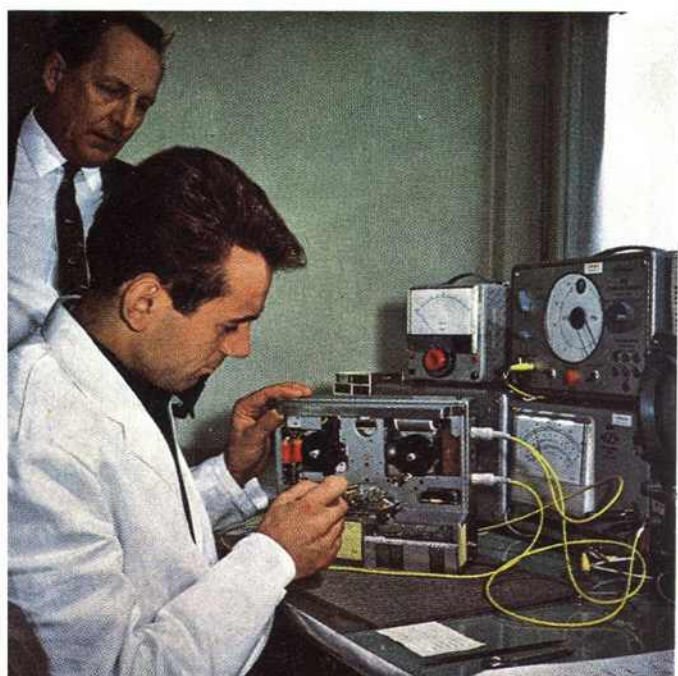
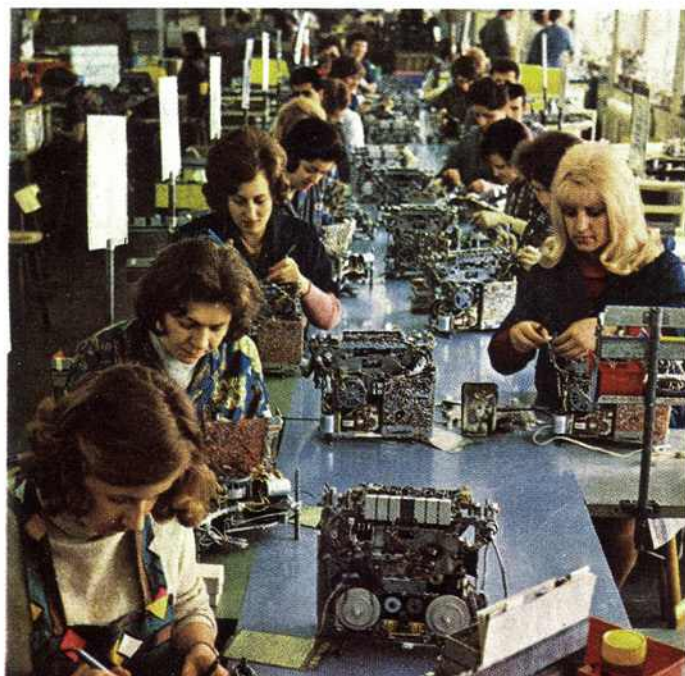


**AUDIO FAIR
ISSUE**

Amateur Tape Recording

AUDIO-VIDEO

April 1967 Vol 8 No 9 2/6



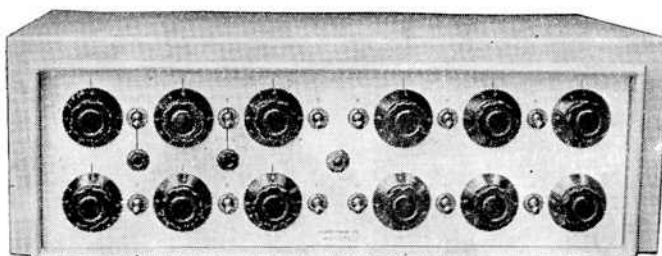
TAPE RECORDERS IN THE MAKING—UHER—Page 10

—Vortexion

quality equipment

12-WAY ELECTRONIC MIXER

The 12-way electronic mixer has facilities for mixing 12 balanced line microphones. Each of the 12 lines has its own potted mumetal shielded microphone transformer and input valve, each control is hermetically sealed. Muting switches are normally fitted on each channel and the unit is fed from its own mumetal shielded mains transformer and metal rectifier.



FOUR-WAY ELECTRONIC MIXER

This unit provides for 4 independent channels electronically mixed without "spurious break through" microphony hum and background noise have been reduced to a minimum by careful selection of components. The standard 15-50 ohm shielded transformers on each input are arranged for balanced line, and have screened primaries to prevent H.F. transfer when used on long lines.

The standard 5 valve unit only consumes 18.5 watts. H.T. is provided by a selenium rectifier fed by low loss, low field, transformer in screening box. The ventilated case gives negligible temperature rise with this low consumption assuring continuance of low noise figures.

20,000 ohms is the standard output impedance, but the noise pick-up on the output lines is equivalent to approximately 2,000 ohms due to the large amount of negative feedback used.

For any output impedance between 20,000 ohms and infinity half a volt output is available. Special models can be supplied for 600 ohms at equivalent voltage by an additional transformer or 1 milliwatt 600 ohms by additional transformer and valve.

The white engraved front panel permits of temporary pencil notes being made, and these may easily be erased when required. The standard input is balanced line by means of 2 point jack sockets at the front, but alternative 3 point connectors may be obtained to order at the rear.

Mixer for 200-250 V AC Mains	..	..	..	..	£40	8	6
Extra for 600 ohm output model	..	..	..	..	£1	18	6
Extra for 600 ohm 1 milliwatt output	..	..	..	..	£3	0	6
Size 18½in. wide × 11½in. front to back (excluding plugs) × 6½in. high.							
Weight 22 lb.							

THREE-WAY MIXER and peak programme meter, for recording and large sound installations, etc.

This is similar in dimensions to the 4-Way Mixer, but has an output meter indicating transient peaks by means of a valve voltmeter with a 1 second time constant in its grid circuit.

The meter is calibrated in dBs. zero dB being 1 milliwatt-600 ohm (0.775 V) and markings are provided for + 10 dB and - 26 dB. A switch is provided for checking the calibration. A valve is used for stabilising the gain of this unit. The output is 1 milliwatt on 600 ohms for zero level up to + 12 dB maximum. An internal switch connects the output for balance unbalance, or float. This output is given for an input of 40 microvolts on 15 ohm.

An additional input marked "Ext. Mxr." will accept the output of the 4-Way Mixer converting the unit into a 7-Way controlled unit. This input will also accept the output of a crystal pick-up, but no control of volume is available.

The standard input is balanced line by means of 3 point jack sockets at rear, but alternative 2 point connectors may be obtained to order at the front or rear as desired.

The 8 valves and selenium rectifier draw a total of 25 watts.

P.P.M. for 200-250 V AC Mains	..	..	..	Price on application.
Size 18½in. wide × 11½in. front to back (excluding plugs) × 6½in. high.				
Weight 23 lb.				
10/15 watt Amplifier with built-in mixers.				
30/50 watt Amplifier with built-in mixers.				
2 × 5-way stereo mixers with outputs for echo chambers, etc.				

Full details and prices on request.

VORTEXION LTD, 257-263 The Broadway, Wimbledon, S.W.19

Telephone: LIBerty 2814 and 6242-3-4

Telegrams: "Vortexion London S.W.19"

one switch to give you two mikes

The Philips P33 is a superb, professional microphone at a medium price, which provides cardioid or omni-directional characteristics — at the click of a switch.

The frequency response is 80 c/s to 15 Kc/s $\pm 3\text{db}$. It is flat over a wide range and remains flat in the low frequency range when used close up. In the cardioid mode sensitivity

at the rear is 17db less than at the front. Impedance is 500 ohms.

The P33 is mounted in a quick-release holder and can instantly be used as a hand-held microphone complete with a detachable, twin screened cable 16 feet in length. In addition an anti-vibration mounting is available, preventing transmission of rumble from the stand.



Modern appearance coupled with high quality make the P33 a must for entertaining, recording and public address. Ask your dealer for details or contact:

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sound and vision

PETO SCOTT LIMITED
Addlestone Road, Weybridge, Surrey. Tel: Weybridge 45511

PETO SCOTT for Philips professional sound

GW PS17

E.M.I. Records (The Gramophone Co. Ltd.) E.M.I. House, 20 Manchester Sq. London W.1



MATT MONRO
Here's To My Lady Capitol TA-T2608

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Hall Of Fame Columbia TA-SX6120

emi tape the sounds of excitement

JIMMY SHAND AND HIS BAND
Gateway To The Forth Parlophone TA-PMC7018

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Brass On The March Columbia TA-SX6121

THE BEACH BOYS
Surfer Girl Capitol TA-T1981



SONY research makes the difference

MODEL TC350 - FEATURES

4 track stereophonic and monophonic recording and playback ☐ Precision solid state circuitry comprising independent recording amplifiers and playback preamplifiers ☐ Professional 3 head system ☐ Sound on sound recording ☐ Language/music training facilities ☐ Vertical and horizontal operation ☐ All idler beltless tape driving mechanism ☐ Two tape speeds ($7\frac{1}{2}$ and $3\frac{3}{4}$ ips) ☐ 7" reel capacity ☐ automatic shut-off switch ☐ head-set monitor jack ☐ pause control ☐ digital tape index counter ☐ two VU meters ☐ integrated record/playback connector

SPECIFICATIONS:

Power requirements: 50W, 100, 110, 117, 125, 220, 240V, 50/60 c/s AC.

Reel: 7" or smaller.

Tape speed: $7\frac{1}{2}$ and $3\frac{3}{4}$ ips. with automatic equalization change.

Recording system: 4-track stereophonic or monophonic.

Frequency response: 30-20,000 c/s at $7\frac{1}{2}$ ips. ± 3 db 50-15,000 c/s at $7\frac{1}{2}$ ips. 30-14,000 c/s at $3\frac{3}{4}$ ips.

Signal-to-noise ratio: Better than 50 db.

Wow and flutter: Less than 0.17% RMS at $7\frac{1}{2}$ ips. Less than 0.25% RMS at $3\frac{3}{4}$ ips.

Harmonic distortion: Less than 3% at 0 db line output.

Level indication: Two VU meters.

Record: NAB standard.

Playback: calibrated to 0 db line output.

Recording time:

	4-track stereo	4-track monophonic
1,200' tape	$7\frac{1}{2}$ ips. 1 hr. 2 hrs.	$3\frac{3}{4}$ ips. 2 hrs. 4 hrs.
1,800' tape	$7\frac{1}{2}$ ips. $1\frac{1}{2}$ hrs. 3 hrs.	$3\frac{3}{4}$ ips. 3 hrs. 6 hrs.

Fast forward and rewind time:

Within 4 min. (1,200' tape).

Input: Microphone

Sensitivity: -72 db (0.19mV)

Impedance: low (will accommodate any microphone from 250-1K ohm impedance).

Auxiliary

Sensitivity: -22 db (0.06 V).

Impedance: approx. 100K ohms.

Integrated record/playback connector.

Sensitivity: -42 db (6.15 mV).

Impedance: approx. 100K ohms

Output:

Line

Output level: 0 db (0.775V).

Impedance: optimum load impedance 100K ohms.

Binaural monitor

Output level: -1 db (0.692V).

Impedance: accommodates 10K ohm head-set.

Integrated record/playback connector

Output level: 0 db (0.775V).

Impedance: optimum load impedance 500K ohms.

Head: Recording RP 30-2902.

Playback PP 30-4202N.

Erase EF 18-2902H.

Transistor: 2SC402 x 18, 2SB381 x 2, 2SC291 x 1.

Diode: IT22A x 2, 5G-D x 2.

Dimensions: $15\frac{1}{2}$ "(W) x $6\frac{5}{8}$ "(H) x 13"(D).

Weight: Approx. 17 lbs. 3 ozs.

Accessories: Empty 7" reel. Connection cord. Capstan. Pinch roller. Reel cap.

Recommended retail price 75 Gns.

Sony offer the finest range of tape recorders from the battery portable TC 900 to the studio quality 777.

For further details see your Sony dealer or write to:

Sony U.K. Sales Division,
Eastbrook Road, Gloucester.
Tel: Gloucester 21591.

London Showrooms:
70-71 Welbeck Street, London, W.1.
Tel: HUNter 2143

SONY®
RESEARCH MAKES THE DIFFERENCE

See us on Stand 74 at the Audio Fair, Hotel Russell, W.C.1 — March 30-April 2



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INTRODUCE THE NEW

OPTACORD 450 BATTERY/MAINS CASSETTE LOADING TAPE RECORDER for 39 GNS.

OPTACORD 450 THE UNIVERSAL TAPE RECORDER FOR BATTERY/MAINS OPERATION (Power-pack incorporated)

- New compact-magazine-system bans tape threading (Philips type).
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- Ready for recordings per microphone supplied with the set, as well as from the radio-receiver, record player or any other tape recorder.

Other features include:

Further to operation on batteries (5 monocells 1.5v each) or on mains (410/220 v a.c.) connection to car battery (6 or 12 V) also possible. Playing time with compact-magazine C 60=2 x 30 mins. with compact magazine C 90=2 x 45 mins. Monitoring via built-in loudspeaker, external speaker or headphone: Frequency response 50-8000 c/s; Contrast =40dB.

Write for illustrated leaflet and further details to:



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71/3 Gt. Portland Street, London, W.1.
MUScum 2901/5

Central London Showrooms at the Tape Recorder Centre, 82 High Holborn, London, W.C.1



April Audio Fair Number out March 23.
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from any newsagent, record dealer, or by post 2s 6d post free
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Complete
with razor cutter

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M30A



LEARN WHILE
YOU SLEEP!

Languages, studies,
scripts, etc. by means
of tape recordings played at a
whisper through under pillow speaker
SLEEP-O-MATIC UNIT

including two-speed tape recorder complete with microphone, time-switch and under pillow speaker £27/10/- plus 6/- post (Batteries 5/-). Two models available, one for mains only and one for batteries which can be supplied with a mains power pack at 50/- extra. Both will take our special radio tuner at 42/-.

Publications on "Sleep Learning" and "Mental Power Through Sleep Suggestion". Full details on request.

RAPID RECORDING SERVICE
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A Winner

The DP4 microphone is another winner—by performance alone it has achieved world wide acclaim. It is used regularly by P.A. engineers, broadcasting and television companies, film studios, etc., as well as by many professional and amateur tape recordists. Its winning qualities have been designed and produced by Grampian—specialists for over thirty years in the field of sound equipment. We shall be pleased to send you full technical details of the DP4 and other microphones, together with descriptions of various accessories.

Specially designed to use with the DP4, in order to cut down wind noise is the Wind-shield — as illustrated here.



There is also the "Grampian" Parabolic Reflector. Where it is not possible to place a microphone close to the source of sound such as when making recordings of bird songs, weddings, car and train noises etc. the Parabolic Reflector has been proved over and over again to be of enormous value.

Grampian

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Telephone: 01-894-9141

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FREE

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COMPONENT SELECTOR

A useful double-purpose slide rule, giving exact, at-a-glance findings on:

PERCENTAGE TOLERANCE

Pinpoints the tolerance range for any given nominal value of any component (e.g. resistors and capacitors). Five tolerance ranges are covered on one slide: 1%, 2%, 5%, 10%, 20%.

VALUES FOR A CR CIRCUIT

Enables you to rapidly compute time constants involving awkward multiples of capacitance and resistance.

ALSO IN THIS ISSUE Special articles on the 27MHz FIELD STRENGTH METER, the VALVE VOLTMETER AND OHM METER and a wide range of electronic features.

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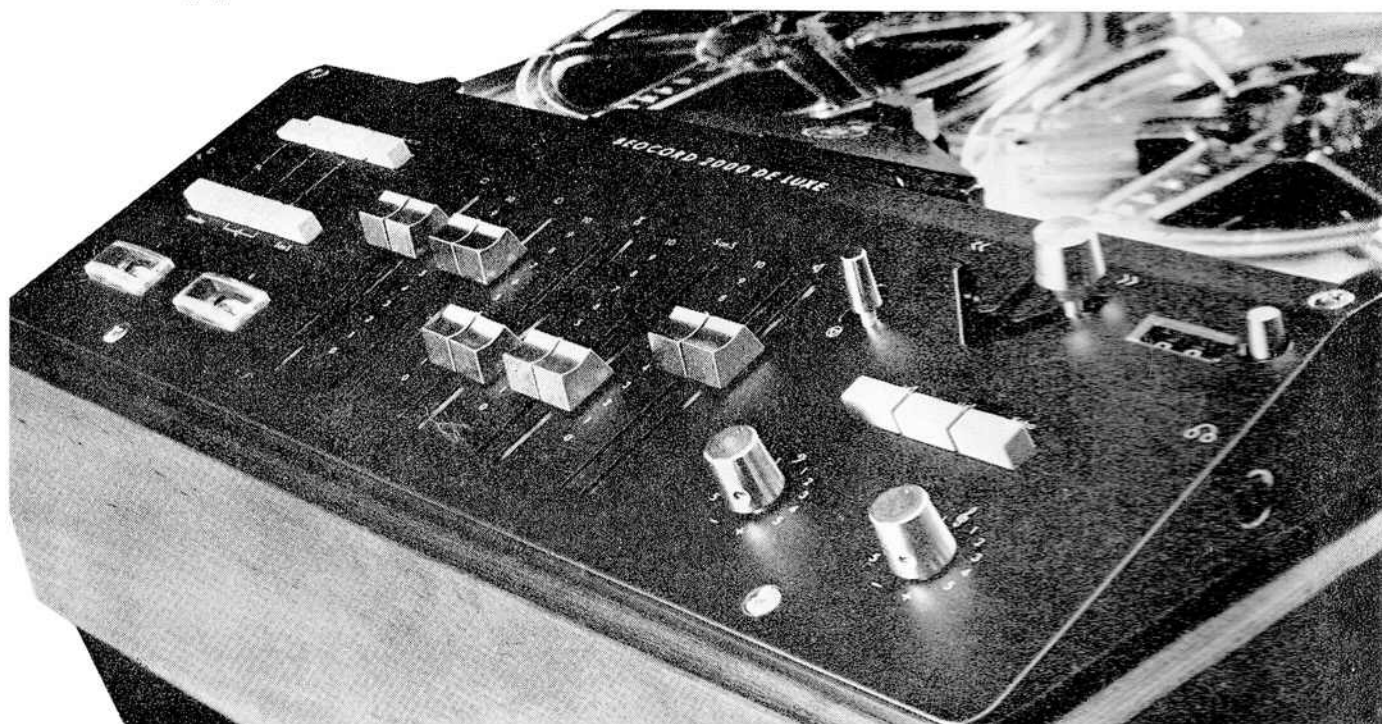
PRACTICAL

APRIL ISSUE—OUT NOW—2/6

ELECTRONICS



B & O - for those who consider design and quality before price



The Beocord 2000 de luxe tape recorder has more built-in facilities—and so it should.

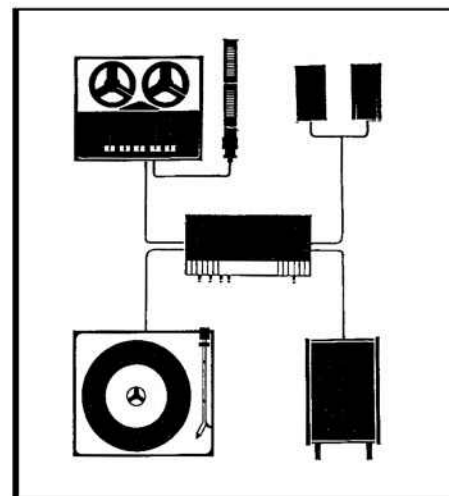
Because you pay 125 gns. for the Beocord 2000 you have to look at it twice . . . and then look again. Just think what *you* could do with the facilities designed into the Beocord.

The 4-channel mixer section for instance. This will enable you to mix on to one recording a complexity of sounds to give professional results. Sound on sound, track to track transfer, variable echo, a straight through stereo amplifier—all these things too. Big 8 watts (R.M.S.) per channel output via two switchable pairs of stereo loudspeaker sockets.

Look at the neat functional design, which makes this tape recorder unique.

Now you see what we mean by quality. And 125 gns. suddenly seems *very* reasonable.

Bang & Olufsen's design theme continues throughout the whole range. For further information on Tape Recorders, Loudspeakers, Turntable units and accessories see your local B & O Dealer now or write for his name and our illustrated catalogue to :



Bang & Olufsen U.K. Sales Division

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See the Beocord 2000 and the full B & O range at the Audio Fair · Stand No. 54 · Demonstration Room 322

Prices referred to above are recommended Retail Prices

Amateur Tape Recording

AUDIO-VIDEO

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EDITORIAL COMMENT

British Amateur Tape Recording Contest, 1967/8

With a committee and working plans established, the BATR Contest is now under way, and although it will officially become the '1967 contest' it will terminate with the presentation of prizes in 1968 at the International Audio Festival and Fair of that year. This now enables competitors to use most of the winter months for the making of their tapes, even though, as in some cases, the actual recordings will have been made during the summer – for example, material for interviews or actualities, etc. The extra time before the closing date (tentatively 31 December, 1967) will allow for more detailed and careful work on editing, etc., and offset time otherwise occupied for summer holidays and so on.

On this basis the 'preliminary' judging will take place in January and February with final judging for first place awards and *Tape of the Year* in March. It is hoped to announce the 1968 contest, with all relevant details, by or even before the 1967 presentations. In this way competitors will have almost a whole year in which to prepare tapes and not just a few months as before. The categories of recording will be decided upon at the next committee meeting and we hope to have these published in the May issue. In addition, separate printed entry

forms and details of the contest rules will also be available from the BATR Contest headquarters. It is hoped there will be extra consolation prizes for runners-up and that fuller reports on the competition tapes will be made available.

This year the contest is being sponsored by the leading audio and recording technical journals and additional support is being given by the tape recording industry. The committee, under the chairmanship of Mr C. Rex-Hassan, is as follows: Vice-Chairman, Miss Brenda Marriott (Chief Publicity Officer, Grundig GB Ltd); Hon Secretary and Treasurer, John Bradley (Federation of British Tape Recording Clubs); Douglas Brown (Editor, *Tape Recording*, and founder of BATR Contest); F. C. Judd (Editor of *Amateur Tape Recording*); John Crabbe (Editor of *Tape Recorder*); Donald Aldous (Technical Editor of *Audio Record Review*) and John Borwick (Technical Editor of *The Gramophone*).

Timothy Eckersley (Assistant Head of Central Programme Operations, BBC) has agreed to act as an independent observer on the running of the contest and has, in fact, already contributed several useful ideas. In agreement with the other sponsoring magazines, ATR will from time to time be publishing news of the contest and guidance on the making of tapes. Once again apologies for not being able to get the contest rules

into this issue, so please make sure you don't miss the next one!

Audio Festival, 1967

This looks like being a larger than ever audio festival, and this year more UK distributors of products manufactured abroad will be exhibiting and, of course, demonstrating. We call your attention to the guide to exhibitors on page 32 and to our two previews of selected tape recorders and other hi-fi equipment being shown this year. Quite a number of manufacturers and distributors have indicated 'something new this year', but are reserving details until the opening day of the Audio Festival itself. We therefore strongly recommend a visit this year, even though you might find climbing up and down to the five floors of the demonstration rooms a bit exhausting. FCJ

FRONT COVER

Upper left, every Uher tape recorder undergoes a frequency response test, record to playback, with special pen graph response testing equipment.

Upper right, speed variation checks are carried out with stroboscopic equipment.

Lower left, one of the modern assembly lines devoted to Uher tape recorders.

Lower right, the Editor of ATR watches a Uher Pilot recorder being aligned. This recorder was specially designed for recording sound tracks synchronized with cinefilm.

TAPE RECORDERS IN THE MAKING UHER

ATR visits Munich, the home of Uher tape recorders
and a cultural centre with world-famous
theatrical and musical activity



Wolf Frhr. Von Horstein, general manager of Uher.

The history of Munich dates back to 1158 – Uher began manufacturing tape recorders sometime later – and from 1253 onwards was the residence of the Bavarian Electors. In 1806 it became the home of the Bavarian Kings and is now the seat of the Free State of Bavaria. With a population of nearly one and a half million, Munich has become the third largest industrial city of the German Federal Republic and is concerned with the manufacture of electrical apparatus, motor vehicles, optics and textiles. The *Uher Werke München* was founded in 1953 with Wolf Frhr. von Horstein as President and General Manager of the company. Today, nearly 600 people are employed at the Munich factory, with another 450 at the branch works at Buchbach. Both factories are concerned solely with the manufacture of tape recorders, accessories for tape recorders, language teaching systems and tape recorders for special applications. The daily output of tape recorders alone is more than 500, 45% of which are exported to the Common Market and EFTA countries, the USA, Canada and South Africa, involving some 120 overseas distributors with service facilities and trained technical personnel. There are 23 appointed service agents in Germany alone. The main UK distributors and service agents are Bosch Limited, 205 Great Portland Street, London W1.

Milestones in Uher History

In 1956 Uher produced the first of their type 95 tape recorders, a somewhat large but otherwise successful series. In 1958 came the *Universal Series*, one of which was reviewed in *ATR*, although at this time Uher was little known in the UK. Then followed the *Stereo Record 3* which was the first Uher machine to make real impact on the export markets. By 1961 the first of the 4000 *Report* series became a pioneering achievement in the field of portable tape recorders, being adopted, as it is now, for professional purposes. Among the most recent tape recorders from the Uher factory are the *Royal Stereo*, which is a home studio recorder, and the *22 Hi-Fi Special*, one of the first tape recorders specially designed for use in hi-fi



The Uher factory on the outskirts of Munich.



Part of the assembly shop where the printed circuit boards are fitted with components and where the wiring of the tape recorders is completed.

systems (also favourably reviewed in *ATR*). Last, but not least, is the *Uher 1000 Report Pilot* which was developed for linkage with a film camera to achieve synchronized sound tracks. It employs a pilot tone system and many are already in use by German and foreign broadcasting stations.

