The Bulletin

Vol. 38 no. 2 Summer 2013

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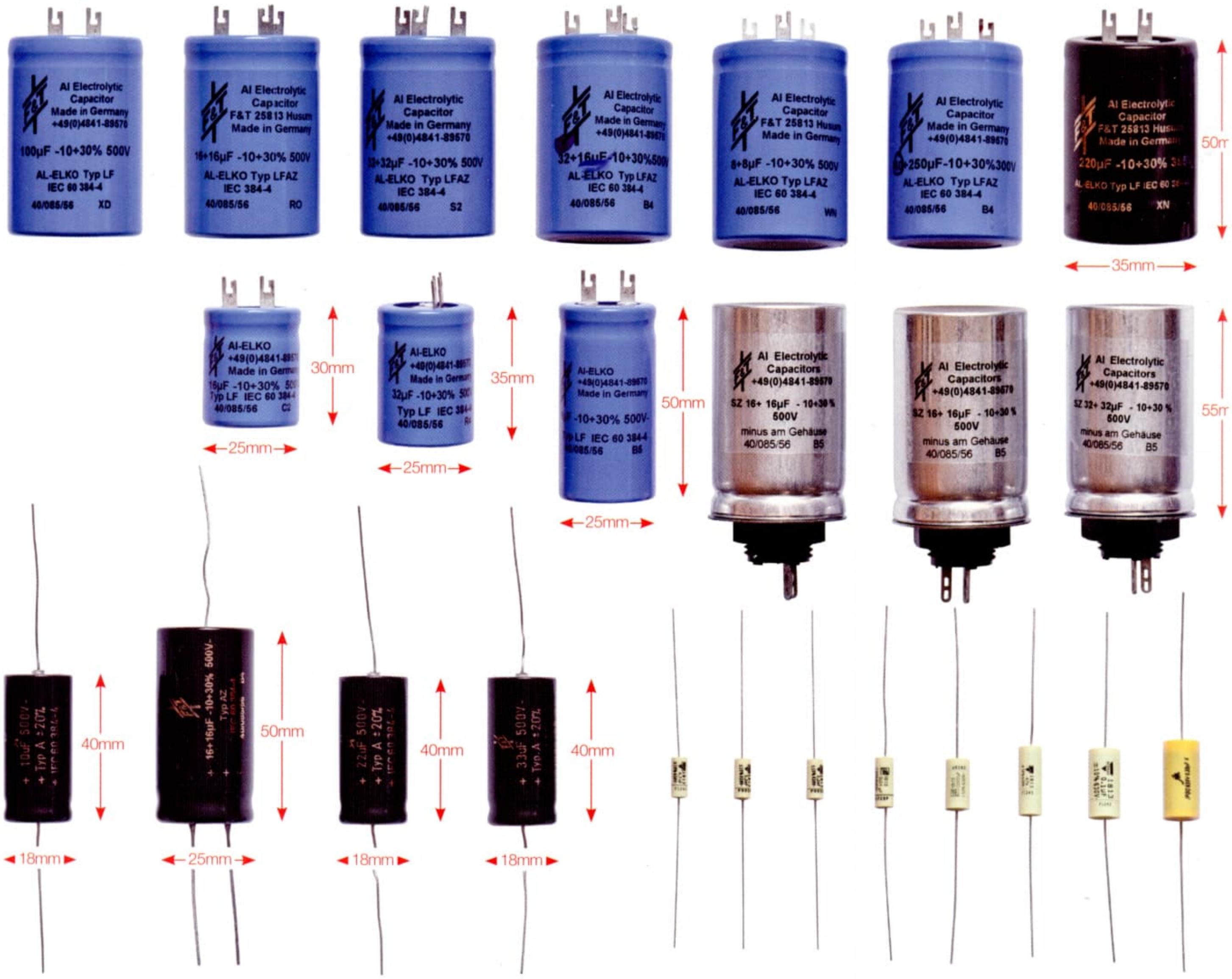

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Front and rear cover: A sample of the Rodney Dews collection.

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From the Chair

Summer is Here! Well we all think it should be after this long cold winter, but it does seem to be very shy this year. Although I suspect it is just a normal year and we have gotten used to the early warm spells. Never mind, these cold days mean time is better spent in the workshop dealing with a radio on the bench rather than outside digging the garden and planting as it is still too cold for most things to start to grow.

Over the last couple of months I have been doing physio exercises and my wrist is certainly much better than the last time I wrote. I have pretty much full movement and a much better grip, but I must still be very careful when lifting things. This has meant a lot of work I wanted to get underway has been put to one side. Those pre-war TV and radiogram chassis made from super thick steel plate are still a bit much to man handle. I hope to be back to normal by the middle part of this year if I get the "all clear" from the Hospital at the end of May.

You will find the latest 2013 "Members Handbook" enclosed with the Bulletin. Please make best use of it as it costs a good deal to produce and is packed full of useful info. Following on from the recent AGM, we have agreed that the Golborne Radio meeting held in the North West of the country should in future be known as the 'Golborne Northern Regional' Meeting as it was thought that many people did not realise it was a meeting held north of Manchester and the name is somewhat apt.

It is now less than a month to the NVCF at the Warwickshire Exhibition Centre. There has inevitably been a price increase on this event entry fees due to higher running costs. However if you think back to the days where the NVCF was at the NEC, the new entry fee for visitors is only £1 more than the NEC car park charge! That was not including the entry fee and the ridiculously high prices charged to get anything to eat or drink. BVWS members still get the £1 Restaurant voucher discount as well.

The early entry fee has seen the biggest increase to £25 which we think is correct for those who wish to take advantage of getting in early as this is a commercial event to raise funds for the British Vintage Wireless Museum and BVWS projects and maintain a Premier National event. Stall booking fees remain as before and are especially attractive to BVWS members. I will be there on the gates welcoming everyone in on the morning. See you all there…

Your Society Needs You!

From the next AGM 2014, we will be without a Society Treasurer unless we can find someone who can fill the boots of Jeremy Day who will be standing down from this duty after many years of dedicated service to the Society. Jeremy will remain on the Committee as Vice Chairman and will be able to help and train any new person taking on that role. We ask that this person must have been a member of the Society for at least 3 years and have some experience in financial matters such as book keeping and dealing with accountants for yearly accounts etc. This is a Committee role. This role, however does take a great deal of time and effort to execute well and this must be born in mind. Attendance at all of the major meetings is essential. If you think you can help us then please get in touch with the Chairman. Mike…

Roger Grant receiving his award at Spring Harpenden

Communications Receivers

and a detailed look at the Eddystone S940 by Peter Lankshear

The professional communications receiver is not well represented in collections. Relatively few were made and their price could be many times that of a good domestic receiver. Many collectors don't consider them as they aren't in pretty cabinets that are acceptable to housewives, and they are heavy and appear more complex than domestic receivers. Visual appeal is of course subjective and a handsome well proportioned communications receiver can look fine in the right surroundings.

The Eddystone S940. The large knobs are for tuning and wave changing. At over 14inches wide, the tuning dial provides plenty of room for well spaced and legible calibrations. At the centre top of the dial is a window showing the edge of the 6 inch diameter vernier disc. To the left is the meter indicating the strength of the received signals.

Early History

Prior to the advent of radio broadcasting in 1921, all radio receivers were for communication. By the mid 1920's receiver development was concentrated more on broadcast receivers but an interest was growing in shortwave transmissions. Until the early 1930's shortwave receivers were regenerative TRF's. The first shortwave superhets could be noisy and with spurious signals, but in 1935 the American National company introduced the revolutionary HRO. The overall performance and the precision P.W. dial of the HRO set new standards for communications service. (Reference 1). As Bulletin readers will be well aware, with the outbreak of war Britain relied heavily on HRO receivers imported in sizable numbers, and they were the mainstay of the Bletchley Park operation. By 1945 several other notable models were in extensive use in all Services for communications and intercept service. From Britain there were the Marconi CR100 series and Eddystone 358. Some well known American models are the RCA AR88, the Hammarlund Super Pro and the Hallicrafters SX28. These can frequently be seen in WW2 documentary programmes.

To anyone unfamiliar with them, internally and operationally, communications receivers can be a revelation. Although the workings of a frequency synthesised set like the Racal 17 receiver can be daunting, the majority of communications receivers were conventional superhets, operating on the same principles as domestic sets and the same servicing techniques apply. They had valves, capacitors and resistors like home receivers - it's just that there were more of them and frequently of a better grade. For instance, trimming capacitors often used air dielectric. Servicing can be easier than on run of the mill receivers. With a carefully planned layout and wiring, components are readily identifiable and accessible.

The Eddystone S940

The most frequently encountered later English communications receivers are likely to be from the Eddystone factory in Birmingham. They made a wide range of sets and high quality components for a period of over 40 years. In this article we will look in detail at one of their last and most popular models, the S940, the writer's example dating from 1964.

Eddystone receivers were characterised by their splendid dial movements and their use of die castings for front panels and RF compartments. This conferred unparalleled rigidity and stability that were enhanced by the use of separate I.F. and audio chassis and by a third chassis for the power supply. Wiring and assembly were meticulous.

In 1949 Eddystone developed the model S680, a very successful professional high performance receiver which, with some minor changes, the chief being the change to a large horizontal dial, was to remain in demand for a decade. Prior to this Eddystone had used octal valves, but the S680 line up was based on the efficient 7 pin button based miniature series. The S680 followed the classic and time tested pattern pioneered by the National HRO of a single conversion superheterodyne incorporating two R.F. stages, separate oscillator and mixer valves and two I.F. stages with a crystal filter. This concept proved to be very successful and popular for many generations of high performance communications receivers. The main attributes were the two R.F. stages providing good image rejection, the separate oscillator superior frequency stability and the I.F. section, high gain and selectivity for operation in crowded shortwave bands.

By about 1960, "top of the line" Eddystone receivers had become affordable only by Government departments and large commercial organisations. At the lower end were good quality general coverage "entry level" receivers, made to Eddystone's usual high standard but missing from the product line was a mid-priced high performance communications receiver for the "well heeled shortwave listener and discerning amateur".

A Recycled Model

Major factors in governing the final price of a product are its development costs, and keeping these down by utilising an existing design can be a significant way of economising. The S680 was a decade old by now and although still an excellent basic design it was time for it to be phased out. It was, for example, not ideal for use on single sideband transmissions. With some modernisations such as a product detector Reference 2 and a high performance input stage, the S680 could be revised to meet modern requirements. The S940 as it was known, incorporated simple switched I.F. selectivity rather than the continuously variable of the S680 and to cope with single sideband reception there was a combined product detector and BFO.

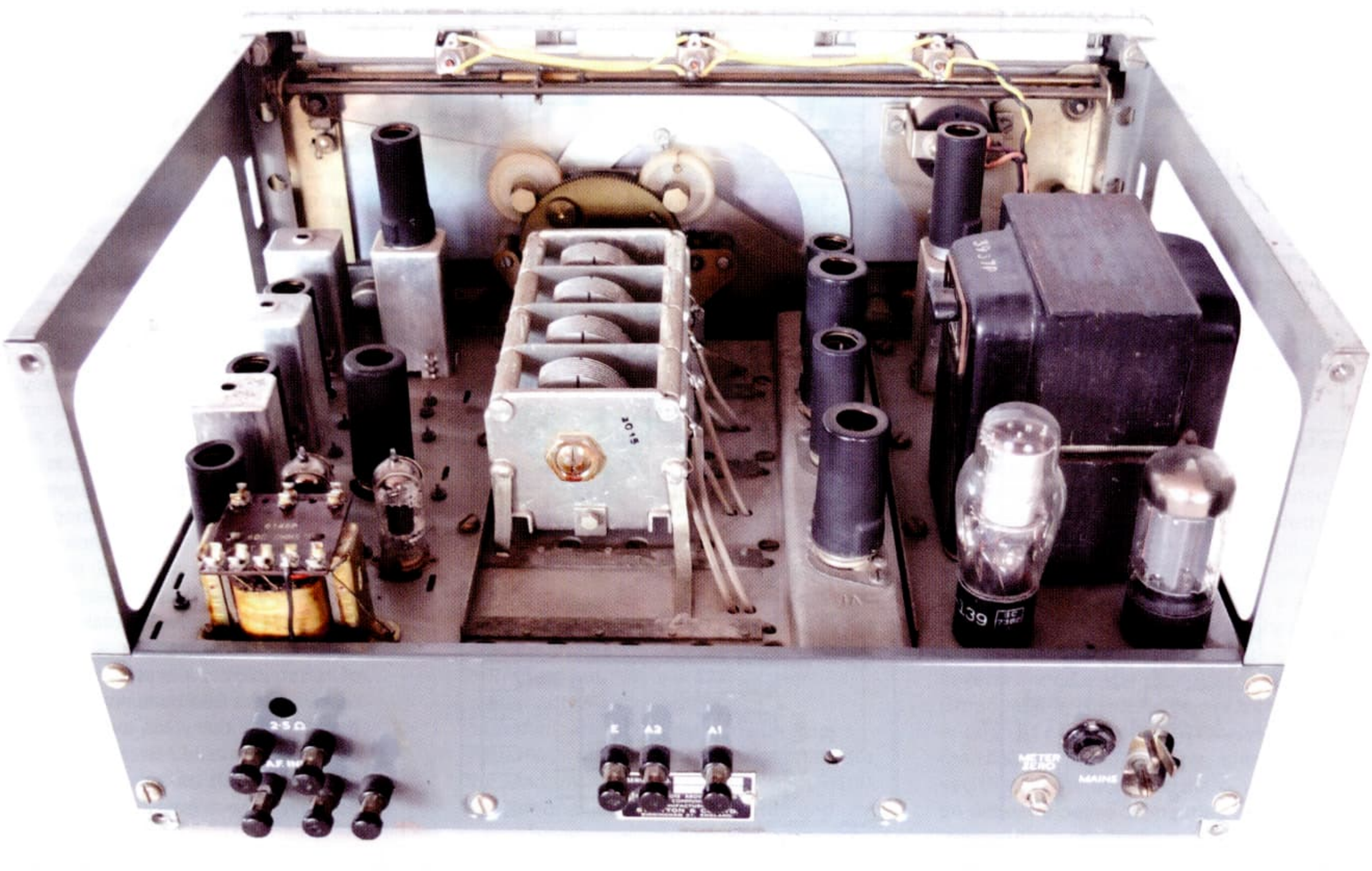
There were some changes in valve types and functions. The pentodes in the audio voltage amplifier and phase inverter of the S680 were replaced by a simpler and better balanced double triode combination. The Beat Frequency Oscillator was replaced by a 6BE6 pentagrid oscillator and product detector. The mixer valve was now the hexode section of an ECH81.

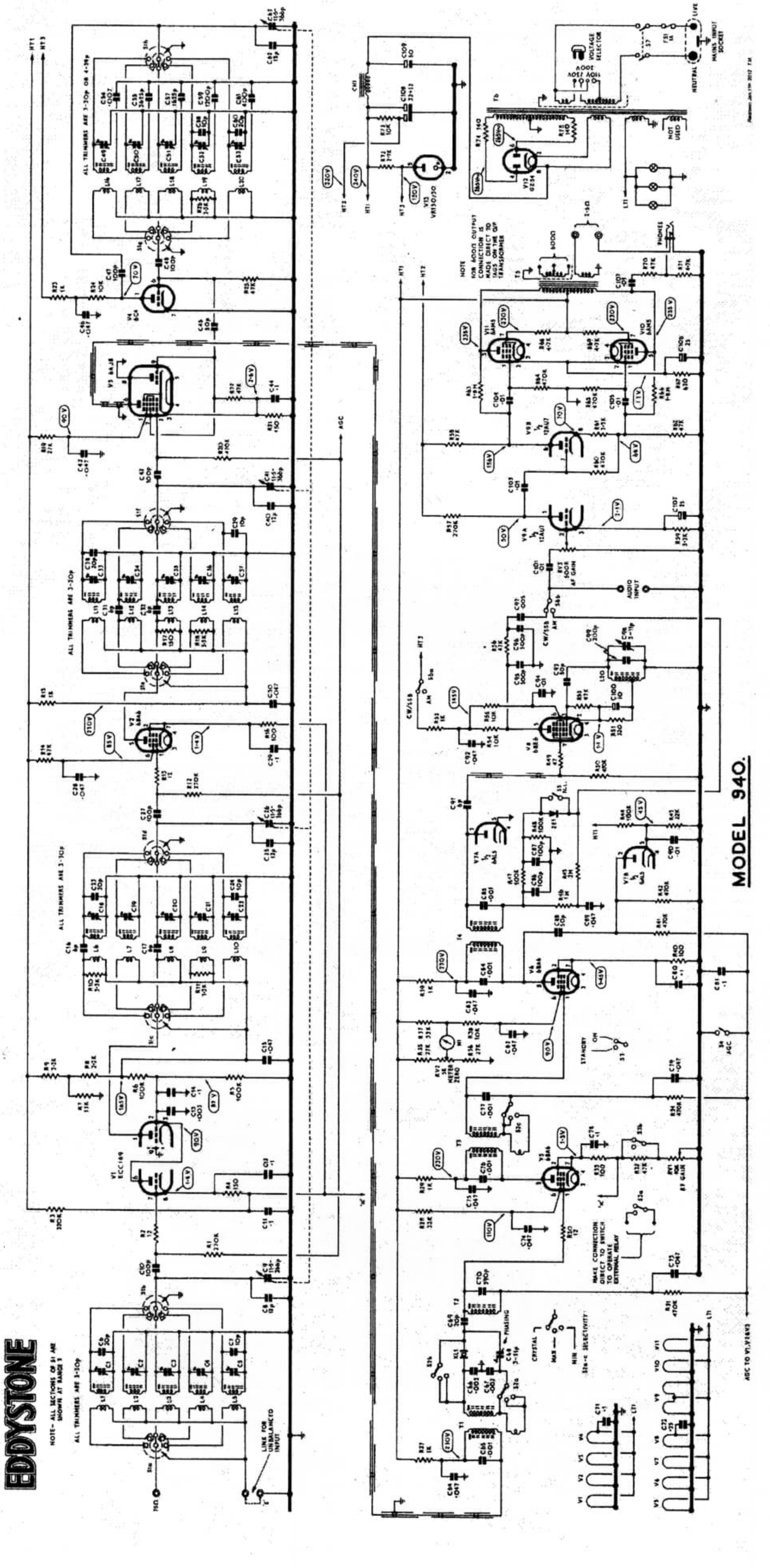
A significant change was made to the input stage. Since its advent in the very early 1930's the pentode had been the standard R.F. stage and the S680 was fitted with the widely used 6BA6/EF93 but above about 15mHz the internally generated noise of pentodes is a problem. By 1960 there had been a significant development for the "front end" of TV tuners in the development of the "Cascode" (Cascaded triodes) double triode amplifier, essentially a cathode follower directly coupled to a grounded grid amplifier. The cascode is a very stable amplifier with as much or more gain than a pentode and very low noise. However, standard double triodes have a problem when used as cascode R.F. stages as their sharp control grid cut off can produce cross modulation and overloading and are unsuitable for automatic volume control. Fortunately, there was a variable mu triode especially made for cascode operation and readily available as it was popular for T.V. tuners. This was the ECC189/6ES8 with a massive mutual conductance of 12.5ma/v. By comparison, the familiar EF39 has a mutual conductance of 2.2ma/v, the 6BA6 4.4ma/v. With a ECC189 aerial stage and a 6BA6 second stage, the S940 has a front end performance unmatched in conventional communications receivers.

The S940 has the usual Eddystone rugged die cast front panel and R.F. chassis. Eddystone dial drives were among the best ever made, and that of this receiver is no exception. To anyone used to the usual domestic receiver dial drives it is a revelation. Silky smooth, with no back lash and "feather light" it features a gear ratio of about 75:1. Each of the five dial scales is 350mm (13.5 inches) long and as each band has a frequency ratio of only about 2.5:1, the fine calibrations are well spaced. There is also a logging scale linked to a large edge calibrated disk which is visible at the centre top of the dial, and providing over 30ft of vernier scale for each band. It is quite easy at even 30mHz to retune to an accuracy of better than 1 kHz. Despite the low gearing a few flicks of the flywheel loaded tuning knob are sufficient to traverse the full sweep of the dial. The only comparable drive that the writer has used is that of the stratospherically priced 19 valve Hammarlund SP600.

The affordable S940 proved to be a winner. One of the best selling Eddystones of all time it was their last valve equipped model in production, being manufactured until 1970. By then the company had been taken over by the Marconi organisation, valves had given way to semiconductors and Eddystone equipment was no longer available for private purchase.

The rear of the S940 showing the three sub chassis, with the solid die cast R.F. section in the middle. To the left is the IF and Audio section, to the right the power supply.

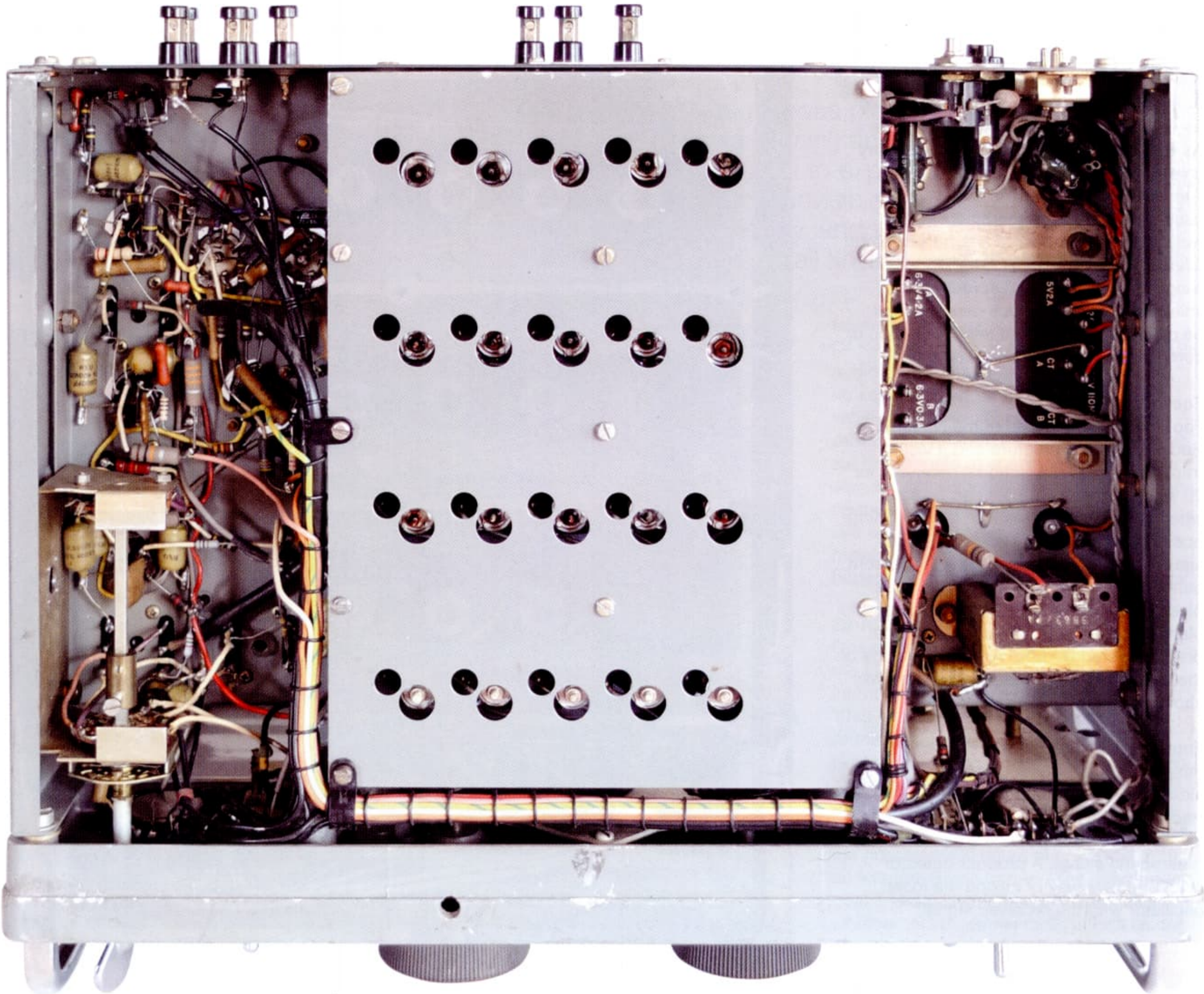




The Circuit

Most circuit details will be quite familiar to anyone used to domestic receivers. For stability, extensive filtering and bypassing are used. Here is a brief description, although a complete analysis of the S940 design would however fill several articles. The drawing is divided into the three sections corresponding to the three chassis. The upper half of the drawing comprises the circuit of R.F. and mixer unit. The aerial connections cater for either balanced or unbalanced feeders and are switched to the appropriate aerial coil. Coils for each stage are grouped in separate compartments in the die cast chassis. All coils have polystyrene formers with adjustable iron cores and air dielectric "beehive" trimmers. The tuned secondary windings are connected to the cascode R.F. amplifier V1. This in turn is coupled conventionally to V2 the second R.F. amplifier. V3 is a ECH81 triode-hexode operating as a mixer. Rather than the conventional practice of using the ECH81 internal triode, the oscillator is a separate valve V4. The use of a separate oscillator valve was usual communication receiver practice to improve stability and minimise "pulling" of the oscillator frequency by strong signals.

The lower left section of the drawing covers the I.F. amplifier, detectors and audio chassis. A coaxial cable couples the mixer anode to the 1st I.F. transformer T1 whose secondary has a ganged 3 position variable selectivity switch controlling the coupling to the second I.F. transformer. Next is a feature not to be found in domestic sets. A quartz crystal ground for the I.F. frequency of 450kHz can be switched in to provide extreme selectivity. In the days when Morse transmissions, and amateur activities crowded the shortwave bands crystal filters were very useful, but today there is little need for them. The crystal is mounted in a standard 7 pin valve envelope. There follows two conventional 6BA6 I.F. amplifiers providing much of the gain of the receiver. V7 is a 6AL5 double diode conventional diode detector and Automatic Gain Control (AGC) rectifier. As is standard practice for well designed receivers, the AGC diode cathode has a positive bias to provide some delay in the onset of control. In most receivers this delay is only about three volts, but as an indication of the enormous differences in overall gain of communications and domestic receivers, the S940 has no less than 45 volts delay! V8, a pentagrid 6BE6 is a combined Beat Frequency Oscillator (BFO) and product detector normally only switched in for Morse



The underside of the S940 with the large coil section in the centre. The cover plate has access holes for each of the adjustable coil cores and trimmers. Eddystone receivers had meticulous wiring and layout, simplifying Identification of components and access for servicing.

and Single Sideband reception. For general listening, this facility is not often needed.

The 940 has a quite conventional audio amplifier. V9 is a double triode 12AU7 voltage amplifier and split load phase inverter driving a pair of 6AM5 pentodes. Although a standard power pentode could have been used for the output stage, Eddystone practice was to use push-pull pairs of smaller valves providing about the same power output but with better quality and making fewer demands on the output transformer. In addition to the usual 2.5 ohm winding for a loudspeaker there is a 600 ohm winding for feeding a balanced line to other equipment. In common with most communications receivers, there is no internal loudspeaker.

The third chassis is for the power supply. A husky transformer supplies an equally husky rectifier V12, a GZ34. Filtering is conventional with a choke and electrolytic capacitors. V13 is a gaseous voltage regulator, another feature not found in domestic radios but common in communications receivers. It is used to stabilise the H.T. supply to the two oscillators.

Finally

Utilisation of the shortwave spectrum has changed considerably in recent years and there is considerably less traffic than a few years ago. Satellites and the Internet have taken over long distance communications and the recent sunspot minimum was long and profound. Propagation is now recovering rapidly but shortwave transmissions are now largely confined to broadcasting.

Communications receivers were an example of the quality and performance that could be achieved with electronic equipment. For this reason alone they should be preserved. They were necessarily expensive and were largely to be found in government, military, marine and communications organisations. A few affluent enthusiasts and amateurs did own them but they were never plentiful.

