LONDON AUDIO FAIR

April 1960



THE

LONDON AUDIO FAIR

1960

at the

HOTEL RUSSELL

LONDON, W.C.1

THURSDAY 21st – FRIDAY 22nd

SATURDAY 23rd – SUNDAY 24th

APRIL

11 a.m. to 9 p.m.

●

CATALOGUE 2/6

THE COUNCIL OF MANAGEMENT

V. G. P. WEAKE (*Chairman*)

M. L. BERRY (*Vice-Chairman*)

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D. A. LYONS

J. W. MAUNDER

G. E. SPARK

T. R. B. THRELFALL

•

Exhibition Organiser and Officer:

C. REX-HASSAN

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The Exhibition Office for the duration of the Fair is in Room 244 on the Second Floor.

The permanent Secretarial and Administration Office is at: 22, Orchard Street, London, W.1. WEL 9111.

The permanent Exhibition and Organisation Office is at: 42, Manchester Street, London, W.1. HUN 2080.

Press Information: JOHN CARLSEN, PATRICIA PRIDDY.

The Central Press Bureau is in the Glass Hall, and there is a Press Lounge in Room Number 344.

. . . *for the guidance of visitors*

This London Audio Fair, 1960, is divided into two distinct Sections.

In the **First Section** on the ground floor in the Exhibition Halls are Booths on which Exhibitors are displaying their Products. These Booths are manned by expert personnel who are able to discuss any aspect of their equipment.

The **Second Section,** and the one which is considered the most important, is on the First, Second and Third floors of the Hotel. On these floors the manufacturers who are exhibiting are giving live demonstrations. The way up to their demonstration rooms is by means of the main Hotel staircase, situated straight on through the Halls. There are other staircases for visitors to circulate around and down to visit any room, and there is a special staircase from the demonstration room floors allowing re-entry into the Main Halls.

The Audio Fair is well sign-posted, and visitors should not have any difficulty in finding their way about. On the Corridor Walls are plans of the floor; these can be spotted quite easily because of their red frames.

SPECIAL FEATURES

Two most interesting displays in this Fair are being arranged by the British Broadcasting Corporation and the British Sound Recording Association respectively. The one of the B.B.C. is in two parts—a display on Booth 72, and a Demonstration in Room 144. The Special Display of the B.S.R.A. is to be found at the head of the stairs on the first floor. It is clearly marked and cannot be missed.

AMENITIES

There are ample cloakroom facilities in the Hotel for visitors who would like to leave their hats, coats and parcels.

A large bar is situated near the front Hotel entrance, and there are also spacious lounges. There are excellent restaurants adjacent to the centre Exhibition Hall, where either *Table d'hôte* or *à la carte* meals can be obtained. Light refreshments are also available in the Hotel lounges throughout the opening times of the Exhibition, and there is an extension of licence for alcohol during the afternoon hours.

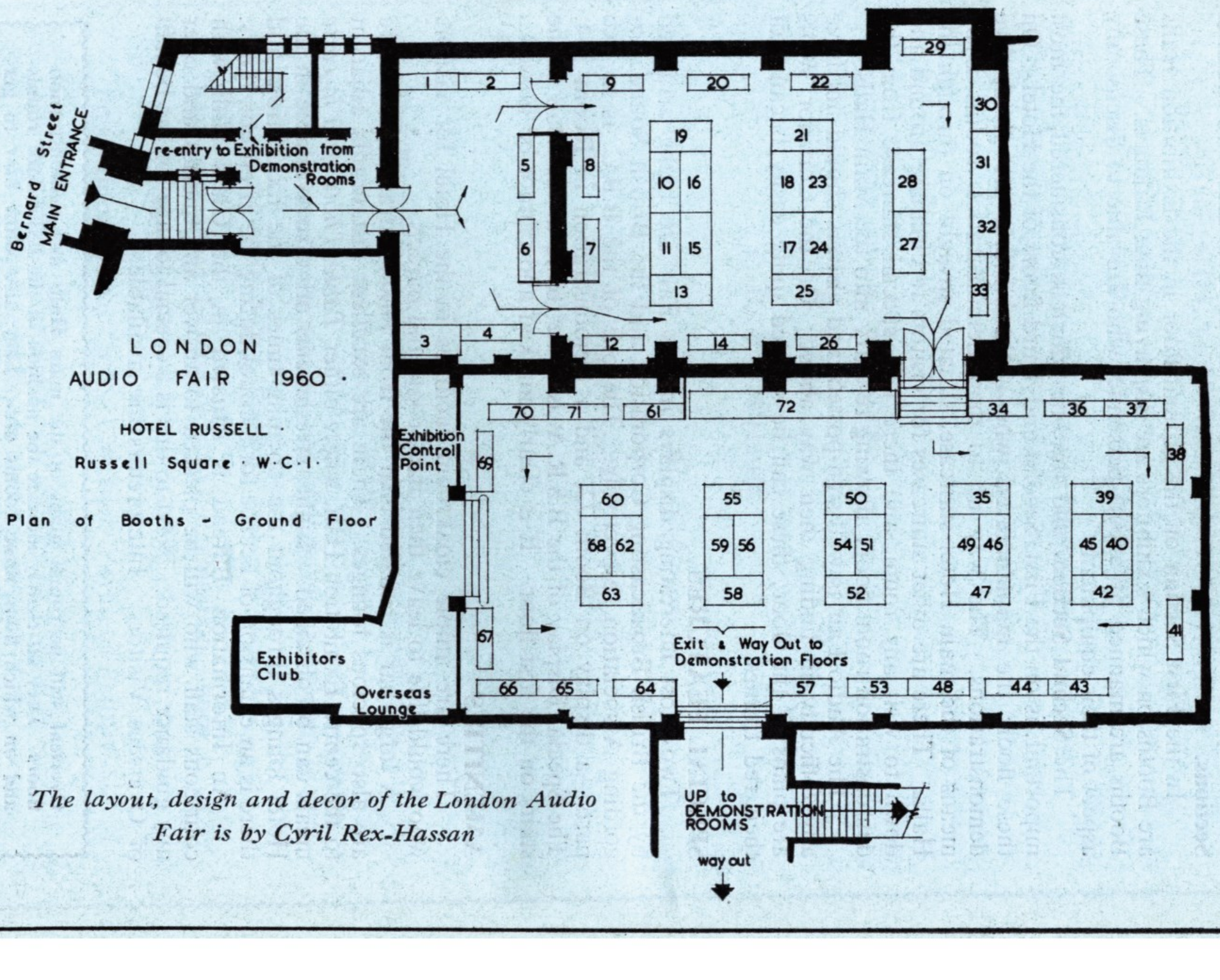
An Information Bureau is situated in the Glass Hall with courteous staff who will be pleased to answer any queries and offer any guidance required. Next to this is a special lounge for the benefit of Overseas Visitors. Interpreters are available.

Overleaf will be found plans of the main Halls and demonstration floors. They all clearly indicate the position of the Exhibitors' rooms and on which floor these rooms are. They also show how to get about the Exhibition. Following on will be found an Index of Exhibitors with a note of products being shown and manufacturers' addresses. Next to that is a Guide by Products.

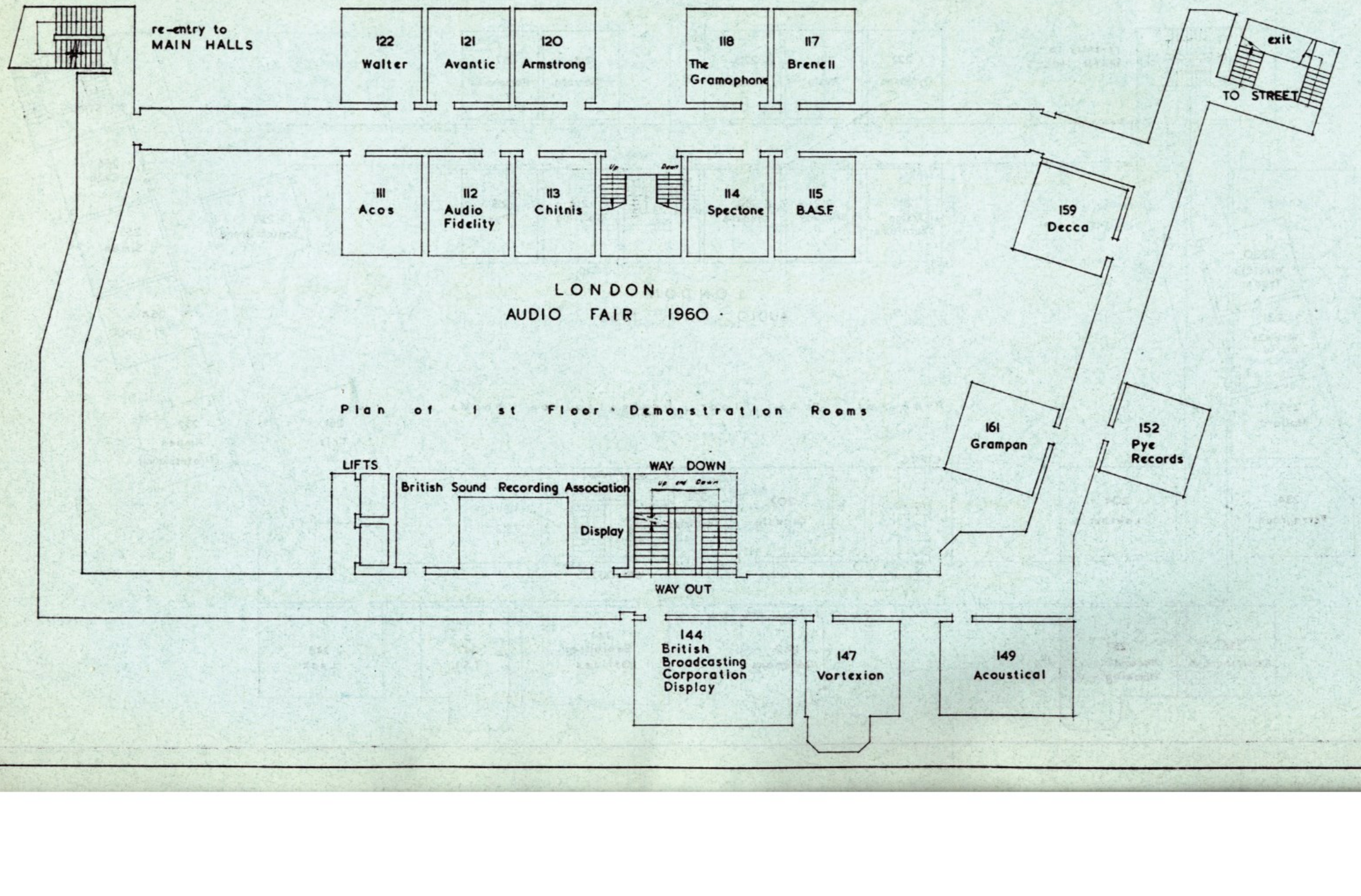
LONDON AUDIO FAIR 1960

HOTEL RUSSELL
Russell Square · W·C·1·

Plan of Booths - Ground Floor



The layout, design and decor of the London Audio Fair is by Cyril Rex-Hassan



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INDEX OF EXHIBITORS

BRAND NAME	EXHIBITOR	BOOTH No.	ROOM No.	OFFICE	PRODUCTS
ACOS	Cosmocord Limited, Eleanor Cross Road, Waltham Cross, Herts. (Waltham Cross 25206)	65	111	109	**Microphones and Accessories, Pick-ups, Pick-up arms, Pick-up cartridges, Pick-up Styli.**
ACOUSTICAL	Acoustical Manufacturing Co. Ltd., Huntingdon, Hunts. (Huntingdon 361)	63	149	148	**Amplifiers and Pre-Amplifiers, Loudspeakers (Electrostatic), Tuners (A.M.), Tuners (F.M.).**
AKG	Akustische u. Kinogerate G.m.b.H., Nobilegasse 50, Vienna XV, Vienna. *U.K. Agents*: Politechna (London) Ltd., 357, Euston Road, London, N.W.1. (EUS 5851)	34	312	—	**Microphones and accessories.**
AMATEUR TAPE RECORDING	Associated British Tape Recording Clubs Ltd.. 145, Fleet Street, London, E.C.4. (FLE 7732)	67	—	331	**Publications.**

BRAND NAME	EXHIBITOR	BOOTH No.	ROOM No.	OFFICE	PRODUCTS
AMPEX *(Domestic)*	Ampex International S.A., 1, Rue des Pilettes, Fribourg, Switzerland.	28	314		Tape Recorders (Domestic), Pre-recorded tapes, Reproducers.
AMPEX *(Professional)*	Rank Cintel Limited, Worsley Bridge Road, London, S.E.26. (HIT 4600)	27	252	251	Amplifiers and Pre-Amplifiers, Mixers, Tape Recorders (Professional), Transistor Amplifiers.
ARMSTRONG	Armstrong Wireless & Television Co. Ltd., Warlters Road, London, N.7. (NOR 3213)	26	120	—	Amplifiers and Pre-Amplifiers, Radio Chassis, Tuners (A.M), Tuners (F.M.), Tape Pre-Amplifier.
AUDIOMASTER	W. & N. Electronics, 80/2, Uxbridge Road, London, W.5. (EAL 4774)	19	317	—	Amplifiers and Pre-Amplifiers, Cabinets, Loudspeaker Enclosures, Loudspeaker Systems, Mixers, Tape Recorders (Domestic), Tape Recorders (Professional), Tuners A.M. & F.M.
AUDIO FIDELITY	Audio Fidelity (England) Ltd., 44, Crawford Street, London, W.1. (PAD 2103)	1	112	—	Records.
AVANTIC	Beam-Echo Limited, 13, South Molton Street, London, W.1. (MAY 1039)	62	121	124	Amplifiers and Pre-Amplifiers, Loudspeaker Systems, Tuners (A.M.), Tuners (F.M.).
BASF	Badische Anilin & Soda Fabrik A.G., Ludwigshafen am Rhein, Germany. *U.K. Agents*: F. A. Hughes & Co. Ltd., 4, Stanhope Gate, London, W.1. (HYD 6080)	2	115	—	Magnetic Recording Tape and Accessories.
BBC	British Broadcasting Corporation, Broadcasting House, London, W.1. (LAN 4468)	72	144/6	—	Display and demonstration of studio recording and monitoring apparatus.
BRENELL	Brenell Engineering Co. Ltd., 1a, Doughty Street, London, W.C.1. (HOL 7358)	8	117	116	Amplifiers and Pre-Amplifiers, Mixers, Tape decks, Tape Recorders (Domestic).
BSRA	British Sound Recording Association, 68, All Souls Avenue, London, N.W.10.	First Floor Gallery		141	Special Display — SOUND IN THE SERVICE OF MAN.

BRAND NAME	EXHIBITOR	BOOTH No.	ROOM No.	OFFICE	PRODUCTS
BUTOBA	Schwarzalder Uhrwerke-Fabrik Burger KG, Schonach, Germany. *U.K. Agents*: Denham & Morley Ltd., Denmore House, 173/5, Cleveland Street, W.1. (EUS 3656)	40	356	—	Tape Recorders (Domestic).
CELESTION	Celestion Limited, Ferry Works, Thames Ditton, Surrey, (Emberbrook 3402)	51	352	351	Loudspeakers (Dynamic), Loudspeaker Systems, Public Address Equipment, Transformers.
CHAPMAN	C. T. Chapman (Reproducers) Ltd., Chapel Lane, High Wycombe, Bucks. (High Wycombe 2474)	37	220	209	Amplifiers and Pre-Amplifiers, Radio Chassis, Tuners (A.M.), Tuners (F.M.).
CHITNIS	Gopal G. Chitnis, Westfaelische Strasse 38, Berlin-Halensee, West Germany. *U.K. Agents*: Chitnis Electronics Ltd. 1, Long Acre, W.C.2. (COV 2052)	11	113	—	Microphones and accessories, Tape Recorders (Domestic).
CONNOISSEUR	A. R. Sugden & Co. (Engineers) Ltd., Market Street, Brighouse, Yorks. (Brighouse 2142)	14	318	324	Amplifiers and Pre-Amplifiers, Cabinets, Disc Recorders, Loudspeaker Enclosures, Pick-ups, Pick-up Arms, Pick-up Heads, Pick-up Styli, Transcription Turntables.
DECCA	Decca Radio & Television, Ingate Place, Queenstown Road, London, S.W.8. (MAC 6677)	61	159	150	Pick-ups, Pick-up Arms, Pick-up Cartridges, Publications, Records, Record Reproducers.
DESIGN FURNITURE	Design Furniture Limited, Carnwath Road, London, S.W.6. (REN 2217)	32	211	—	Cabinets, Loudspeaker Enclosures.
DYNATRON	Dynatron Radio Limited, St. Peters Road, Furze Platt, Maidenhead, Berks. (Maidenhead 5151)	60	222	223	Loudspeaker Systems, Record Reproducers.
EKCO	E. K. Cole Limited, Ekco Works, Southend-on-Sea, Essex. (Southend 49491)	31	256	—	Record Reproducers.
ELIZABETHAN	E. A. P. (Tape Recorders) Ltd., Bridge Close, Oldchurch Road, Romford, Essex. (Romford 62366)	18	348	362	Microphones and accessories, Tape Recorders (Domestic), Tuners (A.M.), Tuners (F.M.).

BRAND NAME	EXHIBITOR	BOOTH No.	ROOM No.	OFFICE	PRODUCTS
E.M.I.	E. M. I. Sales & Service Ltd., Hayes, Middlesex. (SOU 2468)	59	313	301	Magnetic Recording Tape, Record Reproducers, Tape Recorders (Professional).
E.M.I. RECORDS	E. M. I. Records Ltd., 8/11, Great Castle Street, London, W.1. (LAN 5544)	15	302	—	Pre-recorded tapes, Publications, Records.
E-R	Electronic Reproducers Ltd., Porters Wood, Valley Road Industrial Estate, St. Albans, Herts. (St. Albans 50555)	12	347	346	Pick-ups, Pick-up Arms, Pick-up Cartridges, Pick-up Styli.
FERROGRAPH	British Ferrograph Recorder Co. Ltd., 131, Sloane Street, London, S.W.1. (SLO 2214)	29	234	—	Tape-decks, Tape Recorders (Domestic), Tape Recorders (Semi-Professional), Continuous Tape Players, Head Demagnetisers.
FI-CORD	Fi-Cord Limited, 40a, Dover Street, London, W.1. (HYD 3448)	9	254	—	Tape Recorders (Domestic).
GARRARD	The Garrard Engineering & Manufacturing Co. Ltd., Newcastle Street, Swindon, Wilts. (Swindon 5381)	7	218	226	Automatic Record Changers, Pick-ups, Pick-up Arms, Pick-up Cartridges, Pick-up Styli, Tape-decks, Transcription Turntables.
G.E.C.	General Electric Company, Magnet House, Kingsway, London, W.C.2. (TEM 8000)	25	355	—	Amplifiers and Pre-Amplifiers, Loudspeakers (Dynamic), Loudspeaker Enclosures, Loudspeaker Systems, Microphones and accessories, Mixers, Record Reproducers, Transformers, Tuners (F.M.), Valves.
GOLDRING	The Goldring Manufacturing Co. (G.B.) Ltd. 486/488, High Road, London, E.11. (LEY 8343)	53	214	—	Pick-ups, Pick-up Arms, Pick-up Cartridges, Pick-up Styli, Transcription Turntables, Record cleaning pads, Stylus balance,
GOODMANS	Goodmans Industries Ltd., Axiom Works, Wembley, Middlesex. (WEM 1200)	13	242	241 243	Loudspeakers (Dynamic), Loudspeaker Enclosures, Loudspeaker Systems.
THE GRAMOPHONE	The Gramophone, The Glade, Green Lane, Stanmore, Middlesex. (Grimsdyke 389)	—	—	118	Publications.

BRAND NAME	EXHIBITOR	BOOTH No.	ROOM No.	OFFICE	PRODUCTS
GRAMPIAN	Grampian Reproducers Ltd., Hanworth Trading Estate, Feltham, Middlesex. (FEL 2657)	16	161	162	Amplifiers and Pre-Amplifiers, Loudspeakers (Dynamic), Loudspeaker Enclosures, Microphones and accessories, Mixers, Public Address Equipment, Recording Cutters, Record Reproducers, Transistor Amplifiers.
GRUNDIG	Grundig (Great Britain) Ltd., Newlands Park, Sydenham, London, S.E.26. (SYD 2211)	46	202	—	Loudspeaker Systems, Magnetic Recording Tape, Microphones and accessories, Publications, Radio Chassis, Recording Heads, Record Reproducers, Tape-decks, Tape Recorders (Domestic).
HI-FI NEWS	Classical Record News, 99, Mortimer Street, London, W.1. (MUS 3967)	69	—	363	Publications.
H.M.V.	The Gramophone Company Limited, Hayes, Middlesex. (SOU 2468)	56	342	341 343	Amplifiers and Pre-Amplifiers, Cabinets, Loudspeakers (Dynamic), Loudspeaker Enclosures, Loudspeaker Systems, Record Reproducers, Tape Recorders (Domestic).
IRISH BRAND	Orr Industries, Inc., Opelika, Alabama, U.S.A. *U.K. Agents*: Wilmex Limited, 131, Sloane Street, London, S.W.1. (SLO 0621)	3	—	—	Magnetic Recording Tape.
JASON	The Jason Motor & Electronic Co., 3-4, Gt. Chapel Street, London, W.1. (GER 0273)	71	321	—	Amplifiers and Pre-Amplifiers, Kits, Tuners (A.M.), Tuners (F.M.).
LEAK	H. J. Leak & Co. Ltd., Brunel Road, Westway Factory Estate, London, W.3. (SHE 1173)	70	248	—	Amplifiers and Pre-Amplifiers, Loudspeaker Systems, Pick-ups, Tuners (F.M.).
LOWTHER	The Lowther Manufacturing Company, Lowther House, St. Mark's Road, Bromley, Kent. (RAV 5225)	64	204	239	Amplifiers and Pre-Amplifiers, Loudspeakers (Dynamic), Loudspeaker Enclosures, Loudspeaker Systems, Pick-ups, Radio Chassis, Transcription Turntables, Transistor Amplifiers, Tuners (F.M.).
LUSTRAPHONE	Lustraphone Ltd., St. George's Works, Regent's Park Road, London, N.W.1. (PRI 8844)	24	—	143	Amplifiers and Pre-Amplifiers, Microphones and accessories, Mixers, Public Address Equipment, Transistor Amplifiers, Transformers.
MINIVOX	Challen Instrument Co., 2, St. Michaels Road, London, S.W.9. (GIP 4381)	6	212	—	Disc Recorders, Tape Recorders (Domestic), Transistor Amplifiers.

BRAND NAME	EXHIBITOR	BOOTH No.	ROOM No.	OFFICE	PRODUCTS
M.S.S.	M. S. S. Recording Company Ltd. 21, Bloomsbury Street, London, W.C.1. (MUS 1600)	10	359	350	Amplifiers and Pre-Amplifiers, Disc Recorders, Loudspeaker Enclosures, Magnetic Recording Tape, Mixers, Recording Heads, Tape Recorders (Domestic), Tape Recorders (Professional), Transcription Turntables.
MULLARD	Mullard Limited, Mullard House, Torrington Place, London, W.C.1. (LAN 6633)	47	233	232	Publications, Transistors, Valves.
PAMPHONIC	Pamphonic Reproducers Limited, 17, Stratton Street, London, W.1. (GRO 1926)	55	217	225	Amplifiers and Pre-Amplifiers, Loudspeakers (Dynamic), Loudspeaker Systems, Mixers, Public Address Equipment, Record Reproducers, Tuners (A.M.), Tuners (F.M.).
PYE	Pye High Fidelity Division, 65, Fairview Road, London, S.W.16. (POL 9441)	68	215	216	Amplifiers and Pre-Amplifiers, Cabinets, Loudspeakers (Dynamic), Loudspeaker Enclosures, Tuners (A.M.), Tuners (F.M.).
PYE RECORDS	Pye Group Records (Sales) Ltd., 10a, Chandos Street, London, W.1. (LAN 0521)	52	152	151	Records.
RECORD HOUSING	N. & S. B. Field & Co. Ltd., Brook Road, London, N.22. (BOW 7487)	30	237	—	Cabinets, Loudspeaker Enclosures.
REFLECTOGRAPH	Multimusic Ltd., Maylands Avenue, Hemel Hempstead, Herts. (Boxmoor 3636)	42	236	235	Tape-decks, Tape Recorders (Domestic) Tape Recorders (Professional).
RESLO	Reslosound Ltd., London Road, Romford, Essex. (Romford 49087)	33	221	224	Loudspeakers (Dynamic), Microphones and accessories, Public Address Equipment, Transistor Amplifiers, Transformers.
ROGERS	Rogers Developments (Electronics) Ltd. 4/14, Barmeston Road, London, S.E.6. (HIT 7424)	20	213	—	Amplifiers and Pre-Amplifiers, Cabinets, Loudspeaker Systems, Tuners (F.M.).
SCOTCH BRAND	Minnesota Mining & Manufacturing Co. Ltd., 3M House, Wigmore Street, London, W.1. (HUN 5522)	23	259	—	Magnetic Recording Tape.