Uher Recorders are Popular

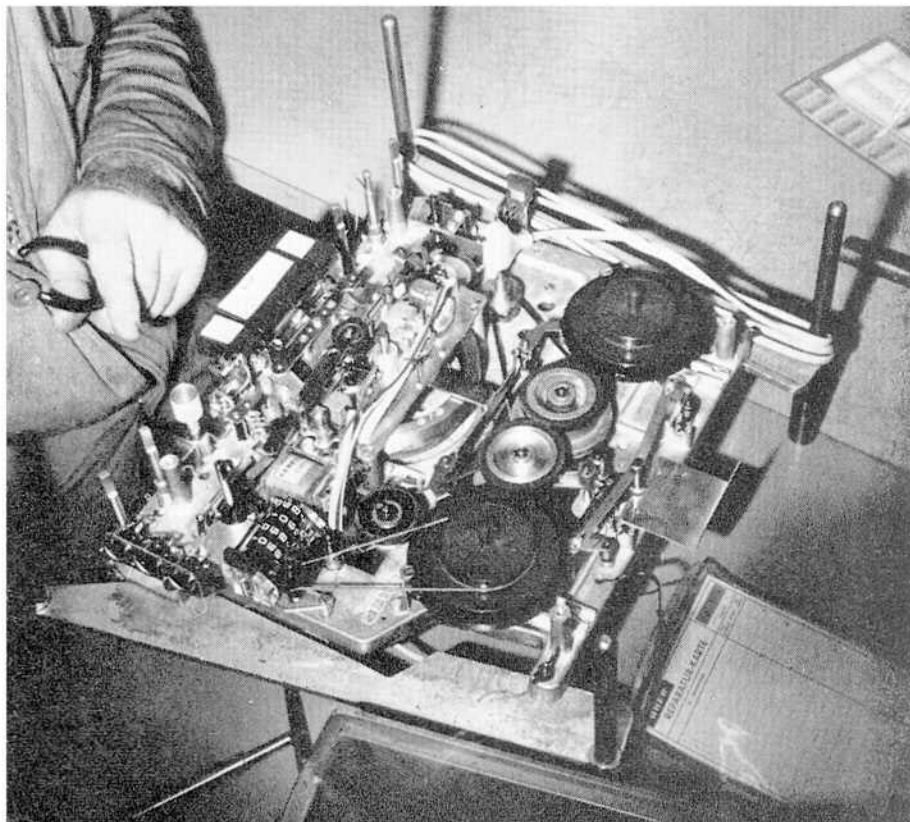
One of the best known of the Uher tape recorders in the UK is the current 4000 *Report L* portable favoured by amateurs and professionals alike. They are used by our own BBC as well as overseas organizations such as NASA, the American Federal

Police, the German Weather Service, the Canadian Broadcasting System, the National Broadcasting Company, the American Broadcasting Company, Radio Hong Kong and many other professional studios throughout the world. Uher estimate that 50% of the world's journalists and radio reporters use the 4000 Report L. Among the famous who use Uher tape recorders are Ella Fitzgerald, Stirling Moss, Dizzy Gillespie, and King Hassan of Morocco, to mention just a few.

Uher Werke München

I think one of the most surprised people to ever visit a tape recorder factory was radio reporter and *ATR* contributor Bob Danvers-Walker who came with me to visit Uher (he writes elsewhere in this issue on our recording activity in Munich). Within ten minutes of being in the factory his own Uher 4000 Report L was, to his utter amazement, completely stripped down to its various sub-assemblies. The Uher engineers just wanted to show him that, after six months of continuous use, both the mechanical and electrical performance were still absolutely to within specification. We more or less followed the bits and pieces right through the factory until the re-assembled recorder was handed back to him completely with frequency response certificate! I thought at the time that Uher were pretty confident of the performance of their products.

The factory is located in the outskirts of Munich not far from the site of the Munich Oktoberfest. It is an extremely modern factory with up-to-date machine tools, a plating shop and plastic moulding plant, etc., and Uher manufacture many of the components for their tape recorders, most of which



At every stage close inspection is carried out and the results recorded on a production card attached to the tape recorder.

employ printed circuit electronics. We toured the entire factory from the machine shops through the assembly and testing bays right to the production control and design laboratories.

Uher have a saying 'Your dreams are our tasks' and I must say they listened most attentively to what Bob and I had to say on the technicalities of tape and tape recorders. The fact that Uher specialize has led to some

Final testing stages where circuits and mechanical functions are checked and recording heads aligned.



TAPE RECORDERS IN THE MAKING UHER

Continued



Every Uher tape recorder undergoes a frequency response test with this special pen-recording response test equipment.

quite outstanding advances in development, especially in portable tape recorders. They were the first manufacturers to use printed circuits and among the first to employ transistors. Models such as the *Royal Stereo* and the *22 Hi-Fi Special* introduced new high standards for domestic recorders and such achievements have only become possible because the entire staff have a single obsession – the production of tape recorders for all purposes, capable of meeting all requirements. It is interesting to note that many of the Uher employees are themselves

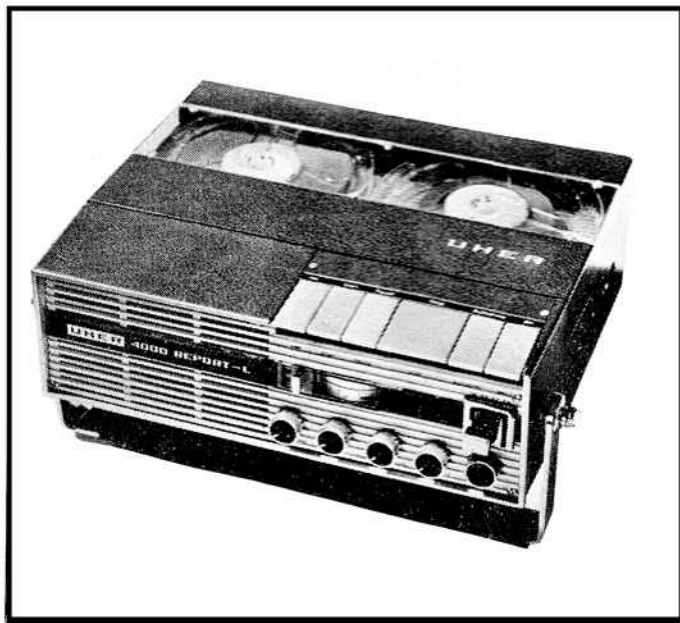
tape recording enthusiasts. The current Uher catalogue shows ten different tape recorders at present in production, as well as dozens of accessories such as microphones, mixers, cables, slide projector synchronizers, headphones, remote control units and special accessories for individual recorders. Uher is truly devoted to tape recording.

The individual manufacturing stages of Uher tape recorders and accessories are of course too numerous to relate in detail, and I hope that the photographs will give some idea of the factory and its products. Bob Danvers-

Walker was impressed, and so was I, with the thoroughness and precision that goes into the design and manufacture of Uher products. Our visit to Munich will not quickly be forgotten mainly because of the very warm Bavarian welcome extended to us by Helmut Grill (Uher publicity officer) and his wife, who made quite sure that we experienced some of the delightful 'tourist' attractions of Munich before we left. I returned with some very fine recordings of the sounds of Munich, made, of course, with my *Uher 4000 Report L*. FCJ



The Uher 22 Hi-Fi Special designed for use with hi-fi systems and available for half or quarter-track, mono or stereo operation.



The now-well-known Uher 4000 Report L portable is used all over the world by radio reporters, journalists and amateur enthusiasts alike. Function is half-track with four operating speeds, $7\frac{1}{2}$, $3\frac{3}{4}$, $1\frac{1}{2}$ and $\frac{1}{8}$ ips.

QUALITY

the simple, single aim

behind the manufacture of these and every UHER Tape Recorder. The production of tape recorders for every amateur and professional need is the sole pre-occupation of the UHER Company, whose specialisation has led to many outstanding developments, including the first application of printed-circuit techniques in tape recorder manufacture.



4000 Report-L

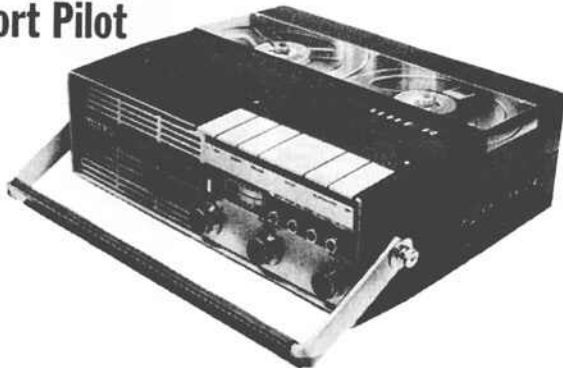
UHER



An extremely versatile battery portable that gives virtually every facility of a mains-operated recorder—with many exceptional new features. Four tape speeds provide an infinite variety of recordings. Collectorless motor. Weighs only 6 lbs. Price, including microphone and tape, 103 gns.

1000 Report Pilot

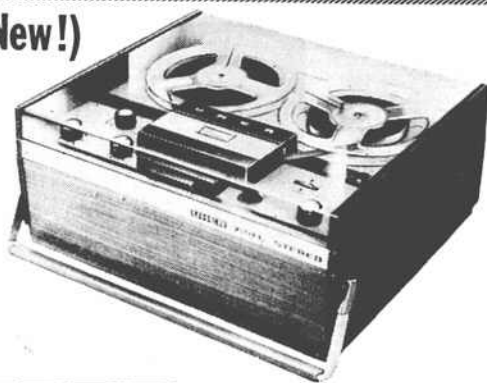
UHER



A tape recorder of the highest standard, specially manufactured for professional use. Ideal size, weight, performance and exceptional quality reception. Can be used to synchronise sound with film as well as reporting under professional conditions, on a wide range of voltages. Remote control stop/start. Full track. Collectorless motor. Automatic volume control. Price on application

724L Stereo (New!)

UHER



The latest, full stereo four track, all mains recorder, specially designed to meet the strong demand for an instrument particularly easy to understand and operate. Monophonic and stereophonic recording and playback. Suitable for use with 'hi-fi' equipment. Fully transistorised. High impedance output. Takes 7" spools. Now built in to a smart teak cabinet, with a smoke-tinted perspex lid. Priced at only 75 gns.

**SEE US AT THE AUDIO FAIR—BOOTH
No. 47 IN DEMONSTRATION ROOM 122.**

BOSCH

BOSCH LIMITED, 205 Great Portland Street,
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UHER

MIX-DON'T MUDDLE

by George Wilkinson

'Just make a Master from These' or 'All we do is mix'.

It sounds so simple; it's those two words that do it. How they came to be in a tape recordist's vocabulary, I shall never know, but then he doesn't use them, now I come to think of it. The director, he's the one. Just, it's all wrong, there's no mention of the getting ready, and that's just the start. The other night at George's place we began on a new master tape. Graham had given him the completed script and masses of sound effects, then quite casually said: 'Just make a master from these, George.' We started by untangling the assorted leads, fitting a different plug to one of them (John had bought himself a new recorder) and making extra leads. Helping George to carry in a larger table, I trapped my hand in the door. That delayed things until George's wife found a bandage. We got the four recorders on the one table, but had nowhere to work on the script, so we fetched the smaller table back again. It was a bit cramped, but we could manage.

At last the recorders were connected together, but we were one mains plug short. We just connected another (George has plenty of odd ones), switched on, and blew the fuses. That delayed us a little. George had to go next door to borrow some fuse wire. Fuse replaced, power on, recorders switched on to warm up, when George's wife said: 'Where shall I put the tea tray, dear?' 'All right, dear, we'll move these up a bit,' says George, pushing the recorders back. So we break for a cuppa, and that slice of home-made cake which always leaves crumbs to clear.

At last we are ready to begin the mixing. 'Something wrong here. I'm not getting anything from you, John,' says George.

'It should be all right now,' says John. 'The plug came out when we moved the recorders back.'

'Wait a minute, George - that's my plug, John, this must be yours on the floor,' says Harry.

'Right, let's try again,' says George.

The spools begin turning, and George is crouched over his machine, earphones



'...untangling the assorted leads.'

clamped on his head, 'There's something wrong here,' says George. 'Let's check, John, you're on one, right. Harry, your number one is on two; that's it, you're coming on three. Let's change them round.'

At last we are ready to begin mixing, and the machines start turning once more. 'Hold it, now what's wrong? It's still the same,' says George. Harry mumbles something. 'What's that, you changed them round at your end?' Blast it, so I did,' says George, whose blood pressure is beginning to rise. 'Right, let's try again, one OK, two OK, three OK; that's it, we're ready,' says George with beads of perspiration beginning to form on his balding head.

So the mixing began, with tempers just a little frayed, but the ragged edges really began to show as John, reaching for another spool, breaks the twisted wires apart (no

adaptor) and quickly twists them together again.

'Now we've got a bloody hum,' says George. 'Do you have to swear, George,' says George's wife coming in at that moment, followed by the dog, a ruddy great Alsatian whose wagging tail smoothly flicks a couple of plugs from their sockets. Now there is a short adjournment as George grabs the dog, and bustles her back into the kitchen, and then has to settle with his wife for being so rough with the 'little mite'.

George eventually returns, and once again the checking begins. 'John, I'm not getting you at all,' says George.

'Well I'm plugged in here all right,' says John.

'Must be a connection gone,' says George.

'I'll fill my pipe while you find it,' says Harry.

George connects the soldering iron, finds the solder, and by that time John has found the bad connection. It is one of those confounded DIN plugs.

'Best thing to do is to cut the wire clean through, do the job properly and clean off the old solder. Earth; that goes to the centre pin. Where does the other wire go?' asks George.

'It goes on the same pin it came off,' says Harry.

'But we cleaned off all the pins,' says George. 'We'll have to test.' So George and Harry test the plug for the right connection, while John and I examine the script.

'George, this script - the numbering is wrong. We've been using page twelve, instead of page two, so we're not following the sounds in the right order,' I said, and I did not expect George to turn on me like that.

'I'm bloody well fed up with this lot tonight. We'll start again.'

The plug was put right, the tape bulk erased, and we are ready to begin. The spools begin to turn, George (complete with earphones) crouches over his machine, and the recording session is under way.

'Now,' says George, 'that's fine.'

We had done it; the first section of the script completed without fault.

'Well, shall we get on to the next bit? Start from *From where I stand*; got that bit?' asks George.

'Look George, it's gone ten thirty, and we still have to pack up. Hadn't we better call it a day?' asks Harry, interrupting John who is all set to carry on.

'Just as you like; we've done quite well tonight. One and a half minutes in the can, not bad at all. Another six nights like this, and we'll be finished,' says George.

There is the packing up, and it is eleven o'clock as George says 'Good night' to us as we leave.

It seems an integral part of tape recording to wrestle with a multiplicity of assorted plugs and leads, and the making of a complex tape revolves around this eternal battle. The usual answer, when one asks for an easy way to connect two or more tape recorders together, is use a mixer or twist the wires together. All very well. I tried the latter; all I got were hums and bad connections. So then I tried the mixer, which seemed to add to the number of different plugs. The wrong plugs were always on the right lead, or the other way round. The time wasted in connecting recorders together must be far in excess of the actual recording time, and this is the time we must save if we are to obtain the maximum benefit from our recorders. It was to save this time that our not so mythical George set out to do. All have at one time or another, experienced his problems - they are not fiction but fact, and as facts they can be handled. George solved his problems and often one man's meat is also another man's meat.

George, being short and fat, had to be a man of peace. He was too short to run, and too fat to fight, so he sat down to think. If he made a connecting box, this nightly battle could be won without a fight, so he made plans to build such a box. He called it a unit. He went the whole hog. He made it six feet long, and installed it in the spare room. His wife now refers to it as George's studio (sounds better when talking to the neighbours). It also made peace in the home; the



'... with tempers just a little frayed!'



'His bits and pieces were now in one place.'

boys were no longer in the lounge, cluttering it up, and the dog could also be relegated to its room.

In the working top he fitted his two recorders, boxing them in to make a level working top, so that between them he had a script deck. At one end he left space for the occasional recorder. On the face of the unit, working from the top, he installed a monitoring speaker, tuner, mixer, all of which he connected to a panel of interconnecting plugs and sockets. At the side of the unit, where the occasional recorder would be placed, he fitted connecting sockets which terminated on the connecting panel. Various cupboards were included. They held his tapes, books, index file, together with the impedimenta that goes with tape recording, so again he pleased his wife. His bits and pieces were now all in one place.

What a difference when the next time Graham said: 'Just run up a master tape from that lot, George!'

Harry and John arrived with their own leads ready to plug straight into the unit, and they were ready. Even when the tea arrived, nothing had to be moved, and the dog lay on the rug by the fire. It did not matter; all the leads were boxed in clear of her tail. But the best thing of all (and I never did find what George used as an eliminator) is that frayed tempers never interfere with recording sessions any longer. There must be a moral here somewhere, and I would think it is to eat and get fat, then you cannot fight, so you must sit and think. Be like George, make a connecting unit, and eliminate the battles. The recordings are all the better.

ON TEST PHILIPS EL3553

by Peter Knight

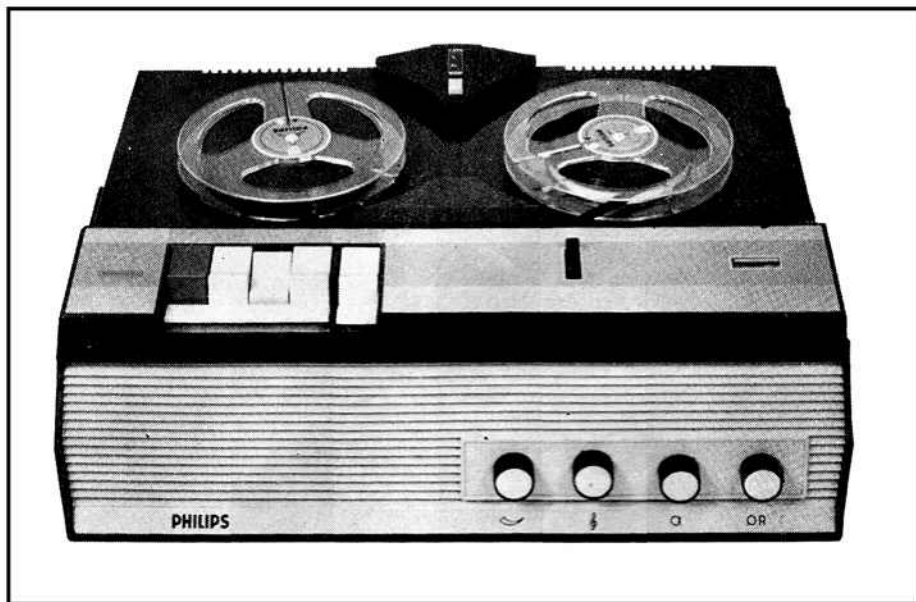


Fig. 1. View with top cover removed.

This is a mains-powered, four-track, mono-only machine using transistors. Its design is focused towards the family and domestic user, though it would also be of interest to the tape enthusiast as possibly a second machine of fair recording and playback quality. As a domestic recorder it has very much to commend it. It uses the very latest circuit techniques (transistors instead of valves), its price is reasonable at £37 16s 0d, which includes a moving-coil microphone, tape, spools and interconnecting cable, and it is very good to look at. Above all, it is simple to use and would soon catch on with potential tape recordists who have been put off in the past by complications.

It takes in and delivers signals via six DIN sockets on the side of the machine (these can be seen in Fig. 3). The deck is served by five press-keys and the amplifiers by four control knobs, as shown in Fig. 1. The tape track is selected by a three-position switch near the take-up spool, the third position giving the now common paralleling of the two head windings on playback. A moving-coil recording level indicator has two-colour scaling, and the tape position is indicated by a three-number digital counter. A useful feature is the ability of taking 7 inch spools.

Fully Insulated

The mechanics and electronics are housed in an all plastic case of clean and modern styling. This provides 100% electrical safety, since it is impossible for the body to come into contact with any metal item of the internals when the machine is correctly cased – as it normally would be, of course! This aspect of the design was specially explored when it was seen that the mains cable is only two-core, carrying no third earth wire. The machine runs on two speeds of $3\frac{3}{4}$ and $1\frac{7}{8}$ ips and on playback delivers about 1.8 watts into the internal, 5 ohm loudspeaker.

The easy-to-operate press-keys give the fast winds, ordinary tape motion, record and pause, and a stop bar along the base of the keys cancels any deck programming

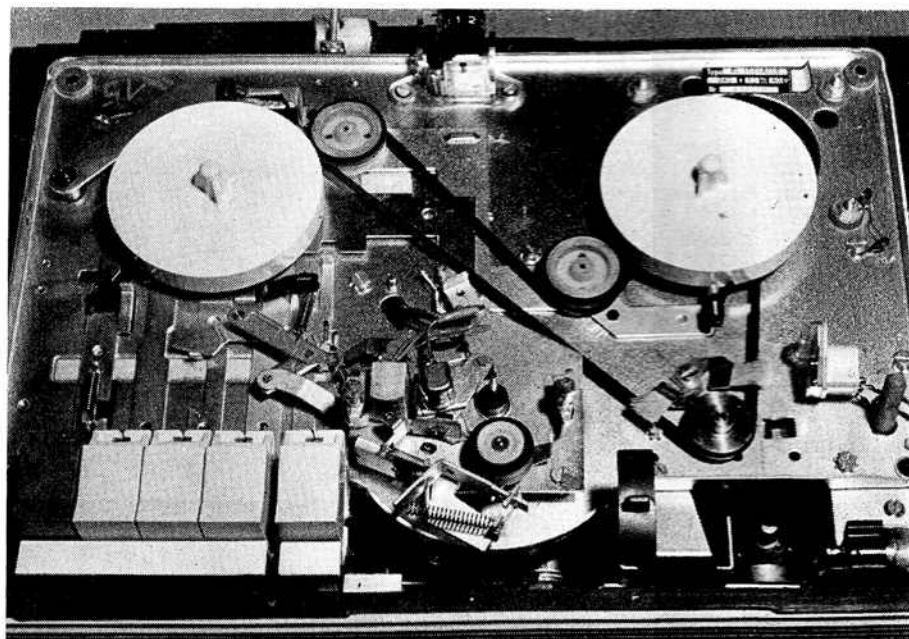


Fig. 2. Showing the top of the tape deck.

and halts the tape. For recording it is necessary to depress the red key at the same time as the start or tape motion key, and mechanical interlocking makes it impossible to accidentally erase a recording. The pause key operates by releasing the pressure roller from the capstan, and the pause condition is retained when the main key is depressed. To release from the pause condition, a small complementary key needs to be depressed. This is useful since it avoids having to hold down the pause key, and to unlock or release the key only a very light pressure is required on the complementary key.

The deck proper is a substantial mechanism as can be seen in Fig. 2. The drive motor, in the far left-hand corner of the deck, is belt-coupled to the capstan and flywheel (see also Fig. 3) and a pulley drive-belt system is adopted for operating the spool carriers on fast winds and for

tape tensioning on the play conditions. When the machine is switched on, a small pilot lamp is illuminated and shows through a window in the right-hand corner of the front of the cabinet (see Fig. 1). This lamp can be seen in Fig. 2, close to the moving-coil level indicator, which the lamp also illuminates. The meter is shown resting on the top of the deck in Fig. 3. This is normally clipped into a slot on the top plastic panel of the machine.

A side view of part of the deck is shown in Fig. 4 below which can also be seen the transistor electronics and the DIN sockets. The electronics are built upon a printed circuit board. The design is very good here, too; but this is to be expected of a machine from the Philips stable, bearing in mind the vast experience this company has had in radio and television design, using printed circuits and semi-conductors.

Input and Output Sockets

The sockets in Fig. 3 are neatly grouped for convenience and correspond from left to right to (i) for preamplifier, allowing stereo reproduction of a stereo tape, (ii) for moving-coil microphone, (iii) for 'diode' pick-ups from radio, for instance, for amplifier or for second recorder (the latter for both recording and replay), (iv) for gramophone pick-up, (v) for extension speaker and (vi) for headphones. The three inputs have sensitivities of 2mV across 20Kohms on the 'diode' socket, 70mV across 680Kohms on the pick-up socket and 0.2mV across 2Kohms on the microphone socket. The four outputs are 750mV across 20Kohms on the 'diode' socket, 1.8 watts approximately across about 5 ohms on the speaker socket, 1.5V across 50 ohms on the 'phones socket and an input for a stereo preamplifier (Philips model EL3787).

The amplifiers are controlled by four knobs on the cabinet front. The first is ordinary volume control on playback, the second is a tone control, giving treble cut as the control is turned clockwise, the third is a recording level control for microphone signal (i.e. input at the microphone DIN socket) and the fourth is a recording level control for a signal applied to the pick-up or 'diode' socket. The third and fourth controls, therefore, can be used for mixing two recording programme signal inputs. The pick-up socket allows the connection of a piezo pick-up for dubbing a disc record on to tape. Equalization is not provided, but since a ceramic or crystal pick-up connected across a relatively low impedance (680Kohms in fact) gives an output approximating velocity characteristics, some degree of frequency compensation is generally required. Normally, though, true velocity characteristics are not obtained until the input load is dropped to about 50Kohms and as the recorder provides 680Kohms, the effect on a piezo pick-up is that of bass attenuation. On playback this is not too bad as treble cut can be applied with the tone control.

For a 'flat' output a piezo pick-up needs to be loaded with not less than 1M (2M preferably, depending on the cartridge), so a better response could be obtained by connecting a 470Kohms resistor in series with the 'live' pick-up lead if the signal voltage delivered by the pick-up is sufficient to outweigh the attenuation that this matching resistor would apply. A magnetic pick-up could not generally be used with the recorder without some form of equalization. Of course, it is possible to dub from disc with any pick-up by feeding the signal from the 'recording' or 'monitoring' socket of a record reproducer or radiogram, for then the equalization is inherent in the reproducer circuits.

Ten transistors

The electronics employ ten transistors and a bridge type metal rectifier operating in conjunction with a fully isolated mains transformer and elaborate ripple filter circuit to provide the transistor potentials. One transistor stage takes the microphone signals and another the programme signals applied to the different sockets. Each amplifier has its own output recording level control, which provides the 'mixing'



Fig. 3. Side view of the deck, showing amplifier section below.

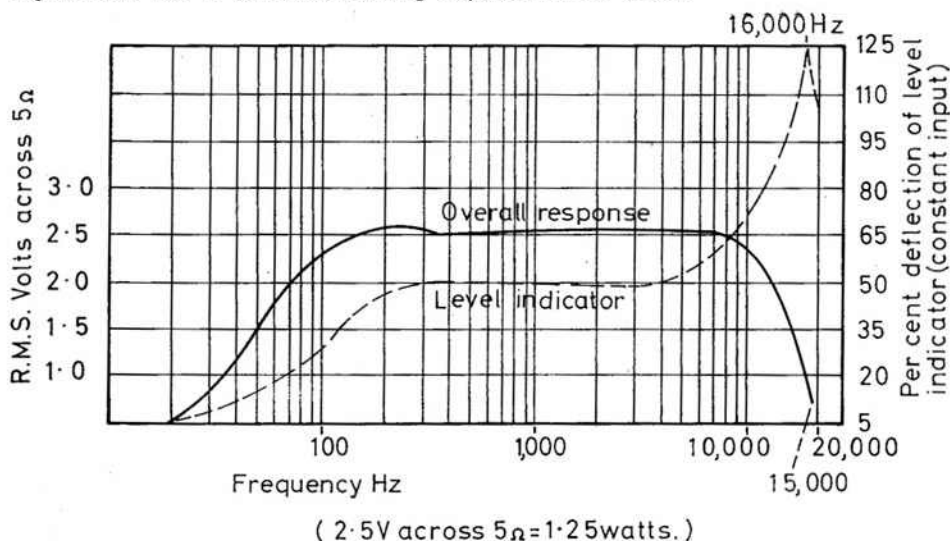


Fig. 4. Full-line curve power response with input at 'diode' socket and output across 5 ohms at external loudspeaker socket and recording made at constant input voltage approximately 10dB below tape saturation. Broken-line curves show the response of the level indicator with constant input signal.

facilities.

