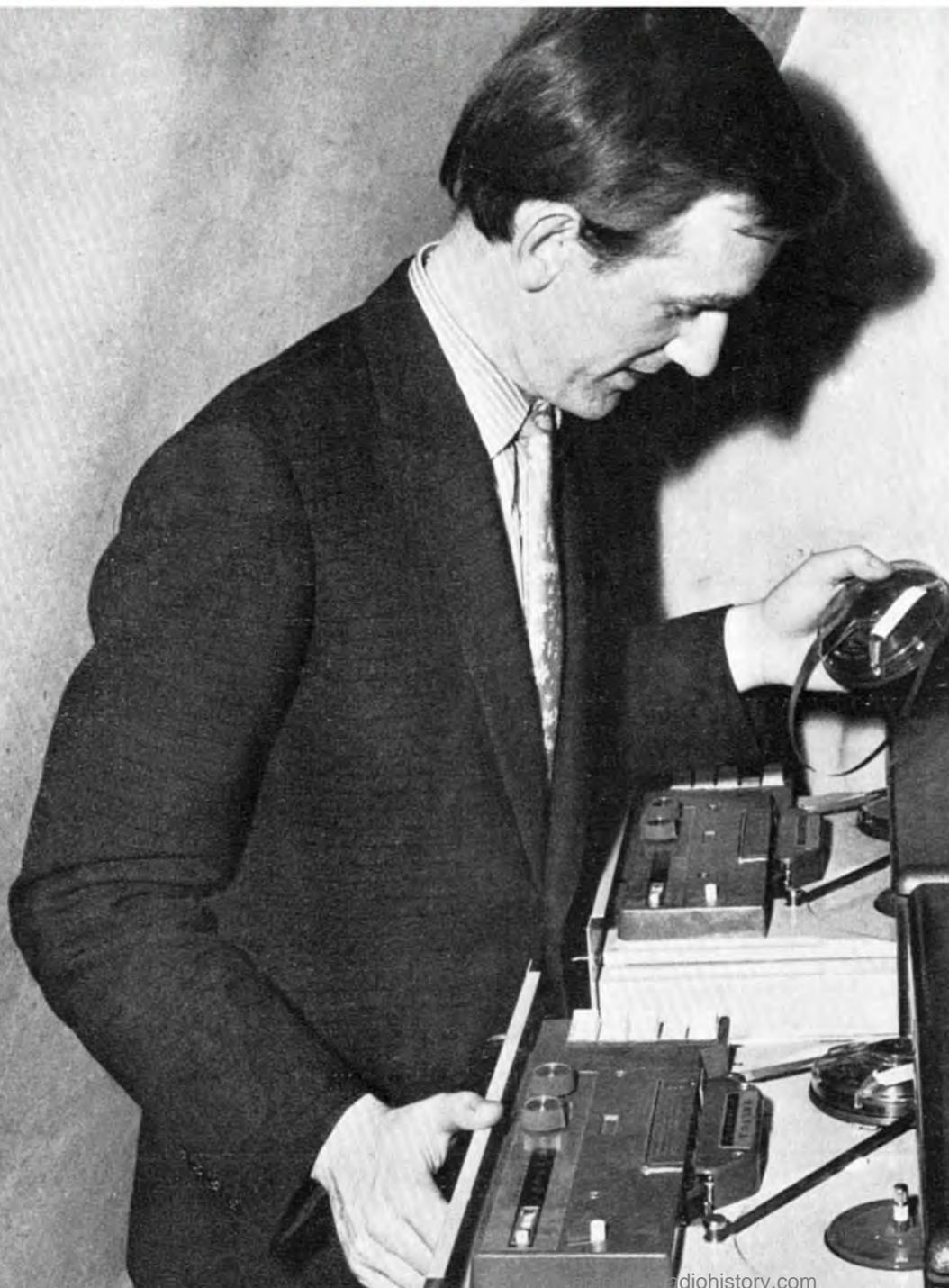


DECEMBER 1967

TAPE

RECORDING MAGAZINE

2¹/₂



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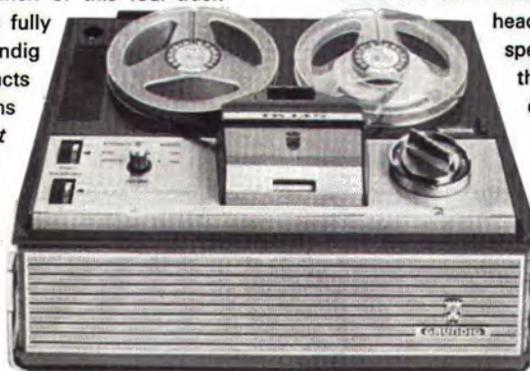
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It's the TK145. And it's quite a tape recorder

Grundig have built quality into every inch of this four-track machine. Recording level adjustment is fully automatic, by means of the unique Grundig 'Magic Ear.' This ingenious device acts with split-second precision, and retains natural loudness variations *without distortion*. And when you want it, manual operation is yours at the click of a switch!

The TK145 has a frequency response of up to 12,500 Hz. Wow and flutter below $\pm 0.2\%$, and a signal to noise ratio of 48 dB. Result? Clean, crisp, *life-size* reproduction.

What's more, you can make synchronised recordings by using the Monitoring Amplifier MA2, and the Earphones type SE3, both available as extras.



There are connecting sockets for recording/playback, monitor headphones and switchable extension loud-speaker. There's even a press-button reset for the position indicator! And—to guarantee cool operation over long periods of playing and recording, the TK145 has the exclusive Grundig single-unit combination of motor and mains transformer.

The uncrushable steel chassis is elegant in teak finish, with a charcoal and silver deck, and silver trim. The TK145 comes with 1,200 ft. of tape and a high-quality dynamic microphone . . . all that for just 47½ gns! Like to hear more? Then send off

the coupon *today* for full details of all thirteen Grundig 2 and 4 track tape recorders ranging in price from under 30 gns. to £135.9.0.

To: Grundig (G.B.) Ltd., Dept. TM2, London, S.E.26.

Please send me 'The Sound of Grundig' all-colour tape-recorder leaflet radio leaflet audio unit and stereogram leaflet *Tick which you require.*

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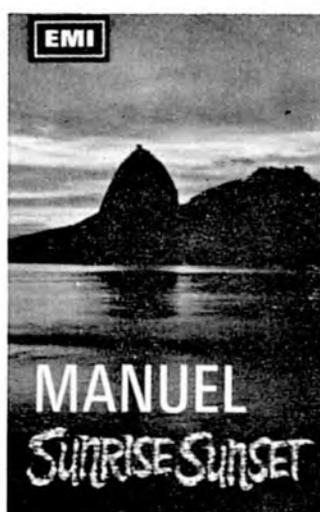
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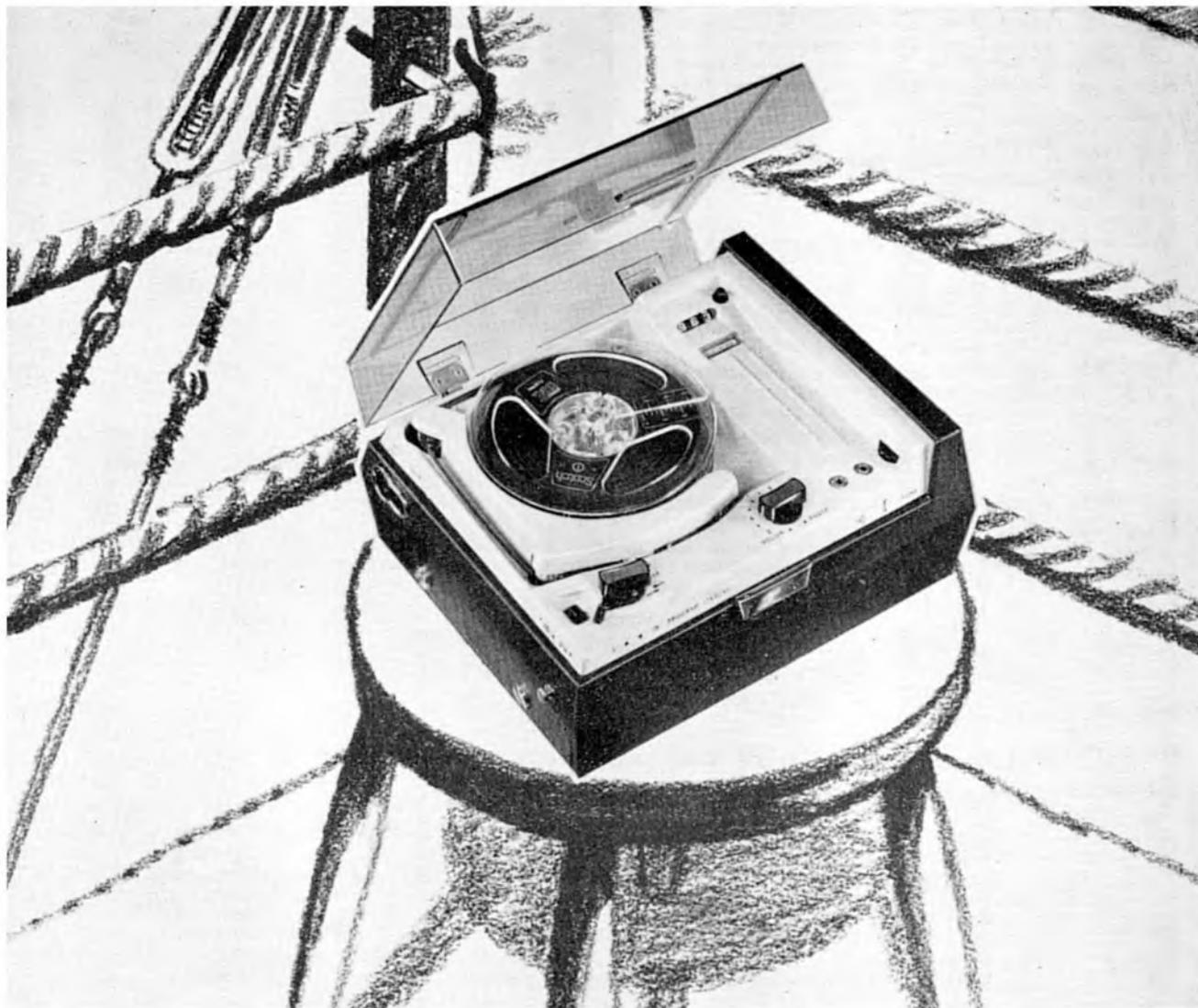
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Fully Transistorised FM 86—108
Mc/s only. £27 + P.T.



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Long, Medium and two Short wavebands
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The High Fidelity Tuner units in the Chapman range are optionally fitted with multiplex decoders for stereo broadcast reception. Models FM 1000A/B and FM 1005A/B illustrated are also available in chassis form for fitting in owners' cabinets.

3 outstanding microphones from the RESLO range For the Hi-Fi enthusiast



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Shown mounted on MS175 'boom' arm. Uni-directional pick-up well maintained through the audio frequency spectrum. Very suitable for high quality music recording and relay purposes. Impedances & Prices Low £15.15.0; Med. and High £16.16.0. (Non-switched version available).



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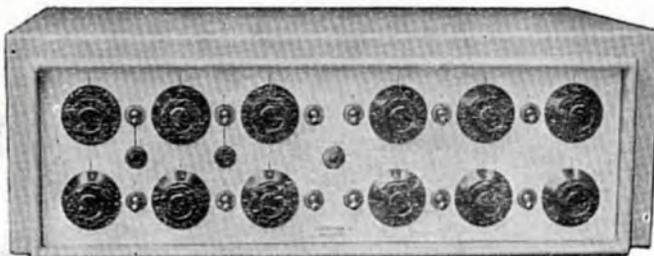
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12-WAY ELECTRONIC MIXER

quality equipment

The 12-way electronic mixer has facilities for mixing 12 balanced line microphones. Each of the 12 lines has its own potted metal 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 metal shielded mains transformer and metal rectifier.



FOUR-WAY ELECTRONIC MIXER

This unit provides for 4 independent channels electronically mixed without "spurious break through," microphone 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 a low loss, low-field transformer in a 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 be easily 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 18½ in. wide × 11½ in. front to back (excluding plugs) × 6½ in. high. Weight 22 lb.				

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

This is similar in dimension 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 dB's, zero dB being 1 milliwatt-600 ohm (.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 input for 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.

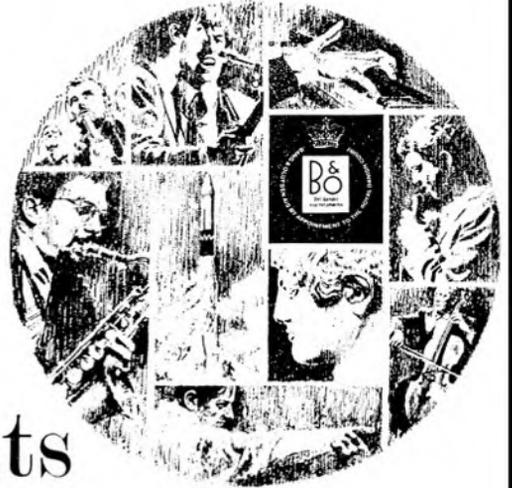
P.P.M. for 200-250 V AC Mains	Price on application
Size 18½ in. wide × 11½ in. front to back (excluding plugs) × 6½ in. high. Weight 23 lb.			
10/15 watt Amplifier with built-in mixers.			
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2 BEOMASTER 5000. Stereo F.M. Tuner with usable sensitivity of 1.5µV. Automatic Mono/stereo switching, 4 stage gang tuned R.F. section, 5 I.F. stages and A.F.C. Large radicator calibrated relative to signal strength. Cursor type tuning control with vernier adjustment. Variable muting and stereo levels. Aerial inputs for 75 ohm, 300 ohm and local. Identical in size and cabinet finish to match Beolab 5000. 85 gns

3 BEOVOX 3000. Pressure chamber loudspeaker with separate bass, mid and high (x 2) frequency units. Variable attenuators to the mid and high frequency units. Provision for the connection of a separate high frequency diffuser unit (Beovox 2500). Maximum power handling capacity 50 watts music power, impedance 4 ohms. Solid Teak or Rosewood finish. 45 gns.