One of the major sources of communications receivers came from World War 2 surplus. Some examples are the Marconi receivers such as the CR100, the National HRO, the RCA AR88 and some Hammarlund and Hallicrafters sets were imported from America. These are all very collectable. Some of the finest postwar breeds are from Britain. The most plentiful make was Eddystone, and there were GEC and Marconi. (Several Marconi models were rebadged Eddystones). Racal and the American Collins receivers are outstanding but perhaps not for beginners.(Footnote 3)

Caution

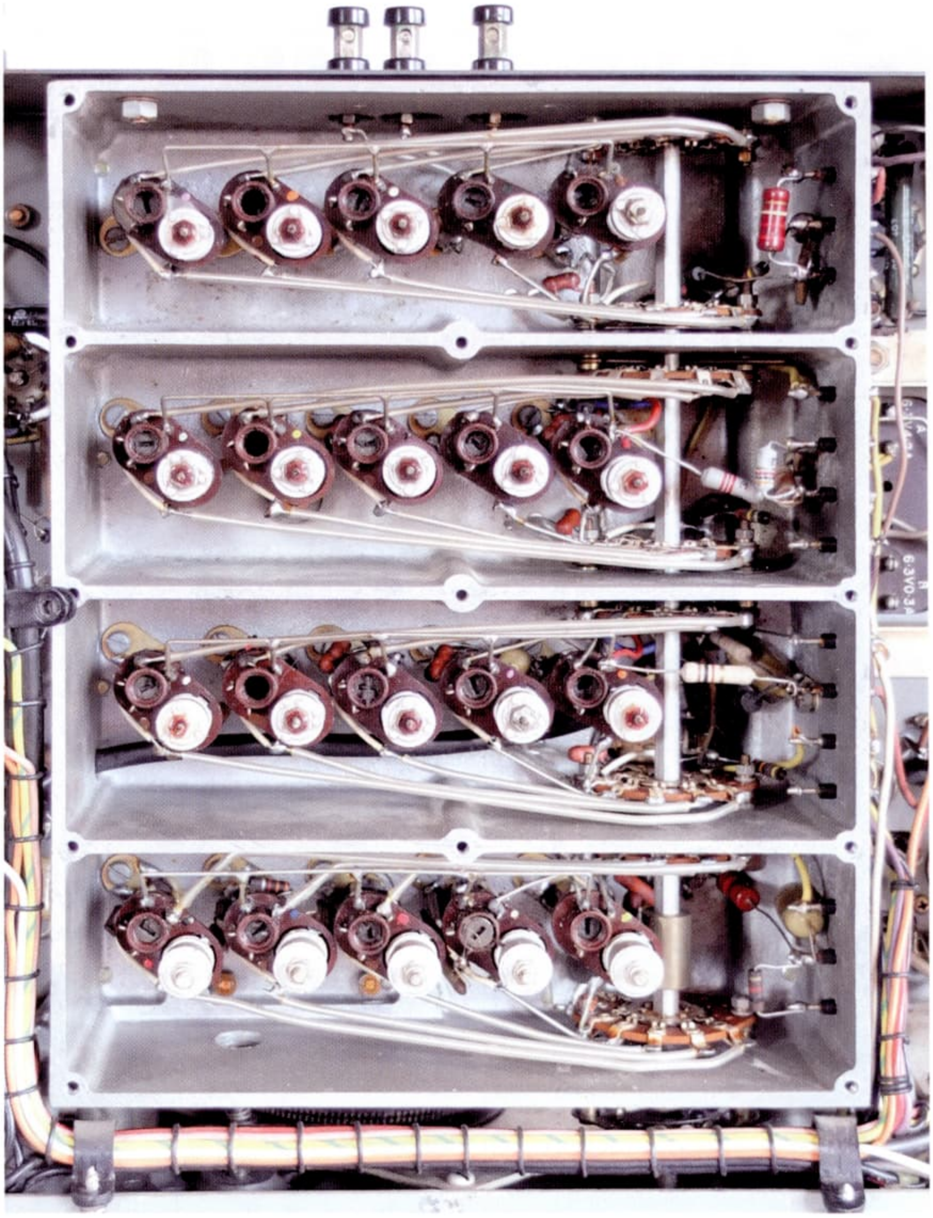
As in all collecting there are pitfalls. Many communications receivers have been in the clutches of "hams" who are by their culture keen "improvers" and tempted to modify receivers. These alterations may be reversible but should be looked for. Additional holes in metalwork are a common clue. Another thing to check is frequency coverage. Whilst they all cover several bands some do not tune the M.F. Broadcasting band. If you are fortunate enough to come across a receiver like the HRO using plug in coils, check to see that all the coils are there. When an estate is being dismantled coils can become separated from their radios. Unfortunately, not all receivers are what they might seem. There were inexpensive makes that look genuine available from mail order or kit set firms. Internally, they may be little different from domestic receivers. As well as looking at construction quality an easy check to make is the weight. Genuine communications receivers are usually heavy. A Hammarlund SP600 weighs the better part of a hundredweight! Even the relatively small Eddystone S940 weighs 45 pounds. Well screened and shielded communications receivers will be quite deaf without an aerial but should come alive with even a modest one.

Footnotes

Footnote 1 The PW dial of the National Radio HRO was a feature and a visual trademark for many National receivers for 20 years. Good examples can be seen when visiting or in photos of the operating positions at Bletchley Park. More than just a large knob, at the centre of the front panel of the HROs, it was an ingenious piece of precision engineering. A geared planetary drive was linked to an internal disk calibrated 0 - 500. Around the edge of the knob were five windows progressively showing the calibration number.

Footnote 2 A Product Detector is mixer type demodulator. Single sideband and continuous wave transmissions (CW) require a separate oscillator (BFO) to provide a carrier or heterodyne signal. A product detector is an effective way of mixing the local oscillator with the received signal.

Footnote 3 Especially fortunate for Eddystone owners, there is an excellent and extensive Web site set up by the Eddystone Users Group with considerable information including downloadable manuals for many models. The address is www.eddystoneusergroup.org.uk/.



Coil Box: The heart of a good communications receiver was the coil box. Here is the S940 box with the cover removed. Unlike many domestic models Eddystone receivers had especially stable and rugged R.F. units.

Mystery device

Does anybody know what the object on the left is? It appears to be an upmarket office intercom but has no markings displaying manufacturer or function.

If anybody has any information regarding this device please inform the Editor.

The Berec Pioneer and Ekco U241 Export Radios

by Stef Niewiadomski

As a nation, when did we lose the will to export? Great emphasis was placed on exports immediately after the war, and even in the 1960s ('I'm backing Britain') and 1970s there were still strong demands by the governments of the day for British industry to export. In the 1980s we were told that the growth in our financial sector gave us valuable 'invisible' exports, and hence less importance was attached to our manufacturing industries generally, and to the export of 'things'. More and more emphasis was put on financial services – and we all know where that has led us to.

Figure 1: General view of the Berec Pioneer.

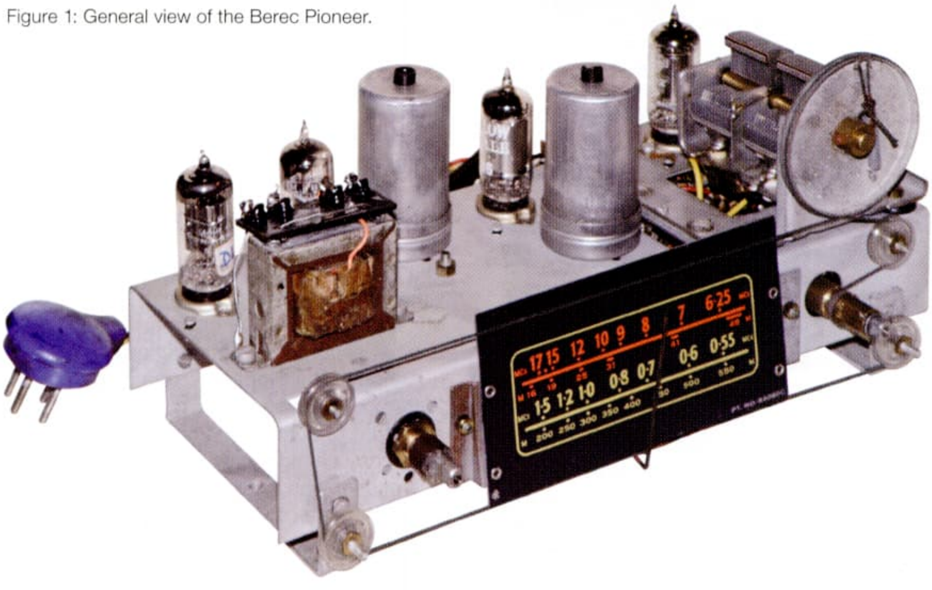


Figure 2: Front view of the Pioneer's chassis removed from the case. This is 'as removed', with no dusting, and its clean condition can be seen. The battery plug can be seen 'lurking' round the back.

The UK radio industry was a strong exporter and I recently came across a couple of radios which at first sight seem to bear no relation to each other, but were both designed for export and which contributed to our balance of payments in the 1950s. I thought it would be interesting to research them and write about the features which were incorporated to make them suitable for contributing in a positive way to our balance of payments.

The Berec Pioneer

Figure 1 is a general view of my Pioneer radio. The Berec brand was used by Ever Ready for its export sets. The radio was introduced in 1955 and since the word 'Pioneer' is not mentioned on the radio itself, you could be excused for thinking the radio was a 'Berec' model. The colour of the case and the background to the tuning scale are Ever Ready blue.

The valves in the set are the standard line-up of 1.4V 'low current filament' DK96 frequency changer, DF96 IF amplifier, DAF96 detector and AF pre-amp, and DL96 audio output. As far as I can tell there is no service sheet for the radio, but this valve line-up results in a fairly standard design and reference to almost any similar set is adequate to enable you to find your way around. Although the radio is battery operated it has no carrying handle, and is therefore intended as a transportable, mainly used in a fixed position with the battery dangling off the cables at the back.

Saucepan Radio

One of the most famous export sets was the Ever Ready 'Saucepan-Special' radio (numbered as J-series), first introduced in 1949 and designed for export to Central Africa for reception of Central African Broadcasts from Rhodesia and Nyasaland. There was a medium / short wave version, as well as a short wave only version. The set needed to sell for no more than £5 and the goal was 300 hours of operation from an external Berec battery. The selling price goal was achieved, though it's not clear whether this made the radio a 'loss leader' and the true manufacturing and distribution costs were recouped by later battery sales.

One problem was to find a cheap housing for the receiver. This was cleverly solved by using a blue-sprayed metal case that was made by the British Aluminium saucepan factory. It was basically a 10" saucepan with the handle removed and a hole punched in the bottom for the loudspeaker, hence the popular name for the radio. Insect-proof gauze covered any openings in the case. Some experimentation seems to have been carried out with the colour of the case and blue seems to have been chosen because it was the most acceptable in the target market cultures. This model is usually referred to as of Ever Ready design and manufacture, and although Berec already existed at the time, I presume it was simply an export organisation and its name did not appear on the radios themselves. If anyone has a saucepan radio, perhaps they could check this for me?

Metal Case

In the mid-1950s wood was still used extensively in the construction of battery-powered radios. If you were exporting to countries where wood-eating insects abound, it was a good idea to avoid its use. The Pioneer was therefore designed to use a three-piece thin steel cabinet.

Figure 3: The controls and tuning dial of the Pioneer with a 'BEREC' sticker mounted under the dial. The combined wave change / on-off switch is on the right, inside the tuning knob, and the volume control is on the left. The background colour to the dial is the classic Ever Ready blue.

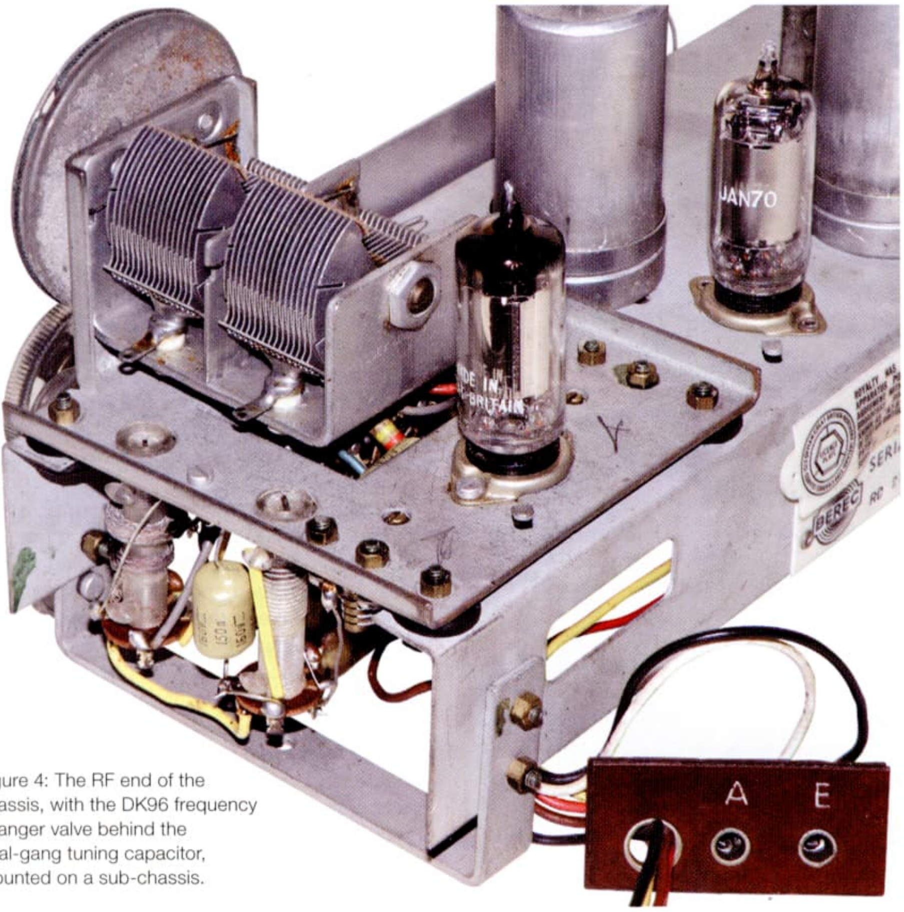


Figure 4: The RF end of the chassis, with the DK96 frequency changer valve behind the dual-gang tuning capacitor, mounted on a sub-chassis.

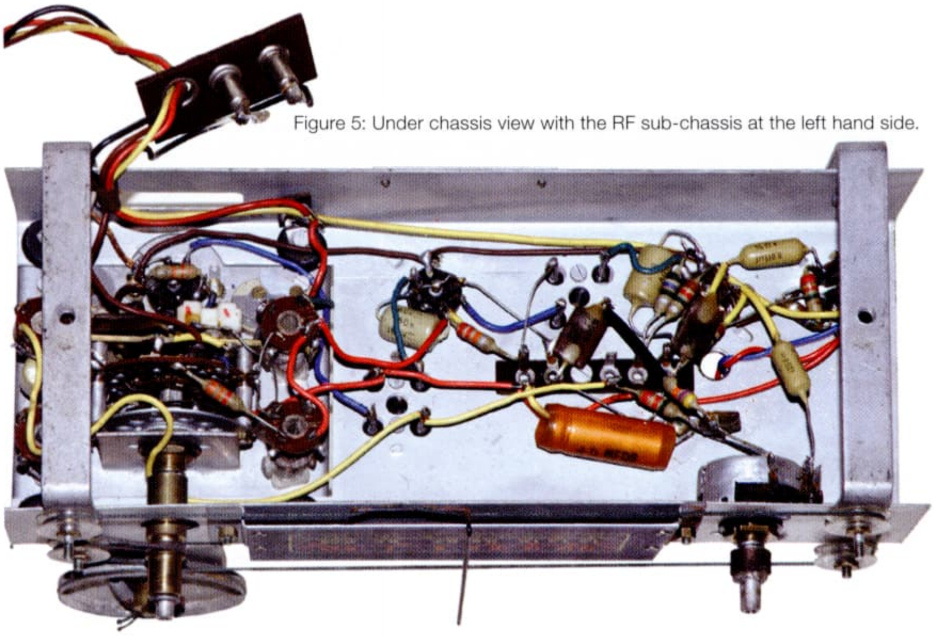


Figure 5: Under chassis view with the RF sub-chassis at the left hand side.

This cabinet has most openings, for example the loudspeaker louvres in the front panel, covered over by fine cloth, presumably to discourage small creatures from crawling inside and eating whatever they could find. One advantage of this was that it tended to exclude dust, and as found, the insides of my set was very clean, as you can see from Figure 2. This contrasts with many radios you open up and find covered in dust and sticky grime.

The front panel is a light grey crackle-finish with louvres to let the sound out and a small plastic dial with a 'BEREC' sticker mounted under the dial (see Figure 3). In fact this is the only identifying marks on the set, there being no label on the back or on the insides, and no mention of 'Pioneer' anywhere.

The case on my Pioneer has some surface rust but I've resisted the temptation to rub it down and attempt to repaint it. It could be difficult to find an exact paint match and I think a little rust reflects its 'off-shore' history, assuming of course that it wasn't acquired in a damp shed somewhere in the UK. Better not to know, I think.

Where you might typically find wax-covered and cardboard-cased capacitors for coupling and decoupling purposes in this era of radio, the Pioneer's capacitors look like a polyester style. I presume this was to discourage 'bugs' from being tempted to find their way into the radio and eat the wax and card.

Switch On

Before applying power to the plug and switching on I thought I'd remove the chassis from the cabinet and take a look around. The back panel is a push fit into the cabinet, as is the front panel: in this case the joint is made a little neater by a length of flexible black plastic which is pushed over the joint. The knobs have countersunk screws in their centres which are unscrewed and then pulled off. Two screws in the bottom of the cabinet secure the internal chassis.

Although the Pioneer is specified to use 25mA xx96-series valves my set contained a mixture of 50mA and 25mA valves. The frequency changer was a Mullard DK92; the IF amplifier was a Willow Vale (see footnote) DF92; the detector/AF preamp was a Mullard DAF91; and the audio output valve was a Mazda 1P1/DL96. I thought I'd leave these in the set for the initial switch-on. The holders for the DAF91 and DL96 are mounted on rubber grommets, presumably to prevent microphony effects, which may have been greater because of the metal case not damping audio resonances as much as a wooden or plastic cabinet.

The 4-pin battery plug was still intact

Willow Vale Electronics Ltd was a TV & radio spares wholesaler in the 1970s, 80s and 90s. They sourced valves from second tier manufacturers and had them marked with the 'Willow Vale' brand, rather than make them. They were based in Reading for most of their existence as an independent company.

Figure 6 (below): H P Radio Services' (of Liverpool and Ormskirk) advert in Practical Wireless for September 1958, offering the Pioneer at a bargain price.

Figure 7 (right): Premier Radio of London also sold 'The Berec' in The Radio Constructor as shown in this October 1959 advert. Note that this is a completed radio, and not a kit.

Figure 8: Gladstone Radio of Camberley offered the 'Berec Pioneer Radio In Maker's Carton' in this Practical Wireless advert for June 1960. A kit version could also be purchased.

and the wiring disappearing into the back of the radio was in good condition. I connected my Pioneer to an aerial and a mains-powered 90V plus 1.4V supply and switched on to the medium wave position, as indicated by the yellow dot on the front panel corresponding to the yellow scale on the dial. The warm-up time of these DK-series valves is very short and I could immediately hear a few stations as I tuned around, though these weren't very loud and sounded distorted. So I switched to the red dot position and was surprised to find that band relatively dead with only a few weak signals here and there. After a few moments it dawned on me that this was the short wave position and not the long wave my brain had been anticipating, expecting to find a solid Radio 4 signal in the middle of the band.

So it was back to the medium wave, and after I'd changed the output valve for a known-good DL96 things improved with more volume and less distortion, but still not really acceptable. So I replaced the DAF91 with a DAF96 and the distortion went away. Changing the DF92 for a DF96 gave no improvement, but a new DK96 again made the set louder. The set sounded good with its 6"x4" Elac internal speaker.

RF Chassis Assembly

Figure 4 shows a close up of the RF end of the chassis, with the DK96 frequency changer valve behind the dual-gang tuning capacitor. Hopefully you can see that this is a neat sub-assembly mounted on grommets above a cut out in the main chassis. Figure 5 shows an under chassis view and you can see that the tuning shaft is concentric with the wave-change switch. It could be that this sub-chassis was produced by Plessey as it uses one of their tuning capacitors, though this is not conclusive evidence as Plessey were supplying components (tuning capacitors, fixed capacitors, loudspeakers, etc) to many manufacturers at this time, as well as building complete chassis and sub-assemblies.

Kits

I've seen discussions on various forums on whether the Pioneer was offered solely as a kit, perhaps with the 'RC' prefix to the chassis number (mine is RC203914) referring to Radio Constructor magazine. Certainly the magazine published several radio designs which were offered as kits but in my limited collection of mid-1950s Radio Constructors, I couldn't find this design. My chassis is very neat and looks to have been professionally constructed and not built from a kit by an amateur at home.

Figure 6 shows H P Radio Services (of Liverpool and Ormskirk) advert in Practical Wireless for September 1958. As you can see they emphasise the point that this isn't a kit, and make no secret of the fact that Berec is actually Ever Ready. Note that they are offering 'the bargain of the year' because of a 'cancelled export order' - a fairly common expression used in the magazines of the day for a sale of surplus equipment. I don't think it was an indication that the bottom was falling out of the export market (not yet anyway). Premier Radio of Edgware Road in London also sold the model in The Radio Constructor, as shown in Figure 7. Again this is a completed radio.

A little later Gladstone Radio of Camberley offered the Pioneer 'in maker's carton', either covering two short wave bands (2.5MHz-7MHz and 6.5MHz-17MHz – not quite the same coverage as my Pioneer) or medium wave plus one short wave band, see Figure 8. For a saving of ten shillings you could buy the radio in kit form, but with a fully wired coil pack, which I presume is the RF assembly mentioned earlier. Note that none of the adverts even hints at the fact that the

Figure 9: The Ekco U241 table radio, after the cabinet had been cleaned and polished. The white band by the volume control indicates that the set is switched on. There are no dial lights.

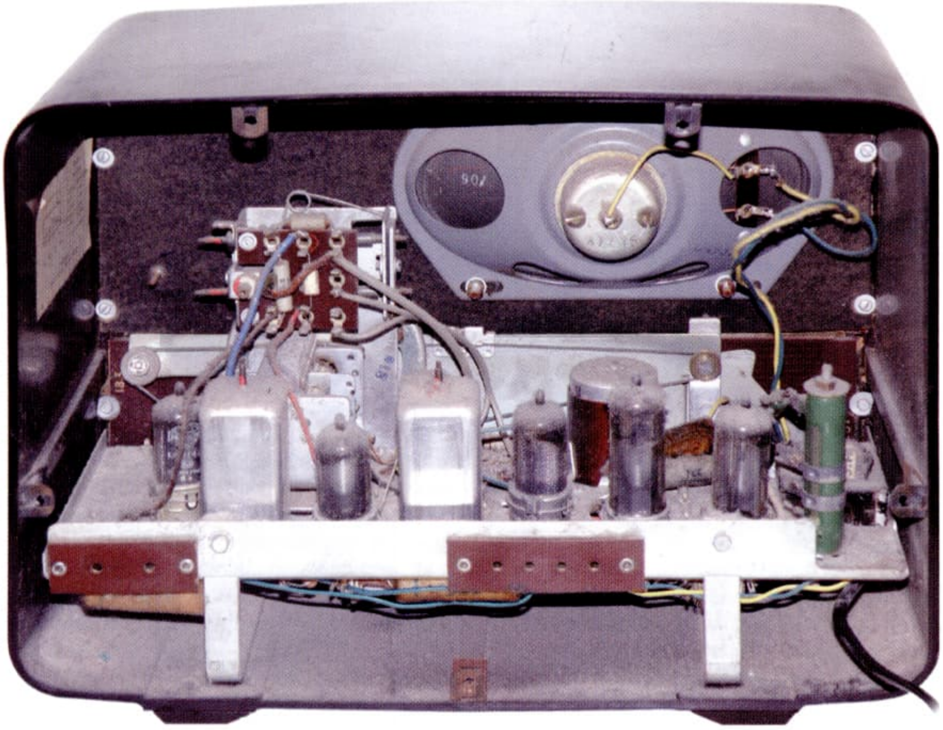


Figure 10: Rear view of the U241 with the back removed, showing the dusty insides.

battery is external to the case, or indeed what material the case was made of.

The price that the Pioneer was being offered at was well below what you could buy a battery portable for from say Ever Ready or Vidor, but of course you didn't get long wave coverage and the metal case and external battery were pretty 'clunky'.

Ever Ready and Berec Designs

There was plenty of 'cross fertilisation' between the Ever Ready and Berec ranges. For example the Ever Ready 'Sky Baby' used the same circuit as the Berec 'Ballerina', and was identical in appearance. The same circuit was also used in the Ever Ready 'Sky Princess' and the Berec 'Calypso'. It could be that Ever Ready and Berec radios were designed by the same group of engineers, though some manufacture was outsourced. The chassis of my Pioneer doesn't look anything like an Ever Ready portable chassis of the day.

Portable radio design in the mid-1950s was very standardised – the DK96/DF96/DAF96/DL96 'low-consumption' valve line-up was almost universally used until the adoption of transistors towards the end of the decade - and design choices boiled down to whether or not to use a ferrite rod aerial, whether to use a PCB or retain the chassis approach, and of course the exact shape, size and style of the cabinet.

The Ekco U241

The second export radio I'd like to describe is the Ekco U241 AC/DC (100-135V and 200-250V) table model, introduced in 1955, and shown in Figure 9. Accommodating such a wide mains voltage and covering the medium (535-1600kHz) and short wave bands (3.3MHz-16MHz, spanning the 80-90m, 60m, 49m, 41m, 31m, 25m and 19m broadcast bands) the set was clearly intended for export. Another 'giveaway' is that no service sheet was produced, or at least none was published in the UK radio trade periodicals as far as I can tell. The circuit is a standard 470kHz-IF superhet using UCH42, UF41, UBC41, UL41 and UY41 series-connected 100mA heater valves, and looks very similar to Ekco's U245 (released in May 1955, and whose service sheet was published in July 1957), apart from differences in the tuning range and mechanism, as described later. This was a busy period for Ekco, releasing the U243 AM/FM radio at about the same time.

The Cabinet

Ekco's own service sheet for the U245 states that "the receiver is contained in a 'mulberry' colour plastic cabinet". Bearing in mind the similarity of the U241 to the U245 I presume the U241 was produced in the same colour. I must admit the case looks brown to me, although the knobs and wave change switch are a dark red. The plastic case was in good condition with no cracks or chips, and responded well to some elbow grease with Greygates Polishing Paste No. 5, bringing up a good shine. The U245 service sheet indicates that a carrying strap was fitted to later models, so maybe this was also the case for the U241.

Figure 10 shows a rear view of the set with the back removed after removing the five wood screws and washers – the service sheet indicates that these are the original screws and not a later substitute - holding it in place. The inside was very dusty, indicating that it probably hadn't been 'messed with', for a while at least. The wave change switch, mounted horizontally on top of the chassis, as shown in Figure 11, is positioned to attract dust and dirt and I made sure it had a good clean before putting the chassis back into the cabinet. I think it would have been a good idea for Ekco to have positioned some sort of a dust shield above this switch, to protect it from dust and dirt during its working life.

Removing the chassis from the case was relatively easy: first the knobs were removed by loosening their grub screws. Then two plinths (made from the same material as the case) were removed by unscrewing their self-tapping screws, and finally four 4BA chassis bolts (whose heads were obscured by the plinths, presumably for safety reasons) were removed and the chassis withdrawn from the case as far as the loudspeaker leads allowed. Figure 12 shows the view under the neatly laid out

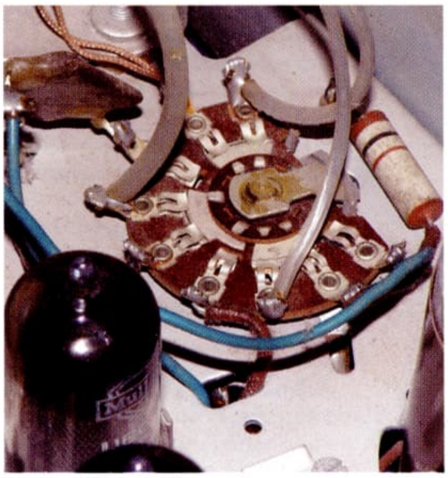


Figure 11: The wave change switch, mounted horizontally on top of the chassis, is well positioned to attract dust and dirt.