BRAND NAME	EXHIBITOR	BOOTH No.	ROOM No.	OFFICE	PRODUCTS
SHURE	Shure Brothers Incorporated, 222, Hartrey Avenue, Evanston, Illinois, U.S.A. *U.K. Agent*: J. W. Maunder, 95, Hayes Lane, Beckenham, Kent. (BEC 7413)	43	322	323	Microphones and accessories, Pick-ups, Pick-up Arms, Pick-up Cartridges, Pick-up Styli.
SIMON	Simon Equipment Ltd., 48, George Street, London, W.1. (WEL 2371)	36	255	—	Microphones, Tape Recorders (Domestic), Tape Recorders (Semi-Professional).
SPECTONE	Specto Limited, Vale Road, Windsor, Berks. (Windsor 1241)	21	114	—	Tape Recorders (Domestic).
STC	Standard Telephones & Cables Ltd., Connaught House, 63, Aldwych, London, W.C.2. (HOL 8765)	35	—	240	Amplifiers and Pre-Amplifiers, Loudspeaker Enclosures, Loudspeaker Systems, Microphones and accessories, Mixers, Public Address Equipment, Valves.
STEELMAN	Redifon Ltd., Broomhill Road, London, S.W.18. (VAN 7281)	44	311	309	Record Reproducers, Tape Recorders (Domestic).
STUZZI	Recording Devices Limited, 44, Southern Row, Kensington, London, W.11. (LAD 4775)	39	361	—	Microphones and accessories, Mixers, Tape Recorders (Domestic).
TANNOY	Tannoy Products Limited, Norwood Road, West Norwood, London, S.E.27. (GIP 1131)	45	336	335	Amplifiers and Pre-Amplifiers, Cabinets, Loudspeakers (Dynamic), Loudspeaker Enclosures, Loudspeaker Systems, Pick-up Cartridges, Pick-up Styli.
TELFUNKEN	Telefunken G.m.b.H., Gottinger Chaussee 76, Hannover, Germany. *U.K. Agents*: Welmec Corporation Ltd., 147, Strand, W.C.2. (TEM 3357)	50	315	316	Magnetic Recording Tape, Microphones and accessories, Mixers, Tape Recorders (Domestic), Tape Recorders (Professional).
TEPPAZ	Teppaz S. A., 170 Boulevard de la Croix Rousse, Lyon (Rhone), France.	17	320	325	Amplifiers and Pre-Amplifiers, Loudspeakers (Dynamic), Loudspeaker Systems, Pick-ups, Pick-up Arms, Pick-up Cartridges, Pick-up Styli, Public Address Equipment, Records, Record Reproducers, Transistor Amplifiers.
TRIX	Trix Electrical Co. Ltd., 1-5, Maple Place, London, W.1. (MUS 5817)	49	261	262	Amplifiers and Pre-Amplifiers, Loudspeaker Systems, Microphones and accessories, Mixers, Public Address Equipment, Record Reproducers, Tape Recorders (Domestic), Transistor Amplifiers, Tuners (F.M.).

BRAND NAME	EXHIBITOR	BOOTH No.	ROOM No.	OFFICE	PRODUCTS
TRUVOX	Truvox Limited, Neasden Lane, London, N.W.10. (GLA 6455)	57	334	—	Amplifiers and Pre-Amplifiers, Recording Heads, Tape-decks, Tape Recorders (Domestic), Stethoset Headphones, Radio Jacks.
TSL	Technical Suppliers Limited, 63, Goldhawk Road, London, W.12. (SHE 2581)	48	247	—	Loudspeakers (Dynamic), Loudspeaker Enclosures, Loudspeaker Systems, Microphones and accessories, Mixers, Pre-recorded Tapes, Tape Recorders (Domestic), Tuners (F.M.).
VERITONE	Veritone Ltd., 16, Station Close, Potters Bar, Middlesex. (Potters Bar 2079)	58	354	—	Mixers, Tape Recorders (Domestic), Tuners (A.M.).
VORTEXION	Vortexion Limited, 257/263, The Broadway, London, S.W.19. (LIB 2814)	54	147	163	Amplifiers and Pre-Amplifiers, Mixers, Public Address Equipment, Tape Recorders (Domestic), Tape Recorders (Professional), Transformers.
WALTER	Walter Instruments Ltd., Garth Road, Morden, Surrey. (DER 4421)	5	122	123	Tape Recorders (Domestic).
WELLINGTON	Wellington Acoustic Laboratories Ltd., Farnham, Surrey. (Farnham 6461)	66	—	—	Loudspeaker Systems, Tape Accessories, Transistor Pre-Amplifiers, Stereo, Pocket Hi-Fi Tester.
WHARFEDALE	Wharfedale Wireless Works Ltd., Idle, Bradford. (Idle 1235)	22	337	339	Loudspeakers (Dynamic), Loudspeaker Enclosures, Loudspeaker Systems, Publications, Public Address Equipment, Transformers, Volume Controls.
W.B. STENTORIAN	Whiteley Electrical Radio Co. Ltd., Radio Works, Victoria Street, Mansfield, Notts. (Mansfield 1762)	4	304	340	Amplifiers and Pre-Amplifiers, Cabinets, Loudspeakers (Dynamic), Loudspeaker Enclosures, Public Address Equipment, Transformers, Tuners (F.M.).
WIRELESS TRADER	Trader Publishing Co. Ltd., Dorset House, Stamford Street, London, S.E.1. (WAT 3333)	41	—	230	Publications.
WIRELESS WORLD	Iliffe & Sons Ltd., Dorset House, Stamford Street, London, S.E.1. (WAT 3333)	38	—	231	Publications.

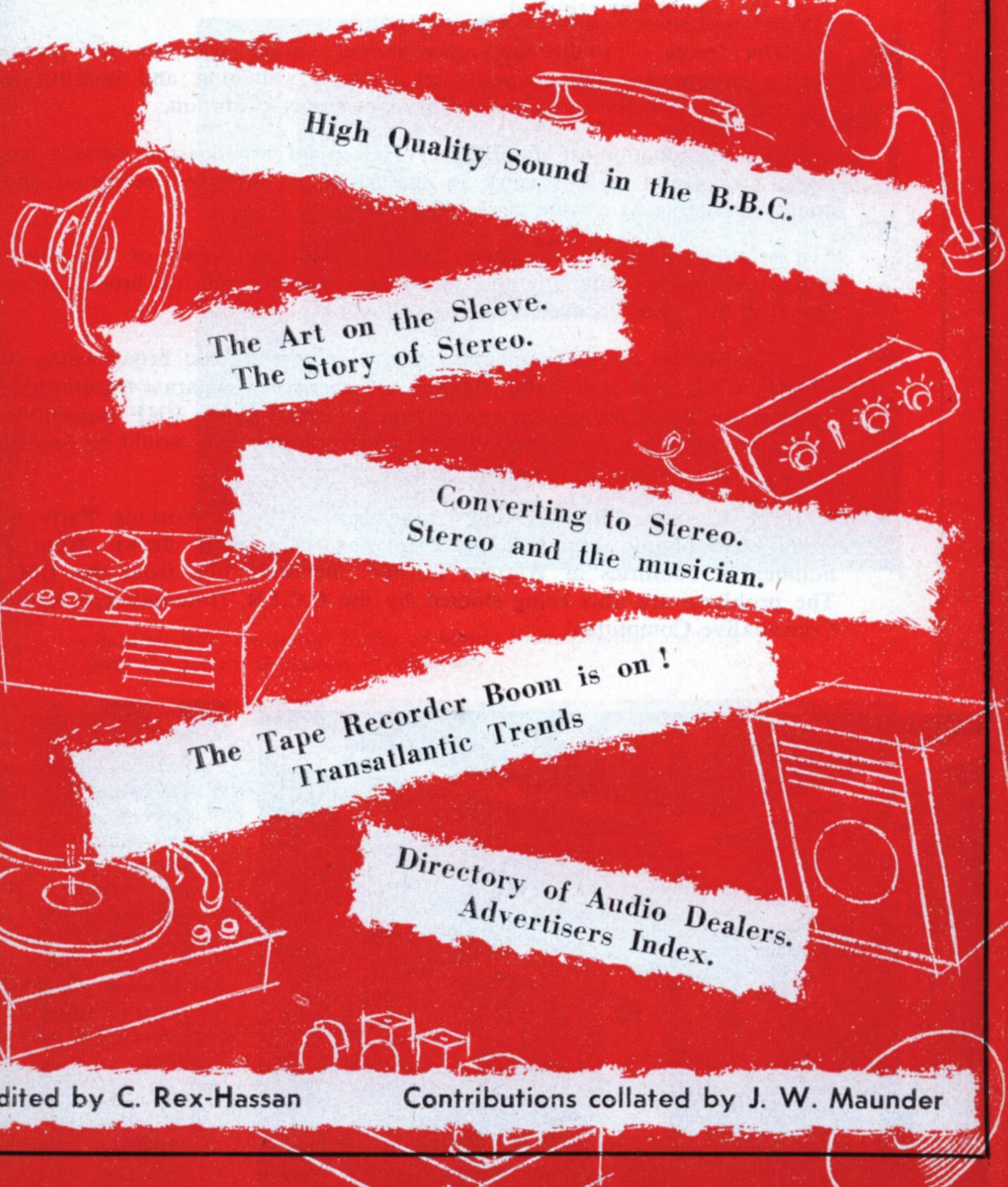
ON SHOW HERE AT THE AUDIO FAIR

PRODUCTS	*TRADE NAME OF MANUFACTURER*
AMPLIFIERS AND PRE-AMPLIFIERS	Acoustical, Ampex (Professional), Armstrong, Audiomaster, Avantic, Brenell, Chapman, Connoisseur, G.E.C., Grampian, H.M.V., Jason, Leak, Lowther, Lustraphone, M.S.S., Pamphonic, Pye, Rogers, STC, Tannoy, Teppaz, Trix, Truvox, Vortexion, W.B. Stentorian.
AUTOMATIC RECORD CHANGERS	Garrard
CABINETS	Audiomaster, Connoisseur, Design Furniture, H.M.V., Pye, Record Housing, Rogers, Tannoy, W.B. Stentorian
CONTINUOUS TAPE PLAYERS	Ferrograph
CUTTING HEADS	Connoisseur, Grampian
DISC RECORDERS	Connoisseur, Grampian, Minivox, M.S.S.
HEAD DEMAGNETISERS	Ferrograph
LOUDSPEAKERS (DYNAMIC)	Celestion, G.E.C., Goodmans, Grampian, H.M.V., Lowther, Pamphonic, Pye, Reslo, Tannoy, Teppaz, TSL, Wharfedale, W.B. Stentorian
LOUDSPEAKERS (ELECTROSTATIC)	Acoustical
LOUDSPEAKER ENCLOSURES	Audiomaster, Connoisseur, Design Furniture, G.E.C., Goodmans, Grampian, H.M.V., Lowther, M.S.S., Pye, Record Housing, STC, Tannoy, Teppaz, TSL, Wharfedale, W.B. Stentorian
LOUDSPEAKER SYSTEMS	Audiomaster, Avantic, Celestion, Dynatron, G.E.C., Goodmans, Grundig, H.M.V., Leak, Lowther, Pamphonic, Rogers, STC, Tannoy, Teppaz, Trix, TSL, Wellington, Wharfedale
MAGNETIC RECORDING TAPE	BASF, E.M.I., Grundig, Irish Brand, M.S.S., Scotch Brand, Telefunken
MICROPHONES AND ACCESSORIES	Acos, AKG, Chitnis, Elizabethan, G.E.C., Grampian, Grundig, Lustraphone, Reslo, Shure, Simon, STC, Stuzzi, Telefunken, Trix, TSL
MIXERS	Ampex (Professional), Audiomaster, Brenell, G.E.C., Grampian, Lustraphone, M.S.S., Pamphonic, STC, Stuzzi, Telefunken, Trix, TSL, Veritone, Vortexion
PICK-UPS	Acos, Connoisseur, Decca, E-R, Garrard, Goldring, Leak, Lowther, Shure, Teppaz
PICK-UP ARMS	Acos, Connoisseur, Decca, E-R, Garrard, Goldring, Shure, Teppaz
PICK-UP CARTRIDGES	Acos, Decca, E-R, Garrard, Goldring, Shure, Tannoy, Teppaz

PRODUCTS	*TRADE NAME OF MANUFACTURER*
PICK-UP STYLI	Acos, Connoisseur, E-R, Garrard, Goldring, Shure, Tannoy, Teppaz
PRE-RECORDED TAPES	Ampex (Domestic), E.M.I. Records, TSL
PUBLICATIONS	Amateur Tape Recording, Decca, E.M.I. Records, The Gramophone, Grundig, Hi-Fi News, Mullard, Wharfedale, Wireless Trader, Wireless World
PUBLIC ADDRESS EQUIPMENT	Celestion, Grampian, Lustraphone, Pamphonic, Reslo, STC, Teppaz, Trix, Vortexion, Wharfedale, W.B. Stentorian
RADIO CHASSIS	Armstrong, Chapman, Grundig, Lowther
RECORD CLEANERS	Acos, Goldring
RECORDING HEADS	Grundig, M.S.S., Truvox
RECORDS	Audio Fidelity, Decca, E.M.I. Records, Pye Records, Teppaz
RECORD REPRODUCERS	Decca, Dynatron, Ekco, E.M.I., G.E.C., Grampian, Grundig, H.M.V., Pamphonic, Steelman, Teppaz, Trix
STYLUS BALANCES	Garrard, Goldring
TAPE-DECKS	Brenell, Ferrograph, Garrard, Grundig, Reflectograph, Truvox
TAPE ERASERS	Wellington
TAPE RECORDERS —DOMESTIC	Ampex (Domestic), Audiomaster, Brenell, Butoba, Chitnis, Elizabethan, Ferrograph, Fi-Cord, Grundig, H.M.V., Minivox, M.S.S., Reflectograph, Simon, Spectone, Steelman, Stuzzi, Telefunken, Trix, Truvox, TSL, Veritone, Vortexion, Walter
TAPE RECORDERS —PROFESSIONAL	Ampex (Professional), Audiomaster, E.M.I., Ferrograph, M.S.S., Reflectograph, Simon, Telefunken, Vortexion
TRANSCRIPTION TURNTABLES	Connoisseur, Garrard, Goldring, Lowther, M.S.S.
TRANSFORMERS	Celestion, G.E.C., Lustraphone, Reslo, Vortexion, Wharfedale, W.B. Stentorian
TRANSISTORS	Mullard
TRANSISTOR AMPLIFIERS	Ampex (Professional), Grampian, Lowther, Lustraphone, Minivox, Reslo, Teppaz, Trix, Wellington
TUNERS (A.M.)	Acoustical, Armstrong, Audiomaster, Avantic, Chapman, Elizabethan, Jason, Pamphonic, Pye, Veritone
TUNERS (F.M.)	Acoustical, Armstrong, Audiomaster, Avantic, Chapman, Elizabethan, G.E.C., Jason, Leak, Lowther, Pamphonic, Pye, Rogers, Trix, TSL, W.B. Stentorian
VALVES	G.E.C., Mullard, STC

AUDIO *Fare*

A MAGAZINE CATALOGUE FOR AUDIOPHILES



High Quality Sound in the B.B.C.

The Art on the Sleeve.
The Story of Stereo.

Converting to Stereo.
Stereo and the musician.

The Tape Recorder Boom is on!
Transatlantic Trends

Directory of Audio Dealers.
Advertisers Index.

Edited by C. Rex-Hassan Contributions collated by J. W. Maunder

HIGH QUALITY SOUND

by Hugh Greatorex

THE BBC has always been in the forefront of world broadcasting organisations in regard to the technical quality of its transmissions. The maintenance of this position entails a continuous programme of research and development work to evolve new techniques, and in many cases the equipment required.

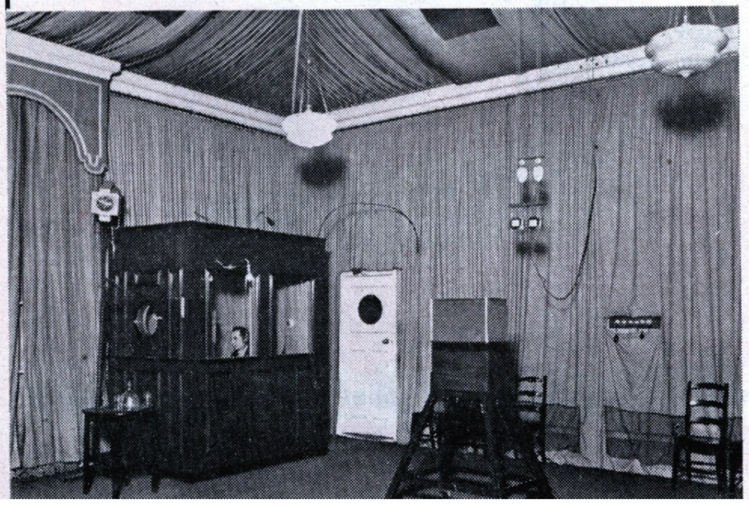
The design of studios and microphones, sound recording and reproducing equipment and a variety of control, switching and monitoring equipment is subject to a process of continuous evolution.

The introduction of the BBC's VHF sound broadcasting service has made the results of this work in the form of improved reception and quality available to a wide circle of listeners.

At this Audio Fair of 1960, examples will be shown of equipment developed by the BBC for the specialised requirements of broadcasting. Some of these are illustrated on the following pages.

The BBC is carrying out experiments in stereophonic broadcasting in which the left- and right-hand channels are carried by separate transmitters. Systems for broadcasting the two channels from a single VHF transmitter are being actively investigated, since a system of this type would be needed for a public service of stereophonic transmissions.

The European Broadcasting Union has set up a Working Party to study stereophonic broadcasting, consisting of experts drawn from a number of countries in Western Europe, including one from the BBC. The problems are also being studied by the C.C.I.R. (International Radio Consultative Committee).

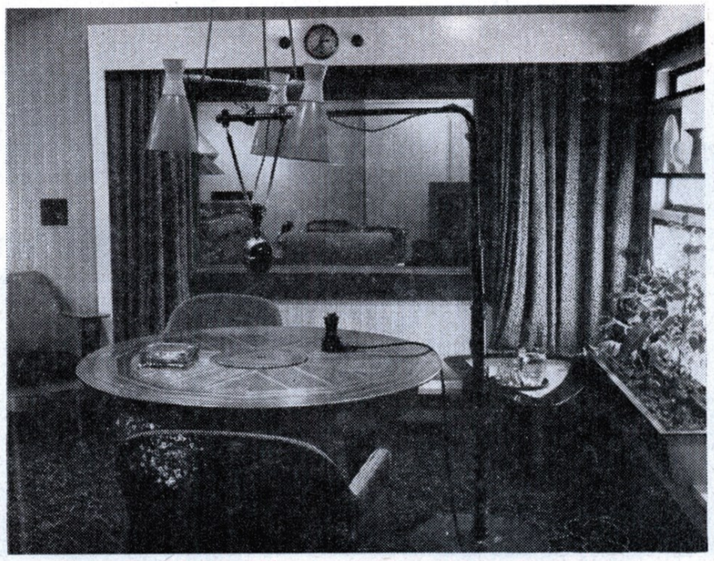


STUDIO DESIGN

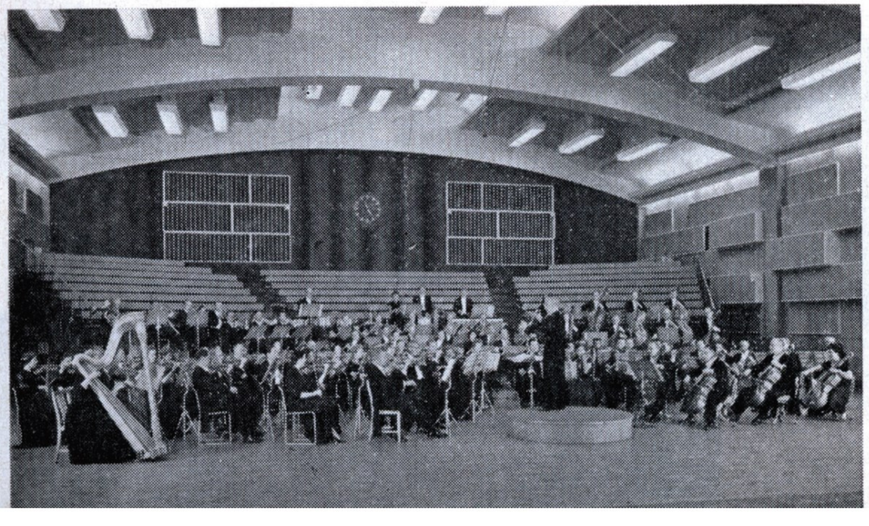
In Studio 1 at Savoy Hill in 1928 the "balancer" sat in his silence cabinet and monitored the programme on headphones. The heavy drapes resulted in very dead studio acoustics, which were modified for transmission by the use of artificial reverberation.

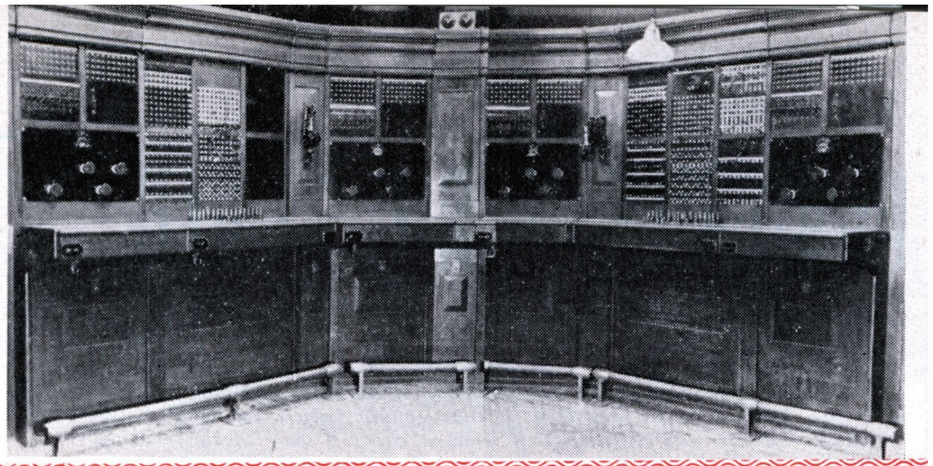
IN THE B.B.C.

Present-day practice as shown by this Talks Studio in Broadcasting House, London, is to provide a separate control cubicle for the studio manager with a soundproof window giving a view of the studio. Here the programme is monitored on a high-quality loudspeaker. The present-day BBC ribbon microphone can be compared with the monster "meat-safe" microphone used at Savoy Hill.



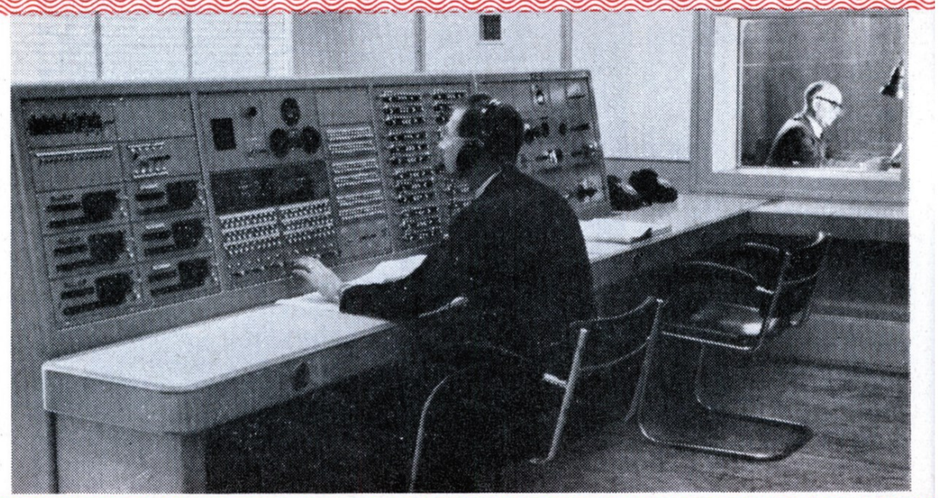
A modern BBC orchestral studio at Maida Vale, London, showing the BBC Symphony Orchestra at rehearsal.



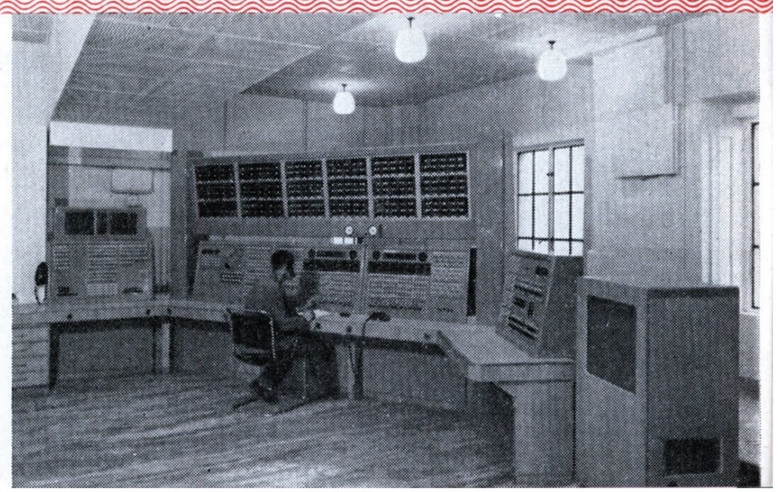


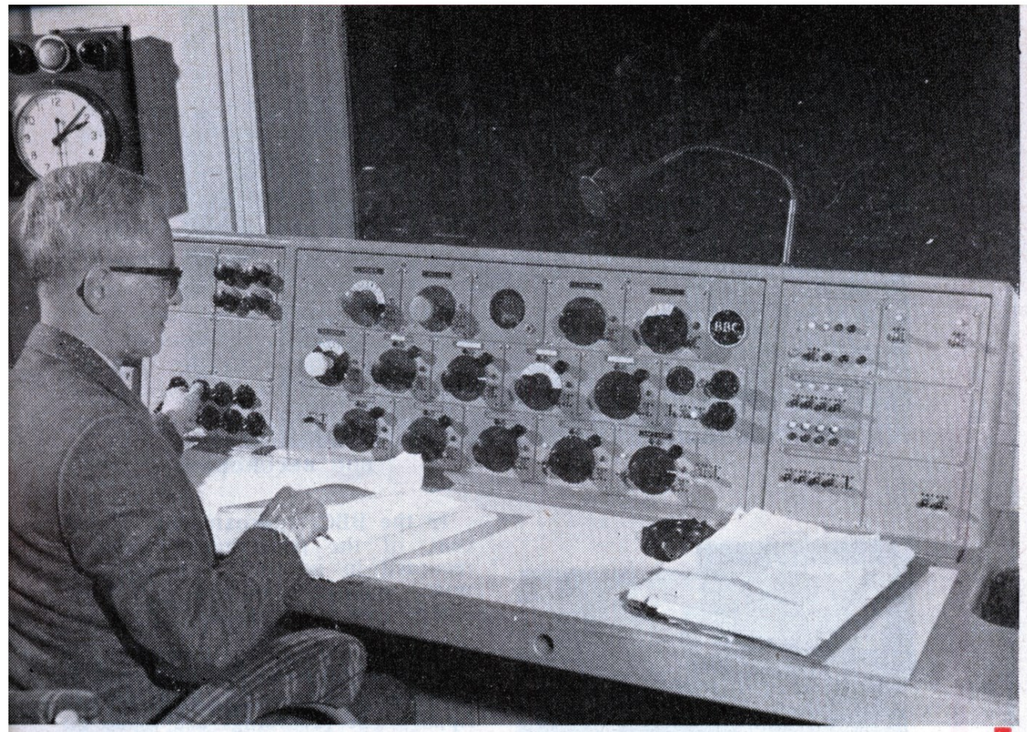
CONTROL ROOM DEVELOPMENT

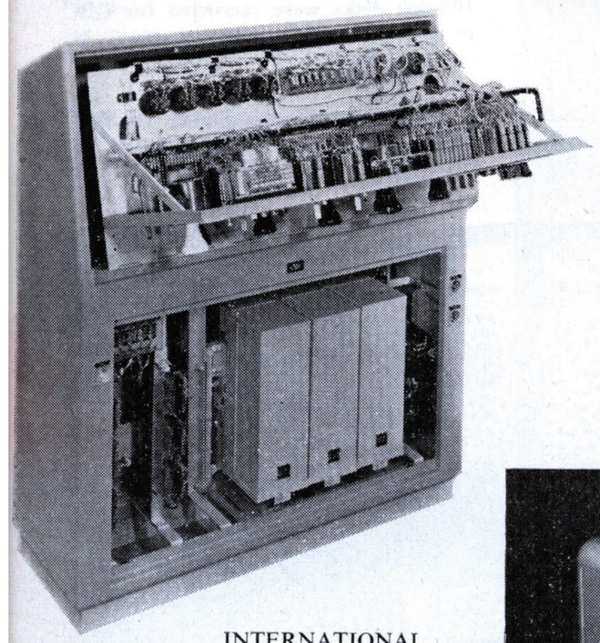
An example of a Regional Control Room of thirty years ago at Broadcasting House, Manchester, and the modern control room that has replaced it.