4 BEOVOX 5000. Pressure chamber loudspeaker with one bass two mid frequency and four high frequency units. Variable attenuators to mid and high frequency units. Provision for the connection of high frequency diffuser unit. Distortion at maximum power 2.2%. Maximum power handling 50 watts music power, impedance 4 ohms. Solid Teak or Rosewood finish, free standing on elegant stainless steel legs. 49 gns.

5 BEOGRAM 3000. Transcription turntable unit fitted with the world famous B & O STL/15° tone arm, lowering device and a B & O SP7 stereo magnetic cartridge. Illuminated and magnified strobe. Mounted on solid Teak or Rosewood plinth and complete with plexiglass cover. 69 gns.

6 BEOVOX 2500. High frequency sound diffuser unit. Six loudspeakers mounted one to each face of a cube for the omnidirectional distribution of the high frequencies. Mounted on a stainless steel base or may be suspended. Power handling 50 watts music power over 2kHz. 42 gns. a pair.



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7½ in/sec (19 cm/sec)

3¾ in/sec (9.5 cm/sec)

Playing time

30 min x 2 at 7½ ips

(stereo 7" 1,200 ft. tape)

1 hour x 2 at 3¾ ips

(stereo 7" 1,200 ft. tape)

Frequency response

50-15,000 c/s at 7½ ips

50-10,000 c/s at 3¾ ips

Power Output

Maximum 1.8W

(each channel)

Undistorted 1.5W

(each channel)

Speakers

Two 4" permanent

built-in speakers.

Voice coil

impedance 8 ohms.

Weight

18lb. (8.5 kg)

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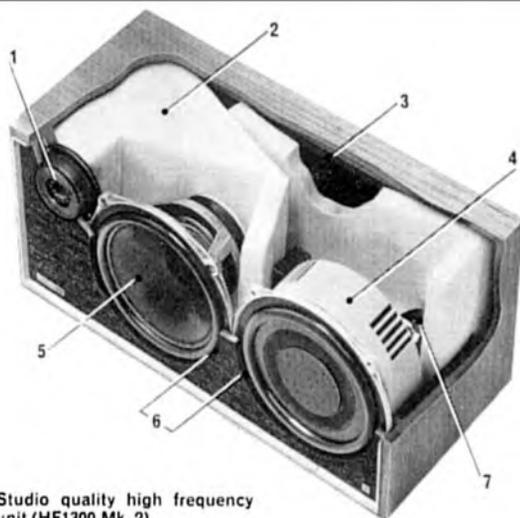
Real stopper x 2

Price: about 69 gns.

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6. Units mounted flush to eliminate diffraction effects and tunnel resonances; covered by acoustically transparent grille cloth for maximum presence.
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IRM 1



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Tape speed: Instantaneous selection, $7\frac{1}{2}$ and $3\frac{3}{4}$ ips.

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

Wow and Flutter: Less than 0.19% at $7\frac{1}{2}$ ips. Less than 0.25% at $3\frac{3}{4}$ ips.

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Record/Playback head: In-line (stacked) quarter track, PP30-420.

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Sensitivity: -72 db (0.2mV)

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

Auxiliary

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Impedance: approx. 200K ohms

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Sensitivity: -42 db (6.15mV)

Impedance: approx. 100K ohms

Output:

Line

Output level: 0 db (0.775V)

Impedance: optimum load impedance 2K ohms

Integrated record/playback connector

Output level: 0 db (0.775V)

Impedance: optimum load impedance 100K ohms

Transistors: 2SD64 (x6), 2SB382 (x2), 2SB383 (x2).

Weight: Approx 16.9 lbs.

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TAPE

RECORDING
MAGAZINE

Vol. 11 No. 12 December 1967

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COVER PHOTOGRAPH: Behind the scenes at Madame Tussaud's, technician David Collison is seen with his two, $\frac{7}{8}$ -track, Truvox tape decks from which all aspects of the "Heroes-Live" spectacle are controlled. These machines blow bubbles, drop confetti and change lighting, apart from reproducing sound. See "Tape at Tussaud's" on page 580 of this issue.

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Tape trends and tape talk

By Douglas Brown

YOU'VE JUST MISSED your chance to make a fortune, you know.

We have published from time to time references to the developing market in tape cassettes, and we have drawn attention to their use in the car trade. Did you spot the opening?

A 23-year-old called Clive King, just down from university, spent last summer in California and there he came across a stereo cartridge car player for the first time. He decided he'd like one for himself, was told where he could buy one wholesale—and . . . click . . . there was the idea for a business as well as a pleasure.

From the American manufacturers he obtained the exclusive manufacturing, music duplicating and marketing rights for the EFTA and Commonwealth countries. He established his own company. At the Motor Show he had one of the best stands in the building.

According to *The Times Business News*, King's company could well make a profit of around £250,000 in its first year.

To think it might have been you. Or—more to the point—me!

* * *

WHEN I MOVED house a couple of years ago, I decided to make a fresh start with my recording equipment. I had a Ferrograph, a Brenell and a FiCord, a pair of CQ speakers and a switched tuner. They had been acquired piecemeal over a period and never arranged in a properly integrated fashion which was acceptable in terms of lounge furnishing! So, in a new house, I resolved to make a fresh start.

More than two years have rushed past, and nothing has been done. Now I am re-examining the whole problem. And problem it has certainly become.

I want stereo tape facilities, of course. I want $7\frac{1}{2}$ and $3\frac{1}{4}$ ips speeds, of course. But do I want $1\frac{7}{8}$ ips—or even $15/16$ ths—as well, in view of the possibility that I may wish to use a tape recorder as a simple dictation machine sometimes? Do I want 4-track as well as 2-track, so that I can be sure of handling all tapes that may come my way from other enthusiasts? Do I need to equip to handle cassettes as well as spools?

Where do I draw the line?

Puzzling over the matter, I went off to visit relatives who have a factory making prototypes of highly sophisticated electronic equipment. They told me of the latest developments in micro-circuitry.

Of amplifiers with 14 transistors contained in a package no bigger than a finger-nail. The biggest things about them are the protruding leads. Link a pick-up at one end and a speaker at the other and

start listening. And they are more stable than any of the orthodox amplifiers on the market now.

This is just one of the developments of the past two years. To date, this type of thing has found its way only into government equipment where expense is not important. Now the whole position is changing dramatically. Components using the new techniques are now fairly freely available at something like one-tenth of their cost two years ago.

The main question mark is now a matter of timing. With things changing so rapidly, at what stage does a manufacturer of domestic equipment abandon his present lines and start again?

I am led to believe that within the next two years we may see such a revolution in home electronics as we have not seen the like of yet.

So what do I buy for my new set-up?

* * *

AND WHILE we are on the subject of technical progress, I have just come across another fascinating use of magnetic tape. The time is not far off when it will not only form the subject matter of this magazine, but will be used in its actual production.

IBM have produced new typesetting equipment with a computer using tape. The operator sits at a small keyboard almost identical with that of an electric typewriter and types at top speed, without regard to line length or any other of the normal considerations of type-setting. The result is stored on magnetic tape.

When a proof (produced simultaneously) has been read, any necessary corrections are typed on to a second magnetic tape. Both tapes are then placed on a console linked to the computer, instructions about line length, indentation, hyphenation, and so on, are keyed in and the equipment is switched on. The finished result is then delivered so fast that the eye can scarcely see the letters appearing on the paper.

Magnetic tape is thus at the heart of a revolution which seems likely to out-date a craftsmanship founded by Caxton and continued in an unbroken line since.

* * *

GREETINGS to the London Tape Recording Club, celebrating its tenth anniversary this month. I write in advance of its birthday party, being held at BBC premises in Portland Place, but I know I am going to meet there pioneer enthusiasts I have known since the earliest days of the club.

Tape Recording Magazine was born ten months before the London Club and we have grown up together. I almost feel there are blood-bonds!

16th International Amateur Recording Contest

BY DOUGLAS BROWN

THE International Recording Contest (CIMES) presented exceptional difficulties this year from the point of view of British recording enthusiasts. A reorganisation of the national contest is under way, which will introduce a new December 31 closing date and an announcement of prizewinners each year at the International Audio Festival in London. This reorganisation inevitably involves a rather longer time gap between British contests during the transitional period and, as a result, there were no British contest-winning tapes automatically to comprise the British entries in CIMES.

Officials of the Federation of British Recordists and Clubs were consequently obliged to seek suitable CIMES on an *ad hoc* basis for this year only. In the event, the British entries were of a high standard—but not quite good enough to carry off any of the principal CIMES prizes.

The only British competitor to appear in the prize list was Mr. Albert Pengelly, of Plymouth. His tape, "Jacob's Ladder," entered in the Music Section of the Contest, was placed second among the monophonic entries in the category and was awarded a challenge cup donated by the Burgomaster of Schaerbeek, Belgium.

"Jacob's Ladder" is a 110-second recording of an uncopyrighted arrangement of a Negro Spiritual sung by Cornish clay workers—the Trethosa Male Voice Choir, performing in the Trethosa Methodist Chapel.

The tape was recorded half-track at 15 ips on a Vortexian CBL and Albert Pengelly was assisted by two other members of the South Devon Tape Recording Club, John Penty and Peter Cox.

This winning tape provides a good example of the availability of first-class feature recording material to enthusiasts, wherever they may live.

What of the other British entries in CIMES?

Phillip Towell, of Boston, produced two entries: "Voices from the Dark," an eight-minute documentary recording interviews with blind persons, and "Belshazzar's Feast," a 3m. 46s. stereo recording of a particularly dramatic passage from William Walton's composition performed by John Lawrenson and the Nottingham Harmonic Society.

Both tapes were recorded on a Tandberg at 7½ ips.

The documentary was placed fifth among the six entries in the mono section of this category—it has to be accepted, I think, that a tape which consists entirely of the spoken word in English is at a serious disadvantage in the contest.

"Belshazzar's Feast" was placed fourth among the five entries in the stereo section

of the music category. With a further eleven music entries in the mono section, there was a preponderance of music tapes in this year's CIMES—perhaps a sign of a general recognition of the difficulties involved in handling speech for a jury speaking many different languages.

The fourth British entry was "Hungarian Uprising," by Ken McKenzie, of East Herrington, Sunderland. Personally, I regard this 2m. 45s. "technical experiment" as one of the best British tapes I have ever heard, but it did not recommend itself to the CIMES jury, which placed it third among the five entries in the mono section of its class. Mr. McKenzie may be glad to learn, however, that his was the tape selected by our German radio hosts, Senders Freies Berlin, to illustrate a short programme about CIMES transmitted while the jury was in session.

British enthusiasts may be interested in Mr. McKenzie's exercise. He spent three weeks at his Beocord 2000 recorder performing a special "beat music" version of Brahms' Hungarian Dance No. 5. He played the various component instruments himself—guitars, drums and tambourines—and multi-tracked them on to the tape, sometimes using half-speed, sometimes echo, sometimes deliberate distortion, and often mixing his effects.

The fifth British entry was Peggy Buchannan's "Amsterdam Street Organ," a straightforward and workmanlike actuality piece captured in Holland at the time of the 1966 CIMES.

This was the first year with the full collaboration of the Czechoslovak amateur recording movement and it was a felicitous circumstance that Czechoslovakia should emerge top of the list in the selection of the "best national selection."

One of the Czech entries took the Grand Prix Stereophony—a 2½-minute stereo "electronic poem" entitled "Futurity." Ivan Stepan, a 23-year-old Prague engineer, spent 40 hours recording it, using only synthetic sound—e.g. sine waves.

The Czechs emerged as formidable opponents in the technical experiment class. As well as producing the Grand Prix tape, they took top places in both mono and stereo sections of the class once the Grand Prix tape had been eliminated. They also produced, in the Compositions category, a feature tape which, although placed third in its category, carried off a special prize of 1,000 Swiss francs awarded for the tape most suitable for broadcasting by radio stations. This award was decided by the representatives of radio concerns sitting on the jury.

It was noticeable that Czechoslovakia, conscious of the language problem, had very sensibly submitted tapes in which speech did not constitute a vital element.

The Grand Prix Monophonic was awarded to a Swiss competitor, F. Paillard, of Geneva, for a four-minute feature called "Mini-Marriage." Recorded with Revox, Uher and Nagra machines, its technical quality was perfect. Its script depended upon

double entendre to produce a humorous effect and it constituted an "in" joke calculated to appeal to a CIMES audience.

The full CIMES prize list is as follows:
Grand Prix Mono: (14 days' holiday tour in the High Tatras, donated by Czechoslovakia)—"Mini-Marriage," F. Paillard, Switzerland.

Grand Prix Stereo: (1,000 French francs, donated by the French Ministry of Youth and Sport)—"Futurity," Ivan Stepan, Czechoslovakia.

Category A (Compositions): 1, (M204 tape recorder, donated by Telefunken)—"Conscience," A. Vasterman, Holland; 2, (10 BASF tapes)—"That's life, I guess," Svend Karlsen, Denmark; 3, (250 Swiss francs, donated by Radio Berne)—"James was here," Philipp Schäfbuch, Germany.

Category B (Reportage and Documentary): 1, (Philips Shield and Stereo Recorder)—"The Hurdy-Gurdy," Pierre Greiner, Switzerland; 2, (250 Swiss francs, donated by Radio of East Switzerland)—"Mexican Mass," Lucien Wassmer, Switzerland.

Category C (Music): 1, (10,000 Belgian francs, donated by Belgian TV and Radio)—"Dreiklang," Svend Eric Nielsen, Denmark; 2, (250 Swiss francs, donated by Radio-diffusion Romande)—"St. James' Infirmary," Klaus Dieke, Germany; 3, (Cup, donated by the Burgomaster of Schaerbeek)—"Jacob's Ladder," Albert Pengelly, Great Britain.

