Street, London W1. Tel. 380-0511

SINEWAVE 24track

PRO TAPE SALES
021 643 4016/4570

Wobbler TEST TAPES
NOW AVAILABLE FROM:

LONDON:	Music Labs	01-388 5392
	Turnkey	01-202 4366
MIDLANDS:	Protape	021-643 4016
	PMD Ltd	0789 68579
NORTH:	Audio Services	06632 4244

¼", ½", 1", 2" formats
Wobbler —The Test Tape of Reliability

REAL-TIME CASSETTE DUPLICATION
Reel to reel copying.
Comprehensive facilities.
The complete duplicating service from:
NRA RECORDING
37 West End, Launton, Oxon.
Telephone 08692 3986

Everything for your next small cassette production

Duplicating from 1p per minute. Label printing (yellow, blue or white 4½p pair). Inlay cards: red, blue or yellow, £3.20 per 100. High gloss self-adhesive mini prints in colour £10 per 100. Cassettes wound to any length. For details of our complete services contact:

Audicord Records
59 Mayfield Way, Barwell, Leicester LE9 8BL Tel: 0455 47298

COUNTY RECORDING SERVICE
For super quality Master Discs, Demo Discs and Pressings. Scully lathe with our latest CR 82/01 Stereo Cutting System.
Also half speed cutting for that very special disc.
Dolby 'A', Dolby 'B' and DBX noise reduction.
London Rd., Binfield, Bracknell, Berks RG12 5BS
Tel. BRACKNELL (0344) 54935

MAIN 3M WOLLENSAK DEALERS
Meticulous alignment of all machines before sale. Servicing to manufacturer's specification by 3M trained engineers. Bulk supplies of SCS Cassettes C2-C100. Stockists for 3M Audio and Video cassettes. Fast Copying Service. Prompt personal attention.

SOUND CASSETTE SERVICES LTD.
P.O. Box 2, South Chard, Somerset TA20 1LR
Tel: 0460 20968

AMPEX HIGH SPEED DUPLICATION
Reel-cassette, cassette-cassette, Reel-Reel (NAB & CCIR)
(All with or without Dolby B) Precision Wound Cassettes

Rainhill Tape Specialists
31 Eccleston Street
Prescot, Merseyside
Tel: 051-430-9001

DATABASE —
Studio Instrument Repairs
Provide studio equipment, installation & maintenance.
WEST COUNTRY PRICES!
Call Database Bath (0225) 319200

TAPE HEAD RELAPPING SERVICE
Worn tape heads cause drop out and loss of high frequencies. Our relapping system removes the MINIMUM amount of surface necessary to restore heads to their original performance. Prices: casette and ¼in—£6.50, ½in—£8.50, 1in—£10.50, 2in—£16.50. Prices include postage and packing and insurance.
For 24 hour service phone Keith on 0482 653116
Fairview Services, Willerby, Hull HU10 6DP

Have you heard?

Cassette and open reel copying. Custom wound blank cassettes supplied. Studio available for voice overs. Dolby facilities. Design, artwork and print services.

Sound Communication

Freepost, Field House, Wellington Road
Dewsbury, West Yorkshire WF13 1BR
Telephone 0924 451717

GATEWAY CASSETTE COPYING
Real time cassette copying direct from ¼" or cassette master tape. All work carried out on Nakamichi machines to the highest standard.

GATEWAY STUDIO
1A SALCOTT ROAD, LONDON SW11 6DQ
TELEPHONE: 01-223 8901

Hanway Cassettes

22 Hanway Street
London W1
Tel: 01-637 7554

High speed cassette duplication. Open reel copying. Small quantities a speciality. 48 hour service (if not sooner).

---

jbs records
MUSIC SPEECH COMPUTER
Quality Cassette Duplication and Blanks from 1 to 500+. Computer printed Cassette Labels. Studio speech and solo recording/editing, etc. Phone JOHN SCHEFEL for our Price List.
jbs records—a division of FILTERBOND LTD
19 Sadlers Way, Hertford SG14 2DZ. 0992-551188

SELECTA SOUND

Real time or loop bin tape duplication. Exact length cassettes; Seven types of housing standard, super-ferric, chrome or high-bias tape including Maxell, Agfa, EMI and BASF.