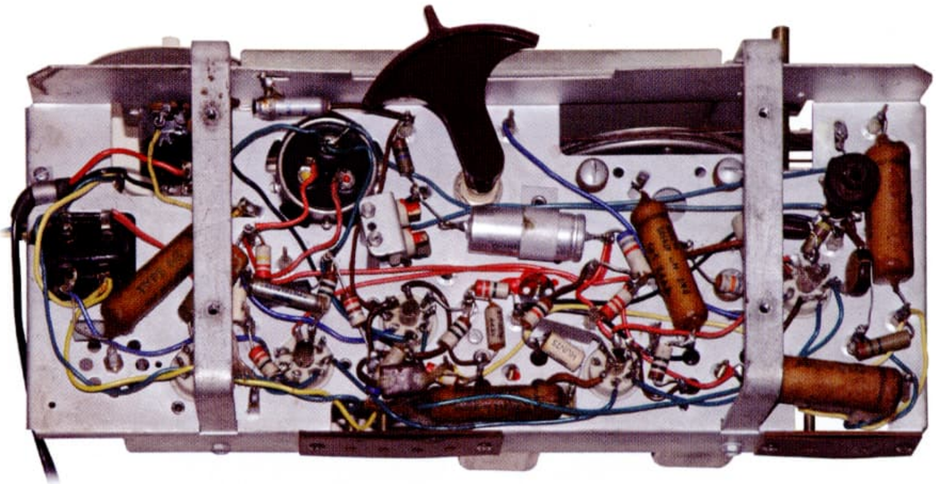
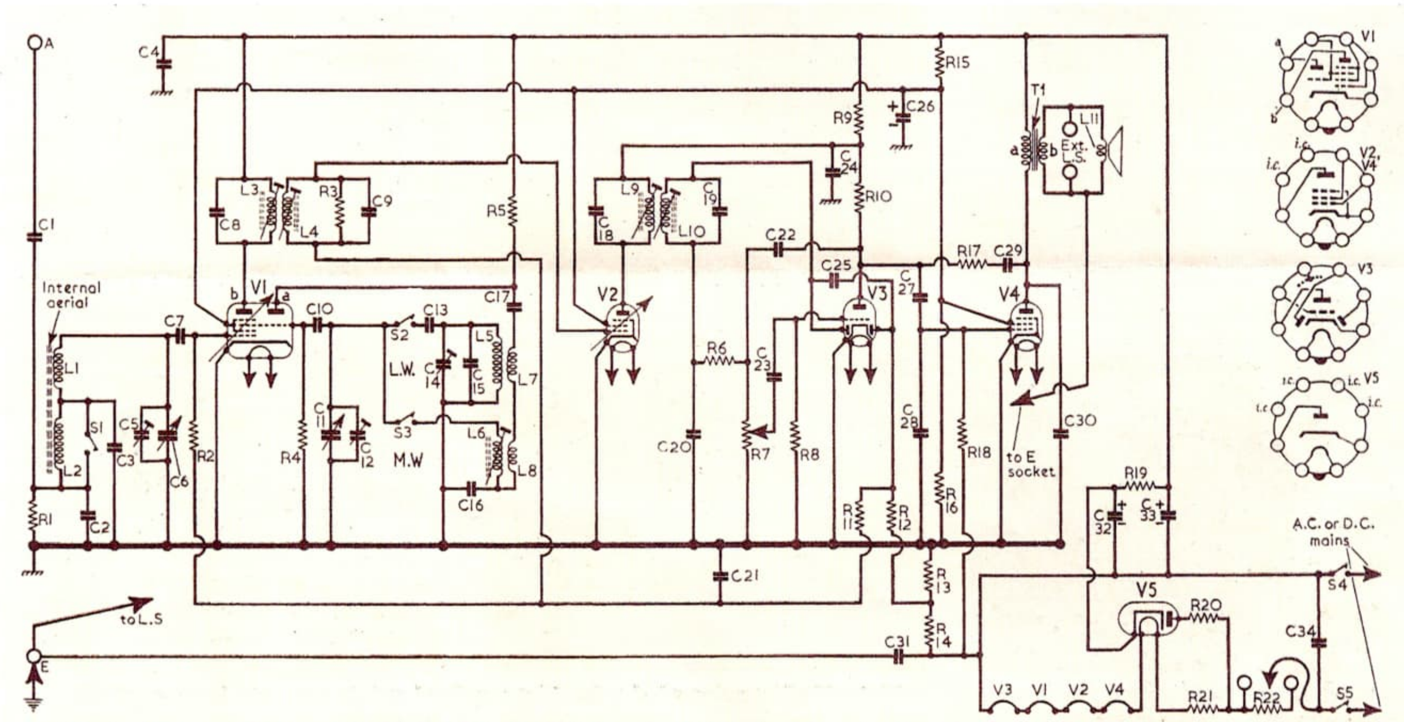


Figure 12: The view under the neatly laid out and wired chassis. The operating lever for the wave change switch can be seen at the upper centre of the chassis.



Circuit diagram of the Ekco U245. A.G.C. delay bias and grid bias for **V4** is developed across **R13** and **R14**. Valve base connections, as seen from the underside of the chassis, are inset on the right of the main part of the diagram.

Figure 13: Schematic of the Ekco U245 which circuit-wise is very close to the U241.

and wired chassis. The plastic operating lever for the wave change switch can be seen at the upper centre of the chassis.

The Schematic

The case (that is the negative side) of the HT decoupling capacitors C32/C33 is insulated from the chassis by a roll of thin Bakelite-like material. This is because the HT negative circuit is not connected directly to the chassis, as shown in Figure 13. This is the schematic of the U245 which circuit-wise is very close to the U241, apart from having a ferrite rod - it still also has external aerial and earth sockets - and covering the medium and long waves, again with the standard IF of 470kHz.

The U241 was not fitted with a ferrite rod aerial. I suppose this comes about because there was the expectation that the listener would be willing to erect an aerial for short wave reception, and this aerial would also serve for the medium wave.

R13 and R14 (connected between mains neutral and the radio's chassis) carry all the radio's HT current and so they drop a few volts and generate a negative voltage with respect to the chassis, measured at about 3.5V on my radio. Via R18 this is used to bias the control grid of V4 (and hence allow its cathode to be connected directly to chassis, obviating the need for a cathode resistor and bypass electrolytic), and provide a delayed AGC bias for V1 and V2. This is similar to what you often see in portable radios where the valves are directly heated and therefore can't use cathode resistors, but it is not often seen in designs using indirectly heated valves.

Voltage Adjustment

Rather than providing a plug and socket arrangement for adjusting the mains voltage the U241 has flying leads that need to be connected to the correct points on the ballast resistor. I think it would have been handy for instructions on how to do this to be stuck to the inside of the cabinet, but there seems to be no sign of this, although there is a label identifying the set and the valve types used. Figure 14 shows this resistor, with the rectifier valve removed so that the resistor can be seen more clearly. The soldered joint at the top connection to the resistor looked a little dry, so I remade this. You often find this with soldered connections on ballast resistors: I assume it's the regular and relatively severe temperature cycling every time sets are turned on and off that stresses soldered connections on these resistors.

As with any 'live chassis' radio the design must ensure the safety of users even if the mains connection is reversed, which was a fairly likely event in the pre-square pins plug era. How this is achieved for the aerial, earth and external loudspeaker connections can be seen on the U245 schematic, but my U241 also had external pick-up sockets

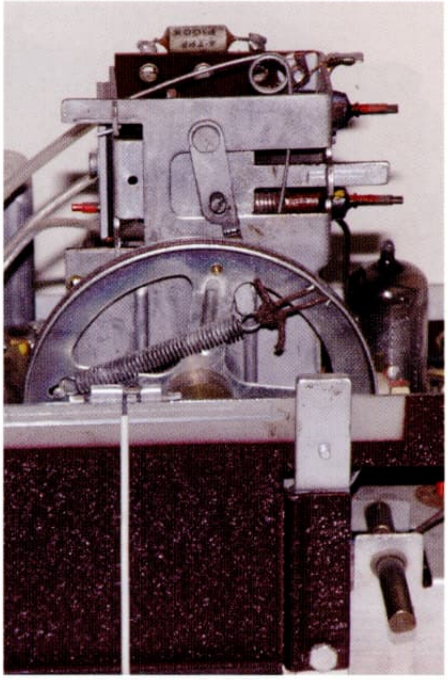


Figure 14 (far left): The heater chain ballast resistor (with the rectifier valve removed) showing the tapping points to accommodate the wide range of mains voltages.

Figure 15 (left): The unusual short wave tuning mechanism of the U241 perched on top of the tuning capacitor.

not shown for the U245. I presume this was a later modification added after the publication of the schematic. Certainly towards the end of the 1950s 'fiddlers' would add pick-up connections to their radios and often weren't too aware of the potentially lethal consequences of what they were doing. Many manufacturers therefore rather rapidly added pick-up sockets with the correct isolation components, as done by Ekco on the U241.

Short Wave Tuning

Whereas the medium wave tuning arrangement is conventional the mechanism used to tune the short waves is unusual. Figure 15 shows the mechanism perched on top of the tuning capacitor. The tuning slugs inside the aerial and local oscillator coils remain stationary for most of the swing of the dual-gang tuning capacitor. When the capacitor gets to about three-quarters closed a cam on the dial cord pulley engages with a spring-loaded lever which gradually extracts the slugs for the remainder of the capacitor's travel. Tuning is therefore controlled by a combination of the conventional variable capacitor and the variable permeability of the coils. One consequence of this arrangement is that the dial cord needs to be well tensioned to operate the lever without slipping on the tuning shaft. I know this from experience after the cord broke on my U241 and I had to re-string it.

Switch On

The mains wiring was in good condition and so after dusting the chassis, applying switch cleaner to the wave change switch, replacing the mains plug with a 1A fuse, connecting an aerial, and switching to the medium wave, I switched the set on. The warm up time was quite long but eventually the set came to life and gave good audio across the band, so the Mullard valves fitted were still in good condition.

Wax-covered Hunts capacitors abound in the design but because the radio seemed to be performing perfectly well I resisted the temptation to change them.

There are no dial lights on the radio and apart from hearing output from the speaker a white plastic ring mounted on the shaft of the volume control shows whether the set is switched on or not. As expected the short wave setting of the radio produced various stations depending on the time of day.

After running the set with its back on for a couple of hours the top of the cabinet was still only warm. I attribute this to the fact that the back is well provisioned with slots, especially in the area near the ballast resistor, the UY41 rectifier and the UL41 output valve – the major heat-producing components in the design. My set consumed about 26W from the mains, considerably less than the 40W mentioned in the service sheet for the U245. I notice a previous restoration of a U245 described at: http://www.vintage-radio.com/recent-repairs/ekco-u245.html involved replacing the dropper resistor with a 1.5uF, 440V motor run capacitor. These are available cheaply on eBay, and I assume the modification would apply equally to the U241.

Successors

The U241 was by no means the end of the line of export sets produced by Ekco. In 1960 they introduced the U700, again an AC/DC radio with a wide operating voltage range, and covering the medium and two short waves. The U764 and U819 were radios covering this same frequency span, and produced at about the same time in Bombay by Ekco India.

I couldn't find an export set successor to the Berec Pioneer. As far as I can tell Ever Ready concentrated on the home market, although they used the Berec brand domestically in the late 1950s on adaptations of Ever Ready portables. These radios still kept the original medium and long wave coverage and were not altered to receive short waves. The Ever Ready radio factory in Wolverhampton closed in 1968 and from then onwards the company concentrated on battery production.

Conclusions

The Berec Pioneer continued the line of battery-powered export radios produced by Ever Ready for use in Africa and other areas under British influence. It was definitely aimed at native populations in rural villages where a mains electricity supply was out of the question. The design seems to have been unique and not an adaptation of a 'home' portable radio sold by Ever Ready. There is a good chance that the chassis was built by an external (to Ever Ready) manufacturer, perhaps Plessey who had strong sub-contracting activities. The temptation to use another saucepan was resisted and a strong three piece purpose-built metal case, with as many orifices as possible sealed against insects, was adopted. Low cost ready-made radios and kits (with a pre-wired RF front end) were also offered in the UK when excess production couldn't be sold into the intended market.

The Ekco U241 seems to be an adapted version of the domestic market's U245, with frequency coverage altered to make it attractive for use overseas. The short wave tuning arrangement is interesting, using a combination of variable capacitor and permeability tuning. Unlike the Berec Pioneer, the U241 was mains powered and so its marketing must have assumed use in cities with mains supplies (AC or DC, over a wide voltage range) or farms with electricity generators, and as such was possibly aimed at ex-Pat, rather than native, populations. Construction doesn't seem to be 'tropicalised' and wax-covered capacitors were used, along with a standard back panel which didn't attempt to exclude potentially damaging bugs and insects. The only concession to 'foreign' conditions was that a wooden case was avoided.

U245s must have sold well, and have been reliable radios as many seem to have survived and come up for sale regularly, whereas the U241 and Pioneer are rarely seen. I presume this is a consequence of most examples having been shipped abroad, which of course was the point of their manufacture, and finding their final resting place there.

Useful References

Some interesting facts about Ever Ready and the Berec brand can be found at: http://www.portabletubes.co.uk/sitefiles/pthistory.htm

For a useful cross-reference between Berec and Ever Ready radios, see: http://www.radiomuseum.org/forum/berec_and_ever_ready_equivalents.html

More information on the Ever Ready saucepan radio and the Central African broadcasts it was intended to receive can be found at: http://www.radiomuseum.org/forum/ever_cabs_the_saucepan_and_ever_ready.html#5

'Attaché Radios' by Mark Johnson, published in 2005 by the British Vintage Wireless Society is an excellent book on the history of this style of portable radio. The book is an impressive collection of colour pictures of these radios and advertising material, and many useful facts and figures. It includes details of several Berec radios, though of course the Pioneer itself is not included.

'Variations on a Theme: The Bush MB60 family' by Robert Darwent, published in the BVWS Bulletin for winter 2010 tells the interesting story of the Bush ETR82 export radio. When the radio was designed its upper frequency limit of 18MHz, for reception of the 16m band, necessitated the use of a DK96 frequency changer stage in an otherwise transistorised design.

'The Pye Export Family of Receivers' by Richard Q Marris, G2BZQ, published in Radio Bygones Issue no. 47, June/July 1997, is an interesting description of some of Pye's radios designed for the export market.

BVWTM at Spring Harpenden

Photographed by Carl Glover

The British Vintage Wireless and Television Museum had its own fundraising stall at Harpenden this spring (provided at no charge by the BVWS) to raise funds for the Museum, a raffle is being held with tickets available at £1 each from the stall. There are four prizes of vintage radios.

The first prize is a McMichael model 374 from 1937, a noted McMichael enthusiast commented that a few examples of this model are known to exist. The receiver is unrestored, and is electrically untested.

The other prizes consist of an 1940s Ultra bakelite receiver with original pastel colour paint, a 1930s Pye transportable radio, and a 1940s General Electric American set. All of the radios are in as-found condition, so the new owners can enjoy restoring these radios to their former glory. All proceeds go directly to the BVWTM.

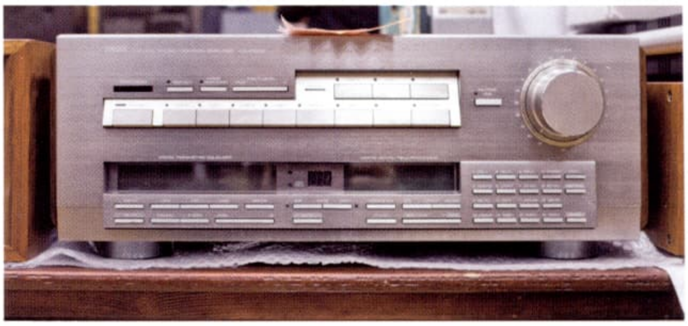
John and Mary Sully at the BVWTM stall

Mike Izycky selects the first winning ticket

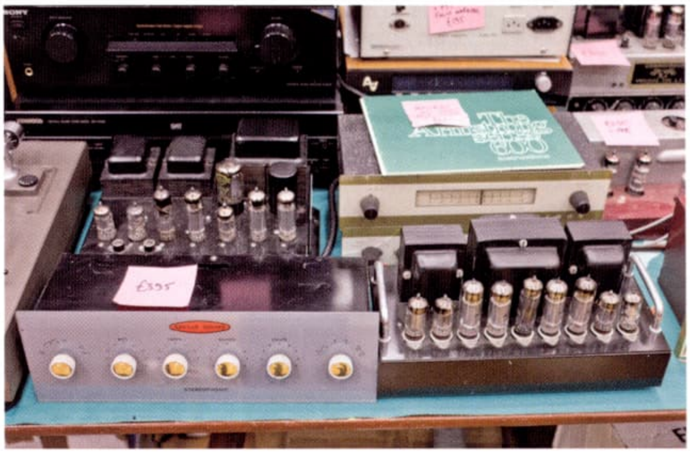
How many Mikes?

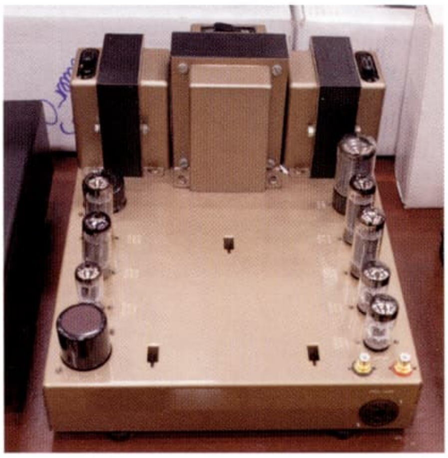
Spring Audiojumble

Photographs by Carl Glover



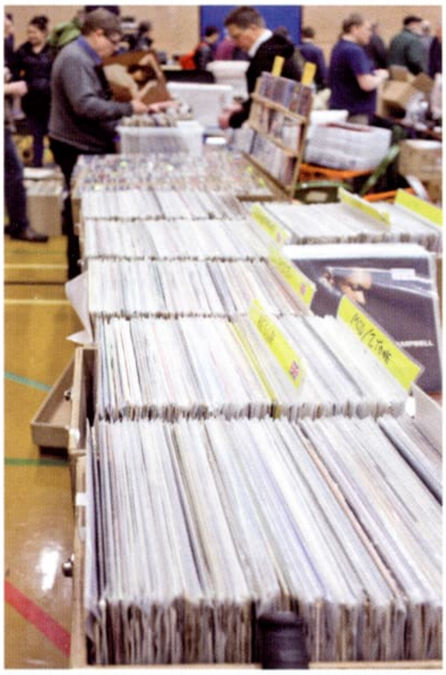
French radios on BVWS table





Leak Stereo 20 amplifier

More Tannoys



Peto-Scott and Bush BP90

A stereophonic pair of Leak 'TL12 Plus' amplifiers

Akai stereo reel to reel recorder

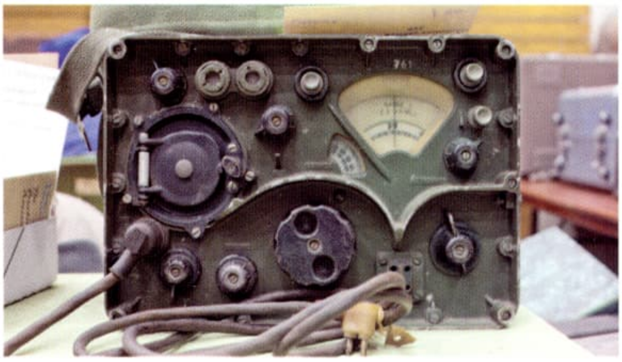
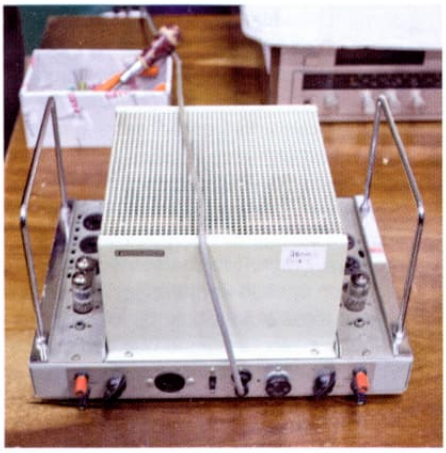
Another Akai stereo reel to reel recorder

Capitol (EMI) home stereo

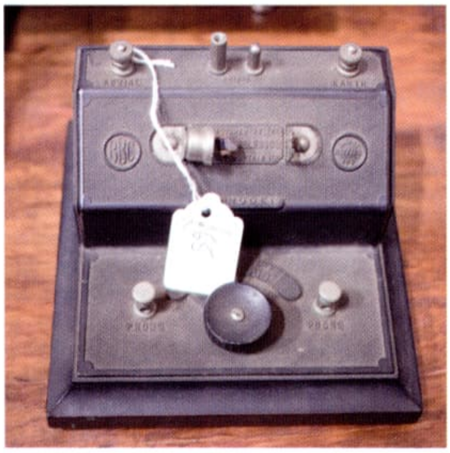




Quad equipment

Radford STA15 amplifier



Brownie crystal set

A pair of Quad IIs

Designing and using a universal router jig for making replica radio backs

by David Taylor

It is one of life's mysteries as to why so many radios have missing back panels. Could it be that a 'phantom twiddler' removed the back from a faulty radio to have a dabble at repairing it, and having not succeeded, didn't replace the back? Or in less safety conscious times, were backs removed to allow more ventilation to prevent sets from overheating, in the hope of prolonging the life of the set by allowing heat from mains droppers and valves to escape? I guess we'll never know! Even when the back is present, it often has chunks missing, due to excess heat damaging it over time, sometimes exposing dangerous high voltage components such as mains droppers.

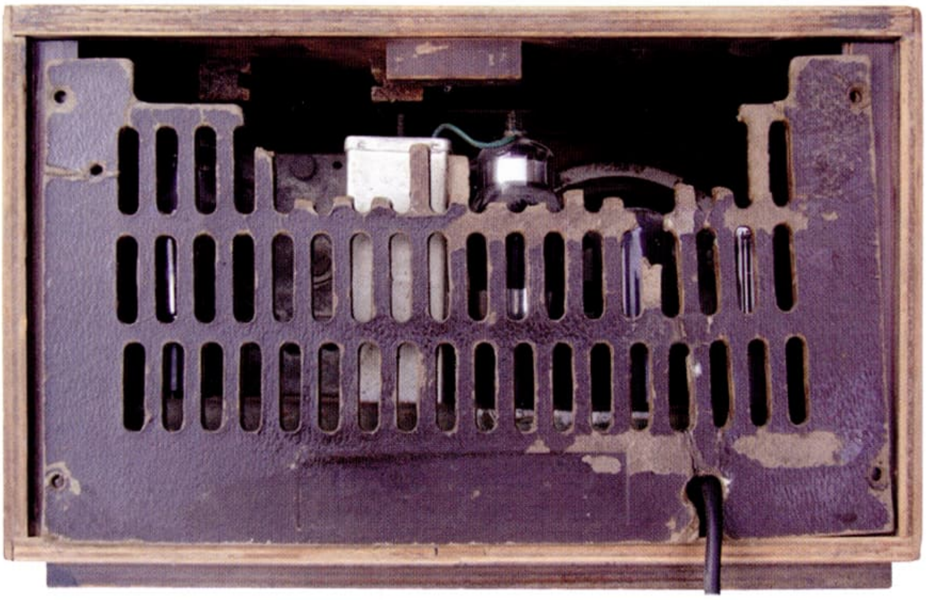


Fig 1: Poor fitting damaged Little Maestro back

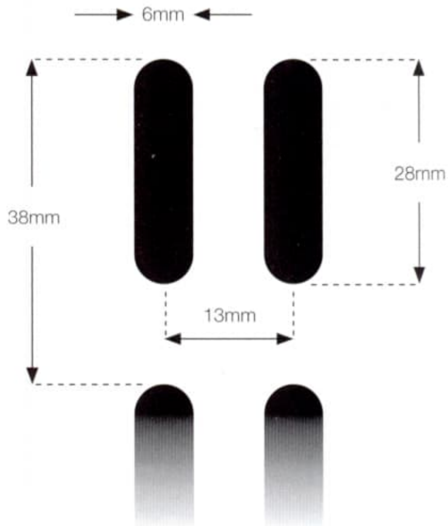


Fig 3: Typical slot dimensions and spacings of UK radio backs, though the length of slots seen to date has varied from 28mm to 25mm & 18mm.
Vertical spacings seen to date are 35mm, 38mm, 40mm & 42mm. (See below for some examples).

Fig 2: Little Maestro with new back fitted

Variations seen to date

Model	**Slot Spacing**	**Slot Length**
Little Maestro post-war 'woodie'	35mm	28mm
Wartime Civilian Set	38mm	28mm
Murphy U198	38mm	28mm & 18mm
DAC90A	40mm	28mm
Portadyne Princess/Noble	40mm	28mm
Little Maestro T105	42mm	28mm

Whatever the reason, missing or damaged backs pose the question of what to do about it. Rarely will a replacement original back in good condition become available, so the next best thing is to create a passable replica of the original, and that's what this article is about.

At the NVCF I bought a post-war AC Little Maestro 'woodie' with an attractive dial and a nice cabinet, albeit a bit worse for wear and with a back in need of replacement. There was enough of the back still intact to enable me to fathom out what it should look like, so I pondered on the options for making a new back, both in terms of time, and the likely end result. I narrowed it down to two options, both of them labour intensive, but the second method has the merit of repeatability and accuracy once a simple jig has been made:

Option 1) Mark out a blank back panel with the layout of the slots, drill a hole at each end of the slots (54 slots in the case of my 'Little Maestro' – 108 holes), and using a hand-held fretsaw or an electric scroll-saw, saw the 108 sides of the slots, or chop them out with a chisel and mallet. Very tedious and time consuming, and however much care is taken is likely to have disappointing results. Furthermore, if another identical back had to be made, it would be just as laborious to repeat the process. I therefore discounted this option.

Option 2) Make a router jig. This would involve three or four hours work, but once made, by using the jig to guide a router, the 54 slots in the Little Maestro back could be neatly cut in about half an hour and the jig could be used if needed again to make other backs. To cut the slots simply involves setting the depth gauge on the router to cut through the new back panel, plunging the router in at the top of the slot position, then pulling the router towards you until the slot is cut, then switching off and repositioning the new blank back laterally in the jig to cut the next slot. To cut each slot and reposition the back panel in the jig to cut the next slot takes no more than 30 seconds.

Hence, I opted to make such a jig, and thought this might be of interest to other restorers, as the basic technique could be employed to make similarly slotted back panels for other radios, as has since proved to be the case. I later went on to make jigs and backs for a Portadyne Princess, Murphy U198 and a Wartime Civilian Receiver, which has a total of 83 slots arranged in four rows. To make such a back panel by any other means than a router jig would be a time consuming and daunting task. After having made three separate purpose-made jigs, I had a 'eureka moment' and realised rather than making a separate jig for each model, I could make a 'universal' jig to cater for most smaller radios, including the ubiquitous Bush DAC90A, (22 cms x 29cms), by using a blank panel 30cms (12 inches) square and cutting it to the desired size and shape after the slots had been cut. The pictures in this article show how the universal jig is made and demonstrates the process of cutting the slots. I have shown examples of six different backs that I've made on the 'universal jig'. Figs 1 & 2 show the original damaged 'Little Maestro' back, and the replacement I made, which inspired me to make other backs, and later, the 'universal jig'.

The design criteria for the router jig are:
To hold the blank back panel in position while each slot is cut with the router.
To enable the panel to be moved into the next position for each new slot to be cut.
To limit the travel of the router to enable the correct length of slot to be cut. (i.e., 28mm, 25mm, 18mm).
To enable the router guide to be re-positioned to cut subsequent rows of slots.
To be adjustable to cater for different vertical spacings from one row of slot to the next, and different slot lengths.

Once the concept of the jig is understood, all that is needed to make and use it are basic woodworking skills, and a cheap DIY store router, which often sell for under £25.00. While they're not up to the more demanding router tasks, such inexpensive light-duty routers are fine for this sort of thing.

The components of the jig are:
A baseboard, 1 Metre (39 inches) x 90cms (36 inches) e.g, 18mm chipboard loft floor pack of three.
Two 'fixed guides'1 Metre x 30 cms (12 inches), made of strips of material of the same type and thickness that the new back panels are to be made of.
Two 'lateral guide panels', 32.5 cms (13 inches) x 30cms (12 inches), again of the same material as the new back panel.
A 'router sole plate guide', 60cms (24 inches) x 17.5 cms (7 inches) made from 10mm or 15mm MDF, with an aperture cut to suit the 'footprint' of the router sole plate, as described below.
Two 'filler pieces' - one 3mm thick, the other 10mm, to fit the aperture in the sole-plate guide to limit the length of travel of the router for cutting slots shorter than 28mm. (i.e., 25mm and 18mm).
6mm Dowels.
Screws.

Fig 4: Underside of baseboard

Fig 5: Top of baseboard

DIY stores often sell off-cuts of MDF and chipboard cheaply, but the small amount needed isn't expensive even if bought new. A 'loft panel pack' of three 18mm chipboard loft flooring panels 1.22 Metres x 320mm from a DIY store is ideal for the baseboard and will typically cost about £7.00. If a loft pack is used, two wooden strips will need to be screwed across the three boards on the underside, as illustrated in Fig 4.

The question arises as to what material to make the backs and the guide panels from.

Many, if not most radios backs were made from 3.5mm thick 'millboard' - a sort of compressed cardboard which becomes fragile and brittle with years of exposure to heat from valves and mains droppers - hence the damage to the old back that we so often see. You can still get millboard from firms that supply car restoration materials but it's not cheap, nor do I think it's the best material to use with a router. (The holes would originally have been stamped out on a press using a punch and die arrangement).

3mm MDF could be used or standard 3mm hardboard, though 3mm oil tempered hardboard is a much better choice as it is more robust than both MDF or normal hardboard, though is not so easily sourced locally. Standard 3mm hardboard is rather 'fluffy', but will suffice and was used to make the six backs shown in this article, using the 'universal jig'.