Category D (Actuality): 1, (2,500 Belgian francs, donated by the Friends of Radio Hainaut)—"Debut de Bande," Marc Corbeau, France

Category E (Technical Experiment): 1, (Sennheiser MKH404 Condenser Microphone)—"AB 1½," Ales Nebesky, Czechoslovakia; 2, (20 Agfa Tapes)—"Hic sunt Leones," Milos Haase, Czechoslovakia.

Schools Category: 1, (10 BASF Tapes)—"Heracles and the Amazons," Jean Borel, Switzerland.

SPECIAL PRIZES

Radio Prize (1,000 Swiss francs)—"For the Sake of Music," Frantisek Pokorny, Czechoslovakia.

Best National Selection (Cup, donated by Dutch Soundhunters' Club)—Czechoslovakia.

Best Humorous Tape (Mannekin Pis Statuette)—"Mini-Marriage."

The Rose Bowl, donated by the British Federation for the best tape in the Actuality class, was won by "Debut de Bande," and the *TAPE Recording Magazine* Shield for the tape securing the highest marks in the Contest by "Mini-Marriage."

The average marks scored by each country were as follows: 1, Czechoslovakia, 13.44; 2, Switzerland, 12.67; 3, France, 12.60; 4, Germany, 12.36; 5, Denmark, 12.27; 6, Holland, 11.95; 7, Great Britain, 11.24; 8, Austria, 11.05; 9, Belgium, 9.15; 10, Sweden, 8.63.

("Techniques" has been held over to next month to allow publication of the CIMES results.)

A MONTH OF AUDIO IN LONDON



Fig. 1. The staff of Davis & Kays talking to visitors at their tape recording demonstration in Hornsey Town Hall

THIS has been an unusually busy month. Many manufacturers have introduced and demonstrated new products for the first time. In addition, one retailer has been holding a series of four evening lectures on high fidelity sound reproduction and tape recording. All these events have been covered on your behalf by TRM staff.

The London showrooms of the UK Division of Bang & Olufsen were the scene for demonstrations of the revolutionary Beolab hi-fi equipment. This is referred to in our New Products Section on page 595 of this issue.

First impression was one of sincere admiration for the designers. Generations of enthusiasts have twiddled knobs. With brilliant ingenuity the B & O staff have produced something completely different. They have thrown away the knobs and replaced them by sliding vernier scales. It's very strange how we have become used to speaking of "turning" up or down volume levels. With Beolab equipment we shall "slide" the volume level adjuster, although there is little doubt that "turning" is so firmly fixed in our minds that even when using sliding controls we shall probably continue to speak of the movement in that way.

Will other manufacturers be tempted to abandon rotary controls? The advantages of a slide are claimed to be accuracy and ease of use. It will be interesting to see if other designers follow this lead.

Close examination of the Beolab equipment revealed a high standard of workmanship. All controls were delightfully smooth and easy to operate. At the demonstration that followed we had only one reservation. It was felt that the loudspeaker system did rather less than justice to its associated equipment. That, however, is a hasty judgment which may well be revised on closer examination. It is notoriously difficult to form accurate spot assessments of loudspeaker performance. In all other respects the equipment both looked and performed in an exemplary fashion. We suspect that many ladies who might jib at conventional styling will be won over by the revolutionary new look of this unorthodox range of equipment. All that will then remain will be for their husbands to pay for it!

Loudspeakers were the subject of the next demonstration given in their Norwood

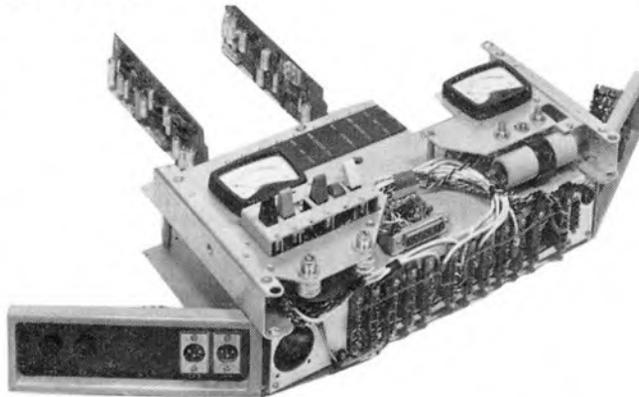


Fig. 2. The new Leever-Rich Series Q battery portable, showing modular construction designed for easy servicing in the field

showrooms by Tannoy Limited. In our New Products Section on page 594 we refer to the "Monitor Gold," the latest version of the Monitor Dual Concentric loudspeaker which was introduced in 1959 and is still based upon the original Dual Concentric design first marketed in 1945.

Of all the components in any hi-fi network the loudspeaker is inevitably the least efficient, and it is also the one component which, more than any other, will colour the final sound to be heard by the listener. We are a long, long way from producing the perfect loudspeaker. All manufacturers are only too conscious of this fact, and so development is continuous.

Our first impressions of the performance of the new Tannoy Monitor Gold were of smooth, effortless, sound combined with pleasingly melodic quality. This is hardly surprising, since the same comments could have been equally truly made of the older model! The evolution of a speaker system is a gradual process and differences between succeeding models are likely to show up only by direct comparative assessment.

Members of the press were invited to tour the No-wood factory, and to our surprise we found behind a deceptively small frontage a large and complicated plant in which every single item required to assemble the firm's products is made. There is even a heavy machine shop with capstan lathes turning out precision metal parts. A woodworking shop manufactures enclosures. And in the same premises a wide range of loudhailers, amplifiers and pick-up cartridges are also made. We left Norwood feeling that we had not only listened to some extremely good loudspeakers, but we had also been privileged to examine the working of a Company that is British in the very best meaning of that word.

Still waving the red, white and blue we next paid a visit to the Wandsworth, London, works of Leever-Rich Equipment



Fig. 3. A corner of the Tannoy works at Norwood



Fig. 4. The new Clarke & Smith Tapete cassette system described on page 578. A British first!

Limited. This name has long been spoken of with reverence in audio circles. Renowned for the production of some of the finest recording equipment that is made anywhere in the world, today their customers

Please turn to page 578

cassettes go HI-FI



-with ^{Trade Mark} Scotch
magnetic tape

It's the very latest 'Scotch' magnetic tape development and it means that hi-fi enthusiasts will want to take another look at cassette recorders. Now, for the first time ever, you can get cassettes containing the brilliant 'Scotch' magnetic tape with 'Superlife' coating. This tape has a flawless mirror-smooth coating that gives improved frequency response and less wear on the delicate recording heads—so it keeps its high quality far longer. With 'Scotch' magnetic tape the cassette recorder becomes a serious possibility as a second, portable machine—and with these new cassettes, the recordings you make will merit playing on your full-scale home set-up.

Scotch **Compact
Cassette**



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AUDIO IN LONDON

are either professional, industrial, institutional or wealthy. Yet when one really thinks about it, is £400 or £500 such a lot of money to pay for a tape recorder if one can confidently anticipate that it will still be working up to specification in ten or twenty years' time? Many an enthusiast will spend that amount of money over the same period in merely replacing obsolete equipment. Even so, it's still a great deal of money to part with at one go.

One of the objects of our visit was to examine the new Leavers-Rich Series Q battery portables. This highly professional machine has only been available for a few weeks, and is the latest addition to the Leavers-Rich range. One of its most important features is the advanced modular construction which enables servicing to be speedily and efficiently carried out under operating conditions in the field. Our illustration shows the very neat manner in which the machine comes apart to enable the separate plug-in card modules to be withdrawn for instant replacement.

The Q Series are, of course, fully transistorised. We took advantage of our visit to discuss the whole question of transistorisation. The policy at Leavers-Rich is to employ transistors wherever this is possible, even in static mains equipment. Many of their specialised items are, however, destined for export to countries where the operating staff may not be so highly skilled as they would be in the United Kingdom. In those cases valved construction is still preferred because the equipment is less likely to suffer damage through misuse or abuse.

Not all Leavers-Rich products are beyond the reach of the ordinary amateur. For instance, they do produce a very neat and highly efficient bulk eraser, model A31, which may be purchased for the modest sum of £7 10s. We have been able to arrange for this instrument to be included in our accessory reviews early next year.

Yet another trade show and demonstration was arranged by Elstone Electronics Limited to display the Tandberg range of equipment. The new Series 6X machine was in prominence, together with the Series 12. One of the most interesting additions to the range available in this country is the Series 11 battery-operated mono recorder. This machine has three speeds, $7\frac{1}{2}$, $3\frac{3}{4}$ and $1\frac{7}{8}$ ips, and a specification that will make all knowledgeable amateurs sit up and take notice. Frequency response at $7\frac{1}{2}$ ips is claimed as 40-16,000 Hertz plus or minus 2 dB. Perhaps even more important, the unweighted signal-to-noise ratio is quoted as 58 dB for the half-track version and 61 dB for the full-track machine. When these figures are linked to a price label of 122 guineas you will appreciate why we regard the prospect of seeing this machine imported into the UK in the near future as one of the most significant and exciting pieces of news to be revealed during the month.

The Series 11 Tandberg portable may be regarded as thoroughly professional, as its specification includes separate record and playback heads and amplifiers with full "after-record" monitoring facilities. Separate controls for microphone and line inputs permit mixing, and level indication and battery checking is by VU meter. Monitoring is via headphones only, there being no built-in loudspeaker or final audio amplification stage. The man who is engaged in serious outdoor recording does not want to have the weight of his equipment increased by the inclusion of speakers and amplifiers that

add nothing to the quality of the recording. In our opinion Tandberg were absolutely right to omit them. We shall be watching the progress of this machine and the impact that it will inevitably make with the very greatest interest.

In the design of cassettes and cassette machines we have to acknowledge that the Continent and the U.S.A. have a clear lead over Great Britain. In fact until a few days ago this country was really not in the cassette business at all.

Now we are only too happy to announce that the position is completely changed. The British firm of Clarke and Smith Industries Limited of Wallington, Surrey, have announced and demonstrated their new "Tapete" system. This is something quite different to any of the cassette systems previously seen, and is claimed to have substantial advantages over any other method.

Using standard quarter-inch recording tape, the plastic cassette reveals, when broken open, a pair of conventional three-inch tape spools. It can be used only in the record/playback or playback only mechanism designed to accept it. The entire system is the result of many years research at Wallington, and it originally came into being through a need to meet the specialised requirements of talking books for the blind.

The Tapete cassette is capable of storing over *twelve hours* of speech, yet is small enough to be sent through the post. The system was the subject of a special resolution unanimously adopted by the World Council for the Blind in Belgrade earlier this year when eighty member countries declared that it comprised the most advanced method for recorded literature for the blind anywhere in the world.

The manufacturers were not slow to appreciate the fact that such a brilliant conception has almost endless applications. Not only can the mechanism be adapted for educational uses, telephone answering, dictation, background music systems and language teaching but, and I quote from the manufacturer's literature: "This new cassette, which is believed to be the only one of its kind in the world, may well become a complete replacement for most existing quarter-inch open reel tape applications."

Such a sweeping statement may cause concern to enthusiasts if it is taken seriously. Our own considered opinion is that cassette systems of one kind or another are here to stay, and within the next five years or so there will be a tendency for them to replace spool-to-spool equipment at the lower end of the price bracket; they will also monopolise some specialised applications. As a result, the market for spool-to-spool recorders will tend to crystallise into the better quality $7\frac{1}{2}$ ips machines which we cannot imagine being superseded by either cassettes or any other system. Time alone will prove us right or wrong.

It is not unusual for manufacturers and dealers to co-operate together in giving demonstrations of hi-fi equipment. These frequently take place in the provinces, and they perform an excellent service by bringing good quality sound reproduction to the notice of large numbers of people who otherwise might not hear it. During the month of October we have had not one, but four, such demonstrations organised by Davis and Kays Limited. We were particularly interested in this programme of lectures since one of the evenings was devoted to pure tape recording without the collaboration of any manufacturer.

The name Davis and Kays may well be familiar to many readers because they own a large and prosperous chain of photo-

graphic retail shops. At one time many photographic retailers also "dabbled" in recording equipment. As tape recording and hi-fi became more and more specialised the ordinary photo retailer found himself getting further and further out of his depth. With a few notable exceptions audio reproducing equipment is now handled by retailers who can focus all their energies and attention to this one subject without the distraction of photography.

This is just what Davis and Kays are doing in a number of their branches. They have created audio departments staffed by enthusiasts who know far more about hi-fi and recording than they do about photography, although this is always their secondary interest. This very sensible policy is already proving its value, and to us at least the mere fact that they bother to arrange this series of lectures adequately demonstrates the sincerity of the enthusiasm.

On October 3 they presented a "Wharfedale Concert" at Hornsey Town Hall. Mr. Jamieson of Rank Wharfedale travelled all the way from Bradford with a selection of loudspeakers and a Wharfedale system 20 amplifier. As the demonstration proceeded we were surprised to note the very excellent performance of the tiny Denton and the slightly larger, improved Super Linton, models. Both these units can be classed as "bookshelf speakers," and in comparative switching they gave an extremely good account of themselves—even against the large Airedale enclosures.

On the 10th at Wood Green Civic Centre Mr. Arthur Dakin gave an impressive demonstration of the Tandberg 64-X recorder reproducing via a Scott amplifier and a pair of Lowther Acousta speakers. There was no doubt of either the demonstrator's confidence in his equipment or the audience's appreciation of it. A thoroughly interesting musical programme, interspersed with easily understood technical explanations, made this a most enjoyable event.

Roy Wiseman, the Davis and Kays staff recorder specialist, produced his own programme on October 17 at Hornsey Town Hall. Under the title, "World of Sound" Mr. Wiseman gave an enthralling illustrated talk which embraced the basic history of recording and included fascinating sounds of historic importance. The audience was deeply moved to hear the actual voice of Florence Nightingale and the sound of the trumpet used to call "Charge!" at the Charge of the Light Brigade at Balaclava on October 25, 1854.