Ring **John Smailes,** 04024-53424
18 Balmoral Road, Romford RM2 5XD

FOR SALE—TRADE

DISC CUTTING EQUIPMENT and systems bought, sold, installed and manufactured (under licence from ORTOFON). TAM/ENGLAND, 13a Hamilton Way, London, N3 1AN. Telephone 01-346 0033. (X)

TEAC 244/34/38 discounts and HP and leasing. Erricks Bradford 309266 (Julian). (X)

CLASSIFIEDS

FOR SALE—TRADE

Studio Clearance

MCI 440 Mixer, 28 inputs	£7,750
STUDER A67 in console	£1,250
AKG B X20 reverb	£950
JBL 4333 monitors	£500
AMCRON DC300 amp	£350
MARSHALL time modulator 5002	£425
NEUMANN U47 and U87	£245
ROLAND TR808 rhythm	£395
HAMMOND A100 + leslie	£375

RACKS, STANDS AND SCREENS ALSO AVAILABLE

Ring 01-385 4630

Uher 4200 Report Monitor portable reel/reel, new only **£415.00. Uher 4000AV** new, only **£355.00.** Prices subject to VAT. Full range of accessories and full after-sales service available.

Michael Stevens & Partners
The Homesdale Centre, 216-218 Homesdale Road
Bromley, Kent. 01-464 4157

High Quality Tape Spools
Ex Stock or on Short Delivery
5" and 7" in bulk

T I Plasro Plastics Ltd.
38 Wates Way, Mitcham, Surrey. CR4 4HR
Telephone: 01-640 0145/9

COST-EFFECTIVE

FOR ONLY £36 THIS SPACE CAN SELL YOUR NEW OR USED MIXERS, TAPE MACHINES, ETC. ETC.

RING LINDA AT STUDIO SOUND ON

01-686 2599, ext. 567

FOR FURTHER DETAILS

TASCAM 52 two track and **TASCAM 58** eight track tape machines in stock. Look at these features: SMPTE interface, real time counter with return to zero, tape dump facility, all metal construction, superb performance. Rack mounts and trolley stands available. Write or telephone for details.

Michael Stevens & Partners,
The Homesdale Centre, 216-218 Homesdale Road,
Bromley, Kent BR1 2QZ.
01-464 4157

MAGNETIC TAPE/FILM HEADS

*We manufacture to order, ¼", ½", 1" and 2" tape heads and a wide variety of film heads at very competitive prices. Please specify machine type for an early quotation.
*We also offer a prompt RELAPPING service at standard prices.

BRANCH & APPLEBY LTD.
Stonefield Way, Ruislip, Middx. HA4 0YL
Tel. 01-864 1577

N.S.F. REVERBERATION

The N.S.F. Mk III stereo reverb plate.
Size 3' x 3' x 5". Excellent transient response. Low noise. Adjustable delay to 4 secs. Mobile/static, vert/horozontal working mode.
Price £6.50.
0789 765186 Stratford Upon Avon

★ USED MICS – BOUGHT & SOLD ★
You have surplus mics? AKG, Calrec Neumann etc
You want TESTED good condition used mics?
WE CAN ASSIST IN BOTH AREAS
Prices subject to test, condition, age.
WHITETOWER RECORDS
2 ROCHE GARDENS, BLETCHLEY
MILTON KEYNES MK3 6HR ★ TEL: (0908) 73969
Phone for quote, SAE for stock list

FOR SALE—PRIVATE

OTARI CASSETTE tape loaders, model DP2700; under one year old. Two units available. £1,750 each. Tel: 01-993 2134. (A)

TEAC 80-8 9 track, ½ inch + DBX DX-8 both mounted in plinth. Studiomaster 16/8 mixer, 30hrs use from new. Private use only in home studio. £2,500. Tel: 01-883 9545. (M)

STUDIO SOUND MAGS. Every copy as far back as "Tape Recorder". Offers? Tel: Findon (0906 71) 3774 daytime Worthing (0903) 67424 evenings. Ask for Dave. (M)

ALICE 828-S stereo production mixer. Ideal for hospital radio or small production company. Good condition £600. 'Phone Paul Smith 01-788 0445. (M)

HOUSE AND PRIVATE STUDIO FOR SALE

SOUTH LONDON

Immaculate 3-bed terr. house with 95' garden containing 22' x 14' purpose-built fully equipped 16-track recording studio. Four releases on major labels in last year.