The amplified signals from the two controls are fed to a three-stage amplifier in the recording condition, and thence to the selected head section. A separate transistor is employed in an hf oscillator circuit for recording bias and erase signal, and a transistor is also used in the recording level indicator circuit, along with a diode. The recording signal is thus amplified for level indication, and a preset control at the input of this amplifier allows for level meter calibration.

On playback, a three-stage audio amplifier comes into operation. This uses one driver transistor, feeding a pair of p-n-p transistors in push-pull (class B), via a driver transformer. A transformer is also used at the output for energizing the phones socket. This audio output section is also available during recording for speaker monitoring, and the speaker output can be regulated by the ordinary volume control. This channel, in fact, can be employed for direct amplification of any recording

programme input signal, including gram, microphone and radio, and on playback a taped programme can be interrupted by a microphone announcement. The two programme input transistors at low-level are low-noise n-p-n type, while the remaining eight are p-n-p.

On Test

On test the recorder handled all programme sources applied quite successfully. The microphone supplied with the machine matches ideally into the first n-p-n transistor. With a ceramic pick-up applied direct, reasonable response was obtained without any correction. It was not possible to increase the effective input impedance since the pick-up used for the tests failed to deliver sufficient output signal. Nevertheless, the replay quality from disc dubbing achieved by this means was acceptable for this type of machine.

The 'diode' input was also fed with signal from the 'recording' socket of a hi-fi amplifier, and remarkably good quality record-

ON TEST PHILIPS EL 3553

Continued

ings were produced, although at first calling for a little bass attenuation of the recording signal. Excessive bass was noticed both when the replay signal was played through an extension speaker and through the hi-fi amplifier. With the internal speaker running, however, the bass lift had insignificant effect.

The machine runs very cool over long periods of time and, although the instructions stress that the machine should not be run with the top plastic cover in position, a test was made with the top covered. Still no apparent increase in temperature, though it is possible that under this incorrect condition the temperature of the motor windings would rise, since the fan

action would then be impaired.

A frequency sweep test using the internal speaker revealed small resonances at 120, 190, 300 and 380Hz, but these could not be considered troublesome on normal reproduction. A point which may be of interest to some users is the high sensitivity of the microphone and microphone channel as a whole. Full tape modulation could be achieved at ordinary speech levels at normal distances from the microphone with the level control set below 50%. Motor noise is audible, but otherwise low for this type of machine, and there is no undue vibration, even when placed on vibrant table tops. The machine is as easy to carry around as it is to use. A side handle is held in by coiled springs which compress when the machine is lifted by the handle. Weight is about 15½ lb (7 kg). The overall dimensions are 5¼ x 11½ x 5½ inches.

Power Response

The overall frequency response was tested and was found to conform essentially with the power response curve in Fig. 4. This test was made by recording sinewave intervals of signal on a clean tape corresponding to frequencies over the entire usable spectrum. The recording level was adjusted to approximately 10dB below the on-set of tape saturation (with the bias as set by the maker) with the signal applied to the 'diode' input.

The external speaker socket was loaded by 5 ohms (exactly) and the signal voltage was measured on a calibrated audio voltmeter while the waveform was monitored on a wideband oscilloscope. At any

frequency, the maximum power that could be obtained with this loading was 1.25 watts (2.5V across 5 ohms). The full-line curve in Fig. 4 shows the overall response at 3½ ips tape velocity. The broken-line curve shows what happened to the recording level indicator over the spectrum with the input signal constant. This gives the impression of quite a bit of treble boost on the recording channel to maintain the treble playback response, which is perfectly reasonable provided the signal/noise ratio is not too much impaired.

Distortion at low frequencies was pretty high, approaching 10% or so, but diminished towards the middle of the spectrum to a nominal 5% or thereabouts at about half volume control setting. The signal/noise ratio was in the order of 46dB, but the wow and flutter of the tape deck could just be heard on a sustained 700Hz tone, though not noticeable on ordinary programme material.

For its purpose, this machine is really one of the good ones and has the advantage of being fully transistorized. It would make an ideal machine for the tape beginner, and its great versatility provides an abundance of scope for experimentation.

Manufacturer's Specifications

Mains requirements: 110 to 240V 50Hz or 60Hz by simple pulley adjustment. **Tracks:** Four. **Speeds:** 3½ and 1½ ips. **Frequency response:** 60 to 15,000Hz at 3½ ips and to 8,000Hz at 1½ ips within 6dB. **Spools:** up to 7 inch. **Fast wind time:** 200 seconds for 1,200 ft of tape. **Power output:** 1.8 watts. **Inputs:** see report. **Outputs:** see report.

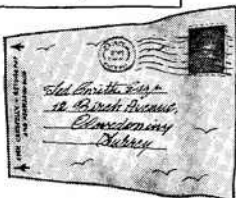
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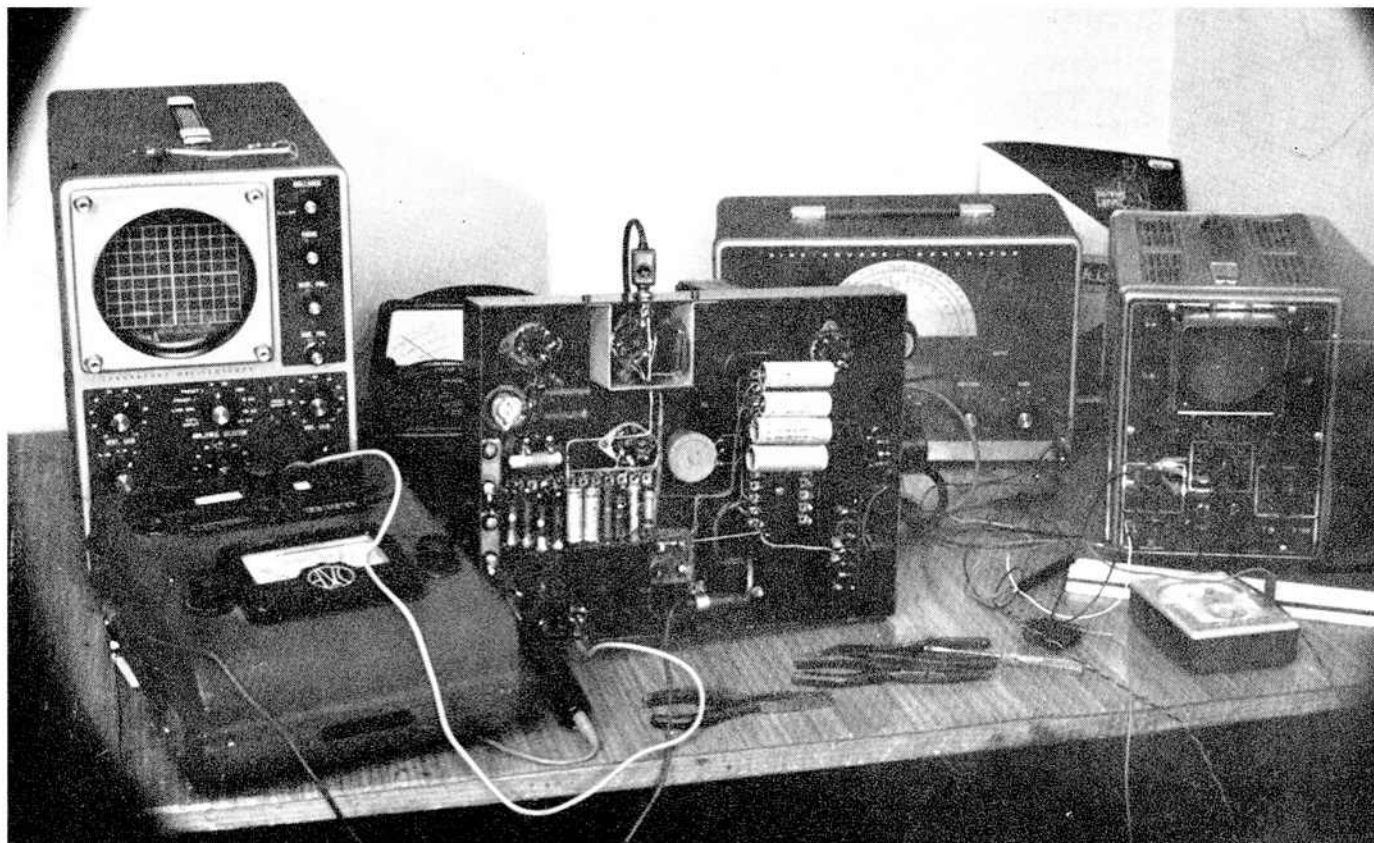


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EQUIPMENT TESTS BY ATR

What really does the potential purchaser of an amplifier, tape recorder or whatever want to know about the equipment? If he is of a technical mind, his chief interest will be with the basic design and engineering aspects, specifications and what-have-you. But if he is of the type only vaguely interested in electronics and electro-mechanical designs he will be far more interested in whether the equipment behaves in service as the maker's sales and advertising literature implies, whether it will fit in with his existing equipment, how easy (or difficult) it is to operate, how well it is made both inside and out, whether servicing is likely to prove difficult, whether spares are readily available and so forth.

Here is the *ATR* testing laboratory we try to take the place of a discriminating purchaser and relate by words and pictures what he himself would discover were he in a position to test the equipment over a period of time: to take it to pieces and examine the design, to operate it in the manner for which it is designed under domestic conditions, to connect it to other equipment, to seek out innovations and, in fact, generally to subject the equipment to the treatment that would be expected under ordinary domestic service. The nearest that a prospective purchaser could get to this sort of testing and examination would be to try out the equipment in the dealer's showroom or, at the best, to have it on a home trial for a day or two. But the shop would not be very pleased to know that their equipment had been taken to pieces.

While the *ATR* laboratory concentrates on the above tests and examinations, tests are also performed on the electrical performance of the equipment, as governed by its nature. A tape recorder, for instance, is always tested for overall frequency response – from signal to tape and from tape to signal – at the highest tape velocity. An amplifier is always given a frequency and power response test and hi-fi equipment, as distinct from

the family domestic type of equipment, is often subjected to revealing squarewave tests. Photographs of the results on the screen of the oscilloscope are then published. The basic procedure caters for equipment tests under normal operating conditions for at least two weeks, and for subsequent instrument tests which concentrate on any specification that appears questionable during the subjective testing period.

After the two-week minimum testing period, the equipment is dismantled and carefully examined for signs of overheating in the electronics and motor(s) and for any mechanical abnormalities. At this stage internal photos are taken for publication, and pictures are also taken of particularly interesting aspects and new or unusual features of the construction or design. The equipment is then tested electrically and electronically, and observations are made on servicing aspects. Finally, the equipment is put together again and given a further test, and in some cases it is put back into service before the report is written.

There is always a special endeavour to obtain the maker's service manual, and this is a good feeler as to how well subsequent service may be handled by the maker or distributor. In 90% of the tests so far undertaken the service manual has been received within a week of application. The service manual, of course, makes it that much easier to take the equipment to pieces and to apply test instruments. It also makes it possible to appraise the circuit and give details of this in the report.

This, then, is how we at *ATR* develop our test reports. We could, if we wanted to, be much more technical but it is our aim to strike the correct (for our readers) proportion of balance between subjective and objective testing. A concentration of the latter, of course, has its place in the engineering world, but it fails to assist the average non- or semi-technical enthusiast in sorting out in his own mind what is good and what is not so good.

PLANNING FOR VIDEO PRESENTATION

by F. C. Judd

When viewers turn on their sets for an evening of relaxation they do not expect to see a blank screen or a show sharply curtailed with no 'end of part one' notice before the commercial break. They expect smooth continuity. This is the task of the presentation section of *Rediffusion Television*, the nominated contractor for the network from Monday to Friday. This means that the section is responsible during transmission for co-ordinating all the programmes for *Independent Television*. The company's presentation section works for the network as well as the local London side too. Included in the job is the *slotting in* (scheduling) of on-air promotion for future programmes which is done in consultation with the promotion section. This calls for the length of slots for commercials (to meet the needs of the sales department) and informing the network of the exact in-and-out (beginning and end) times of any given programme.

First a quarterly schedule is drawn up by those responsible for planning. It outlines which slots (programmes) will be seen by the whole network and when each station goes 'local', or in other words, shows programmes originated in its own region. From this, after consultation with the sales department, a daily schedule is made up about 10 days before transmission. On this goes the precise 'in' time of any programme, its title, which areas are screening it (networking), the exact length of the programme and the originator and also when the commercial breaks occur and how long they last. Because each company shows its own commercials, the individual advertisements are not written out at this stage. From these sheets, each ITV company draws up its own complete programme and advertising daily schedule. This operational document is the *presentation schedule*.

If any ITV company wants to transmit a programme from any other company, then certain arrangements must be made for it to go simultaneously from one company to another. This is done through the General Post Office who have laid a number of direct cable links between various points and, provided a line has been requested and booked, will feed the programme through from one point to another. These lines have to be booked in advance with specific times detailed. If programme timings should have to be altered by more than a small margin, the GPO lines bookings may have to be altered as well. It is through this system that, say, *Westward*, *Rediffusion* and *Gramplan* can transmit the same programme while the rest of the network transmits another.

Rediffusion has four programme officers who each work on five-hour-on-the-air shifts requiring meticulous advance preparation. To help them they have a programme officer's



Fig. 1. A *Rediffusion Television* vision room with its large number of monitor screens that enable the programme director and vision mixer to see what is happening on all camera channels and telecine.

clerk who, among other things, keeps the log – an exact record of what time everything happened throughout transmission. They also have a vision mixer, a sound balancer and an announcer. Before each shift a briefing session is called by the programme officer, who tells his duty team and the engineers in *Master Control* exactly how much linking material or programme promotion is to be used and when – whether it is slides, film, or video tape, or announcer in vision, or a combination of sources.

Whilst on the air, the programme officer is in complete control. His word is law and he is responsible for making sure that everything goes out. It is he who cues in the films, the commercials and the announcer. If there is a mistiming, a technical fault or some unpredictable emergency he contacts the rest of the network on a special red telephone which has a direct line to every other company and tells them what is happening and what he proposes to do about it. If the network agrees, he goes ahead. But there may be times when it is impractical for some of the companies because of their previous commitments, so arrangements then have to be altered to suit all. In the case of extra news flashes from ITN or of national crises such as the assassination of President Kennedy or the death of Sir Winston Churchill, the programme officer has to put into effect the wishes of management.

This involves the programme officer in the rapid application of his own common sense and know-how, particularly in the initial stages before there has been time for detailed consideration by management. It is a vital part of the programme officer's job to use his background knowledge and experience to handle such situations.

Close Liaison is Vital

Presentation works in very close liaison with the engineering department because the engineers are in charge of the video tape recording machines, the telecine machines, the slide projectors and the clock which is controlled by a radio signal from Greenwich. It is the engineers in *Master Control* who supervise the availability and technical quality of all the sound and vision channels which *Presentation* require, and who ensure that other companies receive good sound and vision on the outgoing network line. When on the air, the programme officer sits in front of a bank of special television sets, including a transmission monitor (showing what he is sending to his own transmitter) and off-air monitor (showing how faithfully this is being sent to the viewers) and preview monitors carrying the various sources upon which he will call (Fig. 1). These include three lines from the main *Rediffusion* studios at Wembley. A further monitor shows what is being sent out to other companies

through the GPO system. Aside from keeping a constant watch on all these and the clock, it is the duty of the programme officer to ensure that each programme and advertisement goes out as planned and if a change of plan is called for, to act quickly and calmly.

Amateur Video Presentation

The foregoing paragraphs describe all too briefly the complexities of presentation in professional television, but I am bound to say that after the experience of the *Video Show* production with the Walthamstow Tape Recording Society, which I described last month, I very soon realized that even an amateur production can be a highly complex affair. My own part in that particular venture involved me in something like seven full working days and that was only the initial planning, arranging for equipment and the production of sound effects, etc. However, for a 'first-time-ever' venture into the realms of amateur TV production and video recording it was highly successful but there were lessons to be learned. One of these was how very essential it is to rehearse such a programme as many times as possible. We had time for only one full rehearsal. I must also add that 'rehearsal' should include the full operation of all technical equipment involved and the personnel delegated to operate it. One thing was proved quite conclusively, however, and that was just how creative video recording can be. I was able to explore some of the possibilities whilst the Sony TCV2000 video recorder was in my possession for the two weeks or so prior to our exercise with the Walthamstow Tape Recording Society.

Video Techniques

With equipment like the Sony TCV2000 one can do much more than 'record things from the telly'. To begin with, the sound channel is quite separate and although the sound is recorded on the same tape at the same time, it is quite easy to record pictures and sound which are unrelated. For example, one can stand in front of the camera and 'mime' to a gramophone record fed into the sound channel. If on future models the manufacturers could also arrange for sound to be recorded afterwards, i.e. after pictures have



Fig. 2. The effect of a non-linear frame scan due to wrong adjustment of the display linearity controls. Photo taken from actual recording.

been recorded, then greater latitude would be possible soundwise. For instance, one could dub on post-synchronized sound effects or speech and music which were not possible to record simultaneously with the pictures. This facility would be useful for 'telecine' which I will deal with later.

Tape editing is quite feasible with the half-inch wide tape used on the Sony TCV2000 but video editing will generally depend on the recording system used which incidentally raises the question of standardization. Sound-only tape recording is fairly well standardized and tapes can be interchanged. Will this apply to all future video recorders or is every manufacturer going to adopt his own particular system, thereby making tape interchange impossible? But to return to the Sony TCV2000 on which editing is practicable. A tape splice can be made with a

long diagonal cut, although even a butt splice produced little interference to the synchronization of the pictures.

Video recording does, of course, involve a camera and a means of displaying the pictures, i.e., a television screen, all of which require various adjustments. Unlike sound-only recording, there are many more controls and adjustments that have to be taken into account such as camera focus, beam intensity, video record level, display brilliance, contrast focus, picture linearity and so on. Correct adjustment of all the various controls is essential to the proper recording and playback of pictures. Unfortunately, time did not permit me to take photographs showing the results of all the possible wrong adjustments, but one at least is shown in Fig. 2. This clearly indicates a wrong setting

continued on page 58

Fig. 3. Below: original of Fig. 2, i.e., before recording, but which still shows poor frame linearity, so indicating that adjustment is required at the display screen.

Fig. 4. Right: using the Sony TCV2000 video recorder for 'telecine' (see text). Extreme left: cine camera, central-video camera focused on cine screen; right: video tape recorder and monitor.



TAPE RECORDER SERVICING PART XVI

In this concluding series Gordon J. King deals with automatic recording level control

In Part 15 we considered various methods used for indicating the recording signal current in the head winding. In Fig. 1 of this article, the final one of the present series, is shown an indicator circuit employing a transistor, as used in the Philips EL3553 with a high degree of success. The transistor serves simply as a signal voltage amplifier (monitoring the recording head current as explained in previous articles) for feeding the meter rectifier or diode. It is arranged in the common emitter mode with the recording signal, as picked up from the head circuit in the recording condition, applied to the base via the 47Kohms sensitivity preset.

Transistor Level Meter

The boosted output signal is taken from the collector and applied through the 10 μ F coupling capacitor to the diode. The rectified signal charges the 125 μ F capacitor almost to the peak value of the signal waveform, and current is drawn from this source to operate the meter movement. Thus, the meter deflection is proportional to the amplitude of the recording signal. The rate at which the meter responds to signal peaks is governed by the impedance across the input circuits of the diode, while the decay time relies upon the 125 μ F capacitor discharging through the meter and its series resistor. This kind of circuit is usually arranged to have a fast rise and a relatively slow decay.

As the meter deflection can be altered at a given level of recording signal by adjusting the sensitivity preset, the circuit is best set up with a signal of constant amplitude applied to one of the inputs. A signal of 1,000Hz is often recommended, and in this Philips it is applied to the 'radio' input. The recording level control is turned to maximum, and the signal across a 22ohm resistor in series with the head is connected to an ac millivoltmeter. The amplitude of the input signal is adjusted until 2.8mV is registered across the resistor (i.e., at a test point) and finally the meter sensitivity preset is turned so that the pointer indicates to within 2mm of the division between the red and green segments on the scale. These adjustments ensure that the tape does not approach saturation until the pointer deflects into the red segment of the scale. As mentioned in past articles in this series, the amount of magnetism that can be applied to the tape is governed by the nature of the tape employed and also by the amplitude of the bias signal. Too little bias will give an improved treble response, but the tape signal will tend to distort at reduced head current amplitudes, and this would need to be counteracted by increasing the sensitivity of the meter amplifier. Conversely, excessive hf bias will produce a less distorted recording at a given head signal

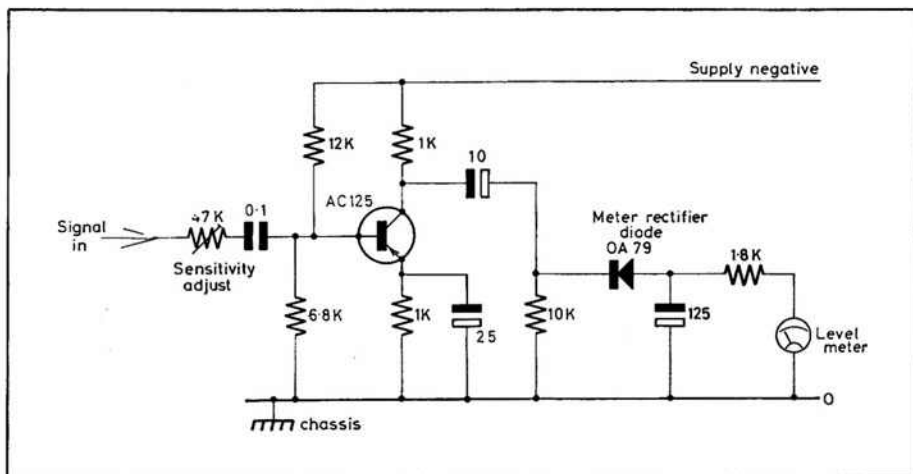


Fig. 1. Transistorized recording level indicator circuit.

current, but will have a lower frequency treble roll-off.

Auto Level Control

A series on tape recorder servicing would be incomplete without some reference to automatic recording level control circuits. These circuits have been in existence for almost a decade, especially in connection with the dictation type of recorder. As indicated by their name, they serve automatically to adjust the level of recording signal current in the head winding so that the tape is never overmodulated, no matter how strong (within reason) the input signal. When we record manually, of course, we need to turn up the recording level control for weak signals and turn it down for strong signals; the former to avoid undue noise and the latter to prevent the level indicator from peaking too deeply in the 'overload' or red section on the scale. Machines with auto control need have no level control, for the amplifiers are automatically at full gain on weak signals and reduced gain when the input signal rises above a predetermined level.

Control is achieved by passing the signal to be recorded through a variable-mu valve and arranging for signals derived from the same source to produce a control potential for the valve. A variable-mu valve is specifically designed so that its slope or mutual conductance is dependent upon the negative voltage (grid bias) applied to its control grid. As the negative bias is increased above the nominal value needed to bias the valve for class A working, so the slope of the valve is reduced. This means that the amplification given to the signal is reduced. In other words, a variable-mu valve can be looked upon as one with a variable amplification characteristic — the greater the negative bias, the smaller the

amplification. There is a control range over which this class of valve can work satisfactorily. If the range is exceeded — for instance, by the application of an excessive negative bias to cut the gain to a very low value — the signal is badly distorted. It is necessary, therefore, to ensure that the valve does not receive an excessive negative bias.

Ordinary valves exhibit this property to some extent, but owing to the rather violent curve in their characteristic, the control occurs very rapidly and the stage is soon pushed out of class A working, resulting in distortion. The variable-mu class of valve, however, has a gentle curve in its characteristic, giving a relatively large control range with small distortion. A popular variable-mu valve is the Mullard EF89 which, although an rf pentode, works quite well as an audio amplifier. A basic auto control circuit is given in Fig. 2. Here recording signals from the first amplifier (connected to the microphone or radio input) is applied to the control grid of the EF89 through C1, S1 and P2. The valve thus amplifies this signal and communicates it to the recording output valve via C2 in the ordinary way. The recording signal, however, is also fed to a control amplifier indicated by the rectangle in Fig. 2. This is a fairly straightforward amplifier which often uses one half of a double-triode valve (as in the Elizabethan Auto 2/4 machine). The amount of signal reaching this amplifier is controlled by the preset P1, which regulates the control voltage, as we shall see.

The output of the control amplifier is fed to a rectifier network, consisting of one or two rectifier diodes. In Fig. 2, two diodes, D1 and D2, are used. The recording signal is thus rectified and a dc voltage is developed across the rectifier load resistor and parallel charging capacitor. In the circuit

under discussion, R1 is the load resistor and C3 the charging capacitor. Since the signal is substantially amplified before being applied to the diodes, the resulting dc voltage due to a strong signal is significant, often rising to a volt or more.

Because the output impedance of the control amplifier is relatively low, the diodes conduct very quickly and C3 charges almost immediately to the peak value of the signals. In other words, the rise of voltage across C3 has very little delay relative to the rise of the signal amplitude itself. However, once C3 has charged, its main discharge path is through the load R1. It will be seen that this is a very high value, which means that C3 will take quite some time fully to discharge. The rise time of such circuits is in the order of mS, while the decay time is often specified in minutes.

These characteristics are essential for the correct operation of the circuit and to avoid it acting as a signal compressor. Before we study the actual working, however, let us finish with the description of the circuit in Fig. 2. It will be seen that the load R1 is in dc connection with the control grid of the variable-mu valve; also that the dc voltage developed across R1 and C3 is negative with respect to the negative or chassis. Clearly, the charge across C3 is reflected to the valve as a negative bias, and as the charge is governed by the signal amplitude, the amplification of the variable-mu stage is automatically regulated by the signal level. An increase in level will increase the charge across C3, thus providing more negative bias to the valve and reduced gain. Readers with some knowledge of radio receivers will realize this is rather like the

action of automatic gain control (agc) circuits.

There is a difference, though, and this has to do with the decay time. Radio agc circuits have to respond fairly rapidly to both the rise and fall signal variation. This cannot happen with audio control, however, for the effect would be signal compression and the dynamic range of the programme material would be seriously impaired. In fact, the effect would be the same as rapidly adjusting the recording level control on a manual recorder in an endeavour to keep the pointer of the level meter at one particular spot on the scale, irrespective of the nature of the programme material. The low level sounds would thus be over-amplified and the high-level sounds under-amplified. This is limiting which, to this extent, has no place in sound recording.

Because the auto control circuits of recorders are designed for the slow fall-off in negative bias, the signal itself is not compressed, but instead the gain of the controlled stage is simply adjusted automatically to avoid peaks of signal pushing the tape into saturation and resulting in a distorted recording. The circuits are also arranged so that the auto action does not take effect until the recording signal reaches a predetermined level. This level can be set by P1 in Fig. 2, while P2 regulates the 'average' recording level corresponding to the type of tape used and the hf bias amplitude. Some machines with auto recording level control have a switch to cut-out the control and bring the manual control into circuit when required. In this case, P2 would then serve as the recording level control and a switch would remove

signal from the input of the control amplifier.