What a thrill it was to hear these historic recordings. And how the audience appreciated them. The object of this demonstration was to prove that the tape recorder, unlike the gramophone, is a creative instrument in its own right. All those who heard this demonstration must have been absolutely convinced of the truth of that statement.

Lastly, on October 24, a final programme took place at Wood Green Civic Centre in co-operation with Sony of Japan and Bang & Olufsen of Denmark. We do feel that the initiative and effort displayed by Davis and Kays deserves mention. They have clearly demonstrated their willingness to preach the gospel of audio to any who are able or who care to come and listen. Such endeavours will always have our wholehearted support.

So we come to the end of a remarkable month in London. From all this activity it is only too obvious that interest is increasing in every direction. The prospect for the future is exciting indeed.

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EMI TAPE LIMITED HAYES MIDDLESEX ENGLAND



The "works" are suspended from the ceiling at Madame Tussaud's. Machines produce bubbles, drop confetti and move figures—all actuated by pulses recorded on tape

MADAME TUSSAUD'S is a traditional entertainment. Countless families will make their pilgrimage to Baker Street during the Christmas holidays. How many would associate the familiar waxworks exhibition with one of the most advanced and interesting tape recording applications we have come across for a very long time?

A completely new exhibition, entitled "Heroes-Live," opened to the public on October 3rd, and visitors will be able to see it on their Tussaud ticket. Heroes-Live is an involved concept, employing completely new ideas combined with an advanced *son et lumière* spectacle. The exhibitors claim to have created a new environment in which visitors and portrait figures participate in a sequence of sound, light and projection. That is probably the best description that can be applied to such a unique event.

Readers will appreciate the importance of Heroes-Live because we are now able to reveal that the entire show is controlled in all respects by two ordinary, domestic, Truvox quarter-track tape decks. The creators of all the mobile effects, Theatre Projects Group, have displayed the most astounding ingenuity and have exploited magnetic recording to its limits.

Just over twelve months ago Madame Tussaud's opened "Trafalgar . . . as it happened," and this show is still running. It called for a single complicated five minute sequence of sound, light and effects, all of which were produced by a battery of five Truvox tape decks. Trafalgar has now been showing seven days a week for just over a year. Those five Truvox decks have been turning all the time, and the only trouble was a single motor burnout caused through over-heating when the tape from an endless loop

A NEW ENVIRONMENT—A UNIQUE EVENT— ALL CONTROLLED BY TAPE

cassette got itself tangled around a capstan. That is a most remarkable tribute to the mechanical efficiency of the decks.

The new show, Heroes-Live, required not only a series of sequences such as was produced for Trafalgar, but as a changing panorama the system would have to be so flexible that any figure might be withdrawn, re-located or replaced at short notice. As a final requirement the producers were warned that the hall might have to be turned over to a single subject without disturbing its main functions. To accomplish this Richard Pilbrow, David Collison and Michael Wilson of Theatre Projects have designed, and Electrosonic of Greenwich have built to their specification, one of the most flexible lighting, sound and effects systems ever installed outside a television studio.

Visitors to "Heroes-Live" are greeted by the sound of teleprinters chattering the current news situation. It was subsequently learned that a Grampian DP4 microphone is used for this. Inside the hall the visitor is immediately drawn into the contemporary scene—the world of seemingly infinite space peopled by some of the most colourful and newsworthy figures of the moment. One by one, by means of sixteen *son et lumière* sequences, these figures are brought to life. We have Elizabeth Taylor and Richard Burton caught in a torrential downpour and beset by newsmen, Cassius Clay in the sweating, turbulent, artistry of the boxing ring, Frank Sinatra and Nobby Stiles personifying the legends which made them, Alfred Hitchcock assiduously dispensing the macabre, Bobby Kennedy and Spanish bull-fighter El Cordobes courting public acclaim in two very different arenas. . . .

On a cue from the sound tape the ultra-sophisticated sound and lighting control, working independently and entirely unattended, brings a given sequence to life and can go on through as many as twenty changes of lighting synchronised by the tape until, at the conclusion of the sequence, the dimmers automatically switch across to a new set of lighting units at the beginning of the next episode. Electrical outlets for the lighting, sound and effects equipment are provided every six feet over the entire area and to ensure maximum flexibility of location for the lighting equipment the unique tubular grid is based on a three-foot

TAPE AT TUSSAUD'S

**EXCLUSIVELY REPORTED
BY DENIS GILBERT**

EXCLUSIVELY REPORT



Our photographer betrays a keen sense of humour by taking this unique shot of the figure of General De Gaulle. Is he speaking to us, or are we telling him? The organisers did not appreciate the significance of placing him so close to their Exit sign!

module. Where special effects equipment for particular exhibits was required, such as confetti and bubble devices for the Kennedy and Sinatra sequences and psychedelic lighting backgrounds for the Twiggy episode, this was designed by Michael Wilson and built by Theatre Projects.

The intricate technical structure and complicated sound patterns of Heroes-Live confronted Theatre Projects sound specialists David Collison and Anthony Horder with many problems. Whilst it was originally intended for several sequences in both rooms to run simultaneously, it was finally decided that each room should contain only one active programme at a time, plus a low key continuous background feature with some relatively unobtrusive sound track. This background sequence would be faded out only when the dramatic content of neighbouring exhibits so required.

A NEW ENVIRONMENT—A UNIQUE EVENT—
ALL CONTROLLED BY TAPE

TAPE AT TUSSAUD'S

EXCLUSIVELY REPORTED BY DENIS GILBERT



What's Brigitte Bardot got that we haven't?

Since the sound track provides the cueing system throughout the exhibition, this demanding programme called for a highly sophisticated pulsing system to switch the track from one location to another while simultaneously co-ordinating lighting and mechanical effects. As mentioned earlier, the equipment comprises two four-track Truvox tape replay machines with endless loop cassettes running at 3½ ips, providing two tracks of audio—one of continuous sound and one of sound to be located in sequence—and two tracks of synchronised pulses, one prompting the main control, the other switching sound from location to location. Thirteen Wharfedale Dovedale speakers are used, driven by four 50 watt amplifiers. Of rather better quality than is usual in exhibition work these speakers can accommodate extremes from both ends of the frequency range and so cope ably with any

audio changes envisaged in the area.

As well as engaging their technical skill, Heroes-Live offered David Collison and Anthony Horder every scope for their inventive ability. Once the basic script was ready, Theatre Projects embarked on an extensive research programme which took them to sound archives, film libraries, television libraries and commercial recording companies as well as to their own extensive effects library. Where ready-made effects could not be found substitutes were created in the studio, one example being the heavily stylised water dripping sequence at the opening of the Hitchcock episode. Once captured the basic effects were subjected to many hours of painstaking adaption until blended into a unique comment on the subject concerned.

One section required a montage of opinions, all spoken by Malcolm Muggeridge. This was built up from a jumble of random recordings of his voice and then cut together on two parallel tracks which were subsequently mixed. In this 25 second sequence alone there were over sixty tape edits. The figure of Twiggy required the preparation of another highly complex recording. Snatches of dialogue were cut in with short pieces of pop sound, the sound of a photographer at work and overall a continuous driving "pop" sound.

The enterprise under the name Theatre Projects has for the past ten years meant the best in sound and lighting design in the theatre. They have been connected during those years with nearly every noteworthy theatrical production and are currently lighting consultants to the National Theatre and co-producers of the musical hit "Fiddler on the Roof." Now the techniques they have perfected are finding new outlets in the field of dramatic exhibition and design, of which their participation in Heroes-Live is the latest example. Other recent activities in this sphere have included the "Wrecking of the Galleon in Light and Sound" for "Treasure of the Spanish Main" at the New York Parke-Berndt Galleries, the sound of "Swinging London" at Madame Tussaud's and four major commissions for Expo '67 at Montreal.

In an exclusive interview David Collison talked of his work and showed us the equipment. His reasons for deciding to use Truvox decks were very simply explained—the requirement was for utmost reliability at reasonable cost. Endless loop cassettes are essential for continuously running programmes and he is at present using those manufactured by Akai. For the live recordings

Theatre Projects have at their disposal a mixed bag of tape recorders and microphones of almost every imaginable make and type.

For the Trafalgar spectacle arrangements were made (after very long and protracted negotiation) for a recording to be taken of the sound of one of the original guns from HMS Victory actually being fired. Once official approval had been obtained the Admiralty were very co-operative, even specially preparing the old-fashioned black powder that was standard issue in those days.

But what a responsibility for the recording engineers. Once that gun had been fired it would probably never ever be heard again. To ensure success a whole battery of tape recorders and microphones were positioned around the cannon on board HMS Victory. Even ribbon microphones were used "just to find out what happened."

David Collison assured us that they really need not have worried. Every single recorded version produced a reasonable representation of the sound. The one that was finally selected for "Trafalgar" was a version made on an EMI L4 battery-portable with a Grampian DP4 microphone.

Obviously such work is as exciting as it is absorbing. What of the amateur? Could the amateur really hope to produce this kind of show? The answer is both yes and no. There is little hope of any amateur ever beating Madame Tussaud's at their own game. This is pure professionalism requiring vast resources that no ordinary person would ever have at their disposal. But if the private endeavour were to be scaled down to reasonable size there is not the slightest reason why such spectacles should not be attempted—particularly as a co-operative effort by recording clubs.

By using an ordinary four track machine together with a pulse actuated accessory switching mechanism the amateur has at his command the basic tools for the job. There must be a great many local events held throughout the country where such a *son et lumière* programme would be most welcome. If you have lots of patience, even more ingenuity and a few helpers this brilliant idea could be turned into practical reality.

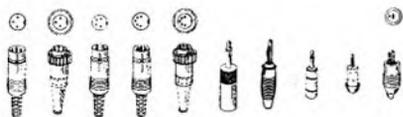


Fig. 1. A plethora of plugs (courtesy of Tape Recorder Spares Ltd.)

HAVE YOU THE RIGHT CONNECTIONS?

By
JOHN BORWICK

THERE are two aspects of this question. First, there is the nuisance of non-standardisation in the world of plugs and sockets so that it is impossible to be involved in tape recording for long without running foul of a plug that will not fit the required socket. Figure 1 shows just some of the plugs listed in the catalogue of Tape Recorder Spares Ltd. Second, there is the need to match the impedances of any pieces of equipment being plugged together.

Microphones, gramophone pickups and radio tuners are all sources of low level signals (less than 1 Volt, say) and indeed so too is a tape recorder if it has a low level outlet (direct from the tape head or the pre-amplifier) for feeding to an external amplifier or a second tape machine.

Because these signals are so tiny, they are prone to interference from the magnetic fields surrounding mains cables, transformers and motors. When the signals are later amplified and reproduced through a loudspeaker the induced interference is amplified too, and appears as that old bogey "mains hum"—a low, droning sound at 50 Hz plus its harmonics. To keep out mains hum, low level signal-carrying cables are almost always of the screened co-axial type. One or more "live" wires, insulation covered, are contained inside a sheath of metal braiding. To maintain the screening over the whole length of the connector, the plug too should have a metal outer jacket, to which the braid is connected, and one or more insulated "live" pins. The socket will also be constructed so that, when mated to the plug, the outer screening effect is continuous.

Let us see how this is achieved in the three most common types of signal connector used on domestic recorders:

1. Phono Plug. (Fig. 2a). This is a close relative of the simple co-axial plug used for TV aerial leads. It is universally used on British and American hi-fi amplifiers and many domestic tape recorders. It looks simple enough, but is quite tricky to solder. Except in the better quality examples, where the body of the plug is strengthened and extended, it is sometimes difficult to pull out of the socket. You may occasionally need to prise the plug out gently with pliers—obviously it is not a good idea to tug on the cable itself for fear of breaking the soldered connections. For these reasons I do not think the phono plug is a good choice for connections that are often being changed. When used for microphones, the phono plug has the added disadvantage that it may be accidentally pulled out. You can make it a tighter fit by very gently bending the outer lugs inwards.

Figure 2a shows how to strip the braided cable for soldering to a phono plug. Happily, you can now buy leads of every description with the plugs already fitted and adaptors to suit all types of gear. Plastic packs of these valuable accessories are made by Tape Recorder Spares and Radiospares and Goldring have just produced a useful kit of connectors.

2. Jack Plug. (Fig. 2b). This is a stouter job altogether, and first cousin to the famous Post Office jack used in telephone switchboards and broadcasting control rooms. The live lead is carried through to the insulated tip of the plug and, when pushed home in the socket, this engages with a notch-shaped spring contact. As a variation, the socket can be of the "make-and-break" type. Then, pushing home the plug simultaneously opens an auxiliary spring contact to switch off some previous connection. A common application is in the External Loudspeaker socket of a tape recorder where plugging in the external speaker automatically cuts the built-in speaker.

Jack Plugs come in various styles. Figure 2b shows the soldered type but you can also get a version in which screw terminals are used instead. Some jack plugs have plastic covers. In view of my earlier remarks on the need for screening every inch of low level signal connectors, you will see that the plastic type is best reserved for speaker connections, etc. For microphones and pickups you should choose the metal-cased type (costing 1s. or so more). Another version is made for so-called balanced line working in which twin live conductors are surrounded by an earthed screen. The jack plug then has a second insulated "ring" between the tip and the metal sleeve. This type of plug now has an extended usefulness because it is suitable for one-plug stereo connections.

All these standard jack plugs have a quarter-inch diameter plunger. There is also a miniature version, of about one-eighth inch diameter, used on transistor radios (for earphones) and some portable tape recorders.

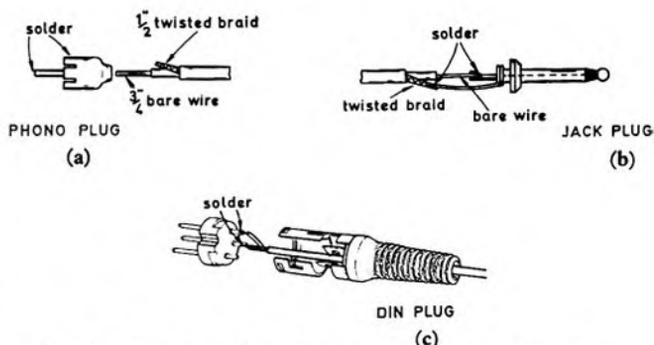


Fig. 2. How to solder screened cable to, (a) phono plug, (b) jack plug, (c) DIN plug

3. DIN Plugs. (Fig. 2c). As a welcome move towards standardisation, the German DIN (Deutscher Industrie Normenausschuss) standards organisation has recommended a limited range of multi-pin connectors. These are gradually finding approval in other countries too and may become a universal standard.