House and Studio: £40,950
Equipment: £15,500 ★ Both: £54,950
OFFERS WELCOME
DETAILS: **01-648 2510**

HOME USED STUDIO EQUIPMENT FOR SALE

Everything in Perfect Working Order

MCI JH110A ¼" 2 track 7½-15-30 ips £2,750. Tannoy Ardens £375. Rebis RA 301 stereo complim £260. Rebis rack, psu, 4 gates, 1 parametric, 1 miclin £300. Roland RE501 chorus echo, new, flightcased £350. Brenell 1" 8 track, remote, varispeed, BEL nr, £2,300. Aiwa ADM 8000 3hd cassette deck, wireless remote, autobias, calib, £150. All ONO + VAT. **WANTED:** 2xdbx 160, plate/digital reverb, autopanner, scamp modules.

Tel: 01-289 9224

PUBLICATIONS

THE RECORDING BOOK THAT'S ROCKING THE MUSIC INDUSTRY. "Practical Techniques for the Recording Engineer" by Sherman Keene is endorsed by the Recording Institute of America and the State Univ. of New York, Colleges, Studio/Schools, Musicians and our Correspondence Students around the world. Recommended by reviewers of the MIX, Re/P, Guitar Player and other top publications. THE BOOK: Hard cover, 380 pages, 28 chapters (4 on computer assisted mixing), illustrations. $29.75 ($31.69 in Calif.) + $2.50 UPS (or surface) shipping (overseas air mail $16). THE CORRESPONDENCE COURSE: Private instruction from a world-class author/lecturer. Certificate theory course using two textbooks, corrected and graded homework, three final exams, unlimited dialog with the author via cassette, Basic, Intermediate and Advanced levels. Installment plan available. THE CURRICULUM: for schools only — all you need for a very complete course: Teacher's Manual (lesson plans for 24 class modules in two textbooks, reading and homework assignments, suggested session content), Student's Workbook, Final Exams. FOR INFORMATION OR TO ORDER contact: S.K.P. 1626 N. Wilcox No E-677 Hollywood, CA 90028, USA. Order by phone using Visa or Mastercharge by calling (213) 708-2933. (X)

FOR HIRE

35 BRITANNIA ROW LONDON N1 8QH

BRITANNIA ROW **01 226 3377**

Hilton Sound Ltd

The best digital effects hire service around town!

Phone Andy on **01-708 0483**

10 Steedman Street, London SE17

HIRE
MULTITRACK
Q-Lock Tape Recorders
Digital
U-matic
Monitors
01-354 2955
01-348 1339

CLASSIFIEDS

FOR HIRE

ADVANCED SOUNDS HIRE (A division of Advanced Sounds Ltd)

Offer for hire — Per day (Weekly rates × 4)

The Emulator — Real sounds sampling at its simplest; Sounds can be stored for later use. Full sound library available	£65
Linn Drum — With full range of alternative voices	£30
Roland TR808	£15
PPG Wave 2.2	£45
Fostex A8 + 350 mixer	£25
Alice 828 mixer	£12
MXR Flanger Doubler	£10
DBX 155 four channel noise reduction	£10

AND MUCH MORE

★ *Delivery/Collection Service Available* ★ *Hire rates for longer periods are negotiable*

ADVANCED SOUNDS LTD Tel: 01-467 4603

PA-VS 01-540 2164

Video and audio equipment hire including Sony PCMF1 digital processors, SLF1 video recorders, high and lo-band U-matic recorders, profeel video monitors and a range of cameras, AMS digital audio effects, digital drum machines plus 8-4 and 2-track analogue recorders, mixers and monitors

Repairs, modifications and maintenance services also available. Design and prototype work carried out

MUSIC LAB HIRE

the latest and the best...