Two 4ft x 2ft sheets are sufficient to make the jig and several backs. If oil tempered hardboard can't be found locally, then either

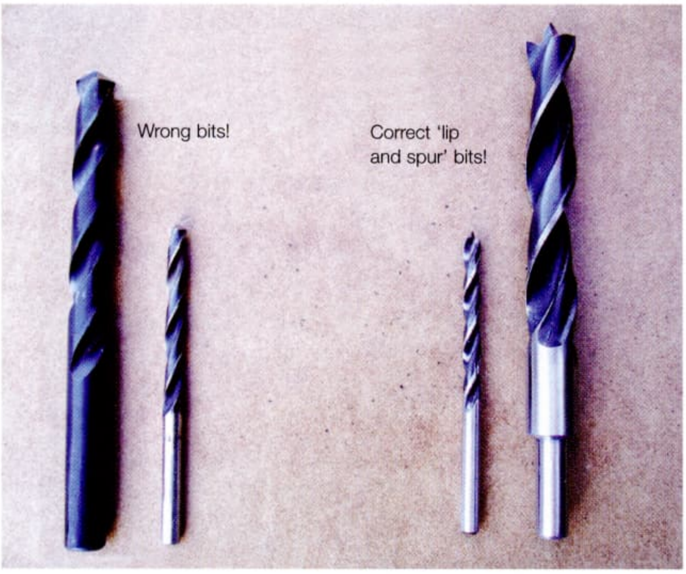


Fig 6: Use the correct type of wood bit for drilling holes in wood, MDF or hardboard

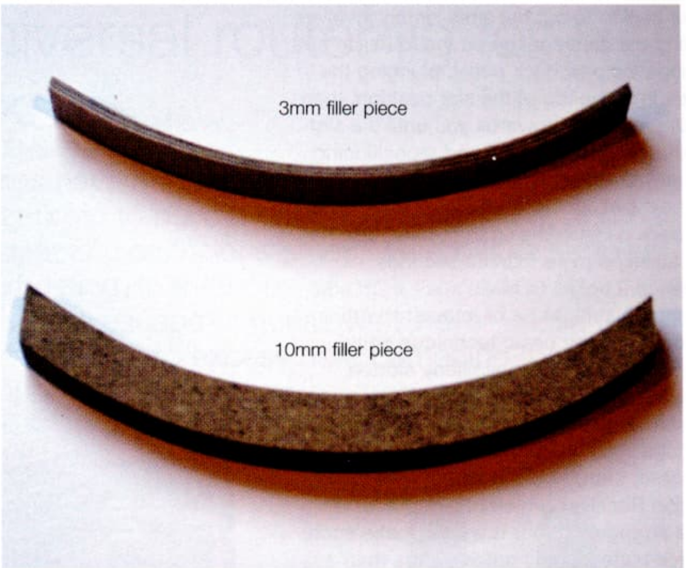


Fig 7: Sole plate guide 'filler pieces'

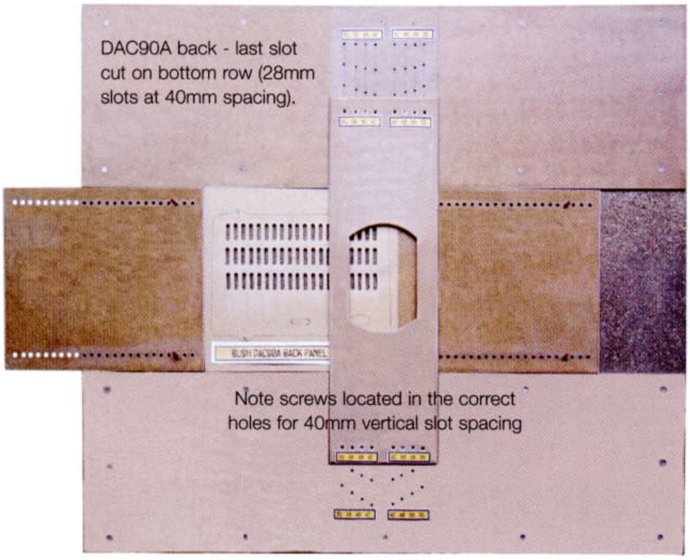


Fig 8: Jig with DAC90A blank in place

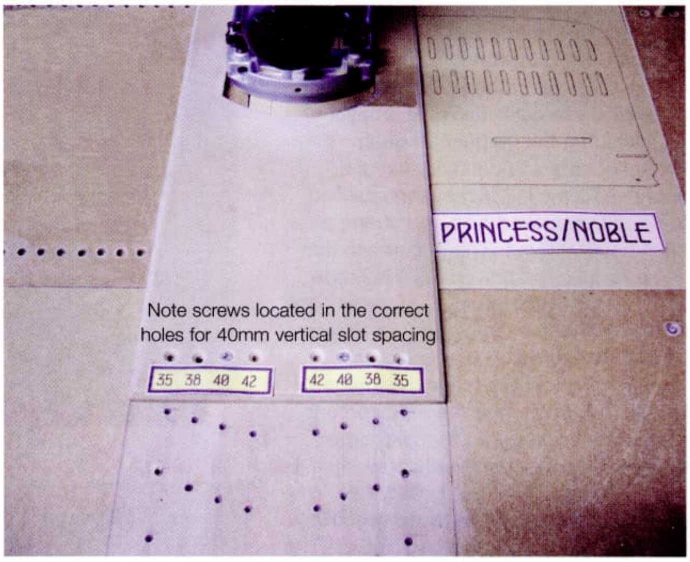


Fig 9: Princess Back showing 40mm screw spacing

3mm MDF or standard hardboard would suffice. At the time of writing, a 1.2 x 2.4 Metre (4ft x 8ft) sheet from B&Q costs less than £6.00 and in larger stores they'll cut it to your sizes free of charge while you wait. At less than 20p a square foot, there's lots of scope for making the jig, making mistakes, and making lots of backs too!

The same basic principles apply to making a slot-cutting jig for any radio back that has ventilation slots rather than holes. The width of slot seems to be standard at 6mm (1/4"), and the horizontal spacing in all of the radio backs that I have seen has uniformly been 12.5mm, (1/2"). However, the length of slots that I have encountered to date have been 28mm, 25 mm and 18mm, and vertical spacing from the top of one slot to the top of the slot beneath it has varied from 35mm, to 38mm, 40mm and 42mm. For the jig to be worthy of the name 'universal' it needs to cater for different lengths of slots and vertical spacings, and as designed, the jig will indeed cater for these variations. Fig 3 shows common dimensions that I've encountered, but they are by no means 'standard'.

If radios are encountered with larger dimensions that the jig can cater for, or different slot spacings, the same basic principles can be used to build a larger purpose-made jig for such radios. For example, the circular back of the Ekco A22 is just a little too large at 32.5cm diameter (12.75") to use the jig as it stands, but all that would be required to modify the jig to suit the A22 back panel would be to reposition the top and bottom fixed guide panels to enable a 32.5cm square panel (or a little larger to allow for some waste) to fit into the jig. The A22 panel has a row of 11 horizontal slots down each side, and 11 slots across the top, all 28mm long, spaced at 12.5mm centres. All three rows of slots could be cut on the jig by turning the square blank so that each row of slots is cut in the upright position along both sides and the top. The rest of the ventilation holes on the back panel of the A22 are 20mm diameter and could be quickly cut on a pillar drill using a 20mm 'lip and spur' drill bit. The square blank would then be trimmed to its circular shape on a band-saw or with a fretsaw.

If slots in particular radios are encountered which differ from the usual 12.5mm (1/2") horizontal spacing, all that would be needed would be for the two lateral guide panels to have their two rows of holes for the dowels to be positioned at the correct intervals. (There is no reason why additional rows of holes could not be made in the lateral guide panels for different horizontal spacings and alternative dowel positions to suit those additional rows of holes, rather than to make new guide panels).

Making and using the 'Universal Jig': The Upper and Lower Fixed Guide Panels:
Two fixed guide panels are screwed to the baseboard above and below the back panel blank, such that the blank and the two lateral guide panels can move sideways between these two fixed guide panels to reposition the blank and the lateral guide panels for the cutting of each slot, but with no play between those panels. See fig 5

The Lateral Guide Panels:
For the slots to be spaced accurately between each other, two 'lateral guide panels' are made from the same material as the new back, each to fit either end of the blank back panel. These guide panels are held in position with two 6mm dowels for each end panel. By making the guide panels 33 cms long (13"), up to twenty-four 6mm (or ¼") diameter holes can be drilled in these panels at 12.5mm (1/2") intervals, which will enable up to 24

slots to be cut in a blank back panel up to 34.5cms (13.5") wide . Use a 'lip and spur' drill bit intended for woodwork to drill the holes – not a standard metalworking bit, which is hopeless for drilling accurate holes in hardboard or MDF. See fig 6 for drill types. (A set of seven 'lip and spur' bits will typically cost no more than £5.00). In making these two guide panels, they should be carefully marked out, temporarily taped together and accurately drilled together as a pair so that the holes of each panel match up exactly when held in place with the pairs of dowels on the jig.

The Router Sole Plate Guide:
The job of the router sole plate guide is to restrict the movement of a plunging router to that which is needed to cut the slot. The aperture in the sole plate guide allows the router to move up and down the 'Y' axis for 28mm, to cut a slot using a 6mm router bit. The router sole plate guide is made from an off-cut of 10mm or 15mm MDF, using a jigsaw to cut an aperture to the shape of the footprint of the router soleplate but 28mm longer than the soleplate - the length of the slots to be cut in the new back panel.

This aperture in the guide must be accurately cut so that there is no sideways play as the router moves up or down the soleplate guide. The greater the care in cutting this aperture, the greater will be the accuracy of the slots, so it's worth taking extra care over this.

To cut slots shorter than 28mm – for example, 25mm or 18mm, which I have encountered, a 3mm or 10mm 'filler piece' may be inserted into the aperture to limit the travel of the router by that extent. The 3mm filler piece can be made of layers of thick card glued together to the desired profile. (See Fig 7: filler pieces)

If the sole plate guide is made to the dimensions stated, and the top edge is set to 4cms from the top of the baseboard, it should be possible to cut up to six rows of slots in a blank panel ranging from 2cms from the top of the panel to the top of first row, to 5cms from the bottom of the panel to the bottom of the last row. This may vary according to the size and shape of the router sole-plate.

To drill the screw holes at intervals to enable vertical spacings of 35, 38, 40 and 42mm, it is only necessary to accurately mark the series of holes in the top fixed guide panel. Then fit screws into each pair of holes at the top of the router sole plate guide and use a small drill to drill pilot holes for the corresponding pair of screws in the bottom fixed guide panel. This simplifies the marking out and ensures that each set of four screw holes is accurately lined up.

Positioning the holes for the 6mm dowels on the jig:
With the router sole plate guide in place, insert a 30cms square blank back panel beneath the guide and position each lateral guide panel at either end of the back panel. Slide the three panels to the right until the first pair of holes of the LH panel are 16cms (6.25 inches) from the LH edge of the baseboard, and the first pair of holes of the RH panel are 20cms (7.75 inches) from the RH edge of the baseboard. Put the router in position with the bit lowered to just touch the blank panel. That should have set the first slot cutting position at 2.5cm (1 inch) from the LH edge of the blank panel. A 30cm wide blank will allow rows of 21 slots to be cut, (as needed in the Wartime Civilian Receiver for example), allowing for 2.5cms at either end. If a blank panel of 34cms (13 inches) is used, it would allow rows of 24 slots to be cut, allowing for 2.5cms at either end of the panel. In that case, the holes in the baseboard for the two dowels for the LH guide panel will still need to be 16 cms from the LH edge of the baseboard, and the RH dowel holes will also need to be 16 cms from the RH edge. This isn't as complicated as it may sound! With the blank back panel and the two guide

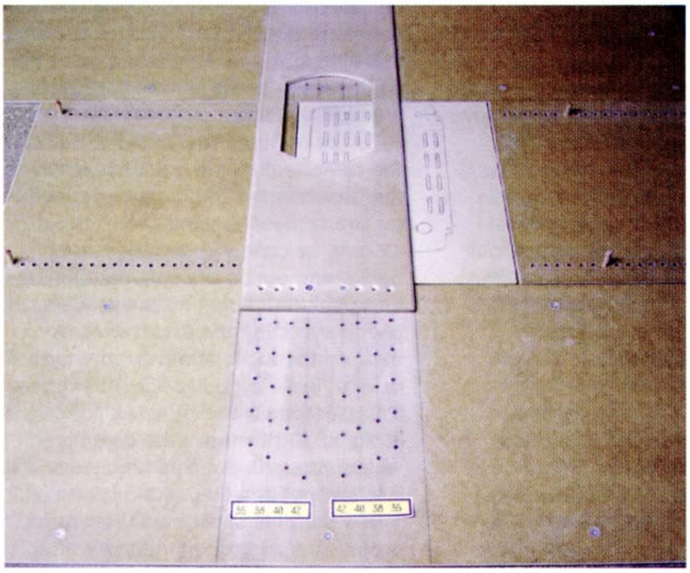


Fig 10: Murphy U198 showing back on end to cut slots, and 42mm slot spacing

Fig 11: 10mm Filler Piece in place to cut shorter slots (18mm)

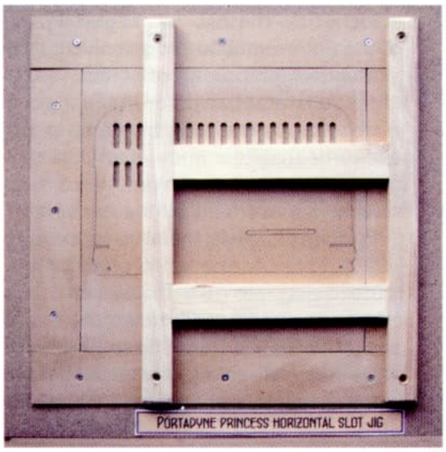


Fig 12: Portadyne horizontal slot jig step 1

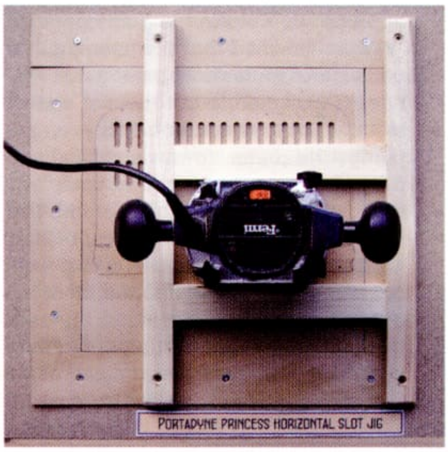


Fig 13: Portadyne horizontal slot jig step 2

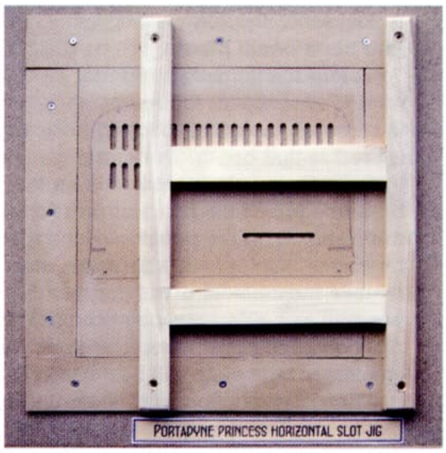


Fig 14: Portadyne horizontal slot jig step 3

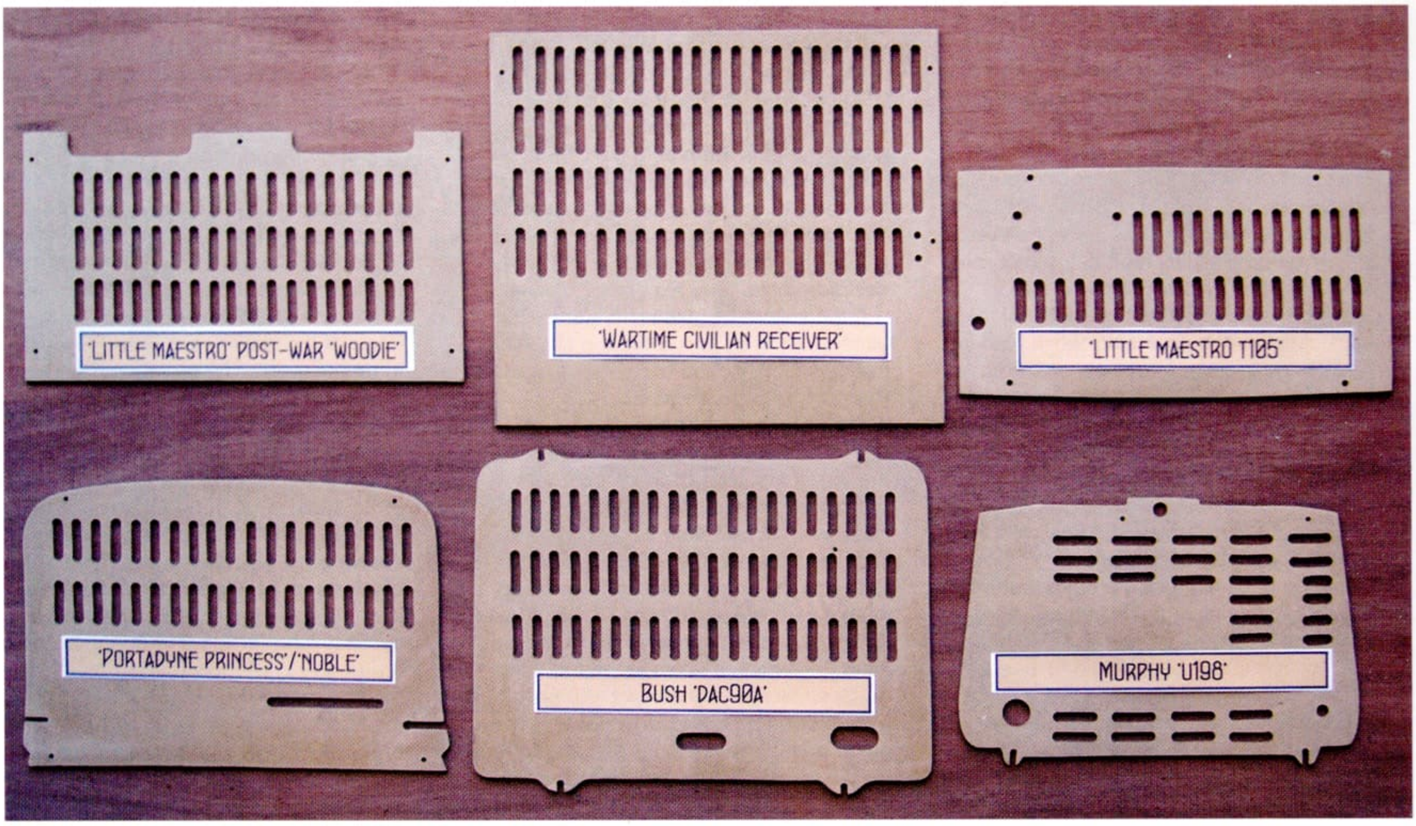


Fig 15: Backs ready for painting and labels.

panels in place, it becomes self evident where the dowel holes need to be drilled.

If all is well, drill 6mm holes in the baseboard through the far LH pair of holes of each lateral guide panel for the dowels to fit into. In use, the dowels need to be just loose enough to be easily removed and refitted with the fingers so as to move the guide panels and refit the dowels in their holes as each new slot is cut.

In use, as each slot in a row has been cut, these two lateral guide panels, along with the new back panel, are moved to the left (beneath the fixed router sole plate guide) one hole at a time on the dowels until all the slots in the first row have been cut. The sole plate guide is then repositioned lower down at the desired distance (from 35 - 42mm) for the particular panel being made, to enable the next row of slots to be cut, and the process repeated for any further rows of slots.

Positioning the router sole plate guide, lateral guide panels, and back panel blank:

To set up the jig, with the router switched off and unplugged, the router bit is lowered so as to just touch the blank, and locked at that depth. The router is placed in the sole plate guide with the router bit at the top of the first slot position on the blank. Mark the position of the router bit on the blank panel with pencil, then remove the blank and use that pencilled position as a reference point to draw the position of all the slots on the blank, to ensure that the slots will be correctly positioned where you want them on the blank. Ideally, the complete pattern of the slots should be marked on the blank (perhaps using an old damaged back or one borrowed from another set as a template), so that slots are only cut in the correct positions on the blank. Because the jig can cater for up to 24 slots, it's all too easy to inadvertently cut too many slots if fewer than 24 slots are needed, as will mostly be the case. This is especially important with back panels that have oddly spaced slots of different sizes, as is so with the Murphy U198 for example.

The sole plate guide is then screwed to the baseboard in a position which will enable the blank back panel and the two lateral guide panels to be progressively moved sideways along the 'X' axis beneath the sole plate guide to cut the first row of slots. Still with the router unplugged and the bit lowered, move the router up and down the sole plate guide to satisfy yourself that the guide is accurately positioned over the blank to cut the first slot where you want it. Then place the two lateral guide panels either side of the blank back panel, with the two dowels in each panel pushed through the appropriate holes in the guide panels.

When satisfied that the lateral guide panels and router sole plate guide are correctly aligned to cut the first row of slots, unlock the router bit so you can plunge the router downwards, and set the depth stop on the router so as to just cut through the blank, but not into the baseboard. Plug in the router, position it at the top of the sole plate guide, switch on, plunge the router into the blank and pull the router towards you to the end of the guide to cut the first slot, and then allow the bit to retract and switch off the router. When the router has stopped, put it aside and reposition the blank by moving it and the two lateral guide panels one place to the left on the pairs of dowels.

Repeat this process until the entire first row of slots has been cut. To cut a slot and reposition the guide panels to cut the next slot takes no more than thirty seconds, so once the jig is set up, to cut a row of 20 slots should take about ten minutes.

To cut the next row of slots, reposition the router sole plate guide lower down on the baseboard in the correct screw-holes for the vertical spacing, from 35mm to 42 mm, as called for by the particular back., and screw the sole plate guide into position, repeating the procedure used for cutting the first row of slots, then do the same again for any further rows of slots as called for. This process will become clearer by reference to the pictures. Fig 8 shows the completed jig with all the components labelled and the last slot cut in a DAC90A back panel.

The pictures show how the work progresses, with the first hole in the top row being cut, proceeding until the whole back panel has been cut. It will be evident how the two lateral guide panels of the jig are moved progressively to the left, with the next pair of holes in each of these lateral panels of the jig held in position by the two dowels so that the vertical slots can be cut, while the back panel blank is prevented from any sideways movement by the two lateral guide panels. Note the rows of screw holes in the baseboard to enable the router sole plate guide to be moved down and re-secured further down the board at desired intervals from 35mm - 42mm for each successive row of slots to be cut. Fig 9 shows the screws in place on the Sole Plate Guide for the 40mm spacing of slots in the Portadyne Princess.

Two other slots that needed to be cut

Fig 16: Backs painted and labelled

along the top of my Little Maestro panel were quickly cut on a bandsaw. Holes were drilled for the back to be screwed onto the radio, and a hole for the mains flex. If an odd shaped back is called for (circular, sloping sides, curved top etc), as was the case with the Murphy U198, Bush DAC90A and Portadyne Princess sets, the blank must start out rectangular and slightly oversized, then when all the slots have been routed out, the board is cut to the desired shape using a cardboard template of the shape of the back panel in question.

Occasionally backs may have horizontal slots and slots of more than one length - the Murphy 'U198' for example has both 28mm and 18mm slots. In that case, a 10mm 'filler piece' will need to be put into the aperture in the router sole plate guide when the shorter slots are cut, to limit the travel of the router to cut those shorter slots.

Cutting horizontal slots:
As the slots in the Murphy U198 panel are horizontal, the blank panel was placed on its end in the jig so that the slots could be cut from top to bottom in the router guide. In effect, the back is cut 'portrait' fashion rather than 'landscape' as shown in fig 10. The shorter (18mm) slots are cut with the 10mm 'filler piece' in place in the sole plate guide. Fig 11 should make this clear. (For the longer slots the 'filler piece' is removed).

After the slots have been cut, the blank will need to be shaped either on a band-saw or with a fretsaw, and several holes drilled for such things as the wave-change switch, mains lead and mounting holes, but the router takes care of the tricky stuff!

Cutting other slots:
Occasionally it will be necessary to cut additional slots of odd lengths in positions not catered for by the jig. This was the case with the Portadyne Princess and Noble receivers, in which a 75mm horizontal slot was needed beneath the vertical ones, so a simple horizontal guide was made for that, and is shown in figures 12, 13 & 14. The new back panel was held in place on a baseboard by strips of hardboard and the position of the slot was marked on the new back panel. With the router positioned at one end of where the slot is to be cut, strips of wood were then screwed to the baseboard to guide the router and to limit the travel of to allow the 75mm slot to be cut.

Finishing touches - painting and labelling the panels:
Most panels are dark brown, so to paint the backs I've made to date I've used 'tester pots' of brown matt emulsion paint from a DIY store. Homebase 'Double Espresso' or Wilko 'Java Bean' are a reasonable match, and will be enough to give two coats to two or three small back panels. When painted, I've then created and printed labels as close to what the original labels consisted of, sprayed with clear lacquer to make them waterproof and fixed them with wallpaper 'border paste'.

In some instances labels were made from scans of actual backs – in others, I've designed a label by choosing a font as close to the original wording. In the case of the Wartime Civilian Receiver, I aged some paper by soaking it momentarily in strong black coffee, then ironing it dry between two sheets of kitchen roll. Figs 15 and 16 show six completed backs before and after painting and labelling.

Safety precautions:
It must be stressed that working with a router poses several hazards for which precautions must be taken if accidents are to be prevented. The router bit revolves at about 30,000 RPM, and the router must be switched off after each slot is cut, and the bit fully retracted and at a standstill before placing it down ready for positioning in the guide for the next slot to be cut.

Routers are very noisy, and MDF produces hazardous dust, so it makes sense to wear ear defenders, goggles and a dust mask. The term 'dust mask' does not include the disposable 'nuisance dust' white paper masks, whose only purpose is to fool one's loved ones into believing that we are taking sensible precautions. These masks fall far short of what is required when working with MDF or when wood turning. Face masks for working with MDF should be to P2 standard, and are widely available. Don't use your lungs as a dust filter!

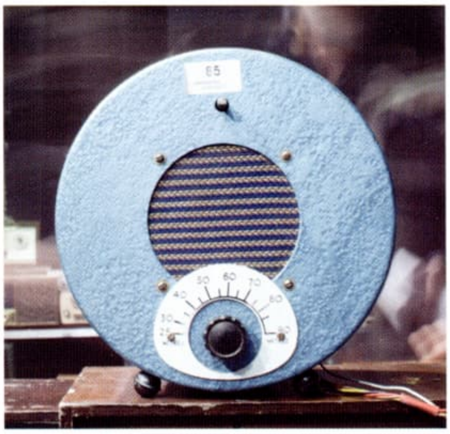
I am indebted to fellow members of the Golborne Vintage Radio Forum for their encouragement, helpful suggestions and assistance with making the labels for replica backs. Notably, Tony Thompson for the excellent artwork for the Wartime Civilian Receiver back label, and Joe Freeman, Gary Tempest, Colin Wood and Robert Darwent. I am also indebted to Howard Craven who provided pictures of his Portadyne 'Princess', including the wording on the back panel, enabling me to make a back for my 'Princess' and later, for a 'Noble' TRF, which uses an identical cabinet to the 'Princess'.

I regret that I am unable to make backs or jigs on request due to time constraints, and it would of course make no economic sense to do so, but I do hope these notes provide enough information to inspire others to have a go themselves.

Seen at Harpenden

Photographs from 24th February swapmeet by Carl Glover

Ekco AC76

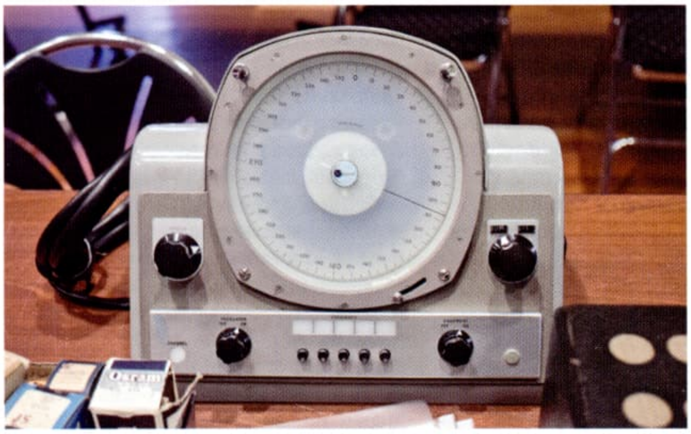


Ever Ready 'Saucepan Special'

It's a RAP!