Transistor Auto Control

Auto control has also been attempted in transistor circuits, but the drawback here is that there is no such thing as a variable-mu transistor. Not in the true sense of the word, that is. It is possible to regulate the gain of a transistor amplifier by adjusting the base current, but this can result in rather high values of harmonic distortion at high input signal levels. Nevertheless, for applications where quality of reproduction is not of prime importance – such as with office recorders for dictation – this method of control has been used with a fair degree of success. Indeed, the Grundig dictation machines have adopted it for a number of years. It is only recently, however, that more concentrated thought has been applied to the design problems of transistor auto control with low distortion.

Several schemes have been evolved, and the majority of them incorporate a control diode somewhere in the circuit. The ordinary rectifier and time-constant circuit (fast attack and slow decay) is used, but the control voltage so produced is often arranged to change the conduction of a diode and hence its series or shunt impedance across the recording signal. One idea uses the diode in the collector circuit of a transistor amplifier where the control bias changes the diode impedance and hence the effective collector load impedance. Because the voltage gain of the stage depends upon the value of the collector load, the gain is altered in sympathy with the control voltage.

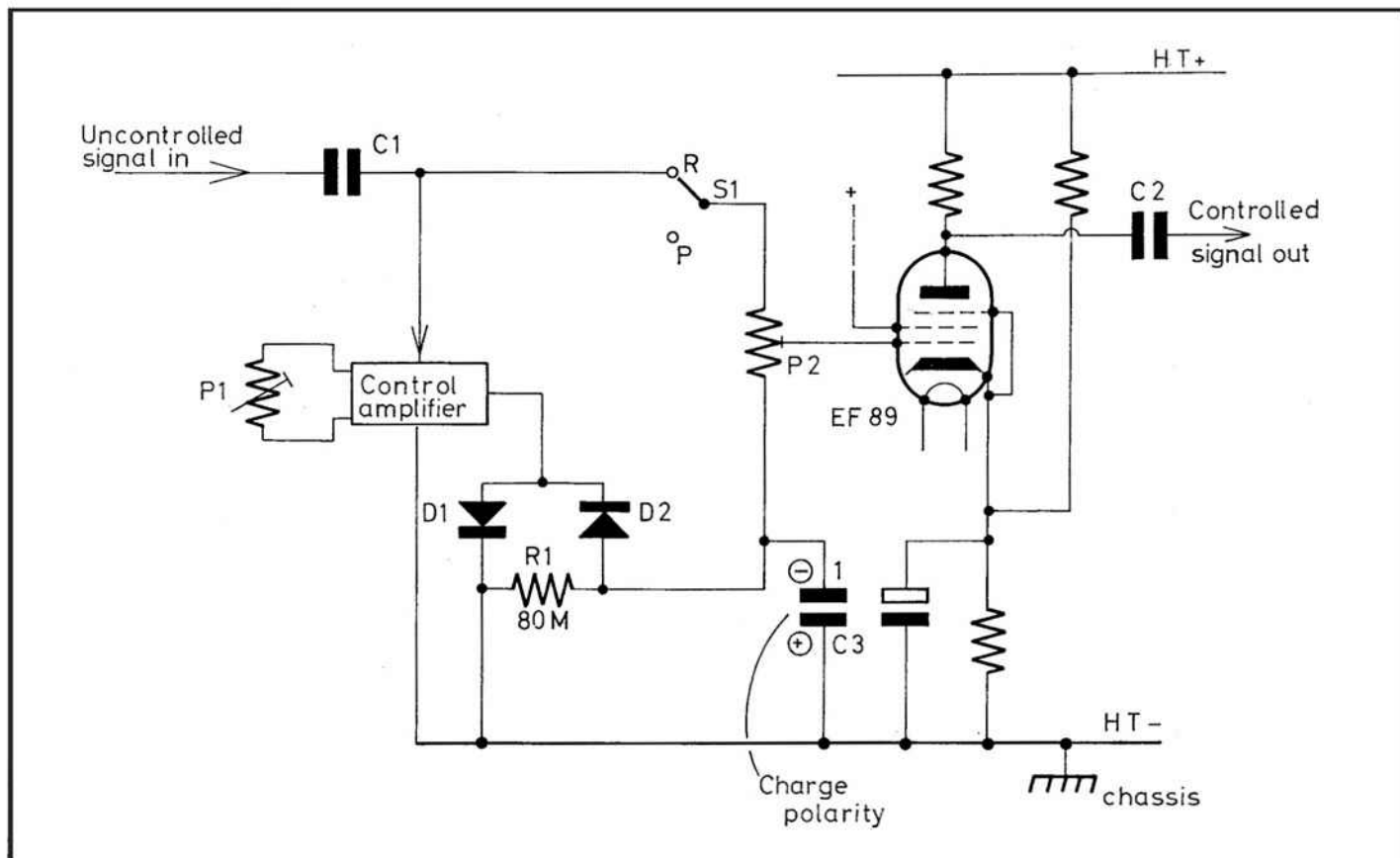


Fig. 2. Auto recording level control by the use of a variable-mu valve.

TAPE RECORDER SERVICING—PART XVI

continued

A clever arrangement developed by the Mullard applications engineers utilizes the changing slope resistance of a diode with changing bias in an input potential-divided circuit. The slope resistance of a diode increases as its bias is increased, and vice versa. Unfortunately, the change is very non-linear and this could cause excessive distortion. However, by the use of a second diode arranged to counteract the non-linearity, very low distortion of control has been achieved. The second diode in the Mullard circuit consists of the emitter junction of a control transistor, and a very simplified block diagram of the set-up is given in Fig. 3. The input signal, possibly from a front-end microphone or radio amplifier in the recorder, is applied across a potential-divider consisting of R1 and the effective slope resistance of the diode. The signal developed across the slope resistance is fed to the input of the amplifier under control (represented by the triangle symbol). The output of this amplifier feeds the control circuit which delivers a dc voltage corresponding to the potential across the charging capacitor (as already explained in conjunction with the circuit in Fig. 2). This dc is fed to the base of the control transistor and regulates the emitter current. Since the control diode is in the emitter circuit, its slope resistance varies in accordance with the control voltage, in such a manner that the resistance decreases as the control voltage rises. Now, as the slope resistance falls, the voltage fed to the input of the amplifier under control also falls (this is the basic potential-divider action in conjunction with R1 whose value remains constant). In other words, the circuit provides an automatic potential-divider (or volume control) action at the input of the controlled amplifier, under the

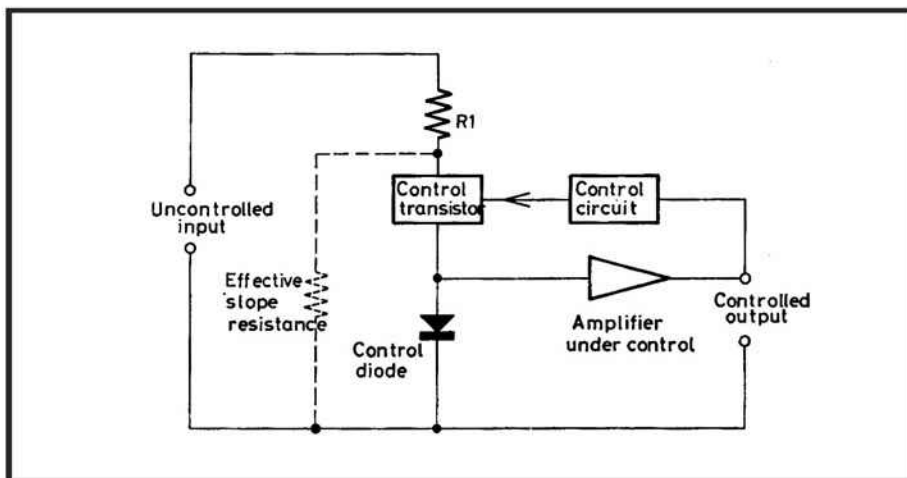


Fig. 3. The Mullard auto control system shown in simplified block form. This relies upon a change in slope resistance of a diode in an input potential-divider circuit, the slope resistance being controlled by the dc potential derived from the recording signal.

control of the signal appearing at the output of the amplifier. The linearity of this system is very good and with a signal below about 2mV (rms) the distortion does not exceed 2%. A maximum input attenuation of the order of 40dB can be obtained. The control circuit is arranged for an attack time of about 150mS and a decay time representing a gradual increase in gain of 6dB/min. The capacitor gradually discharges and causes a progressive increase in the value of the slope resistance of the diode.) Servicing in auto control circuits is simplified considerably once the basic principles of operation are understood. If possible, a circuit or manual of the machine should be obtained and a study made around the auto control circuits. This will soon reveal the circuit sections referred to in this article, and, if possible, a high resistance test meter should be used to measure the control voltage across the charging capacitor. Lack of control voltage would indicate either an open-circuit in the control amplifier or rectifier circuit. It is not unknown

for the control rectifier to fail. Of course, severe over-recording would be exhibited by an auto machine with a defective control circuit. The rest of the electronics would be proved in order if all is well on 'manual', assuming that the machine has an overriding master switch. Failure of the charging capacitor would greatly limit the recording signal, as already explained. A good test for the capacitor is to run the machine on record with a strong input signal and then to switch off and measure the voltage across the capacitor. Even after several minutes a high resistance meter on the low volts range should give a kick on its pointer when connected across the capacitor. If there is no sign of charge, either the capacitor is faulty or the diode has developed a short circuit or low reverse resistance. This, then brings to an end this series of articles with the emphasis on 'servicing'. Readers wishing to complete their own series can find details of the back numbers concerned which appear in ATR from time to time.

THE MAY EDITION OF ATR

will contain a special section for newcomers to tape recording

including the first of a new monthly series for beginners by Gordon J. King called *Introduction to Tape Recording*

together with

- * Actuality and Interviewing
- * How not to be a good tapespondent
- * Sound Scene survey of tape recorders for those new to the hobby
- * Full test reports on two tape recorders for the beginner

and for the experienced tape and hi-fi enthusiast

- * Report on the 1967 International Audio Festival and Fair
- * The Sound of London
- * Planning for Video
- * Testing hi-fi amplifiers

and for everyone

Club News—Readers' Letters—Tape Directory—New tape and hi-fi equipment—Details of the British Amateur Tape Recording Contest—A to Z in Audio and Video.

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tape club news

Many thanks to all clubs who wrote expressing their good wishes for me in my new job. I'm sure many clubs have planned a visit to the Audio Fair and I look forward to meeting members at the ATR stand (number 39) where I shall be throughout the Fair.

ISABELLE TOURNOR

Northern Tape Club now NATIONAL Tape Club

In view of their rapid expansion in recent months, the Northern Tape Club has undergone complete re-organization and will in future be known as the **National Tape Club**. It was felt that because of their widespread membership the club's former title was misleading. A special committee has been appointed to organize club affairs, the officials of which will be responsible for activities such as Recruiting and County Sections, Circulation of Tapes and Overseas Liaison and Information. Not to be content with their recent increase in membership, NTC is geared (in the words of A. Lomas, Information Officer) 'for even greater effort, in not only quantity but quality of its various activities'.

The circulation of members' programme tapes has proved popular and successful. In addition to his membership number, each member has a prefix call sign. Every county in the UK, countries and zones abroad use this system of identification. Leadership of the club is retained by Taylor C. Foggon of Northumberland, who has finalized a tapespondence contest which he introduced last year. The winner in all classes is treasurer Tom Riley, who has over 70 contacts in this country and abroad.

The NTC's bi-monthly journal, *Reporter*, is now supplemented by a news bulletin prepared by editor A. Lomas. George Greenhough, County Organizer,

provides a photo-feature for each issue in which members are shown in their recording dens and a description of their equipment is given. The February issue of *Reporter* featured founder member Tom Ingham, who is Tape Circulation Controller. In the photograph (reproduced below) Tom is seen at ease in his home studio at Failsforth, Manchester. His equipment includes a WB Stentorian matching speaker and an eight inch FS/AL Wharfedale speaker and Tripletone tuner in the cabinet below. On the sideboard, a Brenell MK5 deck lies on a mounting rack with a Stern powered mixer below. Next to this is the Vortexion WVB with Wearite deck 5A and Collaro record player. The microphone shown is the Lustraphone LFV/59. Tom's home is the scene of many gatherings of local NTC members.

Enquiries regarding membership in NTC should be made to George Greenhough, 24 Florist Street, Shawheath, Stockport, Cheshire.

Club Chairman on Front Cover of ATR

There was a great deal of excitement at the Newcastle and District Club when members discovered a photograph of their Chairman, Malcolm Hill, in full colour on the front cover of the February issue of *ATR*. Modest as he is, he hadn't mentioned this to anyone! At their AGM the club was able to look back on a year of sound progress (in more than one sense I imagine!). Membership has risen, finances are satisfactory and the programmes for the new season have already been charted. The Chairman, Secretary and Treasurer remained unchanged, i.e. Malcolm Hill, Bob Turner and Malcolm Watt respectively. Two new committee members were elected: Derek Seward as Assistant Secretary and Kelvin Morrison as Librarian. Recent meetings have involved a quiz night, tape sketches and an hilarious time when Malcolm Watt demonstrated tricks involving speed changes and backwards playback. A very full and interesting evening was spent listening to some of the BATRC winners from the FBTRC archives.

The Secretary, R. Turner, makes an appeal to the ladies of Tyneside - at present the club hasn't a single female member! Mr Turner can be contacted at 43 Richmond Street, Gateshead 8, Co Durham.

Documentary Tapes

For some weeks now three independent groups of members of the Derby Club have been busy producing documentary tapes. The first, produced by the group led by Chairman Ernest Flecknoe, was about Venice, and music, voices and actuality recordings produced a marvellous sound picture of this ancient city. The next tape discussed the influence of television and included opinions of members of the public. This tape was produced by a group led by Derek Hill. The third was produced by Alf Stanway's group and was entitled *One for the Road*, a dramatized documentary about the effects of drinking on driving. Everyone agreed that the results were first class and that they had thoroughly enjoyed the work which went into their production.

Club meetings are held on alternate Wednesday evenings at 7.30 at the Engineers' Club, Osmaston Road, Derby.

Doncaster Club moves to new studio

At a recent meeting the club visited a newspaper where the object was to obtain sound effects and to see a newspaper being printed. Meanwhile, the Chairman and Honorary Secretary were arranging the removal of the club's equipment to their sound-proof studio which has been built into the new block of the Doncaster YMCA. This move has not entirely disrupted the club's programme, for they have managed a visit to Leeds and a demonstration of Richard Allan speakers between meetings devoted to adding the finishing touches to their studio.

Sound tracks for amateur films

In a recent programme, the Secretary of the Southall Club, Les Williams, gave an interesting and entertaining demonstration on the making of sound tracks for amateur films. During the demonstration he used a self-built, professionally finished tape and film editing machine. Some of the methods and problems of synchronizing taped sound track and film were explained in his talk.

The evening was concluded with the showing of a short musical film accompanied by magnetic sound track. It was agreed by all present that Mr Williams be asked to give another programme in the near future.

A recent recording session, presented by Chairman John Weed, included Peter Tucker, Denzil MacGrath and Royce DeSonna who played drums, piano and guitar respectively. Between recordings members were invited to ask questions and discuss the problems of making live recordings.

Attempt to form New Zealand Club successful

The second attempt to form a branch of the Australian Tape Recordists Association is going ahead very well indeed. Talks, visits, tape and slide shows and instruction sessions on tape recorder technique and maintenance are planned. Once formed, the branch will have a club library of its own and a tape library available.

New Zealand readers are invited to contact the club's representative, Warren Prescott of 455 Ham Road, Bryndwr, Christchurch, New Zealand.

New address for London Club

One of the most difficult aspects of tape recording for the amateur is the art of interviewing. Unlike previous occasions when members have been thrown to the mercy of London streets to find courage and a willing interviewee, a recent meeting was specifically designed to build up the necessary confidence by instruction and planned mock interviews.

The London Club has moved to the Marquis of Granby, Chandos Place, WC2. New members and old friends are welcome. Details from the Secretary, David Campbell, 46 Aberdare Gardens, NW6.

ATR Challenge Cup Winners

Since the inception of the ATR League Championship it has been the Rugby Club's aim to bring the cup to the Midlands. The first two years they were placed fourth, the next third, and last year they finished second, just three points behind Thornton Heath. After a determined effort this past year, members are the proud holders of the *ATR Challenge Cup* for the most active club in the country.

At the time of going to press arrangements were in hand for E. McKeown to present the cup at a special meeting in Rugby. Mr Judd had hoped to make the presentation, but he was obliged to attend the organizational meeting of the BATRC Contest which unfortunately coincided with this evening.

Make-a-Tape produces imaginative recording

A Dream, created by Arthur Barnard, was the first result of *Make-a-Tape*, a feature recently introduced to the Brighton Club's programme to stimulate constructive and imaginative recording. Arthur's tape was interesting and lively; no words were spoken but a dream about going to work emerged from the various sound effects.

Many new activities are planned for the club and notice is being taken of the proposed local radio station in Brighton. The club Secretary is Keith Upton and he will be pleased to hear from people interested in sound. He can be contacted at 47 Kingsley Road, Brighton 5.

Stockman Cup results

C. J. Block, Mrs S. Furneaux, G. C. Jones and Miss D. Scattergood comprised the team of members who recently won the South Devon TRC's Stockman Cup.

(continued on page 28)



26 Tom Ingham, founder member of the National Tape Club, at ease in his home studio.



Donald Aldous

Technical Editor of 'Audio/Record Review'

came to see how we make the incomparable Ferrograph

These are some of the things he wrote:*

Acknowledged quality and reliability. Quality and reliability are terms that can—as time has shown—be not unreasonably applied to Ferrograph machines . . .

. . . At last, I thought, I shall find the secret of the perennial success of these recorders leading to this rare reputation . . .

Enthusiasm and high standards. . . . one soon appreciated that tradition and pride of workmanship motivated this organisation. Coupled with the enthusiasm of the various heads of departments I spoke to, and the keen efforts of the workers to maintain high standards, it was readily apparent why Ferrograph has achieved its notable success over the years.

Service and stamina. Purchasers of Ferrograph recorders certainly buy them for keeps, as a glance in the Service Department showed a batch of early machines (2A models for example) returned for checking and to have their performance restored—where necessary—to its original level. Some of the cases had obviously received a fair bashing but the units all worked and would soon be restored to their pristine glory.

No useless gimmicks. The special models built for the Services have undoubtedly influenced the design of the domestic recorder from this organisation. Dependability and no useless gimmicks in the designs are characteristics that have emerged from this Forces' association.

Made on the spot. Self-sufficiency—in the sense that they manufacture the bulk of their own components—is another important feature . . . for me one of the highlights was the production of Ferrograph tape heads—a task not often undertaken by recorder manufacturers . . .

Quality control. Another contributory factor in the Ferrograph success story is the great attention paid to quality control or test procedures—from individual checks to further tests on the assembled equipment. Mechanical and electrical test methods are most extensive, with a case history sheet attached to each unit, providing information on frequency response, distortion, hum level and wow/flutter figures. This information is filed for reference . . . A speed micrograph . . . of the instantaneous velocity variation of the tape transport system, is also prepared. Incidentally it is the RMS value of this variation, as checked on a wow/flutter meter, which is the figure usually given for spec. purposes. In the Ferrograph Series 6 sample we saw, this figure came out at 0.14% at 7½ ins. p.s.

Certificate of Test. Certain Ferrograph recorders (and probably all models shortly) are despatched with a Certificate of Test, signed by the Chief Inspector, which summarises the performance data and includes the B & K pen-recorded frequency response curve and the speed micrograph chart. A reassuring document for any customer to receive with his machine. . . .

* Donald Aldous also had many other interesting observations about the Ferrograph, published in the September 1966 issue of 'Audio/Record Review'. If you would like to receive a complete reprint, with Ferrograph leaflets, please send us your name and address.

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Ferrograph

THE INCOMPARABLE TAPE RECORDER

TAPE CLUB NEWS (continued)

For this they were required to produce recordings of a musical item, an interview, a short sketch or play and a documentary or actuality. At a later meeting the Sony VTR was demonstrated by Messrs D. Skinner, K. Holloway and G. Berry from Tom Mollands Limited of Plymouth. At this meeting the club recorded their highest attendance ever with 62 members present. Details of membership are obtainable from the Honorary Secretary, Gordon Furneaux, 45 Kenwyn Road, Ellacombe, Torquay.

Great Yarmouth and District aid blind enthusiast

The local Welfare Department has asked the club to look after a blind man who has recently been sent a tape recorder by his son. The club is delighted to report that he can use his machine better than some of their members - not bad going for a youngster of 85! The Central Library, headquarters of the Great Yarmouth Club, adjoins the old Yarmouth Jail. Because of this, members have access to a dungeon which came into use in the year 1264. Here they took their recorders and mics and now have an interesting tape to send to Dartford.

Elmwood Tape Recording and Audio Club holds fair

This club, a section of the Elmwood Community and Youth Centre, recently held its own and very successful Audio Fair. The club has a full and interesting programme planned for the next year including competitions, discussions and talks by both professionals and amateurs in the field of tape recording. Events planned for the near future include a visit to the BR motive power and marshalling yards. Some evenings are devoted entirely to films and the club has two at present to which they are adding sound. Further details of activities and membership are available from C. A. Brooke, Programme Secretary, Elmwood Community and Youth Centre, 53 Darlington Road, Hartburn, Stockton-on-Tees.

Solent Tape and Audio Club

The club has enjoyed a variety of social and practical meetings recently. Their film, *Gosport Carnival, 1966*,

was shown to members of the Gosporters and others who took part in the Carnival. The club has been pleased to welcome several new members during the past few weeks. All members are looking forward to their future programme which includes making a drama tape with the local Theatre Group, and viewing a practical demonstration of audio equipment. Members are delighted at the engagement of Mr Percy Wright to Miss Greta Rogers who met at the club, and wish them every success and happiness in the future.

Programmes for Old Folks

The Liverpool-based Merseyside group has been busy producing 90-minute programmes for several old folks' homes and the Merseyside Hospitals Radio Network. The venture received valuable encouragement and subsequent approval from the city Welfare Department. Following discussions, a regular half-hour sound magazine, *Mersey-go-Round*, has been launched, primarily with old folks' homes in mind. On the social side, friendly relations with the Middleton Tape Group have been strengthened by mutual visits at which much information was exchanged. The Secretary of the Merseyside Club is E. J. Elcock, 37 Rockbank Road, Stonecroft, Liverpool 13.

North London Club records organ music

Members visited St. Andrew's Church, Enfield, at the invitation of Mr Eric Pask, organist, to record an interesting talk with illustrations on the keyboards and stops on the organ. Two Brenells, a Ferrograph, a Truvox and a Philips stereo were among the machines used and results on the whole were very good. Keith Parker had fixed up a simple public address system in order to hear and record Mr Pask explaining the excerpts he was playing. Requests are being received for events and shows to be recorded and the club forecasts a bright and busy future. The club Secretary is John Wilson, 202a North End Road, Fulham, W14.

Programmes planned for beginners

As part of their new programme, the Montrose and District Club is devoting several meetings to such things as basic recording, splicing and maintenance for the benefit of newer members. The Hospital Request Programme which was started last year is now well under way and several requests

are received each week. The club had an opportunity recently to record a few acts from *Othello* when a few of the Scottish Junior Actors paid a visit to Grey Harlings, headquarters of the club and home of its president.

Details from the Secretary, The Montrose and District Tape Recording Club, Grey Harlings, Montrose.

New club planned for Hyde

An ATR reader, Mr T. D. Kay, wishes to start a club in the Hyde district. Accommodation for the club has already been offered and Mr Kay's programme plans sound interesting. Those with an interest in tape recording - whether or not they own a machine - are invited to contact Mr Kay at 17 Reynard Street, Hyde, Cheshire.

Top Ten for March

- | | |
|------------------|--------------------|
| 1. Walthamstow | 6. Brighton |
| 2. Leeds | 7. North London |
| 3. Reading | 8. Rugby |
| 4. Friern Barnet | 9. Great Yarmouth |
| 5. South Devon | 10. Thornton Heath |

Late News

On Thursday, 23 February, Mr McKeown and I had the pleasure of visiting the Rugby TRS to present to them the ATR Challenge Cup. The clubroom in the Central Hotel was well filled and the meeting began with a 25-minute tape which highlighted the club's activities of the past year. This tape was prepared by Jack Willis, a blind member of the club and who, according to other members, can use a tape recorder better than most of them. Mr Bannister, President, then gave a talk outlining in more detail those activities which have given the Rugby TRS the distinction of being the most active tape club in Britain. When presenting the cup, Mr McKeown commented that, after hearing the tape and Mr Bannister's talk, he felt that Rugby deserved the cup even more than he had realized. In fact, he was surprised that this Society had not won it before.

Mr McKeown and I would like to thank the club for a most enjoyable evening and express our good wishes to them for the coming year.

ISABELLE TOURNOR

THE TAPE DIRECTORY

This is a service operated by ATR through which readers can tapswend with one another. If you wish to be included in the Tape Directory, complete the coupon on page 56.

Particulars of tapespondents are given in the following order: name, age, occupation, address; special interests, tastes in music; type of machine, spool size, speeds; area of tapesponding required.

Australia

Barry Grimley, 17, GPO, PMG department, 68 Rochlea Street, Coopers Plains, Brisbane, Queensland, Australia. Reading, radio, yachting; pop, instrumental. National RQ505, two-track, 5 in, 1½, 3½. Girl of same age in post office in UK, USA or Canada. Letter first please.

Geoffrey W. Phillips, 16, student, 5 Gardiner Avenue, Glengowrie, S Australia. Coin collecting, cars, science, mathematics; folk and modern. Standard two-track, 7 in, 1½, 3½, 7½. UK, France, USA, Russia.

Peter Foster, 25, tape recorder sales assistant, 1 Kenton Avenue, Oaklands Park, Nr Adelaide, South Australia. Photography, music, taping; all kinds. Revox F36 Stereo, 10 in, 3½, 7½. Anywhere.

British Forces

SAC David Benham, 20, serviceman, Airmen's Mess, RAF Steamer Point, BFPO 69. Photography, swimming, motor cycles; pop, R and B, modern jazz. National 755 stereo, 7 in, 3½, 7½. UK, France, English-speaking, females preferred.

23670787 Cpl John McDougall, 27, HM Forces, The Royal Scots Greys, BFPO 38, Germany. Touring; all kinds. Uher 711 automatic, 7 in, 3½. Anywhere.

Ireland

Patrick Scully, 24, farmer, Curraghmeelagh, Blue Ball, Tullamore, Offaly, Eire. Cinema, Irish showbands, photography; film music, popular R and B. Civic and Beocord 2000K, 7 in, 1½, 3½, 7½. UK and Eire.