AMS DMX-15-80S Digital Delay
AMS RMX-16 Digital Reverb
Lexicon 224X Digital Reverb
Lexicon 224 Digital Reverb
Lexicon 200 Digital Reverb
Linn Drum Computers

We also have a comprehensive range of Tape Machines, Mics, Mixers, Amps, Speakers, EQ etc.

Immediate delivery and collection service

01-387 9356

76 Eversholt Street, London NW1 1BY

35 BRITANNIA ROW LONDON N1 8QH

BRITANNIA ROW 01 226 3377

STUDIO DESIGNERS AND CONSULTANTS

KENNETH SHEARER AND ASSOCIATES

Consultants in acoustics

30 years' experience in the custom design of all kinds of recording and TV studios, remix, dubbing and viewing suites — new and conversions. Down to 25 Hz.

Tel: 0442 54821

STUDIO BUILDING AND ACOUSTIC INSULATION

Undertaken. Brickwork, concreting, custom joinery and cabinet making. Electrical and electronic installation. Experienced craftsmen. Reasonable rates.

Ring **Recession Recordings, 01-985 7573.**

MIKE JONES Audio Consultant
Acoustic & Audio measurement,
Professional Audio Servicing
Independent advice on all your Audio & Tape problems.
Specialised Service to the Tape Duplicating Industry.
We can help you to reduce unit cost and increase profits by solving those awkward technical and production problems.
19 Glenroch Rd., London NW3 4DJ. England.
Tel: 01-586 5167. *24 Hour Answering Service*

STUDIO FACILITIES

8-TRACK MOBILE RECORDING UNIT

In an air-conditioned custom-built trailer we have combined the following: MCI 1" 8-track, 10-8-2 Trimix, two twin-track tape decks, two dual speed cassette decks, mics by AKG, F1 video/digital equipment. Two-way radios, GPO radiophone, film/video platform. All for around £70 per day.

PHONE: **ANDREW TOMS**
Daytime: **061-430 2223.** Evenings: **061-794 9807**

FOR DETAILS OF HOW TO ADVERTISE IN THIS SUCCESSFUL SECTION CONTACT LINDA GUBBY

01-686 2599 ext. 567

STUDIO FOR SALE

COTSWOLD AREA

Comprehensive small recording studio. Fully modernised and equipped, with new lease in large town centre. **£31,550** to include all equipment and 16 track facilities.

Contact
Mr. Crittenden on **0386 881806**

SITUATIONS VACANT

EWART TELEVISION
require a
SOUND MAINTENANCE ENGINEER
With experience of multitrack recorders, mixing consoles and studio systems.
Please apply in writing to:
13 Wandsworth Plain, SW18 1ET

MOBILE RECORDING MANAGER

I'm looking for a sensible experienced Recording Engineer to run a Mobile Recording Unit. (If you look under 'Studio Facilities' you will see the Andrew Toms Mobile.)
The Mobile will be yours to run. You will generate new work, and look after established clients.
If you are interested in a challenge, please write to
Andrew M. Toms
11 The Crescent, Worsley, Manchester M28 4WN

STAR SOUND DYNAMIX

The manufacturers of the Dynamix range of mixers want to know about you if you have the following talents and experience:

WORLDWIDE MARKETING AND SALES PERSON
With: Technical and working knowledge of mixers and associated products, ability and experience to liaise between customers, directors, advertising, production and R & D. Must be able to take responsibility.

Q.C. AND AFTER-SALES SERVICE PERSON
With: Production test background in pro-audio, ability to liaise with suppliers on quality control, experience of after-sales service, ability to build up and head a department.

If you think you have something to offer us, send a written C.V. to:
40/40A POTTERS ROAD, NEW BARNET, HERTS.

Sound Engineer to be responsible for the installation commissioning and service of professional standard sound amplification equipment at our client's premises.
The successful candidate will have had experience of systems of similar nature and a leaning towards marketing.
A company vehicle will provided and salary is negotiable.
Apply: **McCormack Electronics Ltd.**
35-37 Sefton Street, Liverpool L8 5SR.
051-709 6351

CLASSIFIED ADVERTISEMENTS ORDER FORM

Please use this coupon for all your sales and wants. Rates 43p per word. Minimum £10.75. Box Nos. £2.50 extra. To: ***Studio Sound,*** Classified Advertisements Dept., Link House, Dingwall Avenue, Croydon CR9 2TA. Please publish the advertisement below for.....insertion/s under the heading.....