A pair of Ultra T401's

An Ekco AC64 and a Philco A537



GEC Superhet 5

Emor Globe

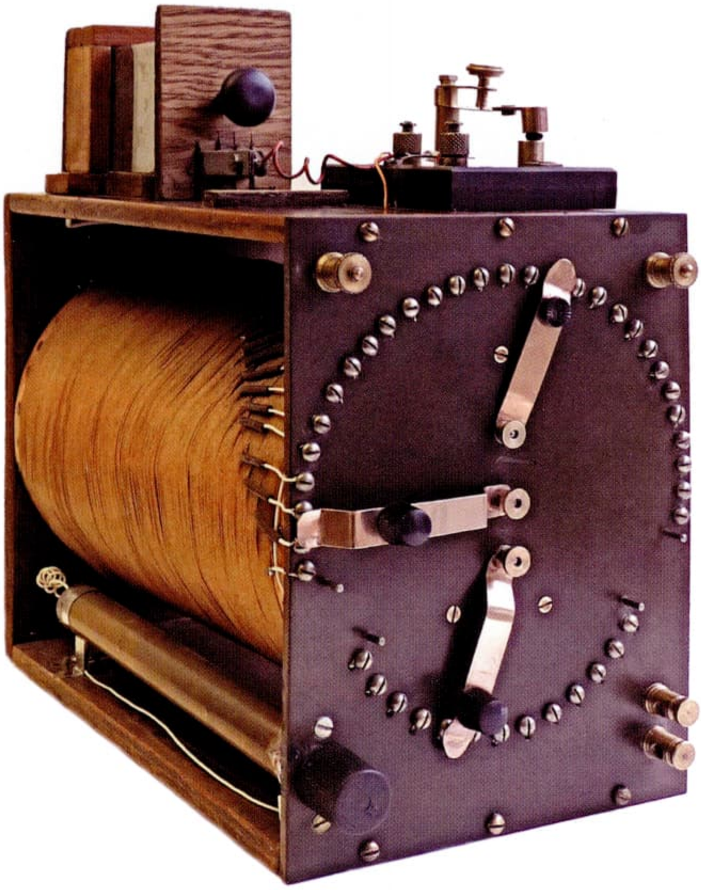
Baird T165 and a Murphy SAD94S

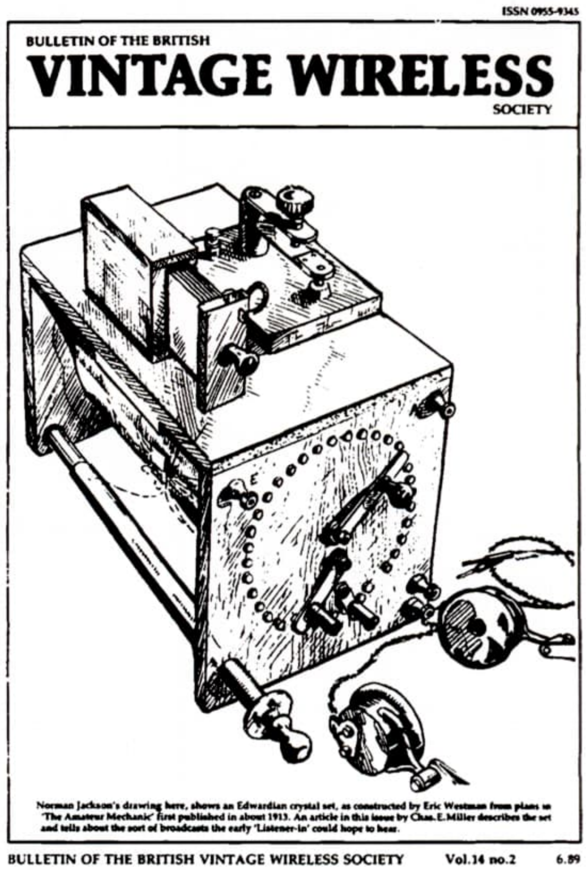
Marconiphone V2A

Crystal Set Mystery Nearly Solved!

By Richard Allan

Eight years ago I purchased a number of items at auction, one of which included a 1920's radio together with a number of similar vintage components and a rather large home constructed coil assembly. The coil former was about ten inches long and the ebonite 6x8 inch front panel was equipped with three wipers which made contact with a large number of screw studs. It had the appearance of having been neglected and consigned to a damp shed or garage for many years.

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BULLETIN OF THE BRITISH

VINTAGE WIRELESS

SOCIETY

Norman Jackson's drawing here, shows an Edwardian crystal set, as constructed by Eric Westman from plans in 'The Amateur Mechanic' first published in about 1913. An article in this issue by Chas. E. Miller describes the set and tells about the sort of broadcasts the early 'Listener-in' could hope to hear.

BULLETIN OF THE BRITISH VINTAGE WIRELESS SOCIETY Vol.14 no.2 6.89

When I got it home I realised that this was something rather more than a mere coil assembly as detailed in the auction list. It was filthy and had thin double cotton-covered wires sprouting out in all directions, the brass screws were green but it was undoubtedly a substantially completed crystal set. A house move delayed any further investigation and it languished untouched for a long time until I trawled through one of the BVWS CDs and hit upon the illustration on the front cover of a 1989 Bulletin. The article within spurred me on to consider getting it back to life. It indicates that this crystal set was designed in 1910 and was further described in 'The Amateur Mechanic' in 1918 and it implies that the 'long distance receiving apparatus' was designed to cover wavelengths from 7500 metres down to 300 metres (40kHz-1MHz).

The tuned circuit comprises two concentric coils, the outer of which is just under six inches in diameter and 9½ inches long, and an inner one of unknown dimensions. The outer coil has 29 sections of 14 or 15 turns (so about 420 turns in all) which are taken to 29 brass screws placed in the upper semicircular switch arrangement. I do not know the diameter or details of the inner coil, which is totally inaccessible, but the above mentioned article indicates that there are in total more than 1000 turns. I guessed therefore that the inner one has more than 600 turns with twelve sections (as there are 13 screws) each having 50 or so turns. There are two variable capacitors, the one on the top made from zinc plates and pieces of glass and the other (bottom left) made from two pieces of brass tube. There was no way that I was going to get it to work without taking it apart, cleaning all the brass parts and making good the connections. The connections between the coil tappings and the switch were all replaced with insulated tinned copper wire. The screws, switch wipers and terminals were cleaned in Harpic lavatory cleaner which contains hydrochloric acid and finished off with Brasso metal polish which removes the resultant coppery hue. The ebonite front panel was polished with CarPlan T-Cut Scratch Remover. The set was also missing knobs on the switch sliders and the insulation on the sliding tube, which was a sticky length of impregnated fabric tape, was replaced with a piece of PVC sleeving. The sliding plate capacitor which had never been fully completed was given a plywood back and a front with a knob and I made four steel pillars to limit the rotation of the wipers beyond their respective screw studs. When it was all assembled and a germanium diode was placed across the detector terminals I was left with a dilemma. My crystal set, although apparently almost identical to that in the drawing, had the switch wipers in different positions as mine has two on the upper set of contact rather than one. I spent some time experimenting and trying to figure out how it should be connected up. I was puzzled by the arrangement of the two wipers on the top switch. The shorter of one traverses about 12 of the tappings and the longer one transverses all of them if lifted over the shorter one. It is not possible to have two which could traverse all the screw studs because of the position of the Aerial and Earth terminals.

From one of the numerous diagrams I found on this very informative site www.crystalradio.net/,I guessed that it was intended to be wired up with the tubular variable capacitor in parallel with the larger coil in the aerial circuit and that the plate capacitor would be used to tune the secondary in the detector side. The additional wiper would, I assumed, offer a degree of variable coupling by altering the number of primary turns and their relative position with respect to the portion of the secondary winding in circuit. I left the shorter one unconnected. When I equipped the set with headphones, aerial and earth I found that it picked up a couple of local stations, but was not very selective. Again it was consigned to a shelf alongside my other radios and remained there until I purchased a little digital LCR meter as a Christmas present for myself two years ago. I used this and my more recently acquired Marconi TF131A Universal Bridge to measure the inductance of the coils. I then calculated the values using Wheeler's formula and, as can be seen, the results for the primary coil compare favourably with the measured value. Using the measured inductance of the secondary coil and various estimates for the number of turns and coil length, I found that a coil diameter of 4 inches with about 480 turns should have an inductance matching the measured value. It seems therefore that the "more than a thousand turns" suggested in the article cannot apply to my set.

$L = n^2d^2/(18d + 40h)$
where: L = inductance in microHenries
n = number of turns
d = mean diameter in inches
h = height of winding in inches

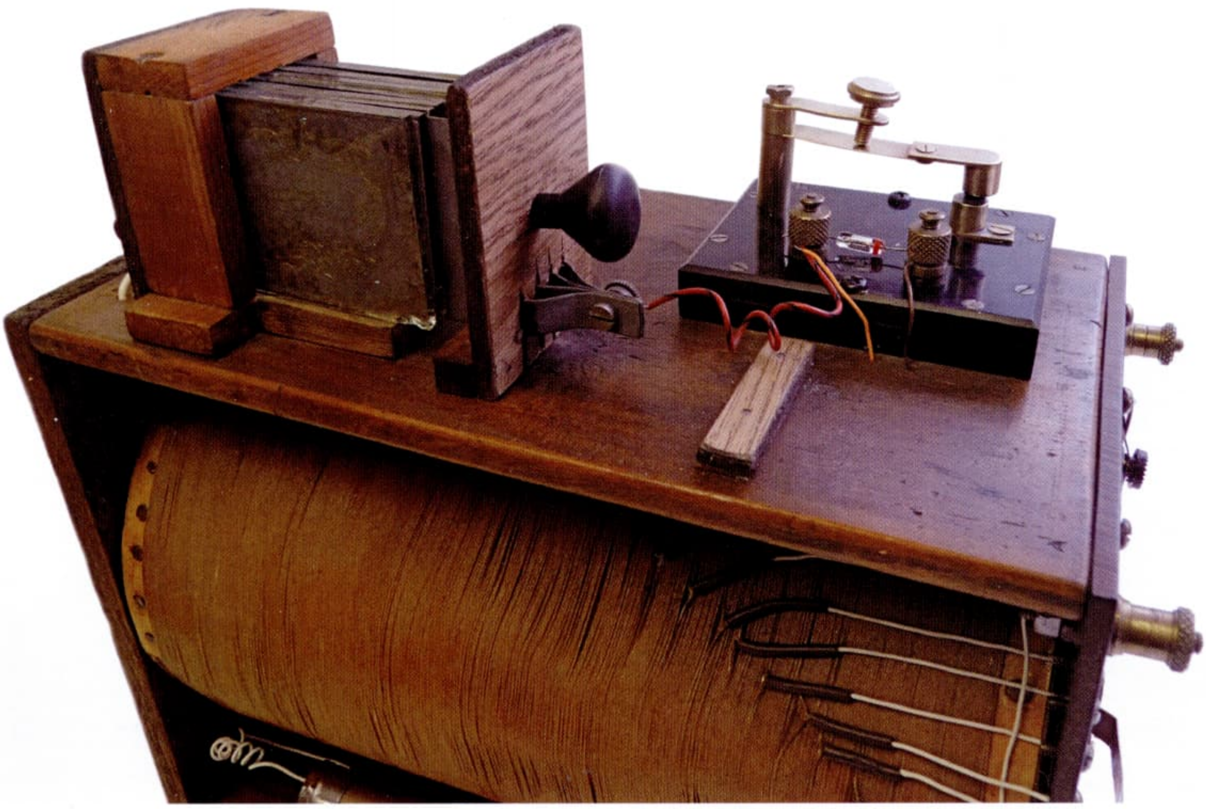
	Coil dimensions	Measured coil values	Measured capacitor values	Calculated inductance
Primary [outside]	420 turns 5.75" dia x 9.5" long	12.2 mH 27.5 Ω	50-160 pF	12.06 mH
Secondary [inside]	480 turns 4' dia x 8.75" long [estimated]	8.42mH 68Ω	50-480 pF	8.73 mH

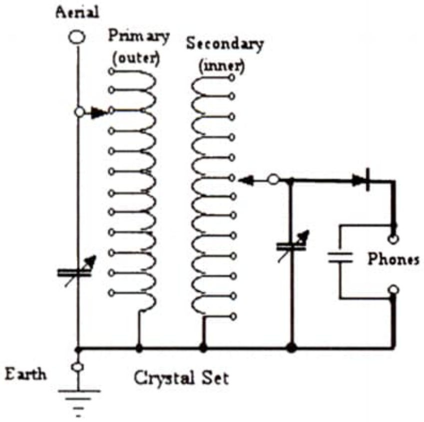
I have recently been given a copy of the relevant pages of 'The Amateur Mechanic' which shows that the double wipers should traverse the lower connections rather than the upper ones. It also confirms that the inner coil should be 4 inches in diameter as I had suspected. The construction of the device seems to be generally in accordance with the very detailed instructions except in this one fundamental respect with regard to the wipers. Were the holes drilled in the wrong places or was there something more clever in mind? The front panel described in the article is intended to be 7½ inches square rather than rectangular; could this be a reason why the constructor got into a muddle? Another minor difference is that the order in which the tappings are connected to the screws is reversed, i.e. the first tappings of each coil should be on the left rather than on the rightmost screws. The crystal holder has not been equipped with the suggested zincite/bornite junction, but in other respects has been made as instructed. The experimenter who constructed this example never got round to making the fixed capacitor which should have been connected across the headphone terminals. In the original illustration (fig. 22 on next page) it is shown fitted below the upper variable capacitor.

The following table based on one in the above mentioned article indicates the suggested switch positions for various wavelengths and also shows the intended connection of the coils and switch wipers (see figure 2 on next page). For close coupling between the coils the second wiper on the secondary is set on the first stud for all frequencies. With the coils connected as shown in figure 1 I connected my Advance model 4B signal generator via a dummy aerial and monitored the rectified output on an oscilloscope. I found that that it was possible to tune for maximum response over a range from 55 kHz to 1.3MHz. Curiously the very detailed instructions only specify the wire gauges, coil diameters and winding lengths, but I did note that the plate capacitor should have been constructed with glass from redundant photographic plates rather than the 1/8th inch glass used in my example. I happen to have a box of negative plates dating from 1916 with images of my father in a pram which I found were half the thickness, so theoretically had the thinner glass been used, the capacitance of the secondary capacitor could be doubled and resonance at the lower frequencies mentioned in the article obtained. The parts required to construct the set which are detailed in the article include 8 ounces of 28 gauge and 3 ounces of double cotton insulated wire. Using data from copper wire tables this should be sufficient for 500 primary turns and about 1000 secondary turns. The resistance measurements clearly indicate that if the specified wire gauge was used there are considerably fewer than 1000 turns on the secondary.

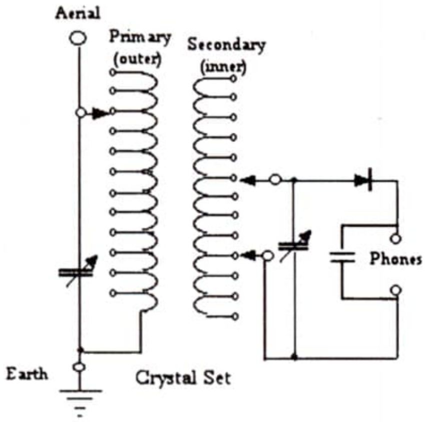
metres	Primary	Secondary	kHz
600	2	1-2	500
900	3	1-3	333
1200	4-5	1-4	250
2000	5-6	1-5	150
2600	9-10	1-7	115
3500	15-16	1-8	86
4000	20-21	1-10	75
5600	28-30	1-13 *	53
7200	25-26	1-13 *	41.6

* with secondary condenser





Above: figure 1



Above: figure 2

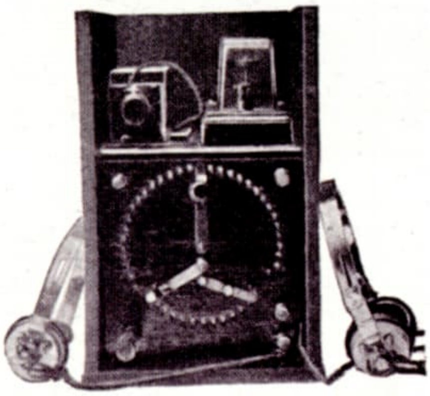


Fig. 15.—Long-distance Receiving Apparatus (Crystal) with Front and Top of Box Removed

There appear to be several combinations of capacitor value and switch position which can be used to tune to a particular frequency:

a) to obtain resonance at 55kHz both wipers need to be to the far left (29 and 13) with the secondary capacitor fully engaged, but with the wipers in the same position and the capacitor right out the set tuned to 62 kHz. The aerial capacitor seemed to have little effect.

b) with the secondary wiper on the second stud and the primary on stud 20 resonance occurred at 350 kHz when the secondary capacitor was fully engaged, but again the primary capacitor seemed to have little effect.

c) when the primary wiper was then moved to the first tapping the set could be tuned to 1.15MHz when the secondary capacitor was set to minimum.

The early pioneers must have had endless patience, the following instructions for adjusting to a particular frequency require the adjustment of all four controls to obtain the maximum signal. I guess that 80 or 90 years ago there was much less to listen to and a lot less background noise from interference.

Working the Set

"Let the first trial take place at night, listening for stations in the table on the opposite page at the times given, and with the various switches, etc., set as described. Begin with the movable portion of both variable condensers drawn as far out as possible, without removing same. It will be noticed in this trial the lower secondary switch has not moved, nor has any use been made of variable condensers; but now, if Poldhu is being heard, is a good time to try them. With the primary switch on the stud where Poldhu is heard at the loudest, slowly push in the tube of the tubular condenser, and note the effect. This is tuning in between the studs. If signals are not improved, move the primary switch one stud lower, and again try the condenser. Having found the best position for the primary switch, move both secondary switches towards the left, one stud at a time, and note the effect. When the upper secondary switch is at the extreme left hand side, re-tune the aerial with the primary switch, and add a little capacity to the secondary circuit by means of the variable condenser on the top. The effect of this should be to first bring the signals up loud again, the 'loose coupling' minimising interference from any other station. When listening for ships or other stations using wave-lengths of 300 or 600 metres, place the primary tuning switch on the second stud (left-hand side) and the secondary tuning switches one each on either the first and third studs (right-hand side), or on the eleventh and thirteenth. As has been stated, the tuner is capable of tuning in Clifden**, whose wave-length is about 7,200 metres, without any auxiliary inductance or 'loading coil,' and when listening for this station place the primary tuning switch on the twenty-fifth or twenty-sixth stud with all the secondary coil in circuit (that is, with the secondary tuning switches at opposite ends of the half-circle of studs); and probably about half of the secondary variable condenser added. With these instructions to guide him, the beginner will, it is hoped, succeed in receiving signals without the discouraging nights of fruitless 'listening' that have been the lot of many, and once signals are received, improvement is comparatively easy. Before setting up a receiving station in Great Britain, it is necessary to obtain a licence from the Postmaster General."*

* The Poldhu transmitter situated in Cornwall which operated on 3000 metres was the one that Marconi used to send signals to Newfoundland in 1901. At the time that my earliest copy of the article was published it transmitted press news until about 1.30 a.m. with intervals each quarter of an hour.

** The Clifden transmitter situated at Derrygimla Bog, Clifden, County Galway on the West coast of Ireland was where Marconi established the first regular trans-Atlantic wireless service in 1907.

References

BVWS Bulletin Vol 14, No 2, 1989.
Article by Chas E Miller.
Radio Data Charts, third edition
RT Beatty, J McG Sowerby,
Wireless World 1944
The Amateur Mechanic, A practical Guide for the Handyman. Ed. Bernard E Jones, Vol. 4 Waverley Book Company Ltd., London EC. (undated) The latter was reprinted several times and I also have been given a copy of a slightly different form of the article from a later edition which has EC4 as the postal address of the publisher. This would indicate that it was published after 1917 when numbers were first added to London postal districts.

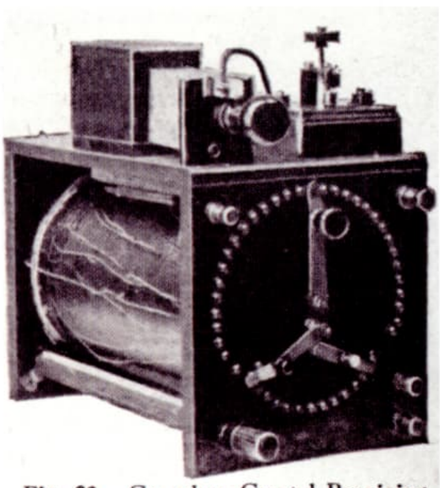
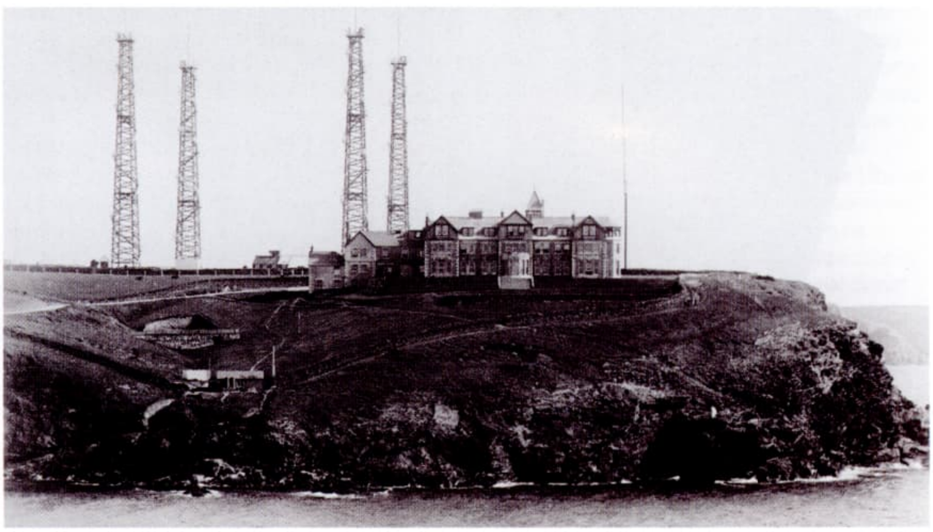


Fig. 22.—Complete Crystal Receiving Apparatus, with Case Removed

Below: the Polhu transmitter, Cornwall



A film drama about John Logie Baird? by Malcolm Baird

People who know the story of John Logie Baird's life have often asked me why there has never been a film about him. This article might help to answer the question.

Paul Kermack as John Logie Baird in the 1988 docudrama

A few weeks after Baird's death in June 1946, a film project had been suggested to Ealing Studios by the journalist Ronald Tiltman who had earlier written a biography of Baird. Nothing came of this, but other heroic British figures were featured in later films such as Scott of the Antarctic (1948), and The Magic Box (1951). In this latter case, the "box" was not television but the cine-camera; the film starred Robert Donat as its inventor, William Friese-Greene, whose life story in some ways resembled that of Baird. Laurence Olivier played a memorable cameo part as a policeman who looked into Friese-Greene's studio and was transfixed by the moving images on the screen.

After the postwar resumption of British television, the BBC expanded its coverage from London to the rest of England and eventually to Baird's native Scotland. In August 1952, BBC Scottish region asked me to take part in a radio drama about my father as part of their series "Famous Scots". This was aimed at the younger generation as part of the daily Childrens' Hour. The rehearsals and the broadcast took place at the BBC's original Glasgow studio on Queen Margaret Drive, and I still have a copy of the script. I acted as co-narrator with the up-and-coming Scottish actor Rikki Fulton; for this I was paid the princely sum of 1½ guineas (£1.58).

The next Baird dramatic effort came not from the BBC but from their commercial rival STV (Scottish Television), on December 18th 1957. They put on a play by Geoffrey Scanlan under the title "A Voice in Vision" but unfortunately I have not been able to locate either a video or a copy of the script. The cast contained some notable names; Michael Gwynn took the J.L.Baird part while Gwen Watford played the part of Margaret Baird, my mother. Baird's old friend and mentor "Mephy" Robertson was played by Leslie Philips who is still with us at age 89, one of the grand old men of British film.

For the next 21 years there was a hiatus. J.L.Baird's reputation, which had been in decline since his death, began to recover with the appearance of books and articles about his later work on electronic colour and 3D television. It was even suggested that he might have played a part in Britain's radar programme and in secret signalling technology during World War II.

The year 1988 marked the centennial of Baird's birth on August 13th 1888 and BBC television produced a docudrama entitled "I Preferred Madness". The title referred to my father's decision in 1916 to give up a steady salaried job in favour of independent business. The producer, Dorothy Grace-Elder, had been a television presenter in the 1970s and she later became a member of the Scottish Parliament; she is now a respected journalist. The programme showed Baird, recovering from a heart attack in 1941, sitting back in a garden chair and dictating his memoirs. The part of Baird was brilliantly played by Paul Kermack who also acted as narrator (see still on left). Sadly, Kermack died of a heart attack a couple of years after the production. "I Preferred Madness" is not available in either VHS or DVD format, but it may eventually appear on YouTube.

By the 1990s I was nearing retirement from my demanding university job in Canada and I was being approached on film projects. In 1993 a small California company called Point Blank Productions drew up a script outline entitled "A Man for His Country". This was inspired by the claims that J.L.Baird had been secretly involved in Britain's radar programme; it showed him in the RAF Fighter Command control room at Bentley Priory during the Battle of Britain. Despite efforts on both sides of the Atlantic to promote this treatment, it never went into production.

In 1998, two interesting treatments came across my desk. One of them was entitled "The Visual Purple" and it dwelt on my father's interest in dreams and the paranormal. The other treatment had as its main character the grotesque ventriloquist's dummy used in the early television experiments in the 1920s. Both of these treatments had merit, but they were perhaps too esoteric to attract major backing.

In 2002 a major television documentary, directed by Jan Leman, was shown on the BBC under the title "JLB, the man who saw the future". It was repeated several times and it can now be seen on YouTube. Although it was not a drama as such, it contained many dramatic elements and interesting characters, supporting the adage that truth is stranger than fiction. It was hoped that it might lead to the production of a drama. In October 2008 a film project was announced in the press by a young producer who had been part of the team in the 2002 documentary. Once again, the screenwriter centred his story on the legend of Baird's secret war work. I was assured that the film could not go ahead unless there was an exciting story and that the secret war legend would provide the required excitement. But once again, no potential directors or backers came forward.

So there the matter rests. This little history has shown the extreme difficulty of developing film or television drama projects no matter how worthy the subject. Even the recent efforts to make a film about Scotland's national poet, Robert Burns, have met with little success. Film differs from most other art forms (such as writing and painting) in that a large up-front investment is needed before the work can be produced. Would-be investors are given no business plan in the conventional sense; there is an element of luck, and they have to take a major gamble. However it is not impossible that a J.L.Baird film will be produced at some point in the future.

The Decca TP22 Transistor Radio

by Stef Niewiadomski

This good looking early Decca transistor radio caught my eye at the Harpenden event in September 2012, and I bought it for a very reasonable price. I'd recently worked on a few valve portable radios and thought a transistor portable would make a welcome change.

Figure 1: The Decca TP22. As received the cabinet was in good condition, and I only needed to give the knobs a good clean.

The radio is definitely on the 'cusp' of the transition from valve to transistor: it uses a ferrite rod aerial, but also has an external aerial socket 'just in case', and its construction makes use of a metal chassis rather than a PCB. The cabinet is made of wood and although many radio manufacturers had already adopted moulded plastic cases, perhaps Decca were a little slow to make this move.

The TP22 was launched in September 1959, priced at £15 2s 1d. The TT33 'table' model, using the same chassis, appeared at the same time and cost about 16s more. These radios began a progression of Decca transistor radios and as far as I can tell no more valve-based radios were released. However Decca did persevere with a line of valved AM/FM stereo radiograms into the 1960s, which with typical power outputs of 3-5W per channel were still beyond the capability of affordable transistors.