More ambitious is the new Control Room at Bush House, London, which handles programmes for BBC's Overseas and European Services. The equipment designed by BBC engineers, provides remotely controlled switching for the connection of 150 sources to 132 outgoing routes. Programmes in the Overseas and European Services total more than 82 hours a day.





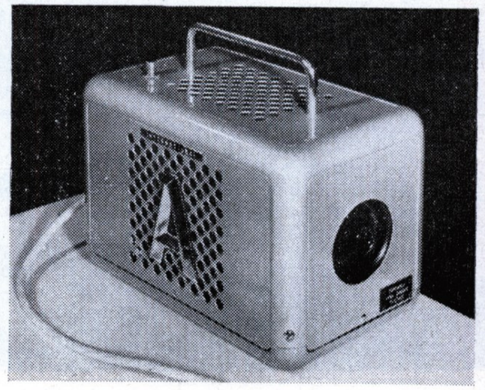


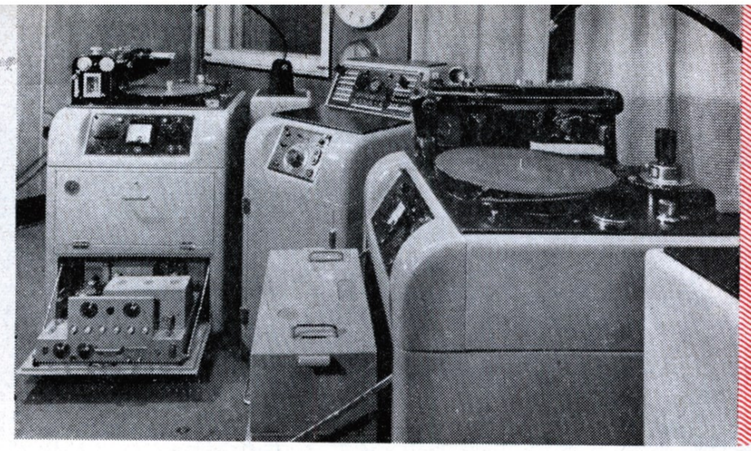
STUDIO CONTROL EQUIPMENT

A Studio Manager at the control panel adjusts the volume of the outgoing programme and the output of the various microphones in the studio. The equipment shown is of BBC design, and is constructed on the unit principle to suit the size of studio and the facilities required. A separate rack houses the associated amplifiers, which have been reduced to three standard types.

INTERNATIONAL STANDARD A-TONE GENERATOR

This equipment has been designed by the BBC for use in studios. It produces a note of 440 c/s (the international standard of musical pitch) with a suitable amount of harmonics to facilitate orchestral tuning.





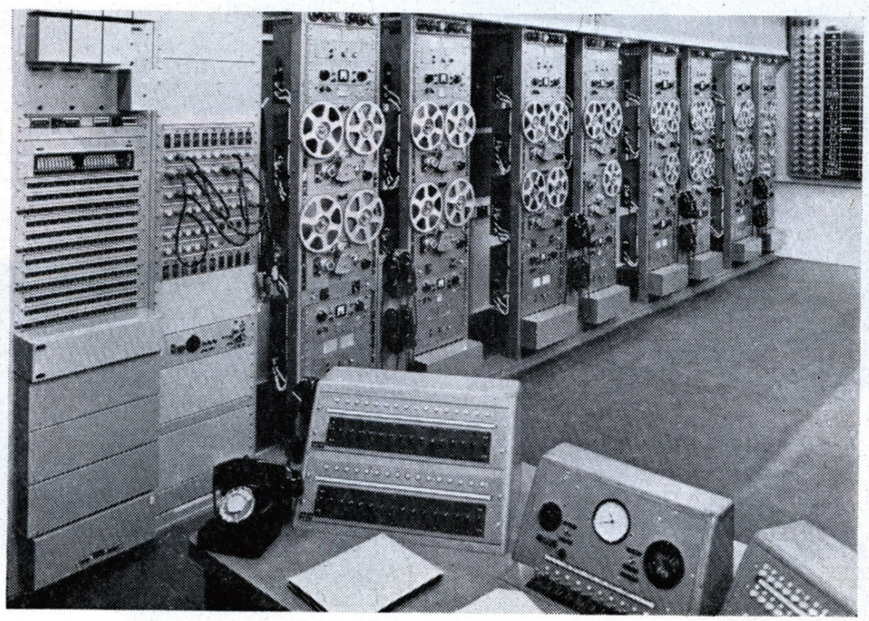
BBC RECORDINGS



In the BBC, approximately 50 per cent. of the programme output is recorded in advance; this figure is much smaller than that for most comparable organisations.

Disk recordings are made on this BBC designed equipment, which operates either at 78 r.p.m. or 33⅓ r.p.m. The recordings are made on cellulose-coated disks which can be replayed immediately. In 1959, 108,000 disks were recorded for BBC programmes, although the main recording load is now carried by the magnetic tape system.

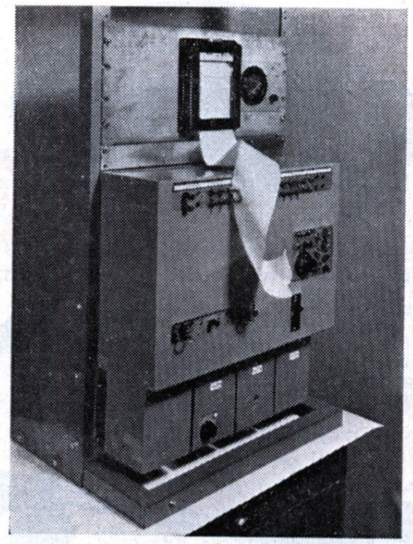
The Reproducing Desk of BBC design will play BBC recordings and commercial gramophone records at 78, 45 or 33⅓ r.p.m. It has an optical groove-locating device and embodies a number of special features which are the subjects of BBC patent applications.

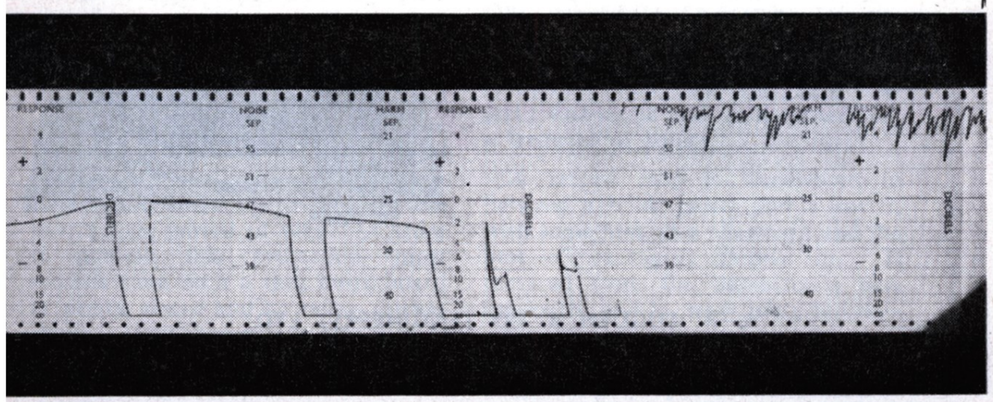


The Central Tape Recording Room is in Broadcasting House, London. The recording machines can be started and stopped by remote control from certain studios to which they are connected as required. Standard 2,400 ft. spools of ¼ in. plastic tape are used. BBC standard tape speed is 15 inches per second. During 1959, recordings were made on 24,000 miles of magnetic tape. Most of these tapes can be used again once the material recorded is no longer required. A BBC tape reclamation unit has, therefore, been established for testing and repairing tapes; it reconditions and returns to service for future use some 450 miles of tape each week.

AUTOMATIC LINE TESTING EQUIPMENT

A continual check must be kept on the performance of the 25,000 *miles of music lines rented by the BBC from the Post Office and the problem becomes more acute as the number of unattended transmitters increases. The automatic line tester shown here can be set to make a complete frequency run on a circuit, test it for noise level and distortion and make a record of the results. Charts are collected from unattended stations at suitable intervals.*

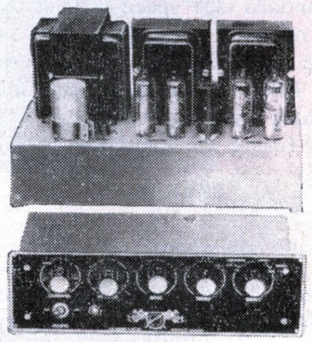




Superb equipment by

Connoisseur

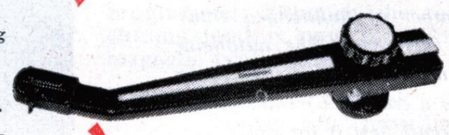
for stereo or monaural



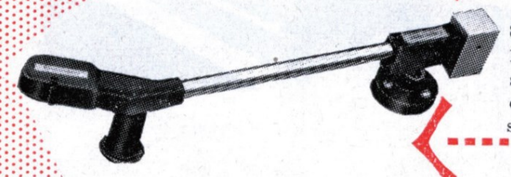
Stereo Amplifier and Control Unit Type S66.
Twin channel, delivering 7.5 watts per channel with ultra linear output stage. Inputs for P.U., Tape and Radio, sensitivity being 6m.V. Separate treble and bass controls.



2-speed Transcription Motor.
33⅓ rpm and 45 rpm. Full 12in. turntable is lathe turned. New nylon graphite bearings. Synchronous motor dynamically balanced. Neon indicator on/off warning light.

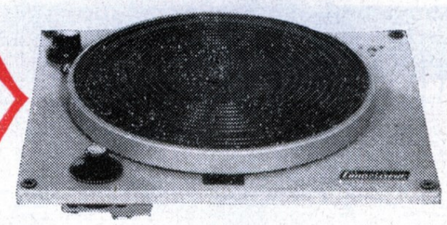


Stereo Pickup Type CS1.
Pickup arm fitted with integral lifting device. The pickup head employs miniature ceramic units, frequency range 20-16,000 c.p.s. output 20m.V with channel separation of 20-25 dbs. Downward pressure 3½-4 grams. Diamond stylus. Will accept Mark II monaural heads.

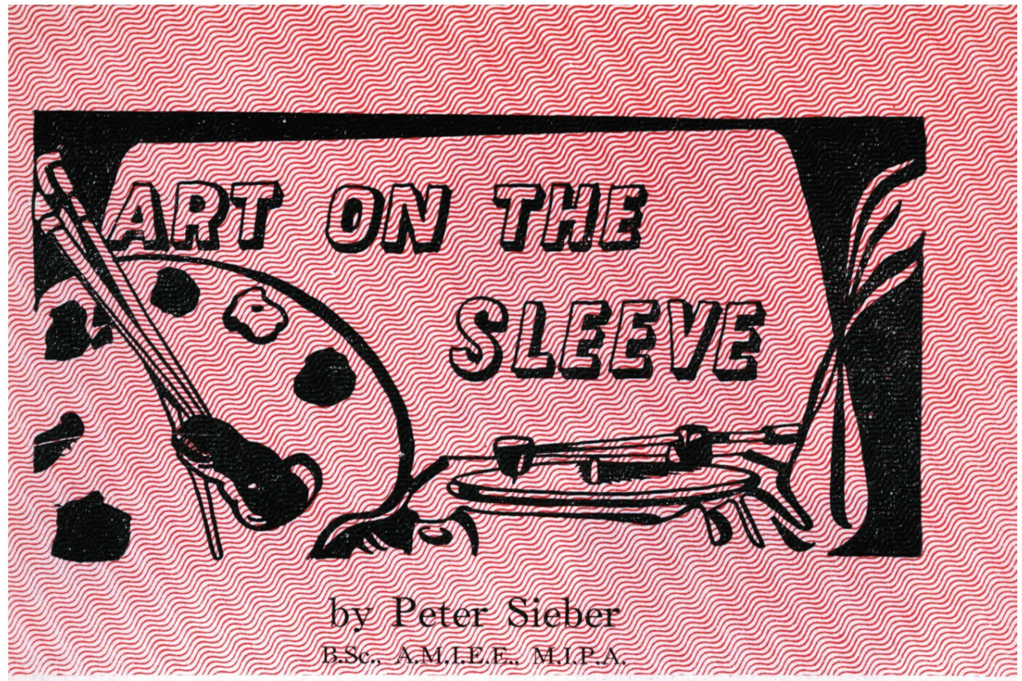


Stereo Pickup Mark III.
Designed to accept both monaural and stereo heads. Adjustable for heights of various turntables. Pickup head specification identical with the Type CS1.

Variable 3-speed Motor.
For 33⅓, 45 and 78 rpm. Stroboscope fitted with internal light source. Synchronous motor dynamically balanced resiliently mounted. Mechanical speed change giving 4% variation on all speeds.



A. R. SUGDEN & CO (ENGINEERS) LTD.
MARKET STREET BRIGHOUSE YORKSHIRE



by Peter Sieber
B.Sc., A.M.I.E.E., M.I.P.A.

IT comes almost as a shock when one recalls that it is not so many years since the traditional wrapper for a gramophone record was a manilla envelope, with hole in middle, and—all too soon—tattered edges at corners. Right from the first, however, LP records have been clothed with a dignity that becomes their greater value, and the splendidly colourful sleeves of LP records quickly became an established and welcome feature of the record collector's library.

There have been criticisms that these sleeves are simply a sales gimmick, made unnecessarily elaborate to catch the eye in the shop, with the buyer of the record ultimately footing the bill for this costly packaging. This kind of argument is less than fair to the record manufacturer. Of course the recording firms package their products in a pleasant form to increase sales ; in this respect they do not differ from all other enlightened manufacturers. The first function of the sleeve, however, is to protect the record. LPs are not breakable, but they are sensitive to scratching and must be guarded against dust. The LP disc is valuable, and has a useful life of many years, so that the container must stand up to frequent use over a long period of time. In order to achieve this protection, most records have both a thin inner board or plastic sleeve and an outer, thicker sleeve. Most sleeves are coated with plastic on the outside for extra wear. The notes printed on the backs of these sleeves are a useful addition ; they are compiled by experts, and the result of detailed study. A great part of the total cost of sleeves thus lies in essential protection, and functional printing of notes and titles—however plain. Very few record buyers would blame the makers for spending comparatively little more to make their sleeves coloured.

The LP sleeve presented an interesting challenge to the graphic designer. Here was a brand new medium for his art : square and therefore unusual format ; a new and intriguing subject ; vast scope and, as it turned out, a tremendous future.

A record case is somewhere in between a book jacket and a poster, with something of a showcard and the best of packaging thrown in. It required from the designers a new approach and a new imagination—especially with the earlier LPs when no pattern had been established. At first, a large proportion of all sleeves

THE ART

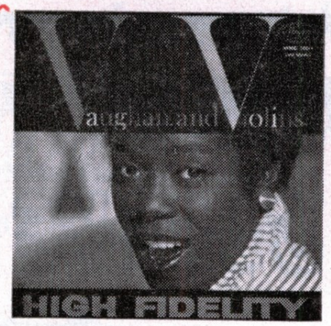


Fig. 1

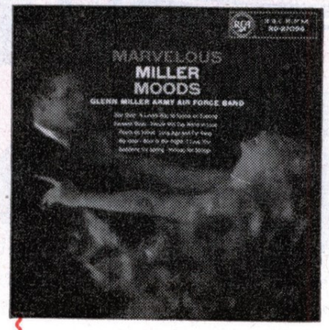


Fig. 2



Fig. 3

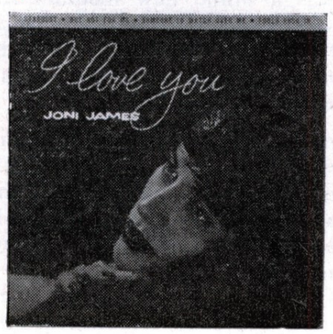


Fig. 4

relied on design and finished artwork created by the designer or according to his " visual." In more recent years there has been increasing use of designs employing photography. Many different designers have used many different methods, but there are two basic groups of approach : First, the sleeve can illustrate the artists, performers or, more rarely, the composer of the work. Secondly, the sleeve can in some way convey the mood, the feeling, the period or the setting of the recorded work, or symbolise it by some visual element that evokes the atmosphere of the music.

Sleeves in the first group, those featuring the performers, naturally tend to rely most on photography, and this has resulted in a great number of pleasing covers, for example, *Vaughan and Violins* (Fig. 1), *Marvellous Miller Moods* (Fig. 2), *Sammy Swings* (Fig. 3), *Joni James* (Fig. 4), and *Tops With Lonnie* (Fig. 5), illustrate the results when first-rate designers use first-rate photographs.

Humour can play a merry part in portraying the artists, as shown in *Olde Englyshe* (Fig. 6), a recent " period " piece showing Master Ted Heath in Elizabethan costume (Master

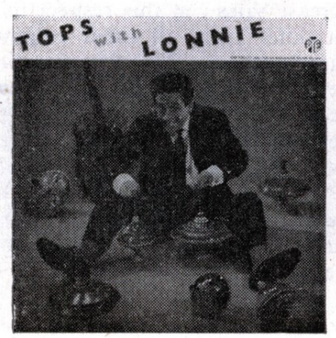


Fig. 5

ON THE SLEEVE

Heath himself is reported to have been delighted with this sleeve).

The second approach—that featuring the musical work—offers even greater scope for creative design, and has led to some outstandingly good sleeves. *Italian Panorama* (Fig. 7), for instance, shows the setting of the music in a most inviting shot; *Schubert's Symphony* (Fig. 8) evokes the period of the work. *Mexican Magic* (Fig. 9) and *The Rite of Spring* (Fig. 10) both use striking photographs in quite unorthodox ways to arrive at particularly pleasing covers. *The Mikado* (Fig. 11) and *Pulcinella Suite* (Fig. 12) rely on exquisite design and artwork, while *Le Coq d'Or* (Fig. 13) uses a strident coq d'or in a superlatively successful sleeve.

One major recording firm has recently started to issue some of its covers with outstanding paintings by some of the world's greatest painters, for example, a fine Van Gogh for *Schubert's "Unfinished" Symphony* (Fig. 14). These do not contain any new design merit, but the meeting of visual and musical masterpieces is a happy one.

Two records of *My Fair Lady* (Figs. 15 and 16) show that both ways —illustrating the performers or sym-

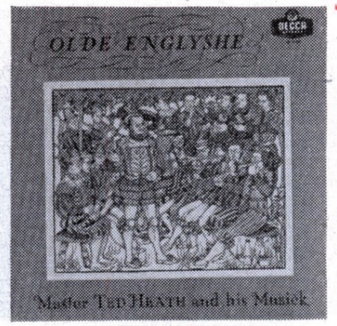


Fig. 6

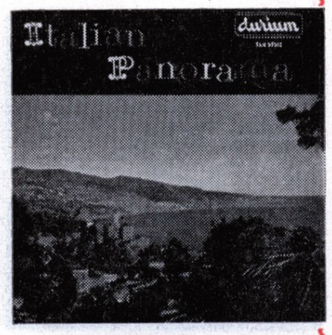


Fig. 7



Fig. 8

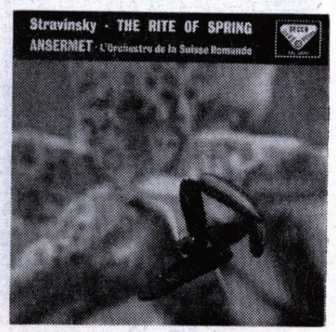


Fig. 10



Fig. 9

THE ART ON THE SLEEVE



Fig. 11

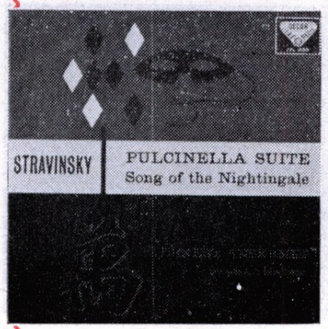


Fig. 12



Fig. 13

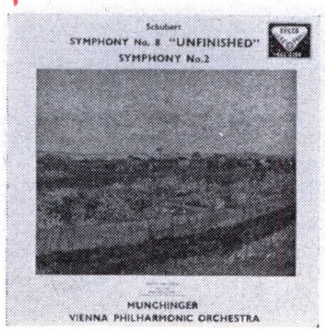


Fig. 14

bolising the work—can lead to the Rome of a pleasant sleeve.

Spoken word records, though numerically amounting to only a small proportion of the total record production, have led to some of the most successful sleeves, perhaps because the spoken word makes a more direct appeal to the designer and artist. A straightforward approach leads to successful sleeves from *Shelley Berman* (Fig. 17), suitably perched on his bar stool, to Cecil Beaton's superb photograph of *John Betjeman* (Fig. 18). The sleeves for a series of nursery rhymes, *Mother Goose*, for example (Fig. 19), have a charm that is bound to please children and adults alike. Arthur Wragg's box designs for The Works of Shakespeare (for instance, *Othello*, Fig. 20), are far more than merely interpretive illustrations. Given what, one suspects, was both a most exhilarating and a frightening task, Mr. Wragg has produced works of sensitivity and strength that will have lasting artistic value in their own right.

In a major commercial operation like this, inevitably not every single sleeve comes up to the highest



Fig. 15

standards. With several years' issues on the market, it is bound to become ever more difficult to find original solutions, and the constant, competitive urge for novelty has occasionally driven a designer beyond good taste, while many sleeves are without a doubt repetitive run-of-the-mill. Nevertheless, the average level is good, and the top is very high indeed. Above all, in a field where the glamour of the performers might make doubtful treatments very plausible, there is on the whole a refreshing absence of vulgarity. To appreciate how true this is, just look at a collection of dust-jackets on cheap books.

The LP sleeve presented a great visual opportunity. When you consider what a vivid and interesting panorama these sleeves have brought to the record shop and to practically every home you visit, you must agree that the record makers who are responsible for the sleeves, and the designers and artists who create them, rose to the occasion. When you reflect that about *two thousand different sleeves are issued every year*, you must marvel at this reservoir of imagination.

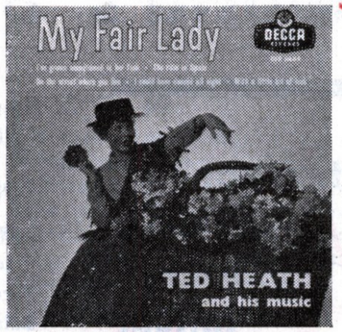


Fig. 16



Fig. 17

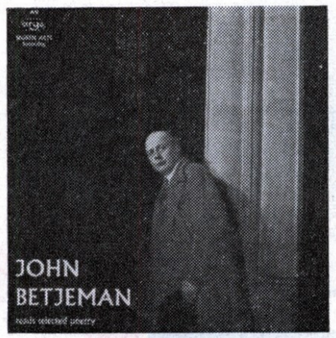


Fig. 18



Fig. 20

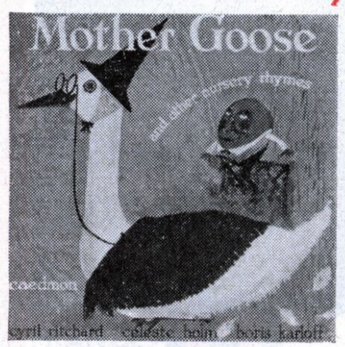


Fig. 19

The World's Best Portable

stereophonic portable record player

448

Stereo tone arm. 4 speed turntable. Automatic stop system. Adaptor Eco 60 for LPs and 78 listening.

3 speakers including 1 tweeter on each one of the 100% revolutive Spatio Dynamic baffles.

2 independent controls for treble and bass.

2 contour slide switches.

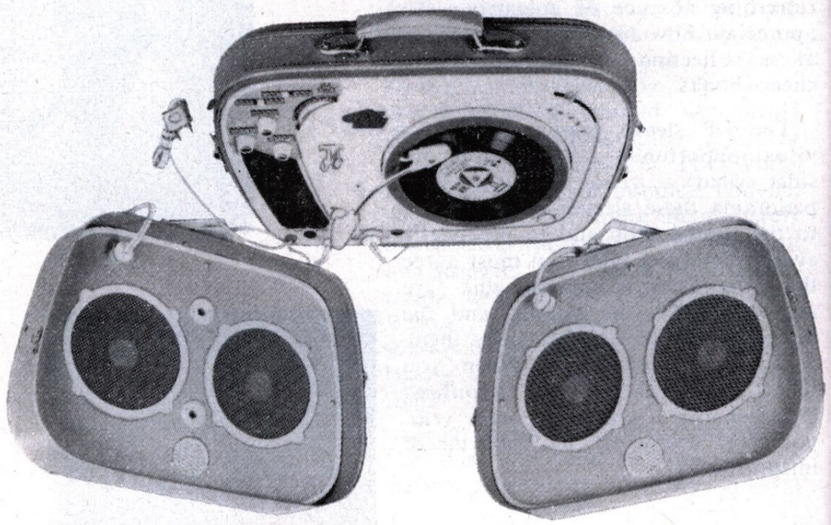
Balance control.

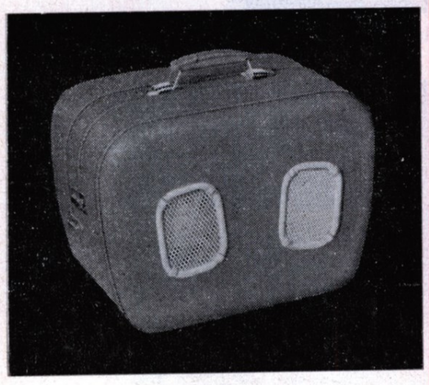
Power: 2 x 6 watts.