Name .....

Address .....

.....

.....

Cheque/P.O. enclosed £.....made payable to Link House Publications (Croydon) Ltd.

Is a Box No. required Yes/No. If no, please include remittance to cover name and address and/or tel. no.

Please write in block capitals.

CLASSIFIEDS

Index to volume 25

100 ▶

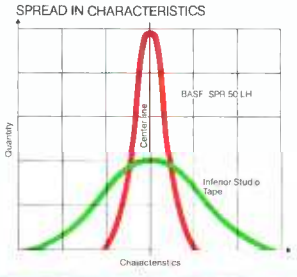
Index to volume 25

INDEX TO ADVERTISERS

Studio Sound is available without charge to qualified readers: these are directors, managers, executives and key personnel actively engaged in sound recording in any part of the world. The Publisher reserves the right to refuse applications considered inappropriate and restrict the number of free copies sent to any one company or organisation. Non-qualifying readers can buy *Studio Sound* at an annual subscription of £14.00. All enquiries to: Subscription Department, Link House Publications PLC, Link House, Dingwall Avenue, Croydon CR9 2TA, Great Britain. Phone 01-686 2599. Published by Link House Magazines (Croydon) Limited on behalf of the proprietors, Link House Publications PLC, Robert Rogers House, New Orchard, Poole, Dorset BH15 1LU and printed by Lawrence-Allen Ltd., Gloucester Street, Weston-super-Mare, Avon BS23 1TB.

From reel to reel from batch to batch from delivery to delivery quality and consistency.

Compelling characteristics of SPR 50 LH are not only its excellent and well balanced electro-acoustical properties but especially also its consistency. (Narrow tolerances for all characteristics.) You know what it means when things go fast and furious in the studio: No time for adjusting or aligning.



You have to be able to rely on a tape whose characteristics remain; both unchanged and top quality.

BASF's SPR 50 LH gives you this surety.

Reliable in operation BASF SPR 50 LH.

BASF Aktiengesellschaft
Gottlieb-Daimler-Str. 10
D-6800 Mannheim 1
Telephone: 06 21/40 08-1
Telex: 464 990 basf d

BASF

THE OTARI MTR-10 SERIES

"...I thoroughly recommend this machine"...

Hugh Ford, Studio Sound, December 1981

"The Otari MTR-10 has an exceptionally high standard of construction in the electronics department with sensible controls which allow accurate and quick alignment.

"Great care has clearly been taken in the overall functional layout of the machine which has many unusual features for a machine at this price. Overall I thoroughly recommend this machine for its performance which could justify a considerably higher price."

The MTR-10 Series are fully microprocessor-controlled mastering/production recorders available in four formats: ¼" full-track; ¼" two channel (pictured above); ½" two channel and ½" four channel.

Working closely with industry leaders in broadcasting, film and recording, we have designed superbly reliable recorders which consistently deliver performance to the highest standards.

To receive the complete text of Hugh Ford's review, a comprehensive brochure and price details, or to arrange your own "hands-on" review, call one of our authorised dealers now or contact us directly at 0753-38261 and ask for Mick Boggis.

The MTR-10 Series recorders are like no other tape machines; built with quality you can hear and feel, affordability that makes Otari the "Technology You Can Touch."

Otari Electric (UK) Ltd., Herschel Industrial Centre, 22 Church Street, Slough SL1 1TP, Berkshire, Tel:0753-38261 Telex:849453 OTARI G

Authorised Dealers:

ITA
1-7 Harewood Avenue, Marylebone Road, London NW1 6LE
Tel: 01-724 2497/8 & 01-724 3768 Telex: 21879

TURNKEY
8 Barnet Road, New Barnet, Herts EN4 8RW Tel: 01-440 9221

OTARI®

Technology You Can Touch