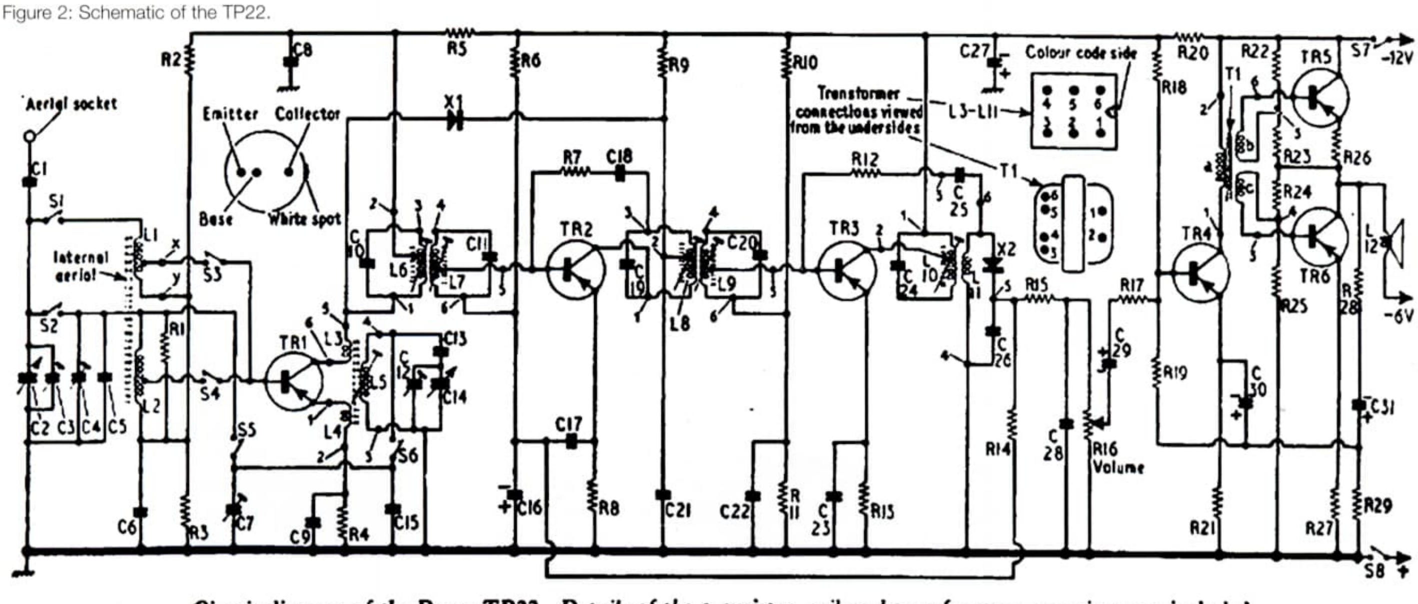
Schematic of the TP22

The schematic of the radio is shown in Figure 2. The design uses six Ediswan X-series transistors and two germanium diodes, and is a fairly conventional medium / long wave superhet of the day. One interesting feature is the audio output stage where a transformer phase-splitter is used in the driver stage but the output transistors are directly coupled to the speaker, without an output transformer. The 6V+6V spilt supplies allows the speaker to be returned to the mid-rail point and therefore a high capacitance DC-blocking output electrolytic is not needed. The downside is that you need two batteries.

In the early years of transistor radios the most critical area was the design of the frequency changer stage, and the selection of an appropriate transistor for this function. Very early designs used two transistors but when the self-oscillating frequency changer was developed (I believe it was first used in the Regency TR-1) one expensive transistor was saved which made a significant saving to the overall cost of the radio. The single-transistor frequency changer design became the de-facto standard for all transistor radios from then onwards.

In Reference 1 Robert Darwent describes how Bush needed to include a single DK96 valve as the frequency changer in its ETR82 radio because the transistors of the time (this is 1959) could not operate at 18MHz or so required to cover the 16m band needed for this 'export set'. A year later the OC170 was available and this replaced the DK96 in the following model. The Regency TR-1, the

Figure 2: Schematic of the TP22.



Circuit diagram of the Decca TP22. Details of the transistor, coil and transformer connections are included.

world's first production all-transistor radio, used an IF of 262kHz, which was sufficiently lower than the standard US IF of 455kHz to allow the frequency changer transistor to work. In the UK some early transistor radios had an IF of 315kHz for the same reason.

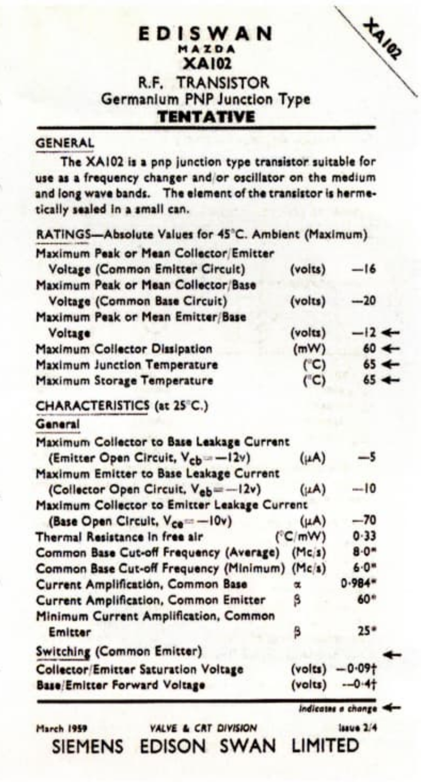
The XA102

The TP22 uses an Ediswan-Mazda XA102 germanium transistor in the frequency changer stage. Ediswan-Mazda provided data sheets and application data for radio designers and I've reproduced the March 1959 version of the XA102 data sheet in Figure 3. As you can see the data is described as 'tentative' but presumably the designers at Decca had sufficient confidence in the data that their circuit would work in production. Ediswan-Mazda also provided a self-oscillating frequency changer 'reference design' (see Figure 4). The Decca designers used the general outline of the circuit, but increased the values of the resistors, presumably to save power and hence lengthen battery life.

As far as I can tell the TP22 (and by implication the TT33) was the first, and the last, Decca radio that used X-series Ediswan-Mazda transistors. All subsequent models used Mullard OC-series transistors. This was a common story throughout the industry and Mullard soon became dominant in supplying transistors to most radio manufacturers.

The TT33

The service sheet for the TP22 also mentions a table model, the TT33, which "uses a similar chassis and circuit to the TP22", but doesn't show a picture. The Radiomuseum at: http://www.radiomuseum.org/ does show a picture of the TT33: the radio appears to have a light brown polished wooden front panel and dark wood cabinet, and no carrying handle, but which is still battery powered. The position of the dial, controls and the speaker are identical to the TP22.



XA102

EDISWAN
MAZDA
XA102
R.F. TRANSISTOR
Germanium PNP Junction Type
TENTATIVE

GENERAL

The XA102 is a pnp junction type transistor suitable for use as a frequency changer and/or oscillator on the medium and long wave bands. The element of the transistor is hermetically sealed in a small can.

RATINGS—Absolute Values for 45°C. Ambient (Maximum)

Maximum Peak or Mean Collector/Emitter Voltage (Common Emitter Circuit)	(volts)	—16	
Maximum Peak or Mean Collector/Base Voltage (Common Base Circuit)	(volts)	—20	
Maximum Peak or Mean Emitter/Base Voltage	(volts)	—12	←
Maximum Collector Dissipation	(mW)	60	←
Maximum Junction Temperature	(°C)	65	←
Maximum Storage Temperature	(°C)	65	←

CHARACTERISTICS (at 25°C.)

General

Maximum Collector to Base Leakage Current (Emitter Open Circuit, V_{cb} = —12v)	(µA)	—5	
Maximum Emitter to Base Leakage Current (Collector Open Circuit, V_{eb} = —12v)	(µA)	—10	
Maximum Collector to Emitter Leakage Current (Base Open Circuit, V_{ce} = —10v)	(µA)	—70	
Thermal Resistance in free air	(°C/mW)	0·33	
Common Base Cut-off Frequency (Average)	(Mc/s)	8·0*	
Common Base Cut-off Frequency (Minimum)	(Mc/s)	6·0*	
Current Amplification, Common Base	α	0·984*	
Current Amplification, Common Emitter	β	60*	
Minimum Current Amplification, Common Emitter	β	25*	

Switching (Common Emitter) ←

Collector/Emitter Saturation Voltage	(volts)	—0·09†	
Base/Emitter Forward Voltage	(volts)	—0·4†	

Indicates a change ←

March 1959 VALVE & CRT DIVISION Issue 2/4

SIEMENS EDISON SWAN LIMITED

Figure 3: The March 1959 version of the XA102 data sheet.

Taking it apart

The chassis was very easy to extract from the cabinet. First the three knobs were removed: these were held on with grub screws and to my relief they didn't put up a fight. The knobs were quite dirty and so I gave them a good clean in soapy water and set them aside to dry. Then two screws were removed from the base of the cabinet and after unsoldering a couple of wires the chassis slid out, complete with the tuning mechanism and scale. Figure 5 shows this assembly newly removed: the transformer to the right of the chassis is the audio driver transformer. You can see the IF transformers and local oscillator coils along the left hand edge.

The frequency changer stage, TR1, is mounted out of sight behind these coil cans. Initially I thought the way the aerial socket had been mounted looked amateurish and I suspected it had been added on by a previous owner. However the socket is on the schematic and can be seen on other examples of the radio, so it is original. On my radio the socket was broken and so I replaced it.

Figure 6 shows a front view of the Perspex dial, with the ferrite rod 'peeping over the top'. I like the uncluttered design of the dial with station names, and frequencies and wavelengths both shown in red and black, against its background colour. If you look at the top right hand corner, you can see 'IF 472 Kc/s' conveniently marked for servicemen.

Figure 7 is a photo of under the TP22 chassis. The audio driver transistor, TR4, is at the bottom right of the picture, and the output transistors, TR5 and TR6, are at the upper right. The IF stages, TR2 and TR3, are located along the left hand side of the chassis. There are four tag strips running front-to-back in the chassis onto which most of the components are soldered.

Transistors

Five of the six transistors are mounted on the chassis and are held into the side of the chassis by rubber grommets, with the transistor's leads soldered into the tag strips. These leads are quite long, presumably to protect the transistors from heat as they were soldered. Such long transistor legs have a tendency to break over the years, so I checked them all and they appeared to be sound. There seems to be no attempt to

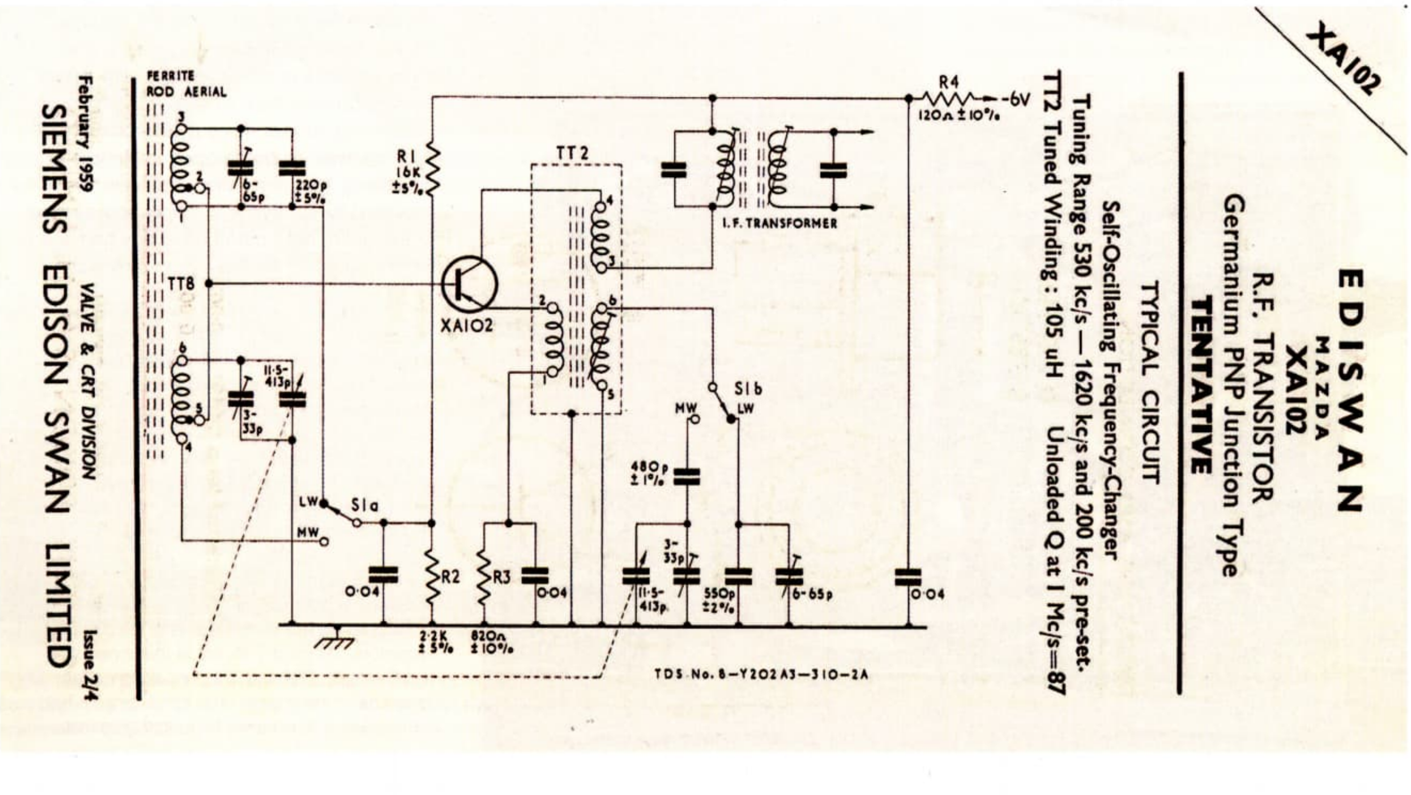


Figure 4: Ediswan-Mazda's self-oscillating frequency changer 'reference design' for the XA102.

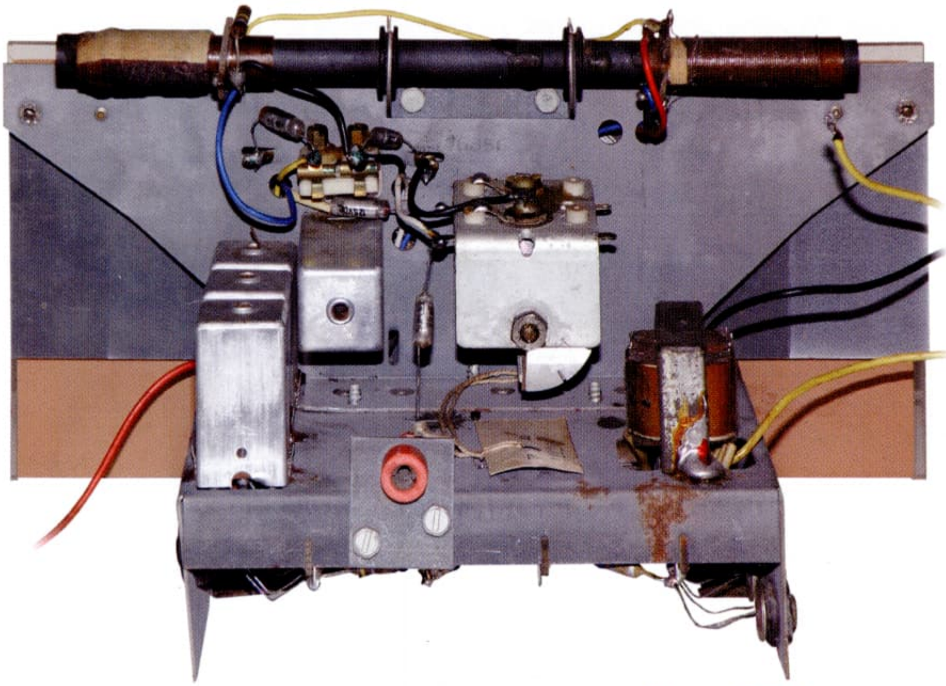


Figure 5

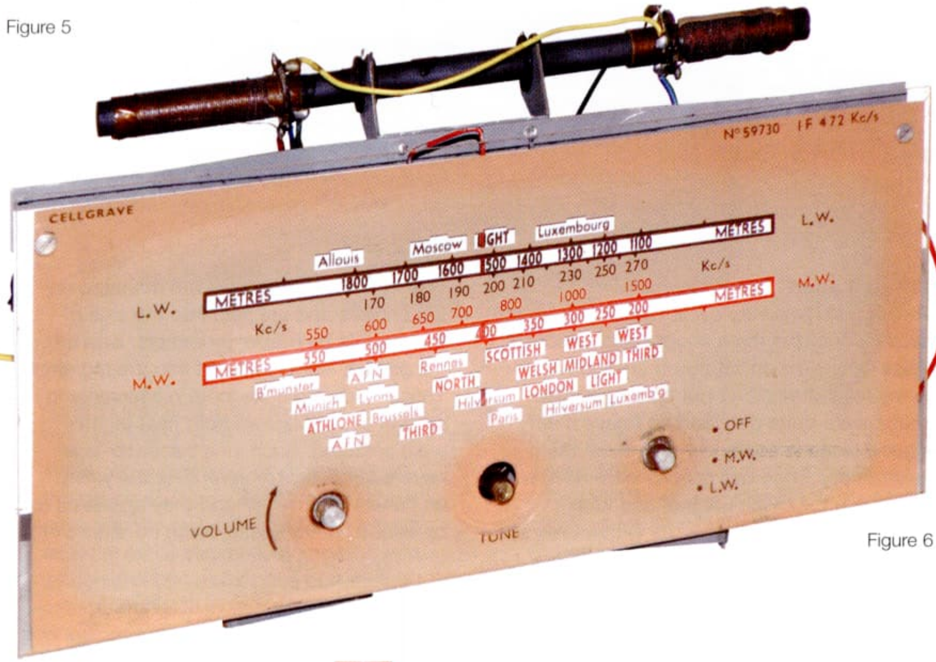


Figure 6

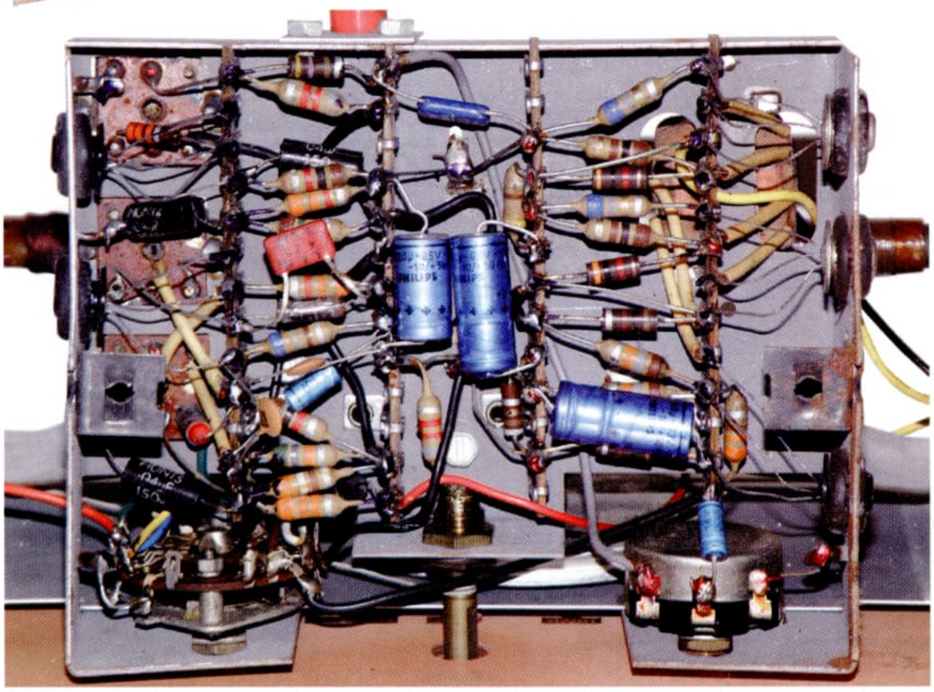


Figure 7

use the chassis as a heatsink, presumably because there was no need to dissipate any appreciable heat. The wavechange switch is mounted at the left hand bottom corner of the chassis, then the tuning shaft and finally the volume control on the right.

The service data mentions that replacement transistors could be obtained in packs, as types RF1 or LF1. RF1 contains one XA102 and two XA101s, and LF1 contains one XB103 and a matched pair of XC101s. It recommends that if one of the RF/IF or AF transistors fails, then the full three should be replaced, hence the packs. In 1959 transistors were regarded as being very delicate, whereas experience would show that once they were safely soldered into circuit they were pretty robust. I would have thought that the only way of damaging the transistors in the TP22 was to connect the batteries the wrong way round. The shape of the battery shelf and the off-set of the battery contacts make this hard to achieve.

There are four electrolytics used on the chassis, all made by Philips and blue in colour. These looked original as I could still see the coloured marker 'blob' added to all the soldered joints as they were checked. I was wary that these may be leaky, but it was worth a switch-on to see how they behaved. There were also a number of non-polarised Hunts capacitors which also seemed to be in good condition.

The chassis was constructed from folded and plated steel and there was some evidence of rust caused I believe by a leaky battery at some point. I rubbed these areas down to remove the loose surface rust and treated them with Kurust. Hopefully this, storing the radio in dry conditions from now on and making sure that flat batteries aren't left inside the set, will stop any future rust problems.

Speaker Grille

The intention of the designers seems to be that the speaker grille was bowed outwards from its cut-out in the cabinet. On my radio it had been pushed in and there seemed to be no mechanism, apart from good intention, to stop this from happening. In fact the outward bowing in itself seemed to be an open invitation for anyone to 'give it a poke'. I believe the standard fix for this is to apply some starch to the grille, but I didn't have any handy so I'll rely on good will from now onwards.

Top left, Figure 5: The plated steel chassis, and attached tuning mechanism, dial and ferrite rod, removed from the cabinet. You may just be able to see the inspection label still attached to the aerial socket.

Centre left, Figure 6: Front view of the dial attached to the chassis. The background colour of the dial is difficult to pin down, but my wife described it as 'light caramel'.

Lower left, Figure 7: View of under the TP22 chassis. The audio driver transistor, TR4, is at the bottom right of the picture, and the output transistors, TR5 and TR6, are at the upper right. The IF stages, TR2 and TR3, are along the left hand side of the chassis. The transistors are held in the sides of the chassis by rubber grommets.

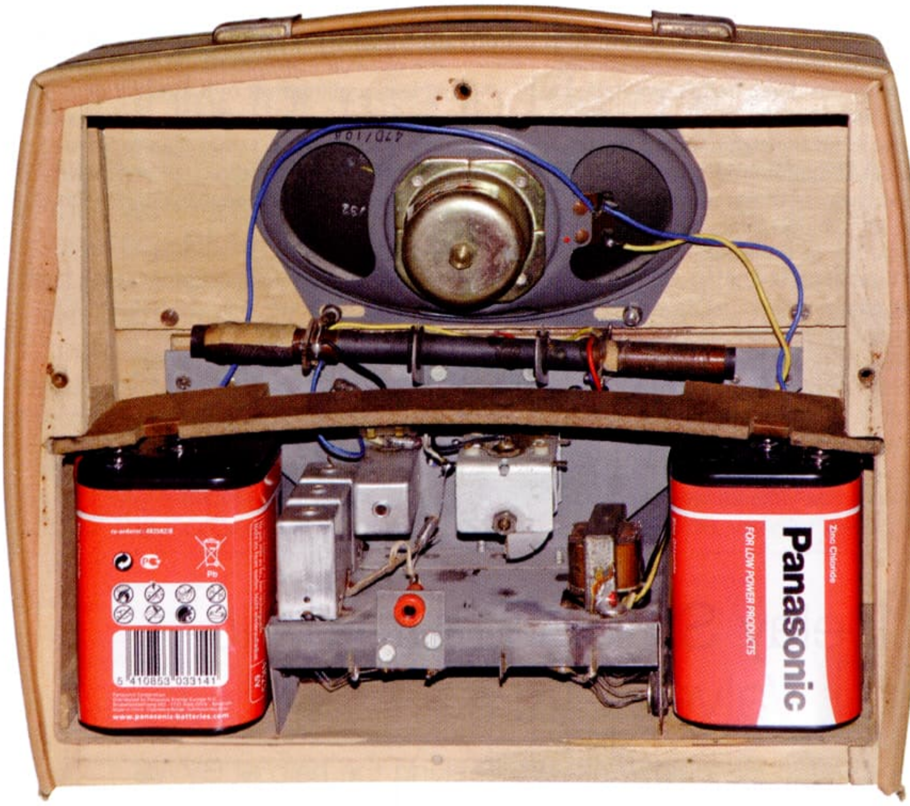


Figure 8: Rear view of the radio with the type 996 batteries fitted.

Figure 9: The top left-hand (viewed from the rear) corner of the inside of the cabinet: hopefully it shows some of the complexity involved in the wood-work.

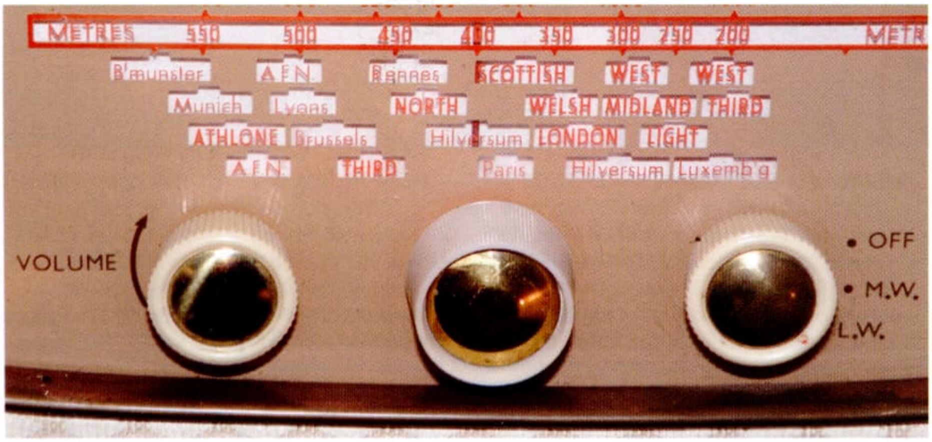


Figure 10: The three knobs on the radio. The tuning knob is a different shape from the volume control and band switch, and looks whiter than the other two. Looking at photos of a couple of examples of the TP22 on the internet revealed that they are the correct shape for my radio.

The set contains a 7" x 4" Fane elliptical speaker of 35Ω impedance, according to the service notes, and this gives it a good sound. The speaker is held in by four nuts and washers running on captive screws in the cabinet.

Batteries

I mounted the chassis back into the cabinet, refitted the shelf, reconnected the wires I'd unsoldered and refitted the knobs. The batteries called for in the service sheet are a pair of Ever Ready type 996 lantern batteries. Luckily this battery is still used for lantern-torches and I bought a couple on eBay. I think the design of the 996 has changed over the years: the ones I bought had two spring clips for connection whereas the battery loading instructions (still stuck to the inside of the back panel of my radio) showed a battery with one spring and one contact strip. This wasn't too much of a problem. The clip on the connecting wire to the radio could still be made to connect onto the spring on the battery.

Figure 8 show a rear view of the radio with the batteries fitted. The shelf was bowed upwards when I received it, presumably from the upward pressure over the years of the springs on the batteries. I was tempted to carry out an 'in field' modification to reinforce the shelf but in the end left it as original.

After switching to the long wave I could hear a hiss from the speaker and Radio 4 came in loud and clear round about 1500m. The medium wave revealed the usual set of stations I'd expect to receive and the calibration was close enough so I didn't mess with it. I plugged a long wire antenna into the aerial socket and while some stations came in louder there were lots of whistles and howls between stations. I presume the front end was being overloaded so I changed the antenna for a short length of wire and this improved things considerably.

Construction of the cabinet

Having removed the 'electronics bits' I was struck by the complexity of how the cabinet had been built. I counted no less than 26 discrete pieces of softwood or plywood glued and screwed together, many of which were curved or had cut-outs in them, plus the hardboard battery shelf and the rear panel. No doubt jigs were used to help mass-produce the various shapes but the cabinet making process must have been a major operation. Figure 9 shows one inside corner of the cabinet: hopefully it shows some of the complexity involved. Of course it was to be only a very few years before moulded plastic cases would become the standard, and many companies had already made the transition.

The plastic handle had a few cracks in it but was otherwise intact. The metal trims around the speaker and dial cut-outs, and the ones holding the handle onto the top of the cabinet, were a little tarnished, but I left them as they were.

At first I thought that the tuning knob on my radio was from a different radio. As you can see from Figure 10 this knob is a different shape and looks whiter than the other two. Looking at photos of a couple of examples of the TP22 revealed that they appeared to have the same shaped knobs as my radio, so I presume that they are a set.

Conclusions

The Decca company as a whole is probably best known for its record label, and the fact that it turned down the Beatles in 1962 with the comment that "Guitar groups are on the way out", and then at least partly redeemed itself by signing up the Rolling Stones. It produced many radios over the years, and of course many radiograms and record players to encourage people to buy and play their records.

My TP22 was a classically-styled radio for the end of the 1950s, and perhaps I can say that "wooden cabinets were on the way out". The use of a metal chassis for mounting most of the components, and a wooden cabinet, indicated that Decca's designers hadn't quite caught up to the PCB assembly trend just about to hit transistor, and many valve, radios. The ferrite rod was a positive move away from frame aerials and was almost universally adopted very quickly by all transistor radio designs.

The complexity of the cabinet was staggering: there must have been a large production line dedicated to cutting the pieces of wood, forming them to shape and assembling them into the finished cabinet. Within a very short length of time plastic cases would appear and presumably a considerable number of skilled wood-workers lost their jobs.

The radio sounds very good, helped by the generous size of the cabinet and the elliptical speaker. I'll definitely use it, at least until the set of batteries I bought run down. It seems to me to be better to use the radio now rather than to let the batteries run themselves flat unnoticed and perhaps do damage inside the radio.

