The Bulletin

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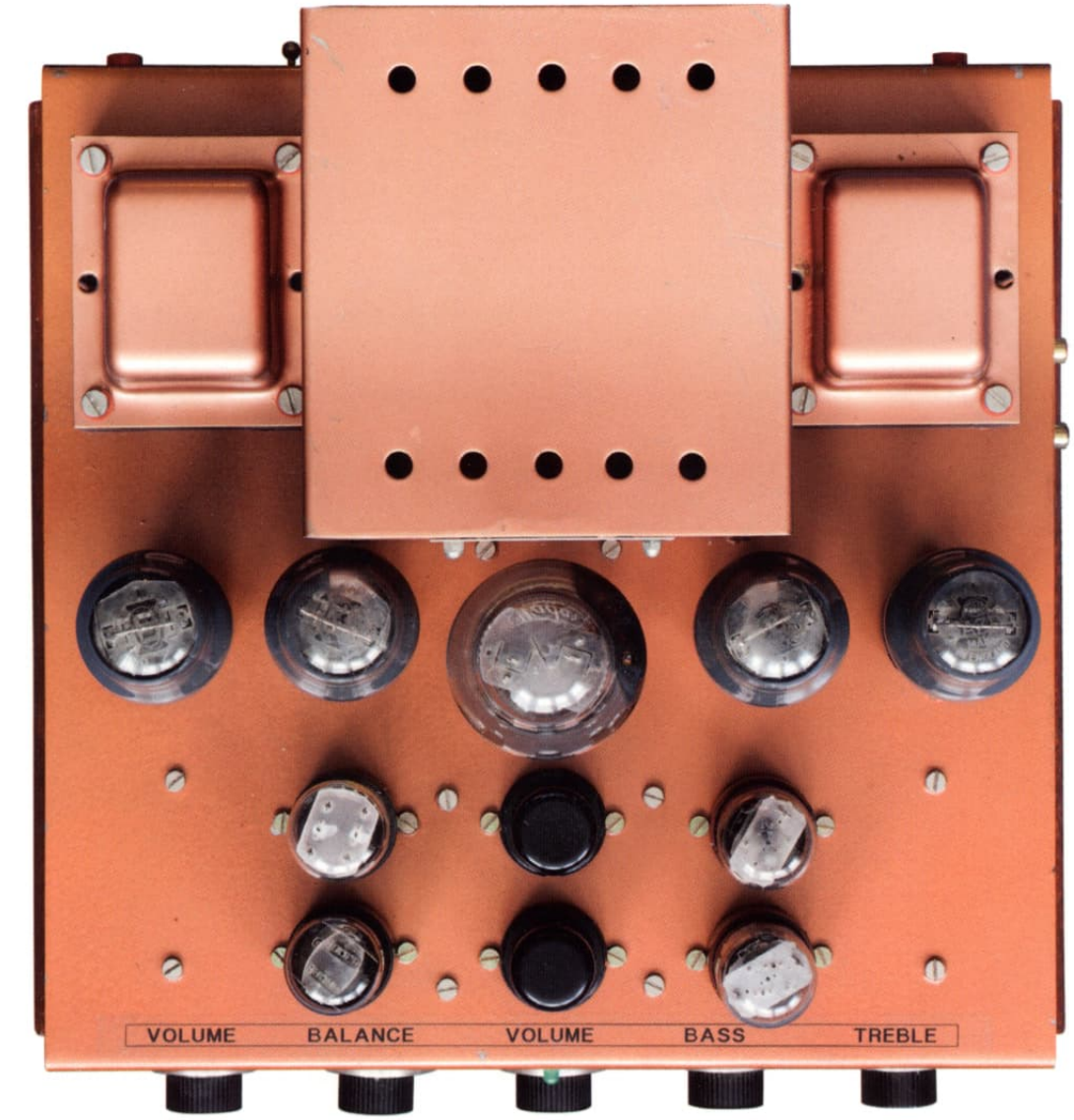

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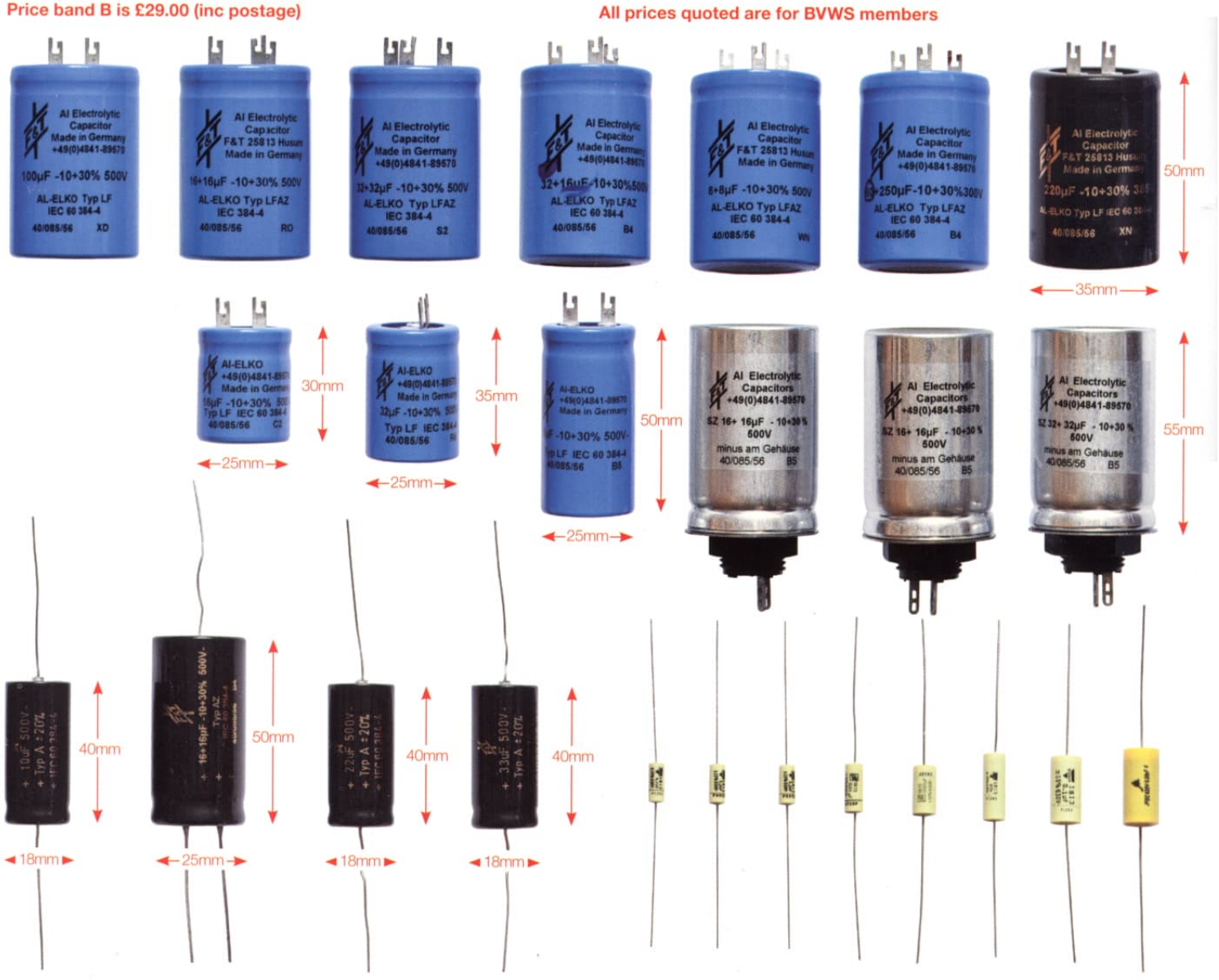

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Bulletin of the British Vintage Wireless Society
Incorporating 405 Alive
Volume 40 No.3 Autumn 2015

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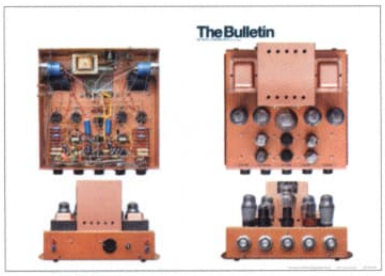

Front and rear cover: Wadar amplifier manufactured by Gerry Wells at The British Vintage Wireless and Television Museum, West Dulwich, London.

Photographed by Carl Glover
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Proof-reading by Jeremy Day and Steve Sidaway

Contents

From the Chair

If you quickly flick through the pages of this Bulletin, you will see it is packed full of interesting articles. The dilemma is to decide if you will start at the front and work through it or jump into reading what interests you most first.

Having read through the proofs before it heads to the printers I could not make my mind up where to look first. However I would really like to see some articles on Vintage Audio, vintage car radios and yes more television.

Perhaps a series on record player repair and restoration? Any experts out their wishing to share their wisdom on the subject?

I would especially like to see some articles on equipment from the 1960's and 1970's. It is interesting to see that equipment from those decades is becoming more widely collected and is no longer thought of as stuff to send to the dump.

If you are currently working on any of these or have completed a restoration then do please put pen to paper as I am sure I am not the only person eager to read what you have been doing.

As part of our 40th Birthday celebrations in 2016 we will be holding a special auction at Harpenden and also a large display at next year's NVCF. There are also some other activities we are planning and I will report on those when arrangements have been finalised. If anyone has some other ideas on how we can celebrate this event, then do please let me know.

2016 Diary Dates
The diary page at the back of the Bulletin now lists all of the BVWS 2016 dates so everyone is given the best possible chances at planning for next year. These dates will also appear on your 2016 BVWS Calendar which will arrive with your Winter Bulletin.

Mike

J. Patrick Wilson receiving his Pat Leggatt award from Mike Barker at the National Vintage Communications Fair, Warwickshire for "Test Sets & Multimeters", part of a series of articles entitled "How do they work?"

Restoration of an Ultra T401 by Stef Niewiadomski

Released in February 1946, the T401 was Ultra's third AC-mains domestic radio to appear after the war, having been beaten to the shops by the models T402 and T406 – containing identical chassis, and with only small detailing differences in their cabinets - which made it to production in November 1945. The Mazda TH41, VP41, PEN45DD and UU6 (of 1938/39 vintage, and with 4V heaters) valve line-up of all these radios was identical to the company's immediately pre-war models 309 and 310. This was a difficult time to be launching new radios into the UK domestic market: supplies of most materials and components were still very tight, and many post-war radios were based on the octal valves that had arrived in the UK from America during the war. Ultra must have been confident that they could get sufficient quantities of these Mazda valves, which don't seem to have had equivalents available from other manufacturers, to maintain production.

Figure 1: Restored condition of the radio. The left hand knob is the Waveband selector, with short, medium and long printed onto the paper dial. The middle knob is Tuning and the right hand knob is the on/off/volume control.

At 12 inches wide by 7½-inches high by 6½-inches deep, the radio just about qualifies as a midget, and was intended to sell as a second radio for the home, though I must admit there seems to be no compromise in quality in the way the radio is built. Prospective buyers would have been familiar with US-originated midget radios from imports that arrived pre- and during the war, and this generated a demand for this style of radio from UK manufacturers. The T401 was only a couple of pounds cheaper than a full-sized 'main home' set and so it was never an impulse buy.

Figure 1 shows the restored condition of my T401, with a brown and cream cabinet. The radio was also sold in Cuban Red, Ivory and April Green. These colours may well have been targeted at the lady of the house, looking to brighten up the décor in austerity Britain. This seems to define the colour of the main part of the cabinet: the inset around the dial and loudspeaker grille was always ivory. For the privilege of owning one of the colourful versions, the purchaser paid 15/- more than the brown and cream model. My radio is a definite cream / ivory / off-white colour: I'm not sure whether this started life as pure white, or whether off-white is the original colour. When they come up for sale today, these Ultra models sell for good prices, typically in the £30 to £50 range, especially the coloured examples of the T401.

Images of the various colour combinations can be found by searching for 'ultra t401 radio' on Google.

Models using the T401 cabinet are often referred to as being 'left-handed' with the dial and loudspeaker on opposite sides of the cabinet from what is usual with most radios. The tuning knob is in the middle, and so there is no real issue about it being easier or harder for right-handed people to operate.

In October 1947, Ultra released the strangely numbered model T491. At 19 guineas, this was not a cheap radio, its cost having perhaps been increased by the modular construction of its three-unit hinged chassis and a lift-off hood-type cabinet. This was intended to make servicing the radio easier: perhaps prospective purchasers would have preferred effort to have been expended in making the radio more reliable? Although most of the valves were the same

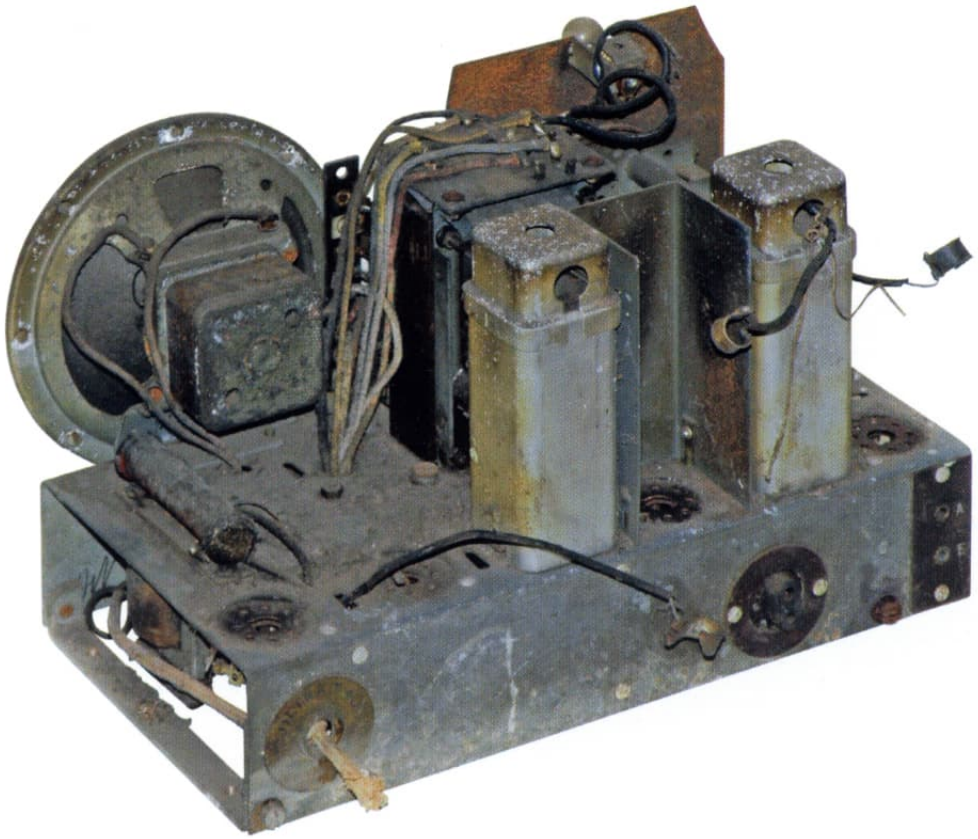


Figure 2: Rear view of the chassis as removed from the cabinet. You should be able to see the IF amplifier's metal screen, mounted between the IF transformers. The chassis weights about 6kg, due to the use of heavy gauge steel, and the hefty mains transformer.

as previous models, the PEN45DD was finally replaced with the more conventional arrangement of an HL41DD double-diode triode and a PEN45 beam output valve.

To address the market for AC/DC 'universal' sets, Ultra produced the four-valve plus rectifier model U405 in November 1945. This radio used the same cabinet at the T401, but as far as I can see (and I'm willing to be corrected) wasn't offered in the same range of colours. The U405 used pre-war octal-based 160mA heater current valves from Osram, and because it lacked a mains transformer was sold for a few pounds less than the T401 (and was a few pounds lighter, again because it didn't contain a mains transformer). Within a year, Ultra moved to a set of Mazda B8A-based miniature valves with 100mA heaters, with the models U431 and U506, which again used the T401 cabinet. These immediately post-war AC/DC Ultra radios don't seem to have survived too well, and are not commonly seen today.

Chassis removal

The radio was in a bit of a mess when it came to me. The cabinet was very dirty, though happily it was intact, the mains lead had been cut off, and it was fitted with only two out of its three knobs. At the first stage of restoration, that is getting the chassis out of the cabinet, the radio decided to put up a fight.

The two knobs were well and truly stuck. On the larger, tuning knob I drilled out the grub screw and it still refused to come off until I injected some WD40 into the grub screw hole, applied pressure from the back (being careful not to damage the cabinet) and tapped it from the front with a hammer, half expecting it to shatter, when at least it would have been off and simply a case of having to find a new set of knobs. To my surprise, eventually it popped off and flew across the workshop, still in one piece. The remaining smaller knob came off after drilling out its grub screw, and applying pressure from the back. I found a matching third knob, so now I had an original set of knobs, intact and only needing a good clean and new grub screws. The backs of the knobs were prevented from scratching the cabinet by felt washers: whenever I encounter these felt washers on a radio I always think that the designers have thought carefully about how to preserve the best appearance of the radio, and it's a sign of a quality radio.