Double push-pull amplifier.

6 Tubes (2 EF 86 4 ECL 82).

2 silicium cells eliminating over-heating.





2 supplemental sockets for extra speakers on right and left.

Compact unit in a single case; the two baffles being top and bottom covers. Strongly designed.

High class finish—leather or blue parm.

Record Players





ECO 60

4 speed turntable.
For good console units; hysteresis synchronous motor, 110/220 Volts.
50 c/s (60 c/s under request). Absolutely constant speed. ECO standard tone arm for 33/45 rpm and 78s. Differential automatic stop system.

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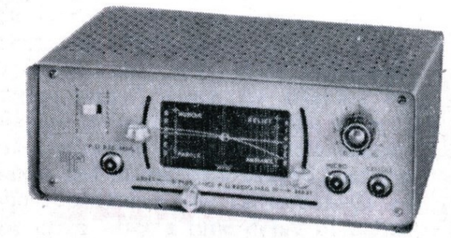
4 speed turntable. Automatic stop system. With HI-FI ECO STEREO tone-arm for high class amplifiers and consoles. Co-axial outlet for right channel.

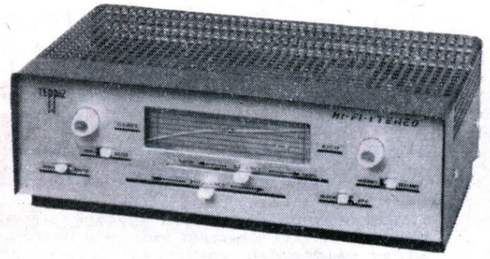
ampli c336

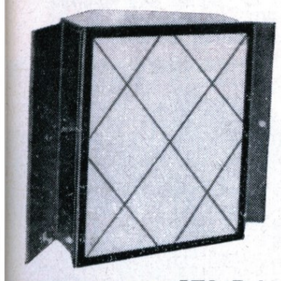
Lineal controls.
Bass and treble controls with graphic lecture. 8 watts. 5 Tubes (2 EF 86 - 2 EL 84 - 1 EZ 80).
Input impedance. 5,000 K/ohms.
Output impedance: selector for 2-4-8-15 ohms.
Outlet for tweeter.
Conditioned chassis.
Golden panel.



ampli 45o

Lineal controls.
Bass and treble controls with graphic lecture.
Balance control of Stereo speakers.
2 x 6 watts. 6 Tubes.
2 Silicium cells eliminating over-heating.
Input impedance: selector for 2-4 8-15 ohms on each channel.
2 separate contour switches.
Elegant chassis, golden and black.
"Chic" and functional panel.





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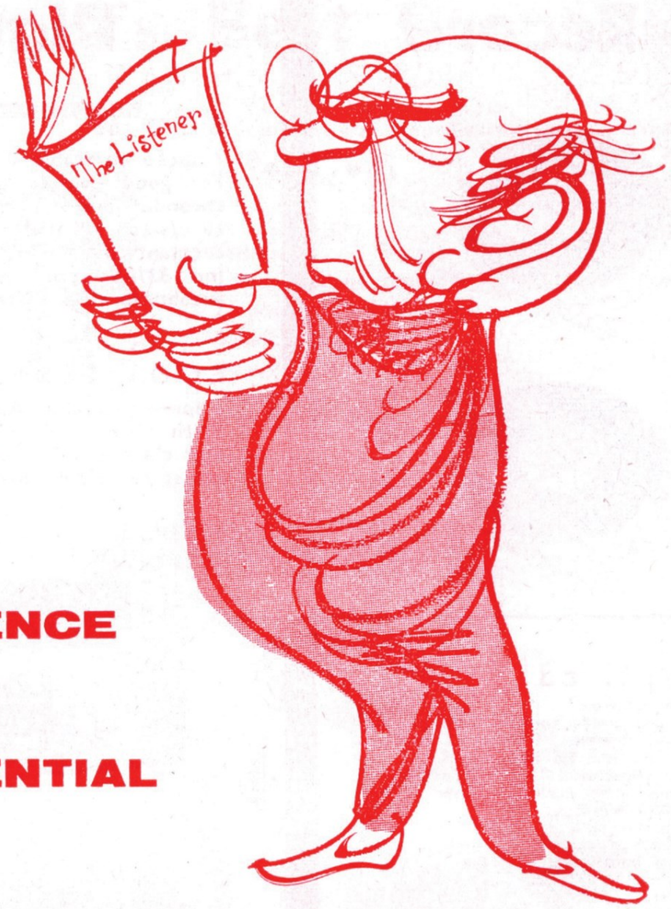

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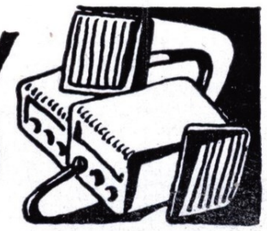
The Story of Stereo



by PETER FORD, LL.B., F.R.S.A., M.R.I. Hon. Historian, B.S.R.A.

OUR ability to localise sounds by mental comparison of the sensations at each ear was investigated as long ago as 1876 by Lord Rayleigh, with some simple experiments on the lawns of his home at Terling Place, Witham. In the following year, Silvanus P. Thompson, of Bristol University, read a paper "on binaural audition" to the British Association at its Plymouth meeting. Both men returned to the subject again—Rayleigh three times—and paved the way for our modern studies of a highly complex matter.

A French telephone engineer, Clément Ader, was the pioneer of stereo sound transmission. In 1881 he arranged two-channel telephone links between the Paris Opéra and the Electrical Exhibition at the Palais de l'Industrie. Forty people could listen at once over earphones and his *téléphones théatricales* were a wonder of the age, though soon forgotten.

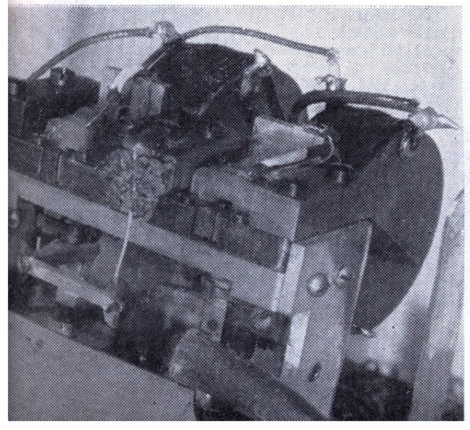
In 1911, Augustus Rosenberg, a German, proposed to make motion pictures with separate synchronised left and right sound records to give auditory perspective corresponding to movement on the screen, but, like Ader, he was before his time.

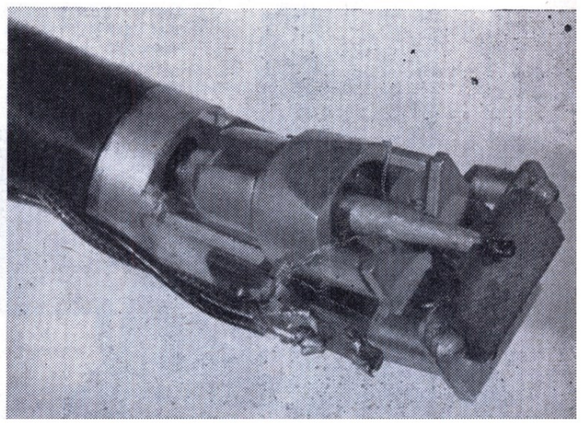
Ten years later, Professor Doolittle experimented with two-channel radio broadcasting at Yale University. His system was actually employed commercially for a short period in 1925 by the New Haven (Connecticut) radio station WPAJ. H. J. Küchenmeister carried out similar experiments in Germany, besides being early in the field with "pseudo-stereophony," which he effected by playing ordinary gramophone records on a machine fitted with two sound-boxes and horns, so arranged that the one reproduced the same sounds as the other after a time delay of about 0.05 to 0.1 second. By this means he purported to obtain a "spread" sound image.

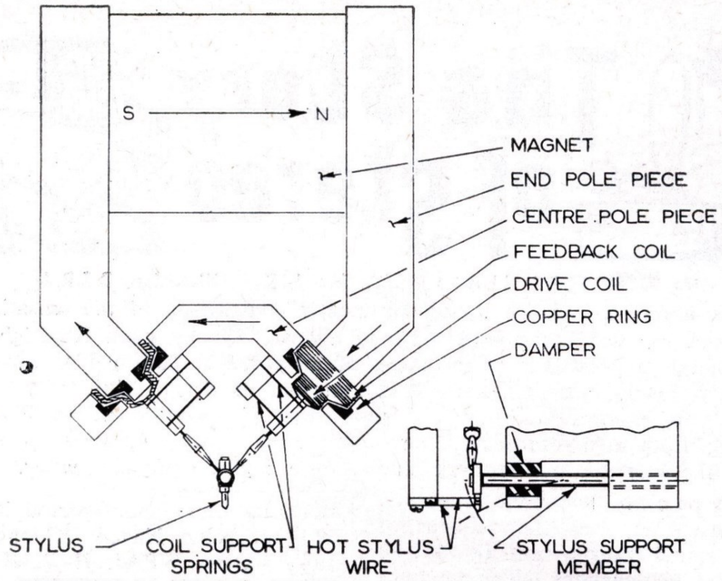
In 1931, A. D. Blumlein of E.M.I., Ltd., laid the foundations of our modern domestic stereo listening with two spaced loudspeakers and contributed the idea of two sound tracks cut in a complex manner in a single

Left: **BLUMLEIN MAGNETIC RECORDER for stereophonic complex cut vertical lateral gramophone records (c. 1932). Two identical balanced armature magnetic cutters mounted side by side, were connected by mechanical linkages to the cutting stylus (seen in the centre).** (Photo: E.M.I.)

Right: **BLUMLEIN MAGNETIC PICKUP for stereophonic gramophone records (c. 1932). Two magnetic systems were disposed with their principal axes of response at 45° to the vertical and at 90° to one another and were driven by a common armature free to move in all directions in the plane of vibration. The outputs were electrically summed and differenced to produce the required left and right channel signals.** (Photo: E.M.I.)





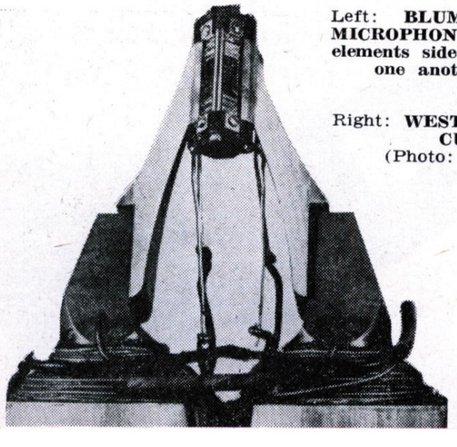


WESTREX 3A STEREO CUTTER (c. 1957) Schematic showing construction and driving systems. (Drawing: Westrex Co. Ltd.).

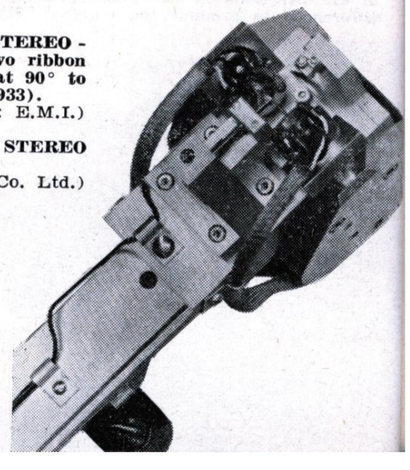
groove on a gramophone record. His work also extended to the cinema, and a wide-screen demonstration film with stereophonic sound was shown to the trade in 1935.

Blumlein believed in using two closely spaced or co-incident microphones to produce his left and right-hand sound signals, but another idea, satisfactory in large auditoria, was pioneered in the U.S.A. in 1933. Three microphones in line, with the two outer ones 28 ft. apart, were used to pick up the sound of the Philadelphia Orchestra playing in its home city, and their signals were transmitted over separate 150-mile land lines to Constitution Hall, Washington, where they were reproduced on three spaced loudspeakers. The system had an astonishing performance for its date: frequency range 40-15,000 c/s ± 1 dB: dynamic range 65 dB. The Bell Telephone Laboratories, which were responsible for this system, recorded two-channel stereo on disc in 1936, and on two steel tapes wound together on the same supply and take-up reels for demonstration at the New York World's Fair. In 1941 they also produced the "compandor" three-channel sound film system. In 1940, Walt Disney produced his "Fantasia", with a multi-channel, but not strictly stereophonic, sound track (never heard in Europe at the time).

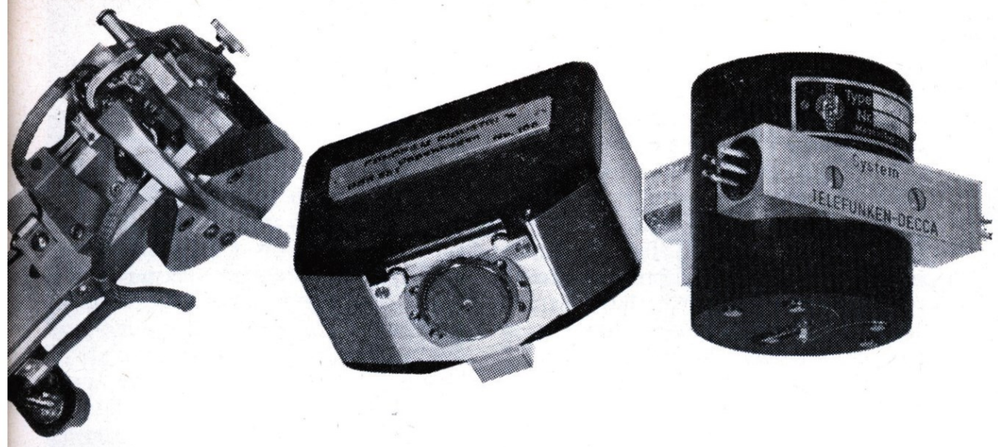
In 1939 de Boer experimented with two-channel stereo in Holland and in about 1944 the Nazi German radio RRG began making a library of two-channel stereophonic recordings of orchestral music on magnetic tape—using spaced half-track heads.



Left: **BLUMLEIN STEREO-MICROPHONE with two ribbon elements side by side at 90° to one another (c. 1933).**
(Photo: E.M.I.)



Right: **WESTREX 3A STEREO CUTTER.**
(Photo: Westrex Co. Ltd.)

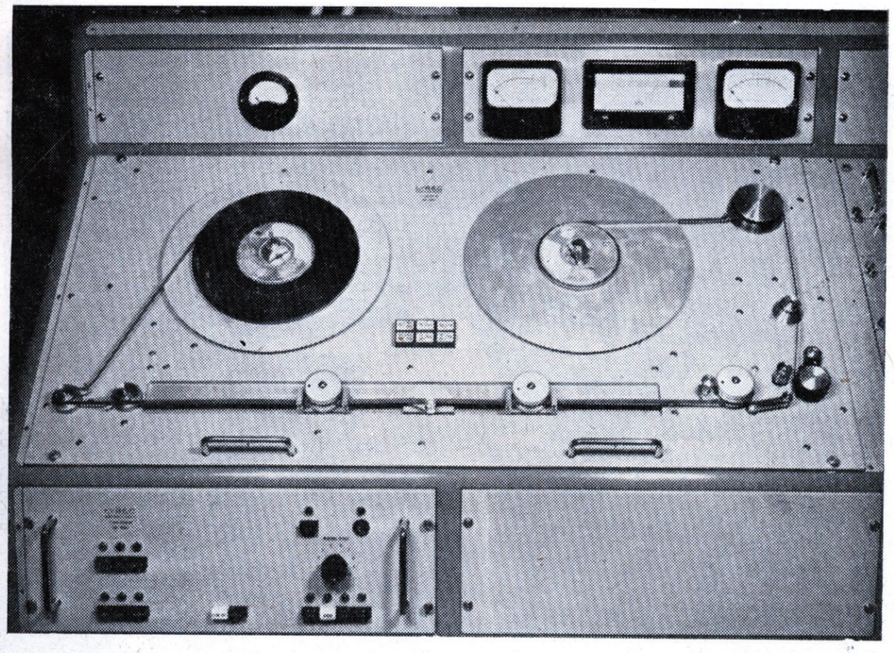


THREE MODERN FEEDBACK MOVING COIL STEREO DISC CUTTING HEADS. Left: **Westrex 3C.** Centre: **Ortofon.** Right: **Telefunken-Decca ZS 90/45. The Westrex model has an advance ball mechanism to control depth of cut automatically.**
(Photos: Westrex, Fonofilm and Neumann)



MODERN ELECTROSTATIC STEREO MICROPHONE for professional use, with two microphone capsules on a common axis. The upper capsule may be rotated through an arc of 270° by inserting a coin in the slit on the top of the microphone. The directional characteristics of the two capsules are remotely controlled electronically.
(Photo: Neumann, Berlin)

TWO-CHANNEL TAPE REPRODUCER used in transferring tape recordings to disc. Three replay heads can be seen. That at the right takes the programme signals to the disc recorder. The other two provide signals controlling respectively the number of grooves per radial inch on the disc and the mean groove depth.
(Photo: Fonofilm, Copenhagen)



After the war, W. H. Livy (1946) and A. C. Haddy (1954) experimented with stereophonic gramophone records using carrier modulation systems for the second channel and A. R. Sugden (1951) and J. T. Mullin (1952) returned to the ideas of Blumlein, which bore fruit in international agreements amongst record manufacturers in 1957. Two-channel stereo tape records—at first using staggered heads—were introduced to the American domestic market in 1951 and (using stacked heads) to that in Britain in 1955.

Sugden's stereo disc demonstrations at the May, 1956, B.S.R.A. Exhibition attracted wide attention on both sides of the Atlantic and were an undoubted stimulus to the record industry. Previous small-scale production of stereo records by E. Cook (U.S.A., 1952) suffered from the disadvantage of separate recordings of each channel on different bands on the disc, which halved the playing time and made accurate phasing of the signals from two pickups difficult. "Compatible" stereo records have also been proposed (P. Goldmark, U.S.A., 1957) and produced on a small scale.

Experimental "pseudo - stereo" radio transmissions were made in France in 1950, and followed by two-channel transmissions in the U.S.A. from 1952, in France in 1955 and in Britain from 1958. Much effort is being directed to the development of radio transmission techniques, which will give the ordinary listener with a single channel receiver a satisfactory programme and thus be economical and "compatible." "Compatibility" is not as easy as it sounds as, apart from the complexities of transmission techniques, it is not always possible to produce a satisfactory single-channel sound by blending the outputs of two or more stereo microphones.

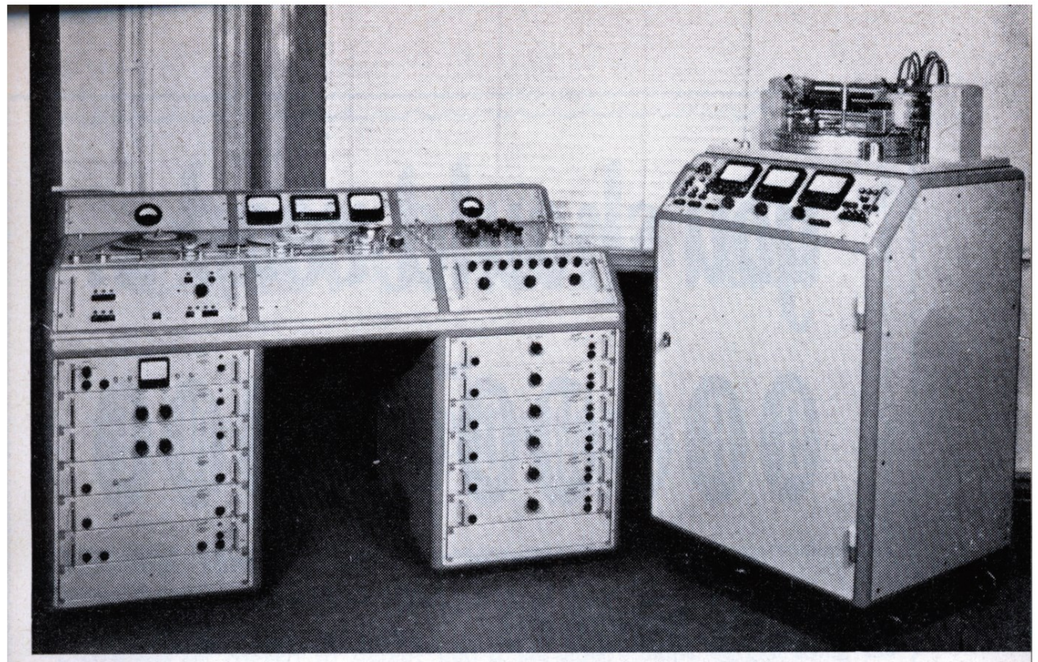
Motion picture engineers have generally followed the spaced microphone techniques devised by the Bell Telephone Laboratories, though much "faking" is resorted to. Seven-track (Cinerama), six - track (Todd-AO), four-track (CinemaScope) and three-track (3D) sound systems have been used since stereo invaded the cinema in and after 1952.

Some idea of the equipment currently used in the production of stereo records for the home can be obtained from the accompanying photographs.

© Peter Ford, 1960

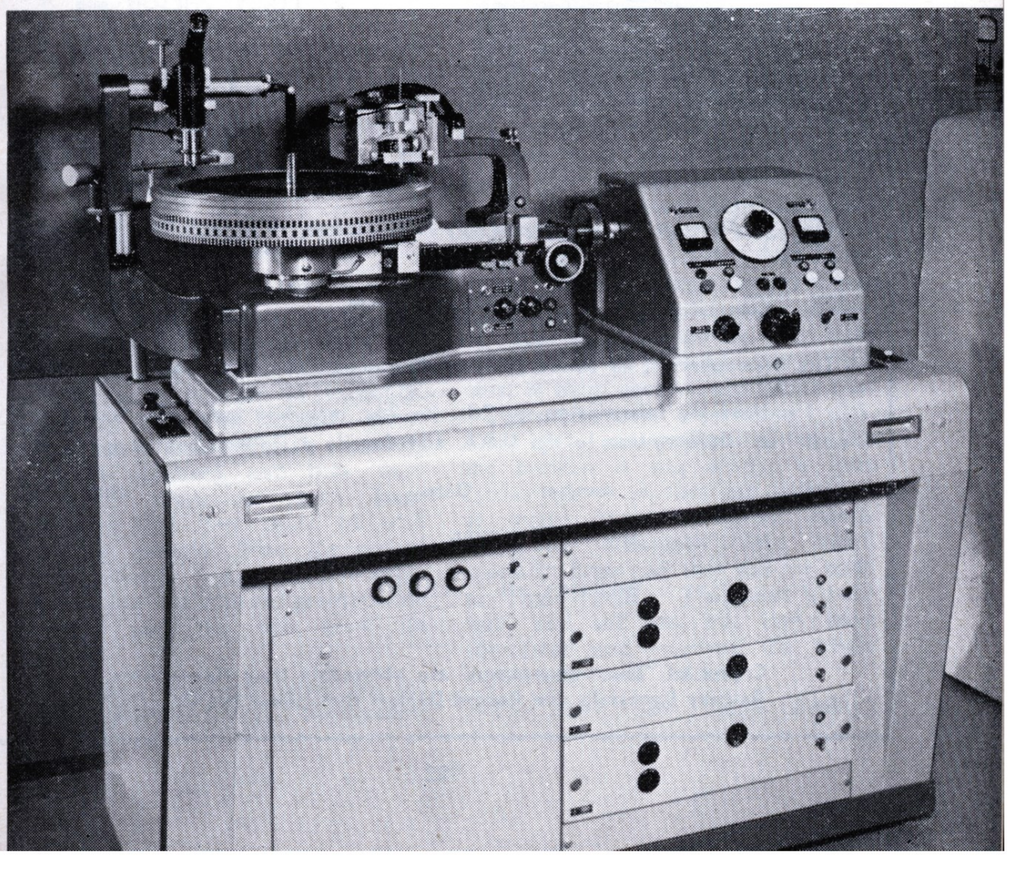
RECORDING CONTROL ROOM with comprehensive facilities for mixing and re-recording stereophonic programme material. (Photo: Decca)





TAPE REPRODUCER AND DISC CUTTING LATHE for stereo recording with fully automatic control of all functions. Four cutting speeds: 78, 45, 33⅓, 16⅔ r.p.m. (Photo: Fonofilm, Copenhagen)

STEREO DISC CUTTING LATHE with automatic control. The pitch and depth of cut control units are at the right. One model permits cutting 45 and 33⅓ r.p.m. discs at half-speed (22½ and 16⅔ r.p.m.) to give the best available sound quality with a given cutting head. (Photo: Neumann, Berlin)



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Converting to Stereo

by Ralph West

"SHOULD we convert to stereo? and if so, how?" must be exercising the minds of many people at the present time, especially many of the visitors to this 1960 Audio Fair in London. It is indeed a most perplexing time with many new words and expressions appearing in all the advertisements. Are "stereo" and "high fidelity" different words for the same thing? and have we only just discovered all our old 78 and LP gramophone records are "monos?"

It would take a long time to explain fully all these things, but we will try and give some help. We cannot choose equipment for the reader, any more than we would presume to choose the readers' clothes, but we will try to give some guidance to enable a wise choice to be made.

Improved Standards

Once upon a time, we used to make our own radio receivers, crystal sets at first, later valve operated ones. We had to do this as there was no radio manufacturing industry in existence. Everyone was an expert then! Gradually, commercially made receivers appeared and they were eventually made in such large quantities that they could be sold relatively cheaply. With the arrival of the electric pickup, this industry also became one with the gramophone industry and the two grew up together.

Technical standards have, on the whole, risen steadily and the modern domestic radiogram is indeed a wonderful box of tricks, though we tend to take it for granted like our watches and motor cars.

There always have been, and, we hope, there always will be little groups of enthusiasts who want something better than the general run of things. Some wanted loudspeakers that didn't sound like loudspeakers, some wanted records with no surface noise, others wanted a pickup that would never wear a record out, and so on. A few of these things could be had right away — at a price of course, but most of them needed painstaking trial —and error—over a period of years. Their goal was perfection, but like the horizon it was always a little farther on — so they are still hard at work! Many of these efforts developed eventually into small specialist firms and that was the birth of "High Fidelity." They have led the way, and still do, but they have stimulated and benefited the whole audio and radio industry.