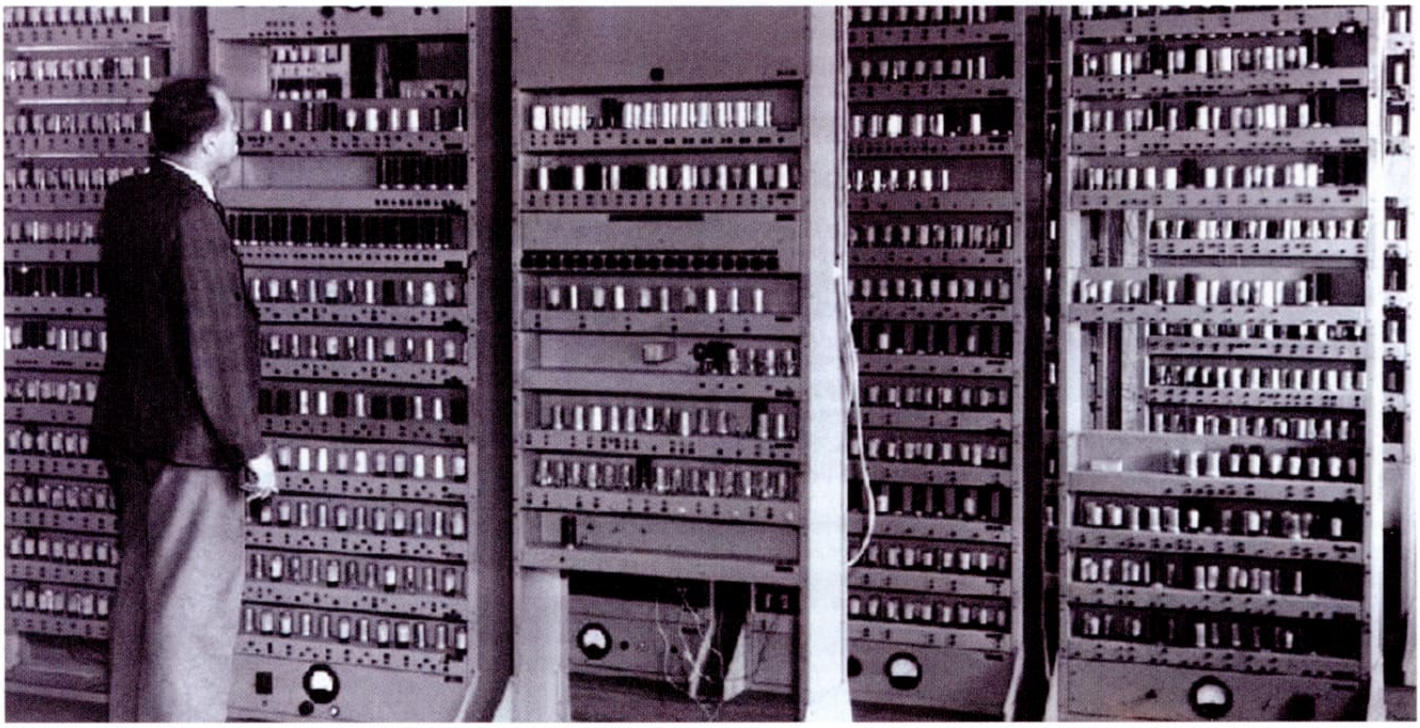
References

Reference 1: 'Variations on a Theme: The Bush MB60 Family' by Robert Darwent. Published in the BVWS Bulletin issue for Winter 2010.

There's a brief description of the restoration of a TP22 at: http://www.vintage-radio.net/forum/showthread.php?p=74049

EDSAC (Electronic Delay Storage Automatic Calculator) Appeal for Valves etc.

The National Museum of Computing based at Bletchley Park are seeking the help of BVWS members to source needed valves and components to enable them to rebuild the EDSAC Computer originally designed and used at Cambridge University in 1949 as a fully authentic working replica.



Valves:
EF54 x 100 EA50 x 200 EB34 x 300 EF50 x 20
12E1 (CV345) x 10 KT61 x 10
ECR60 (VCR97 - CV1097) 6" Cathode Ray tubes as used in wartime indicator units x 10

Valve Holders:
B9G sockets – for EF50 etc. x 1,200 (New or good used examples) They will clean up any used versions.
IO sockets – Octal (1.125" diameter) x 1,110 (New or good used examples)
EA50 top clip x 650 (New or good used examples)
B12B sockets for VCR97 CRT's x 10 (New or good used examples)

Other items:
4 uF block capacitors
2uF block capacitors x 80

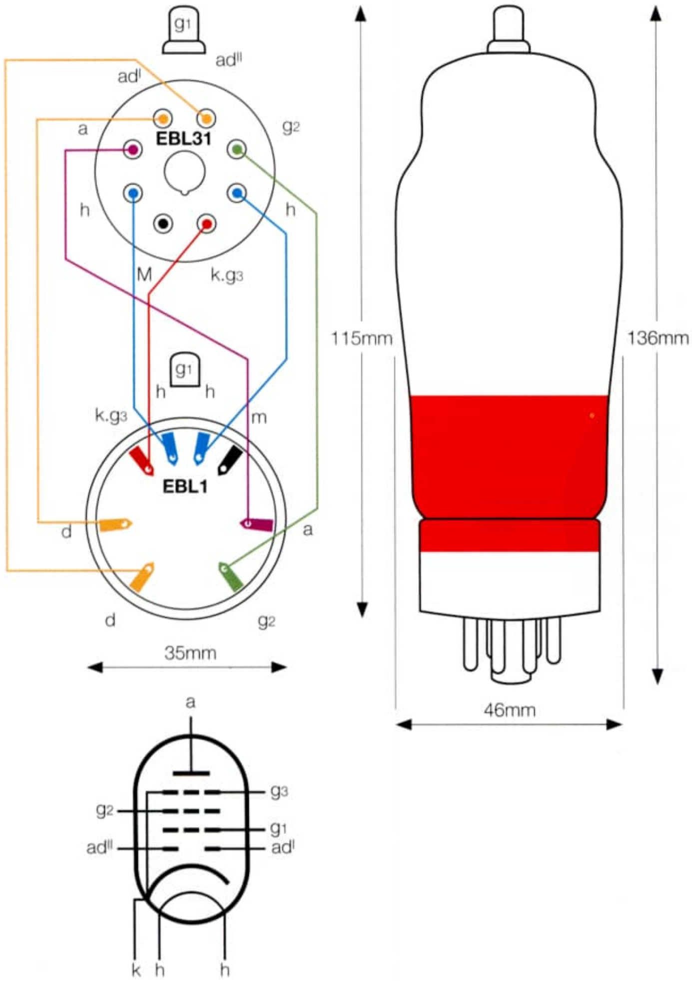
If you can help with any of the above, please bring them along to any BVWS event and give them to myself or other Committee members and we will get them to Bletchley Park. Alternatively why not take a trip out to Bletchley and hand them in on site? See www.edsac.org for full details of the project.

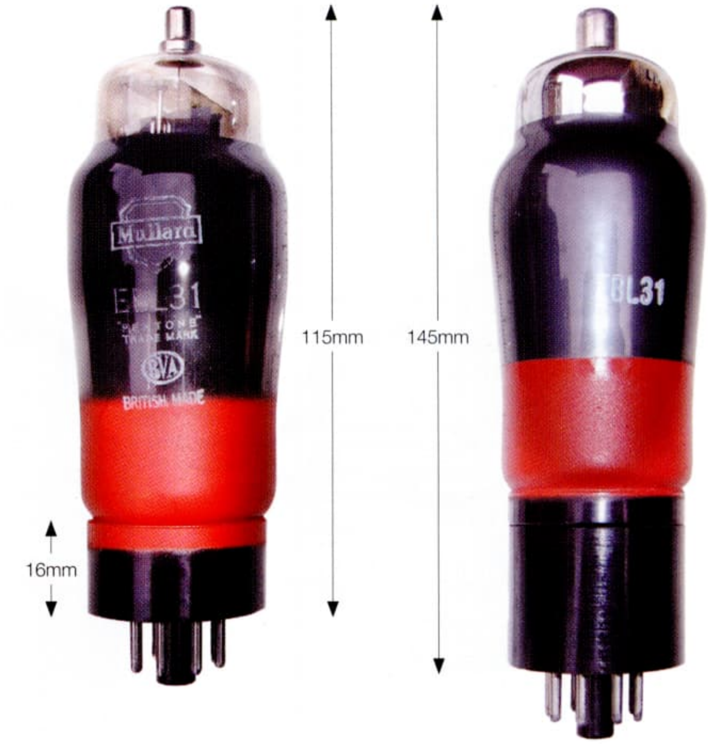
Mike Barker

Conversion of EBL1 valve to EBL31, suitable for use in Ekco A22 radio

by David Taylor

In my article published in the summer 2010 Bulletin ('More Musings on the EBL31 Valve'), I mentioned that those EBL31s presently on offer from several UK valve dealers appear to be converted EBL1s. The clues that point to this are that the valves have a tall octal base and a neat join where the base appears to have been fitted over the side-contact base of the EBL1 valve and wired to it - a much simpler task than the removal of the side contact base and extending the wires to a new shorter octal valve base. These converted EBL1s also retain their larger 3/8" top cap, rather than the ¼" top cap of the EBL31, necessitating the replacement of the top cap clip in the radio. In the Circular Ekco A22 this is further complicated by the top cap clip also being a tag strip which accommodates the 4k7 resistor to G1 on the top cap to the EBL31, so either a new tag strip/top cap clip needs to be fabricated for the larger top cap of the converted valves, or the top cap of the valve needs to be changed for a ¼" one.





Genuine EBL31: essential for use in the Ekco A22 due to restricted space.

Note factory-fitted original octal base on genuine EBL31

EBL1 valve adapted to EBL31 specifications by fitting an octal base as supplied by several UK valve dealers.

Note larger top cap than original EBL31.

Also note joint where an octal valve base has been fitted over the side contact base of an EBL1 to make it work as an EBL31.

Fig 1: Cross-wiring of electrodes from EBL1 side-contact base to EBL31 octal base.

Fig 2: Small and large 'EBL31' valves compared

My own experiences with the EBL31 have been in relation to the Ekco A22, in which, as I outlined in my earlier article, the EBL31 lies horizontally, so the converted EBL1s on offer as 'EBL31s' from UK valve dealers are just too tall to allow the back panel of the radio to fit on. Fig 2 shows a genuine EBL31 alongside a converted EBL1, illustrating the differences in height and the different top caps. The tallest height from the valve base to the top cap that can be accommodated in an A22 is 128mm (5"). A genuine EBL31 measures 115mm (4⅝") cap - a converted one, at 135mm (5¼") is just too tall to allow the back of an A22 to be re-fitted.

EBL1 valves seem to be more plentiful than genuine EBL31s, and often much cheaper, so when the opportunity presented itself at a BVWS Golborne Swapmeet to buy two boxed N.O.S EBL1s for ten pounds each, the temptation proved too great! Partly out of curiosity, partly out of necessity, I wanted to see whether I could convert the valves to EBL31s within the height limitations posed by the Ekco A22. I decided to embark on two approaches - one more radical than the other. The more difficult and intricate option was to cut off the the side contact valve-base and to wire an octal base shallow enough for the valve to be identical in height to a genuine EBL31. The easier option was to leave the side contact base intact, and to cross-wire it to an octal base as shallow as possible within the height constraint. I'll explain those two options - each of which proved successful. I also removed the larger EBL1 top cap and replaced it with the smaller sized one as used on the EBL31 and will explain how I achieved that.

Fig 1 shows how the side-contact valve base connections of the EBL1 need to be cross-wired to an octal base as used on the EBL31.

Method 1 – removal of part of the EBL1 side contact base:

The first task was to de-solder the valve pins on the base of the EBL1, which was straightforward enough using a solder sucker and iron. To make sure that each wire was fully de-soldered I used a magnifying glass and wiggled the wires with a pointed modelling knife. See fig 3.

I'd decided that rather than completely removing the side-contact base, I'd cut around the periphery of the base about 5mm below the point at which the base joined the glass, thus leaving the metalising undisturbed where the base joins the glass. This proved a wise decision. I very carefully cut around the periphery of the base with a diamond cutting disk mounted in a small Dremel type drill, so as to not cut through any wires. The metalising wire which goes to the cathode and G3 connection, (which are themselves electrically connected within the valve), was very close to the inside of the valve base and could all too easily be cut through, so care is needed here.

The rest of the operation proved rather more intricate than I'd imagined, as I'd wrongly assumed that once a valve base is removed, the wires would stay in a neat ring, so would be easily identifiable by counting back and forth from the heater wires, (which can of course be identified by a continuity test). Would that life were so simple! Firstly, the wires emerging from the valve glassware do not emerge in a neat circle, but in a straight line deep within a hollow recess in the glass at the base of the valve. It is therefore vitally important that as soon as the severed portion of the base has been eased off just a little, but while the wires are still in place in the valve base solder tags, each wire is labelled so that when the base is lifted right off, each can be identified. I did this by tying some dial cord tightly around each wire and attaching a tag made from masking tape onto each one. How glad I was that I took that precaution because the moment I lifted the base right off, the wires sprang out of position and apart from the two heater wires, it's anyone's guess which wire emerges from which electrode in the valve.

Fitting the new octal base:

Once the severed side-contact base had been lifted off, I slipped coloured sleeving over each wire to identify which of the pins on the new octal valve base the wires needed to be soldered to. See fig 4. I then obtained an octal valve base from a scrap donor valve. The octal base on the donor valve had been firmly stuck so after having desoldered the wires within the pins, I soaked it in methylated spirit overnight to dissolve the shellac/wood flour cement commonly used to secure bases to valves, and the base easily came away next morning. I then cut the base down to a height of 16mm (5/8") using the diamond cutting disc in the drill. I extended the valve wires by soldering lengths of tinned copper wire to each in turn, then slipping short lengths of sleeving over the wires to obviate the risk of them shorting out to each other when the octal base was pushed into position. The wires were then pushed down into each octal pin according to the EBL31 base requirements as shown in fig 1, taking care that they were in the correct pins, remembering that when viewed from above, the valve pins number 1 - 8 anti-clockwise - the opposite of how they appear when looking at the valve base from below. See fig 5. Having made sure that the new octal base married up neatly with the remnant of the side contact base I mixed some rapid setting two-part

Fig 3: EBL1 pins de-soldered, ready for removal of base

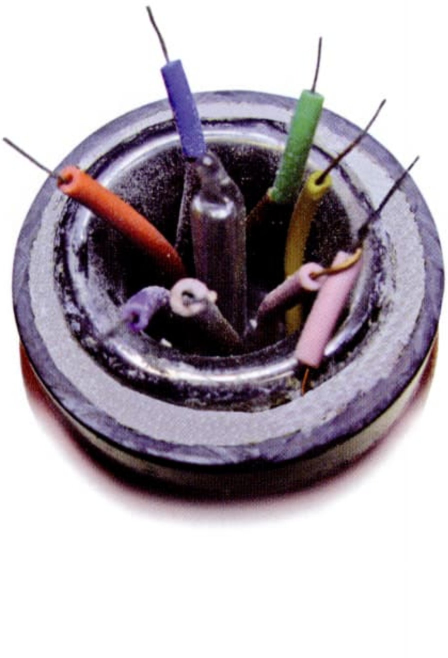


Fig 4: Side contact base cut off, showing electrode wires

Fig 5: EBL1 conversion to EBL31 ready for base to be soldered

Fig 6: EBL1 large top cap removed, correct EBL31 cap ready

Fig 7: Side contacts valve base with insulating disc in place

Fig 8: Original EBL81 shown alongside converted EBL1 valves using 'method 1' (base partly cut off), and 'method 2' (base left in place). On both converted valves the larger EBL1 top cap was removed and replaced with the correct EBL31 (1/4" dia) top cap

epoxy glue ('Araldite Rapid'), applied this to the two valve-base surfaces, pushed the octal base into position and held it there for a minute or two until it was firmly set. I then soldered each octal pin in turn and snipped off the surplus wire ends. That was the 'business end' completed, so I turned my attention to the top cap.

Top cap removal and replacement:
First, I desoldered the top cap to free the wire, gently checking with the point of a modelling knife that the wire was indeed free. I then inverted the valve and immersed the top cap in a small container filled with methylated spirit. I left that to soak overnight and the next morning it easily came free. I scraped most of the cement from the valve but left some on the glass pip to provide a key for the new top cap. I slipped on the ¼" top cap from a donor valve with a generous blob of epoxy cement, and soldered the wire. See small and large top caps: fig 6

As stated earlier, the absolute maximum height of an EBL31 that can be accommodated in the A22 is 128 mm (5 inches) from the valve base to the top of the top cap. A genuine EBL31 valve is 115mm tall (4.75 inches), and my converted EBL1 is 124mm (4.88 inches).

Then came the 'MOT' test - the Moment Of Truth! The valve was plugged into my Ekco A22 and passed its test with flying colours.

Method two – leaving the EBL31 side-contact base in place:
The side contacts of the EBL1 make excellent solder tags onto which extension wires can be attached then poked down the respective pins of an octal valve base, but the downside of this method - which explains why the converted EBL1s on offer from UK dealers have such a tall octal base - is that there must be sufficient clearance within the donor octal base to prevent the side-contact pins from shorting to the octal pins inside the base, with disastrous consequences.

I decided that it would be a wise precaution to slip a disc of thin insulating material over the extended wires, so that when the new octal base is fitted, the octal pins are insulated within the base to obviate the risk of shorting to the pins of the side contact base. I made a disc of hard clear thin plastic of the type that is used in 'blister packs' on all sorts of packaged items, though thin Paxolin - say 0.5mm - would suffice if to hand.

As with the first method, I removed an octal valve base from a scrap donor valve and using the cutting disc in the Dremel type drill, progressively reduced the base in height to the shortest that would allow the base to fit over the side contact base to be cemented to it, which turned out to be 20mm - approx ¾". I then soldered thin insulated wires to each of the side contacts, noted which octal pin each needed to be wired to, then pushed the wires through holes in the insulating disc, dressing the wires flat beneath the side-contact base, and in some cases, around the side of the base, as shown in fig 7. (Only seven holes are needed in the disc as no connection is required to pin 1 of the octal base). The side contact base of the EBL1 was cross-wired to the octal base of the EBL31 as shown in fig 1.

I checked that I'd cross wired the electrodes correctly before pushing the octal base home and fixing it in place with two-part epoxy cement. I then soldered the wires in the octal pins. The finished height of the valve is exactly five inches, (128mm) so is only just within the height limitations of the Ekco A22. I tried it, and it fits - just! I had wondered whether the criss-crossing of wires within the base might risk introducing some instability, but the valve worked fine.

Of the two methods, the first is much to be preferred and frankly, though it needs careful use of the cutting disc when removing part of the side contact base, it doesn't really take much longer than the second method and is closer to what an original EBL31 looks like. Fig 8 shows the two converted valves and their dimensions, alongside a genuine EBL31 valve.

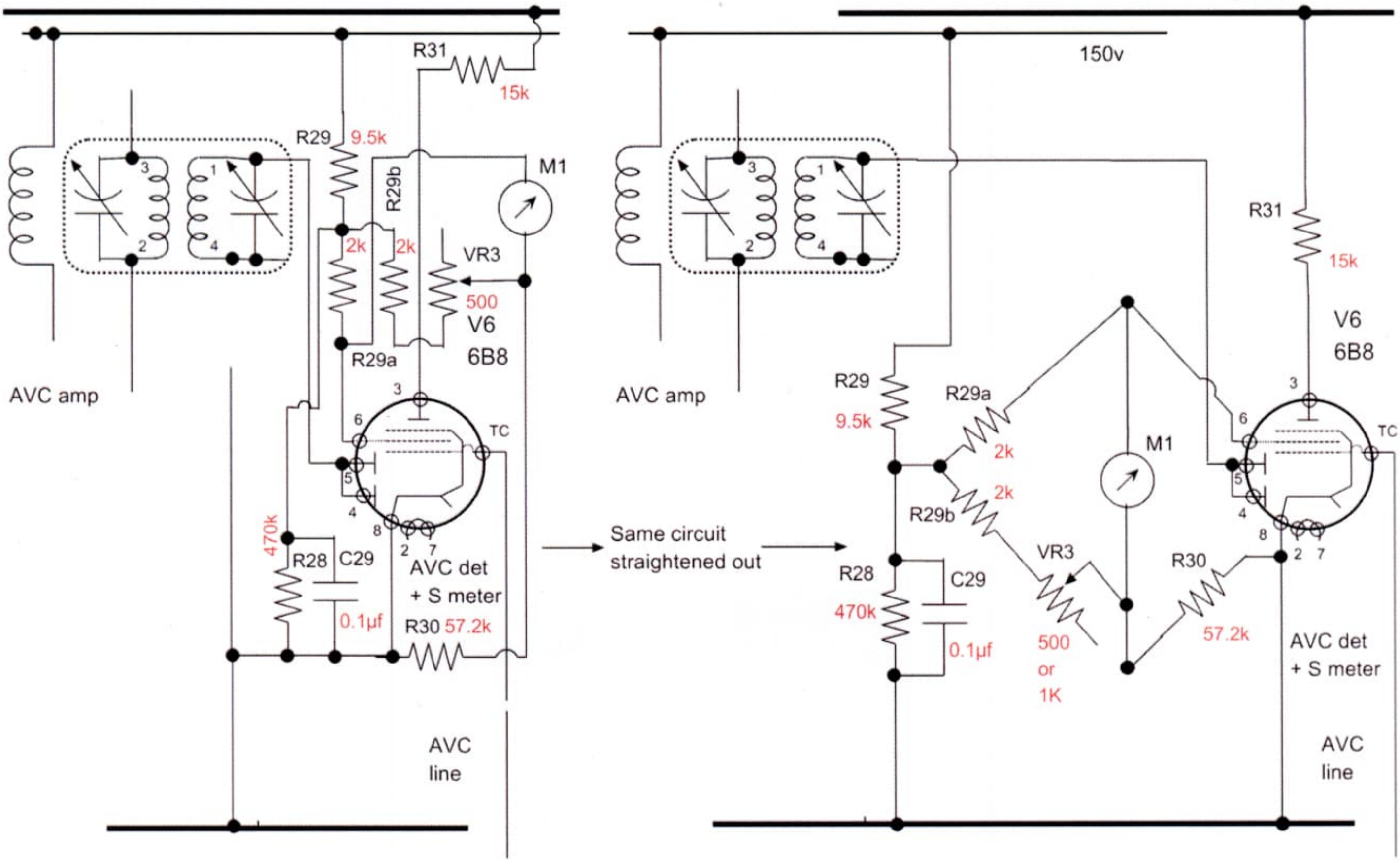
The result of these efforts is that for a total outlay of £20 on two EBL1 valves, I now have what to all intents and purposes are new EBL31s, whereas two converted EBL1s marketed by UK dealers as EBL31s, which are no use in the Ekco A22, would have cost me £50 or more. Well worth the effort!

I hope these notes may be of use to any Ekco A22 owners who are struggling to obtain EBL31s, as I was.

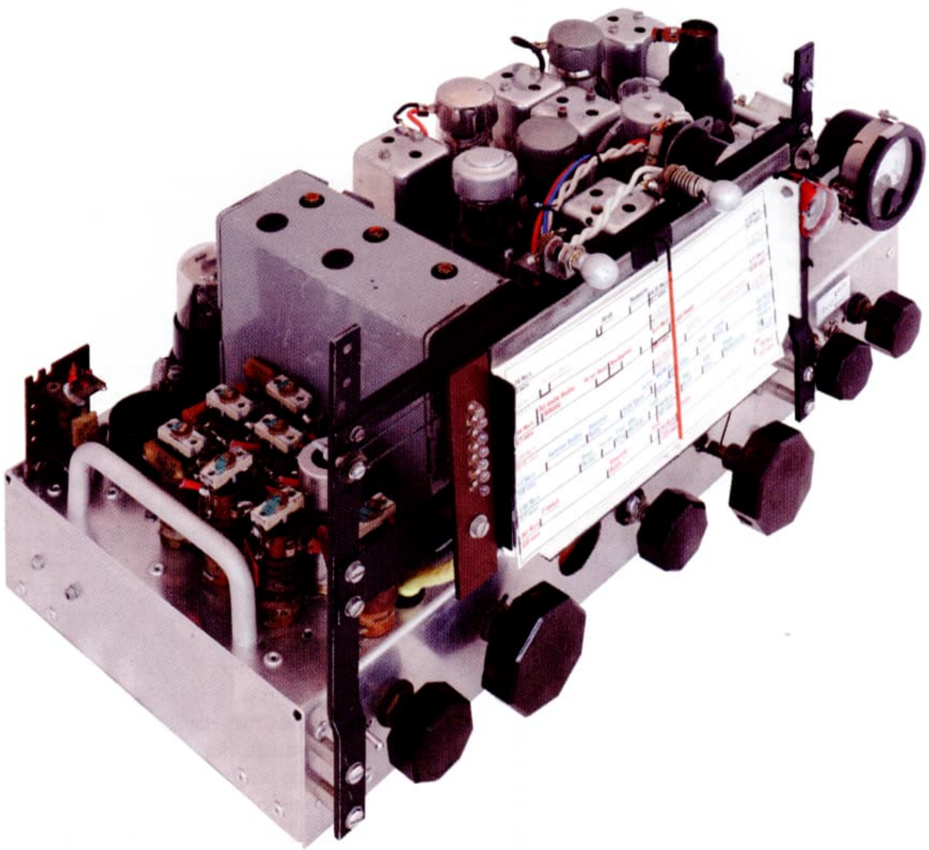
Further to the S meter Design by Keith Fishenden

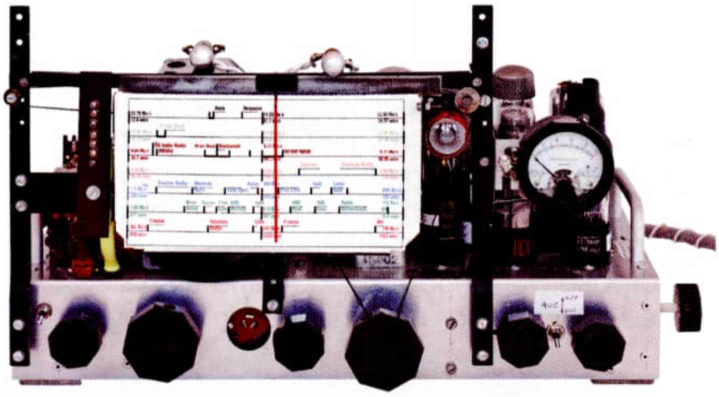
Improvements on *The Project of a Lifetime* featured in the Spring issue of *The Bulletin*

Wheatstone Bridge S meter.



Having sat with the radio for some time, and tuned up and down the dial, I came to the conclusion that the S meter circuit was not very effective. By this I mean not particularly sensitive, and did not use the full scale deflection of the meter. I looked at designs that were incorporated into professionally designed equipment and came to the conclusion that they were not really effective either. The reason for this is that when a meter is designed into the anode circuit of an AVC amplifier (or any other stage, such as the last IF amplifier in some communications receivers), the span of the voltage at the anode of the valve driving the S meter circuit, is usually not enough to drive the meter from zero to full scale. My original circuit provided a voltage swing at the anode of V6 from about 25v to 85v ie it did not reach zero even when the valve was driven hard (because there is an internal resistance between the various valve electrodes, we all know that). What is required is a circuit that can provide zero current for the meter and provide the maximum current on very strong aerial signals. If this could be achieved then the meter could be calibrated properly. One type of circuit that I was aware of that could be implemented quite easily, is the Wheatstone Bridge, as we are dealing with resistances only. (Otherwise we could be implementing a Wien Bridge for reactive





components). A balanced bridge would enable a zero potential difference across two points ie two corners of the bridge square.

In a vari-µ pentode, the mutual conductance of both anode and screen is varied by changes in the control grid bias. An increase in negative bias results in a drop in anode and screen currents. This is equivalent to an increase in resistance between the cathode and anode, and the cathode and screen respectively. It was decided to use the existing V6 as the AVC diode circuit worked well with an anode load of 15k, and directly grounded cathode. The existing screen bias was set up correctly and drew the screen bias from the stabilised 150v supply, through R28 and R29.

The design is arranged to include the cathode-screen resistance as one arm of the bridge. The bridge is formed by resistances R29a, R29b, R30 and the valve resistance between pins 6 and 8 of V6 ($R_{pins6,8}$). VR3 is in series with R29b to enable a balance to be achieved with the resistance $R_{pins6,8}$. An increase in signal strength causes a higher AVC bias to be applied to the control grid of the pentode section, as a result, increased resistance between cathode and screen occurs. This causes the bridge to become unbalanced, and the meter gives a reading proportional to the strength of the incoming signal. Under zero signal conditions, VR3 is varied to match $R_{pins6,8}$ and zero the meter, the correct screen bias voltage between R28 and R29 is unaffected. Under signal conditions, $R_{pins6,8}$ reduces, and draws more current and reduces the voltage between R29 and R28, normal valve operation. The bridge is unbalanced, a voltage appears across the meter, and the meter deflects, indicating the strength of the aerial input.