Four screws were removed from the bottom of the cabinet and after removing the half-height back panel (which accommodates a neat 'tidy' arrangement for coiling up a wire aerial when not in use, or when the radio is being used to receive local broadcasts), the chassis slid out easily. Figure 2 shows a rear view of the chassis after I'd removed a couple of valves. A PEN45DD, which had decided to unplug itself, was floating around inside the cabinet, but it looked intact, and the three other valves were still in their sockets and apparently intact with their labelling quite legible. On my

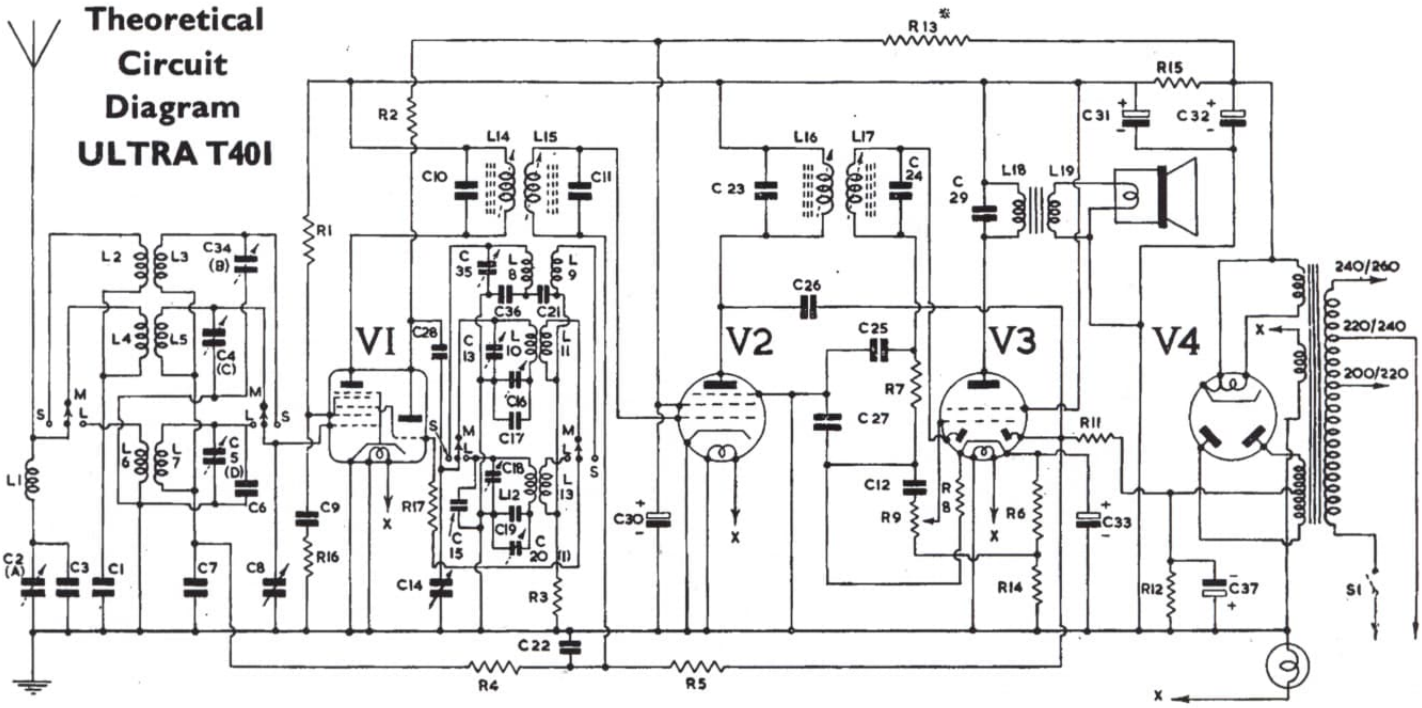


Figure 3: Schematic of the T401, as published in Ultra's service manual in August 1946.

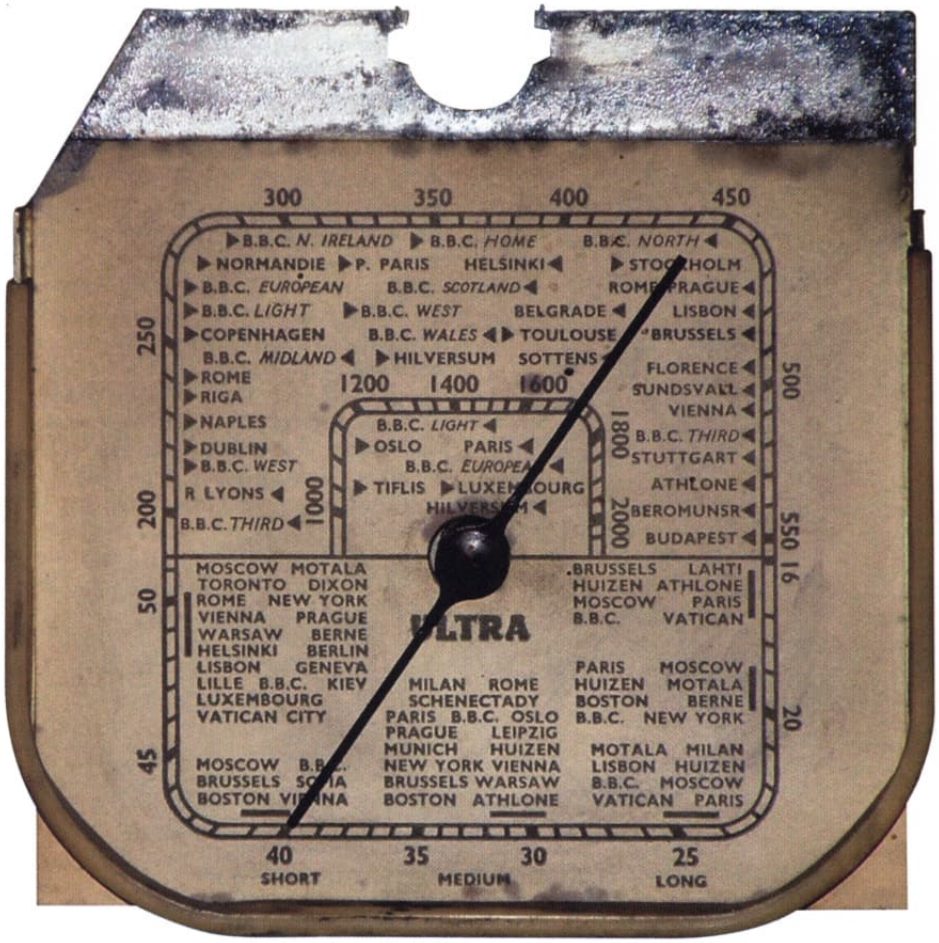


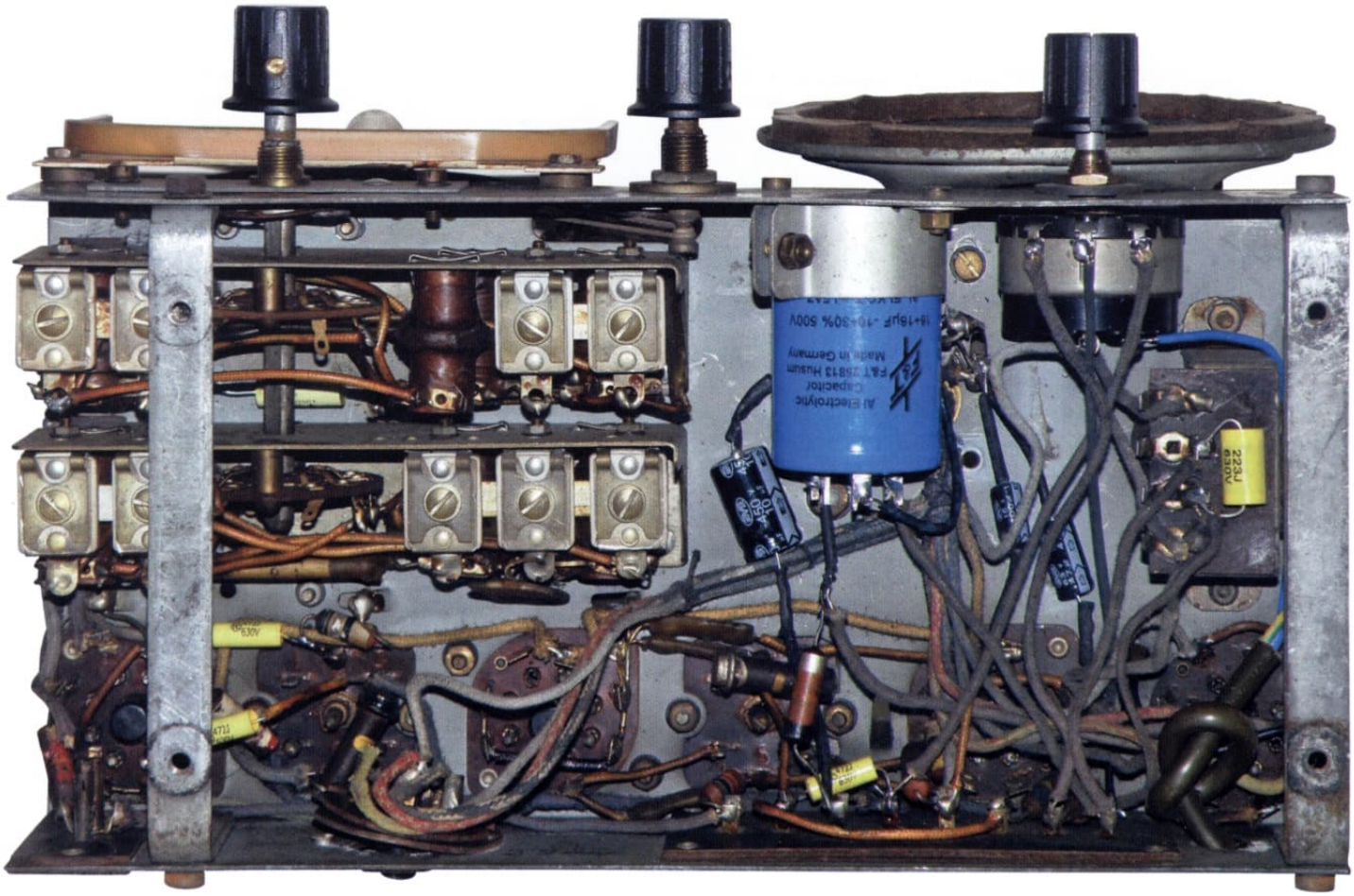
Figure 4 (left): The paper dial of the radio, which has suffered some discolouration, presumably from rust migrating through from the rear. The rather cluttered dial markings show the medium and long wave stations and wavelengths on the top section, and significant short wave stations, and bands, on the lower section.

Figure 5 (below): Underneath view of the chassis after restoration. The new blue-cased BVWS HT smoothing electrolytic is prominent towards the top of the view, and the neat coil pack - with coil assemblies which can be removed relatively easily - can be seen on the left.

radio, the company name, model type and serial number DB244406 were stamped into the rather attractive brass ring that surrounds the mains cable entry hole. I've seen later versions of the T401 where this brass ring has been replaced by a simple stamped metal label riveted to the back of the chassis, presumably to save cost.

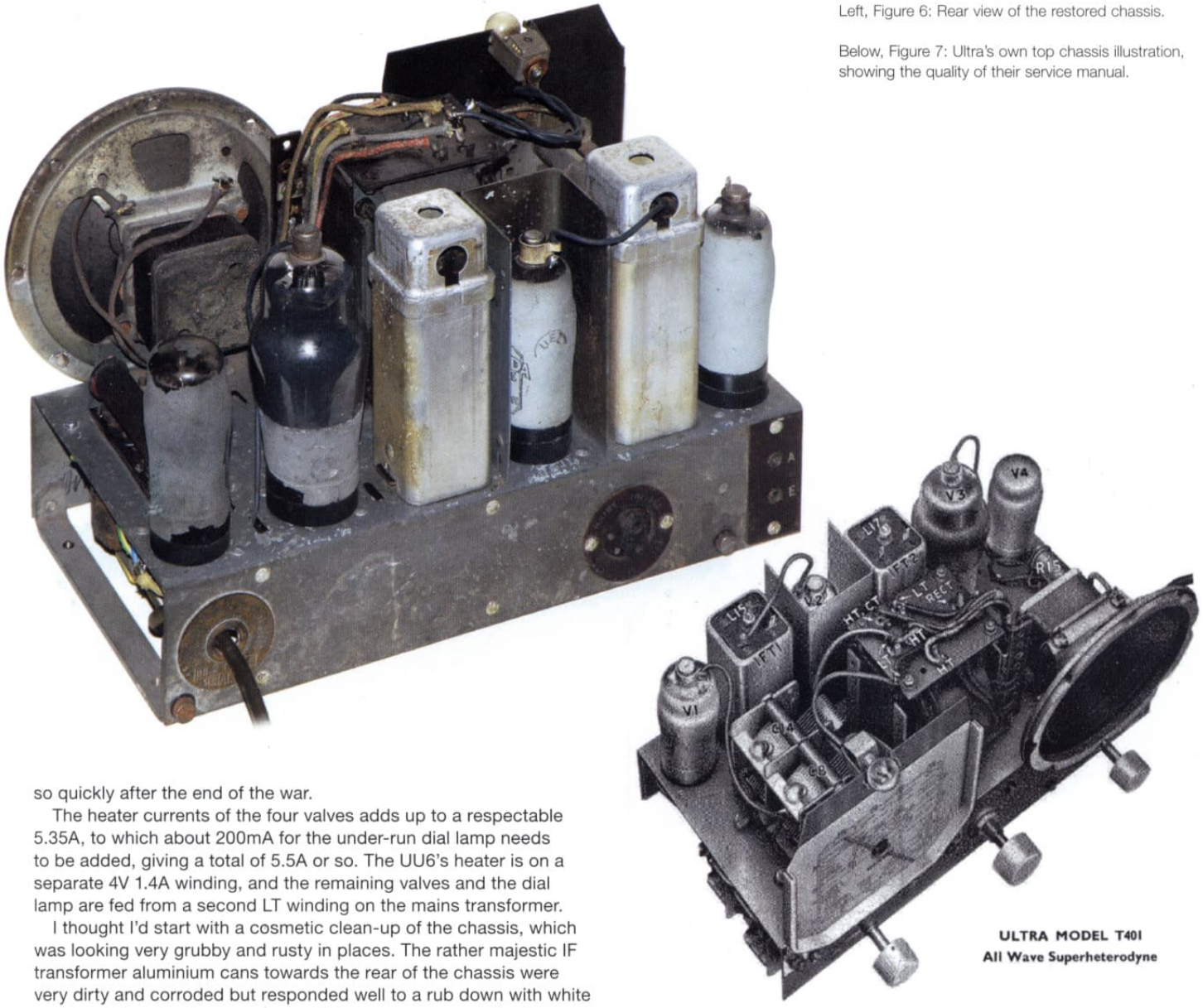
Restoring the chassis

The schematic of the T401, as published in August 1946 in Ultra's own service manual, is shown in Figure 3. The all Mazda valve line-up consists of: a TH41 triode-hexode frequency changer; a VP41 variable-μ screened pentode IF amplifier at 470kHz; a PEN45DD double-diode signal and AGC detector, and beam tetrode audio output stage; and a UU6 full-wave rectifier. These are all 4V heater valves, all of whose heaters checked out OK for continuity, and were used on the immediately pre-war models 309 and 310, and probably explains how Ultra were able to get the chassis into production



Left, Figure 6: Rear view of the restored chassis.

Below, Figure 7: Ultra's own top chassis illustration, showing the quality of their service manual.



so quickly after the end of the war.

The heater currents of the four valves adds up to a respectable 5.35A, to which about 200mA for the under-run dial lamp needs to be added, giving a total of 5.5A or so. The UU6's heater is on a separate 4V 1.4A winding, and the remaining valves and the dial lamp are fed from a second LT winding on the mains transformer.

I thought I'd start with a cosmetic clean-up of the chassis, which was looking very grubby and rusty in places. The rather majestic IF transformer aluminium cans towards the rear of the chassis were very dirty and corroded but responded well to a rub down with white spirit and fine abrasive paper, as did the screen surrounding the VP41. Their tops, which often get lost over the years, were present and simply lift off, give easy access to the tops of the transformers and allowing easy replacement of any perished wires. The dial cord was still intact and the tuning mechanism turned freely.

The large dog-bone resistor (rated at 3W according to the service sheet) towards the left side of the top of the chassis is R15, the 1.2kΩ HT smoothing resistor. This looked to be in good condition, and measured at 1350Ω, close enough to its nominal value to be left alone. It's a feature of the chassis and it would have been a shame to have had to change it. The top of the chassis was cleaned with WD40 and the magnet assembly of the 5-inch speaker was de-rusted and treated.