New Zealand

Warren Prescott, 27, truck driver, 455 Ilam Road, Bryndwr, Christchurch, NZ 5. Travel, driving for blind, hospital tape service; show music, classics. Sanyo, 7 in, 1½, 3½, 7½. Anywhere English-speaking. Ray Wolf, 30, hospital storeman, 508 The Terrace, Thames, NZ. Photography, black and white and colour slides, folklore; all but pop. Home built, BSR deck, 5½ in, 3½. Anywhere, male contacts preferred.

Scotland

Selwyn Cowan, 38, salesman/storeman, 78 Braidholm Road, Giffnock, Glasgow. Big dance bands of the '30s and '40s; swing jazz, dance music. Stella TR 459, Cossor CR 1605 (both four-track), 7 in, 1½, 1½, 3½, 7½. Scandinavian countries, USA, Canada. Bill Redpath, 35, insurance inspector, 18 Lady Nairne Loan, Edinburgh 8. Travel, hi-fi, current affairs; orchestral and opera. Ferrograph 808, two-track, 8½ in, 3½, 7½. Europe, Australasia, USA. No letter required. Jack McKillop, 32, cab-driver, 447 Hawthorn Street, Glasgow N2. Astronomy, philosophy, people; catholic. Civic T72 7 in, 1½, 3½, 7½. Anywhere English-speaking, especially UK, USA. All tapes answered. No letter required.

Wales

A. Warr, 29, cinema projectionist, 26 Intermediate Road, Brynmawr, Breconshire, Wales. General interests; anything. Fidelity Playmatic, 5½ in, 1½, 3½, 7½. Anywhere.

Cheshire

B. Walker, 32, railway clerk, 23 Oakfield Road, Alderley Edge, Cheshire. Railways, travel; all but pop. Grundig TK14, 5½ in, 3½. Holland.

Cornwall

Tony and Pat Bircher, 32/33, student nurse/occupational therapist, 'Tiki', Edmonton Lane, Wadebridge, Cornwall. Photography, 8mm, 35mm, camping, home-made wines; all but heavy classical. Brenell MK5, 7 in, 1½, 3½, 7½. 15. Anywhere outside UK.

Co Durham

William Hickman, 50, civil servant, 121 Bek Road, Framwellgate Moor, Durham City, Co Durham. Hi-

fi, cine and still photography, gliding; Ambrose and orchestra on 78s. Telefunken 85KL and M300, 7 in, 3½, 7½. Jersey, CI, and Australia.

Derbyshire

Arthur T. Humphreys, 49, electrician, 3 Hawthorne Avenue, Glapwell, Nr Chesterfield, Derbyshire. Motor cycling, fishing; classical. Grundig TK 23, 5½ in, 3½. Australia, New Zealand, USA.

Devon

Robert Homes, 28, second mate, Merchant Navy, 'Edgehill', Old Sticklepath Hill, Barnstaple, Devon. Football, cricket, geography, current affairs; pop, C and W, comedy. Sony TC 200 stereo, 7 in, 3½, 7½. Anywhere. Females preferred.

Essex

414 Ft Fry, W.S., 22, HM Forces, 9 Coy Ranc, Colchester, Essex. Stamps, tropical fish, hiking, boats; anything. Philips EL3534, 7 in, 1½, 1½, 3½, 7½. Anywhere.

Frank W. Herbert, 29, inspector, 40 Kendall Road, Colchester, Essex. Hi-fi, cabinet making, fishing; all but classical. Baird Vassity, four-track, 7 in, 1½, 3½, 7½. Anywhere English-speaking.

Alan Frank, 18, radio and TV engineer, 23 Brightside, Billericay, Essex. Short wave; pop. Philips 3549 and 3585, 7 in, 1½, 1½, 3½, 7½. Italy (English-speaking).

Bristol

Stephen H. Jennett, 25, insurance agent, 5 Milverton Gardens, Ashley Hill, Bristol 6. Record collecting; pop and light music. Philips, four-track, 7 in, 1½, 3½. Anywhere English-speaking.

David C. Nicholls, 16, trainee technician, 107 Revenhill Road, Knowle, Bristol 3. Ham radio, sports car racing; pop, R and B. Philips EL3451, 7 in, 3½. Australia, New Zealand, USA.

Nigel R. Pont, student, 56 Ravenhill Road, Knowle, Bristol 3. Reading, bicycles, SWL; pop. Robuk RK44, four-track, 7 in, 1½, 3½, 7½. USA, Canada.

Hampshire

Michael C. Barkitt, 19, apprentice printer, 65 Fromond Road, Weeke, Winchester, Hants. Photography, hi-fi; classical, French pop, some jazz. Ferrograph and Grundig, 8½, 1½, 3½, 7½. Luxembourg, France, UK. Allan J. Ching, 26, driver, 4 Easter Road, Bourne-mouth, Hants. Hi-fi, all subjects; Sergovia, light classical, pop. Revox 736, four-track, 10½ in, 3½, 7½. Anywhere English-speaking. Male contacts preferred.

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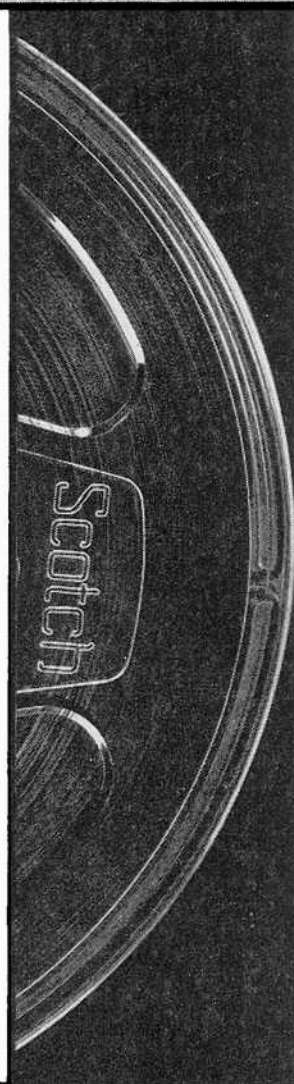
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LONG PLAY (TYPE 203): 5"; 5½"; 7"; 8½".

Write for price list and full technical information to: Minnesota Mining & Manufacturing Co. Ltd, 3M House, Wigmore Street, London, W1. Telephone HUNter 5522.

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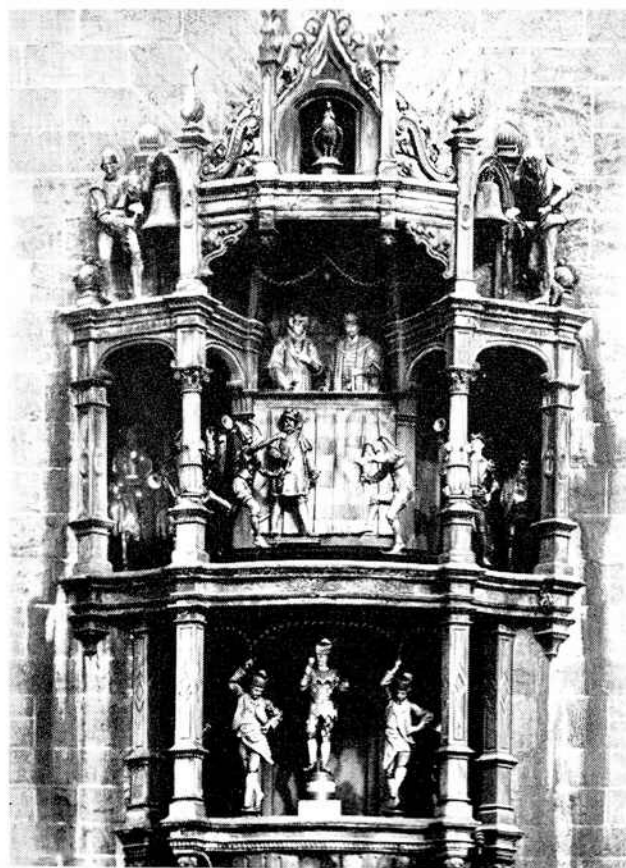


**HEAR Dynarange AT THE AUDIO FAIR
IN DEMONSTRATION ROOM 242**

SWITCHED ON IN MUNICH

A sequel to ATR's visit to the Uher factory in Munich

by Bob Danvers-Walker



The Glockenspiel figures at the top of the tower of the Munich Rathaus (Town Hall).

I was wandering through the streets of Munich with my Uher 4000 picking up sounds and my mind was picking up memories too. Here I was in the capital of Bavaria, guest of the directors of the Uher factory, seeing for myself evidence – both in their impressive factory and in this rebuilt third largest city in the Federal Republic – of that dynamic Germanic characteristic called ‘thoroughness’. Even their hospitality is painstakingly efficient and meticulous in detail. It was Sunday and people were making their way to church. A drizzly rain dampened the roadways and pavements to reflect the white and blue trams and traffic signals in the busy, bustling Marienplatz.

I recorded the Glockenspiel sounding its regular 11 am carillon of bells from the tower of the Rathaus, that enormously impressive Town Hall which dominates the City centre. The bells are interesting, if not melodious, but the many moving figures provide an entertainment which draws every eye to the Gothic tower for the best part of a quarter of an hour. At the eleventh stroke two knights and their squires come out and move slowly round. At their next appearance one of them unhorses the other with his lance. This tournament by the larger-than-life-sized gaily painted copper figures is in honour of Duke William V and his wife on their wedding day in 1568. A group of red-coated coopers then dance to their traditional melody. This custom extends back to the plague years of 1515-17 when coopers announced the end of the epidemic to the citizens with music and dancing. When that is over a rooster flaps his wings three times, crowing shrilly above the noise of the traffic.

I found the best place to record this was at the base of the *Queen of Heaven* statue immediately facing the Rathaus. At the base of this are the figures of four genii symbolizing the fight against War, Famine, Plague and Heresy.

At the end of the performance I enquired my way to the *Hofbrauhaus* of a stumpy little man obviously interested in what I was

doing. He spoke very good English (which helped) and offered to guide me around and show me the sights. In the 1914-18 war he was a prisoner of war on the Isle of Man, he told me. A retired pensioner now, he used to work on the railways. ‘Look over there’, he said, ‘that’s the hotel where your Mr Chamberlain, Mons. Daladier, Herr Hitler and Signor Mussolini met in 1939.’ Ah yes, of



Bob Danvers-Walker records the Glockenspiel bell chimes and melodies associated with the figures that move around the tower of the Rathaus.

course, 'Peace in our time' is what Mr C said as he waved the piece of paper in the air upon his return from the drawing up of the Munich Agreement. 'And over there,' continued the little man with obvious pride in his voice, 'is the new National Theatre.' The original one was reconstructed in 1823 out of funds gathered by a special tax on beer. Allied bombs totally destroyed it during the last war. At the mention of beer we turned off the Maximilianstrasse in search of a stein or two (or three).

Sunday is the traditional day for 'Weisswurst', a special Bavarian sausage which is not so much a mid-day snack but more a kind of blow-out. What with pigs' trotters, brisket, sides of ham and pork pies, no wonder the food-loving Bavarians refer to that massive beerhall, the Hofbrauhaus, as the *Schwemme* – literally *the trough*. It was also the birthplace of Nazidom. Fill one of those big earthenware mugs with the native brew and you're drinking a beer backed by a purity law dating back to 1516 which ensured that *There shall be taken and used only barley, hops and water*. Come Sunday afternoon and whole families flock to the beer halls and wine taverns for zither music, folk singing and the traditional ump-pa-pa bands. On occasions the big political drums are also banged in these public forums where fervent feelings for the Fatherland find expression.

Talking of bands, right round the corner of the Kaufingerstrasse there came one of those heaven-sent moments which always cause me to leap into action with my tape recorder like a rocket taking off from a launching pad. I had heard it coming, that's why there was scant time to say 'Auf Wiedersehn' to my friendly little man as I whipped the Uher microphone from its shoulder holster. On went the controls of my recorder and, diving through the traffic, I sprinted into the centre of the road to tape the most gloriously costumed German band I have ever seen. Garbed in seventeenth-century uniforms, tricorne hats, scarlet and gold jackets, gaiters and with a periwigged banner-bearer at their head, the musicians were blasting off as resounding a piece of martial music as ever came out of polished brass. Walking backwards in front of them I automatically recorded the occasion with that presumptuousness which comes with many years of tape recording and news gathering. And right alongside me was someone else (looking remarkably like a tape recording enthusiast to me) with an identical Uher 4000 over his shoulder. We exchanged grins and walked backwards together.

I wonder what became of my friendly little man. During lulls in our conversation I think we were both a bit conscious of all our yesterdays. I looked for him, but somehow I think he was secretly wanting to tangle with a Weisswurst and was glad to be shot of me. This business of belting around like the proverbial blue-tailed fly has become so much a part of my life that I find I tend to leave people trailing behind wondering just what to make of me. Take Helmud and Gertrude Grill for instance. He is the Public Relations Officer of Uher and his very charming wife also works with the firm. Fred Judd and I found them most excellent company and kindness itself in seeing that everything was to our liking.

An extensive tour of the Uher factory rounded off our schedule and the Editor of



A stein or two of beer in the Hofbrauhaus with the appropriate music from the ump-pa-pa band all duly recorded on a Uher 4000 Report L portable recorder.

ATR reports on this elsewhere but I just want to tell you one last little story. There are eighteen churches in Munich and Helmud Grill knew a lot about them. The twin onion-domed Church of Our Lady is most impressive. It was when he drew my attention to the Church of the Holy Trinity – the *Dreifaltigkeitskirche* – and remarked that it was the only church in the downtown area to survive the war undamaged, that an incident came to mind which struck me as being extraordinarily apposite. I forget exactly how many years ago it would be, but I recall being in Coventry not long after the end of the war. It was still very much a ruin – perhaps less so than Munich after the Allied saturation raids, but still a ruin. Overnight hotel accommodation was literally reduced to one old inn and a boarding house or two. I arrived there to be told that the last room had just been taken . . . by an ex-Luftwaffe bomber pilot who had come to see the damage he had done. I recorded the bells of

the *Frauenkirche* (Church of Our Lady) to file alongside the bells of Coventry Cathedral. Not a bad theme for a tape recording club documentary . . . on the futility of war. Or maybe a suggestion for an interchange of taped sounds and opinions between Munich recordists and their opposite numbers in Coventry.

The last thing I did before leaving Munich was to enquire into the strength of tape recording clubs in Germany. It would appear that, relatively speaking, England has far more clubs, not only than Germany, but of all the other countries in Europe. The question is how active are they, here and over there. One lively club is worth a dozen lethargic groups who do little more than sit around, chat and drink tea . . . or pilsner . . . or cognac . . . or vino . . . or *chocolaté con-leche*.



Typical Bavarian entertainers at the Platzl beerhall where permission to film, photograph and record was freely given.



The Oktoberfest provides colourful background and an infinite variety of sounds and music.

1967 AUDIO FESTIVAL AND FAIR

Guide to Exhibitors' Stands and Demonstration Rooms

As always, the International Audio Festival and Fair is being held at the Hotel Russell, London. Nearest tube stations are Russell Square or Holborn (about 5 minutes' walk). On the ground floor will be found the display booths on which the various exhibitors will be showing their current range of audio equipment. The demonstration rooms are to be found on five of the hotel floors, but note that not all those showing equipment in the ground-floor booths have demonstration rooms. Note also that some trade

and technical journals have booths only on the ground floor, whereas some have a room on one of the upper floors. *ATR*, for instance, has a booth only on the ground floor (Booth number 39). It is quite easy to locate the demonstration rooms, as the first figure of the room number also indicates the floor number. Example: Armstrong Audio Ltd, room 538 which is on the fifth floor. The actual room number will still be shown on the door as 538, although all the exhibitors have signs above the doors.

use. Also range of accessories and hi-fi equipment. Uher tape recorders have been reviewed in *ATR*.

Braun AG BRAUN
Booth 63 *Dem Room 312*
Hi-fi stereo amplifiers, FM tuners, tape decks, loudspeakers, transcription units and tape recorders.

S. G. Brown Ltd
Booth 46 *Dem Room 317*
High-fidelity headphones, built-in microphones, PA and recording microphones and other audio accessories.

BSR Ltd
Booth 70 *Dem Room 218*
Tape decks and record transcription units suitable for building into hi-fi systems, tape recorders and record players.

Celestion Ltd
Booth 5 *Dem Room 204*
Full range of Celestion loudspeaker units and complete loudspeakers in enclosures.

Cosmocord Ltd ACOS
Booth 43 *Dem Room 449*
Crystal and ceramic microphones suitable for tape recording and crystal and ceramic pick-up cartridges and complete pick-ups.

Decca Record Co Ltd DECCA
Booth J *Dem Room 236*
Hi-fi equipment and pick-ups.

Elcom (Northampton) Ltd
Booth 56 *Dem Room 249*
Electronic equipment including quadrant faders and transistorized amplifiers, etc., for studio use. Microphones and line equipment.

EMI Ltd
Booth 32 *Dem Room 147*
Full range of professional tape recorders including the L4 portable machines. Note the EMI L4B is to be featured shortly in *ATR* field trials and a technical test report. Also EMI recording tape.

Eugen Beyer Electrotechnische Fabrik BEYER
Booth 65 *Dem Room 313*
Microphones for domestic and professional recording and extensive range of accessories.

Euphonics Corporation MINICONIC
Booth 17
Pick-up cartridges.

Fane Acoustics Ltd
Booth 21 *Dem Room 213*
Large output loudspeakers for public address, guitar and organ amplifiers. Also public address amplifiers.

Ferranti Ltd
Booth 59 *Dem Room 120*
Specialized audio and electronic equipment.

Ferrograph Ltd
Booth 38 *Dem Room 134*

Acoustical Manufacturing Co Ltd QUAD
Booth 67 *Dem Room 504*
Quad amplifiers and other hi-fi equipment such as loudspeakers, tuners, etc. Demonstrations of the QUAD electrostatic loudspeakers are worth hearing.

AEG GmbH TELEFUNKEN
Booth 16 *Dem Room 542*
Full range of Telefunken tape recorders including portables and professional machines. Also tape recording accessories and hi-fi equipment. Telefunken tape recorders have been favourably reviewed by *ATR*.

Agfa-Gevaert AG
Booth 40
Recording tape and tape accessories.

Akai Electric Corporation AKAI
Booth K *Dem Room 319*
Current range of Akai tape recorders and accessories including FM tuners, etc. Akai tape recorders have been reviewed in *ATR*.

Akustische und Kino-Geräte Gesellschaft GmbH AKG
Booth 14 *Dem Room 302*
Range of AKG microphones and accessories for amateur and professional recordists alike. Demonstration of all equipment in room 302. AKG microphones have been reviewed in *ATR*.

Richard Allen Radio Ltd
Booth I *Dem Room 548*
Full range of Richard Allen loudspeakers and loudspeaker units on display and in demonstration room 548.

Ampex Inc
Booth A *Dem Room 536*
Ampex will be featuring their current range of domestic and professional tape recorders and accessories and also Ampex recording tape. Ampex products have been favourably reviewed in *ATR*.

Armstrong Audio Ltd
Booth 45 *Dem Room 538*
A new range of Armstrong amplifiers with a unique new styling will be on show and demonstrated in room 538. Armstrong hi-fi equipment includes amplifiers, FM and AM tuners and integrated amplifiers and tuners.

Audio and Design Ltd AUDIO DESIGN
Booth 64 *Dem Room 121*
Loudspeakers using the Jordan Watts system and integrated sound equipment.

Audio and Record Review
Lounge 344

Audio Technica Corp (Japan) AUDIO TECHNICA
Booth 26 *Dem Room 318*
Pick-up cartridges for stereo and mono, pick-up arms and styli, etc.

Arena Hede Nielsen Fabriken A/S ARENA
Booth 7 *Dem Room 215*
Loudspeakers, complete hi-fi systems, tuners and amplifiers.

Badische Anilin & Soda Fabrik AG BASF
Booth 33 *Dem Room 234*
BASF recording tape and tape accessories. Special demonstration of use of tape.

Billboard Publishing Co High Fidelity Magazine
Booth 60

Boosey & Hawkes Ltd JORDAN WATTS
Booth 25 *Dem Room 221*
Full range of Jordan Watts loudspeakers and loudspeaker modules. Reviewed in *ATR*. Also on show and being demonstrated - The Stereola - a new stereo loudspeaker in one enclosure.

Bang & Olufsen Ltd B & O
Booth 54 *Dem Room 322*
Unique range of tape recorders, hi-fi amplifiers, transcription units, tuners and radios, etc. B & O tape recorders and other equipment have been favourably reviewed in *ATR*.

Brenell Engineering Ltd BRENELL
Booth 30 *Dem Room 304*
Brenell tape recorders, tape decks and accessories including tape amplifiers and new Brenell hi-fi link system.

Bosch GmbH UHER
Booth 47 *Dem Room 122*
Full range of Uher tape recorders including the new Pilot 1000 portable for professional

Range of Ferrograph Series 63 tape recorders and accessories. Includes model 633 recently reviewed in *ATR*. Also special-purpose recorders.

British Radio Corporation Ltd FERGUSON

Booth 20 *Dem Room 222*
Ferguson tape recorders and radio equipment. Also Booth 27 - HMV tape recorders.

Waltham S/A FIDELA

Booth 24
Tape decks, tape recorders, amplifiers and loudspeakers.

Fi-Cord International Ltd FI-CORD

Booth 66 *Dem Room 311*
Microphones and audio equipment for professional and amateur use. Beyer and Braun equipment on show.

N. and S. B. Field Ltd RECORD HOUSE

Booth 62 *Dem Room 140*
Cabinets for hi-fi and tape recording equipment. Enclosures for loudspeakers.

Fisher Radio International Inc FISHER

Booth D *Dem Room 115*
Stereo amplifiers and radio tuners. Including new stereo multiplex equipment.

Garrard Engineering Ltd GARRARD

Booth 48 *Dem Room 247*
Record transcription units and record player units.

General Publications Ltd

The Gramophone. *Dem Room 153*

Golding Manufacturing Co Ltd GOLD-RING

Booth 41 *Dem Room 334*
Lenco transcription units and pick-ups.

Goodmans Industries Ltd GOODMAN'S

Booth 49 *Dem Room 434*
Full range of speaker units, accessories and loudspeakers with enclosures, including a new version of the Goodmans Mezzo and an all-transistor FM tuner. Goodmans loudspeakers and Maxamp amplifier have been reviewed in *ATR*.

Grampian Reproducers Ltd

Booth 58
Microphones, amplifiers, reverberation units and other accessories for recording and public address.

Grundig (GB) Ltd

Booth 19 *Dem Room 533*
Full range of Grundig tape recorders, hi-fi equipment and test instruments.

Hansom Books Ltd

Booth 50
Records and Recording Magazine.

Haymarket Press Amateur Tape Recording Magazine

Booth 39
Current and back copies of *ATR*. Also the *ATR* Book of Circuits for Audio and Tape Recording.

Iliffe Publications Ltd

Booth 55

KEF Electronics Ltd KEF

Booth 31 *Dem Room 442*
KEF loudspeakers and enclosures.

H. J. Leak & Co Ltd LEAK

Booth 34 *Dem Room 348*
High fidelity amplifiers, FM tuners, loudspeakers and enclosures.

Link House Publications Ltd

Booth 35

Lugton & Co Ltd LUGTON

Lounge 246

Wholesalers only.

Lowther Manufacturing Co Ltd LOW-THER

Booth H *Dem Room 404*
Lowther loudspeakers, enclosures and hi-fi amplifiers.

Linear Products Ltd LINEAR

Booth 19a

Lustraphone Ltd

Booth 15 *Dem Room 342*
Full range of Lustraphone microphones for amateur and professional use. The Radionic system, public address and hearing aid equipment will also be featured this year.

Minnesota Mining & Manufacturing Co Ltd SCOTCH

Booth 23 *Dem Room 242*
Magnetic tape for professional and amateur use. Also range of tape accessories.

MB Mikrophonban-VetrieB GmbH

Booth 37 *Dem Room 217*
Microphones and accessories.

Mullard Ltd

Dem Room 211
Mullard valves, transistors and electronic components.

Ortofon S/A

Booth 8 *Dem Room 117*
Hi-fi record transcription units and precision pick-ups.

Parmeko Ltd

Booth 51 *Dem Room 219*
Special components such as transformers and also amplifiers for public address, etc.

Philips Tape Recorders Ltd

Booth 11 *Dem Room 336*
Full range of Philips tape recorders including latest cassette models. Also accessories and tape. Philips recorders have been reviewed in *ATR*.

Philips Hi-Fi Ltd

Booth 10 *Dem Room 337*
Integrated hi-fi systems and music cassette tapes.

Pioneer Electronics Corporation

Booth G *Dem Room 111*
Hi-fi amplifiers and integrated systems, FM tuners and radio receivers.

Print & Press Service

Lounge 154

Radford Electronics RADFORD

Booth F *Dem Room 448*
High-fidelity pre-amplifiers and power amplifiers. Also FM tuners and other audio equipment. Also STA60 100w amplifier, a new multiplex stereo de-coder and various audio measuring instruments.

Radionette Aksjeselskape RADIONETTE

Booth 36
Integrated hi-fi equipment.

Rank Wharfedale

Booth 72 *Dem Room 502*
Full range of Wharfedale loudspeaker units, crossover networks and other accessories. Also range of loudspeakers in enclosures.

The Rectavox Company RECTAVOX

Booth 13 *Dem Room 349*
High-fidelity loudspeakers in enclosures. Recently reviewed in *ATR*.

Rogers Developments Ltd ROGERS

Booth 61 *Dem Room 402*
Full range of Rogers hi-fi amplifiers, FM

tuners and loudspeakers.

Sennheiser Electronic GmbH SENN-HEISER

Booth 29 *Dem Room 114*
Microphones for the amateur and professional include a new radio frequency condenser mic, the Sennheiser gun mic and a new range of electronic test equipment for audio engineers. Also new range of hi-fi equipment.

Sansui Electric Corporation SANSUI

Booth 73 *Dem Room 314*

SGS Fairchild

Booth 52 *Dem Room 220*
Silicone planar transistors and other semiconductors.

Shure Bros Inc

Booth 44 *Dem Room 447*
Highlight of the Shure display will be the new V15 type 2 Super track stereo cartridge. Shure will be displaying a whole new series of p.n. cartridges as well as microphones and other accessories.

SME Ltd

Booth 57
Precision record transcription units and pick-up arms.

Sony Corp of Tokyo SONY

Booth 74 *Dem Room 112*
Full range of Sony tape recorders and accessories. The Sony video equipment may be on show as well.

Standard Telephones & Cables Ltd STC

Booth B *Dem Room 202*
Microphones for amateur and professional use. Headsets and other audio equipment and the Electroniques range of components for the home constructor.

Stereo Sound Productions Ltd STEREO-SOUND

Booth 9 *Dem Room 214*
Stereo amplifiers and loudspeakers.

A. R. Sugden & Co Ltd CONNOISSEUR

Booth 71 *Dem Room 145*
Precision transcription units, pick-ups, loudspeakers and loudspeaker enclosures.

Tannoy Products Ltd TANNOY

Booth 68 *Dem Room 547*
Complete range of Tannoy dual concentric and Audiometric loudspeakers including enclosures such as the GRF, York, Lancaster, etc.