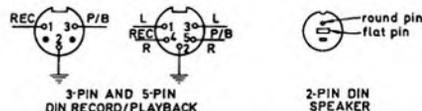


Fig. 3. Pin conventions for 3-pin, 5-pin and 2-pin non-reversible DIN plugs

Pin configurations have been laid down for three-pin and five-pin plugs for various purposes—though you should consult the maker's instructions in case the pin order is non-DIN. Figure 3 shows the record/replay standard for mono and stereo. Note that the centre pin 2 is always earth and that plugging a three-pin mono recorder plug (say) to a stereogram five-pin socket will give record/replay via the Left channel. My drawings show the plugs viewed from the free end, or the socket from the solder tags end. The plugs have a key-way and are irreversible.

Figure 3 also shows the DIN two-pin plug for loudspeaker connections. It too is usually irreversible, which is a good feature in stereo systems because the relative phases of the two loudspeakers cannot be accidentally muddled. But there is also a reversible socket available which can be wired to give a choice between muting or non-muting of an internal loudspeaker.

When you start connecting other pieces of equipment to your tape recorder, you must take note of the relative impedance and voltage ratings. The plug and socket business can be messy but, as I have outlined, is soon resolved by shopping for the right components, properly wired.

Wrong impedances can be more serious: they can cause distortion, weak and therefore noisy recordings. Fortunately, the matching of impedances is not too critical and values that are reasonably close will do, provided the voltage ratings also match fairly well. The classes of impedance met in practice are roughly as follows:—

High: (2,000,000 Ohms): crystal microphones; crystal and ceramic pickups.

Medium: (50,000 Ohms): some crystal and magnetic microphones; magnetic pickups, tuner units, tape recorder hi-fi outlets.

Line: (200-600 Ohms): magnetic microphones.

Low: (30 Ohms): magnetic microphones; (3-15 Ohms): loudspeakers.

If you glance through this list and check it against the specification of your tape recorder or amplifier, you will soon see the sorts of equipment you can use.

Crystal microphones and pickups are cheap and produce a high voltage. They therefore tend to be the included accessory on low price recorders and record players and present no great problems in matching to other units because some attenuation will usually be needed and this can take the form of a series resistor to give approximate impedance matching at the same time. Ceramic cartridges have recently become popular, being more reliable and having a better technical performance than crystals. Their matching is a little more critical, and they are less sensitive, but alternative circuits are supplied with the cartridge to permit working into more than one class of impedance.

Magnetic pickups present a special problem in that their output voltage is very tiny and they have to be fed to an equalising network with the standard (RIAA) gramophone characteristic. This is incorporated in most hi-fi amplifiers, of course, but only in one or two of the most versatile tape recorders.

Magnetic microphones, moving coil and ribbon, are generally an improvement over crystal types. The quality is better as a rule and, being low impedance, they can be used on very long cables. (High impedance microphones are poor on long cables because the capacity between the conductors increases with length, and over about ten feet this starts to attenuate the signal.) A step-up transformer can sometimes be used at the recorder end of the cable to match a low impedance microphone to a high impedance recorder socket. Unfortunately, the voltage rating of the cheaper recordings is often so high that, even with the transformer, the magnetic microphone's signal is too weak for satisfactory recording. So, if you want to up-grade your recorder by buying a magnetic microphone to replace its crystal one (as I often advise people to do) you must first check this point.

Matching in terms of sensitivity is extremely important. If the source provides too great a voltage at the recorder input distortion will inevitably occur, if too little voltage then even maximum gain will not fully modulate the tape. Where it is necessary to reduce voltages to suit the recorder input the selection of attenuator leads included in 'Tape Recorder Spares Ltd.'s catalogue will be found extremely useful. The various leads have built-in resistors of different values enabling the purchaser to select the right one for the job. It is very much easier to handle too much signal (by attenuation) than too little, because this requires additional amplification. Many Continental recorders provide inputs of different sensitivities or even a single input of variable sensitivity. This usually solves the problem immediately. Lacking this facility, however, one can sometimes get away with feeding a low level signal into a high impedance microphone socket if the voltage is too low to be handled at the radio input. Whenever such connections are made the gain control on the machine should be at zero level when the plug is inserted and should then be brought up gradually to avoid the possibility of sudden overloading.

Loudspeaker matching is not unduly critical but there is appreciable loss on running a 15 Ohms speaker from a 3 Ohms outlet. Therefore, if your recorder speaker socket is rated at 3 Ohms, try to get a 3 Ohms, or at least 5-8 Ohms speaker. Most British hi-fi speakers are 15 Ohms but, because of the demand for the lower values to match tape recorders and transistor hi-fi amplifiers, more and more are being supplied in 3-8 Ohm versions.

Tape recording is a hobby that calls for lots of connecting up; I hope this article will help you to get the right connections.



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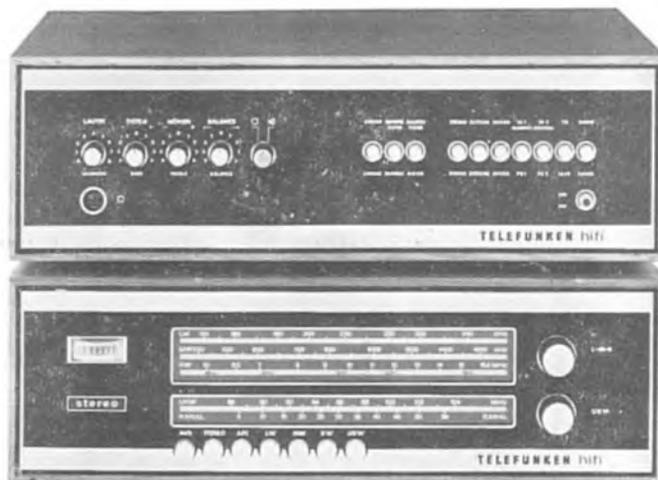
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I DON'T believe it—it can't be true. Christmas must be at least six months away. Only yesterday I was thinking to myself that it's about time I found a home for the tie-clip given to me last Christmas and which I shall never use.

But it is true. This is the December edition and Christmas looms larger and nearer as every day passes. Each year the meaning of Christmas seems to recede further and further into the background. It is not too difficult to imagine a Christmas in the future when the only sound heralding the birth of the King of Kings will be the joyful peal of the cash registers. As piety and commerce step hand-in-hand through the ages there is little doubt who leads whom.

The tape recorder will undoubtedly play a part in the coming festivities. At how many parties will the embarrassed guests be treated to the sounds of their own voices as a secretly recorded tape is played back? Such an uncouth and thoughtless party trick is surely guaranteed to destroy any lingering feelings of peace and goodwill that might have remained after the first thirty minutes of any party. Surely there must be better ways than this of employing the medium of recorded sound as a means of entertainment?

In my opinion the most important use of recording equipment at a party is to provide a continuous and trouble-free supply of suitable background music. Reproduced at a sufficiently low level to permit intermittent conversation without shouting, it will help to create the right party atmosphere and will assist in breaking the otherwise icy chill of the first hour. All kinds of games and quizzes can be devised and the tape recorder can make them a genuine centre of interest. One word of warning however. Indulging in such games is not everyone's idea of a party, and such a programme should only be arranged when the host is quite sure that guests will appreciate such entertainment and not be embarrassed by it. The very worst treatment any guest can receive is to find himself embarrassed, and embarrassment can be caused by the tape recorder more easily than in almost any other way.

Even the most sophisticated gathering can, when thoroughly warmed up, indulge in surprising and mirth-provoking activities. I remember one such occasion when all the ladies present were persuaded to take part in a "Song Contest" which was recorded and then played back to the entire gathering to vote for the winner. You can judge the merriment of the occasion when I tell you that it was unanimously decided that all the lady participants had equally tied for first place!

CROSS TALK

By Audios

AFTER my rather scathing comments on our apparent lack of success with audio equipment in the export markets of the world it is refreshing to be able to report that a list of no fewer than fifteen British firms were exhibiting at the fifteenth International Electronics Exhibition—Firate—in Amsterdam at the end of September.

This was a joint venture with the Board of Trade, and I am told that all the British firms are extremely pleased with the interest shown in their products and in the business which is resulting from it. Most exhibitors held demonstrations in special rooms, and these were very well attended. In addition, some 4,000 people attended the demonstrations on the British Audio Stand which took place hourly throughout the duration of the show.

The firms showing were Acoustical Manufacturing Co. Ltd., Armstrong Audio Limited, Reynold Engineering Co. Ltd., Decca Radio and Television Limited, Goodmans Loudspeakers Limited, Grampian Reproducers Limited, KEF Electronics Limited, H. J. Leake & Co. Ltd., Lowther Manufacturing Co., Pye Group (Radio and TV) Limited, Richard Allen Radio Limited, Rogers Development (Electronics) Limited, Rank Wharfedale Limited, Jordan Watts Limited and A. R. Sugden & Co. (Engineers) Limited.

As a matter of interest I spent a few minutes going through the list picking out the names of those firms who actually manufacture and market tape recorders. It's an interesting experiment. See how many you can find, but there will be no prizes for the right answer.

* * *

I WILL readily admit to being very fond of birds—the feathered variety that is! Unfortunately they can cause an immense amount of damage and it does seem a shame to have to resort to extermination as a means of control.

Mr. Thomas Robertson, the head forester on the Buccleuch Estate in Border Eskdale, has had a bright idea. Driving around in his loud-speaker truck he has reproduced at loud level the tape recorded distress cries of starlings. The large flocks of these birds whose droppings were damaging valuable spruce trees reacted at once. Hearing one of their kind in distress they promptly spread their wings and departed. And if they ever come back Mr. Robertson will be ready to greet them with his loud-speaker van once again.

AS this is the season for indulging in thoughts of peace on earth and goodwill to all men it is appropriate that I should have received a letter from a young lady student in Czechoslovakia, a country that has earned honour and distinction at the recent International Contest. Her letter says that she is at university, aged eighteen, and has a knowledge of English and two other world languages. She would like to make contact with young people from abroad through the medium of tape.

According to her letter her tape recorder is called the "Sonet Duo" and it takes 5-inch spools and operates at 3½ ips and 1 4/8ths ips. I wonder if the latter is an error for 1 7/8 ips?

This column has always done its best to foster the exchange of ideas between the nations. All the peoples of the world must get to know each other better and must learn to appreciate the other side's point of view.

So if anyone would like to tapespond with this young lady whose interests are listed as literature, films and creative art they should contact Miss Doris Uhdé, 17a Srbska Street, Brno 12, Czechoslovakia. If she finds herself inundated with so many replies that she cannot handle them I wonder if I could ask her to pass them on to friends who might be interested in tapesponding in English. It would be a really fine achievement if we could establish a permanent and healthy exchange of tapes between the two countries.

* * *

ONE gets so used to hearing claims of "revolutionary new tape recorders" these days that one tends to treat such claims with reserve. But when such a claim is made by no less a person than Mr. H. Lyton Fletcher, one-time head of recorded programmes at the BBC, then it is obviously worth taking more than a little notice.

The idea is to replace station announcers by using a magnetic tape reproducer, the playback heads of which would scan more than eighty tracks on a single tape. By means of automatic switching the trains would announce themselves by actuating devices on the lines and so tripping a relay in the playback mechanism. To enable the head to scan this large number of parallel tracks it would have to be capable of moving in the vertical plane on a rack and pinion system. It has even been suggested that when using such a method a train running late would itself announce that fact to the waiting passengers. British railways could surely put such an invention to immediate and continual use.

* * *

JOKE of the year. The cover photograph last month showed a violinist intently studying the playback of a recording of his performance. He must have been an extremely clever violinist, because the tape was nowhere near the sound channel and the function control on the Tandberg tape recorder was in its neutral position. If this column fails to appear in January you will know a certain person has succumbed to savage attacks from the rest of the editorial staff. . . !



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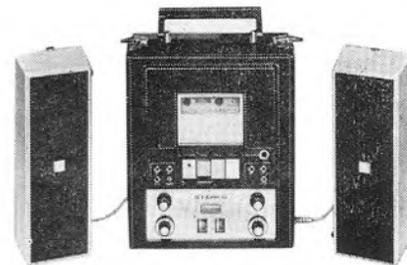
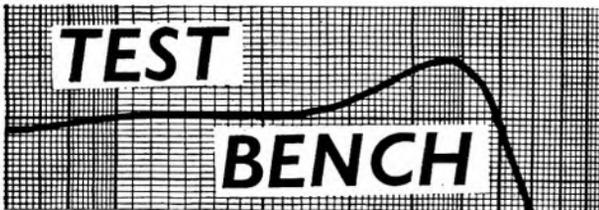
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AIWA TP-1004

INVESTIGATED BY R. HIRST AND D. KILLICK

Manufacturer's Specification Aiwa TP-1004

Type: Compact Cassette Stereo type, capstan-drive, 4-track system.

Power Supply: DC 6V, UM-1 (1.5V) x 4. Mains AC 110-220V interchangeable.

Tape Speed: 1½ ips.

Recording System: AC bias.

Erasure: AC erasing.

Output: Max. 1,000mW x 2; undistorted 800mW x 2.

Vu Meter: 2, built-in also serving as battery level meter.

Speaker: 125 x 77 mm oval. PM. D. x 2.

Microphone: Dynamic microphone (with stop/start switch) x 2.

Earphone: Magnetic earphone x 2.

Dimensions: 360 x 255 x 110 mm (approx. 14 x 10 x 3½ inches).

Weight: 4 kg. (approx. 9 lb.)