The very best "high fidelity"

apparatus can never be very cheap as it usually necessitates the use of somewhat more costly components. rather more care in manufacture and test, and, being made in smaller quantities it does not benefit from the cost reduction of large scale production. There is no definite dividing line any more than there is in the range between the Rolls-Royce and the Ford Popular, but, of course, merely labelling something "High Fidelity" does not improve it one bit! Generally speaking, we have to buy what we can afford, and even the cheapest model from a reputable firm is expected to do its job properly.

What Stereo Offers

Now stereo has come along and has upset all our standards. It has, however, spurred on to even greater efforts the whole audio industry, which responded magnificently and we are the better for it — after a period of trial and tribulation! What does stereo offer?

Well, man is born with a pair of ears which give him two valuable faculties as well as having a spare. The first faculty is the ability to detect the direction from whence comes a sound. This is probably not the most important one from the point of view of listening to music, etc. It was grossly over - emphasised (and exploited) and still is, in much of our approach to stereo, though it was fun listening to ping pong games and trains thundering through our drawing rooms! The most important faculty is the ability to hear clearly when more than one sound is being produced at the same time. This is the thing most noticed by a person going deaf in one ear, not the difficulty of direction.

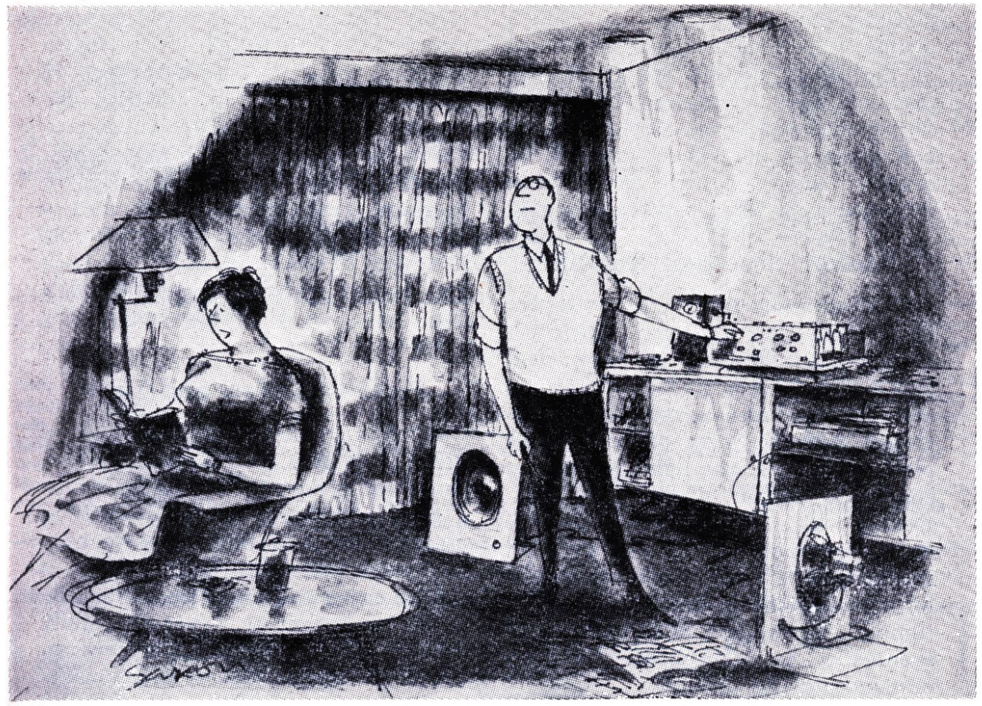
"Cocktail Party Effect"

Amongst engineers it is known as the "cocktail party effect." We use both our ears, of course, listening to a single loudspeaker, but this single speaker cannot recreate at both our ears the subtle differences in sound that exist when we are listening to the real thing. It is like trying to enjoy an orchestra when sitting in a soundproof box with one small hole in its wall — the loudspeaker. "High fidelity" has endeavoured to make this hole larger and less obstructed, a clearer view in fact. The cheapest stereo gives at least the effect of two small holes in the wall. While it is definitely an improvement on "one small hole," it will probably not be judged a good exchange for someone with really good mono equipment. A change to stereo may be very thrilling at first, but unless the quality of the equipment is comparable with the previous mono equipment, disappointment will eventually result.

It should also be pointed out that merely putting two, or even three, loudspeakers in one box, however tastefully styled, and labelling it stereo, does not guarantee the production of any stereo effect. There is more to it than that, as any audio firm of repute very well knows.

Converting in Stages

This, of course, means the change to stereo is not cheap, unless one is replacing relatively cheap equipment. It may well pay to do it in stages, especially if the existing apparatus is good and has given satisfaction. A first step could be a second speaker. It need not be an identical one, but it is often an advantage. Theoretically the two speakers should be identical, but as they are influenced by their surroundings — and these are seldom identical, the force of that argument is somewhat reduced. Run the two speakers from the one amplifier. The mismatch will not do any harm and does little more than restrict the full power output of the amplifier—which should never be used at home anyway! These "semi-stereo" results will be quite an improvement. Most people with stereo equipment find they prefer to leave both speakers in use even for mono signals. The advantages of stereo equipment then, are not confined merely to the playing of stereo discs and tapes. If the two speakers used thus give pleasant listening it is fairly safe to assume



Reproduced from "New Yorker"

"It doesn't sound very stereo to me"

they will be satisfactory when fed with the real thing later on.

The next step would probably be the second main amplifier. It certainly need not be identical with its partner, although it is generally more convenient. Any two good amplifiers will produce results that would be very difficult to distinguish between. Your local "high fi" or radio dealer or the equipment manufacturer will be able to give the necessary technical help and advice. Next would be the pre-amplifier changeover — to a stereo version. It is possible to use a second similar preamplifier but the multiplicity of controls will daunt all but the most enthusiastic. An alternative scheme is to purchase a so called "integrated (stereo) amplifier." That is merely a pair of amplifiers complete with all controls in one box. It is really an old arrangement, but miniaturisation and modern methods have produced compact and elegant designs with excellent quality and more than enough output power for all domestic requirements. The pickup has been left as the final move, but it could also be the first move, especially where it is desired to start buying stereo discs right away. The two outputs from the stereo pickup can be fed into the single amplifier input. Some stereo pickups actually provide a separate mono output which could be used in this instance. One must not expect first class mono results from a stereo disc every time, as the two systems usually use very different microphone arrangements. The stereo pickup will, of course, play mono discs quite satisfactorily providing they are not too badly worn and the comparison is not between an expensive mono pickup and a cheap stereo pickup, needless to say! Never play stereo discs though with a mono pickup. The best stereo pickups of today are at least as good as the best mono pickups of a year ago, and this difference is likely to increase as more

development goes into the stereo pickup. Experience suggests that some of the better quality stereo pickups that are able to use a "half-thou" stylus, may well give old LP discs a new lease of life. Their grooves, of course, must never have been damaged by a worn or broken stylus.

Motor Noise and Rumble

A word about motors is not out of place here. As a stereo pickup is sensitive to vibration in more than one direction, it is liable to show up motor noise and rumble not previously noticed. Some of the cheaper pickups with a too-light head may emphasise it and, of course, a loudspeaker with a good bass response will show up more than say a small speaker in a cheap record player. Many amplifiers are fitted with rumble filters to deal with this eventuality, as we can't all afford the best motors and pickups.

Record Wear

With the highest present day standards, disc life seems to be almost indefinite, but with good average equipment a life of many hundreds of playing is likely provided two precautions are observed. First, the stylus tip is never allowed to wear appreciably. This may be between hundreds and a few thousand sides for a diamond stylus, but only between 50 (at worst) to a few hundred for sapphire. Many dealers have provision for examination of stylus condition. If in doubt change it, a sapphire replacement stylus costs a lot less than one disc, yet could ruin hundreds of discs. Secondly, the discs and pickup should be handled with the care and intelligence they deserve.

Preserving Discs and Tapes

A pickup lowering device is a great help and fingers should *never* touch the grooves. The regular use of a good proprietory cleaning device is essential as it is impossible to keep dust from a disc all the time. Tape is a little easier to look after, but on the other hand damage is not so readily obvious. Again fingers ought never to touch the tape surface as sticky marks lead to wow and flutter. It must be stored in a cool place (and away from sunlight) or noise and print-through increase unduly. It must never be placed, even momentarily, close to ferrous objects, they are sure to be magnetised. The regular use of a head demagnetizer is a good habit as one pass by a magnetized head will seriously raise the noise level on the tape as well as partially wiping the very high notes. Most things last longer and give better service with that little extra care and attention. Stereo certainly needs that little extra effort and care in installing and handling. The dealer cannot give an adequate service until he has had personal experience with it, and the new stereo owner has to learn how to get the best from it. It takes time as none of us is born with the experience.

Well, should it be stereo? Yes, if you can afford it, yes if you realise it is not a substitute for high fidelity but a parallel development that takes high fidelity one step higher and lastly yes if you go to a reputable firm and don't try and do it the cheapest possible way.

Happy listening!



"This time keep off politics, religion and stereo"

with apologies to "Punch"

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Extract from Test Report by J. C. G. Gilbert reprinted from the Music Trades Review. The full two-page Test Report and an illustrated brochure on the amplifiers will be sent you on request.

"The Point-One Stereo" pre-amplifier is probably the most comprehensive unit in existence covering every requirement for stereo tape, disc and radio plus monaural amplification for any form of input signal . . . it is difficult to think of any additional requirement that one would ever wish. The equipment performs with the high performance always associated with the traditions of Leak equipment. It is a fine example of design and construction, and the pre-amplifier can be used with any other Leak main amplifiers. How the pre-amplifier can be sold for as little as £21 can be answered only by Harold Leak . . .*
Summing up, therefore, one can highly recommend the Leak stereo system for use with any current monaural or stereo input whether it be from pickup, tape, radio or microphone."

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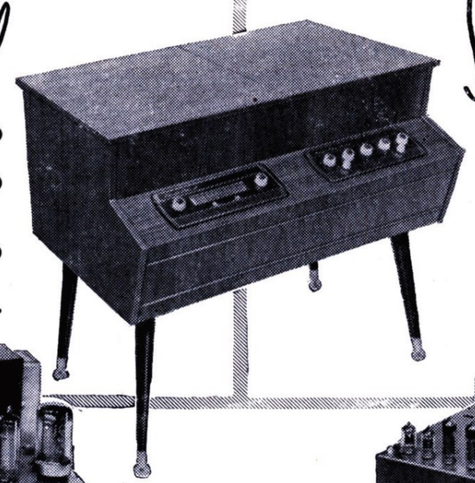
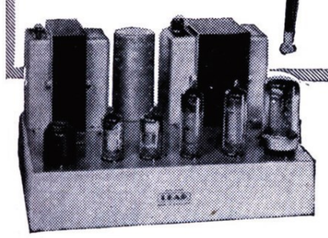
SOUTHDOWN CABINET
TOTAL £55 : 13s.

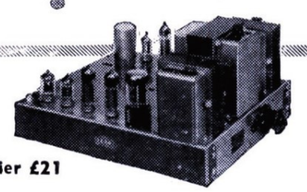


Stereo

POINT-ONE STEREO PRE-AMPLIFIER
STEREO 20 POWER AMPLIFIER
SOUTHDOWN CABINET
TOTAL £72 : 9s.



TL/12 Plus Amplifier 18 gns.



Point-One Stereo Pre-Amplifier £21

Stereo 20 Amplifier 29 gns.



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by Edward Greenfield

"OF course I'm a hi-fi enthusiast but anti-stereo"—that was the remark made to me recently by a highly intelligent record collector, and I am sure it is typical of thousands up and down the country who, having accustomed their ears to the added clarity of hi-fi reproduction now have serious doubts about what they suspect is just a new gimmick.

I would be the last to claim that stereo has achieved anything like perfection—the history of the gramophone shows how fallible our assessment of the reproduction in one generation proves a few years later—but I think it is highly important to emphasise that hi-fi and stereo are not contradictory things but complementary. Some hi-fi enthusiasts may feel at the moment that they prefer good mono reproduction to any existing stereo, but to proclaim oneself as "anti-stereo" strikes me as the height of absurdity.

Stereo I am quite convinced is just as important a development in the history of the gramophone as electrical recording and the L.P. disc, maybe even more so, and it is quite obvious from the big advances already made that the hi-fi enthusiast is going to be as big a gainer from stereo as his less discriminating fellows.

I, myself, hi-fi enthusiast that I am, was at first highly sceptical of the benefits that stereo would bring, but it took very little time indeed after the stereo equipment was installed in my home for me to be completely won over. The first important point I think is that the acoustics of one's own room—often making or marring the sound obtainable from a particular disc on particular equipment—becomes less important since stereo re-creates more vividly than any mono reproduction can, the acoustics of the recording studio. In other words, there is an added immediacy about the sound, and it is more spacious.

Generally, though this does, of course, depend on the equipment used, a stereo reproduction is warmer and richer and remarkably less tiring on the ears. This last quality, I think, owes much to the feeling one has in listening to stereo that the speakers have disappeared. It would be interesting to hear a technican's analysis, but I have a shrewd idea that in stereo reproduction the distortions in the reproduction from one loudspeaker tend to be cancelled out by the reproduction from the other and vice versa.

Then any hi-fi enthusiast must immediately be struck when listening to stereo by the separation of the sound. It is not just a question of the sound of the first violins coming from one direction and the double basses from another, but that one can distinguish and follow the separate parts so much more comfortably. Not long ago an experiment was conducted in which two separate conversations taking place a few yards apart were recorded both monaurally and stereophonically. It was found that while the mono recording produced a jumble of sound with neither conversation completely intelligible, one could in stereo follow either conversation at will just as one could in real life.

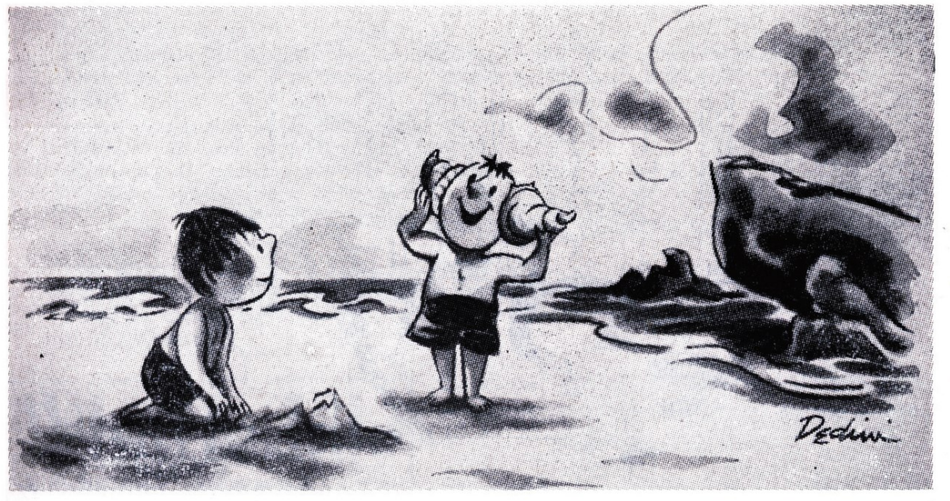
This might suggest that stereo carries one stage further the effect of hygienic, almost disembodied, clarity that marks some hi-fi mono reproduction. Nothing could be further from the truth. It is stereo's great merit that the sound, being so vivid and real, tends to co-ordinate into a pleasing and balanced whole more readily. It is this feeling of co-ordination which adds so much to the sense of realism and atmosphere of stereo.

Often one finds that a musician tends to prefer medium-fi stereo to hi-fi mono, and I rather feel that the reason is the importance a musician places on the relationship between the instruments and the sum total effect, rather than the individual exactness of each strand in the web.

I feel that too many hi-fi technicians—including some of the recording engineers—have placed too much emphasis on the brilliant knife-edged clarity of recordings. I have sometimes called it the "Festival Hall effect," in which every line from top to bottom of the score is clearly separated and reproduced with every known harmonic ringing out like mad above. This is "separation" of a kind in which even the best stereo at the moment finds it hard to compete. but how much more truly separated to my ears at least are the sounds from a good stereo disc.

In opera, for example, it is not just that the singers can be made to move around on the stage and to give the impression of acting their parts before the microphone (sometimes a dubious advantage), but that the singers and orchestra do not sound as though they were breathing down one another's necks just the other side of the loudspeaker.

But there is no point in being dogmatic about any effect of recorded



"Look! Stereo!"

Reproduced from "New Yorker"

reproduction. It is not just that the same record can sound quite different on different equipment or that the same equipment can sound very different in different rooms, but that ears vary an enormous amount in the way they hear sounds.

In the first place, as a man grows older his ears hear far less, and the ceiling for audible harmonics will come down from, say, 20 kc to a mere 8 kc. The late Professor Edward Dent used to say in his old age that everything had come to seem a semitone flat—there the man with absolute pitch talking—and I am sure that had something to do with the absence to his ears of harmonics that he had once perceived clearly. But even granted two listeners with equal powers for hearing the full harmonic range you will find that what their brains make of the messages from their ears is often astonishingly different.

I fortunately have a number of friends who are just as analytical about the sounds reaching them as I am. Frequently I find that where a particular friend hears a woman's voice as rich and full, I will hear a pronounced wobble and occasionally vice versa.

The important thing is to know something about the peculiarities of one's own ears and through acute listening to learn to trust them. If any music-lover does not like the sound presented to him by any equipment, whether mono or stereo—and I have had my ears almost sliced off by some demonstrations—let him say so.

It is the advantage of having equipment put together by a dealer that the permutations and combinations of components are almost limitless. Hi-fi dealers usually have long experience of dealing with exacting customers, and it is up to each music-lover—his duty even—to use his own discernment and rely on it.

With stereo there are various special problems. One finds, for example, that motor rumble can be even more infuriating than in a mono set-up. But generally the same problems apply with stereo as with mono, and it is important to remember that stereo is essentially a domestic medium.

It is vital to hear how it will sound in a room the size of one's own living-room, and incidentally, not to dismiss stereo out of hand just because a mass demonstration fails to have its effect. There is no doubt in my mind that stereo represents the clear way forward in hi-fi, and that already the best stereo is far in advance of the best mono.



"If only that energy could be harnessed and put to useful purpose"

with acknowledgments to "Punch"

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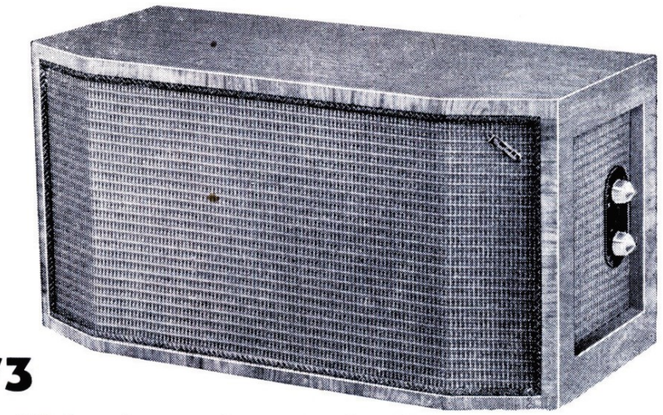
WITH CLEAN BASS



Model W3

The W3 is a three-speaker system in which compactness has been achieved without sacrificing quality of reproduction and without introducing "small box" tonal character. It is ideal for use on stereo or single channel input where room space is limited, as the cabinet may be stood vertically on the floor or placed horizontally on a table or shelf. The sensitivity is high enough to give full domestic volume with any good commercial FM receiver with about 3 watts output.

BASS

L.F. output is produced by a special 12″ unit type WLS/12 fitted with a heavy cone and a new type of suspension which permits large linear excursions and gives a low fundamental resonance of 25-30 c/s.

TREBLE

The upper registers are handled by 5″ and 3″ units connected in parallel via a quarter section 1 kc/s dividing network, with an extra series capacitor to protect the smaller speaker.
Two volume controls permit adjustment of midrange and treble to give tone control and facilitate balancing different speakers on stereo.

Cabinet size 28″ × 14″ × 12″.
Weight 48 lb. completé. Impedance 15 ohms.
Max. input 15 watts.
Effective frequency range 30/2000 c/s.

Price **£39. 10. 0** complete, tax free.

The elegant cabinet is available in a choice of walnut, oak or mahogany veneers. Also available in whitewood, price £36.10.0. Tropical model made with resin bonded plywood can be supplied at £2.0.0 extra.

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3"	150	8 mins	5 6	225	12 mins	8 6	3"	300	16 mins	10
4"	300	16 "	10 0	450	25 "	14 6	5"	1200	1 hr 4 "	2 5
5"	600	32 "	1 0 0	850	45½ "	1 8 0	5¼"	1700	1 .. 30 "	2 17
5¼"	850	45½ "	1 7 6	1200	1 hr 4 mins	1 15 0	7"	2400	2 .. 8 "	4 0
7"	1200	1 hr 4 mins	1 15 0	1800	1 .. 36 "	2 10 0		SUPERGRADE		
8½"	1750	1 .. 33 "	2 10 0	2400	2 .. 8 "	3 10 0	7"	1200	1 hr 4 mins	2 18

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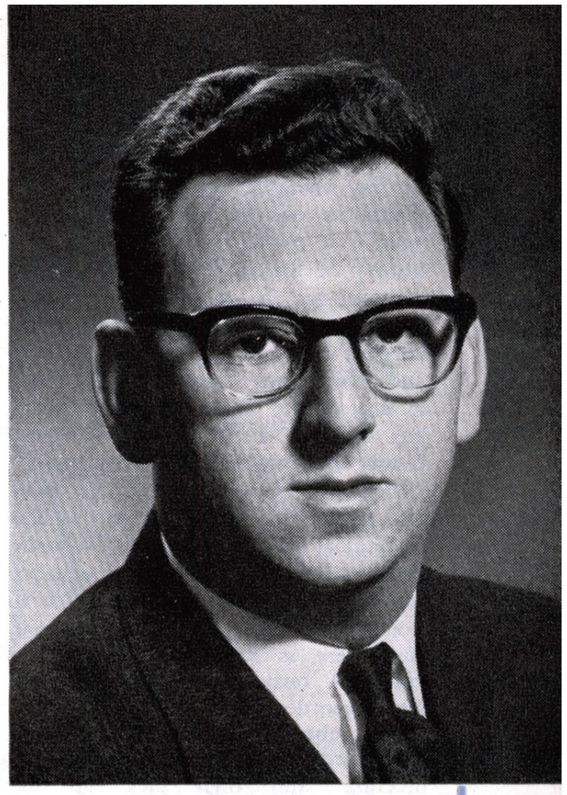
The Tape Recorder BOOM is on!

by

Peter Earl



WHEN the 1950's were still in their infancy, the only people who knew anything about tape recorders and tape recording, were a handful of experts, development engineers and back-room boys who were perhaps convinced that what they had up their sleeve might interest a certain small section of the great British public. Ten years later we can assess just how great has been the impact of the tape recorder on the British way of life. For one thing, they have sold not just by the tens of thousands but in hundreds of thousands and today there are over forty firms engaged in their production.

The incredible thing is that the industry, once established was not merely content to rest on its laurels but embarked on a programme of research and development that makes the early tape recorders seem almost like museum pieces in terms of performance and capability, though some diehards still believe the early models to be the best.

The tape recorder has taken its place in the home with the television set, washing machine and refrigerator as an indispensable part of daily life. One of the reasons for this boom has been the fact that the British family man is now used to paying for things on hire purchase, that what once might have been considered luxury goods have been brought within the financial scope of every average family. Already more tape recorders are sold in this country per head of population than anywhere else in the world and it isn't hard to find the reason why. A look round this Audio Fair will show a wide variety of first-class machines retailing at reasonable prices that genuinely do suit every pocket and which open the door to a lifetime of home entertainment.

By the mere flick of a switch, radio programmes are yours to

record and keep for always. If you are a sports fan you can soon build up an enviable collection of commentaries on the big events of the year. A music lover will find a library of the world's classics at his disposal for the mere cost of a reel of tape that gives many hours recording time and can be used over and over again— up to 30,000 times if necessary. Tape recording today has become a hobby that all the family can join in and enjoy. Family "snapshots in sound" can be built up over the years — baby's first attempt at speech, reciting a favourite poem on the 6th birthday, an engagement party, silver wedding celebrations—the list is literally endless. But there is far more to it than that. A business man can use his tape recorder in the office for dictation, rehearsing an important speech or recording a conference or Board meeting, and then pick up his machine rather like a well filled briefcase and carry it home to continue his work or to entertain his family and friends. Amateur cine enthusiasts create their own sound tracks and others link their slide shows with a running commentary complete with sound effects and music—all on tape. One doctor has even used his tape recorder to record the heart beats of patients suffering from various heart conditions, and also the way they respond to treatment. This tape is used to instruct students and can easily be sent anywhere in the world.

It is impossible to estimate the number of people who now do most of their correspondence regularly throughout the world on tape. A friend of mine in South Africa is regularly entertained by the familiar sounds and voices from his home town which I have recorded on a battery operated tape recorder weighing only a few pounds. One enterprising farmer in the Home Counties uses a tape recorder to scare the birds away from his crops, although it might be rash of me to mention the name of the pop singer that has the most and speediest effect! People are now talking about hypnotism on tape and experiments are being conducted by various hypnotists to teach people to pass the driving test, to lose weight or to give up smoking.

These, of course, are extreme uses but the whole joy about owning a tape recorder is the versatility it places at your disposal. Practically the only limits imposed are those by your own imagination.

When tape recorders began to trickle on to the domestic market, those who were in the know thought that the obvious customers would be actors and musicians who wanted to hear their own voices or their own performances. In fact the stage and concert hall provided merely the spearhead of an army that grew daily and the old conception of using a tape recorder to trap Auntie Nellie's voice unawares when she got a bit tiddly at the party, providing amusement for the others and consternation for her, has now flown out of the window.

When I sat down to prepare this article, I thought I would make a list of some of the individual uses of tape recorders. The list got out of hand very quickly so I scrapped it and started it again listing, for instance, the uses that the Church, architects, doctors, etc., might have and I gave up when it ran into hundreds.

If you have come to the 1960 Audio Fair with the object of looking around and choosing a tape recorder, then almost certainly this word of warning will apply. You may have in mind a very definite purpose and think that that is the only reason for buying your tape recorder but once you have it—use it and experiment, it will get a hold on you, and you will be gaily trotting off down a hundred and one avenues of sound. If you already own a tape recorder you will probably be amazed at my restraint in listing so few of the practical and utterly delightful applications that it offers.