Tape Recorder Spares Ltd

Booth 69 *Dem Room 315*
Connecting leads, plugs, etc., and other accessories for tape recording.

Technical Ceramics Ltd SONOTONE

Booth 22 *Dem Room 321*
Pick-up cartridges and loudspeakers.

Thorens-Franz SA

Booth 28
Pick-up arms, transcription units, motors, turntables and cartridges, etc.

Truvox Ltd

Booth 12 *Dem Room 248*
Truvox tape recorders and the Truvox hi-fi system which includes amplifiers and FM tuners and was recently reviewed in *ATR*.

Tandberg Radiofabrik A/S TANDBERG

Booth 18 *Dem Room 212*
In addition to the current range of Tandberg tape recorders their new four-track stereo tape deck Model 64X will be on show. Also the Miniconic pick-up will be of interest to hi-fi enthusiasts.

continued on page 58

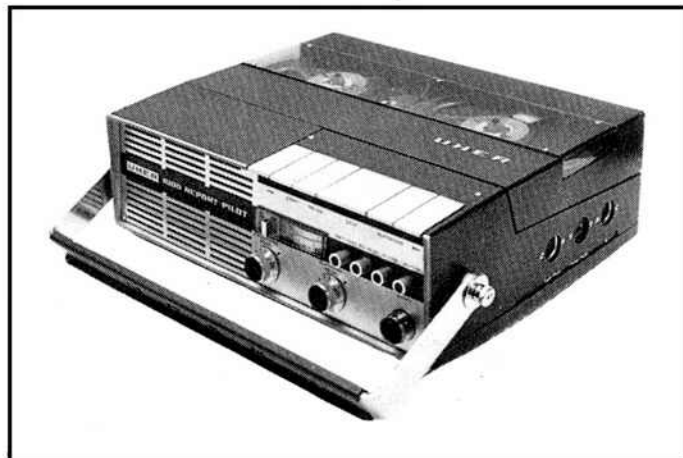


Fig. 2. Above: The Uher 1000 Report Pilot with a special tone system for synchronizing sound with film.

Fig. 1. Left: The Truvox PD104 tape record/replay unit features quarter-track stereo with off-tape monitoring.

A PREVIEW OF TAPE RECORDERS

at the 1967 International Audio Festival and Fair

The most popular of new items being shown at this year's Audio Festival seem to be hi-fi amplifiers with built-in FM tuners and hi-fi systems which include not only record player units but tape recorders as well. No one seems to have produced a tape recorder integrated with anything, an FM tuner for example, so it would appear that apart from changes in styling there is nothing that can be reported as completely different. However, there are a few machines which made an appearance during the latter part of last year and will be of interest to the comparative newcomer to tape recording. Also you may find a few types and makes not seen before in this country, especially in view of the fairly large number of overseas exhibitors. Microphones and audio test equipment will be much in evidence this year and mention of these items is included in this preview.

Truvox

Aside from their domestic hi-fi system, the full Truvox range of tape recorders will be available for demonstration. Among these is the PD104 at 110 guineas which is a fairly new model available for four-track operation, mono or stereo, and which features a nice-looking teak case (Fig. 1). There is also the new Belgravia series RB102 half-track mono recorder at 93 guineas and its quarter-track version at the same price. The Truvox demonstration room will feature the hi-fi system with which any of their tape recorders can be used. They will be demonstrating the Truvox tape or source comparison system so you will be able to hear what goes in and what comes out for yourself.

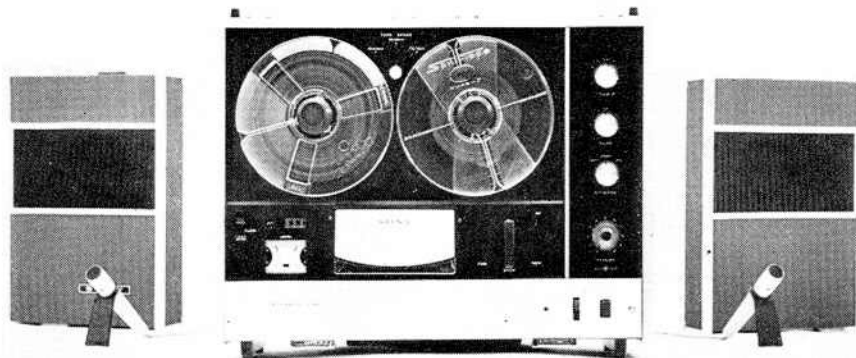


Fig. 3. The Sony TC530 features full stereo record and replay and detachable loudspeakers.

Truvox will also be showing the series 40 recorders which come in the lower price bracket at 47 guineas.

Brenell Engineering

The complete range of Brenell tape recorders and tape decks will be available for

demonstration, as also the Brenell Mk5 series 3 record/playback amplifier. Brenell are also introducing a new hi-fi tape link for stereo operation; this comprises two sets of record/playback amplifiers and will sell at £46 including a power supply. This unit will be worth inspecting by those intending to build



Fig. 4. The new BASF tape boxes with book-end finish and swivel opening.

up a recording and hi-fi system employing a separate tape deck.

Uher

(Distributors in the UK: Bosch Limited.) Uher recorders and accessories need little introduction and what might be described as the highlight of their products this year is the new Uher 1000 Report Pilot portable shown in Fig 2. It has been produced for professional use and features a unique pilot tone system for film and sound synchronization. Uher will also be showing their current range of domestic tape recorders and accessories, some of which have been reviewed recently in *ATR*. Of interest to outdoor recording enthusiasts will be the Uher 4000 Report L portable featured in most of our recent tape and travel articles. A portable worth inspecting.

Sony

It is not known whether Sony will be demonstrating their video recorders, the subject of our *Planning for Video* series last month, but they will have their audio tape recorders much in evidence including the recently announced model TC530, shown in Fig 3. This is a solid state stereo tape recorder with full stereo replay facilities, i.e. two loudspeakers that can be detached and positioned correctly for stereo. It is a quarter-track machine and has a three-head system allowing for monitoring off-tape. For outdoor work the Sony TC800 looks promising and it features a servo-controlled drive motor, two tape speeds and will operate on batteries or mains. For use with hi-fi systems, the TC350 tape record/replay unit is worth seeing as this is a compact unit with full recording facility and replay pre-amplifiers. It also has off-tape monitoring via an extra replay tape head.

BASF

This year BASF introduce two new tape accessories. These are the C60 tape cassette designed for use with the Philips system and a new swivel book-style storage box for standard tapes as shown in Fig. 4. They are also arranging a particularly interesting demonstration in room 234 and although we know what it is, BASF have asked that it remain as a surprise. At least we can say it will be worth hearing.

Grundig

On the Grundig stand you will find the new



Fig. 5. The new Grundig TK245 automatic tape recorder shown for the first time.



Fig. 6. The new Ferguson 3216 tape recorder with the Thorn-Taylor synchro-amp for mono or stereo reproduction.

TK245 automatic stereo recorder shown in Fig. 5. This is a two-speed quarter-track machine operating at $3\frac{1}{2}$ and $7\frac{1}{2}$ ips. It features an automatic recording level system which can be switched out for manual operation if required. An auto stop is also included and facilities are included for multiple recording and monitoring off-tape.

Another new Grundig recorder is the TK220, a twin-track two-speed model with automatic or manual control during recording. This one also features separate bass and treble controls. Also new from Grundig is the C110 cassette recorder for mains operation. This employs the DC System International and the ac motor drives two dynamically balanced

MUCH TOO IMPORTANT NOT TO SEE

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A PREVIEW OF TAPE RECORDERS

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Fig. 7. The latest from Ampex. Their Model 2163 is entirely automatic.

contra-rotating flywheels providing exceptional speed stabilization. Grundig will also be showing their full range of hi-fi equipment and the new Grundig audio testing instruments.

Ferguson

The Ferguson Model 3216 tape recorder together with the Thorn TA/01 Syncro-amp unit for mono or stereo tape reproduction is part of a completely new Ferguson range of low-priced matching audio units, designed so that the enthusiast can assemble equipment for high quality sound reproduction from tape or records. These two units are shown in Fig. 6. Other equipment includes a new integrated tuner/amplifier and a multiplex decoder which have also been designed for unit assembly of a complete hi-fi and recording outfit.

Ampex

Among the Ampex exhibits will be found a new Ampex 'home recorder' which is the 2163 shown in Fig. 7. This is a high quality stereo tape recorder featuring bi-directional recording and sound mixing in addition to automatic reverse running and tape threading facilities. This recorder also has solid state electronics, twin VU recording level meters, three-speed operation and dual capstan drive.

Sennheiser

Several new items will be found on the

Sennheiser stand and, as a result of a recent visit to their factory in Germany, we can assure you that their products are indeed of top quality. They will be showing the full range of Sennheiser microphones for amateur and professional use, among which will be found the now well-known MD421 much favoured for indoor and outdoor recording. If you want to be different they can supply a gold-plated version for about £5 extra! Completely new will be the Sennheiser radio microphone system, and an interesting range of electronic testing equipment. Demonstrations will include recording and replaying under domestic conditions with their new MD411 microphone and the Sennheiser Philharmonic stereo hi-fi system. Of special interest to stereo recording enthusiasts will be the Sennheiser model MDSIN stereo microphone, shown in Fig. 8, which can be used in three different modes for stereo intensity.

BSR

In Booth 70 BSR will be showing their latest three-speed tape deck shown in Fig. 9. This is available in stereo or mono versions with half- or quarter-track BSR heads. The deck features modern styling and finger-tip pressure controls. BSR will also be displaying for the first time their UA65 record turntable unit with an integral mechanical cueing device.

Lustraphone

Aside from the complete range of Lustra-



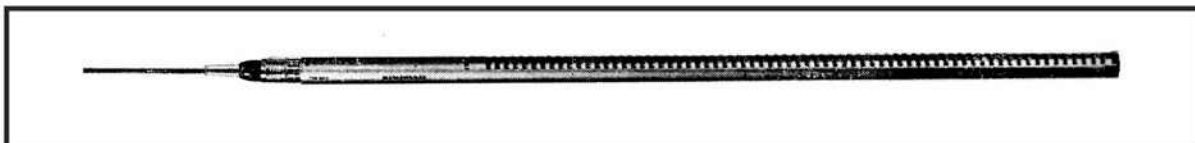
Fig. 8. The Sennheiser stereo microphone MDSIN provides for three different stereo intensities.

phone microphones there will be some new items this year including a portable personal public address system for lecturers, a special hearing aid system for use with telephones, radio and television for those hard of hearing and a telephone headset with built-in transistor amplifier. Among the Lustraphone range of microphones are many designed and priced for the amateur. At professional level there is a selection of studio microphones and the Lustraphone Radiomic system.

STC

In order to demonstrate the performance of microphones, STC are staging a series of 37

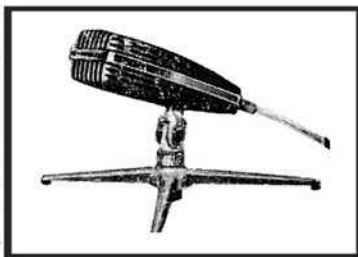
Your tape recorder is only as good as its microphone



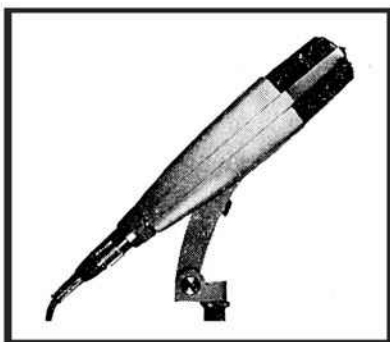
Sennheiser

make the right microphone for your recorder

MD 411 SUPER-CARDIOID
ultra directional microphone. Developed from the now famous Sennheiser studio microphones, MD 411 cuts out background noise and gives professional "close-up" sound in difficult domestic surroundings. Triple impedance suits any recorder. Complete with table stand and zip-up case. £13. 9. 0.



MD 211 OMNI DIRECTIONAL
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Sennheiser's most famous microphone is used by almost every broadcasting station in Europe and over 30,000 amateurs have saved up to buy this "acoustic Leica". Accurate cardioid characteristic and smooth frequency response permit high quality sound recordings in difficult situations. Ideal for prestige public address sound reinforcement and stage use. Built-in dual impedance transformer and variable bass attenuator control. Only the huge amateur demand for this professional microphone has brought the price down from £70 to £31. 12. 6.

Do you know the rest of the Sennheiser range of products? RF. condenser microphones (like the "gun mic." shown above), radio microphones, miniature magnetic microphones and earphones, hi-fi reproducers, audio test equipment.

Audio Engineering Ltd

33 Endell Street London WC2 TEM 0033

A PREVIEW OF TAPE RECORDERS

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Fig. 9. The new BSR tape deck is now available for stereo or mono, half-track or quarter-track.

piano recital recordings in conditions similar to those encountered by most amateurs. Microphones in all price brackets will be used and the music has been carefully chosen to fully test their capability. The STC demonstration room will be worth visiting.

Tandberg

New from Tandberg are the series 6X stereo tape decks. Full details of these are not yet available, but the 64X will incorporate many of the features of the very successful Tandberg Model 64. These decks will have full

recording facilities and playback pre-amplifiers and will be fitted with stereo multiplex interference filters. The model 64X will be a four-track machine with tape speeds of $7\frac{1}{2}$, $3\frac{1}{2}$ and $1\frac{1}{2}$ ips. The full range of Tandberg tape recorders and accessories will also be on show.

AKG

Completely new in the AKG range of microphones and accessories are nine microphones and three high-fidelity headphone sets. Of the microphones the D11D cardioid looks

Ferrograph

No doubt the Ferrograph demonstration room will be popular and they will be demonstrating all the series 6 models including the 632 shown in Fig. 10. All these recorders have similar facilities but are available for half-track or quarter-track stereo or mono operation. Ferrograph accessories such as the endless loop cassette will also be on show.

EMI

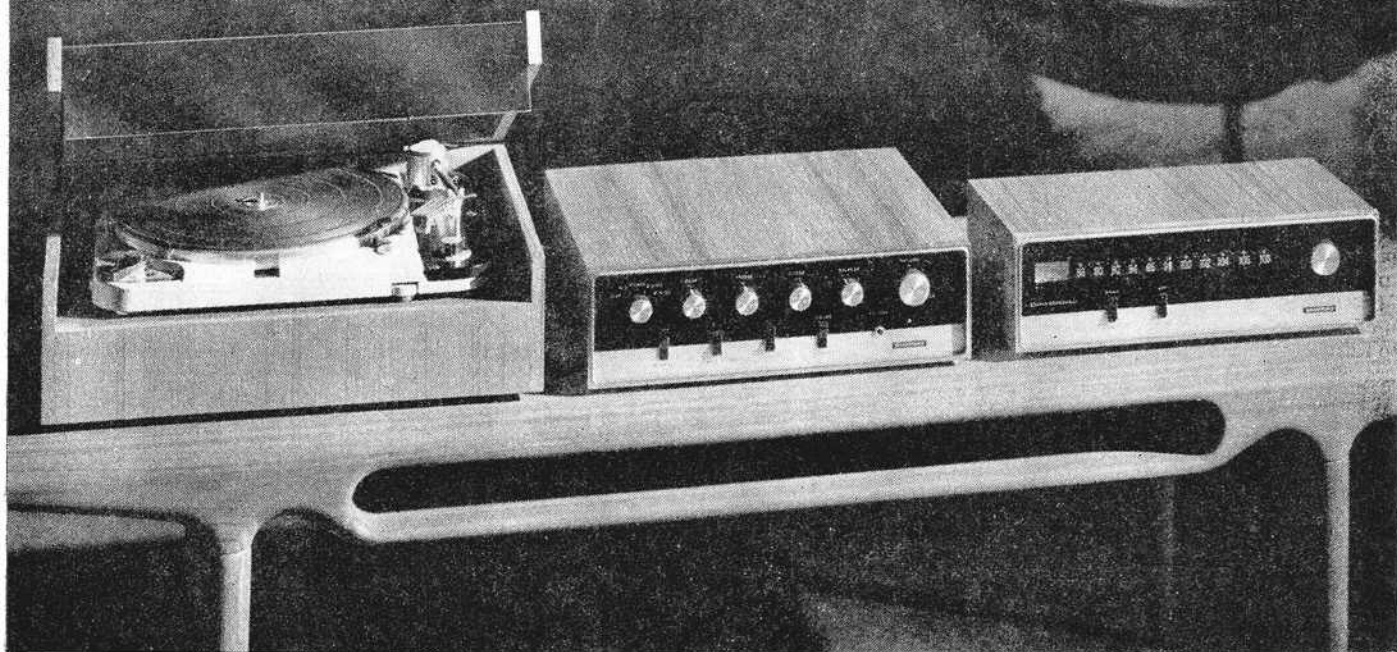
In the not too distant future we shall be featuring the EMI L4 portable of which there are three versions. One of these is shown in Fig 11 and is the L4A half-track model which, although of professional calibre, is used by many amateurs. It has an off-tape monitor system, a headphone socket and will accommodate two microphones and line input. Operating speeds are $7\frac{1}{2}$ and $3\frac{1}{2}$ ips. One of the L4 models is available for full track recording. EMI will also be demonstrating their studio recorders and magnetic tape and other accessories.

Fig. 10. Below: The Ferrograph Model 632 leads the way in British-made tape recorders.

Fig. 11. Right: The EMI L4 portable will shortly be the subject of field trials and an ATR test report.



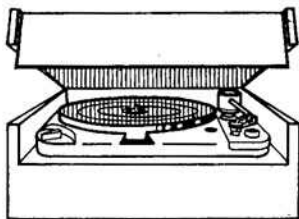
THIS IS IT!



system 20 by Wharfedale

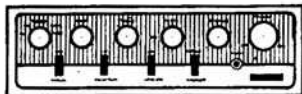
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SYSTEM 20 comprises: Wharfedale WHF-20 transistorized stereo amplifier (20 watts per channel).

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There is a choice of two housings—the elegant Howard console and the



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ATR.4

A PREVIEW OF HI-FI EQUIPMENT

at the 1967 International Audio Festival and Fair

Last year's Audio Festival and Fair produced very little that could be described as *new*. One or two firms brought forth transistorized amplifiers and a few tape recorders had changed appearance slightly from those of previous years. This year looks much more promising and with new exhibitors from both the UK and overseas the total number is of course much greater. It seems also that five floors of the Russell Hotel are now booked for demonstration rooms so a little physical training might be worthwhile before attempting the assault on the steep climb to the upper regions of hi-fi sound. It's usually easier to start at the top (via the lift), work down to the ground floor and thence to the bar or the restaurant for recuperation and refreshment. But whatever course you take, it will all be worth looking at, especially some of the items mentioned in this preview. Quite a few have been reluctant to disclose new items before the opening day so you may find our list of exhibitors and their products on page 32 useful for selecting those of particular interest.

First on our preview list is Bang & Olufsen (distributed by Debenham of Gloucester) who will be featuring B & O tape recorders and hi-fi equipment for the first time. A static display of equipment will be shown on Booth 54, in addition to which half-hourly demonstrations will be given in demonstration room 322. Note that technical staff will be in attendance at all times. B & O have a fine range of hi-fi units and even complete outfits in cabinets. The Beomaster 1000 integrated stereo unit is representative of the range and is shown in Fig. 1. It caters for all stereo and mono requirements. Another item from the B & O list which is fairly new is their model 900M AM/FM tuner equipped for stereo multi-plex, shown in Fig. 2.

Arena

The new Arena T2400 unit is an advanced FM tuner plus a module built 2x15 watt amplifier as shown in Fig. 3. It has a 'memo-matic' circuit for push-button selection of five pre-tuned stations of choice, a jack output for a tape recorder and inputs for gram (mono or stereo) and a headphone socket. This unit is extremely compact and measures approximately $3\frac{3}{4} \times 19\frac{1}{2} \times 9\frac{1}{4}$ inches. In addition, Arena will be showing a new range of amplifiers, loudspeakers, pick-ups and transcription units. Note that the prices of

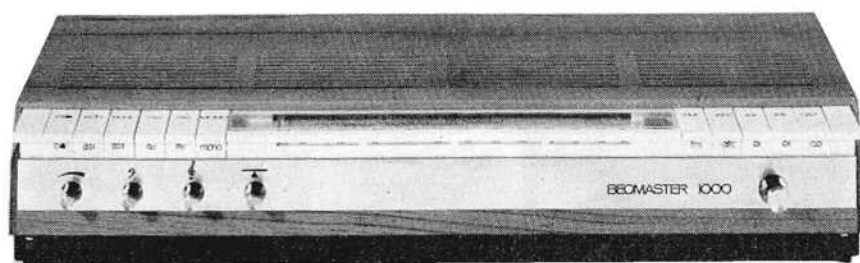


Fig. 1. The B & O Beomaster 1000 integrated stereo-mono hi-fi amplifier.

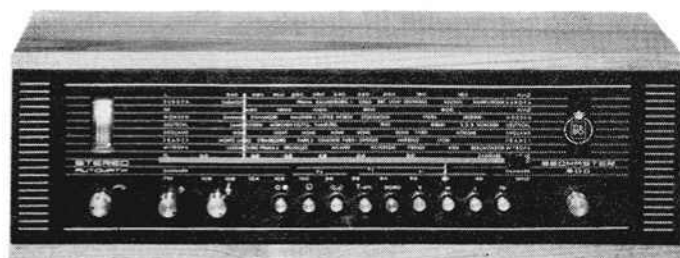


Fig. 2. The B & O 900M stereo tuner equipped for reception of stereo broadcasting.

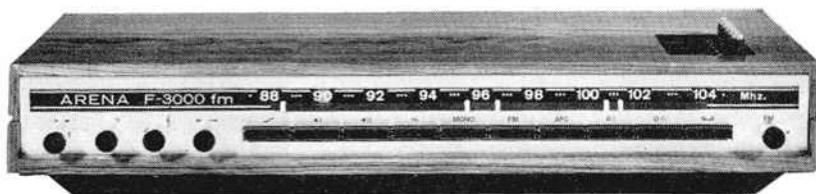


Fig. 3. The Arena T2400 amplifier with integrated tuner. A new innovation in hi-fi units.

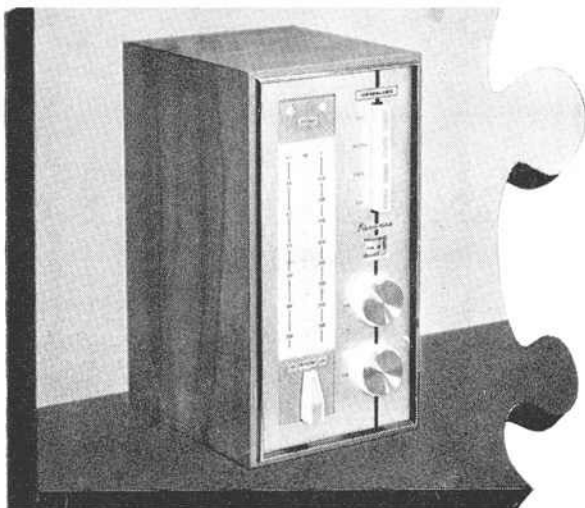
some Arena items will have been reduced by the time this report appears in print; for example, their stereo-tuner-amplifier type

T1900F will be available at 55 guineas and not 59 guineas as before.

Continued on page 45 41

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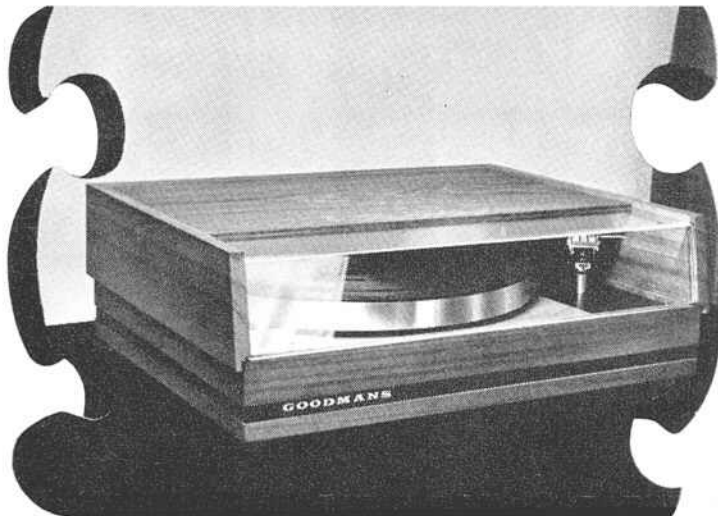


STEREOMAX

Goodmans AM/FM Stereophonic FM Tuner, transistorised and designed to match the Maxamp 30 in quality, styling, and size; available Teak or Walnut to order.

MAXAMP 30

Transistorised stereophonic High Fidelity Amplifier. Quality proven; 15 + 15 Watts; Silicon solid-state throughout. Polished wood case, Teak or Walnut to order. *ONLY 10½" x 5½" x 7¼" deep.*

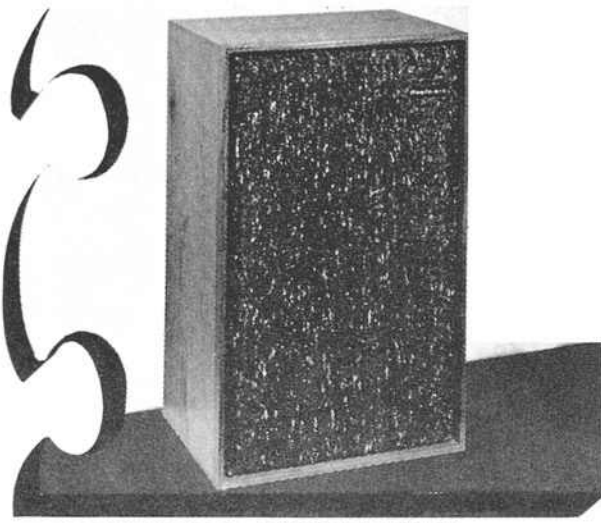
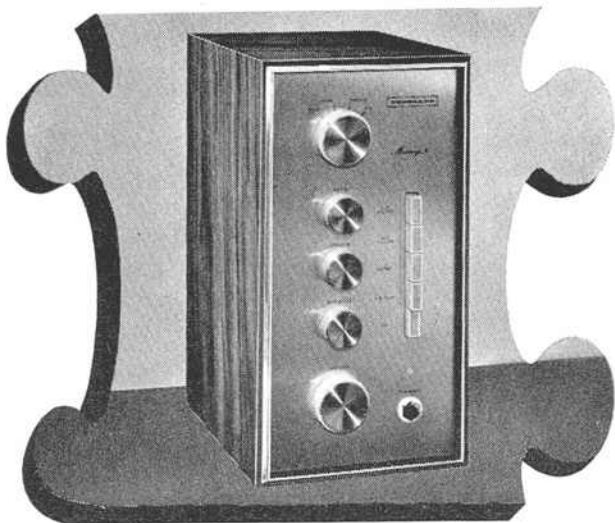


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THE High Fidelity Bookshelf reproducer. NEW up-to-the-minute styling, flush-built attenuator control. 12" x 19½" x 9" deep.