I guess the key to a successful restoration for this radio is the state of the mains transformer, located at the centre front of the chassis. It would seem to be unlikely to find a replacement that would fit into the same space, except from an identical radio. Mine looked reasonable with no obvious burning, although a small amount of some waxy substance seemed to have leaked out at some stage. I'd have to wait until I turned the radio on to check whether it had survived the years.

The rear of the metal sheet onto which the paper dial was glued was rusty, and so the assembly was removed from the chassis, the dial lamp clip removed, rubbed down and treated with rust remover. Figure 4 shows the dial of the radio. The rather cluttered dial markings show the medium and long wave stations and wavelengths on the top section, and significant short wave stations, and bands, on the lower section. The dial lamp tested OK and just needed its perished leads replacing. The lamp was rated at 6.2V 0.3A and was fed from the 4V winding on the mains transformer, along with the valve heaters.

Under the chassis

I worked my way through all the components, replacing the waxed paper capacitors and small electrolytics with modern components, and checking the resistor values as I came across them. All the resistors were within tolerance and none needed changing. The only awkward capacitor was located inside the coil pack, and with some fiddling it was removed and replaced.

The output transformer's primary winding measured 375Ω and its secondary measured about 0.5Ω, when disconnected from the speaker of course, and the speaker's coil itself was intact.

I removed the main HT smoothing capacitor can, which contains C32 (16μF) and C31 (24μF), and reformed them. They seemed to be OK, taking less than ½mA each after a period on my reformer, and so I refitted the can into the chassis and connected it back into circuit. The can was marked Radiospares, so maybe it had been replaced at some point in the radio's life. What I didn't do was to measure the capacitance of each section, and this was to bite me later on in the restoration.

To aid servicing and replacement of a potentially faulty coil, the aerial and oscillator coils are mounted on vertical panels under the chassis and can be partially released and swung clear of the chassis. This involves removing four screws accessible from the top of the chassis, and removing the wavechange switch spindle. The service sheet identified the location of all the coils and showed the DC resistance of each, so that a faulty coil could be identified and replaced. I didn't attempt this manoeuvre, deciding to leave well alone.

As built, the radio has no mains earth lead, presumably because

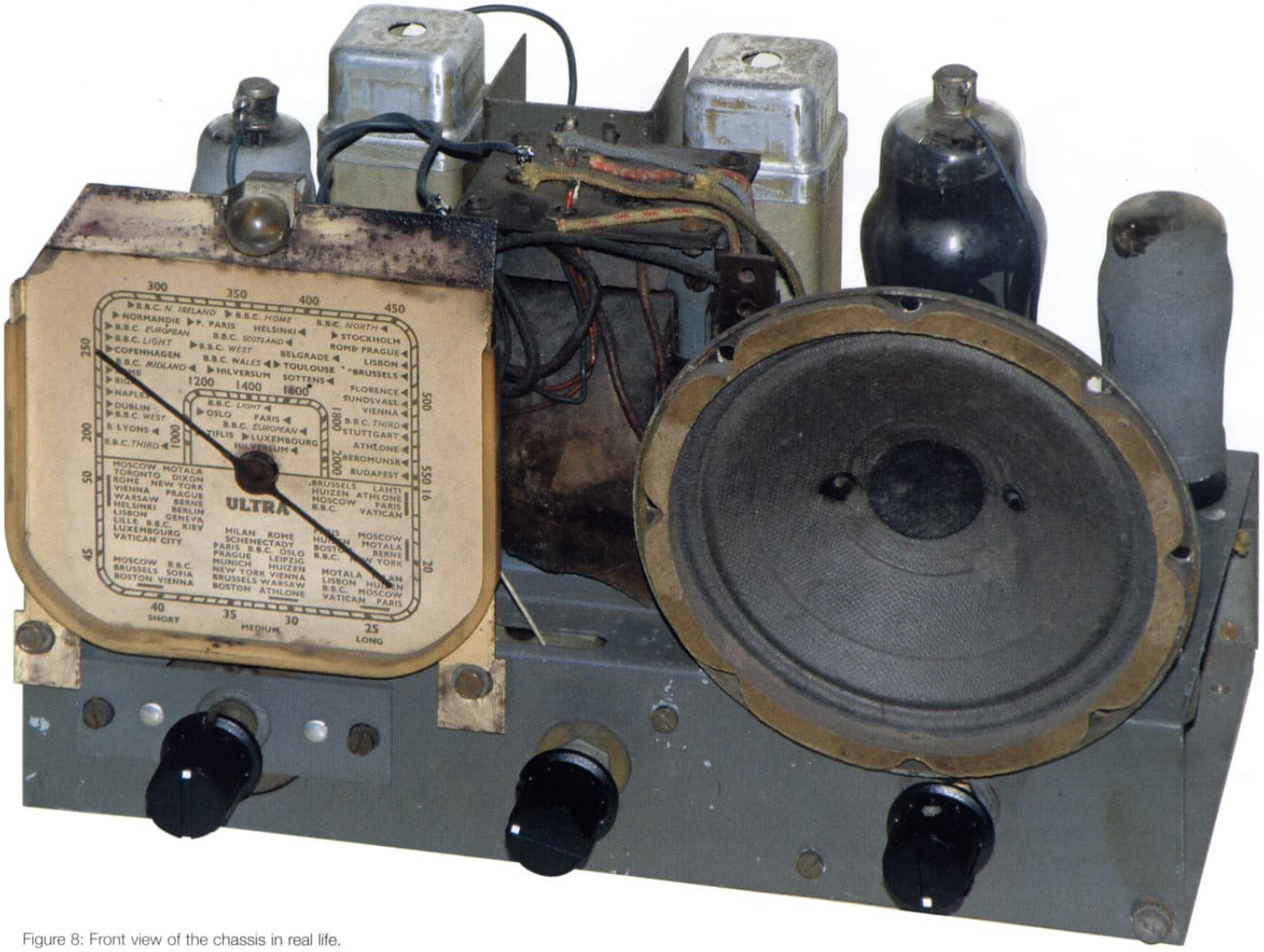


Figure 8: Front view of the chassis in real life.

it would typically have been used from two-pin wall sockets or lighting sockets. Since the radio's chassis is fully isolated by the mains transformer's primary, I decided to fit a three-core mains cable and earth the chassis. Potentially (no pun intended) this puts more electrical stress on the transformer, but I thought this was worth a try to make the radio safer to use. A 13A plug with a 1A mains fuse was fitted.

Switch on

I carefully checked all the wiring, replaced the valves that came along with the radio, plugged in an aerial and switched on. After ten seconds or so of warm up time, I was greeted with a loud humming sound which couldn't be turned down by adjusting the volume control. A quick switch off and I checked the volume control, which seemed to be intermittent across some of its range. Luckily I already had an identical Morganite component in my junk box, so I fitted it and – no difference, still the same uncontrollable loud hum.

I decided at this stage that trying a new set of valves might be a good idea. I was thinking that maybe the PEN45DD could have developed a heater-cathode short and this could be causing the hum. The original valves were rather old and it had always been my intention to fit new ones, so this wasn't a big emotional investment at the time. The TH41, VP41 and PEN45DD weren't difficult to source, but I couldn't find a replacement or substitute for the UU6. Switching on with the new valves fitted (apart from the UU6) produced exactly the same problem.

Now my train of thought indicated that maybe the UU6 was faulty, and so I removed it and fitted a pair of 1N4007 1000V PIV diodes (each with a 220Ω resistor in series) across its socket to give mains rectification. The UU6 has something of a reputation for unreliability, caused by overheating because of its metallised coating. Again switching on gave the same loud hum.

I was getting a little desperate, and tried to think logically as to what could cause this hum. My suspicion fell on the HT smoothing electrolytics, despite the fact that they seemed to have reformed successfully. I disconnected them from the circuit and measured their capacitance – each was only a small fraction of a µF! So out came the can and in went a new BVWS 500V 16µF + 16µF electrolytic. Switch on again, and to my relief, silence! If I'd checked the capacitance of the old capacitors before and after reforming them I would have saved myself a lot of pain. Figure 5 shows the underneath of the restored chassis after the new electrolytic can had been fitted.

Tuning around the long and medium wavebands produced no stations, and so I checked on a nearby radio to see if the new TH41 frequency changer valve was oscillating, and I could detect nothing. I checked the DC potentials on its pins, and the screen grid (pin 7) measured at full HT voltage, rather than the 60V or so that it should have been, so it seemed that the valve was taking no screen current. Looking carefully at the underside of the socket, I couldn't see the valve's pin 7 sticking through the socket. Turning the chassis over, I saw that I had inserted the new VP41 into the frequency changer valve's socket, and the new TH41 into the IF amplifier's socket. I quickly swapped them over, switched on again, and the radio came to life! Switching between bands, the radio was lively on all three bands.

Since I'd replaced the UU6 with the 1N4007s I decided to re-instate the original arrangement to see if the UU6 was good. I removed the diodes, tidied up the wiring around its socket and re-inserted the valve. Switching on again, the radio worked fine, so the UU6 was perfectly serviceable.

The next step was to check the old valves and to see if they were still usable. The old TH41 worked back in the radio, but the old VP41 produced a dead radio again, so I concluded that it was faulty, and I re-inserted the new VP41. Looking at the old PEN45DD, I could see that its

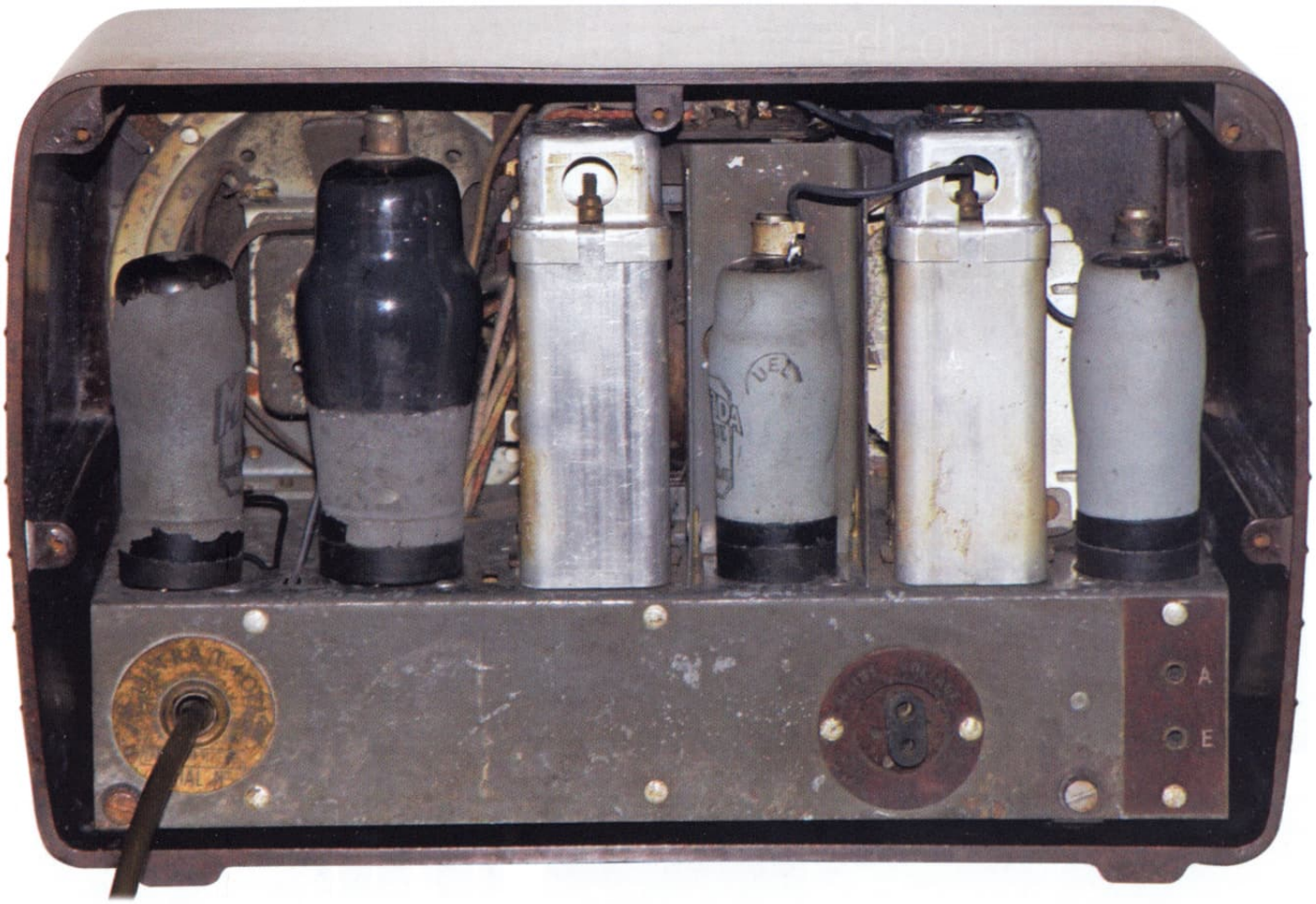


Figure 9: Rear view of the chassis back in the cabinet. The heights of the valves – especially the PEN45DD – and the IF transformers make for a tight fit.

top cap was loose, and as I wiggled it, it fell off. The broken off cap had left a few mm of wire sticking out of the glass envelope and I managed to crimp and solder a length of bare tinned wire onto it, and then pass this wire through the cap salvaged from the non-working VP41 and solder it on. The old PEN45DD worked well enough in the radio to leave it in place, so I had a new PEN45DD to add to my collection of spare valves. Figure 6 shows a rear view of the restored chassis. Ultra's own top chassis photograph, showing the quality of their service manual, is shown in Figure 7 and Figure 8 shows what the front of the chassis looks like in real life.

I let the chassis soak test for a couple of hours on the bench and it continued to work well. The radio took about 45W from the mains and a voltage drop of 59V across R15 indicated an HT current of 44mA.

Cabinet

The cabinet was in very good condition, with no cracks or serious scratches, and after removing the dial glass from the inside, just needed a good wash in hot water and a polish to bring it up to more than acceptable condition. The dial glass was given a clean and mounted back into the cabinet.

The chassis was re-inserted into the cabinet, and the fixing screws and cleaned knobs (with the felt washers), which had given me so much trouble when being removed, were re-fitted. Figure 9 shows a rear view of the radio: as you can see the heights of the valves and IF transformers make for a tight fit.

Summary and conclusions

The Ultra T401 is a well-engineered radio and a very worthwhile restoration project, and it holds its value today rather better than many other radios of the era, especially if the cabinet is in good condition. It was sold in four colour combinations, and the more colourful variants are more sought after than the brown and cream finish of my radio. Judging by the colour of the chips and scratches the coloured versions seem to show, the colour seems to have simply been a layer of paint applied over the brown base plastic cabinet. Restorers sometimes completely re-spray their cabinets with a modern equivalent of the original colour.

What should have been a straightforward restoration was complicated by the difficulty in removing the knobs, and a couple of basic mistakes on my part. Firstly I failed to measure the capacitance of the HT smoothing capacitors, and although they seemed to reform successfully, they had very little capacitance left and needed to be replaced. This caused me to go up a couple of blind alleys until I realised my mistake. I then managed to confuse myself by swapping over the frequency changer and IF amplifier valves, which hardly surprisingly caused the radio not to work. In the end I had a good-looking radio that worked well on its three bands.

Because of the lack of an audio pre-amplifier stage between the signal detector diode and the audio output stage, strictly speaking the T401 is a 'short' superhet. I must admit I didn't think the performance of the radio was noticeably worse than the many 'long' superhets I've encountered. Ultra eventually fixed this deficiency by the use of an HL41DD double-diode triode, and a separate audio output valve, in the model T491.

A memorial to the man in the white coat

The British Vintage Wireless and Television Museum, June 6th 2015

Photographed by Lorne Clarke and Carl Glover

A variety of sets made by Gerry Wells over the years

Bargains were to be had in the quadrangle

Tony Constable (right) arriving at the event

More items for sale in the quadrangle

85 balloons were released, each one representing a year in Gerry's life

Tony Clayden

DJ John Wakeley

John Thompson, microphone, and wine

L. McMichael Co. Ltd. 'Screened Dimic Three' circa 1928-31

by Robert Lozier

Leslie McMichael had been involved as an amateur wireless experimenter since 1913; he was one of the founding members of the RSGB. From the WW-I demobilization in 1919, at the age of 34, he set up a business to supply the needs of experimenters primarily from the sale of war surplus goods. In mid-1920 he formed a private company with an old friend, René Klein and by early 1922 merged with a business that had been established by Benjamin Hesketh in 1920. By late 1922 the business was receiving very favorable reviews of their own manufactured wireless sets featuring components designed by Hesketh.

Figure 1: Oak cabinet with Jacobean Revival style finish.

By 1927 the first versions of R.F. screen grid valves became available to set manufacturers in the U.K.; and the next year, the introduction of the pentode audio amplifier tube made a significant improvement in audio amplifier power and efficiency.

Messrs. McMichael combined these two innovations with a conventional A. F. triode as a regenerative detector to produce a three valve battery powered radio considered very good in performance on the Medium Wave band and exceptional in performance on long waves. Added to that, this receiver employed provisions for interchangeable coils; 9 in all, that would permit coverage from 10,000 to 15 metres.