The particular Ferranti meter used had a 1mA (0.7v) FSD, at 1.03mA/V sensitivity. The calculations derived resistances for a Wheatstone Bridge of 2kΩ for R29a and R29b, 57.2kΩ for R30 and VR3 of 0-1kΩ (to balance the meter). $R_{pins6,8}$ was measured for this valve by the voltage across the pins 6 and 8, and the current through the valve using my AVO model 8. Now what I don't know is what the typical spread of screen-cathode resistance would be across a selection of the same valve type (6B8 in my case). For different pentodes the screen-cathode resistances would most certainly be different, and the bridge values would be different therefore. The Wheatstone Bridge calculations are College book stuff, found in any electrical text book on the subject. So no point in boring you with it here. However I would commend this circuit to anybody as it is much more sensitive and controllable than the series anode type referred to earlier.

I found the formulae in my old very nostalgic Advanced Level Physics 1961 text book, by Nelkon and Parker, William Heinemann Ltd, pages 864 to 869.

An interesting and useful calculation to make is that for the AVC time-constants. With the changed design, the values of components and therefore the time-constants have changed from the original. Now, my original calculations are misleading as they are the calculations for the Charge time constants. Very interesting, but what we want are the Discharge time constants, as it is the time of the discharge that holds the gain down.

The Charging time constant of the AVC circuit is equal to the sum of the products (multiplications) of all the resistors in the AVC circuit and the total capacitance following them in the circuit.

Generic example:

$$T_C \text{ seconds} = R1(C2+C3+C4....C_N)+R2(C3+C4+C7....C_N)+RNC_N$$

For this application:

$$\begin{aligned}\text{fast} &= R27(C28+C30+C27+C24+C23+C16+C8)\\ &+R26(C30+C27+C24+C23+C16+C8)\\ &+R30a(C27+C24+C23+C16+C8)+R22(C24+C23+C16+C8)\\ &+(R22+R21)(C23+C16+C8)+R12a(C16+C8)+R5C8\end{aligned}$$

$$\begin{aligned} &= 5.7k(330pf+330pf+100pf+100pf+100pf+0.1\mu f+100pf)\\ &+47k(330pf+100pf+100pf+100pf+0.1\mu f+100pf)\\ &+10k(100pf+100pf+100pf+0.1\mu f+100pf)\\ &+470k(100pf+100pf+0.1\mu f+100pf)\\ &+(470k+470K)(100pf+0.1\mu f+100pf)\\ &+470k(0.1\mu f+100pf)+1.3M(100pf)\\ &= 0.2 \text{ seconds.}\end{aligned}$$

$$\begin{aligned}\text{Slow} &= R27(C28+C30+C26a+C24+C23+C16+C8)\\ &+R26(C30+C26a+C24+C23+C16+C8)\\ &+R30a(C26a+C24+C23+C16+C8)+R22(C24+C23+C16+C8)\\ &+(R22+R21)(C23+C16+C8)+R12a(C16+C8)+R5C8\end{aligned}$$

$$\begin{aligned} &= 5.7k(330pf+330pf+1\mu f+100pf+100pf+0.1\mu f+100pf)\\ &+47k(330pf+1\mu f+100pf+100pf+0.1\mu f+100pf)\\ &+10k(1\mu f+100pf+100pf+0.1\mu f+100pf)\\ &+470k(100pf+100pf+0.1\mu f+100pf)\\ &+(470k+470K)(100pf+0.1\mu f+100pf)\\ &+470k(0.1\mu f+100pf)+1.3M(100pf)\\ &= 0.2 \text{ seconds}\end{aligned}$$

The Discharging time constant of the AVC circuit is equal to the sum of the products (multiplications) of all the capacitors in the AVC circuit and the total resistance leading them in the circuit.

Generic example:

$$T_{DC} \text{ seconds} =CN(RN.....+R4+R3+R2)+ C_{N-1}(R_{N-1}+R4+R3+R2)+C2R2$$

For this application:

$$\begin{aligned}\text{fast} &= C8(R5+R12a+R22+R21+R22+R30a+R26+R25)\\ &+C16(R12a+2R22+R21+R30a+R26+R25)\\ &+C23(2R22+R21+R30a+R26+R25)+C24(R22+R30a+R26+R25)\\ &+C27(R30a+R26+R25)+C30(R26+R25)+C28R25\end{aligned}$$

$$\begin{aligned} &= 100pf(1.3M+470k+470k+470k+470k+10k+47k+470k)\\ &+0.1\mu f(470k+470k+470k+470k+10k+47k+470k)\\ &+100pf(470k+470k+470k+10k+47k+470K)\\ &+100pf(470k+10k+47k+470k)+100pf(10k+47k+470k)\\ &+330pf(47K+470k)+330pf470k\\ &= 0.25 \text{ seconds}\end{aligned}$$

$$\begin{aligned}\text{Slow} &= C8(R5+R12a+R22+R21+R22+R30a+R26+R25)\\ &+C16(R12a+2R22+R21+R30a+R26+R25)\\ &+C23(2R22+R21+R30a+R26+R25)+C24(R22+R30a+R26+R25)\\ &+C26a(R30a+R26+R25)+C30(R26+R25)+C28R25\end{aligned}$$

$$\begin{aligned} &= 100pf(1.3M+470k+470k+470k+470k+10k+47k+470k)\\ &+0.1\mu f(470k+470k+470k+470k+10k+47k+470k)\\ &+100pf(470k+470k+470k+10k+47k+470K)\\ &+1\mu f(470k+10k+47k+470k)+100pf(10k+47k+470k)\\ &+330pf(47K+470k)+330pf470k\\ &= 1.25 \text{ seconds}\end{aligned}$$

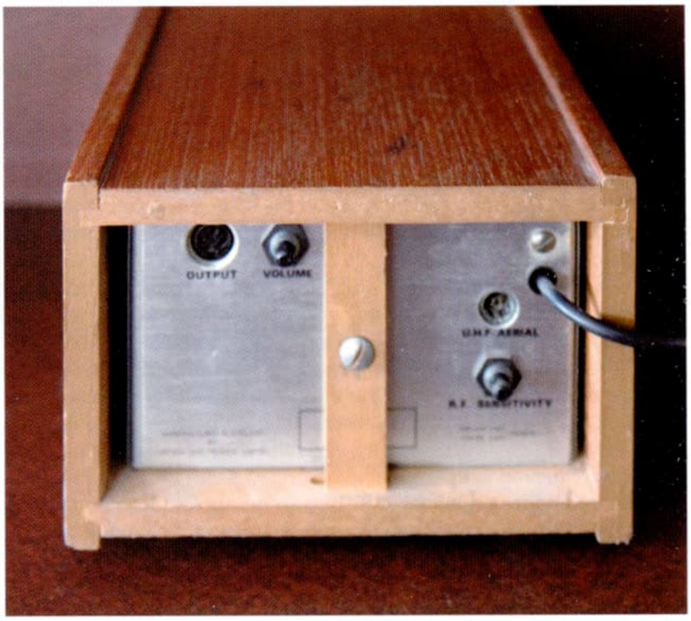
So, AVC charge times for fast and slow = 0.2 seconds.
And, AVC discharge times for fast and slow = 0.25 and 1.25 seconds respectively.
(Hmmm, I might need to do some modifications here to increase the slow discharge time.)

So what we have to control the gain of the radio, are separate manual gain controls for the RF amplifier and the IF amplifier, the distributed AVC as described above and a manual gain control superimposed on the AVC line. One has to be careful how all these are adjusted as it is possible to make the set go from being almost deaf to completely unstable. I hope this has satisfied Gerry Wells' worry about the control of the overall gain designed into the set. I hope to present this to Gerry before the 2013 BVWS Garden Party so he can have a play with it.

The Celestion Telefi and the Motion Electronics Television Sound Monitor

a postscript by Tony Clayden

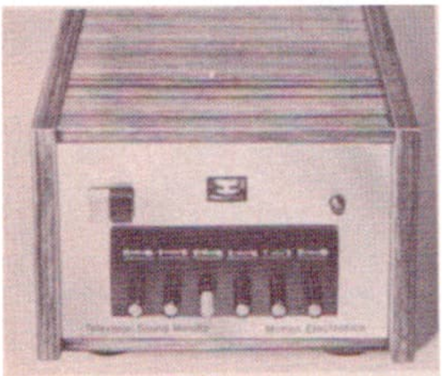
I was very interested to see John R. Sully's articles on the Telefi and the Television Sound Monitor in the last two editions of The Bulletin.These were both conceived at a time when domestic TV sets – valved of course – had lethal voltages on non-mains-isolated chassis; the only way of safely extracting an audio signal was to use a 1:1 isolating transformer, fed from a set's audio output stage, (i.e. across the loudspeaker). Radiospares - as they were then known - actually marketed a transformer especially for this purpose, with good isolation and a snap-on insulated cover, and I recall that Wharfedale also listed a similar component in their catalogue.



The downside was that the performance of the sound output stage of the average TV set wasn't particlarly good from a distortion point of view, and the signal was often corrupted by sundry hums, buzzes, and other artifacts; these were not always very audible through the five-bob speakers which the manfacturers usually fitted! It was fine if you just listened in lo-fi, but if you wanted to feed the audio into a better amplifier and speaker combination and / or wished to make a sound recording, (which many did), you were a bit stuck. Hence the need for a better solution, and this was the reason that both products appeared on the market.

I had been playing around with tape recorders, amplifiers, etc., since 1957 and from 1963 I found myself working in the Radio/TV/HI-Fi trade. In the early 70's, I had a retail Hi-Fi shop of my own; I remember very well the advent of these two devices, and indeed sold a few of them.

Taking the Telefi first :- As John Sully states, it was developed by Dinosaur Electronics, (a very small, probably 'one-man' business) but was soon taken-up by Rola- Celestion, as a sideline to their Celestion HI-Fi speaker business, in which market they were a major player at that time. They had the name and the financial clout to do some serious promotion of the product. The company had been formed out of a merger of the Briish Rola and Celestion companies during WWII, and had a factory at Thames Ditton, Surrey- although by the late 60's production moved to Ipswich, Suffolk. It was in the ownership of a Mr D. Prenn, who also had the Truvox company, well–known for its tape recorders and floor-cleaning machines. It eventually became Celestion Industries, and one of the other companies in that group was a manufacturer of ladies' corsets!



Motion Electronics TV Tuner

I seem to remember that the Telefi wasn't a particularly successful product. As John suggested, it worked better on some sets than others, depending on how much stray field was emitted from the IF circuitry; it wasn't really the best answer to the problem, albeit an ingenious idea. However, a Scottish-born engineer by the name of Bob Bourhill hit on the idea of producing the Television Sound Monitor, for which purpose he formed Motion Electronics, operating from premises at Gravesend and subsequently East Peckham, both in Kent. I have an idea that he had previously been in the employment of the Hi-Fi manufacturers Rogers Developments at Catford, SE London.

His concept was, I feel, a better one - Use a TV-style front-end, push-button tuning controlling varicap diodes, a decent line-level output stage and the result should deliver a 'clean' audio signal, comparable with broadcast FM radio quality.

I started to read the Spring 2013 issue of The Bulletin during the clear-out of some thirty years' accumulated stuff (!) prior to moving house, and I remembered that I still possesed an early example of the Sound Monitor, which, amazingly, I was able to find! As can be seen in the accompanying picture, mine has a slightly different cabinet from the one shown in John's article. It is made out of solid wood, is of much better quality and certainly looks better than the cheaper one used on later production examples. I remember that the sound performance was reasonably good, although it did have a tendency to drift slightly as it warmed up - I don't imagine it is equipped with Automatic Frequency Control.

Here I must take a small issue with John Sully, who suggested that the DIN output socket on the unit was not such a reliable a connection as the phono (Cinch/RCA)


Television Sound Monitor

In the last issue of the Bulletin (Winter 2012) I considered the Dinosaur/Celestion Telefi. This device enabled a high quality sound signal to be extracted and utilised as a source for external processing and amplification. The device is used in conjunction with other Hi-Fi separate components to achieve better sound reproduction than was otherwise available from a normal television.

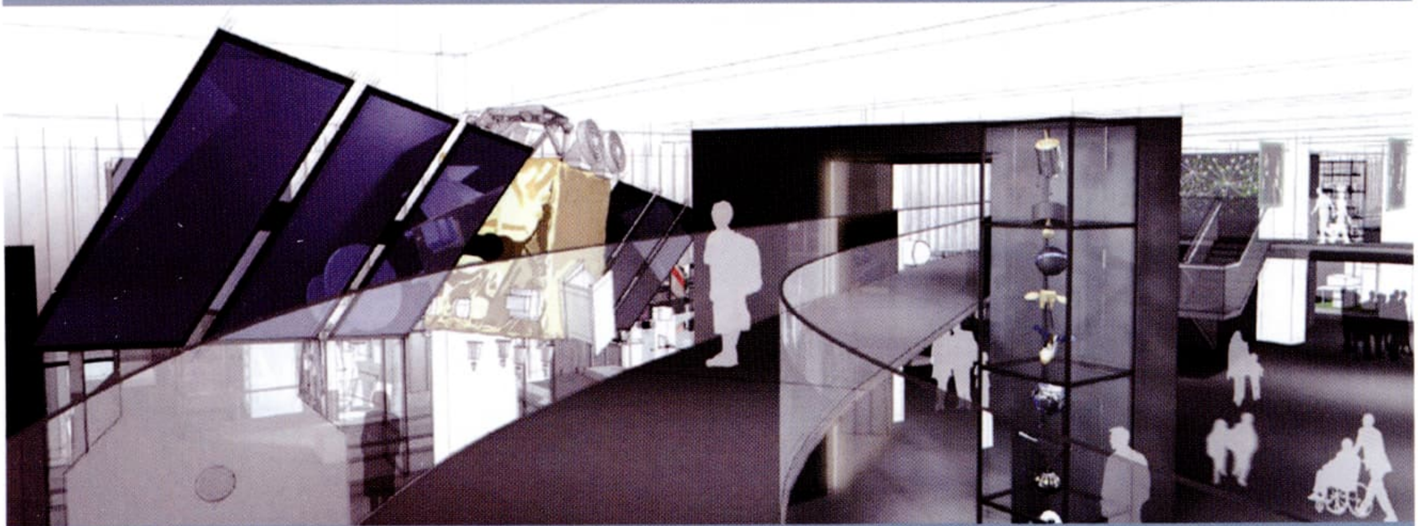
Right: John Sully's article as it appeared in the Spring issue of The Bulletin

socket used on the Telefi. Having spent many years working on Grundig, Philips and other European equipment, and building PA racks using DIN connectors, I beg to differ! I believe that the DIN system is far superior, provided that the solder connections are made properly, and decent- quality plugs with solid metal shells are used.

I understand that the Sound Monitor was a fairly successful product; in the 1975 edition of Hi-Fi Yearbook, Motion Electronics listed an alternative model in their range, additionally incorporating an FM stereo tuner. They went on to design a high-quality, (and potentially very expensive), TV tuner, which could deliver both Nicam stereo audio and composite video, but although it was advertised and a few prototypes were made, it never entered production. A long-standing friend of mine, Tony Walker, who for many years owned and ran a thriving company manufacturing high-end public address equipment, (Millbank Electronics Group of Uckfield, Sussex), tried to assist in reviving the company, but it ceased operations in the early 90's.

It may be of interest to readers to learn that I am donating my Television Sound Monitor to the Vintage Wireless and Television Museum at Dulwich, where I am hopeful that it will be put into active service on their newly-upgraded analogue distribution system.

New gallery at the Science Museum 'Making Modern Communications'



The Science Museum, London, are developing an exciting new gallery 'Making Modern Communications'. For some time now the project team has been working in collaboration with the BVWS to develop stories and displays that explore the history of radio broadcasting.

We would now like to give all visitors to the 2013 National Vintage Communications Fair the opportunity to meet with us, see something of our plans and, most importantly, give you the opportunity to share with us your personal memories, stories and experiences of radio and television.

You will find us next door to the BVWS table (W27) upon entering the Hall at the 2013 NVCF – see you there!

Letters

Dear Editor
I think the bulletin is always a really high quality production but I especially enjoyed reading Keith Fishenden's recent article. I struggled to follow all of the design detail since it is so long since I designed valve circuits but I was especially pleased to see the reference to the 1958 Practical Wireless series about building a series of TRF receivers based on the SP61 ,'A beginner's constructional course'. This set of magazines was what started my interest in radio. In parallel with a friend, I built and modified these radios following the articles. The fault-finding at the end was about putting faults on the receivers so that one could learn to diagnose them.

As a teenager I developed a little business repairing radios. I had that first set in my bedroom and listened to Radio Luxembourg in the evening. After being away to Manchester to study physics I got married. My mother disapproved. (We are still happily married - which shows how much she knew!) I was too busy in my new job, DIYing in my new house to remove my precious stock of electronics from the shack at my mother's house. She had the whole stock dumped including my first construction.

A few years ago I discovered the BVWS and went along to the NEC where I purchased replacement magazines and components. I had great pleasure in reconstructing the final version of that radio - which worked first time.

Yours sincerely
John Clapham

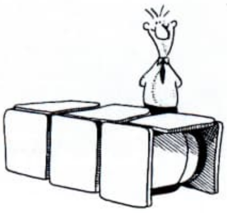
Dear Editor,
It is always nice to have complimentary letters about one's articles, I thank Peter Lankshear. Also for his background information about Dr Zepler.

However the points I was trying to make about the use of a triode-hexode, here somewhat expanded, and a separate oscillator were as follows: as the LO and the mixer are coupled via the first's control grid, it seems to me that it would be pulled as badly as if they had used the internal triode. Further, in practice the effect is so strong that the alignment instructions tell one to use noise, not a signal to align at the top end of coverage. I can tell you from trying that even the use of a very weak signal will pull the oscillator, thus confirming my point.

Further, there was a shortage of these valves in the war, and they cost more, and it added another item to the spares inventory, and the more grids, the higher the noise. And lower the gain: the conversion conductance of these valves is poor.

Both the HRO and AR88 use a pentode. Further, I replaced the X63 with a pentode, to confirm my expectation: the set is slightly off–tuned by this, predictably, but otherwise works normally without further modification. To use this permanently the top range would need the oscillator alignment redoing. As the screen grid is being driven, one assumes more volts are needed, ideally, so anode connection from the LO would probably work better. That said one achieves the better option of leaving its tuned grid circuit unloaded, which should give better HF stability. It therefore seems entirely advantageous to use the pentode.

Yours sincerely, Phil Moss


Garage For Sinclair C5


Crazy Paving


'Robocop' Fancy Dress

Ear Muffs

Ice Skates


Novelty Flat Earth Society 'GLOBE'

Ostentatious 'SHADES' For Non-Squarials


Stout Binder For 'WHAT VIDEO'

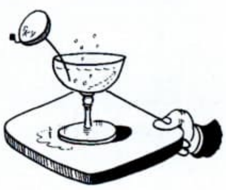
Cast your minds back to circa 1990 when BskyB (the original lot) folded and the nation's 'squarials' fell to earth with a plop. Dicky Howett commemorated the event with some timely cartoons in 'What Video' magazine. (Jan 1991)

Tate Gallery Art Exhibit


Ouija Board

Artist's Palette (for better colours)


Fancy Garden Edges


Drinks Tray with Novelty 'Olive'

Grave Stones

Blinkers

House Name Plate

Dear Editor

In the Winter 2012 issue, mention [the *Five Green Ekcos* article] was made of a Radio Retailer in East Finchley, London called 'Janes and Adam'. Actually, they were called Janes and Adams Ltd; they were a privately- owned business with a few more branches in North London - Whetstone, Palmers Green, Barnet, etc. They used to advertise in the local cinemas, and had distinctive facias on their shopfronts, the graphics of which were replicated on their fleet of vans. I hope to be able to do a bit more research on this and other Radio & TV shops in the North London area, and contribute my findings to a future edition of the Bulletin.

In the Spring 2013 issue, Dicky Howett asks about the 'Travelling Eye' vehicle shown in an accompanying picture. This strange-looking rig was originally constructed to act as the service tender to support an endurance test undertaken by a Morris Minor in the early 50's.

Using the motor racing track at Goodwood, Sussex the, car was run continuously for ten days and nights in October 1952, covering ten thousand miles in the process. The idea was to keep the engine running and the car moving during the whole time, so re-fuelling,servicing, oil and tyre changes all had to be undertaken whilst the vehicle was in motion! And so this odd contraption was born. The car would be driven into the open-bottomed 'pen' at the back of the trailer and secured by a front-bumper-mounted towing eye, coupled to a similar one on the trailer. This must have needed steady hands and nerves on the part of both drivers!

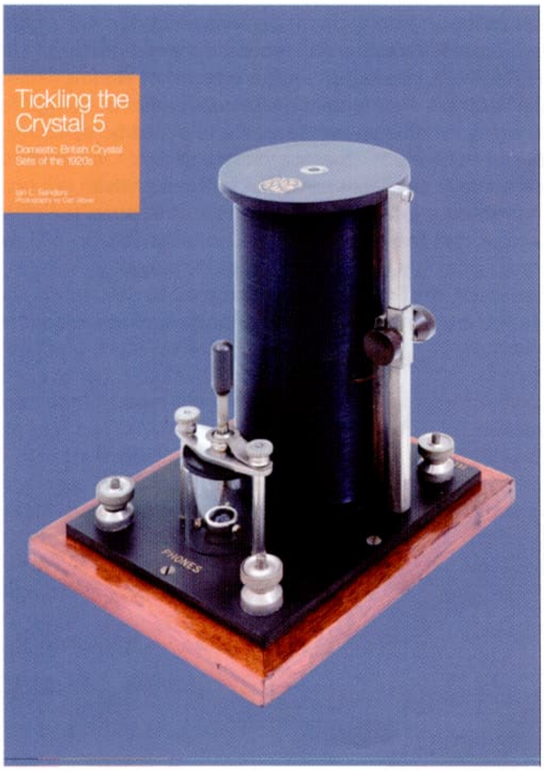
The mechanics had a narrow (15") ledge, complete with safety rail, upon which to stand in order to carry out their tasks. I don't know what special arrangements were made for jacking-up the car in order to carry out wheel changes. All this whilst cruising round the track at as steady 45miles per hour! After the required work has been completed and with probably a change of driver, (there were six in all), the pin would be removed from the towing eyes and the two vehicles would become uncoupled and go on their separate merry ways!

The Minor was packed with extra instruments and testing equipment, and had an observer ensconced in the passenger seat; his job was to report hourly on an extensive list of items which were carefully monitored. The car survived its ordeal with flying colours, providing a huge amount of useful research data for Morris's engineering department which apparently took many months to evaluate, and a similarly beneficial degree of publicity for the company and its products. I have actually seen film newsreel footage of this project, which attracted a great deal of interest at the time.

I can only surmise that the rig was put to use in its TV OB role afterwards, possibly to garner even more publicity, although in those days, the Beeb was very coy about being seen to promote the interests of commercial organisations.

Yours sincerely,
Tony Clayden
Barnet, Hertfordshire

BVWS Books



Out Now!

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Obsession Gerry Wells
Growing up in the 1930s, young Gerry Wells preferred wireless to toys. He had a postwar career as a radio and TV engineer designing and managing amplifiers, PA's and TVs. He now runs the British Vintage Wireless and Television Museum from the home where he was born. This is the story of one man's dedication to wireless £6.00 196 pages paperback (+ £2.50 p&p UK) £3.50 EEC (rest of world £5.50)

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BVWS Books

Eighth page advertisements cost £22.50, quarter page advertisements cost £45, half page: £90 and full page: £180. Cheques made payable to 'BVWS' please

The Bulletin back issues

All Bulletins and supplements are priced at £2.50 each + postage.

Postage: for individual Bulletins add £1.50, for all extra bulletins add £1 each. Cheques to be made payable to 'British Vintage Wireless Society'.

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Marconi on the Isle of Wight

In November 1897, a twenty-three year old Italian inventor visited the Royal Needles Hotel that overlooked Alum Bay on the west coast of the Isle of Wight. The young Guglielmo Marconi's proposal to rent rooms to perform his 'experiments' over the deserted winter months was warmly welcomed by the hotels proprietors. Marconi used some of the working capital of his newly formed Wireless Telegraph & Signal Company to convert the hotel's billiard room and install his equipment and spark transmitter. Several small ships were hired and fitted with wireless aerials and receivers while moored at the pier below. A huge mast, 168 feet high, had to be hauled up the cliff face of Alum Bay and raised in the hotel grounds, a feat that required the help of most of the able bodied men in Totland.
On Monday 6th December 1897 Marconi started his wireless experiments from the Royal Needles Hotel, including a month of private demonstrations for Queen Victoria and the Royal family using wireless stations he installed at Osborne House and on board the Royal Yacht. For the next two and a half years the world's first permanent wireless station would be operated from the Isle of Wight.
By 1900 Marconi realised he need more space, greater privacy and longer ranges to his new stations being built in Cornwall. He moved his equipment and aerial mast from Alum Bay across the Island to a new station built in Knowles farm in Niton. While there Marconi developed the vital science of tuning, enabling multiple wireless signals to be separated without interference. In January 1901 transmissions from Niton reached Marconi's new station at Lizard Point in Cornwall. This was 196 miles away, a world record for 'radio' waves, convincing Marconi that his system was now ready to attempt to transmit across the Atlantic ocean, over 2,100 miles.
The success of Marconi's famous "S" across the Atlantic in December 1901 gave a huge impetus to the growth of wireless (or radio as it soon become known) equipment. As the orders for ships wireless equipment started to increase, Niton soon became an active Marconi shore station (one of 40) handling passing ship wireless traffic in the Solent. Marconi's Niton station was taken over by the Post Office on 29th September 1909 and four years later, as part of a major reorganisation, land at Niton Undercliffe, about four miles from Ventnor, was leased from Lloyds at an annual rent of £5. On the new site a Lloyds signal and wireless telegraphy station using Marconi equipment was built, along with various houses which belonged to the Coastguard, and the station building that was later to become Niton Radio. There was also a Marconi station located on Culver Cliff.
The science and art of wireless communication was born on the Isle of Wight.
The story of a young Italian engineer, whose small experiments on a small Island grew to produce our modern world of instant global communication, radio broadcasting, mobile phones, television, satellite communication and even the internet is simply amazing. Marconi on the Isle of Wight changed the world forever.
The full story of Marconi on the Isle of Wight, 250 pages, 140 photographs is available directly from the publishers:- please see www.authorsonline.co.uk. Or specifically www.authorsonline.co.uk/book/1339/Marconi+on+the+Isle+of+Wight/
For further information please contact the author at timwander@compuserve.com or as always see 2mtwrittle.com

News and Meetings

GPO registration Numbers

Martyn Bennett is the custodian of the BVWS GPO Registration Numbers list. As many members know, the project of assembling this list was started in the early days of the BVWS and was carried on by the late Pat Leggatt. Members are strongly urged to help build the list, whenever they get the opportunity, particularly as it is something that will help with the identification of vintage wireless in years to come. The list is by no means complete and the GPO no longer have a record of the numbers granted to wireless manufacturers. The BVWS Handbook contains the current listings - one in numerical order and one ordered by name. Please let Martyn have any additions, or suggestions for corrections, by mail or over the phone.

Martyn Bennett, 58 Church Road, Fleet, Hampshire GU13 8LB telephone: 01252-613660 e-mail: martyb@globalnet.co.uk

2013 Meetings
May 12th NVCF
1st June BVWS Garden Party
2nd June Harpenden
July 7th Wootton Bassett
July 14th Table top sale at The Vintage Wireless and Television Museum, West Dulwich
August 10th An Afternoon of Music at The Vintage Wireless and Television Museum, West Dulwich (from 12.30 onwards)
September 15th Murphy Day
September 29th Harpenden
6th October Audiojumble
3rd November BVWS Northern meeting - Golborne
1st December Wootton Bassett

2014 Meetings
March 2nd Harpenden
May 31st Garden Party at The Vintage Wireless and Television Museum, West Dulwich
June 1st Harpenden
September 28th Harpenden

The British Vintage Wireless and Television Museum:
For location and phone see advert in Bulletin.
Harpenden: Harpenden Public Halls, Southdown Rd. Harpenden. Doors open at 10:00, tickets for sale from 09:30, Auction at 13:30. Contact Vic Williamson, 01582 593102
Audiojumble: The Angel Leisure Centre, Tonbridge, Kent. Enquiries, 01892 540022
NVCF: National Vintage Communications Fair
See advert in Bulletin. www.nvcf.co.uk
Wootton Bassett: The Memorial Hall, Station Rd. Wootton Bassett. Nr. Swindon (J16/M4). Doors open 10:30. Contact Mike Barker, 01380 860787
Golborne: Golborne: Golborne Parkside Sports & Community Club. Rivington Avenue, Golborne, Warrington. WA3 3HG contact Mark Ryding 01942-727428
Mill Green Museum: Bush Hall Lane, Mill Green, Hatfield, AL95PD
For more details with maps to locations see the BVWS Website:
www.bvws.org.uk/events/locations.htm

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Send your articles to: Carl Glover, 33 Rangers Square, London SE10 8HR
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National Vintage Communications Fair
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early entry 9.00 at £25
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