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TRANSISTOR

AUDIO POWER AMPLIFIERS

Rank Cintel Ltd have pleasure in announcing the first demonstration of their new range of TRANSISTOR POWER AMPLIFIERS and PRE-AMPLIFIERS in Room 252.

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These amplifiers will be used in conjunction with Ampex professional tape recording equipment during a demonstration of single channel monophonic and 2 and 3-channel stereophonic recordings.

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The amplifiers can be inspected on Booth No. 27 and full technical data will be available.

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Worsley Bridge Rd., London SE26
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T.V. AND AUDIO Division

Ampex domestic and professional equipment

MUSIC SOUNDS BEST ON TAPE

In room 314 you can hear for the first time in this country just part of the range of Ampex Domestic Tape Recording Equipment featuring

4 TRACK 7½ i.p.s. STEREO TAPES

These tapes are but a minute selection from the vast range of recordings now available on

UNITED STEREO TAPES
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which feature the world's greatest artists.

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EQUIPMENT GIVES THE
FINEST REPRODUCTION OF TAPE

AMPEX INTERNATIONAL

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In room 252 Rank Cintel Ltd are presenting another fabulous demonstration of three-channel stereo featuring Ampex professional tape recording equipment.

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Not only can you hear the world's finest recorded sound but also how the two-channel stereo and single channel masters are made from the 3-channel original.

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Continuous demonstrations three times an hour on the hour are being given throughout the period of the fair. Hundreds were disappointed at Harrogate, so make sure you don't miss the only London demonstration this year.

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Programme presented by the U.K. distributors of Ampex video and professional audio tape recording equipment.

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a BASF presentation

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1st among more than 80 films entered, 'The Magic Tape' highlights in 30 minutes of fascinating colour and action what can be achieved with magnetic recording tape.
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TRANSATLANTIC TRENDS

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AND

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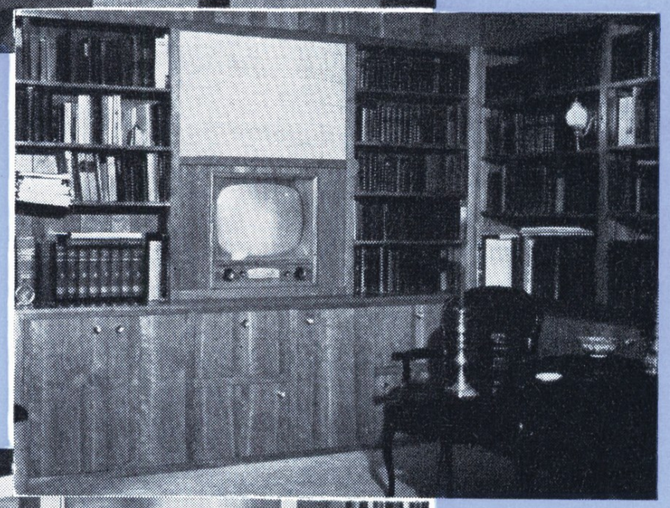


A monophonic installation easily convertible to stereo. The loudspeaker is concealed behind the grille cloth above the television Tuner, transcription motor and arm and preamplifier . .

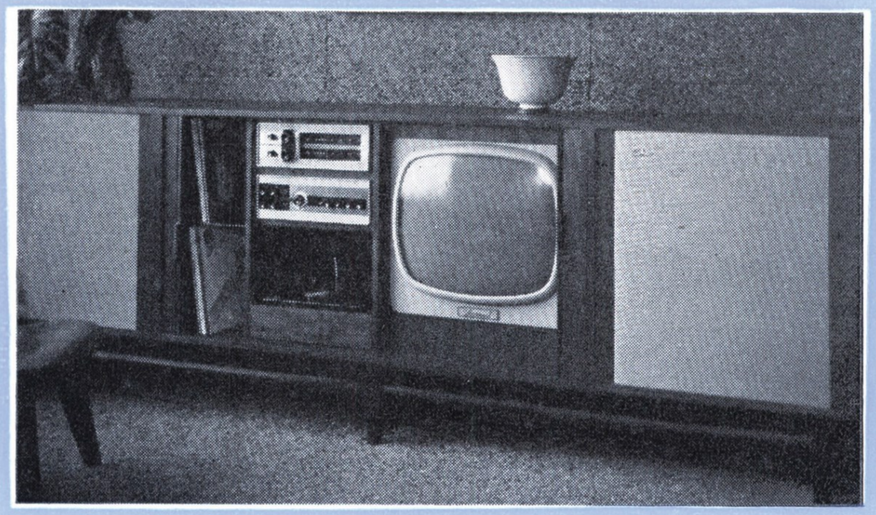


. . . are readily accessible. Extension loudspeakers are provided in the garden-room

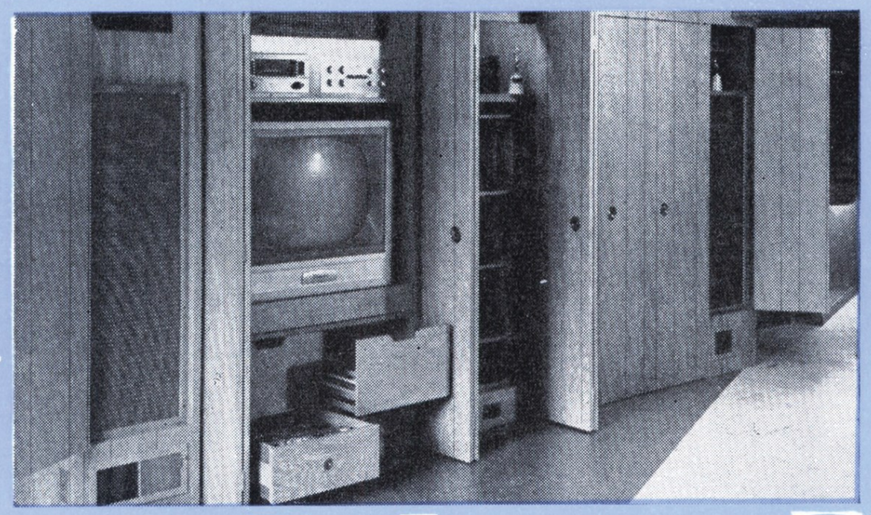
(AUDIO EXCHANGE)

TRANSATLANTIC

Some examples of high fidelity installations possible when space and income are not at a premium.



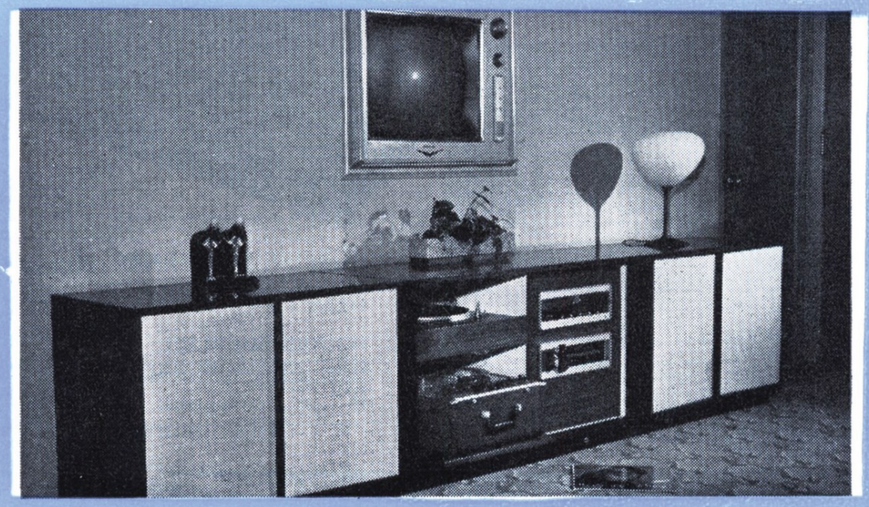
Simply Beautiful.



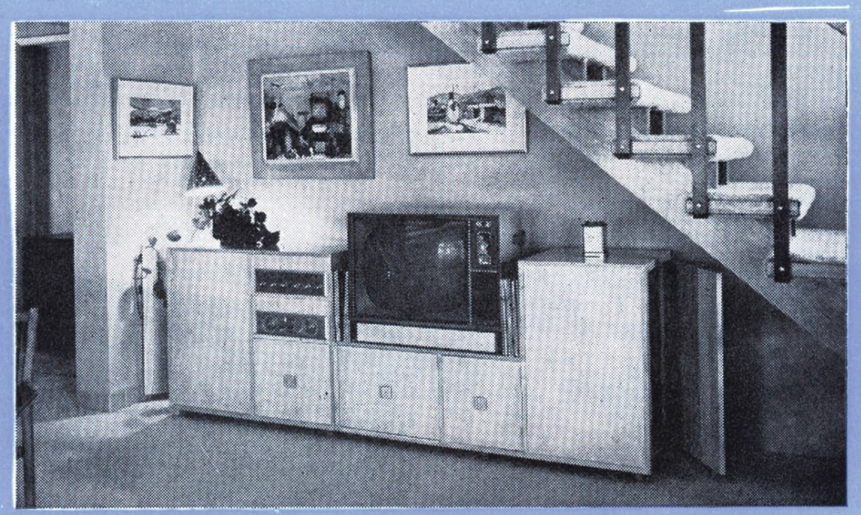
THE WHOLE WORKS — *Built-in installation comprising remote-controlled television, stereo control unit with separate amplifiers, A.M./F.M. tuners, stereo tape deck and pre-amplifiers, multi-channel loudspeaker system and two changers — one for father's favourite records and the other for the children!* (AUDIO EXCHANGE).

TRENDS

By kind permission of HIGH FIDELITY.



Stereo reproducers with F.M. and A.M. Tuners, record changer, television, and (below) tape recorder (SERGENT-RAYMENT).



SOUND UNDER THE STAIRS — *In this installation the speakers are mounted at each end and the adjustable doors reflect the sound into the room. The television chassis is rotatable, stereo radio, tape and record reproduction is provided* (H. H. SCOTT).

QUAD II POWER AMPILFIER



PRICE £22.10.0

POWER OUTPUT
15 watts throughout the range 20-20,000 c/s

INPUT
Sensitivity: 1.4V.rms for 15 watts output. Load imposed on input: 1.5 MΩ in parallel with 10 pF.

FREQUENCY RESPONSE
Within 0.2 dB 20-20,000 c/s.
Within 0.5 dB 10-50,000 c/s.

DISTORTION
(measured at 12 watts output).
Total third and higher order: less than 0.1% at 700 c/s.
Higher order alone: less than 0.03% at 700 c/s.

BACKGROUND
80 dB referred to 15 watts.

OUTPUT IMPEDANCE 15Ω and 7Ω
Effective output resistance: 1Ω for 15Ω output.

POWER SUPPLIES
Input: 200-250v AC single phase (or 95-125v AC) 40-80 c/s.
90 watts consumption (excl. control unit, tuners, etc.)

QUAD 22 CONTROL UNIT



PRICE £25.0.0

Additional Adaptor Units each 15s.

FREQUENCY RESPONSE
Radio and Tape inputs: 20-20,000 c/s±0.5 dB.
Gramophone: Maintained over 20-20,000 c/s within ± 1 dB of the selected characteristic.

INPUT SENSITIVITY (at 1 Kc/s for 1.4 Vrms output)
Radio: 70 mVrms. Load impedance 100,000 ohms.
Tape: 70 mVrms. Load impedance 100,000 ohms.
Microphone: 1.5 mVrms. Load impedance 100,000 ohms.
Pickup: Depending upon adaptor unit.

DISTORTION (1.4 Vrms output)
All controls level: Any input 0.02%

NOISE
Total hum and noise: Better than—70 dB.
Noise:—80 dB or where applicable, the equivalent noise of the pickup load impedance at the input.

OUTPUT
Control unit to power amplifier: 1.4 Vrms.
Tape outputs: Peak signal approx. 0.25 Vrms.
Maximum loading 500,000 ohms and 200 pF.

INTERCHANNEL SPECIFICATION
Cross talk: Better than 40 dB 20-20,000 c/s.
Balance control: Provides up to 9 dB unbalance either way.

QUAD FM TUNER



PRICE £21.0.0
Plus £7.17.6 P.Tax

TUNING RANGE
87.5-108 Mc/s.

SENSITIVITY
3μ V for 20 dB quieting.

OUTPUT
100 mV at 100,000 ohms impedance (to be terminated by 100,000 ohms across amplifier input).

CONSUMPTION
6.3 v 1.85 A: 330 v 27 mA.

QUAD ELECTROSTATIC LOUDSPEAKER

MAXIMUM OUTPUT
6ft. on axis in free space 93 dB referred to .0002 dynes/cm² in frequency range 50 c/s-10 Kc/s.
100 dB referred to .0002 dynes/cm² in range 70 c/s-7 Kc/s.
Total integrated radiation equivalent to 95 phons in enclosures up to 5,000 cubic feet with average reverberation.

BANDWIDTH
45 c/s-18 Kc/s. Rate of attenuation asymptotic to 18 dB/8ve.

DISPERSION
Approximately 70° Horizontal, 15° Vertical.

IMPEDANCE
30-15 ohms in range 40 c/s-8 Kc/s falling above 8 Kc/s (see booklet for power amplifier requirements).

AC POWER CONSUMPTION
Negligible.



PRICE £52.0.0

(All prices applicable to United Kingdom only)

QUAD

For the closest approach to the original sound

BOOTH 63

DEMONSTRATION ROOM

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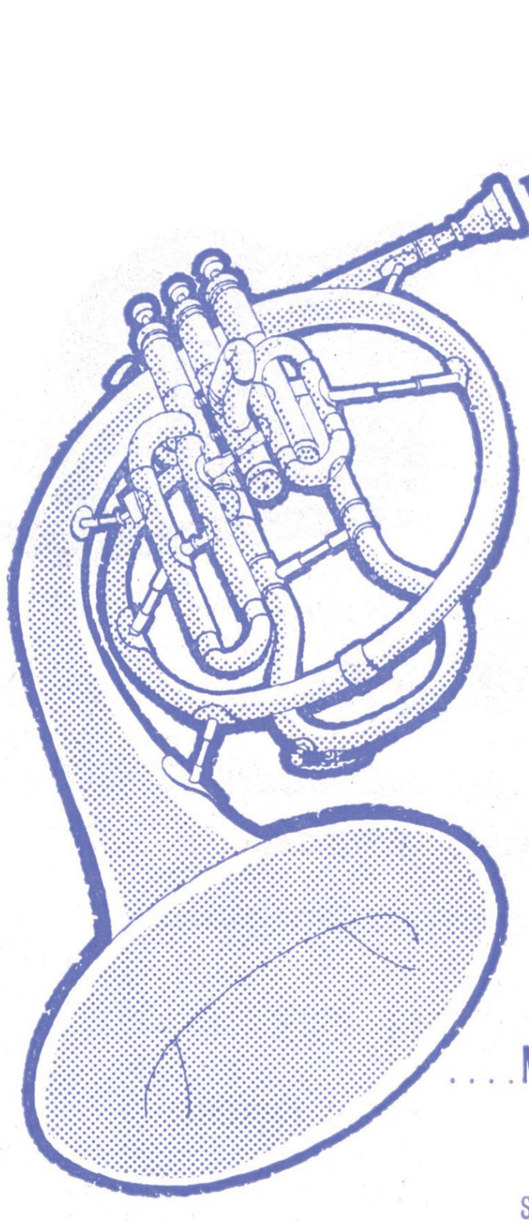

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TORRINGTON PLACE
LONDON W.C.1.

MVE216

Selecting a Tape Recorder

By JAMES MOIR, M.I.E.E.

MUSICAL sounds are stored on tape as magnetic patterns in a thin surface layer of iron oxide rather than as side-to-side excursions of a spiral groove as in the familiar gramophone record. The technical advantages of storing sounds in this way are considerable, but they may be summed up in the simple phrase, greater fidelity of reproduction.

The advantages are so great that in the professional field, tape has completely superseded discs for all original recordings. This is true even in the gramophone recording studios where it may reasonably be assumed that the disc was not abandoned without good reason.

Tape has been less widely accepted for domestic use, though the reasons for this neglect are not very clear. In convenience of handling, it is in some ways inferior to the old-fashioned gramophone record which everybody understands (or thinks they do) but there are other factors, first cost, difficulty in selecting a required passage, an assumed liability to damage, and the restricted repertoire that is available; all minor items but probably sufficient to bias the possible user against tape. Most, if not all, these problems will disappear with the introduction of tape in cassette holders for these are as simple to handle as the traditional record, though they may find it difficult to compete on a first cost basis.

What should one look for in selecting a tape recorder for domestic use? There are few machines at any price that include a loudspeaker capable of doing justice to the rest of the machine for there is insufficient room in a portable machine to provide adequate baffle area. The designers appreciate the limitation and practically all machines have provision for connecting an extension speaker. If you are an enthusiast for high quality sound and do not possess a good loudspeaker, do not expect to find one in a tape recorder but bear the absence in mind when planning your spending. If you have a good speaker system, check that the tape recorder output matches the impedance of your system or that you can obtain a suitable matching transformer.

Tape speeds are something of a problem. There are four standard tape speeds, 15in., 7½in., 3¾in. and 1⅞in./second and most machines include provision for recording and replaying at two of these speeds, some include three speeds. Fifteen inches/second is of no great value to the non-professional user though it is the standard for studio use because of the outstanding performance that can be secured. Results that are adequate in every way for the non-professional user can be obtained from tape running at 7.5in./second, the speed that is standardised for all commercially recorded tapes. For this reason facilities for running at 7.5in./second should be considered as mandatory when choosing a machine. Results obtained from the two lower speeds are acceptable for recordings where the sound quality is not of first importance. The bottom speed is, in fact, only suitable for speech, but it allows an uninterrupted playing time of several hours.

Comparisons of performance based on claims for frequency response obtainable are misleading, for there is little doubt that the frequency range that can be obtained at 3¾in./second (in the best machines) will do more than justice to the majority of the material that is available to the amateur owner of a tape recorder.

The performance at 3¾in. and 1⅞in./

second is limited more by the speed instabilities technically known as "wow and flutter" than by any restrictions of frequency range. These "wows" introduce a most annoying form of vibrato into everything that is reproduced. The amount of wow and flutter is expressed in per cent., most manufacturers quoting a figure for "total flutter" in their performance specifications. A figure of .1 per cent. is very good, .15 per cent. very acceptable and .2 per cent. tolerable. Few dealers have the equipment that will allow them to check this aspect of the performance but check the performance on a recording of a soprano singer or a solo trumpet. Excessive "wow and flutter" makes the sound very cracked and unpleasant.

Pushbutton control of all the functions is convenient and is undoubtedly preferred by the majority of users.

Most domestic machines make provision for 7in. diameter spools, but there are a few that will not accommodate a spool larger than 5in. Select a machine that will accept the larger spool unless your choice has many other advantages, for most of the commercially recorded tapes require a 7in. spool and these tapes are such a valuable source of entertainment that they cannot be neglected.

Practically all the machines on the market have a rated power output in the region of 3—4 watts, though there are a few with higher outputs. Three watts is marginally satisfactory for the average sixteen by twelve room even when a good external speaker is used, but it is completely unsatisfactory in such a room when the small speaker fitted to the machine is all that is available for replay.

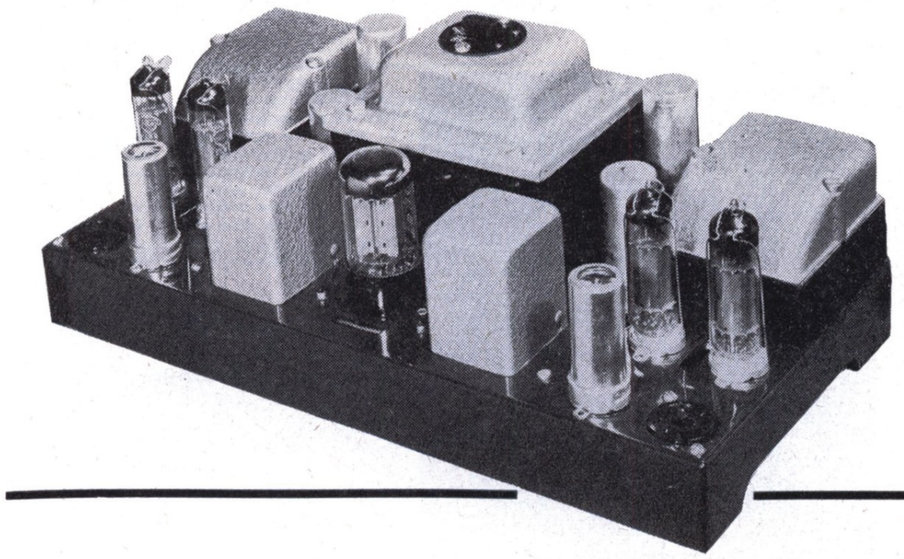
All the tapes now available have two recorded tracks and all machines now have facilities for playing either track, but four track tapes and machines suitable for their replay are just beginning to appear. The provision of four tracks doubles the playing time per tape at the sacrifice of a few dB. in signal/noise ratio. It is too early to forecast the extent of public acceptance of these tapes but I suspect that the advantage of longer playing time or, viewed in another light, the reduction in cost per recording will ensure their approval. The new four track machines will replay the existing commercially recorded two track tapes though as the full track width is not scanned the signal/noise ratio falls slightly. It has been noted that all current machines can replay two track tapes but there is a difference in the case with which the second track can be replayed. The majority of machines require the two spools to be lifted off the machines and reversed; not a very difficult job, but one that the less expert user obviously finds a bit of a nuisance. A few machines provide facilities for replaying either of the two tracks without spool reversal, a facility that is invaluable.

Now the problem of stereo. If you are a convert to stereo then you may wish to be able to replay some of the very excellent stereo tapes now available. Technically their performance is superior to that obtained from the stereo disc, though the price is higher. There are a few machines on the market that are fitted with twin track heads and the other facilities necessary to replay stereo tapes. The same machines also replay the standard tapes and though the stereo facilities cost a little extra they are well worth while when the emphasis is on sound quality.

Weight is important if you wish to carry the machine around with you. Forty pounds is perhaps a minor problem when the car is a few hundred yards away but above fifty pounds a machine becomes inconveniently transportable rather than portable.

Finally, a word of warning. It is quite impossible to select a tape recorder on the basis of the published performance specification. Narrow your choice down to perhaps two or three machines and have them home for the week-end, preferably with the speaker you intend to use. A comparison in your home is much more illuminating than the most complete technical specification. A good pair of ears is still the best judge of sound quality.

THE NEW RD JUNIOR STEREO AMPLIFIER



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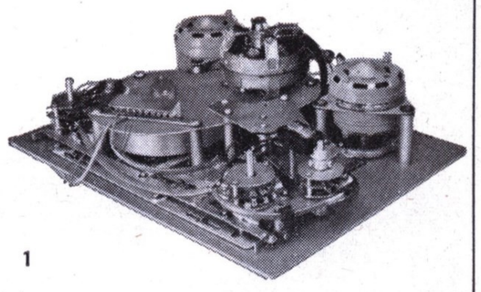

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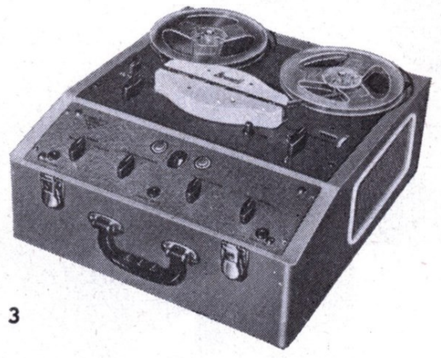

3



4

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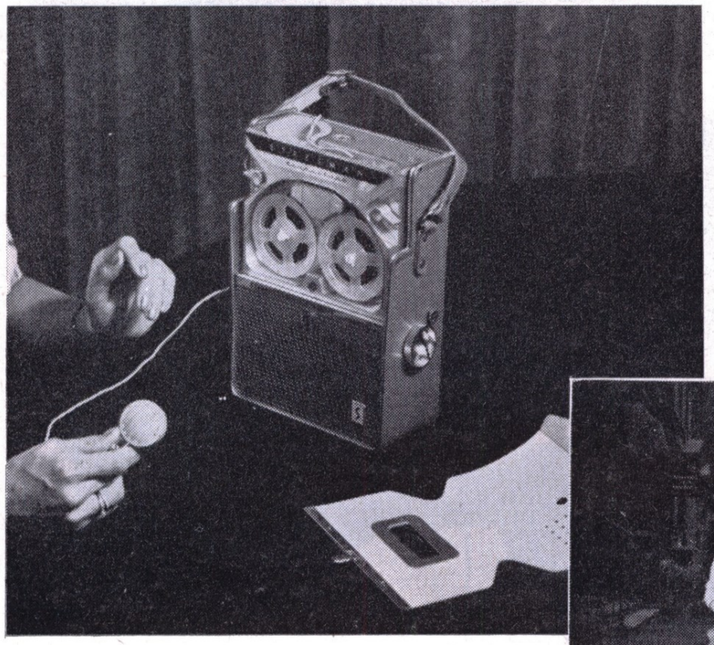



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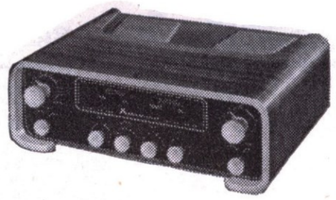

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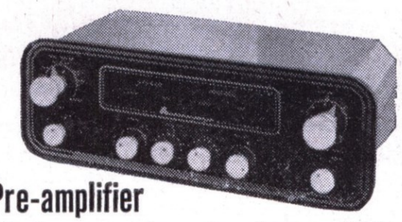

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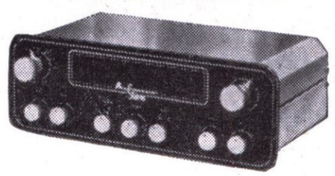

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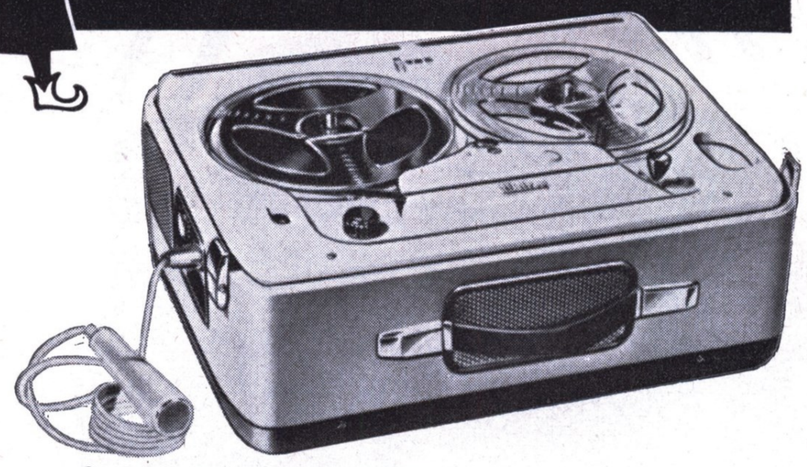