Coverage of such wavelengths would lead me to think this set was purpose built for the radio amateur but the advertising I have seen of the day does not overtly make that distinction. Nor do the detailed reviews given to stand holders at the great Radiolympia exhibitions by the writers for Wireless World.

One interesting side note is that the sets capabilities won the firm contracts to supply these receivers to Crown Agents for the

Figure 2: The three coils in one box were standard issue for MW and Daventry. The other 9 coils were optional.

Colonies. I took special note of that statement because included with this radio, was a letter from that well known early American collector and dealer in vintage equipment, Paul Giganti. He stated that he had purchased this radio in 1954! for the outrageous price of $35; his usual limit at the time being $10. So I have wondered if this set might have come from a U.K. consulate office here in the USA.

Correspondence with U.K. collectors indicate no other surviving Dimic 3 set having such a large assortment of boxed coils. About 30 years ago I purchased this receiver from another well known radio collector of the 1970s & 80s, John Caperton.

The cabinet is 'flaky cut' oak and the grain is filled but not levelled; somewhat in the style of the Victorian era Jacobean furniture revival; an essentially unknown style here in the USA but found in a number of early U.K. sets.

The top lid is a single plank with routed edge. Without splined end pieces, such a wide & thin board is prone to splitting. Placement of the hinges for the lid simply seem to just dare someone to push the lid back enough to rip out the short screws. (There being no provisions for a lid prop.) The lid on my radio was missing, John had never been able to find any photographs of the cabinet and thus never did any conservation or restoration on the set. Before the age of the Internet I had no better luck in figuring out what would be necessary to fabricate a credible replica.

In 2013 I was visiting the UK Vintage Radio Repair and Restoration Forum and found some exchanges about a mains version of this receiver with photos of a restored set. From that I learned of a 1928 Wireless World article on the battery powered version like my set. I now had enough information to recreate the missing lid. Decades ago someone had found a plain 'flaky cut' oak board and attached it to the top of my cabinet. It had been coated with polyurethane varnish, was not square, and worse, it was 1 1/8" too short and the width was 1" too narrow. I have never been able to locate a larger piece of such vintage planking. I had a notion that I could butt glue wood strips to the existing plank and then route the ogee curve on the board such that from the outside, the plank would appear seamless.

Figure 4: This is where you learn that you can NEVER have too many clamps in your shop.

Figure 5: No such task in my little shop is easy. I found that I could not find an ogee router bit of the correct profile that could be used in a conventional portable router. I determined that if I had a router table with a very high work fence, the flat of the board could be placed up against the fence so that the ogee curve would be cut 90 degrees

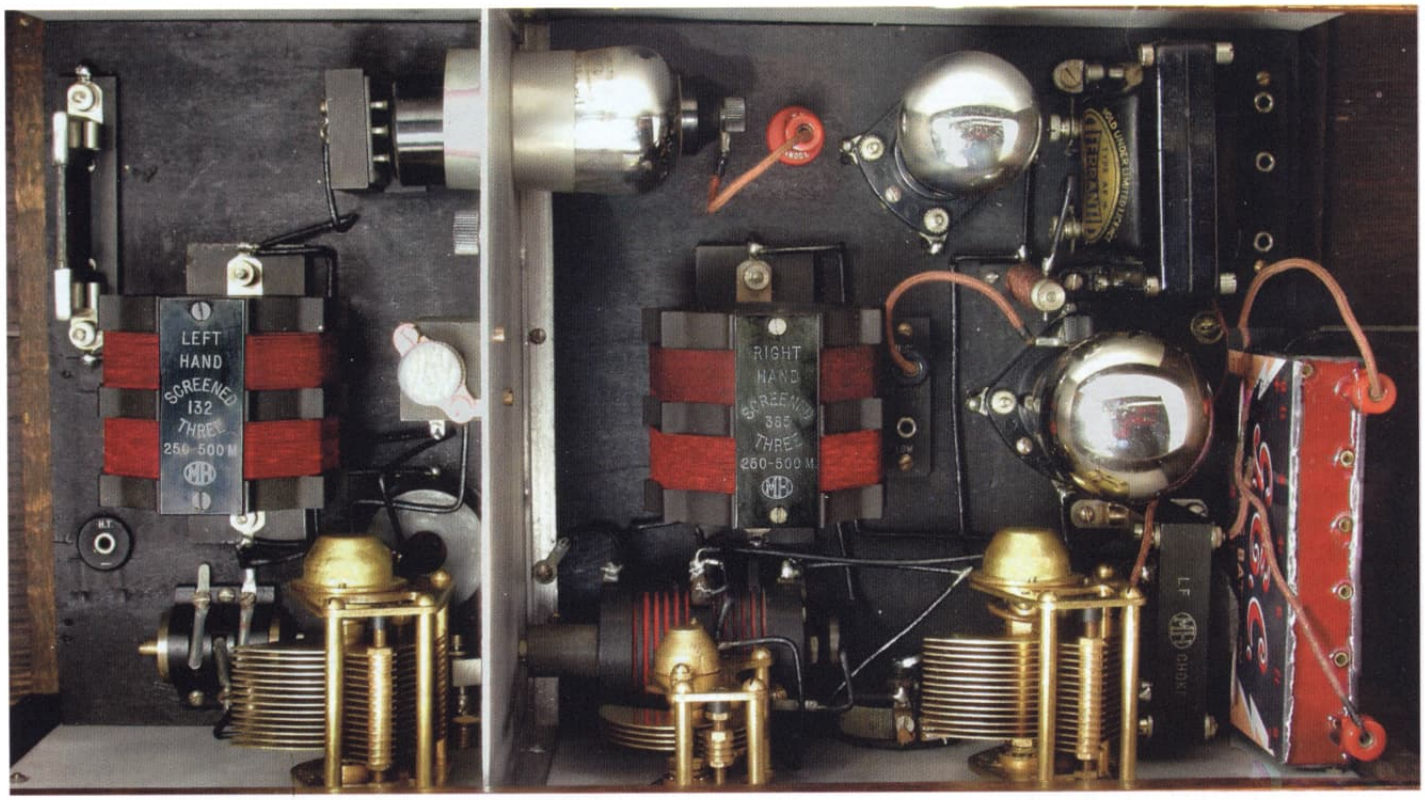


Figure 3: Top view of chassis with grid bias battery replica.

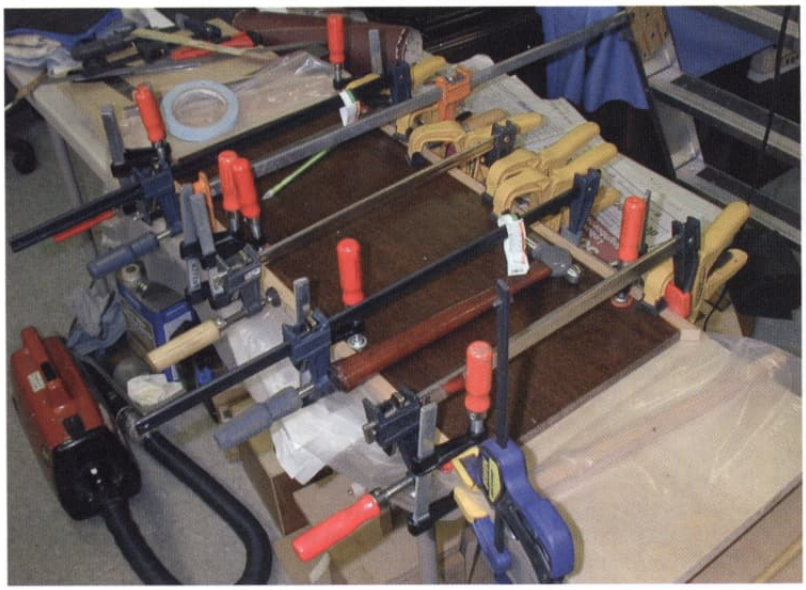
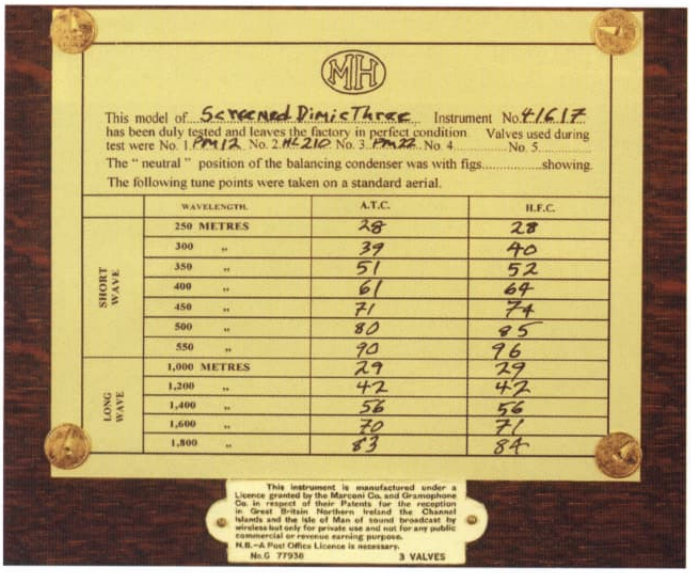


Figure 4: 'Stretching' my available board by gluing-on oak strips to the edges. Proving you can never have too many clamps in the shop.

Figure 5: My modifications of a folding work bench to make a high fence router table.

Figure 6: Removing the polyurethane varnish on the salvaged board and staining to match the original cabinet was no small task.



This model of Screened Dimic Three Instrument No. 1617
has been duly tested and leaves the factory in perfect condition. Valves used during test were No. 1. PM12 No. 2. HL210 No. 3. PM22 No. 4. No. 5.
The "neutral" position of the balancing condenser was with figs. showing.
The following tune points were taken on a standard aerial.

	WAVELENGTH	A.T.C.	H.F.C.
SHORT WAVE	250 METRES	28	28
	300 "	39	40
	350 "	51	52
	400 "	61	64
	450 "	71	74
	500 "	80	85
	550 "	90	96
LONG WAVE	1,000 METRES	29	29
	1,200 "	42	42
	1,400 "	56	56
	1,600 "	70	71
	1,800 "	83	84

This instrument is manufactured under a Licence granted by the Marconi Co. and Gramophone Co. in respect of their Patents for the reception in Great Britain Northern Ireland the Channel Islands and the Isle of Man of sound broadcast by wireless but only for private use and not for any public commercial or revenue earning purpose.
N.B.—A Post Office Licence is necessary.
No. G 77936 3 VALVES

Figure 7: Replica calibration chart and Marconi license tag thanks to good photos & measurements from UK Vintage Radio forum members.

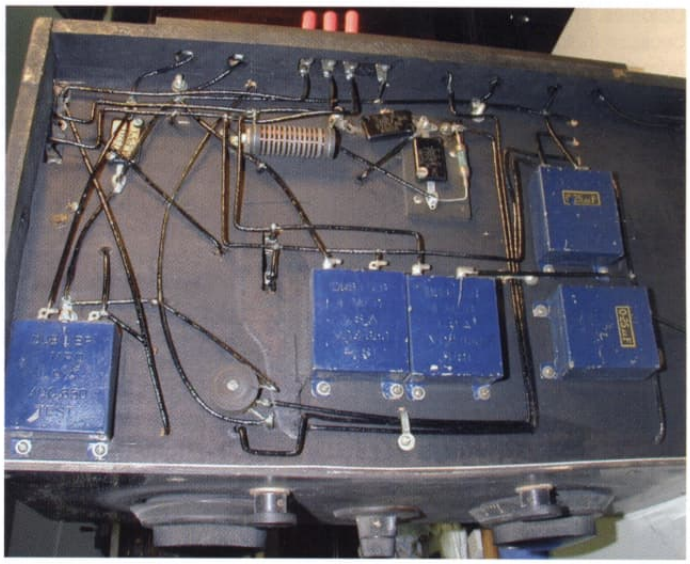


Figure 8: The underside of the Dimic 3 chassis was well protected from the 'insults of age'.

Figure 9: Heavy soil and corrosion on the top side of the chassis demanded all parts be removed for proper cleaning.

to its conventional usage. I modified a Work-Mate folding bench (something I very rarely use) to hold my small router and built this high fence. It worked like a charm.

Figure 6: Getting the new wood to match the rest of the cabinet was no small task. Taking the cabinet out in sunlight reveals differences in hue but there is no problem evident in normal room lighting.

Figure: 7 Now that I had a lid of the proper dimensions, I needed to recreate the paper chart with calibration settings. Thanks to one of the UK Vintage Radio Repair Forum regulars, I got a good snapshot of the chart that I could use as a template for making new graphics using Photoshop 7.0

I needed to find the proper way to attach the chart.... While taking the chassis apart, I had found the head of an old style thumbtack in the debris. Comparing it to the snapshot sent to me confirmed that it was indeed one of the tacks used to fix the chart! Then it was off to eBay to search for vintage thumbtacks. (Never thought I'd be doing such a thing.) No luck immediately, but within two weeks I found almost identical tacks to do the job... (Thanks! eBay vendors.)

Since I have not made any attempt to operate the receiver, I cannot determine the calibration values directly. So for now, I simply copied the values from the photographed set with a steel nib and drafting ink. (Just my dirty little secret for viewers that don't take the time to read this whole saga.)

Also mounted to the original lid is the Ivorine (white celluloid) Marconi three valve license tag. Thanks to a very sharp photo sent to me by another Forum regular, I was able to generate another graphic using Photoshop 7.0. I printed the image onto glossy laser photo paper and laminated it to white ABS plastic sheet stock commonly used by toy train hobbyist for making buildings and train car models. Afterwards I applied a very fine air-brushed coating of clear lacquer adulterated with a few drops of aniline 'light oak' wood dye to give the finished tag a slightly yellow cast.

The cabinet joints were loose in places so had to be re-glued but fortunately the good original cabinet finish survived unscathed.

The only other missing bit to deal with was the pull knob on the back cover of the cabinet. A completely horrid oversize brass drawer pull was in its place.... eBay to the rescue again... This time someone had an empty Dimic III cabinet for sale complete with the correct knob! Unfortunately for me, getting the cabinet shipped to the USA was prohibitively expensive. BUT the photographs were sufficiently detailed for me to turn-up a very close brass replica of the correct pull knob.

With the decades long cabinet problems solved to my satisfaction, I could attack cleaning of the innards. As mentioned in my previous article on the restoration/conservation of my 1928 SOLODYNE, the type of soil and corrosion found on British sets of this vintage seem especially difficult to remove. Everything on the top side of the chassis had to come off. Fortunately the bottom side was sealed from the environment and showed virtually no 'insults of age'. Figure: 8

The ball bearing vernier drives for the two tuning dials and regeneration control are exceptionally smooth. There was not a lot of general corrosion on these parts but did need to go thru the ultrasonic cleaner since the other top-side parts definitely required cleaning. (Figure 9) The removal of oxides with my acid salt of choice, sodium bisulphate, (common usage to lower ph in spas & swimming pools) tends to leave exposed copper at the surface of the brass. I use a little rotten stone on a felt pad to buff away the excess and reveal the yellow brass. Afterwards I always use the air brush to apply a coat of clear acrylic lacquer.

Some years ago I put together an article on ultrasonic cleaning you might like to read. Here is the link: http://kd4hsh.homestead.com/Ultrasonic_cleaning.html

My cleaner cost around 400 USD some 20 years ago and I must say it has proven to be one of the very best equipment

additions made to my shop. If it dies today, I'll be purchasing an essentially identical one from the very same manufacturer.

Just removing these and other parts from the front panel proved very difficult because of heavy corrosion. A few of the threaded flanges were badly damaged nickel plated brass and so were re-plated. If you have never tried nickel plating of small parts, I encourage you to give it a try.... The material investment is relatively small and the results are very satisfying when applied to small hardware encountered in pre-1930 wireless outfits. There are a wide range of supplies available from www.caswelleurope.co.uk. When plating small parts, I see no need to buy the plating outfits... Just purchase the chemicals and nickel anodes and cobble your own double boiler (old coffee pot powered from a 600 W lamp dimmer) a 600 ml Pyrex glass beaker and a power supply consisting of 3 'D' cells (LR20) batteries or any junk power supply with a current limit resistor in series. Team up with a friend to buy supplies since the base quantities will supply twice what you are likely to need for a long time.

I cursed the designer of the slotted bobbin inductors. The approximately 40 Gauge red & green - silk wrapped wires were attached to solder lugs with no strain relief whatever. Of course any accidental rotating of the lug parts the wire. The largest inductor had to be rewound.

There is a cam switch linked to the 'Long & Short' front panel knob. Corrosion was so bad that two of the switch leafs had cracked. So replacement leafs were fabricated.

The hard rubber front panel is heavily oxidized and I have no way of determining how deep the oxidation goes. I simply applied plain white crème waterless hand cleaner with #0000 wire wool to buff the surface to a more or less even - dull sheen.

Empty spaces...