Distributors: B. Adler & Sons Radio Ltd., 32a, Coptic Street, London, W.C.1.

Price Complete (with accessories and demonstration cassette): 44 gns.

AIWA TP-1004 TEST CHART

Frequency Hz	Overall Response dB	Signal/Noise Ratio dB	Distortion	Crosstalk dB
1½ ips	-10	-40	1.8%	20 dB
60	-4.5			
100	-1.5			
250	0			
500	0			
1,000	0			
2,000	0			
4,000	+2			
6,000	-1			
8,000	-3			
10,000	-6			
Wow and Flutter	0.42%			

Notes:

The Overall Response figures relate to record and playback. For Signal-to-Noise Ratio the tape was recorded at peak level and then the input signal was removed from the record amplifier. By reference to the signal level recorded and the resultant tape noise, the noise voltage was read off with the tape still in motion. Distortion is quoted against a 1,000 Hz signal recorded at the correct maximum level as indicated by the manufacturers, and the figure is R.M.S. value.

Wow and Flutter is also R.M.S., the test frequency being 3,000 Hz.

Test equipment used includes: Marconi Signal Generator, Bruel and Kjaer Frequency Analyser Type 2107, Gaumont-Kaylee Wow and Flutter Meter and Marconi Distortion Factor Analyser.

OUR review this month deals with a Compact Cassette machine of Japanese manufacture. This was deliberately selected as we feel sure that within the foreseeable future there will be an increasing number of equipments of this kind imported from Japan. Some of these will probably be of remarkably low cost, and will offer playback facilities only. For our review, however, we have selected what is probably one of the most comprehensive stereo cassette machines available from any source. Naturally the price is related to the facilities offered, and so is in the middle to upper region of the cassette equipment price bracket.

The AIWA TP-1004 cassette recorder follows the easy-to-carry, slim, miniature suitcase formula, with a central carrying handle at the top. At first glance it appears to comprise a central, dark brown control panel which contains all the controls, level meters and input/output sockets, with a pair of narrow, light grey speaker panels on either side. Further investigation reveals a pair of chromium plated clips on the upper surface whose function is

to hold the speaker neatly and firmly in place, but when these are released they are detachable and will operate on about five feet of extension cable each.

The equipment may be used as a single, compact, unit, with side speakers locked on to the main body of machine, or for better quality stereo separation the speakers may be detached and used at a maximum separation of about ten feet.

A further cursory glance reveals the fact that all cabinet work, including speaker enclosures, is plastic. Frankly, your reviewers are not at all keen on finding too much plastic used in the manufacture of recording equipment. When we buy a recorder we expect to get many years of useful life out of it, and all too often plastic cracks or suffers damage only too easily. A good plastic, however, will combine both durability with lightness, apart from offering enormous manufacturing advantages for certain applications. Had the casework of the Aiwa machine been other than plastic the result would have been a heavier and more cumbersome piece of equipment. We therefore feel that the manufacturers are justified in using this method of construction. As a final comment on this point, we have subjected the review machine to heavy use—short of actually throwing it on to a stone

floor—and it shows neither damage nor other visible deterioration. In fact, a wipe with a damp cloth immediately restores it to brand new appearance.

One of your reviewers enthusiastically refers to the TP1004 as “a small recording studio complete with every accessory and yet so light and compact that it can be carried with just three fingers of one hand.” Before we get too enthusiastic let’s take a look at the laboratory findings. The overall response, that is record and playback, was the only reading we could take since we are not in possession of a Compact Cassette calibration tape—to the best of our knowledge these are not commercially available. It will be noted that the response is relatively flat within the range 100 to 8,000 Hz. These readings were obtained with the tone controls rotated about 25° in a clockwise direction. By increasing the treble lift control the response will extend to somewhere in the region of 10,000 Hz, although one will then have to tolerate a lift at about 4,000 Hz. At the lower end response tends to fall off a little above what would be desirable, and at 60 Hz it is down by 10 dB with reference to 1,000 Hz signal.

From these figures it is obvious that we have a response curve that cannot be said to promise “high fidelity” reproduction. However, with the limitation of the 1½ ips tape

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David Lester: Q. A. Engineer

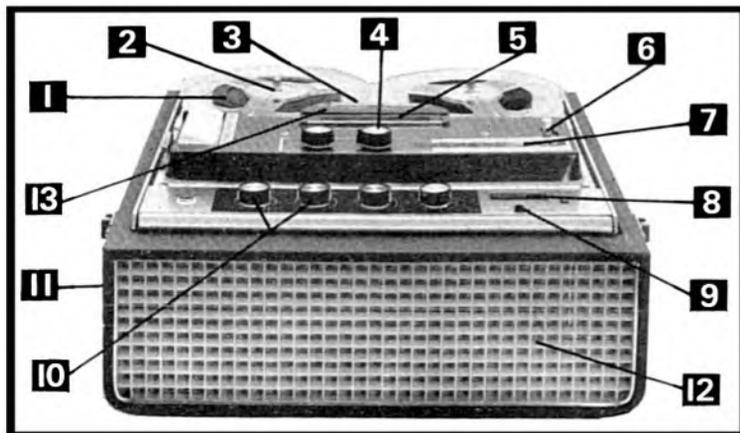
What does he put to the test on weekends?



To Jerry, his violin is his living. And he's a superb violinist. But not the best. *Yet*. So when he's not playing before thousands, he's practising before his Truvox 100 Tape Recorder. He plays, then turns a knob, *and learns*. The Truvox 100 is the only tape recorder for Jerry. If you can catch him in a spare moment, he'll be glad to give you the reasons, button by button **1** 7" spools **2** Spool clamping **3** Duo play and Multiplay (R 104) **4** 3 speeds **5** Built-in splicing flap **6** Cue and inching control **7** Push button reset 4 Digit counter **8** Accurate V.U. Recording Meter **9** Tape/Source A-B monitor switch **10** Mic/Radio/PU mixing **11** Solid wood cabinet covered with tough washable P.V.C. **12** 8" x 5" loudspeaker **13** 3 heads

And there are a few features without buttons that make the R 104 Jerry's choice. Like **Solid state all-silicon transistor circuitry/Pre amplifier output fully variable 0-1 volt/3-motor Truvox Tape Deck/Separate record and playback heads/Micro-switch deck operation/Also available - Belgravia model finished in selected teak veneers.**

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THE TRUVOX SERIES 100



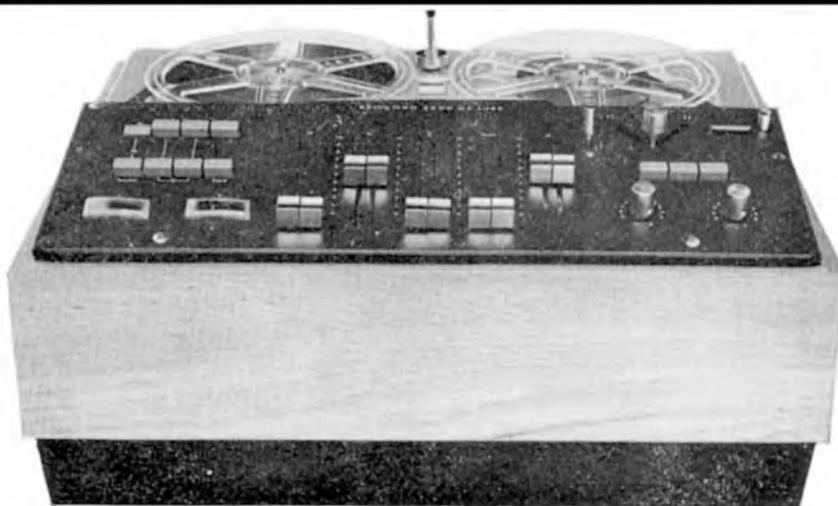
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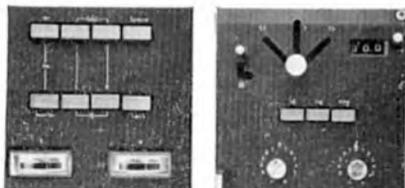
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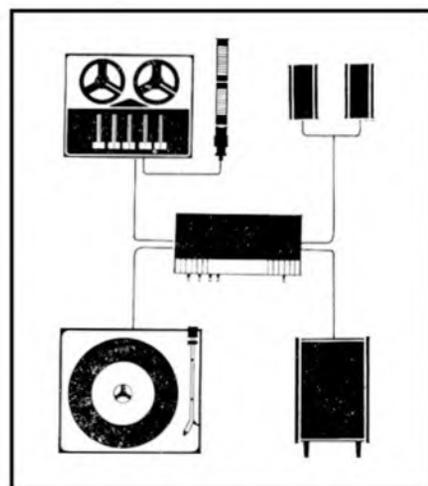
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speed and the narrow track configuration all equipments of this kind are bound to suffer from attenuation of response at the extreme ends of their effective range. In assessing a Compact Cassette machine one cannot compare it to spool-to-spool equipment using standard tape running at 7½ ips and probably costing more than twice the price. If, nevertheless, we do compare the TP1004 with a conventional spool-to-spool machine running at 1½ ips, we find that in terms of frequency response it does rather well for itself, although the figures are not quite so good as those obtained from the Philips EL3312 reviewed in May. This latter comparison is, however, not strictly fair, since the Philips machine is a standard mains equipment whereas the Aiwa is a battery or mains portable and is significantly less costly.

Signal-to-noise ratio at 40 dB below the peak recorded signal is acceptable without being outstanding, but the most surprising measurement was the exceptionally low distortion level. A figure of 1.8 per cent total harmonic distortion at 1,000 Hz is almost unbelievable. One might expect to find a comparable figure only in the specification of a thoroughly professional and extremely expensive standard machine. At 750 mW output this distortion level increases to 2.8 per cent due to the influence of the replay amplifier. When one considers that 3 per cent is generally regarded as a high fidelity standard then it will be realised that this is a remarkable achievement. If the outlet is connected directly to a good quality amplifier the low distortion content is immediately apparent from the very clean reproduction.

The weakest feature of the TB1004 was its wow and flutter content of 0.42 per cent. The Philips machine referred to previously gave a reading of 0.26 per cent, and we regard this difference as fairly typical of the difference between the mains and the battery Compact Cassette transport mechanisms; this would probably be revealed by other battery portables regardless of manufacture. We do feel this is a pity because the differences in pitch that will be heard on long

sustained notes may be unacceptable to some listeners. Another unfortunate aspect of this machine lies in the crosstalk between channels—the output from channel 2 was 20 dB down on that of channel 1. Whether this reading was brought about by the record/playback head or whether it was caused by breakthrough in the amplifiers is uncertain. Its effect, however, is to impair stereo balance, although this can of course be readjusted by making use of the independent volume controls. Tone controls, again separate for each channel, give a variation in output of about 10 dB at 8,000 Hz, and as mentioned in our earlier paragraph on frequency response the setting will depend upon the listener's preference.

These laboratory findings confirm our earlier impression that although not coming within the exalted hi-fi classification the TP1004 is capable of performing a useful function, and so we proceeded with user tests.

The first thing we noticed was the very clear and concise instruction booklet, written, we are pleased to say, in intelligible English. To our surprise we found that the outfit included not only the main machine with its pair of detachable speakers but also a separate mains lead, a pair of "deaf aid" type ear-pieces complete with miniature jacks for personal private listening and also—believe it or not—two very neat pencil-shaped microphones (one with an on/off switch) and plastic clips to form desk stands. The Japanese are most thoughtful in carefully considering what accessories might be needed and then including them in the total price.

More care was revealed in the design of the speaker enclosures which incorporate in their two rear sides storage space for spare cassettes and the mains lead. Even this does not exhaust their ingenuity, because two pairs of clips behind the left-hand speaker enable the two microphones to be stored within the case as well. This explains our reference to "a complete portable studio." Every single item that might be needed for either listening or recording, or both, is neatly stored without a single accessory or

loose wire being visible from the outside. This is really a remarkable design achievement.

Operation of the deck is by piano keys on the front panel. A white key provides the stop control; fast-forward, run and rewind are grey keys. Record level playback volume control is by a pair of separate rotating knobs, each with a numbered reference scale reading from 0 to 10. The two tone controls, one for each channel, are again rotating knobs, and the level indicators, which also serve to check the battery level, are a pair of edge-type Vu meters. Inputs are provided for microphones (left-hand channel with remote control) and auxiliary (radio or gram) and are of the miniature jack type. Extension speaker outlets, one per channel, are also miniature jack but a single standard jack is provided for headphone monitoring.

The entire outfit operated extremely well, both in the reproduction of Musicassettes and in producing its own recordings. Naturally the two detachable plastic speaker enclosures do less than justice to the quality of the recordings. Nevertheless, they provide an extremely useful and highly transportable stereo sound source and would probably be wholly acceptable to less discerning listeners or for others who merely wish to make use of background sound. When the output is fed via an external amplifier into full range speakers we have a very clean and cheerful sound which, to our ears, is marred only when the programme content reveals the unavoidable wow.

To summarise, we must conclude that this most comprehensive outfit offers the finest value we have come across to those who will accept its audio limitations. Being fully aware of the appalling sound quality that a great many people normally endure without question, we conclude that this machine will be of great interest to a very large number of people. We were so pleased to note the inclusion of a pair of microphones, which we hope will encourage experiments in stereophonic recording. For the young in heart an excellent buy.

JAN FEB MAR APR
MAY JUN JULY
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MUSICASSETTE

REVIEWS

CORRECTION: Last month in our Musicassette reviews we inadvertently referred to the price of three Philips classical Musicassettes as being 45s. each. For some time all Philips classical issues have been priced at 40s. We would apologise to readers and Philips Records Ltd. for any inconvenience caused.

MOZART. Concerto for Flute, Harp and Orchestra in C major, K.299; Clarinet Concerto in A major, K.622. London Symphony Orchestra conducted by Colin Davis with Herbert Barwahser, flute, Osian Ellis, harp, and Jack Brymer, clarinet. Philips CPC0012, 40s.