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MEZZO II (as above)

MAGNUM-K The hard-to-please Audiophiles' choice. Three-speaker system; two attenuator controls; Studio quality; 25 Watts and only 24" x 15" x 11½" deep.

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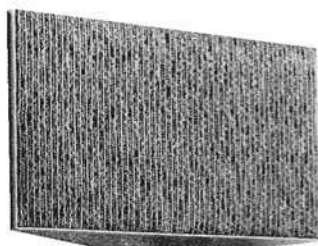
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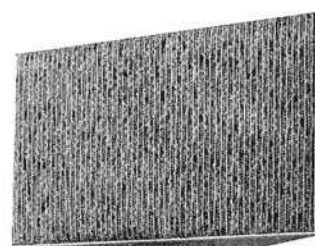
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HARMONY (Mus)

Can be variously described by simple phrases such as "a Melodious Sound", or "a Combination of musical notes to make a chord".

It is also the name for the science involving musical sounds in their combination and progression. It is a most complicated science in its own right, for the simplest chord on the purest-toned instrument is a remarkably complex thing: an orchestral climax would probably defy complete analysis.

HARMONY (domest)

A highly desirable state of peace and completeness which can be attained in musical families by the simple expedient of mounting a pair of extremely good loudspeakers on the walls of the listening room.

Floor space is saved, the vacuum cleaner can be used again, cables are not lying all over the floor, and a flower vase (if essential!) can be stood on top: "She" is happy.

The phasing does not get disturbed, the loudspeakers do not get moved about, stereo is consistent, and the reproduction is truly excellent: "He" is happy.

The effect is cumulative within the household of course; each is happy because the other is.

The Jones' are not so. (Unless they did it first).

Visit your dealer, ask to hear a pair of OMNIs on their sides or on a shelf (or something) about 4-5ft above the floor with the controls level.

And make sure you do just that — it makes a vast difference and could save you a small fortune if it is realism with extreme smoothness which you are after.

If your dealer turns out to be a helpless square, tell us, at Rectavox, and we will soon find you a better one!!

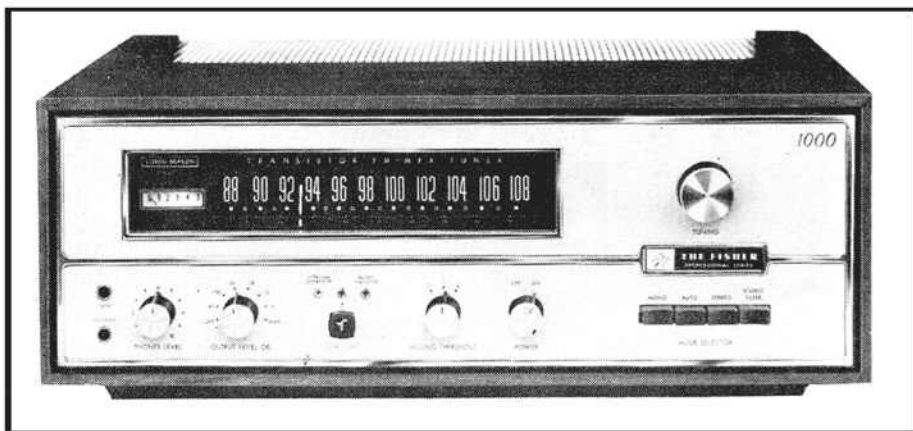
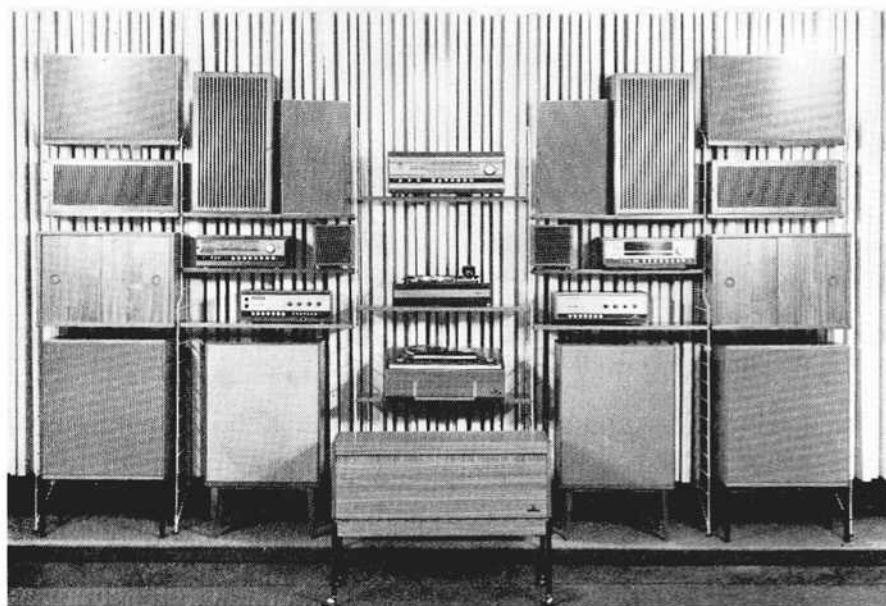


Fig. 4. The Fisher integrated hi-fi amplifier has a built-in FM tuner with stereo multi-plex decoder.



A PREVIEW OF HI-FI EQUIPMENT

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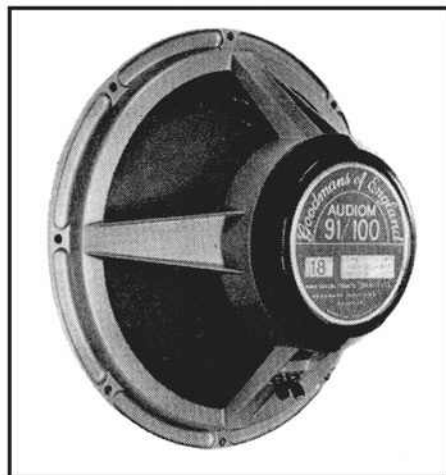


Fig. 6. Above: If you must have a 100 watt hi-fi outfit, then you may need this giant power Goodman's loudspeaker designed for public address work

Fig. 5. Left: Grundig offer a choice of units for setting up a complete hi-fi system.

Fisher Radio International

Integrated tuner-amplifiers seem to be in the fashion this year and a new and interesting item from Fisher Radio is their model 400 amplifier with built-in FM tuner. Since the advancement of multi-plex broadcasting in the UK, the sales of Fisher tuners have increased tenfold, the main reason being the reliability of their multi-plex decoder. The model 400 integrated tuner-amplifier retails in the UK at 99 guineas. If you are looking for a high grade tuner of the type used by laboratories and broadcast stations there is the Fisher model TFM1000 which operates to an extremely rigid specification. It is shown in Fig. 4 and is an all-transistor unit with an output for external amplifiers or high quality headphones.

Grundig (GB) Ltd

The full range of Grundig tape recorders will be on show. On the hi-fi side they will be demonstrating a range of power amplifiers, pre-amplifiers, loudspeakers and complete hi-fi outfits. There is a wide choice of equipment for a domestic hi-fi system as shown in Fig 5. There is no announcement

of anything new from Grundig except their range of test equipment - one item of which we will shortly be reviewing (for Grundig tape recorders see Sound Scene preview in this issue).

Goodmans Industries

One has only to mention Mezzo, Magnum or Maxim and the subject automatically becomes Goodmans, the name being synonymous with loudspeakers. However, aside from their unique range of speakers with enclosures and speaker units, they recently introduced the Maxamp integrated stereo amplifier. Now they have an all-transistor tuner known as the Stereomax which has been designed to operate with the Maxamp amplifier and to match it physically. The M range of speakers mentioned above will also be demonstrated. One other new item from Goodmans is a 100 watt speaker unit for noisy localities. We hasten to add that this is for public address work and is shown in Fig. 6.

SME

The precision pick-up arms manufactured by

SME remain unchanged and are as reviewed in the February issue of *ATR*.

Truvox

No news of any new items from Truvox Ltd, but they will be showing and demonstrating their current range of tape recorders and the Truvox domestic hi-fi systems, which include the FM100 all-transistor tuner available with stereo decoder (Fig. 7).

Fane Acoustics

Fane will be introducing a new loudspeaker known as the Ionofane Model 604. This is a rather expensive unit but there are other similar Fane hi-fi speakers on show including model 603 which consists of an Ionofane hf unit plus a 5 inch mid-range unit and a 15 inch bass unit in a Design Furniture enclosure.

Design Furniture

Aside from loudspeaker enclosures, as mentioned above, Design Furniture have an excellent range of cabinets for housing entire hi-fi systems. To show how good they are as cabinet makers we include Fig. 9, which

A PREVIEW OF HI-FI EQUIPMENT

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Fig. 7. Part of the Truvox domestic hi-fi system is the FM100 transistorized FM tuner which is available for mono or stereo reception.

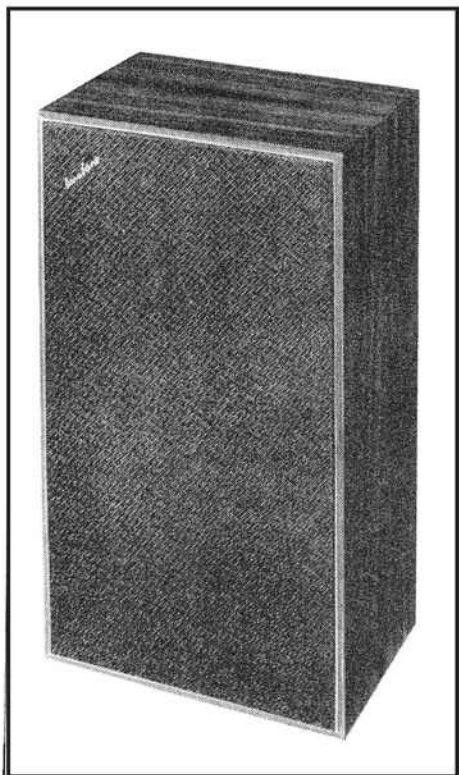


Fig. 8. The new Fane Ionofane high fidelity loudspeaker employs a newly developed hf reproducing system.



Fig. 9. A Sheraton-style cabinet for hi-fi by Design Furniture.

shows their *Sheraton* model made in mahogany with satinwood inlay. It is based on an original design by Thomas Sheraton and will comfortably accommodate a record transcription unit or a tape deck and amplifier and tuner. Expensive? At 105 guineas yes, but they do have an attractive range of cabinets at much lower prices.

Tannoy

For the hi-fi enthusiast with expensive tastes, Tannoy will be showing their range of enclosures including the Autograph, GRF and York enclosures. Tannoy loudspeakers are used in the House of Lords but for less exalted environments they can offer the small bookshelf enclosure with a dual concentric speaker unit type 111LZ shown in Fig. 10.

Daystrom Ltd

46 Daystrom (Heathkits) are not showing at

the Russell Hotel but are staging their own display of Heathkits for hi-fi and recording at the Grand Hotel in Southampton Row. This will be open during the same period as the Audio Fair. New equipment includes their SD1 stereo decoder, the CR1 car radio and the Avon compact bookshelf loudspeaker all in kit form.

Armstrong Audio Ltd

This year Armstrong Audio Ltd will be introducing a new range of transistorized amplifiers, tuners and integrated systems with an entirely new styling. These will be known as the Armstrong series 400 consisting of the 421 stereo amplifier, 423 AM/FM tuner, 424 FM tuner, 425 FM stereo tuner/amplifier, 426 AM/FM stereo tuner/amplifier. Optional with any of the FM tuners and tuner/amplifiers will be the M4 stereo radio decoder. The whole series are designed for

bookshelf mounting and will cater for all the normal requirements of hi-fi. Power outputs are in the region of 15 watts and performance generally will exceed the current Armstrong series 200 range of equipment.

Rank Wharfedale

Aside from the Wharfedale range of loudspeakers and enclosures, it seems they have gone over to the manufacture of complete hi-fi systems which will be shown for the first time. Of the two at present available the 'Howard' is shown in Fig. 11 and comprises the cabinet fitted with a Wharfedale WHF20 amplifier (stereo), a WFM1 tuner, also stereo and a model TD124 professional record transcription unit with a Thorens TP14 pick-up arm and Shure cartridge. The amplifier delivers 20 watts output per channel and will therefore operate with any of the popular range of Wharfedale loudspeakers.

continued on page 48

NEW

Be among the first to hear the **Ditton 15**

The Ditton 15 is Celestion's new 3 element compact loudspeaker enclosure. Although only 1 cubic foot in size, this full-range 15 watt system gives improved bass performance over simple closed boxes because of a new concept in design—ABR (Auxiliary Bass Radiator).

ABR gives the following advantages :

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A PREVIEW OF HI-FI EQUIPMENT

continued from page 46

Shure

One of the highlights in pick-up cartridges will be the Shure V15 type 2 'super track', an entirely new cartridge designed with the aid of an analogue computer. This new cartridge will track at less than $1\frac{1}{2}$ grams, thus eliminating distortion due to tracking. It is shown in Fig. 12 and will be the subject of a special demonstration showing the problems associated with pick-up tracking.

KEF

Being shown for the first time is the KEF Cresta, an ultra-compact two-way speaker system as shown Fig. 13. Although it is a fairly small speaker it has been carefully designed with proper regard for acoustical performance rather than spectacular miniaturization. It will handle up to 15 watts and has a frequency range of 50 to 30,000Hz. Of interest to professional users will be the KEF Carlton system which is a three-way speaker designed for sound, film and television studio use.

Garrard

Automatic play facilities for single records is one of the new features of the Garrard LAB80 Mark 2 record changer which combines the top quality performance of a transcription turntable with the advantage of an automatic record player. Another innovation is the record repeat adaptor which fits over the automatic spindle and allows a record to be repeated as often as desired. Also on show will be the Garrard A70 Mark 2 automatic turntable, which features record changer mechanism, and the AT60 Mark 2 with a new system of cueing and pause control. For the discriminate hi-fi enthusiast there is the Garrard 401 which has a precision stroboscope allowing speed control adjustment to $\pm 3\%$.

Sugden Ltd (Connoisseur)

This is a hi-fi manufacturer we don't hear about very often but who are nevertheless makers of precision equipment. This year they are showing, for the first time, a pick-up arm designed to meet the requirements of the connoisseur. Known as the SAU-2, and shown in Fig. 14, it incorporates several interesting features such as gimbals set at $45^\circ/45^\circ$ to enable the natural force of gravity to be harnessed to advantage. By adding a small arm to the inner gimbal ring an outward bias is achieved with the minimum of moving parts. This compensates for 'skating' effect on inward pull due to the offset of the

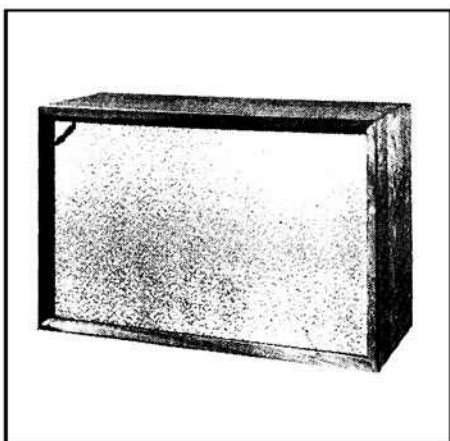


Fig. 10. A small bookshelf loudspeaker by Tannoy. It employs the Tannoy type III LZ dual concentric speaker unit.



Fig. 11. The new Rank-Wharfedale hi-fi system known as the Howard includes amplifier, tuner and transcription unit.

pick-up head and the friction between the stylus and the record. Sugden Ltd will also be featuring their *Classic* turntable, pick-up and plinth assembly for two-speed operation which is small enough to stand on a bookshelf.

Richard Allen Ltd

New to the hi-fi range of loudspeakers by Richard Allen Ltd is their *Sarabande*, a complete medium-sized wide range triple speaker assembly. The *Sarabande* incorporates an entirely new development, namely a mid-range and tweeter module which follows the same general pattern as their successful existing modules. The mid-range module is available separately either in chassis form or complete in a cabinet and is ideal for adding to existing systems to improve reproduction generally.

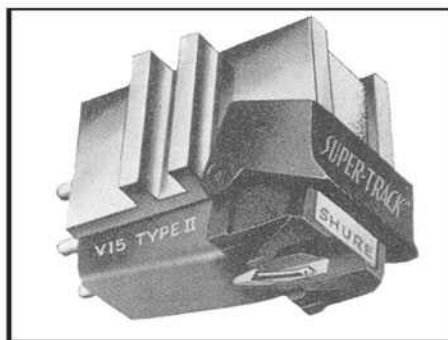


Fig. 12. The new Shure Super-track pick-up cartridge.



Fig. 13. The Cresta, one of the new range of KEF compact loudspeakers.

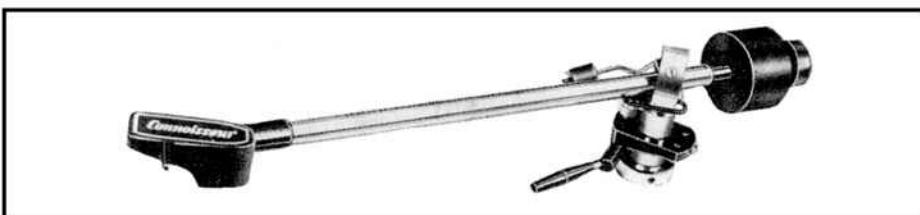


Fig. 14. The Sugden SAU-2 precision pick-up arm, a new Connoisseur development.

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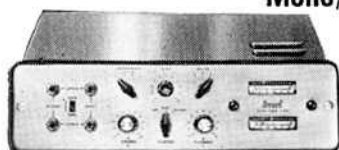
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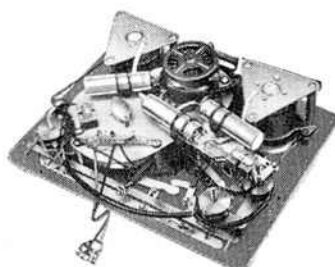
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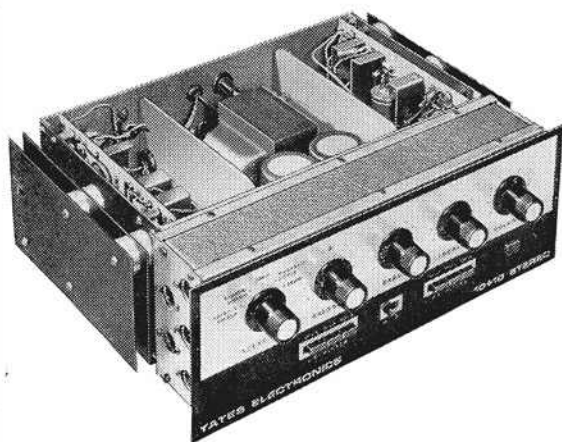
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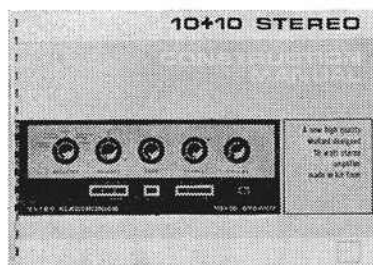
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THE ELEMENTS OF EQUALISATION

by Gordon J. King

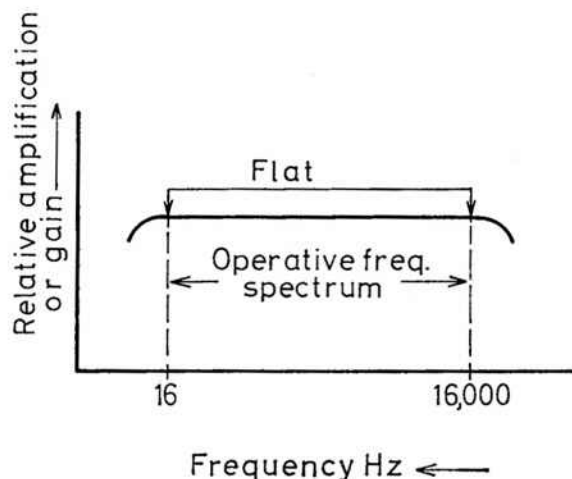


Fig. 1. A 'flat' response characteristic.

While equalization is not a direct function of matching, equalizing circuits can complicate or affect the transference of a signal from one circuit or section to another. It was shown in the January issue that matching is fundamentally the process of securing the optimum transfer of signal from, say, a microphone to an amplifier in the manner proposed by the designers without causing a boost or attenuation of the signal over the frequency spectrum. Equalization, on the other hand, is the process of purposely boosting and/or attenuating the signal at specific frequencies or bands of frequencies over the operative spectrum. The intrinsic design for an audio amplifier is towards the most consistent amplification or gain, from the lowest bass frequency to the highest treble frequency, a spectrum often considered as from 16Hz to 16,000Hz, from the lowest to the highest music octave. Such an amplifier would be considered as 'flat', implying no rise or fall in the overall spectrum response and would have an amplification (gain) to frequency characteristic as shown in Fig. 1.

An amplifier of this nature would demand a programme signal which is also flat over the frequency spectrum. It is difficult to visualize a signal of this kind because music or speech is not itself consistent in sound intensity or signal amplitude. Nevertheless, programme signal is often considered as having a 'flat' characteristic. Let us look at this in terms of signal output from a microphone, for example. If we connect a sensitive millivoltmeter across a microphone and then speak into the microphone, the meter would indicate in terms of loudness of the speech. The louder we speak, the greater the deflection of the meter. Of course, the needle would fluctuate over a range of signal voltage, from a low level - when the voice is soft - to a high level - when the voice is loud. We could average the voltage readings and in that way find the nominal output of the microphone for a particular voice level. But we would still not know whether or not the programme signal (the voice in this case) had a flat frequency characteristic.

To discover this we should need a sound-ing device whose output could be adjusted in frequency from, say, 16Hz to 16,000Hz

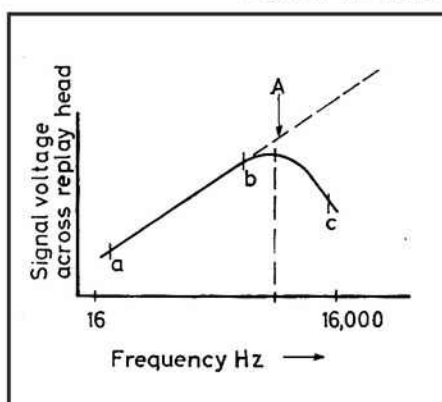


Fig. 2. The output from a tape replay head.

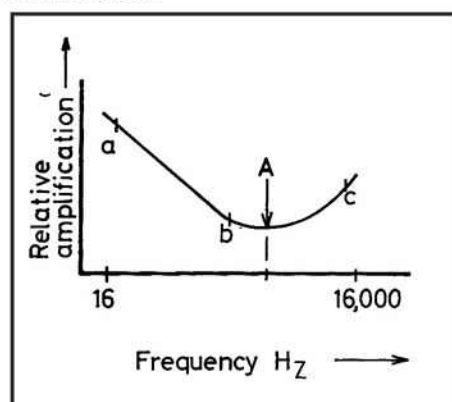


Fig. 3. Tape equalizing characteristic.

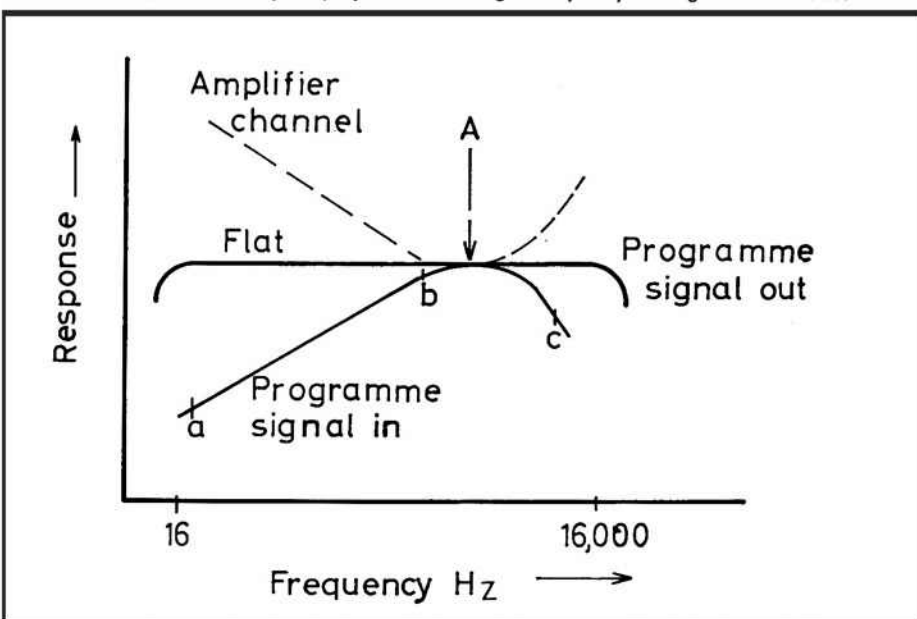


Fig. 4. Showing how a 'flat' response is obtained by integrating the two curves at Fig. 2 and Fig. 3.

without changing the intensity of the sound. We may have a loudspeaker capable of achieving this (although unlikely), in which case we could connect an audio power generator to its terminals and adjust the signal frequency over the spectrum, making sure that the amplitude of signal applied remains constant. The speaker

would then emit a tone of constant amplitude from the lowest to the highest frequency (we hope!). Having such a controlled source of sound, we could put our microphone in front of it and plot the signal voltage from the millivoltmeter that it delivers over the spectrum, at various spot frequencies. This seems all right in theory,

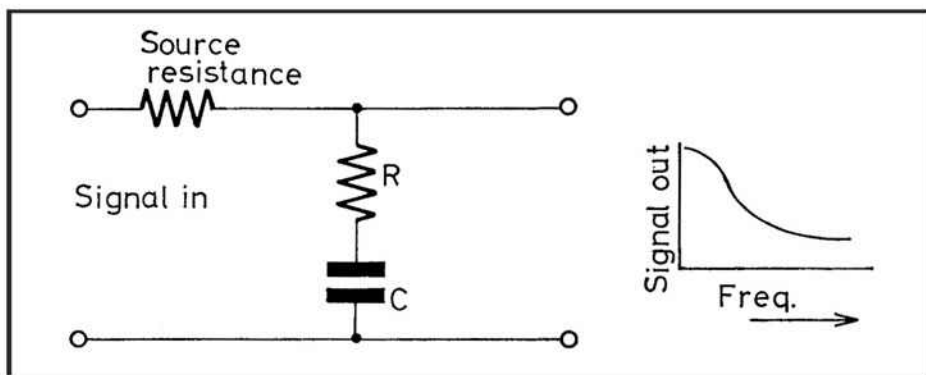


Fig. 5. A simple RC compensating circuit for a tape head.