Figure 10:

I noticed that the grid bias battery for the audio amplifier shown in the Wireless World August 8th, 1928 article has terminations never used here in the USA. Rather than having Fahnestock clips or threaded studs on the battery, the terminations are hollow short brass tubes or formed brass sleeves with an internal diameter of 1/8". This becomes the receptacle for what was commonly referred to as a 'wander plug'. There are many variations of this plug from barely functional to really clever.

This scheme was also employed on 'B' batteries (H.T. batteries) and was a common practice throughout Europe. Apparently all these batteries had a paper flap, barrier or sealed pasteboard lid over any of the connections that must be torn off, punctured or removed to gain connection to the battery. It was a sure way for you to know if the battery was new. I don't think any US makers adopted this practice here in the 1920s or 30s.

My receiver had neither the grid bias battery nor the pair of 60 Volt H.T. batteries. Since McMichael provided space within the cabinet for such batteries, there is certainly a lot of empty space without them. With my zeal for preserving knowledge about the absolutely essential disposable batteries in most radios of the 1920s I set out to make museum grade replicas.

Not an easy task these days.... Very few people have made it a point to save old batteries and the vintage advertising literature rarely provides detailed images, accurate dimensions or (most importantly) provide true colour references. Postings to various forums seldom yield useful results. As some may know, there are a number of people over the past two decades that have indeed made replica batteries with adequate but, unfortunately most often, much less attention to detail than I find acceptable for museum grade exhibition.

A lot of this can be traced to the novice graphic artist not having access to image software that provides for full control/ modification of text generation. They rely on basic image clean-up tools to retouch scans rather than the more advanced techniques of using a scanned image only as a template over which new layers are created with text, logos, lines, etc. The template layer is also used as a clone source for colour fields. This way you can reproduce the less than perfect ink distribution of the old printing processes.

The graphics I have generated for these batteries can be downloaded from this Web page: http://kd4hsh.homestead.com/Battery-Art-index.html

My old friend, Anders Widell, in Sweden was able to provide me a scan of a G.E.C. grid bias battery. I am still not sure of the vintage of this graphic, but it sort-of seems like it might have been in use circa 1928. In any case, I think I have made a very accurate replica that will serve till better information comes to hand.

Figure 10: My replica 9 Volt Grid Bias battery – Vintage of graphic unknown.

Figure 11: Finding enough documentation to reproduce early H.T. batteries seems to present an even higher level of difficulty. The same friend was able to provide images of a 60 Volt Ever Ready "Winner" battery pasteboard shell. To the best of my knowledge this graphic must date from 1932 to 1934. So it is reasonable to think that my Dimic III could have still been in regular service with such batteries.

Figure 11: My replica of 60 Volt H.T. battery – I think the graphic dates from 1932 to 1934.

Since I was going to add replica batteries to my receiver, I was going to need more 'wander plugs'. Fortunately there were two such plugs in the basic receiver; one for the S.G. valve anode and another for a "High/Low" plug board. I fabricated 8 more plugs using Delrin plastic for the black insulators and mixing up urethane resin with red dye to get rod stock for the red insulators. After successfully completing these eight replicas and in the process of wiring up the set, I realized I can't count! I really needed 10 replicas.... Oh well... The junk box produced two miniature banana plugs that will have to do for now.

Ah!... The 2 Volt accumulator.... Well that is indeed another level of challenge I have not yet been able to surmount. Since the 2 Volt valve was not used in the American market, we do not see single lead/acid rechargeable cells of suitable capacity for

Figure 12: Celestion cone speaker of 1928 vintage. Seems ideal to match to the first generation pentode audio output valves.

Figure 13: Parchment cone reinforced with a 10 turn spiral of 1mm square bamboo on front side. Glued to a paper cylinder at the cone edge

Figure 14: Eighteen bamboo radials support the back side. I wonder how much labor was required to fabricate these in volume production?

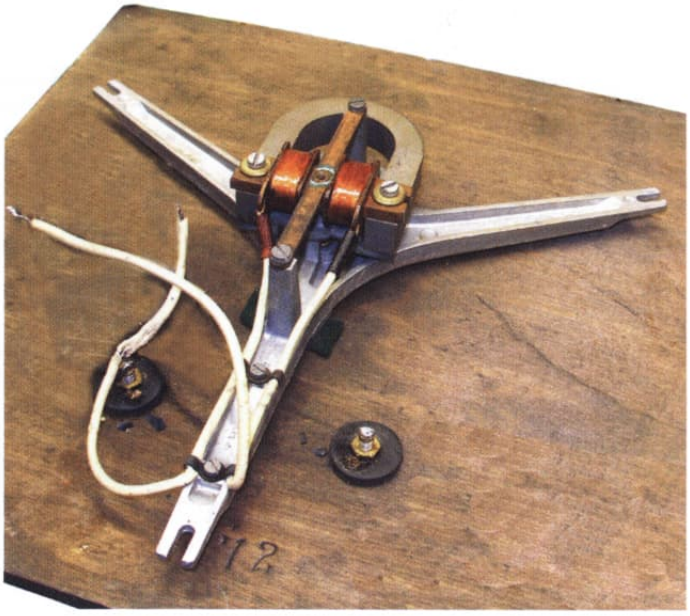


Figure 15: Very robust driver mechanism must move cone only a few thousandths of an inch in normal operation.

this service here. Three-cell, nominal 6.3 Volt, were the norm to power our 5 to 8 valve sets. These batteries were comparable in size to automobile batteries. That spelled their doom for future collectors because, by 1915, there were already many businesses engaged in the rebuilding of lead/acid auto batteries and there was a ready market for dead cells to salvage for scrap lead. In my 40+ years of collecting I have found only one, genuine and complete full size lead/acid "Radio A" battery (circa 1926) contained in a hard rubber case. Many experienced collectors confirm that it is the only one they have seen in existing collections. (You will find small, say 20 A/H, three cell batteries in glass cases. These were made to go inside 'A' Battery Eliminators. They provide enough power to operate the radio for just a few days while avoiding hum problems of operating directly from the mains.)

Perhaps some reader will eventually point me towards a complete and appropriate British made, glass or Celluloid cased 2 Volt cell one day so that my exhibit of this marvellous radio can be essentially complete. Fortunately the original 6 pages of "Instructions and notes upon the McMichael Screened Dimic Three" and Dimic Coil specification sheets were saved by Mr. Giganti way back in 1954.

All-in-all, this receiver provides a distinctive contrast to 'American Practice' in early All-Wave receiver design and appears to slightly pre-date the introduction of the popular series of radios made in the USA by the National Company, Inc. National did not provide loudspeaker operation from their receivers until the SW-4 of 1929. So I have been delighted to be able to present this receiver at exhibitions and expand peoples understanding of worldwide technology progression.

Footnote:

I enjoy exhibiting sets at various vintage radio events. In doing so, I like to include associated artefacts and as much documentation as I can locate. Since the Dimic 3 is an early example of wireless sets using the pentode audio output valve, I wanted to show an appropriate speaker. I have only two late 20s British made cone speakers.

The Celestion loudspeaker (Figure 12) I exhibit with this radio was highly regarded at the time for its (relative) sonic accuracy. (At least so by writers for Wireless World and The Wireless Engineer.) Its relative low efficiency was offset by the early adoption of the pentode audio power tube.

Figure 13: The cone is very thin paper (apparently vegetable parchment) that is reinforced on the front side by a ten turn spiral of 1mm square bamboo rod and on the back side by 18 radials of the same bamboo; thus making an extremely rigid but light cone. (Figure 14)

I have yet to imagine how these cones were made in any quantity but apparently this series of speakers found wide acceptance in the marketplace.

Figure 15: The very robust, high impedance 'pin driver' mechanism, I'm guessing, moves the cone only a few thousandths inch in normal operation.

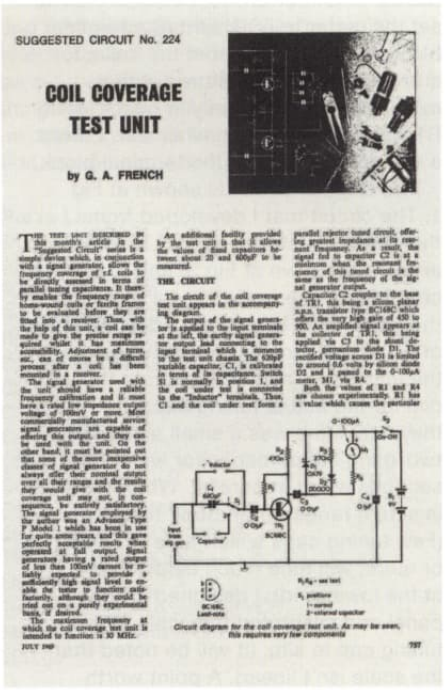
The first versions of these cones as illustrated in The Wireless Engineer for April 1925, p.433 were supported entirely by the apex connection to the pin driver. However at some later date, the periphery of the cone was attached to a paper cylinder supported by a cast aluminium spider at three points. This later construction method is employed in my speaker.

When connected to a good audio source it does give a pleasant mellow tone.

Robert Lozier – Monroe, NC 28112 - kd4hsh@juno.com – 704-459-1076 cell

A Coil Coverage Test Unit by David Taylor

Though I'm able to test the inductance of home-wound or commercial manufactured RF coils, it occurred to me that it would be handy to be able to test the frequency coverage of the coils out of circuit, as it's much easier to add or remove turns at that stage than when the coil is soldered into position. I'm quite a fan of the 'Suggested Circuits' series by G.A. French that featured in the much lamented Radio Constructor Magazine back in the 1960s, and I came across a design of his for a basic 'Coil Coverage Test Unit' - 'Suggested Circuit No 224' in the July 1969 issue of the magazine - a simple circuit to enable the frequency range of home-wound RF coils, (or commercially made coils of unknown provenance), to be evaluated before the coil is fitted into a receiver.


SUGGESTED CIRCUIT No. 224

COIL COVERAGE TEST UNIT

by G. A. FRENCH

THE CIRCUIT

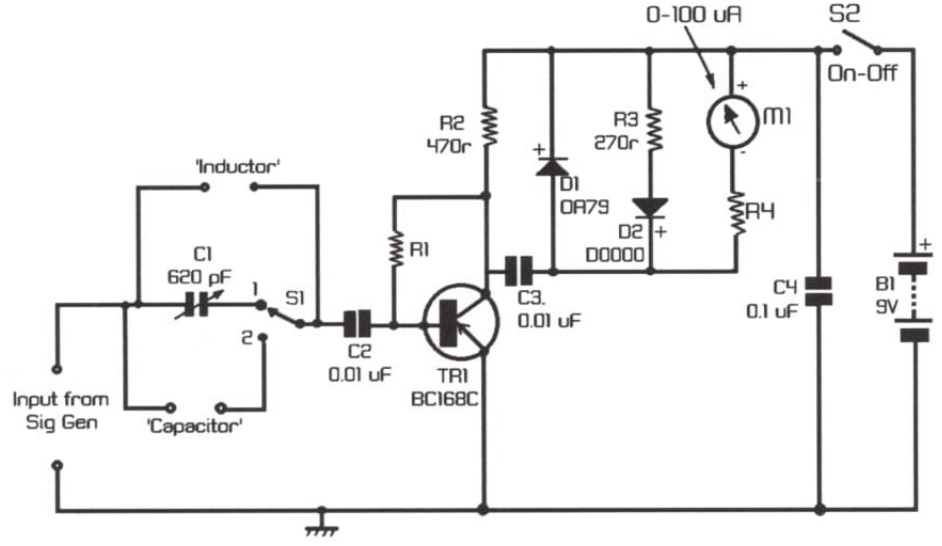


Figure 1: The original coil test unit circuit, *Radio Constructor* July 1969

The operation of the circuit is explained more fully in the original Radio Constructor article, which can be found by entering 'Suggested Circuits of G.A. French' into a search engine such as Google. The basic concept is that if you have a calibrated variable capacitor and put the coil to be tested in parallel with it to create a parallel-tuned circuit, then feed it with a signal from a signal generator, sweeping the generator across the dial, when the circuit reaches resonance, there will be a dip on the meter of the test unit, at which point the frequency can be noted from the signal generator.

Hence, if the tuning capacitor in the equipment for which the coil is being designed covers say from 50pF to 300pF, the tuning cap of the Coil Coverage Test Unit can be set to those two extremes, and the frequencies at which a dip on the Test Unit meter is observed at those extremes will indicate the frequency coverage of the coil. If the frequency coverage of the coil is too low, turns can be removed from the coil to bring it up to the desired frequency. Conversely, if the frequency is too high, turns can be added to the coil. Obviously it's much easier to do this with the coil out of circuit than when it's built into the equipment. The original article stated that the unit should be suitable for coils up to 30 MHz.

'Suggested Circuits' were just that - they were a starting point - not finished projects, so there were no layouts or constructional details – just an explanation of the operation of the circuit, and a few tips on layout. No doubt it could be - and in the 1960s probably would have been - built on a tagboard, but I designed and made a PCB to my own requirements, and adapted the circuit to suit my own needs. The original design had the facility to check the value of unknown capacitors, but capacitance meters are so cheap nowadays that there seemed no point in incorporating that feature, so I dispensed with the switch and sockets shown on the original circuit.

Back in the late 1960s, frequency counters were beyond the reach of most

amateur constructors, but that isn't so nowadays. I therefore added a frequency counter socket to give a more accurate readout than relying on the signal generator dial. The original design used a long since obsolete silicon diode - a Lucas D0000. After seeking advice from others, I settled on a 1N4002 as being close enough to the Lucas spec. None of the other components should pose any difficulties in sourcing. On the original circuit, both R1 and R4 were 'select on test' so I decided that it would be more convenient to incorporate two pre-set pots for adjustment purposes - R1 to set the collector current to 4 or 5mA - R4 to set the meter to FSD. I fitted a terminal block on the PCB so that the collector current could be monitored with a milliammeter temporarily in circuit while R1 was adjusted, then when set, I fitted a wire link in place in the terminal block.

The original circuit is shown at Fig 1. The circuit that I developed from the original is shown at fig 2. The PCB artwork is shown at Fig 3, and the component overlay at fig 4. I've included the front panel layout that I devised, but of course anyone wishing to construct the unit would need to calibrate the dial for the actual tuning capacitor that they use. Mine was a small air-spaced two-gang 250pF capacitor with both sections wired in parallel. When tested in situ, it ranged from 35pF to 550pF. (Few tuning caps which tune to 500pF or more, will tune much below 50pF at the lower end). I designed a front panel and calibrated the scale of the tuning cap in situ. (It will be noted that the scale isn't linear). A point worth stressing is that if a metal enclosure is to be used, the tuning cap must not be grounded. Thus, as I used scrap double-sided copper PCB laminate for the front panel, I mounted my tuning capacitor on insulated stand-offs.

It doesn't matter whether or not the meter goes to full scale, so long as it goes across far enough to enable a dip to be observed at resonance. Though the original article specified a 100 uA meter, after some experimentation I settled on a 50uA meter, which can be adjusted on the preset potentiometer for full scale deflection and will also allow a low input signal level from the signal generator. The null on the meter is unambiguous when the coil is at resonance, and is even more dramatic when observed on an oscilloscope, so for the small additional work involved, I added a socket for the connection of a 'scope.