Here we have some of the very best of Mozart. With a nice sense of judgment the Clarinet Concerto has been coupled with the Concerto for Flute, Harp and Orchestra to provide works of comparable delicacy and clarity.

In recordings of this kind one has to evaluate overall sound quality as being of as much importance today as performance standards. Here, Philips have produced a beautiful, round, orchestral sound for the accompaniment, together with fine rendering of the solo instruments. If there is a fault it is perhaps of slight over-brilliance—judicious use of top cut will just take the edge off the strings.

As these happen to be two of my favourite works I can honestly say this Musicassette held nothing but pleasure and enjoyment for me. Colin Davis exhibits superb control and his soloists provide adequate interpretations. A delightful Musicassette full of melodic quality and as such strongly recommended.

LISZT. Piano Concerto Nos. 1 and 2. Sviatoslav Richter with London Symphony Orchestra conducted by Cyril Kondrashin. Philips CPC0008, 40s.

In the sleeve notes accompanying this Musicassette the anonymous writer properly comments on the importance of the soloists' interpretation in the performance of these two concertos. When we see the name Richter we can be sure of an original and searching approach.

In this recording the engineers have produced a realistically dominating piano sound in the foreground, together with brilliant orchestral quality. Unfortunately careful listening will reveal very slight traces of distortion on some of the piano notes, but then the piano is a notoriously difficult instrument to record, and one would have previously thought impossible to reproduce, at 1½ ips. However, the distortion was so slight as not to detract from enjoyment, neither was I troubled by pitch instability, and so this Musicassette can be recommended as an excellent piano recording (with the one small reservation mentioned) and as a fine example of one of our leading pianist's interpretations of the composer.

HARRY SECOMBE Christmas Cheer. Philips CPP1050, 40s.

One could almost be forgiven for beginning to think that Harry Secombe has a rightful place in the tradition of Christmas. It wouldn't be quite the same without him, would it?

For our enjoyment he has produced for us this year: *Here we come a-wassailing, While shepherds watched their flocks, The first Noel, Good King Wenceslas, Once in Royal David's city, O come all ye faithful, on side one, and That's what I'd like for Christmas, The holly and the ivy, Mary's boy child, Silent night, holy night, God rest ye merry gentlemen and White Christmas* on side two.

There is not so very much elbow room in the choice of items for a popular seasonal issue such as this is. However, this is adequately compensated by some very pleasing original arrangements for choir, harp and solo voice. Nevertheless, as a genial Friar Tuck figure Harry Secombe sounds far more at home when he is boisterously a-wassailing, rather than when in serious mood in the straight carols.

If Harry Secombe is what you want for Christmas—and who doesn't—this is the Musicassette for you.

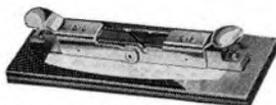
SING ALONG AT FLANAGAN's with Bernard Bedford. Pye CYP168, 40s.

The Flanagan of the title is Flanagan's Irish Dining Rooms in Baker Street, London. The sleeve notes almost suggest that the fame of Sherlock Holmes has now passed and that Baker Street will in future be associated with steak and kidney pudding, Irish stews and the rest of the blarney.

Be that as it may, we have here enough ammunition to raise the temperature of any convivial gathering to or above boiling point. What can the reviewer say when faced with no fewer than 38—yes! 38—cheerful and sentimental ballads all accompanied on a honky-tonk piano and performed with gusto by a congregation of some of the finest lungs that ever caught breath as they departed the Emerald Isle?

Please turn to page 592

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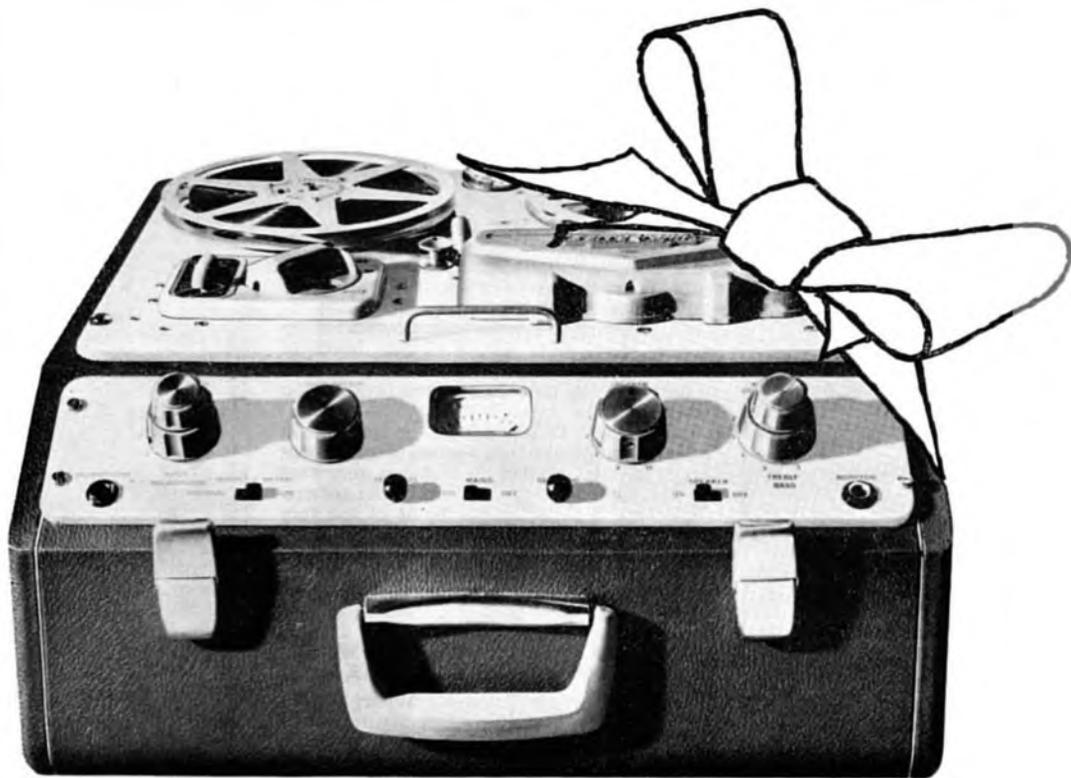


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All I want for Christmas is a Ferrograph

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MUSICASSETTES—from page 590

I shall not list the titles—you name it, we've got it. An absolute must for a nostalgic (or alcoholic) get-together. If any guest does not join in the singing then the error was yours for inviting him.

FIDDLER ON THE ROOF with Topol. CBS 40-70030, 40s.

Every now and again we come across a Musicassette (or a tape or a record) where both the quality and the content are so good—so very, very good—that the listener is astonished by the sounds he hears. Such an issue is this Musicassette selection from the original London production.

Of course Topol steals the show. What an artiste that man is! But the beautiful rendering of voice, chorus and orchestra has achieved a real milestone in the presentation of this class of music.

The really exciting sound is present in great depth, conveying a sense of movement to enable the listener to visualise the stage and to absorb the atmosphere of the theatre. This superb Musicassette is one of the very finest I have listened to and will have pride of place in my collection. I do not believe that anyone can be disappointed in it and I have no hesitation in recommending it in the very strongest terms.

SHIRLEY BASSEY with the Williams singers. Columbia TC-SCX3419, 40s.

Extravagant and vibrant, Shirley Bassey will one day be a legendary figure, taking her place with that select company of female vocalists who managed to rise above the foibles and fashions of their day. I was recently listening to an album by Mae West—recorded when she was seventy. Shirley has a long, long way to go, but such is the stuff of which she is made.

In this collection she sings: *Love is a many splendored thing, Fools rush in, You're nearer, Goodbye lover—hello friend, When or where, Where are you? Climb ev'ry mountain, A lovely way to spend an evening, The nearness of you, This love of mine, Who are we? Angel eyes and Till.* A fair enough selection, which should leave one thoroughly satisfied, both with life and with Shirley. Although recorded quality is fine, I found that the individual numbers lacked the impact that one expects from this artiste. I wonder why? Perhaps because she lacked the warmth of an audience; perhaps because she had been given the rather sterile backing of the Rita Williams Singers. At all events I was left with the feeling that the singer's great personality had been filtered out somewhere down the line. And that's a pity, because in other respects the tape can't be faulted.

LOS PARAGUAYOS. Popular Favourites. Philips CPP1024, 40s.

Performing a collection of best-loved favourites, Los Paraguayos have produced a recording here that really could not fail. The sleeve notes comment on the difficulty of selecting suitable repertoire for performers of this high standing. Choice is only easy when it is limited. Los Paraguayos admit of no limitations and the musical possibilities for them are endless.

So the choice for this album finally resolved itself into *Volare, Adios a la mamma, Cuando caliente el sol, Mona Lisa, La bamba, Vaya con Dois, La paloma, Cancion de Orfeo, A media luz, Ramona, El povom pompero* and *Cu-cu-rru-cu-cu paloma.*

The hallmark of the professional is in all spheres to accomplish the task in hand in a seemingly effortless manner. As melody

follows melody there is not the slightest hint of strain or force. The whole is lively and bubbling, a joy to listen to and still a pleasure to listen to yet again.

Perhaps music on this level lacks the stature of certain other works and performances, some of which are being reviewed this month. But one cannot remain indefinitely stranded in splendid isolation upon peaks of sheer genius. Los Paraguayos bring us down to earth in the kindest and most pleasant way, leaving us with the feeling that we have enjoyed some of the lighter and less heavy of the musical winds.

MUSIC ON TAPE

3 $\frac{3}{4}$ ips. MONO

COME THE DAY. The Seekers. Columbia (TA-SX 6093), half-track, mono, 3 $\frac{3}{4}$ ips, 35s.

The feelings of the listener towards this tape are likely to be conditioned largely by his personal feelings towards The Seekers. Either one likes them, or one doesn't—personally I do.

On track one of this tape we have *Come The Day, Island Of Dreams, The Last Thing On My Mind, All Over the World, Red Rubber Ball and Well, Well, Well.* I found both the performance and the quality on this track to be somewhat uninspired. Strangely, both improved on track two with *Georgy Girl, Yesterday, I Wish You Could Be Here, Turn, Turn, Turn, Louisiana Man and California Dreamin'.* If one could refer to the "flip side" of a tape I would say that in this case it is definitely the best.

Particularly pleasant are *Georgy Girl and Turn, Turn, Turn.* But all the numbers on both tracks give us the genuine, authentic sound of The Seekers—a sound which seems destined to remain high in the popularity polls. As a group they certainly have a unique tonal blend which is easily recognisable by anyone. This is undoubtedly their strength, but in an album of this kind too much similarity can result in a lack of total appeal. On the other hand if the group were other than their likeable familiar selves their countless fans would rise up in revolt. Though unremarkable, this album is a good example of The Seekers' art and to many that will be a strong enough recommendation in itself.

THE NAT KING COLE TRIO. The Vin- tage Years. Capitol Ta-T 2529, half- track mono, 3 $\frac{3}{4}$ ips, 35s.

Breathing deeply in the air and airs of the thirties, Nat King Cole tells us in his inimitable fashion just what happens when he *Takes his Sugar to Tea.* Living up to the titles he continues in nostalgic mood with *The Frim Fram Sauce, You're Nobody 'Til Somebody Loves You, I Miss You So, You're the Cream in my Coffee* and *What's What.*

If these numbers sound dated then they frankly are—but are they any the worse for that? Track 2 gives us *But she's my Buddy's Chick, Naughty Angelina, Baby, Baby all the Time, The Best Man and I think you get what I mean.*

For those who feel themselves to be of vintage years the numbers will be as nostalgic as they are pleasant. For the younger generation it's a glimpse into a world that for them will never be, and for us older ones of a world that will never be the same again.

MUSIC ON TAPE

7½ ips STEREO

Xmas Specials

HANDEL. Selections from *Messiah*. The London Philharmonic Choir with The London Philharmonic Orchestra conducted by Walter Susskind, choirmaster Frederick Jackson. Audio Spectrum AST 315 4-track stereo 7½ ips. 55s.

This album is described as being made up of complete selections from the greatest oratorio ever written. Side 1 contains: *And the Glory of the Lord, Behold a Virgin Shall Conceive, Oh Thou that tellest Good Tidings to Zion, For unto us a Child is Born, There were Shepherds abiding in the Field, Glory to God and Behold the Lamb of God*. On side 2: *Lift up your Heads, Why do the Nations so furiously rage, Hallelujah Chorus, Since by Man came Death, Worthy is the Lamb that was Slain and Amen*.

There are two points of view about selections of this kind. One could quote the appalling vogue for condensed books and other predigested literary material which pretends to offer "culture without intellectual effort." Is one to equate selections of the kind now under consideration, utterly lacking as they are in continuity, with such decadent practices? It is my opinion that the condensed book is a wholly Philistine creation which bears no relation at all to the publication of musical "selections," provided the process of selection is conducted with a fine sense of artistic discrimination.

Whilst admitting that I would personally prefer to hear the whole of the *Messiah* in its entirety, I also appreciate the undeniable fact that a recording such as this Audio Spectrum album will appeal to a far wider audience and will therefore serve a more significant total function. Music was intended for the enjoyment and uplifting of mankind. Mankind consists of a great many individual people. Those who can offer the uplifting experience of fine music in a way that will appeal to the greatest number of those individuals are to be both envied and congratulated for their accomplishment.

The traditional story of the composition of Handel's *Messiah* is too well known for repetition. Having awarded the work a supreme place amongst all the music inspired by the Christian religion, one immediately places it in grave jeopardy. What choir, or what church, has not made at least one—and perhaps many—attempts at performing the *Messiah*? And what crimes have not been committed against it in the name of parochial enthusiasm? More than any other work the *Messiah* has suffered the wracks and pains of amateur performance throughout the breadth of the land. To all who have ever taken part, or even listened, to such performances I commend this album.

This is a thoroughly professional performance in the very best sense of the word. The conductor, Walter Susskind, welds orchestra, chorus and soloists into a vibrant, single entity. Under his baton the exultation of the human mind in its acceptance of the divine image of the *Messiah* as tangible reality is perfectly expressed through Handel's score. He has injected life, sincerity and hope into a work that could otherwise have been too easily dismissed as inconsequential through our over-familiarity.