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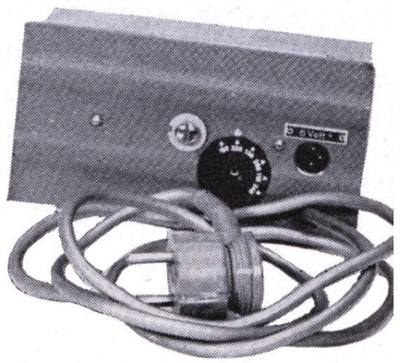

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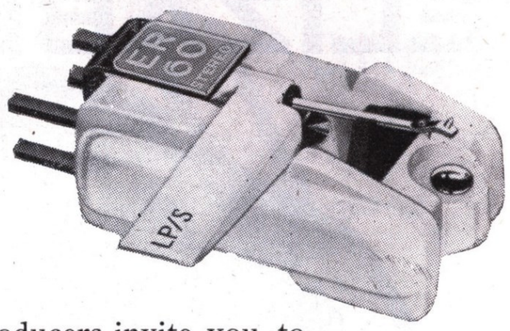

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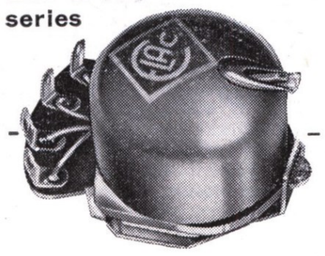

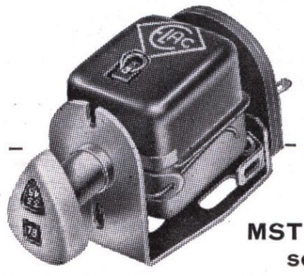

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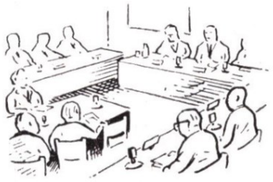

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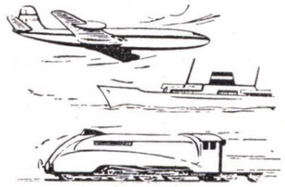

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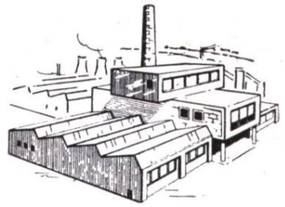

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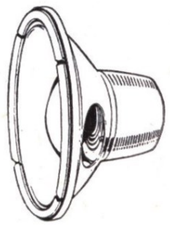

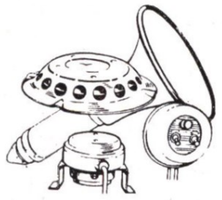

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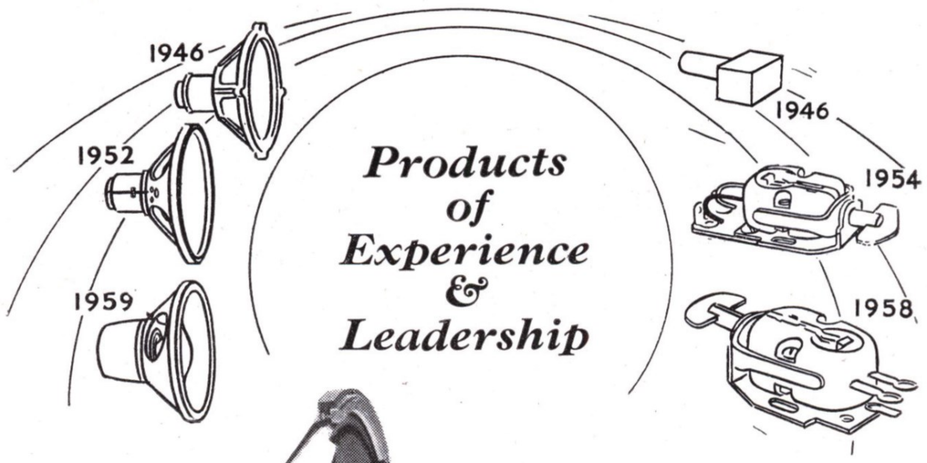

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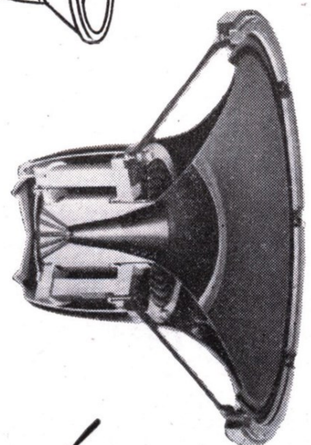

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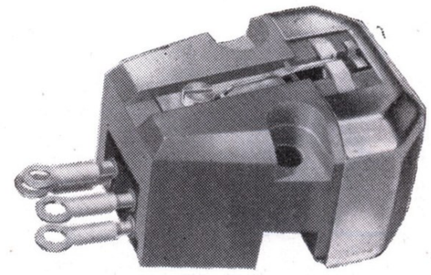
From the introduction of the first Dual Concentric Loudspeaker, Tannoy have won an established place as the quality standard for faithful reproduction.
The Monitor Units embody all the unique features of the earlier, widely acclaimed, 12" and 15" Units, but include the revolutionary Magnetic Shunt, and the H.F. Acoustic Balance Cavity, both important contributions to improved quality of reproduction.



THE VARI-TWIN MK II

Compatible Stereo Cartridge

This triumph of Tannoy research provides a magnetic stereo cartridge completely hum-free. Mounting in close proximity to motors and power amplifiers is now a practical proposition. The Vari-Twin Mk II is designed for micro-groove stereophonic discs made to Westrex 45/45 system. It is however, fully compatible and, with appropriate stylus, monaural discs may be played. It can be mounted in any standard shell or arm suited to its low tracking pressure of 3-4 grms.

TANNOY

Founder Chairman: Guy R. Fountain

TANNOY PRODUCTS LIMITED • WEST NORWOOD • LONDON S.E.27

One of the Tannoy Group of Companies

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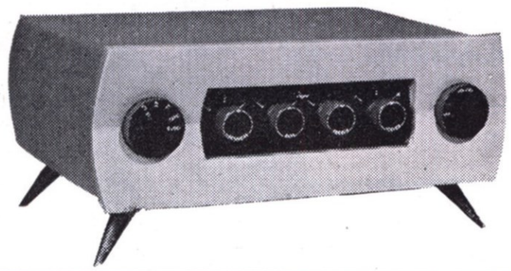
lead with quality and elegance

Our standard of excellence is reflected in the continual reliable performance of Chapman equipment throughout the world. For those prepared to spend a little more Chapman products will prove an outstanding long-term investment.

THE FINEST BRITISH COMPONENTS
FULLY TROPICALISED THROUGHOUT
USE OF SOUND DESIGN TECHNIQUES
STRINGENT QUALITY CONTROL AND TESTING
ALWAYS UP TO SPECIFICATIONS
CONTEMPORARY STYLING

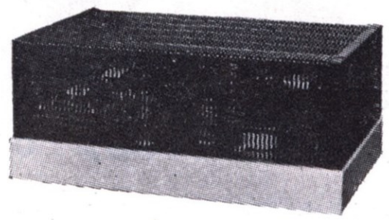


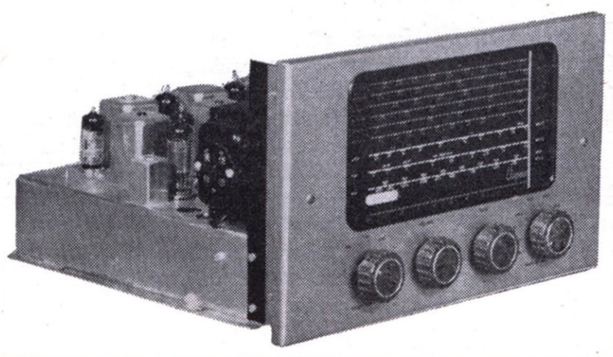
The 305 is a comprehensive stereo or single-channel control unit and affords every facility for high-quality stereo or single-channel radio, gram and direct or pre-recorded tape reproduction without a separate pre-amplifier.

305 Stereo Control Unit 18 Gns

Rated at 8 watts per channel this compact double push-pull amplifier is designed for use with a high-quality stereo system. It is especially suitable for direct connection to our 305 Stereo Control Unit.

305 Stereo Main Amplifier 20 Gns





This is the finest AM/FM tuner in our range and combines the stability and sensitivity of a first-class communication-type receiver with the low distortion and wide frequency response required of the modern high-fidelity amplifier.

S6BS/FM Tuner £67.10.0

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STAND 3



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600′	5″ spool	17/-
850′	5¾″ spool	23/-
1,200′	7″ spool	27/6



Long Play 601 * (Mylar base)

900′	5″ spool	28/-
1,150′	5¾″ spool	35/-
1,800′	7″ spool	50/-



Green Band 211 * (Acetate base)

600′	5″ spool	21/-
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1,200′	7″ spool	36/-



Double Play 724 * (Tensilized Mylar base)

1,200′	5″ spool	45/-
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* *Ferro-sheen process*

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A NAME TO REMEMBER IN TAPE-RECORDING

CHITNIS Tape Recorders are the logical embodiment of the finest trends in Continental recorder design, coupled with standards of manufacture and exclusive techniques to provide instruments of outstanding quality and reliability. Thus they may be said to be the ultimate in modern recorders, as pleasing to the professional user as to the family. CHITNIS Recorders (Made in W. Germany) are characterised by compactness and elegance of design, by better accessibility of controls, by fine performance, and above all, by quality that's years ahead.

TWO-SPEED 2 AND 4 TRACK MONO AND STEREO RECORDERS . . . . .

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● **COMPLETE WITH DYNAMIC MICROPHONE AND TAPE**

GENERAL SPECIFICATION

- Both models housed in cases of neutral beige with gilt metal finish, in elegantly curved styling with domed lid. Fitted with lock and key and strap handle.
- Response—At 3¾″/sec.—30-16,000 c/s ±3dB.
  At 1⅞″/sec.—30-10,000 c/s.
  These remarkable standards come from the Bogen Record/Replay and Erase heads fitted. (Gap—0.0001375″)
- Inputs— Microphone—3mV at 2 Megohms; Radio—3mV at 10 K ohms; Pick-up—100mV at 1 Megohm.
- Outputs—3 watts at 5 and 15 ohms for external speaker; 500mV at 100 K ohms for external amplifier.
- Signal to Noise ratio—Better than 55dBs unweighted. Wow and Flutter—0.12% at 3¾ i.p.s. combined.
- 2-speeds—3¾″ per second for high-fidelity standards; 1⅞″ per second for average requirements and tape economy.
- Recorder stops automically at tape end, or if tape should break. Lock and key on case.
- Speed and track selection, pause, super-impose, mixing on mic. and radio inputs; monitoring; separate bass and treble on output. Fluorescent signal level indicator. Tape position indicator. Fast rewind, less than 2½-minutes.
- Heavy duty Papst Motor ensures positive instantaneous response in all operations. Weight, approx. 19lbs. Tape reel size, 5¾″ max. Complete with CHITNIS Dynamic Microphone and reel of tape.

KM.22
TWO TRACK
54 GNS.

KM.33
FOUR TRACK
62 GNS.

Chitnis M.50TR Dynamic Microphone if purchased separately — 5 gns.

. . . . SEE THE COMPLETE RANGE

STAND No. 11 **DEM. ROOM 113**

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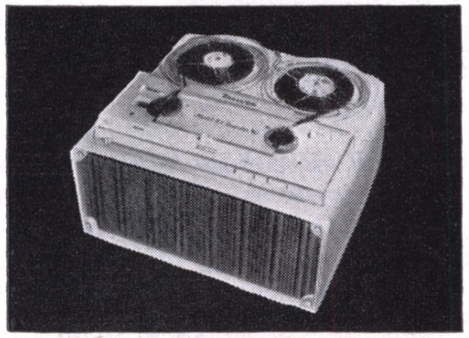
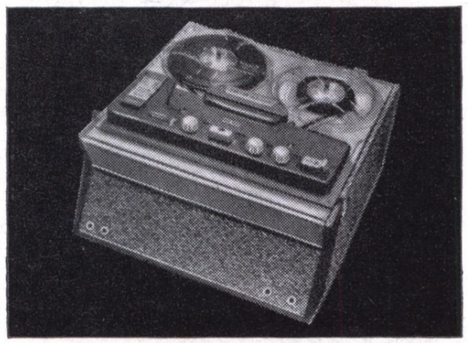


Model R7
Tape Recorder



Model R6
Tape Recorder



Model MK6
Tape Deck

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Truvox Ltd., Neasden Lane, London NW10.



STC
MICROPHONES

for the perfectionist



The **4105** microphone is a moving coil pressure-gradient microphone with a cardioid response obtained by using an acoustic phase shifting network. It is small, unobtrusive and robust.

The **4038** ribbon microphone is a pressure-gradient microphone which sets a new high standard of fidelity. It is accepted as one of the world's best microphones and is widely used by the foremost broadcasting authorities.

ALSO IN THE STC RANGE :

4104 Lip Microphone
4037 Pencil Microphone
4035 General Purpose Microphone
4033 Cardioid Microphone
4032 Hand Microphone
4021 Moving Coil Microphone

STC ALSO MANUFACTURE:

audio amplifiers, loudspeakers, and specialise in the design, installation and maintenance of Sound Reinforcement Systems to meet individual requirements.

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where a range of Brimar Valves is also displayed.

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60/2C/PA

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BOOTH 13
DEMONSTRATION
ROOM 242

GOODMANS



AXIOM 110

The first full range 10″ High Fidelity Loudspeaker. Ideal for all domestic stereophonic or monophonic installations. Plastic-edged hyperbolic diaphragm ; Aluminium voice coil. Die-cast chassis. 10 watts. 40-15,000 c/s. Price £3.15.9 plus P.T. £1.4.3.



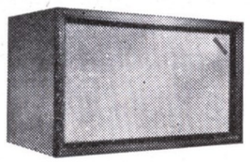
AXIOM 300

The most advanced twin-cone High Fidelity Loudspeaker yet produced, incorporating new developments which reduce distortion to a very low level and provide exceptionally smooth and extended response. 15 watts. 30-16,000 c/s. Price £11.5.9.



TRIAXIOM 12/20

A complete Triple Element High Fidelity Loudspeaker having all three radiating elements integrated into one unit. It is designed to provide a very wide frequency range with exceptionally low distortion and is constructed in accordance with the highest engineering standards. 20 watts. 30-20,000 c/s. Price £25.0.0.

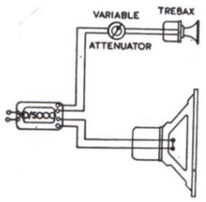


A.L/120

An extremely compact full range triple concentric radiator High Fidelity Loudspeaker system engineered to provide full scale performance at the lowest possible cost and in the smallest possible space. The A.L/120 measures only24″ x 11½″ x 14¼″. 15 watts. 35-20,000 c/s. Now available in walnut or mahogany finish. Price £29.10.0.

A.L/100

A *new* High Fidelity Reproducer, with twin concentric radiators and resistive enclosure loading. Dimensions as A.L/120. 12 watts. 35-15,000 c/s. Available in walnut or mahogany finish. Price £22.10.0.



'Stage-Built' SYSTEM

GOODMANS 'Stage-built' system is a method of building up a multiple unit High Fidelity reproducer having a performance of the highest order. Each stage is a complete full range High Fidelity reproducer, which is improved by the addition of the next stage.

GOODMANS

GOODMANS INDUSTRIES LTD., Axiom Works, Wembley, Middx.
Europe's largest manufacturers and the World's

Contribution to the HIGH FIDELITY FIELD



James Moir
Technical Director of Goodmans Industries and author of "High Fidelity Sound Reproduction".

GOODMANS HIGH FIDELITY LOUDSPEAKERS are developed in this Laboratory, whose staff also carry out regular checks at all stages of manufacture to ensure design standards of performance. Constant research and development ensures that the field is led and not followed, and by attention to detail in all phases of design and production a TRADITION OF EXCELLENCE is upheld.

for High Fidelity

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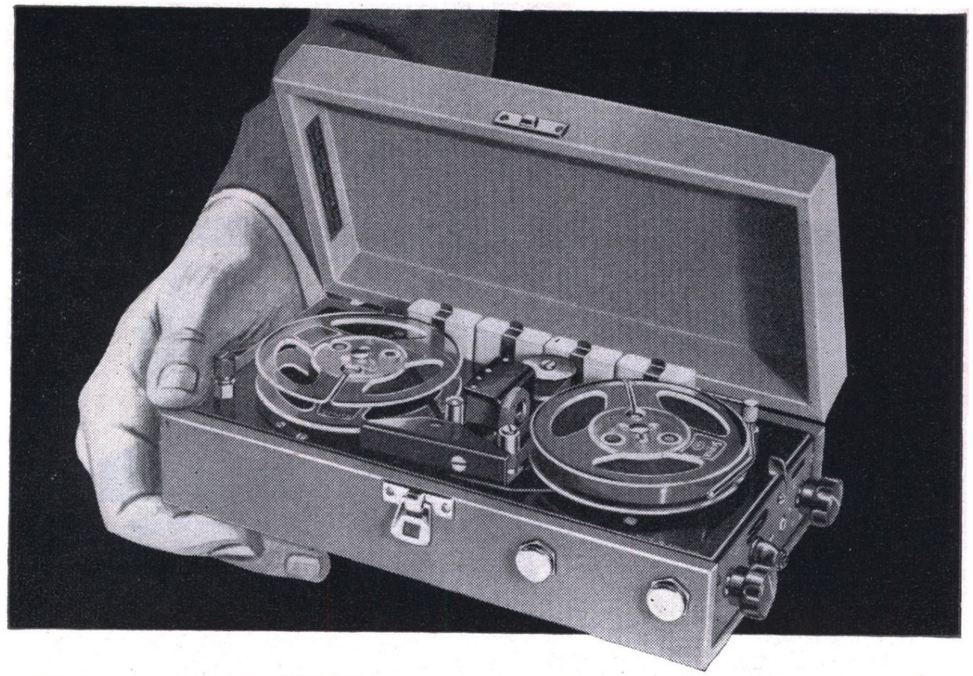
largest exporters of High Fidelity Loudspeakers



Only with **FI-CORD** can you have it both ways—
<u>really HI-FI</u> and <u>really portable</u>

Don't be misled by the compact size. The **FI-CORD** is a high fidelity instrument of advanced scientific design — assuring true-to-life recordings.

Frequency 50 — 12,000 c.p.s. ±3db. Tape speeds 7½ i.p.s. and 1⅞ i.p.s. Twin track record/playback, using standard 3¼" spools.

Wherever you go, you can take your **FI-CORD** with you, it is ideal for adding the realism of sound to movie films.

The **FI-CORD** weighs only 4½ lbs., measures 9⅜" x 5" x 2¾", operates in any position (lid open or shut) and requires no power point. It runs on 4 batteries, rechargeable from the automatic charger supplied.

Built-in speaker. Full playback volume. Extension speaker socket. Dynamic microphone with stop/start switch.

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G&G

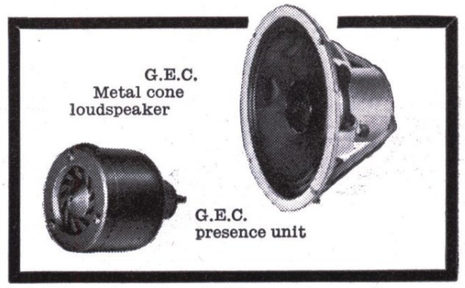
PERIPHONIC





In a triumph of sound reproduction achieved with two "air-coupled" G.E.C. metal cone loudspeakers and associated G.E.C. presence units, the G.E.C. Periphonic system (at 10 watts input) cuts harmonic distortion to 2.7% at 40 c/s. and 0.3% at 1,000 c/s.!
Exclusive to G.E.C., the metal cone loudspeakers give low inter-modulation distortion, and full response at the low bass frequencies while the presence units have extremely smooth high frequency response and excellent transient performance. The combination forms a complete system with full 9 octave realism and wide angle sound distribution.
Units are available separately or as the Periphonic system in a range of cabinets of entirely new acoustic design.

the G.E.C. loudspeaker system that cancels distortion



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Metal Cone Loudspeakers · Presence Units · Stereophonic Systems
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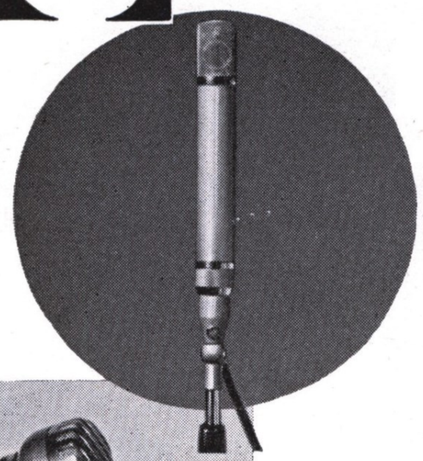
F

AKG *in the service of sound*



C.12



D.19/B
on ST/19 Desk Stand

D.9





K.50

AKG Microphones are to be found in the leading broadcasting, TV, film and recording studios throughout the world. The very wide range of types available extends from condenser microphones with facilities for varying their directional patterns whilst in use, to models for professional use in all spheres and others for domestic tape recorders. Model D.88, a new stereo dynamic instrument is typical of AKG enterprise in producing good microphones for specialised requirements. Please ask for leaflets.

C.12
Condenser microphone. Its directional characteristics may be varied by remote control during use without change in level. Individual frequency response curve with each model. *Other Condenser Types*—*C.*26, *C.*28, *C.*29, *C.*30 *and stereo model C.*24.

STUDIO DYNAMIC TYPES AVAILABLE
in a comprehensive range.

D.19/B
High quality cardioid dynamic with extended frequency range from 40-15,000 c/s. Available with bass cut compensating switch.

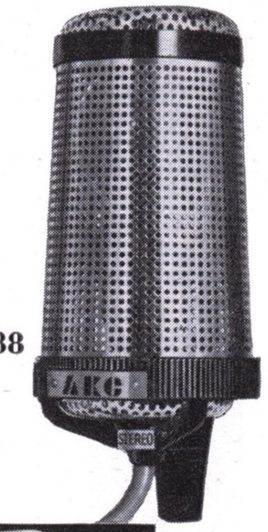
D.9
Omni-directional general purpose dynamic in high, low or dual impedances.

D.88—STEREO
Twin dynamic cardioid in high or low impedance (line transformer available). Response 80-15,000 c/s. Eminently suitable for the modern stereo tape recorder. For stand mounting.

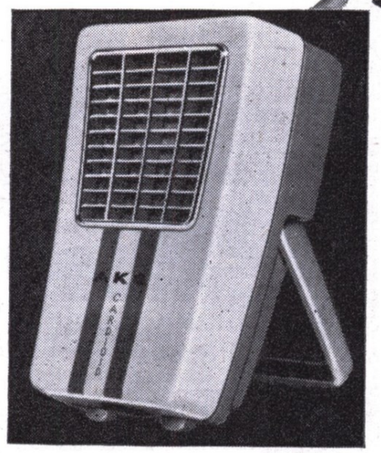
D.11/N
A new popularly styled dynamic microphone for the tape recorder. Cardioid pattern. Exceptionally fine design and characteristics. Frequency response 80-13,000 c/s. Front to back ratio 15dB.

K.50 HEADSET
Featherweight. Frequency range 30-20,000 c/s. Available for mono or stereo use. Requires less than 0.5 milliwatt power. 5,000 Ω version available.

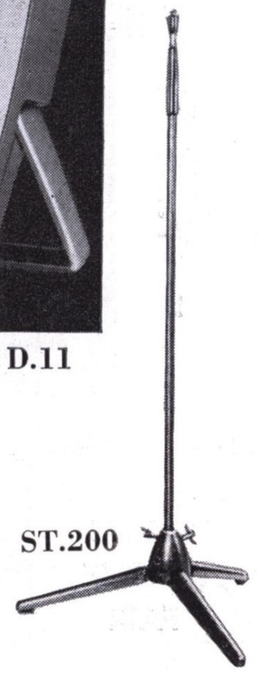
ST.200 SHOCKPROOF STAND
Fully transportable and folds easily. Completely shockproof.



D.88



D.11



ST.200

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AKG

STAND 34
DEMONSTRATION ROOM 312

The man who knows what's inside says:

You get more out of

TELEFUNKEN



TELEFUNKEN *Magnetophon* 75K-15

TWO TAPE SPEEDS	3¾ ips and 1⅞ ips.
FREQUENCY RANGE	60-16,000 cps at 3¾ ips and 60-9,000 cps at 1⅞ ips
PLAYING TIME	6 hours 20 minutes (5¾in. DP tape at slow speed)

Press button controls. Extra-sensitive braking and tape tension control system.
Recording head with ultra-fine gap. Indirect flywheel drive.
Connections for earphones, remote stop/start control and extension speaker.
In attractive lightweight Styron Case. **52 GNS.**
(excluding microphone)

TELEFUNKEN *Magnetophon* 76K

Four TRACKS provide a playing time of 12 hrs. 40 mins. from one 5¾in. DP tape. Two speeds with frequency response of 30-16,000 cps at 3¾ ips and 30-9,000 cps at 1⅞. D.C. heating of valves. Transistorised pre-amplifier stage. Four tracks facilitate perfect superimposition. One track may be monitored through earphone while the other track is being recorded. Simultaneous two-track playback.

(excluding microphone) **64 GNS.**

TELEFUNKEN *Magnetophon* 85KL

Six watt push-pull power stage, two matched oval speakers with cut-out switch, volume control, and separate bass and treble tone controls. Straight-through amplifier facilities. External speaker connection. Continuously variable trick control can be fitted. In luxury case.
(excluding microphone) **79 GNS.**

Studio Equipment
A range of Telefunken studio equipment will also be demonstrated

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TELEFUNKEN
The originators of Tape Recording

WELMEC CORPORATION LTD., 147/8 STRAND, LONDON, W.C.2

Stentorian

ON DISPLAY. SEE THEM ON BOOTH No. 4

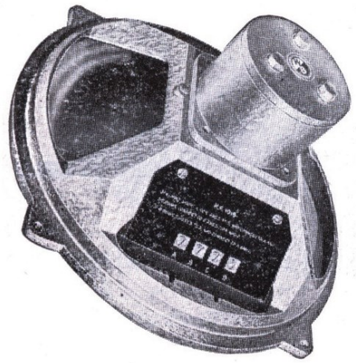


W.B.8 Amplifier £19.19.0.