I made a clear acrylic cursor for the knob, and screwed it to the rear of the knob with two c/s 6BA screws. I scored a line into the cursor, filled the line with red modelling paint, not worrying too much about it going outside of the line, then when almost dry, I used a cotton cloth slightly dampened with enamel modelling thinners (not cellulose!) and wiped off the surplus paint. The same technique can be used for re-painting lettering on radio

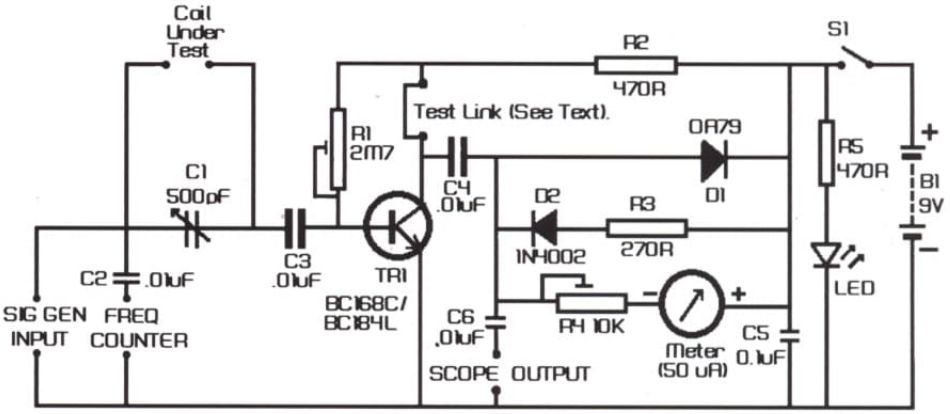


Figure 2: Coil coverage test unit - updated circuit

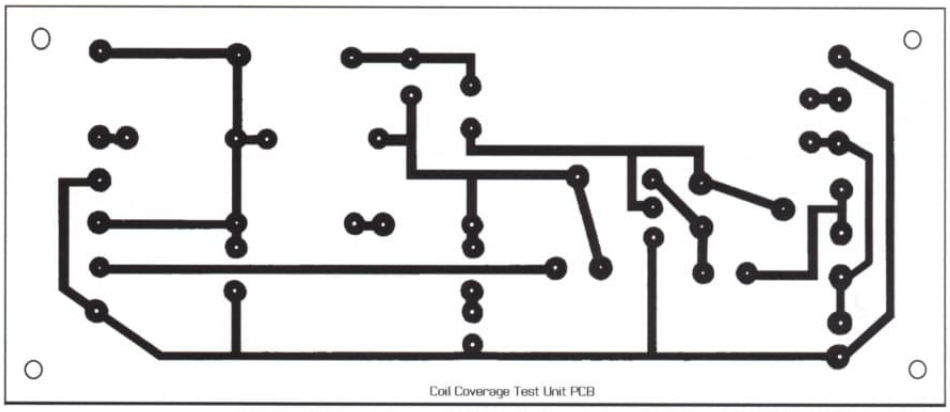


Figure 3: Coil coverage test unit PCB artwork (actual size is 12.5 x 5 cm)

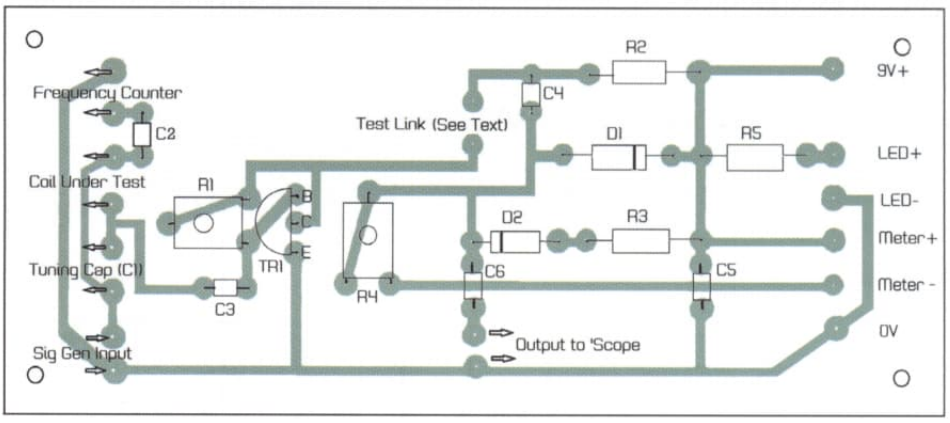


Figure 4: Coil coverage test unit component placement

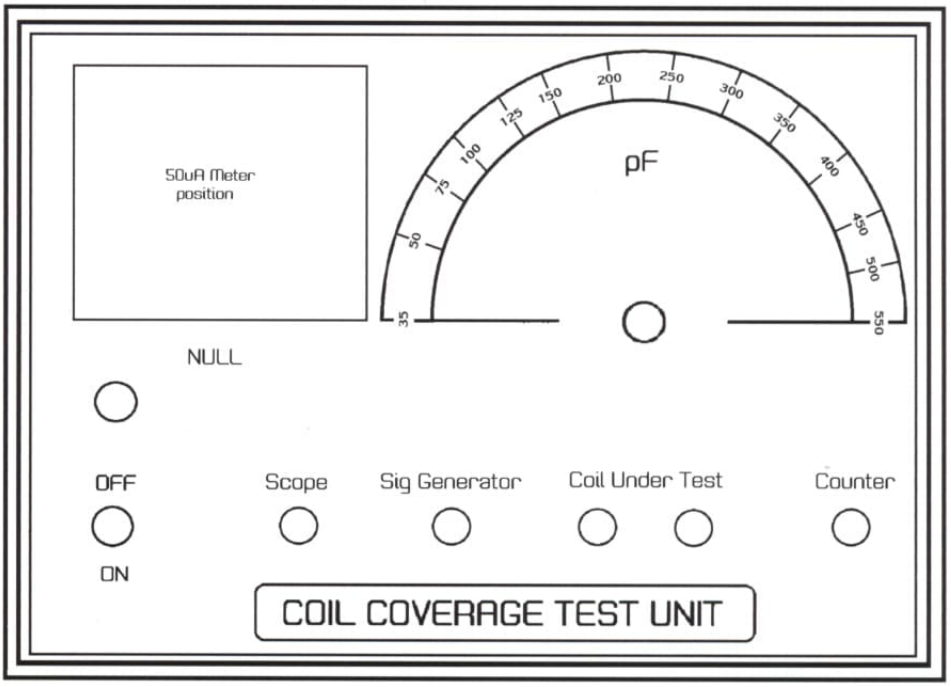
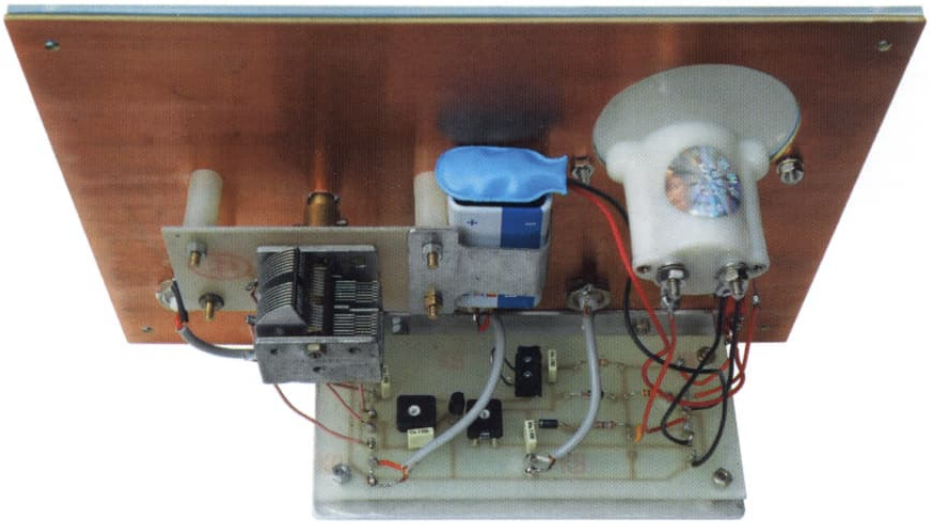


Figure 5: Front panel layout



and test gear knobs. I drew the front panel using MS 'PAINT' then printed it onto card which I encapsulated, then made and fitted a clear acrylic protective panel to cover it.

As has become my habit for housing my home-brew test gear projects, I made a comb-jointed box from scrap mahogany off-cuts, using a home-made router jig. The box is 21cms wide x 16cms high x 10cms deep. A fancy enclosure may seem rather like gilding a lily but such boxes cost me nothing to make, so not only are they an economy measure, to my mind, they give a presentable 'retro' appearance in keeping with this wonderful hobby of ours.

I've tested the unit on several homebrew and commercially made coils to good effect. For the limited use to which it will be put , admittedly it's not the sort of thing that many will want to build, but it's no chore to me as I enjoy building simple test equipment, adequate for my needs.

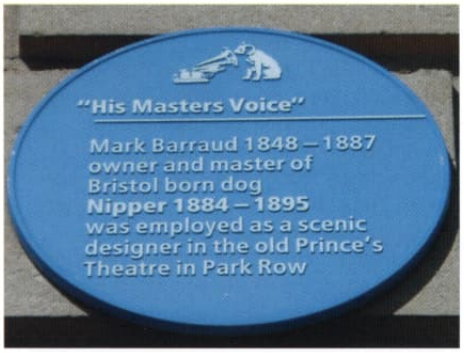
Parts List:

R1: 2M7 PRE-SET POT
R2: 470R
R3: 270R
R4: 10K PRE-SET POT
R5: 470R- 1K (TO SUIT LED)
C1: 500 pF VARIABLE CAPACITOR
C2: 0.01 uF
C3: 0.01 uF
C4: 0.01 uF
C5: 0.1 uF
C6: 0.01 uF
D1: 0A79 GERMANIUM DIODE
D2: 1N4002 SILICON DIODE
TR1: BC168C or BC184L
METER: 50 uA
Test link: 2Pin 5mm Spacing PCB Mount Screw Terminal Block.
LED.

Nipper the HMV dog celebrated in Bristol

Ken Brooks

This is Nipper the HMV dog and his associated blue plaque. Sitting proudly above a busy road in Bristol this tribute can be found on a University of Bristol building at the junction of Woodland Road and Park Row. The site is probably passed by thousands every day but goes unnoticed because the pair are high up and hardly prominent.



The image of Nipper in various forms is perhaps the most enduring and instantly recognisable brand images of all time and the story is well documented on the Internet.

Ferguson 621 U AC/DC AM/FM Radio by Phil Moss

This set was given to me with a Ferguson 384 U, the subject of my article in Radio Bygones and the two sets have a fair amount in common. The style of this set is more traditional, though, it has no push-buttons and no magic eye, and is built on a PCB, mainly. It is therefore a more economical set. As with the 384, it had very weak VHF operation, but unlike that set, this one only produced smoke at first! I knew that the UCC85 was duff because it had been tried in the other set.

As received it was dirty, with a mains lead that had been changed with the new one on a terminal block just in the back. The wire looked like bell flex and wasn't suitable.

The set covers LW, MW and VHF 88-100 Mc/s. A predictable AC/DC valve line-up: UCC85 VHF, UCH81 AM frequency changer and FM first IF, UF89 joint IF, UABC80 AGC, AM detector and FM discriminator and AF preamp, UL84 power amp and UY85 rectifier. The set is a mid-sized table top receiver, in Bakelite, with very nice patterning in it. The front cream part is painted. The set was made about September 1958 going by the main electrolytic. The set uses an 8 X 51/2" elliptical speaker.

Circuit detail

The circuit is to be found on the Vintage series CD No. 4.The following points I think are noteworthy about this set. In FM operation, V2 triode is used as an AF pre-amp, S1D shorts out the HF feedback to stop oscillator running. The AGC is shorted out in FM, by S1A, connecting R25 to earth. This provides grid-current bias to V2 and 3 control grids. Further, the voltage across C50 is applied to V1A via R6, V2 injector grid via R17 and V3 grid 3. R23 applies a proportion to V2 and 3 control grids via R23. I am glad I had the maker's notes to help me with that and didn't have to work it out through all the switching, for myself! All that switching is done on a single wafer, by the way. Running the valves into grid current probably causes some extent of limiting action on FM, thus helping to suppress AM interference. Note that V3 suppressor grid is added into the control loop, too. Two thermistors are used, both in the heater circuit, and the lamps wired across them. This causes them to come on brightly at turn-on, then dim. Odd. The voltage selector does not affect the HT. The tone circuit uses feedback from anode to grid via C53 and (Volume) R33. There is no DC blocking between V4 and 5 anodes, so when R28 went O/C, the valve was still fed via the tone pot.

The tuning cap is a solid affair: apart from the solid chassis, there are brass screens between the VHF sections and the others, and in addition to the normal earth connection to the shaft, there are additional brass flanges on the shaft, and their attendant wipers. The AM sections are dissimilar, with the LO section clearly much lower capacitance than the RF. The cap is on the VHF chassis which has three-point grommet mounting to the main chassis. In my picture of the underside, I have taken off the ally screen which covers the underside of the VHF assembly.

First impressions

As stated when first tried smoke came off R40, in the heater chain. The HT was only 125 V. The two problems do not seem connected. The amount of smoke suggested a fault, not just burning off the dust of ages. The tuning worked in one direction only with the string slipping when the knob was turned the other way. The reservoir/smoothing can did not heat up. Pressing the PCB caused a crunch, the HT went up to 250 V, and now there was a crunch when the wave-change switch was operated. Touching valve pins caused little noise. Hum went up in FM mode. R35 did not get hot, so C54 leaking or OP valve fault was not the cause of hot resistors. (At that stage I didn't know R40 was in the heater chain). I did some voltage checks: and found R13 22 KΩ, effectively O/C. Bridged it. The set did not burst into life. Local oscillator only 44V on anode. Supplied by R15, 15 KΩ with 220 V on the other end. Measured in-circuit at about 80 KΩ. Bridged. This briefly gave me a medium-wave station, but then it went. Others dead. I then fiddled with the valves and got a signal back, and found if I bent the PCB up from underneath, it got much louder. Clearly I couldn't get much further with the set in its box, but I wedged a roll of insulating tape between the set bottom and the PCB. I now got one LW station, too. Checking the UF89 screen grid, it was only about 45 V, should be 65 or 70. Predictably R20 47KΩ was found to be 122KΩ, so I bridged it. I now tried a signal into the FM tuner. RF dead but IF responds at a Volt of input. More sensitive if I put the cable near the IF amplifiers, and also works better on AM than FM. R28, the AF triode anode load was found to be about 2 MΩ, not 120 KΩ, so there wasn't going to be much gain there. Out of the set it was >30 MΩ.

At this stage the set was put aside for some time whilst I did other things. It would need to be dismantled to go through all the faults.

Repairs

Dismantling was easy; the knobs pulled off easily. They are unusually large and heavy, in plastic. There are three screws holding the chassis in. Two are through the front edge of the PCB surround, and one requires the removal of the UF89. The tuning display was held by another at the top. The aerial sockets and speakers sockets are on metal brackets above the chassis on opposite sides of the case. This seems unduly expensive: they could have gone on the back of the PCB assembly. Each has two screws. The antennae is for FM only, the set being wholly dependent on the Ferrite rod for AM. It isn't really good enough, and for any attempt to receive from a distance, an external input would have to be fashioned. The speaker was taken out as it carries the OP transformer. The connections to the primary are on plugs, conveniently. There is a crude internal VHF aerial in the form of a stiff wire, held at the cabinet top by a screw, and soldered to the connector panel for the external aerial. All screws are into the case and all came out easily.

Examination of the PCB revealed many

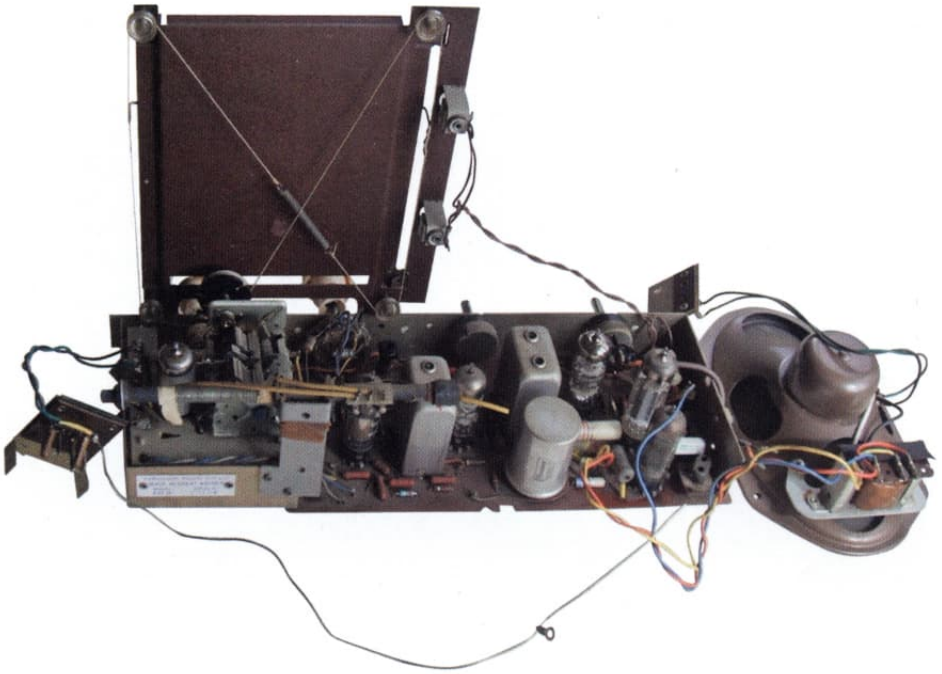
defective and suspect joints, as expected when pressing the board up had increased volume. Most of these were on the IFTs, also as I had expected. They were desoldered, and the pins filed. Then they were resoldered with the use of red-jelly flux as well as the solder's own flux. The results were not elegant: I suspect I would have done better here using lead-based solder, not the tin/copper. Still, the set now worked without effects from flexing the PCB.