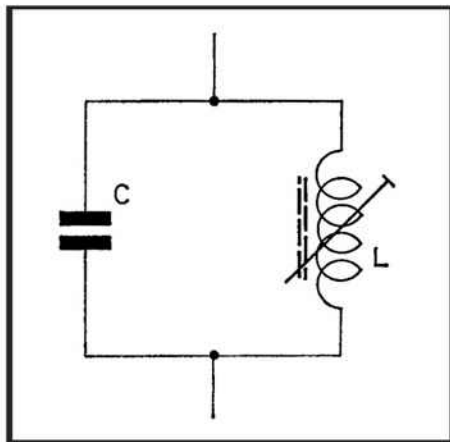


Fig. 6. Right, a resonant treble-emphasis circuit.

but in practice there would be hosts of problems, including the acoustics associated with sound cancellation effects due to reflections, reverberation and so forth. Nevertheless, it is possible by this means to check the frequency characteristics of a microphone.

There are other programme signals that are less easy to check, such as the signals delivered by a pick-up or radio tuner. In the former case, equalization comes into play anyway, as we shall shortly discover and we can undertake a frequency response check by means of a test record having sections recorded at specific frequencies and levels (we shall be looking at such records next month). The programme signals delivered by a radio tuner, however, are virtually impossible to determine in this way, since the transmitting authority rarely radiates suitable constant-level test-tones. A tape recorder could be geared to produce constant-level test tone outputs, for all that is needed to do this is an audio generator to record test-tones of suitable levels on the tape. However, equalization comes into the equation here, too, and this can be fairly readily demonstrated by recording intervals of tone from an audio generator over the whole of the audio spectrum, making sure that each recording gives the same deflection on the recording-level meter, and that the meter itself has a flat response.

However, when the signal across the replay head is monitored on our sensitive millivoltmeter we may – or may not – be surprised to find that the output is nowhere near flat, and that it rises at a fairly constant rate from the bass, peaking towards the middle of the spectrum, from whence it falls more rapidly towards the high treble end. This is shown in Fig. 2. It is instructive to commence studying the equalization problem at this point. That is, relative to a tape recorder.

Clearly, Fig. 2 shows that both the bass and the treble frequencies of the programme signal delivered by the replay head are attenuated relative to the peak in the response shown at point A on the curve. This happens at the bass end because the recording process imparts a pattern of magnetism on to the tape oxide, and the length of tiny magnetic field decreases as the frequency increases. Now the signal electro-motive force (emf) in the replay head winding is produced by the lines of force from the recorded magnetism cutting across the head poles, and thence the

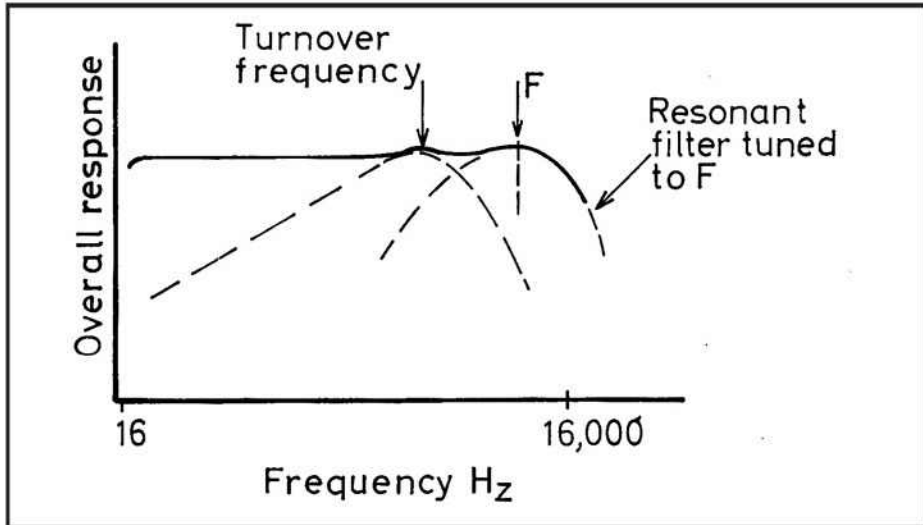


Fig. 7. Showing how the overall tape response is extended at the treble end by a resonant circuit tuned to frequency F .

head winding. This is based on ordinary principles of electricity and magnetism which we learned during our school days. It embodies the principle of the dynamo. Take an ordinary bicycle dynamo. When we are cycling slowly the bulb is dim, but gradually increases in brightness as we increase speed and causes the armature of the dynamo to rotate at a greater speed. So it is with tape recording. The relatively shorter magnetic fields, as recorded on the tape, pass the replay head poles more and more rapidly, even though the tape velocity is constant, and it is this greater rate of change of magnetic flux that causes the progressive increase in emf in the replay head winding, resulting in part a-b of the curve in Fig. 2. When the frequency corresponds to point b, the magnetic flux induced into the head from the tape is changing very rapidly, and although the flux-change further increases from b to c the winding emf fails to rise because now the frequency of the signal is so high that losses on the tape and in the head come into play and bypass some of the treble signal emf. If there were no such losses the signal emf would continue to rise at a steady rate as shown by the broken line on the curve.

Here, then, is a typical need for equalization. There are two ways that this could be handled: one, the recorded signal could be boosted at the bass and treble

ends, relative to point A, as shown in Fig. 3, and two, the replay signal could be boosted in a like manner. In nearly all tape recorders equalization is achieved by boosting the bass in the replay amplifier and by boosting the treble in the recording amplifier. Treble boost in the recording amplifier, however, is not universally adopted, for some recorders apply a little treble boost during playback as well as a little during recording. Anyway, the effect of the programme signal curve and the amplifier curves together provide an overall 'flat' output, as shown in Fig. 4. This is total equalization in a tape recorder. This shows that if we take a millivoltmeter and monitor the output signal from a tape recorded with the constant-level frequency bands above, we should obtain a reading which remains almost perfectly steady over the entire spectrum, from 16Hz (on a very good machine) to 16,000Hz (on many machines at $7\frac{1}{2}$ ips). This is representative of a 'flat' programme signal; but in this case it is only flat after equalization. A microphone, as we have seen, may give a flat signal without equalization.

Dynamo Principle

The degree of bass boost required in a tape recorder follows a well-known law, again based on the dynamo principle. We find that the output emf is directly proportional to the speed of the armature or to

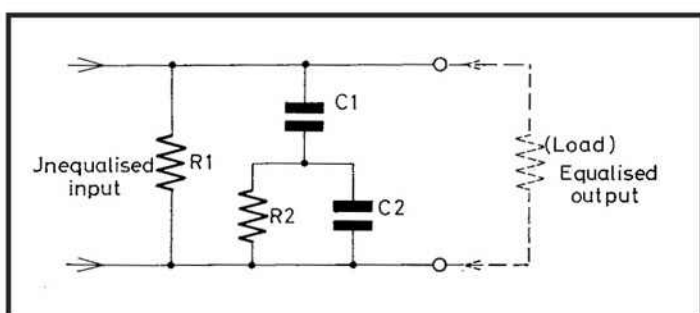
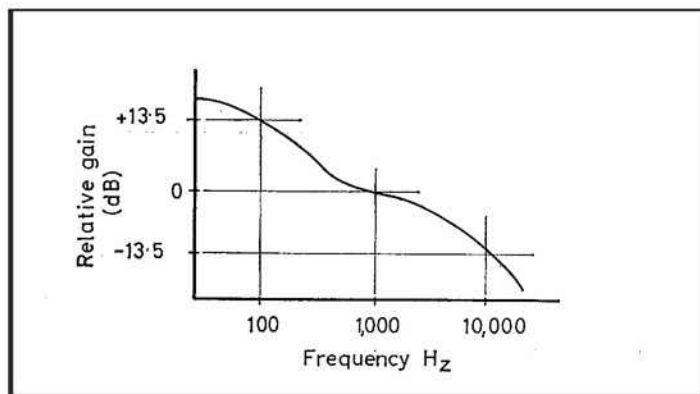


Fig. 8. Left, disc record replay characteristic (see text).

Fig. 9. Magnetic pick-up equalizing circuit.

THE ELEMENTS OF EQUALISATION

continued

the rate of change of the magnetic flux. This means that the output emf will double each time the flux rate is doubled, and this applies to the replay head of a tape recorder up to approximately point A marked on the curves. Incidentally, this point is called the *turnover frequency*. Because the flux change doubles at each rising octave, it follows from the above reasoning that the head emf also doubles at each rising octave. Now, when an emf (or voltage, for the volt is the unit of emf) doubles we can say that it has increased by 6dB. Thus, for each rising octave we obtain a 6dB increase in head emf which can be referred to as a curve with a constant slope of 6dB/octave. The slope of the curves from a to b in the accompanying diagrams, therefore, is 6dB/octave. As soon as the frequency approaches point A (the turnover frequency) this law no longer holds, for the output then tends to flatten for a very short period before taking a fairly rapid dive. Anyway, we can at least design an equalizing circuit based on a 6dB/octave curve for the lf end of the spectrum.

Before investigating this, however, it should be understood that the turnover frequency is affected by the velocity of the tape passing the head. The turnover frequency increases as the tape velocity increases. This is due in part to the fact that a higher tape speed allows a recording (on the tape oxide) of magnetic patterns which are longer than those recorded at the lower velocities. High-frequency losses are then reduced, and self-demagnetization of the magnetic pattern corresponding to the high treble frequencies is less of a problem.

Equalization is accomplished in most electronic circuits by a resistor (R) and capacitor (C) in various combinations. When two such components are partnered, it is possible to obtain a frequency characteristic which also has a slope of about 6dB/octave. This is because the impedance of the circuit (often looked upon loosely as *ac resistance*) falls as the signal frequency rises. With an RC combination arranged, for instance, as in Fig. 5, the output signal drops in a manner shown by the accompanying curve. This is, indeed, a basic equalizing network, and the curve depicted is almost that required to compensate the

rising treble from a tape replay head. Equalizing networks of this kind have a time-constant in *seconds* equal to the value of R in ohms multiplied by the value of C in farads, but since we are more interested in time constants in the order of microseconds (millionth of a second) we usually deal in megohms (one megohm - M - equals one-million ohms) and picofarads (one picofarad - pF - equals one-millionth of a farad). Thus, the product of R in megohms and C in picofarads gives the time-constant in microseconds. For instance, a time-constant of 50 microseconds is obtained with R = 50,000 ohms and C = 1,000 pF. This is the FM radio de-emphasis time-constant, as we shall see.

Time Constants

The CCIR tape equalization time-constants are 35 microseconds for 15 ips and 100 microseconds (old standard) for 7½ ips, giving turnover frequencies of 3.5kHz and 1.6kHz respectively. The new DIN/CCIR 7½ ips standard is 70 microseconds. The DIN/CCIR for 3½ ips is 140 microseconds, while for 1½ ips a time-constant of 280 microseconds is often used.

The RC combinations in the equalizing circuits of a tape recorder are based on the above time-constants, and in many recorders the equalizing circuit is placed in a negative feedback loop in an early replay stage. The circuit might consist of nothing more elaborate than a resistor in series with a capacitor between the anode and grid circuit of the first or second amplifier valve, the values chosen to give the required time-constant and to match the impedances of the circuit.

This arrangement gives frequency-selective feedback based on the 6dB/octave law, so that the gain of the amplifier is caused to reduce with increasing frequency. This is brought about, of course, by the feedback increasing at the rate of 6dB/octave at the bass end of the spectrum.

The treble is often boosted by a resonant circuit in the recording channel (and/or in the replay channel) tuned to a frequency a bit above the turnover frequency. A typical resonant circuit is given in Fig. 6. This could be connected in series with a signal load in the amplifier, and its action in this application would be to lift the amplification considerably in proximity to its reson-

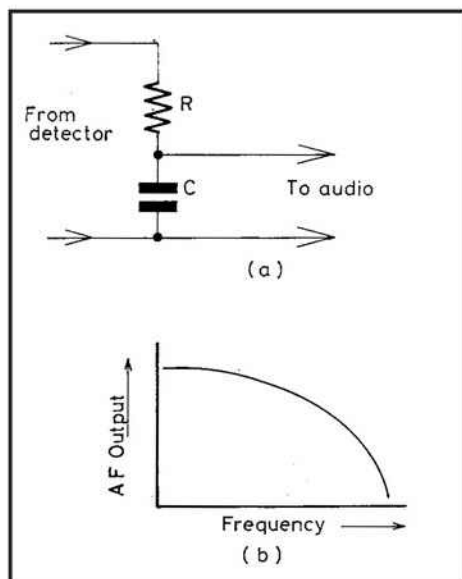


Fig. 10. (a) FM de-emphasis filter; (b) its response characteristics.

ant frequency. Fig. 7 shows how the falling treble from a recorded tape could be compensated by a resonant filter. This curve represents the *overall record/replay characteristic* (heavy-line curve) due to bass-boosting on replay and treble-boosting on record.

Pick-up Equalization

Equalization is also a requirement in a gramophone pick-up channel. This is because gramophone records are made with a falling low-frequency response (to avoid groove breakdown on high amplitude bass frequencies) and a rising high-frequency response (to improve the signal/surface-noise ratio). To compensate for this characteristic, the playback amplifier should have a response closely matching that shown in Fig. 8.

Here the slope of the curve averages 4dB/octave, the response being about 13.5dB up at 100Hz and 13.5dB down at 10kHz, so the simple RC partnership used for tape replay equalization cannot be used fully successfully on disc records. Instead we need a circuit shown in Fig. 9 to provide the necessary equalization. Here there are two main time-constants, R1-C1 at 2,940 microseconds and R2-C2 at 81.2 microseconds. This network can be included in the pick-up circuit direct, but it is usual practice to incorporate it in a

negative feedback loop in the first amplifier. Negative feedback equalizing makes it possible to obtain a better signal coupling to the first valve (without the filter attenuating the input signal) and also helps to reduce the early stage distortion. Both very commendable.

The above assumes that the pick-up is a magnetic type, where the dynamo principle, already expounded, applies. If a piezo pick-up (crystal or ceramic) is used across a high value (about 2 megohms) input load, equalization is automatic within the cartridge. This is because the output signal is a function of stress rather than rate of change of magnetic flux as in a magnetic pick-up. Thus, the recording characteristic earlier described gives a 'flat' output from a piezo pick-up loaded to a high value resistor.

However, if the resistor loading the pick-up is of relatively low value (say, 50,000 ohms), a compensating effect takes place in the cartridge owing to its essentially capacitive make-up. The action, in fact, is very much like that already explained with a series-connected RC combination, and the output voltage rises at a rate which is approximately the reciprocal of the curve in Fig. 8. This means, then, that a piezo pick-up can be used on an amplifier with an equalized pick-up input (for a magnetic pick-up) provided the load across it is about 50,000 ohms. This was covered in last month's article on matching.

FM Tuner Equalization

Finally, let us look at FM tuner equalization. Treble-emphasis (called pre-emphasis) is applied at the transmitter as a means of enhancing the signal/noise ratio of the system. Pre-emphasis means that the FM deviation is caused to increase progressively with rising frequency of the programme signal, and this is compensated at the receiver by a de-emphasis circuit. The idea behind this is much in common with the treble boost given to disc recordings. The lower energy content of the higher audio frequencies is fighting against the surface noise of the record, but by boosting the higher frequencies on recording and attenuating them on replay the frequency response is restored and the worst of the surface noise is deleted at the same time!

The FM de-emphasis circuit is fitted between the detector output and the audio amplifier input and, again, it takes the form of a very simple RC partnership shown in Fig. 10(a). Fig. 10(b) shows how this circuit attenuates the rising treble signals (plus the noise signals).

The British FM system uses a de-emphasis of 50 microseconds, so it is necessary to ensure that the RC circuits fitted before and after the network do not influence this time-constant by any marked degree. It is worth noting that an extra long length of screened cable from an FM tuner to an amplifier could add to the C of the time-constant and impair the treble too much. Stereo tuners must have a de-emphasis circuit of 50 microseconds in each leg (A and B output), and these are often fitted after the encoder. They cannot, in this application, be fitted directly to the detector output, since here they would bypass the stereo information.

A TO Z IN AUDIO AND VIDEO

Audible Frequency Range

Vibrations in the air are translated by our sense of hearing into sound, and the average person can hear vibrations from about 16Hz up to 16,000Hz. 16.4Hz represents the fourth musical octave below middle C, while 16,000Hz represents the seventh octave above middle C. The organ is the only instrument which produces sounds down to about 16Hz and sound a little above the sixth octave above middle C on fundamental tones. Many instruments, however, produce sounds approaching the seventh octave above middle C on overtones or harmonics. The piccolo, for instance, gives out air vibrations up to about 14,000Hz on overtones, but its upper fundamental tone barely reaches 4,000Hz. Noises, such as the clapping of hands, the musical triangle and so forth, can also produce upper treble overtones, and some of the component frequencies of handclapping, for example, reach 16,000Hz. This is one of the reasons why this noise is a good test signal for amplifiers, tape recorders and speakers.

Some young people can hear vibrations above 16,000Hz, and instances of sound perception up to 20,000Hz have been recorded; but, alas, with age the upper frequency responses diminish. The very low-frequency sounds are felt more than actually heard, and vibrations below 16Hz of moderate intensity can produce feelings of mental discomfort. The big organ pipe delivers air vibrations close to 16Hz, and these are invariably felt more than heard. These very low frequencies have the effect of modulating the sounds produced by the shorter, higher frequency pipes.

Automatic Tape Reversal

This is the term given to the system which automatically causes reversal of the tape when one track runs out. In some machines there is also an automatic device for changing over the heads from one track to the other so that when one track runs out, the tape reverses and the adjacent track is switched on. An automatic deck of this kind was produced sometime ago for background music systems. This used four tracks for continuous play, the first track coming in again at the finish of the fourth track.

The review of the Ampex 1150 by our Editor in the January 1967 issue shows that the idea is by no means extinct.

Azimuth Adjustment

The azimuth relates to the angle or arc of the replay and/or recording head gap with respect to the width of the tape passing the gap. This angle will, of course, be the same on both recording and replay on a tape recorded and replayed on any machine with a common recording/playback head. The trouble of angle inconsistency arises when a tape recorded on one machine is replayed on a different machine, or on a machine where separate recording and replay heads are used.

It is imperative under such circumstances for the azimuth of the replay head to match exactly that of the recording head used to record the tape if the best treble response is to be obtained. Normally, the recording head is arranged so that the length of its gap falls exactly at right-angles to the width of the tape. Thus, for optimum high-frequency definition, the length of the gap of the head used to replay that tape must be exactly the same angle with respect to the tape width.

Most machines have an azimuth adjusting screw on the head assembly, and when this is turned the angle of the length of the gap with respect to the tape width is adjusted from a positive, through zero (the correct setting) to a negative value. Adjustment is best made either by playing a white noise or high-frequency test tape and then turning the screw for maximum output. It is desirable to use an audio output meter rather than relying on the ear to determine the maximum output setting.

Baffle

In audio parlance this often relates to the board on which the loudspeaker is mounted (baffle board). Without any kind of baffle an ordinary loudspeaker unit would give very poor reproduction because on one side of the cone is developed a compression wave and on the reverse side a rarefaction (de-compression) wave, and a so-called 'acoustic short-circuit' results at the lower frequencies. This happens at the lower frequencies where the wavelength of the sound waves approach the dimensions of the cone; the effect being that sound waves from the rear of the cone tend to cancel those from the front of the cone, and the acoustic output of the unit drops almost to zero as the frequency is lowered.

This, however, is avoided by mounting the unit on a baffle board so that the rear and front sound waves are isolated. Since the baffle cannot have infinite area, though, some front-to-rear cancellation at the lower frequencies is bound to take place, depending on the dimensions of the baffle. A baffle board is generally designed so that cancellation effects will not be the same in all dimensions as, for instance, they would be by the use of a circular baffle on which the speaker is mounted in the exact centre. The solution lies in the use of a rectangular baffle, as large as practical, with the speaker unit displaced from centre.

A near approach to the infinite baffle is by mounting the speaker unit on a wall dividing two rooms. A more recently popularized technique is the miniature loudspeaker cabinet in which the unit is hermetically sealed. This not only avoids sound cancellation, because sound waves from the rear of the cone just cannot get out of the box, but it also gives good IF loading due to the springy effect of the air trapped in the box.

More next month

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I would like you to include the following particulars in the Tape Directory, and agree to acknowledge all replies I receive in response to my entry (USE BLOCK LETTERS)

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Age..... Occupation.....

Address

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Tape recorder used.....

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5" "	1,200'	15/9 13/9
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B AFX/1—WILD ANIMALS Price 7/6

Side 1—Male and female lions Gibbons Chimpanzees Bell bird
Rattlesnake Baboon Viper Emperor geese Fish eagles Mountain
lion (puma) Kookaburra (laughing jackass)
Side 2—Elephants Mississippi alligator Indian tiger Sea lions
Male lion In the jungle (a background of typical sounds)

C BGX/1—BACKGROUND SOUND EFFECTS Price 7/6

Side 1—Sea (breakers) Wind (howling—eerie) Thunder (light rain)
Side 2—Rain (heavy shower) Factory sounds (industrial) Traffic
(busy street)

D EFX/1—ELECTRONIC SOUNDS AND MUSIC Price 7/6

Side 1—Space ship—take off Space vehicle—imaginary take-off
Space vehicle—imaginary landing Ring modulation—tonal Modulated
tone glide (descending) Modulated tone glide (ascending)
Sibilant—white noise (pitch octave low)
Side 2—Sibilant—white noise (pitch) Sibilant—white noise
(pitch octave high) Three-tone ululation Filtered tone Stridor (tonal)
Ring modulation and sibilant

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Side 2—Spooks Intruder Creaks Fright Dungeon Ghosts Ghouls
Maniac laughter

G MFX/1—AUTHENTIC HIGH-FIDELITY SOUND EFFECTS Price 7/6

Side 1—Lion roaring Twin piston aircraft landing Building and
debris falling Road drills and compressor Ship's siren Steam train
leaving station Small steam loco and whistle Cell door, keys and
locks
Side 2—Police car and bell, chase Police launch and siren Steam
goods train and whistle Car door slam, and starter Storm at sea,
thunder, wind and gulls Tube train, stop, doors and start

H MFX/2—AUTHENTIC HIGH-FIDELITY SOUND EFFECTS Price 7/6

Side 1—American police car with siren—arriving American police
car with siren—departing American police car escort with sirens—
passing American police motor-cycle patrol with siren—stopping
Applause (hand clapping) Orchestra tuning up Car crash Glass
breaking (repeat)
Side 2—City and Waterloo tube train—arriving City and Waterloo
tube train—departing Footsteps (continuous track) In subway
(mixed) In narrow streets (female) On pavement (mixed) Running
in street (female) Running in street (male) Up and down (wooden
stairs) Workmen hammering and sawing

I MPX/1—MILITARY PARADE AND WARFARE SOUNDS Price 7/6

Side 1—March past—Guards and crowd sounds, etc. Royal Salute—
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J TFX/1—AUTHENTIC BRITISH TRAIN SOUNDS Price 7/6

Side 1—Train departure—main line Train arrival—main line
Express train passing—with whistle Fast goods train passing—with
whistle Express train passing Small tank loco—passing
Side 2—Local passenger—arrive and depart Fast goods train—
passing Central London tube train—arrive and depart Train over
points and crossing Slow goods train passing—with whistle

K MFX/3—HORSES Price 7/6

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L LFX/1—SOUNDS OF LONDON Price 7/6

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Ideal for cine films and colour slides

M RSX/1—ROAD SAFETY Price 7/6

With Jack Warner (Dixon of Dock Green) and Coco (Bertram Mills
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O MFX/4—MIXED SOUND EFFECTS Price 7/6

Side 1—Hovercraft passing. Hovercraft departure. Car start, drive
away (interior) Car engine rev and tickover Car starter (continuous)
Car skid Car skid and crash
Side 2—Continental town—street sounds and glockenspiel (clock
chimes Warning siren Warning bell (all typical continental sounds)

P BGX/2—BACKGROUND SOUND EFFECTS Price 7/6

Side 1—London Airport main lounge Passenger flight departure
(announcements in English and German) Passenger flight departure
(announcements in English and French)
Side 2—Train interior (continuous) Children playing Racing Cars
(circuit)

Q EFX/3—RHYTHMIC ELECTRONIC MUSIC Price 7/6

Side 1—Automation (theme of rhythm and melody) Perpetua (theme
suggesting movement) Merry-go-round (theme suggesting fairground
or street organ) Tempotone (electronic sounds in rhythm)

PLANNING FOR VIDEO PRESENTATION

Continued from page 21

of frame linearity; hence the reason for my head appearing too long. This is not quite so noticeable in Fig. 3, although even here there is still some non-linearity at the top of the picture. Now this is only a simple fault and one which is quite easily corrected but it is an indication that video requires a little more technical 'know how' than sound recording.

Telecine

What perhaps intrigued me most of all was the possibility of telecine which means the video recording of cinefilm. The fact that the video camera is working at 50 frames per second means that there are no problems concerning the synchronization of cinefilm projected at its normal 24 or 16 frames per second (or even less). An arrangement for doing this is shown in Fig. 4. The film is projected in the normal way but on to a

smaller area of the screen than usual in order to maintain slightly higher brilliance, thus allowing for a smaller aperture setting on the video camera and consequently the sharpest possible focus. It is then simply a case of 'roll video tape', 'run film'. This means that film inserts can be made just as in professional television. By now you have probably thought of projected slides or even back projected slides so that one can put oneself in the picture. Yes, this too is quite practical including back projected film so that you can put yourself in the middle of some exotic tropical scene already available on film but which would otherwise mean a somewhat expensive operation to video record direct.

In my next article I hope to deal with lighting, and 'props' and, with the kind co-operation of Rediffusion Television, show something of how the professionals deal with these problems.

1967 AUDIO FESTIVAL AND FAIR GUIDE

continued from page 33

Tape Recorder Developments Ltd TRD
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7½" per sec: 62 dB. 3¾" per sec: 59 dB.

1½" per sec: 56 dB.

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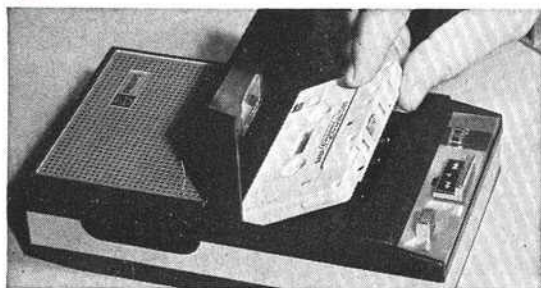
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DEMONSTRATION ROOM 212

Tandberg

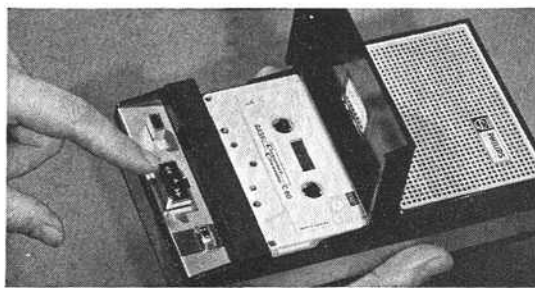
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