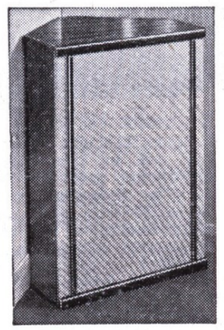


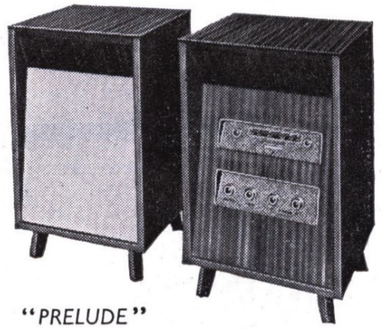
W.B. 8S Stereophonic Control Unit £22.15.0.

The items illustrated are representative of the wide range of W.B. Hi Fi equipment. A noteworthy recent addition is the "Stentereo" Stereophonic Speaker System embodying many novel features. Our experience in sound reproduction covers 33 years: such a background is a guarantee of quality. Full details of all W.B. products will gladly be sent on request.



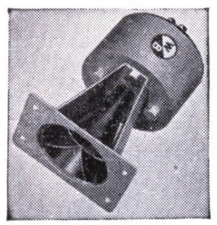
Stentorian Cambric Cone Hi-Fi Units.
The famous H.F.1016 at £7.12.3.
Others from £1.5.6.





"PRELUDE"
ready-to-assemble cabinets in striped sapele from £9.19.6 to £13.13.0.

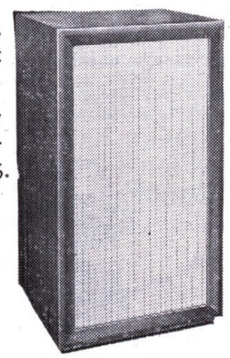
Ready-to-assemble cabinets in polished walnut from £5.10.0 to £16.16.0.



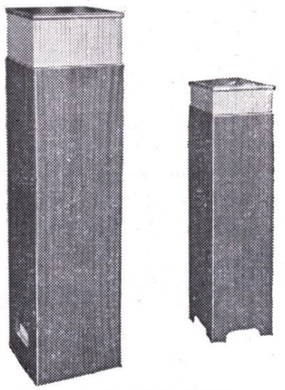
Tweeter Units from 33/3 to £12 12.0.

Prelude Horn-Loaded Cabinet £19.10.0.

HF. 817 Speaker £10.16.6.



Stentorian Extension Speakers from 60/-.



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Cabinet for H.F.816. Unit £18.18.0.
Cabinet for H.F.610 Unit £9.19.6.

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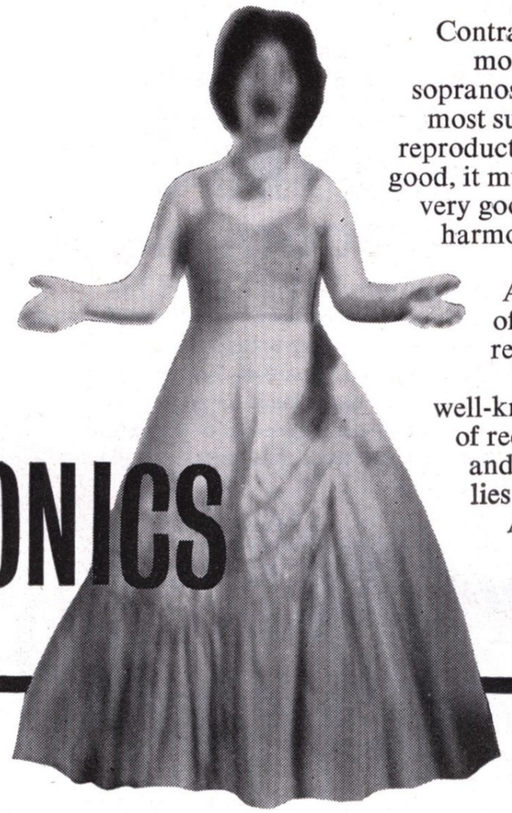
HEAR THE HARMONICS

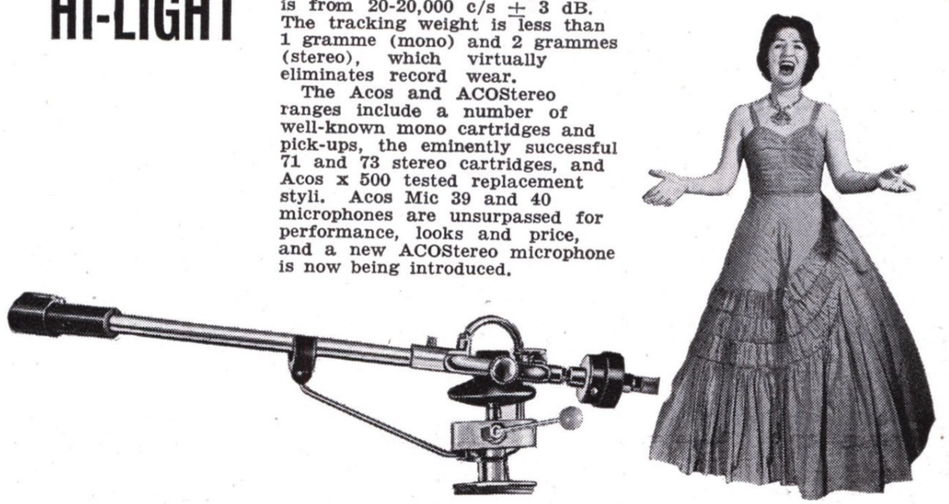


Contraltos can be most contrary, sopranos can sound most surprising. If reproduction is to be good, it must be very, very good; without harmonics, it can be horrid. At the heart of fine sound reproduction in many a well-known make of record player and radiogram lies an Acos or ACOStereo cartridge or pick-up.

ON THE ACOS HI-LIGHT

The new Acos Hi-Light is undoubtedly one of the finest mono and stereo pick-ups in the world. The frequency range is from 20-20,000 c/s ± 3 dB. The tracking weight is less than 1 gramme (mono) and 2 grammes (stereo), which virtually eliminates record wear.

The Acos and ACOStereo ranges include a number of well-known mono cartridges and pick-ups, the eminently successful 71 and 73 stereo cartridges, and Acos x 500 tested replacement styli. Acos Mic 39 and 40 microphones are unsurpassed for performance, looks and price, and a new ACOStereo microphone is now being introduced.



acos ARE DOING THINGS IN STYLI

DEMONSTRATION ROOM 111, BOOTH 65.

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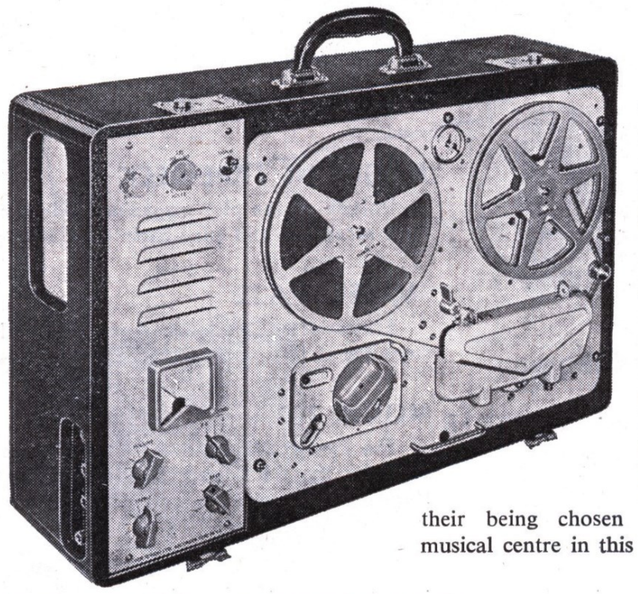
Vortexion



The W.V.A. tape recorder now has provision for Stereo plug - in heads to enable this recorder to replay Stereo. The regular models are retained with additions and improvements. Our high standard, which has made these recorders famous, has been maintained, resulting in their being chosen for the foremost musical centre in this country.

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This is a studio quality electronic mixer suitable for any climate. The controls are hermetically sealed, and great care and selection of components to make certain reliable low noise operation, and individual screens prevent break through. The built-in power transformer is screened and potted, and all the microphone transformers are individually potted in selected heavy gauge Mumetal boxes. Front or rear inputs and outputs may be obtained to order. The normal output is .5 volt, 1.m.w. 600 ohms also available.

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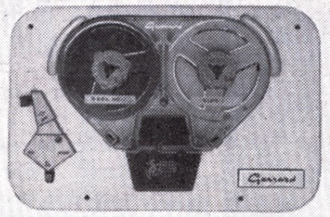

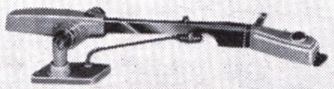

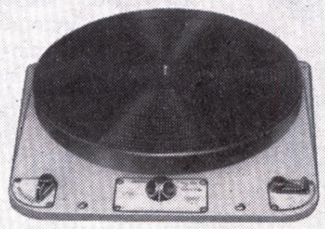





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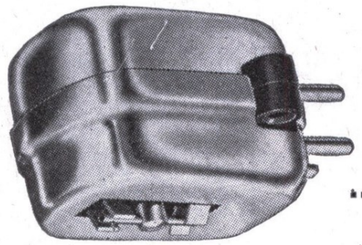

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Weight:	18½ lb.

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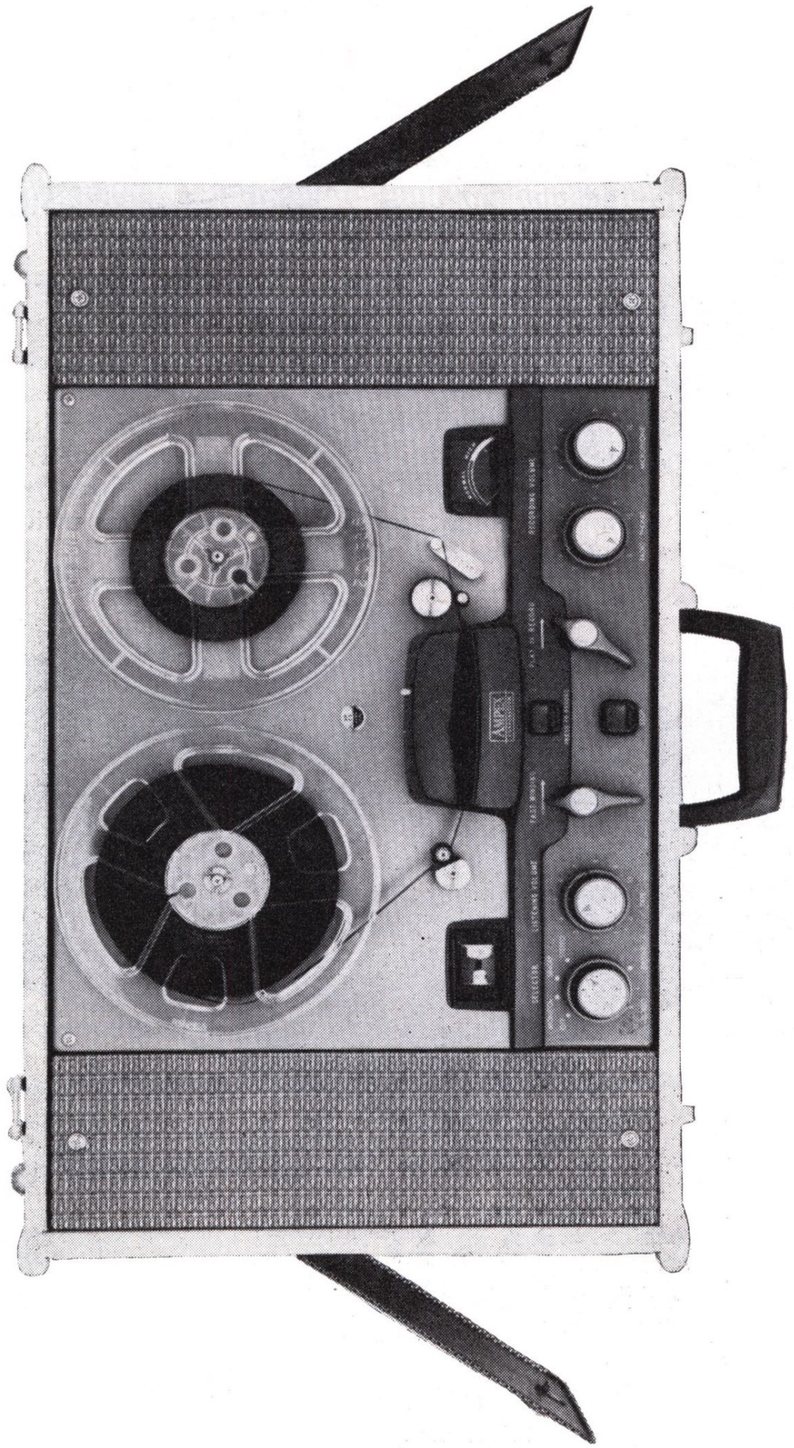

The Ampex recorder pictured at the left is the most unique stereo tape system available in Britain. Unlike any other portable, two adjustable baffles offer complete control over the effective spacing and direction of sound from the matched speakers. It operates at either 3¾ or 7½ ips, records stereo, even sound-on-sound, and plays two or four track stereo tapes. This model 970 is actually only one of many Ampex tape recorders, components and systems that you are invited to see and hear at the London Audio Fair. These include amplifiers, speakers, single channel portables, stereo portables, and complete music systems housed in cabinets of crafted fruitwood, mahogany and walnut.

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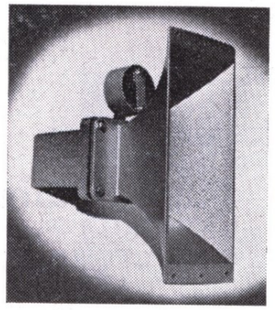

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Mk 11

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Frequency Range: 2Kc/s to 20Kc/s within −1 & +2dB. 2 Micron Aluminium Ribbon (shock resistant, reducing distortion).
Built-in matching transformer.
Power Capacity: Up to 10 watts maximum.
Impedance: 15 ohms nominal.
rice **10 gns**

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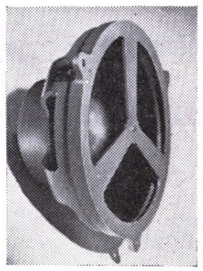
Mk I & II



Designed to meet exacting requirements for reproducing the lower frequencies. Recommended for use with a first-class H.F. Unit (preferably the Kelly RIBBON Mk II). Two externally similar models—Mk I & II—are available. Both models incorporate many unique design features and have been engineered to maintain consistent high quality performance.

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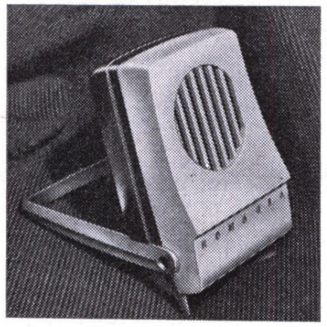
Price **Mk 11—4″ voice coil unit 24 gns.**



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The 4105 is a moving coil cardioid microphone, particularly suitable for use in high quality sound reinforcement systems where a high degree of intelligibility and a good feedback margin are required.

The exhibits will include the newly developed "STANTEL" *curved* column loudspeaker which has been designed for use in high quality sound reinforcement systems.

A 15-watt audio amplifier will also be shown.

VALVES

The exhibit shows those types in the very wide Brimar range which are particularly designed for use in high quality sound reception and reproduction applications. Also shown are triple-crystal units on B7G bases for use in switch-tuned F.M. receivers, eliminating the need for A.F.C. systems. The rest of the conventional tuner stages are, of course, still required, and a wide selection of types suitable for these purposes is also shown.

On the audio side the ELL80 will be of special interest; this combines two output pentodes in a single miniature bulb and is capable of 8.5 watts output in Class AB push-pull for 8 volts drive. Thus, in combination with the 6BR8 triode pentode, as voltage amplifier and phase-splitter, a sensitive high quality amplifier could be made using only two valves. The application of a valve such as the ELL80 in the stereo field would obviously be of great advantage.

For more conventional amplifiers a wide range of other types is exhibited, including the 7D11, two of which in push-pull are capable of 50 watts output, and (as previously indicated) the 6BR8 triode-pentode, which can be used in various circuits (i.e., rumble filter, tone control, low pass filter, phase splitter, etc.) throughout the intermediate stages of the amplifier.

BOOTH 35 ● OFFICE 240

See HMV

STAND

No 56

DEMONSTRATION ROOM

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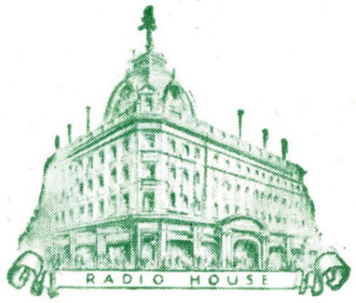

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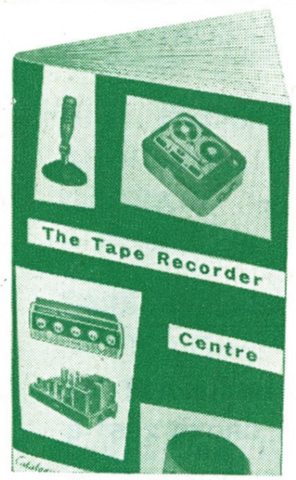

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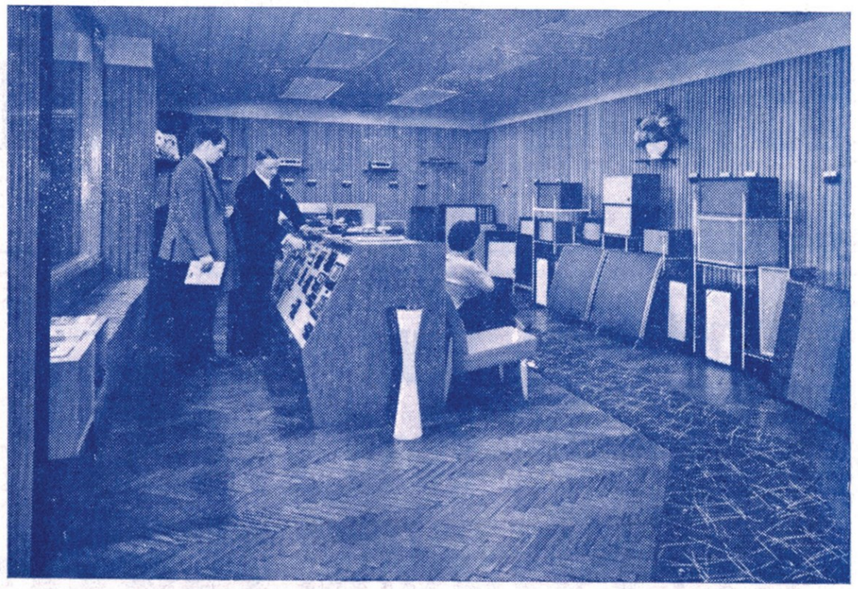

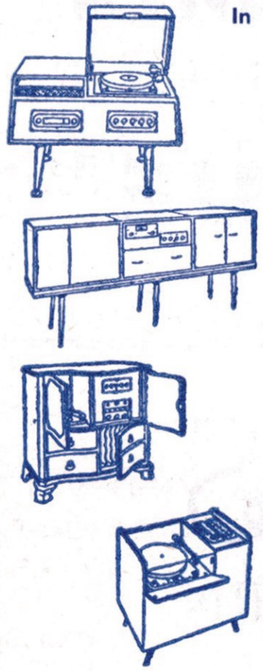

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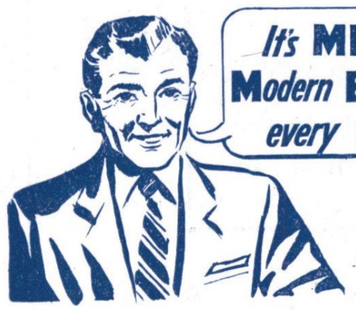

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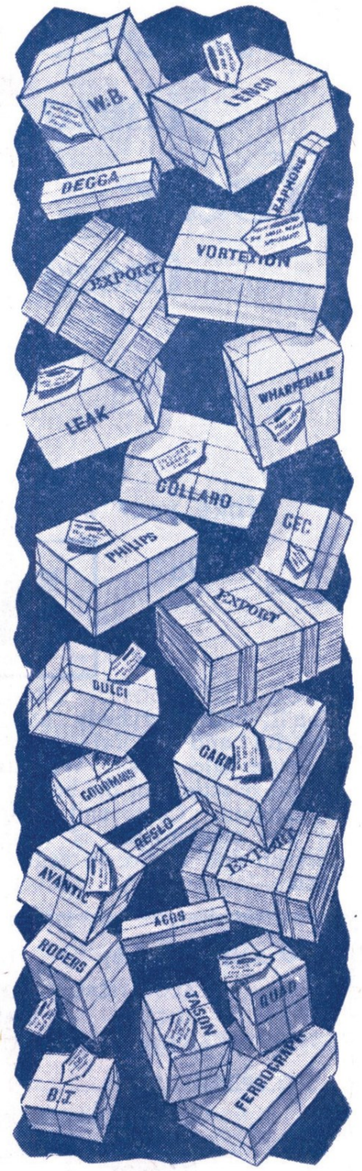

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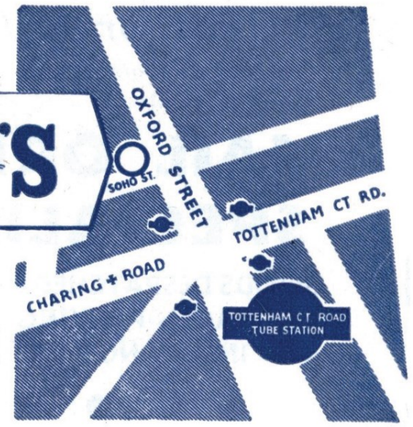

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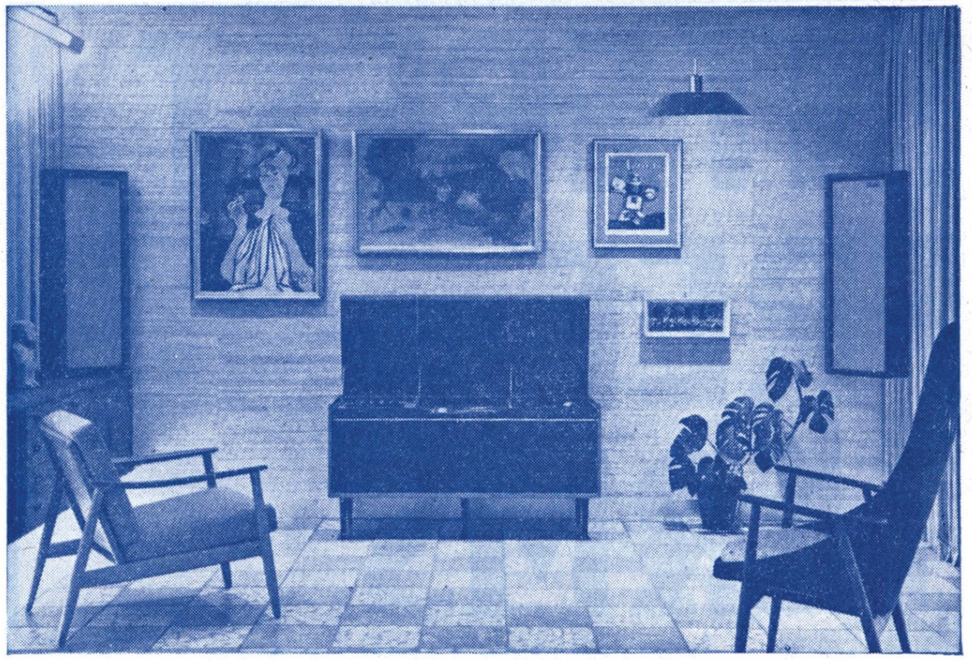

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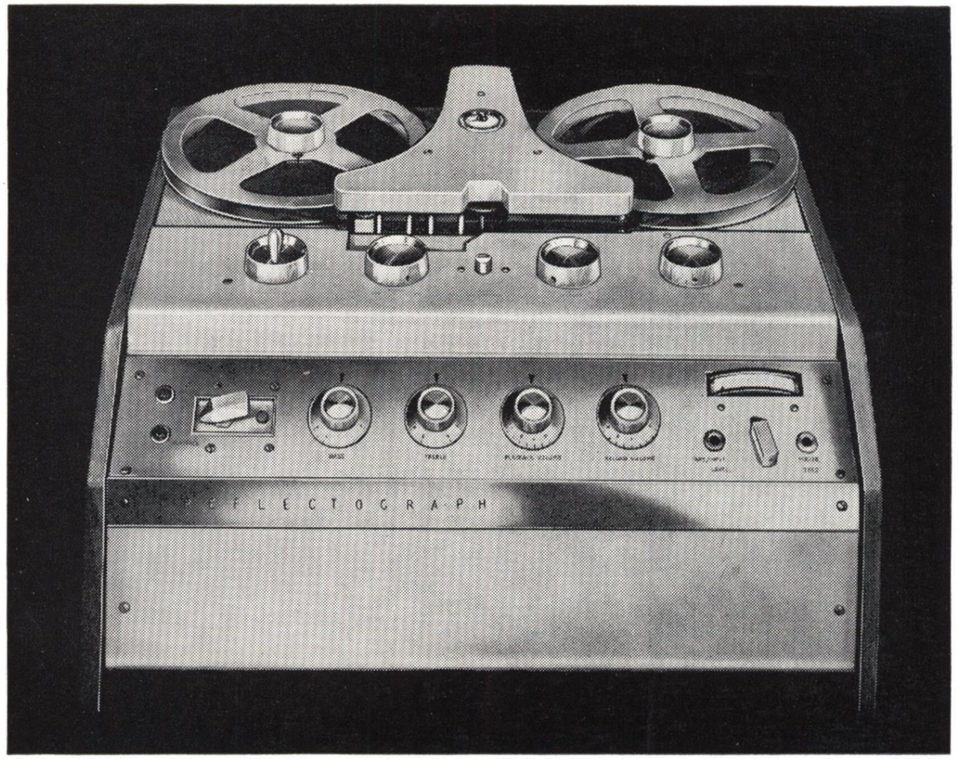

New

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