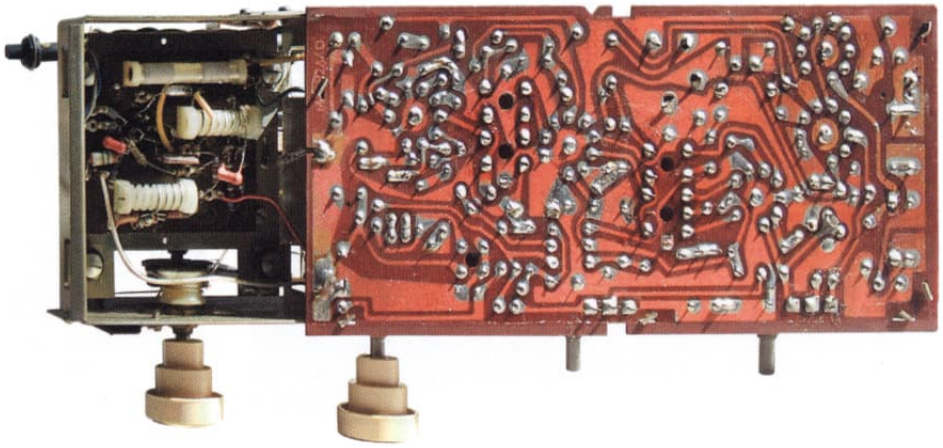
R40 was replaced as cooked, as was R37. No explanation was found as to why I had smoke coming out of the set initially. The resistors mentioned above were all replaced and properly mounted on the PCB. C34 and 31 were replaced because they were Hunts, and easy to get at. Annoyingly they both measured O/C when checked for leakage. R13 22 KΩ was well off and replaced, along with R19, 220KΩ, R17, 68KΩ and R34, 680KΩ. The resistors in the VHF section were OK. R24 had drifted to 5.6MΩ, and although just about in tolerance I replaced it, finding I didn't have one which would fit, I used two 10MΩ in parallel. R25 was on its limit and was changed. To check these I had to lift their ends, as otherwise the values were very low. R23 was dead on: it could have been a hi-stab! Indeed, in practice, it is.

Trying the set after some time and near re-boxing time, a new fault: there was lots of spluttering noise, reduced but nowhere near eliminated by turning the volume down. Quickly traced to poor contact between V4 and its base. A blast with DeOxit cured that. In the process a fair bit went onto the PCB, making it easy to get the dirt off, but also it got onto C51, which was a Hunts I had left alone. Now that the solvent may have got into it, I had further reason to get rid of it, so leaving the set Hunts–less.

With a replacement UCC85 in, the set would work if the antennae was coupled to the tag-board in the set but not to the external sockets. Note to change the valve, the cheap version shield around it had to be unsoldered: it isn't a proper can, just a roll of metal, with a flange soldered to the tuning-capacitor. It also was shorting to the connection to 1 section of the capacitor. To prevent that I bent the lower part of the flange quite sharply before it was clear it could not short. Although there is no definite evidence that someone has been in here apart from changing the mains lead, the VHF wire aerial was rather bent, and it was discovered that the wires from the sockets were incorrectly connected. One went to R3, the other R4. Both these points are remarkably dead. I would expect there to be enough stray capacitance to feed a signal in to the set from either, but no. Connecting the wire to the free end of L1 gave a good signal, but only to there. Connecting the wire to the valve screen gave a fair signal too when it was unsoldered.

The tuning was sticking, and would run only one way. First I used a needle file to roughen the surface of the drive pulley on the tuning shaft, as this nylon drum had become smooth. May have helped but didn't cure. I then oiled the tuning capacitor's gears and the drive shaft. That made things much better. The four pulley wheels were done and the tuning shaft also. It then worked fine.





There was little in the way of restoration needed on this set. With the chassis and speaker out for repair, the case was given a bath. All those slots in the plastic of the front had to be worked with a tooth-brush, but that was not difficult. Once dry, it was T-Cut, then brown shoe polished. It came up very well. There is a small 'squiggly' scratch on the top, but it isn't bad. The Bakelite looks shiny and very nice with its good patterning. The knobs were soaked overnight then tooth-brushed, and came up fine. The brass rings were done with Duraglit and again, came up fine.

One thing went badly wrong though. The lettering on the glass looked as though it had drifted down somewhat. On washing, as I feared, quite a bit came off. In retrospect I should have left it alone, as it wasn't that dirty, and the clear side could still have been done, and that would have made the most difference. Oh well, one makes ones choices and lives with the consequences. The VHF scale is least effected.

The speaker appeared to have a spider's web on it on the front side. Clearing this revealed that a bug had eaten the cone through, I repaired this with Evostik. The set went back together fairly easily.

Conclusion

The set seemed fairly sensitive with its Pinnacle replacement UCC85. More so than the 384 it seemed. The tuning was a bit off: I should really have realigned it, at least on VHF. The tuning appeared to drift rather more though, but the test is to get it on station and use for a couple of weeks, and then see. AM performance is lacking: it really needs an external wire. There is no provision, and it wont tolerate direct connection to the rod's connections. I tried a loose turn round the rod from my external wire, joining the end to chassis. It made a big improvement. If I intended to use this set much I would add this as a modification. I noted a strange shorting ring around the ferrite rod at the far end, carried in a grommet. I tried taking it off and as I moved it along, the signal strength fell. Don't understand that. It is shown on the circuit as part of the alignment procedure for MW.

Trying the set where my usual Murphy A252 is used as the lounge's Radio 4 set, it worked ok, taking annoyingly long to come on as these series-chain sets do, but reasonably stable on frequency. Not Hi-Fi, but OK for the market slot it was intended to fill, so I concluded this was a job done.

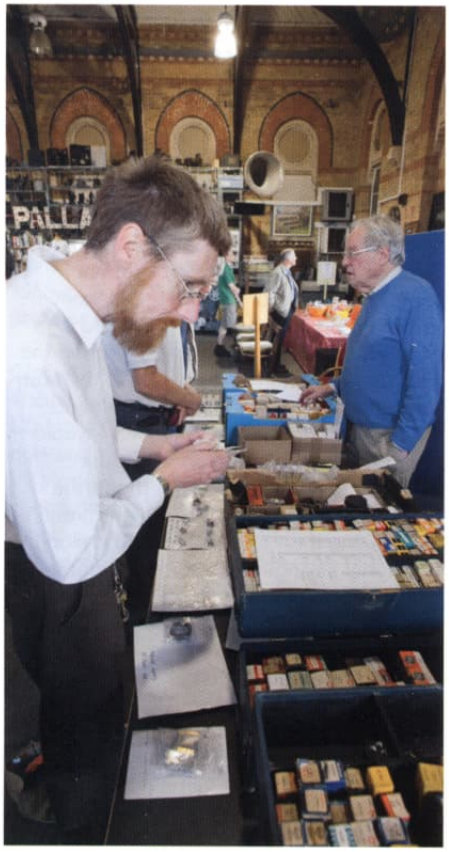
Swapmeet at the Cinema Museum, London June 7th

Photographed by Carl Glover

Phil Taylor

Entrance Hallways

Entrance Hallways



Valves galore!

The BVWS sales table

The BVWS sales table

A view across the main hall

Lots of ceap valves – spot the new EL37 in the £5 box!

Chris Plaister with many interesting items on his stall

My Life and Radio by Richard Shanahan

I hope you will enjoy sharing my, at times, humorous and slightly irreverent story of my early life and radio. My generation made things, we had to, there were few kits about, and little money, in the 1940's or 50's. I made boats and aeroplanes, etc. My dad showed me how to 'wax' a plan, to avoid balsa wood glue sticking to it when laying out wings, spars, fuselages, etc. I had a trix twin 00 gauge railway. Dustbin day and the Ramsgate dump were fertile sources of raw materials. The era was 1943-1959, I'm 71.

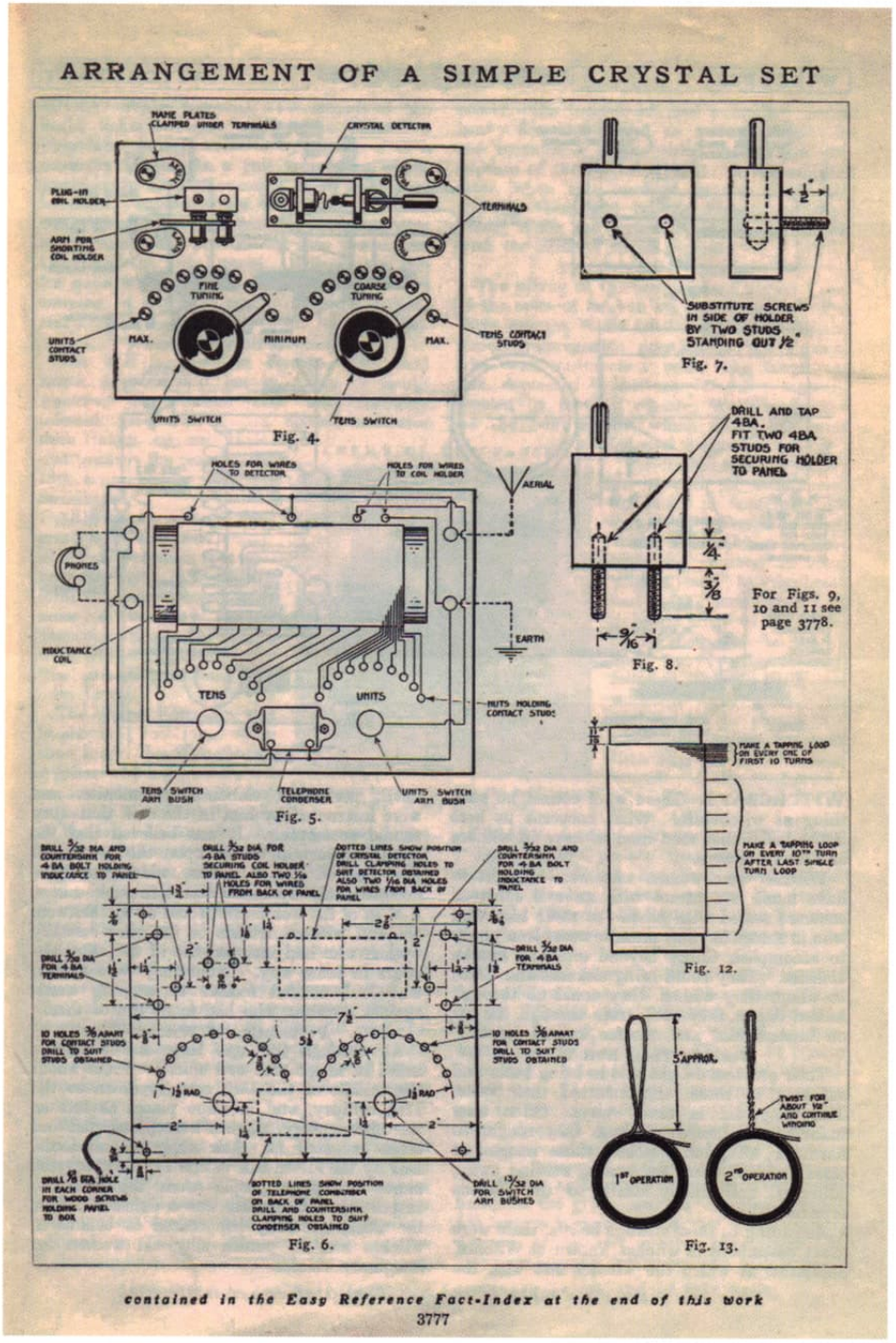


Figure 1: Crystal set circuit from *Cassells Book of Knowledge*, c1924

I made: using basic heat treatment, taps and dies out of steel nuts and bolts, they cut soft metals. Using an ex RAF motor/generator 12v/480v, 5 shillings from the local radio shop, I made a lathe. A very old brass ceiling lamp fitting, it had four globe retaining screws, became a four-jaw chuck. The drive system was Meccano pulleys and string. I was unaware of the possible dangers of a series connected motor. The HV stator/rotor were in series across 240v AC! But I digress.

Radio

Around 1954/55 after numerous simple electrical experiments, I got interested in radio, a 'proper' radio. Our house in Ramsgate had two Rediffusion speakers. We called them radios, one in the front room, the other in the back. We could switch on the light, home and third programmes, a local chap, he was probably two or three years older, could make me one for £3, a large sum in those days. I decided to make one, a crystal set.

My source of information was the 'Cassells Book of Knowledge'. There are eight volumes, given to me some years earlier, by my wonderful Aunty Phil; a fantastic lady, she loved my BSA. In her youth she went to London on one. She used to beg me to take her on my 500cc twin. At eighty years of age? No! Her sister forbade it! The date of publication was, I think 1924, I guessed this from the latest date reference in the index, the books were 'An Encyclopaedia for children'. See figs 1 and 2 for original circuit and construction would have included workshop techniques, the crystal set would have been aimed at a 'middle class' child!

My construction, somewhat simpler, followed the basic design. See photos 1 and 2. As I didn't really understand what the 'loading coil' was. I left it's mounting out. The cats whiskers type of detector was replaced with a point contact germanium diode. The coil was wound on a toilet roll centre. Incidentally, the roll is 3/4" longer at 4 3/4" than current types! The studs and moving arms came from a 'Trix' construction kit. The headphones are SG Browns, they cost 18/6d. A knowledgeable neighbour was a great help. The soldering I did was done with a gas stove heated bit.

My mother came in to find the front room festooned with aerial wire, I probably used a gas pipe earth. I've never forgotten the first joy of hearing my first radio work. We had a strong local BBC home relay station. Very quickly I had the radio on a low stool by my bed. I would listen to late evening programmes, especially the Saturday evening play. A couple come to mind; 'The Day of the Triffids' and 'The Black Cloud'.

I've measured the tuning range with coarse and fine contacts at their coil 'ends', the frequency is 900 kHz, 333m with only the coarse windings in circuit, 2.3 mHz, 130 m. These are really only roughly in the centre of a very flat response.

Soon after making the radio a neighbour gave me a 'selectivity unit', made by Ready Radio. See figure 3 and it's accompanying

circuit. I opened it up years later. It has two controls and four terminals. One control, a three position switch, selects 'off', 'on' and 'e'. The other is a solid dielectric variable capacitor, its control is marked from 0 to 36.

The top LHS terminal is marked 'aerial lead'. Top RHS 'aerial set'. The two lower terminals are 'earth lead' and 'earth set'. The case is black crackle tin, the panel probably vulcanised. The markings are very faded. This little unit was brilliant. I found I could tune out the previously all-prevailing home programme, into, I assume, the trawler band (around 150-200 metres). I could listen to the North Foreland Marine Radio Station, The ship would reply on the same frequency. I still remember the words; - "North Foreland, North Foreland, Atlantic Star" (For Ex). Pretty soon I was making OVI's and IVI's, and various types of T.R.F with an add-on HF unit I received from the USA. The broadcast of Queen Elizabeth II visit to a baseball game. The announcer commented on a foghorn being used by someone in the crowd.

Batteries were a problem. The local radio shop used to give me the near exhausted HT ones from portables. I used to connect them up in series to get the HT needed. My accumulator was charged for 6d.

The shop also gave me scrapped radios and TVs. Some large items had casters, I used to push them home, about half a mile! The TV tubes I destroyed in the garden, in a cardboard box. I jabbed a steel rod through the box and stripped everything worth while. During this time I 'honed' my scavenging techniques. I was a regular customer, they let me serve myself from their workshop stores. That is until the manager came in one day and said 'what is that kid doing serving himself?"