The soloists, April Cantelo, soprano, Helen Watts, contralto, Wilfred Brown, tenor, and

Roger Stalman, bass, add materially to the sincerity of the production. And if anyone believes that the only place for a "beat" is in modern pop music then they should listen to these choruses of *For Unto Us a Child is Born* and *Glory to God*. I defy anyone to restrain their feet from moving in time with the music. This comparison with pop is not so absurd as it might seem; from it one can assess the worthlessness of much of the shameless noise to which we are today subjected.

Recording is generally very good indeed. I say "generally" because my copy of the tape did suffer from one or two very tiny dropouts. However, the excitement of the performance was such that these passed almost unnoticed. Of the tapes reviewed this month I must award the accolade to this selection from Handel's *Messiah*.

DENNIS DAY SINGS "CHRISTMAS IS FOR THE FAMILY" with guest star Jack Benny and the Vail Choir Boys. Pickwick P4T-X-1. 4-track stereo 7½ ips, 35s.

In this typical Christmas collection Dennis Day exhibits a surprisingly melodic and wholly pleasant voice quality. He is accompanied by the Vail Choir Boys, who are said to have been patterned after the Vienna Choir Boys. The sleeve notes add that Vail is the only choir of its kind in America. Certainly the boys have been well trained and have a thoroughly professional approach.

The items offered are: *Jingle Bells, White Christmas, Rudolph the red-nosed reindeer, I heard the bells on Christmas Day, Christmas is for the family, Silent Night, Hark! the herald angels sing, O little town of Bethlehem, Away in a manger, O come all ye faithful, The First Noel, and God rest ye merry, gentlemen*.

Just what Jack Benny is supposed to be doing is rather obscure. He appears briefly at the beginning and end of each side, scrapes some horrible sounds out of a violin, makes a couple of fatuous remarks and then happily vanishes. Presumably he was included only to enable his name to appear on the box, which is a pity, because the recording does not need propping up in this way. One word of warning—this is pure Americana and some of the melodies may be surprisingly unfamiliar. This could be a refreshing change for a Christmas selection.

CHRISTMAS DRUMMER BOY with Don Janse and his 60 Voice Children's Chorus. Pickwick P4T-X-2. 4-track stereo 7½ ips, 35s.

Compared to the Vail Choir Boys the sixty children featured in this recording provide only an amateur performance. This deficiency tended to spoil my enjoyment of what might otherwise have been a successful album.

The works include *Drummer Boy, Santa Claus is coming to town, Up on the house top, Rudolph the red-nosed reindeer, Parade of the wooden soldiers, Jingle Bells, Joy to the world, Twelve days of Christmas, I saw three ships, Silent Night, Babes in toyland, Deck the halls, and We wish you a merry Christmas*.

A rendering of serious Christmas songs is always thought of in terms of sweet voices—perhaps angelic voices. When that celestial quality is lacking the works teeter dangerously on the brink of banality. Need one say more?

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DESIGNED to meet the demand for a slender moving coil microphone with directional properties the Reslo Type CPD has been introduced. The cardioid dynamic insert is housed in a sturdily-built, but lightweight, case, and is held in position by a hand-turned and slotted front cap which protects the diaphragm but which, by means of strategically placed slots, is said to allow almost equal acoustic energy to be received at both sides from sounds originating at the rear. Specially recommended by the manufacturers for both music and general use when high-quality recordings are required, the frequency range is claimed to be smoothly maintained from 50-17,000 Hertz, -2 dB at 70 and 16,000 Hertz referred to the level at 1,000 Hertz.

Rear suppression is partial and is claimed to be in the order of -10 to -20 dB over the range 200 to 15,000 Hertz. Impedance values are Model L 30-50 ohms, Model M dual impedance 250 or 600 ohms, H dual impedance "Hi-Z" (approximately 40 k ohms) or 30-50 ohms. The M and H models incorporate miniature line transformers in the case. Finished in fine grain black shrivel enamel with a matt silver head and front cap, the weight is 8 ounces and the size is 8½ inches by a maximum diameter of 1½ inches.



The microphone is offered complete with a light action on/off switch, a suitably designed plastic detachable stand holder and an A 900 plug with eight yards of cable. The connection is by a Reslo three-contact socket at the base end of the microphone. Prices are: Model L 15 guineas, Model M 16 guineas, Model H 16 guineas.

Reslosound Limited, Spring Gardens, Romford, Essex.

**LEEVERS-RICH
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A NEW arrival in the professional battery-portable field is the Leavers-Rich Series Q. Operating on twelve U2 dry cells (which are housed in a removable cassette) the machine has been specially designed to achieve professional standards of performance and reliability and to offer ease of maintenance in the field.

Three basic models are offered. Q1 single-track—full or half-track—for all audio applications. Model Q2 is a standard twin-track model using in line heads for stereo recording and for twin-track data applications. Model QS is intended for synch with cameras using the synchopulse system.



Tape speed is 7½ ips and flutter is claimed to be 0.1 per cent RMS. Maximum spool size is 7 inches and frequency response is claimed to conform to BS 1568:1960.

Prices vary from £350 for the mono version to £425 for the stereo or synchopulse versions.

Leavers-Rich Equipment Limited, 319b, Trinity Road, London, SW18.

**MONITOR GOLD
A NEW
DUAL CONCENTRIC**

CONTINUAL research by Tannoy has resulted in a new version of the famous Dual Concentric loudspeaker. This is to be known as the "Monitor Gold."

The new version has been fitted with a control panel accommodating treble roll-off and treble energy controls. This enables the extreme treble response to be attenuated whilst the energy control reduces the treble response from crossover point upwards. These adjustments enable the loudspeaker to be tailored to suit specific acoustic conditions.



Impedance is now 8 ohms, making the unit particularly suitable for all types of transistorised amplifiers. The mass of the LF diaphragm assembly has been increased to improve bass response in small enclosures. The improvement at the lower end is said to be approximately half an octave down for a given size enclosure relative to the older units.

Prices for the loudspeaker units only are £31, £34 15s. and £40 depending on model, and complete enclosures cost from £41 for the 111 LZ in a Mark 2 enclosure to £167 10s. for a 15-inch in Autograph enclosure.

Tannoy Limited, Norwood Road, West Norwood, London, SE27.

BEOLAB PRESENTS A NEW LOOK

WHAT is claimed to be one of the most advanced sound reproduction systems ever made for domestic use has now been introduced by Bang & Olufsen. Known as Beolab it comprises a complete high fidelity system which has been produced as the result of several years of research and development at the B & O factory.

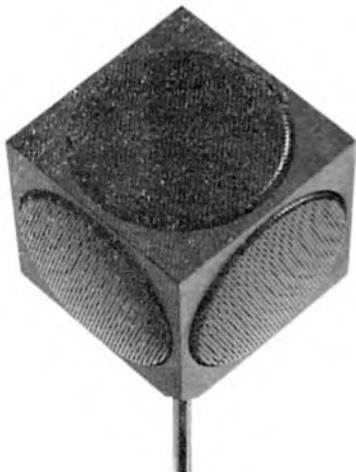
The name has been selected to indicate that all units in the series will correspond very closely to the technical specifications of laboratory models, and in fact are claimed to exceed all established international standards for high fidelity.



As will at once be apparent from the illustrations the designers have adopted a completely new approach by abandoning rotary controls in favour of sliding vernier scales. The stereo amplifier has a claimed output of 2 x 60 watts at 0.6 per cent distortion at all frequencies. Designated the Beolab 5,000 the amplifier, cost 120 guineas, has provision for the connection of two separate pairs of loudspeakers plus centre channel, a special test control for adjusting balance and a widely variable tonal range to suit all tastes.



Following the same styling the FM stereo tuner, Beomaster 5,000, is said to have excellent selectivity and sensitivity incorporating a stereo decoder with a high degree of channel separation and low distortion.



This instrument features silent tuning and automatic frequency control. A data processing section switches from mono to stereo automatically when a stereo signal of suitable strength is received. Cost of the stereo FM tuner is 85 guineas.

Beovox 5,000 is a pressure-chamber loudspeaker with a specially designed bass unit plus two mid-range and four high frequency units mounted in line source form. With a total of seven speakers in all it is said to be capable of handling up to 50 watts of power. The price per unit 49 guineas.

Another unusual item in this range is the Beovox 2,500 high frequency sound diffuser unit, illustrated bottom left.

This distinctive cube-shaped device can be free-standing or suspended from the ceiling. It contains six high frequency radiators to emit sound in all directions.

Maximum power handling capacity is 50 watts and the price of the Beovox 2,500 is 21 guineas.

Other items in the range are a professional stereo record player, the Beogram 5,000 and a stereo tape recorder, the Beocord 1,500 de luxe.

Bang & Olufsen UK Division, Eastbrook Road, Gloucester.

TRUVOX SERIES 50 TWO NEW MODELS

TWO new models are announced by Truvox Limited. They are the R 52 half-track and the R 54 quarter-track, and they both have entirely new Truvox decks running at 7½, 3½ and 1½ ips. Known as the Series 50, they incorporate many interesting design features.



Each machine has two acoustically matched loudspeakers size 7 x 4 inches built-in, and the claimed frequency response is from 30 to 17,000 Hertz plus or minus 3 dB at 7½ ips. Signal-to-noise ratio is claimed as better than 48 dB on the R 52, 46 dB on the R 54. Equalisation is to the new CCR standard and outputs are provided at external speaker sockets to give 6 watts into 8 ohms.

Mixing facilities are built-in and monitoring is by a VU meter. Tone controls are provided and the machine has been provided with a pleasantly styled all-wood cabinet.

Price, including microphone and tape, 56 guineas for either model.

Truvox Limited, Shore Road, Hythe, Southampton, Hampshire.

CHANGE OF TRIO DISTRIBUTOR

THE Trio Corporation of Japan is well known for its high fidelity equipment, and this is now being distributed in this country by Messrs. B. H. Morris & Co. (Radio) Limited.

Apart from a number of interesting communications receivers, a wide range of amplifiers and integrated tuner amplifiers are available at prices ranging from 45 to 175 guineas. In addition, Model S 120 loudspeaker system with a power handling capacity of 20 watts will be available at 39 guineas.

B. H. Morris & Co. (Radio) Limited, 84/88, Nelson Street, London, E.1.

THOUGHT FOR XMAS

AS Christmas draws nearer the annual scramble for small but useful gifts is with us once again. A good suggestion from Multicore Solders Limited is their Home Electrician's Kit.



Housed in an attractive plastic wallet, the following items are included: Bib Model 8 wire stripper and cutter, 3 Bib flex shorteners, Ersin multicore tape solder, insulating tape, screw-driver and fuse wire. An instruction card is included in each wallet. At 14s. 6d. it could make a most useful and welcome gift that would ensure the repair of a blown fuse if one should go during the height of the festivities.

Multicore Solders Limited, Multicore Works, Maylands Avenue, Hemel Hempstead, Hertfordshire.

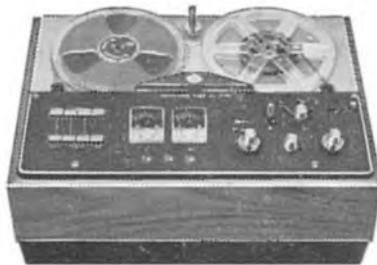


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Beocord 2000T DeLuxe	33	17	3	8	9	4	129
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Ferguson 3214	11	11	0	2	17	9	44
Truvox 44	12	6	9	3	1	9	47
Ferguson 3216	12	17	3	3	4	4	49
Tandberg 843	15	9	9	3	17	6	59
Philips EL3556	16	5	6	4	1	5	62
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Grundig TK18L	9	3	9	2	6	0	35
Grundig TK125	10	7	6	2	11	10	39½
Truvox 42	12	6	9	3	1	9	47
Tandberg 823	14	3	6	3	10	11	54
Tandberg 92	18	2	3	4	10	7	69
Brenell Mk. V3	19	8	6	4	17	2	74
Brenell Mk. V3 (Meter)	20	14	9	5	3	9	79
Truvox R102	23	7	3	5	16	10	89
Brenell V.3 'M'	24	8	3	6	2	1	93
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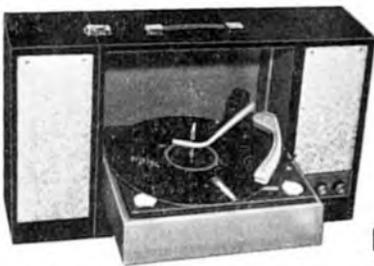
Philips EL4304	6	11	3	1	12	10	25
Philips EL3302	7	1	9	1	15	6	27
Grundig C100	10	7	6	2	11	10	39½
Telefunken 300	12	17	3	3	4	4	49
Telefunken 301 4-T	14	3	6	3	10	11	54
Telefunken 302 4-T	15	9	9	3	17	6	59
Grundig TK6L	17	6	6	4	6	8	66
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Akai X-IV 2 or 4-T	30	19	6	7	14	11	118

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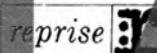
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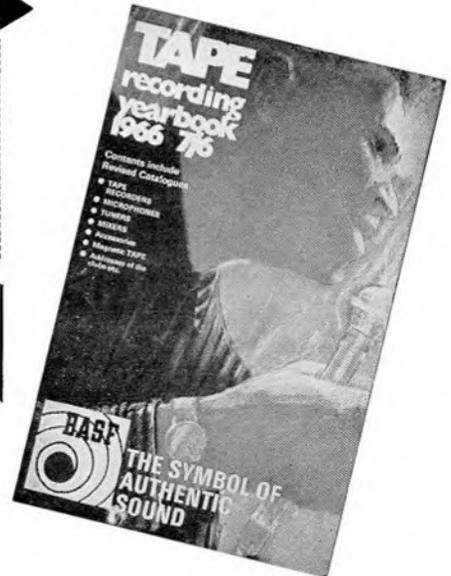
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