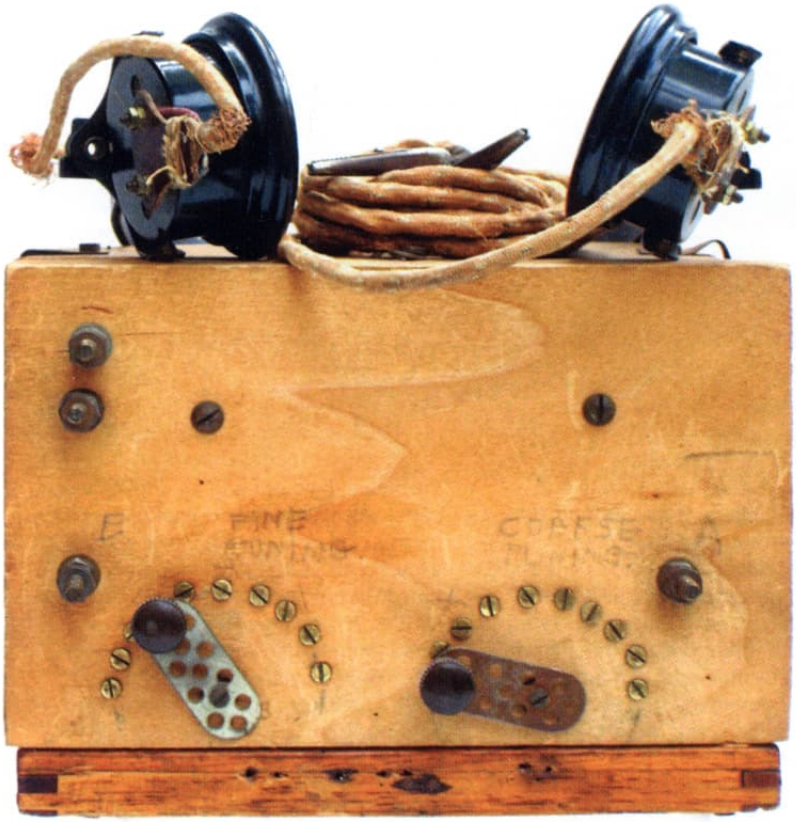


Figure 2: My home made crystal set

Figure 3

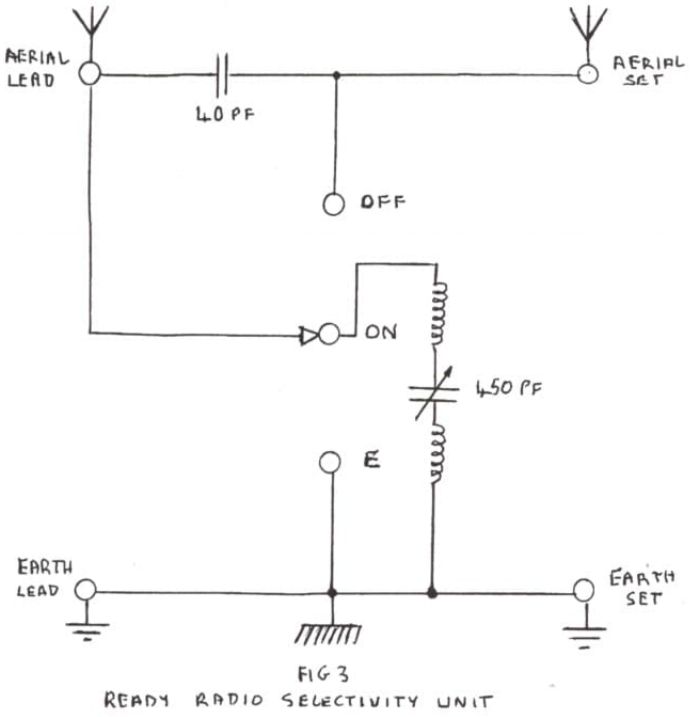


Figure 3 circuit

Figure 4

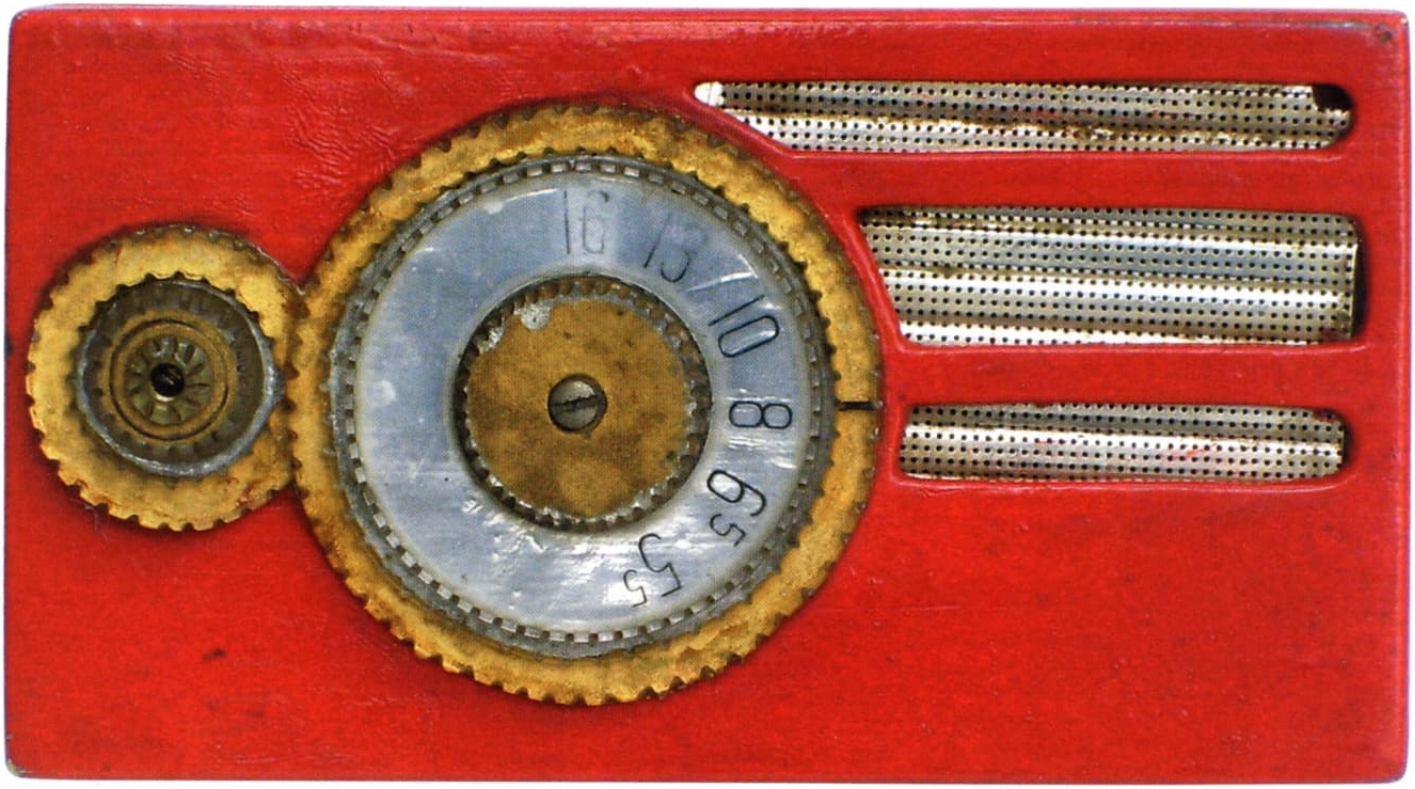


Figure 5: My home made transistor set

Very soon I graduated to homemade battery eliminators. I had wound transformers from scrap ones, I had an FJ Camm book on transformers, I used to try and match the core, limbs and windows as closely as possible to my needs, usually 10 turns/volt. Very often one would start to vibrate and I would lean over the back of my bed and tap scraps further in the gaps. Sometimes I got a belt!

A Gecophone cone drive unit acted as a reasonable loudspeaker. My first 'proper' radio was an R109, bought from the science master for £3, around 1957. I carried it home, about two miles. He used to have it in his canvas topped Morris van, on single lengths of 'O' gauge rail track as an aerial. These run on 6 volts, a vibrator for HT. The valves are the AR8, ARP12 types. Sometimes the vibrator was noisier than the signal. I used to unplug it and whack it hard.

I soon made one of my power supplies, a hand wound transformer with a SenTerCell bridge rectifier for HT. Although the valves each had droppers in their LT circuits, 6V to 2V, these would have been difficult to remove. An old Davenset battery charger supplied the 6v L.T. Years later, in the 1980's, the transformer burst into flames whilst I was running the set. I took the opportunity to remake the supplies using modern components. It still runs today. The army signals sent me the full manual and set-up details. There is a circuit in the rear of the case, but it is difficult to see.

A lot of my early testing was done using a 0-7.5v Ferranti voltmeter. Dad, was a probation officer in Dagenham, bought it for me, probably from Henrys' radio, for 5 shillings. With this I made my first multi-range test meter, again from an FJ Camm book. I chose to make it for my craft lesson project at school (St Georges Boys School) see figure 4. The movement was a 5mA moving coil type, from a local junk shop for 5 shillings. Years later I tested the accuracy of my home made shunts and 'near' value multipliers, it was around 10% to 20%, The Ferranti was an AC type.

Using one of Henry's Radio designs I made a small transistor radio, see figure 5. It was, I think, a very basic design, with 3 or 4 red and/or green/yellow transistors. It used a small ferrite aerial and earpiece. The case was homemade, the controls were from a friends scrap Motorola radio. I remember listening to the 9pm news, during the Morning Service/assembly at school. Years later I took the innards from a friends vest pocket radio, he'd broken the case and put it in mine, it still goes.

Around 1956/57 I got to know a couple of radio amateurs. I went with one, on our cycles, to see a Mullard presentation of the transistor. I still have the handout, dated 1957, in a local hotel. The other amateur used an HRO as his receiver, I can't remember what the transmitter was. I fancied his daughter, but sadly she had eyes for another, they eventually married.

The science master was a nice chap, he helped one or two of us in a Wednesday afternoon session on radio/electronics, etc. He gave me an early 'Melody Maker'. I had to re-wire it, it went very well. It had the original circuit/plans with a view of the Eiffel Tower, before the road was constructed between the 'legs'

One or two attempts at superhets were attempted, not very successfully, plus some ex-service units were bought. One of these was my second 'proper' radio, a modified RII55, from Bristol, for 9 Pounds, in 1958. It had been nicely done with the usual power supply/amplifier in the D.F. space. Years later, at a visit to the Chalk Pits Museum, one of the guys gave me the missing longwave aerial coil. I re-connected aerial and oscillator components. It still goes well.

At another visit the same guy gave me the visual indicator and an original loop aerial. I obtained the original AM manual, for the complete R1155/T1154 set-up, allowing me to run a full 'spec' R1155. I bought it from one of my works technicians for £15. It is fully working, I use a long wire in the garden with the loop aerial in the house extension 'in-line' with it.

My uncle, around 1958 gave me an original Samurai sword, he was a WWI veteran, for repairing a radio. At home I dropped it into my foot. Mum, guess what? A spurt of blood showed the entry wound. At Ramsgate General Hospital, I was known for having minor accidents, a stunning lady Indian Doctor asked "How did you do this?" After lifting back a fold of skin. My prompt response was 'stitch it up please.'

My first 'proper' test meter, I think it came from Relda Radio, was a Carry model A10, for £4.17s.6d. It arrived with a cracked glass. They replaced it. It happily resides in my old steel toolbox.

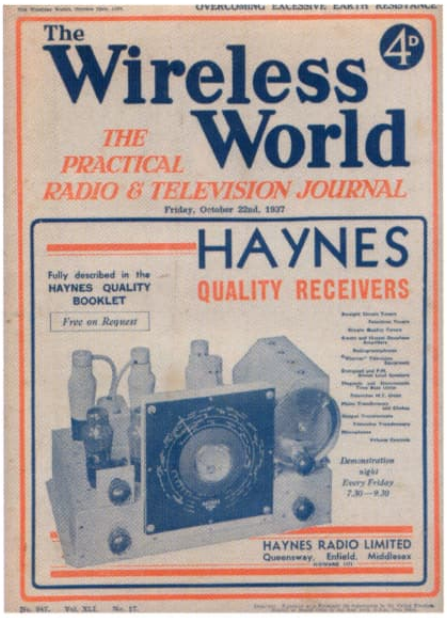
The close of 1959 found me at Harrogate Station at 8.30pm December 31st. I was bound for Uniake Barracks, as an apprentice technician, radio (light)

It was a disaster. Nearly all the intake, 140, were in the same trade. After a short period, I was allowed to phone home. Dad made enquiries. He was in the Irish Guards, then seconded to the Royal engineers, for bomb disposal in WWII, for which he was decorated. He spoke to his old C.O. Nothing could be done. The alternatives: Cook, driver etc. were not appealing. You need to know that once past the three months basic training, it's very hard to get out. He bought me out for £20.

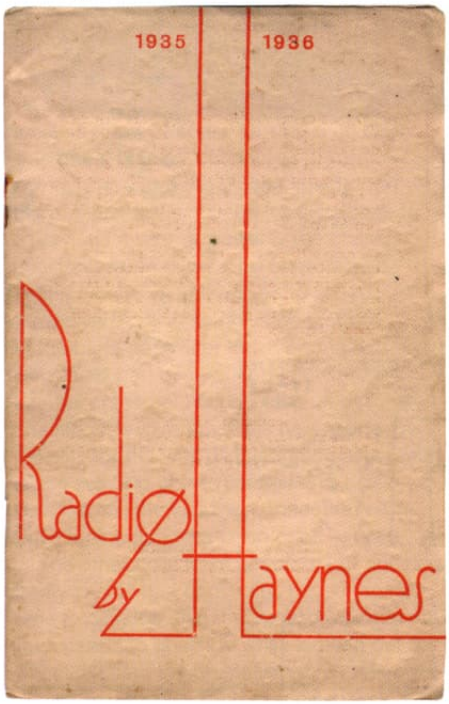
From 1960 my life story is worthy of a book, but I had fun getting here.

The Haynes R2 late 1930s tuner chassis by Mike Butt

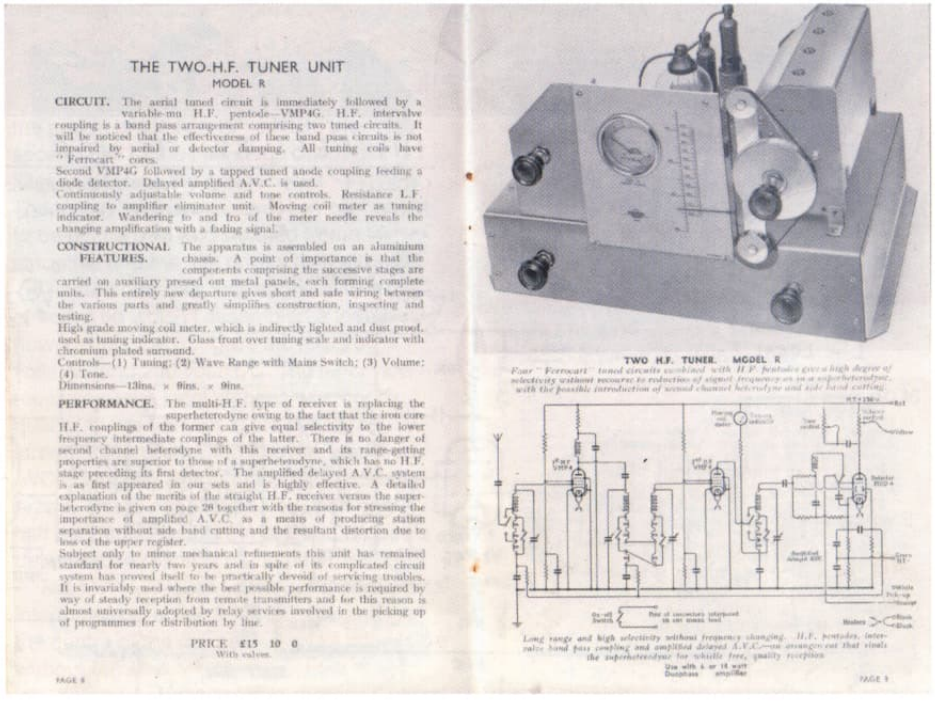
I purchased this chassis at a radio auction a few years ago. On examination I discovered problems which appeared to make a working restoration difficult. The tuning pack used was a Colvern 'Ferrocart' type, using iron dust laminations which had suffered from moisture absorption. The prominent moving coil tuning meter had a movement that was badly corroded, the coil itself being open–circuit.



Above, right: The front cover of Wireless World Oct 22nd 1937, advert showing Haynes tuner type R3 (with extra valves for TV sound)



Haynes 1935/36 catalogue



THE TWO-H.F. TUNER UNIT
MODEL R

CIRCUIT. The aerial tuned circuit is immediately followed by a variable-mu H.F. pentode—VMP4G. H.F. intervalve coupling is a band pass arrangement comprising two tuned circuits. It will be noticed that the effectiveness of these band pass circuits is not impaired by aerial or detector damping. All tuning coils have "Ferrocart" cores.
Second VMP4G followed by a tapped tuned anode coupling feeding a diode detector. Delayed amplified A.V.C. is used.
Continuously adjustable volume and tone controls. Resistance L.F. coupling to amplifier eliminator unit. Moving coil meter as tuning indicator. Wandering to and fro of the meter needle reveals the changing amplification with a fading signal.

CONSTRUCTIONAL FEATURES. The apparatus is assembled on an aluminium chassis. A point of importance is that the components comprising the successive stages are carried on auxiliary pressed out metal panels, each forming complete units. This entirely new departure gives short and safe wiring between the various parts and greatly simplifies construction, inspecting and testing.
High grade moving coil meter, which is indirectly lighted and dust proof, used as tuning indicator. Glass front over tuning scale and indicator with chromium plated surround.
Controls—(1) Tuning; (2) Wave Range with Mains Switch; (3) Volume; (4) Tone.
Dimensions—12ins. × 9ins. × 9ins.

PERFORMANCE. The multi-H.F. type of receiver is replacing the superheterodyne owing to the fact that the iron core H.F. couplings of the former can give equal selectivity to the lower frequency intermediate couplings of the latter. There is no danger of second channel heterodyne with this receiver and its range-getting properties are superior to those of a superheterodyne, which has no H.F. stage preceding its first detector. The amplified delayed A.V.C. system is as first appeared in our sets and is highly effective. A detailed explanation of the merits of the straight H.F. receiver versus the super-heterodyne is given on page 28 together with the reasons for stressing the importance of amplified A.V.C. as a means of producing station separation without side band cutting and the resultant distortion due to loss of the upper register.
Subject only to minor mechanical refinements this unit has remained standard for nearly two years and in spite of its complicated circuit system has proved itself to be practically devoid of servicing troubles. It is invariably used where the best possible performance is required by way of steady reception from remote transmitters and for this reason is almost universally adopted by relay services involved in the picking up of programmes for distribution by line.

PRICE £15 10 0
With valves.

TWO H.F. TUNER. MODEL R

The Haynes Model R tuner

Haynes Radio was a small–scale manufacturer of high quality radio tuners, amplifiers, and loudspeakers from the 1930s through to the 1950s. The company was founded by F. H. Haynes, assistant editor of Wireless World for many years before leaving in 1931 to set up the business. The radio tuners and amplifier chassis made by the company could be supplied in various combinations with or without cabinets, as required by the buyer.

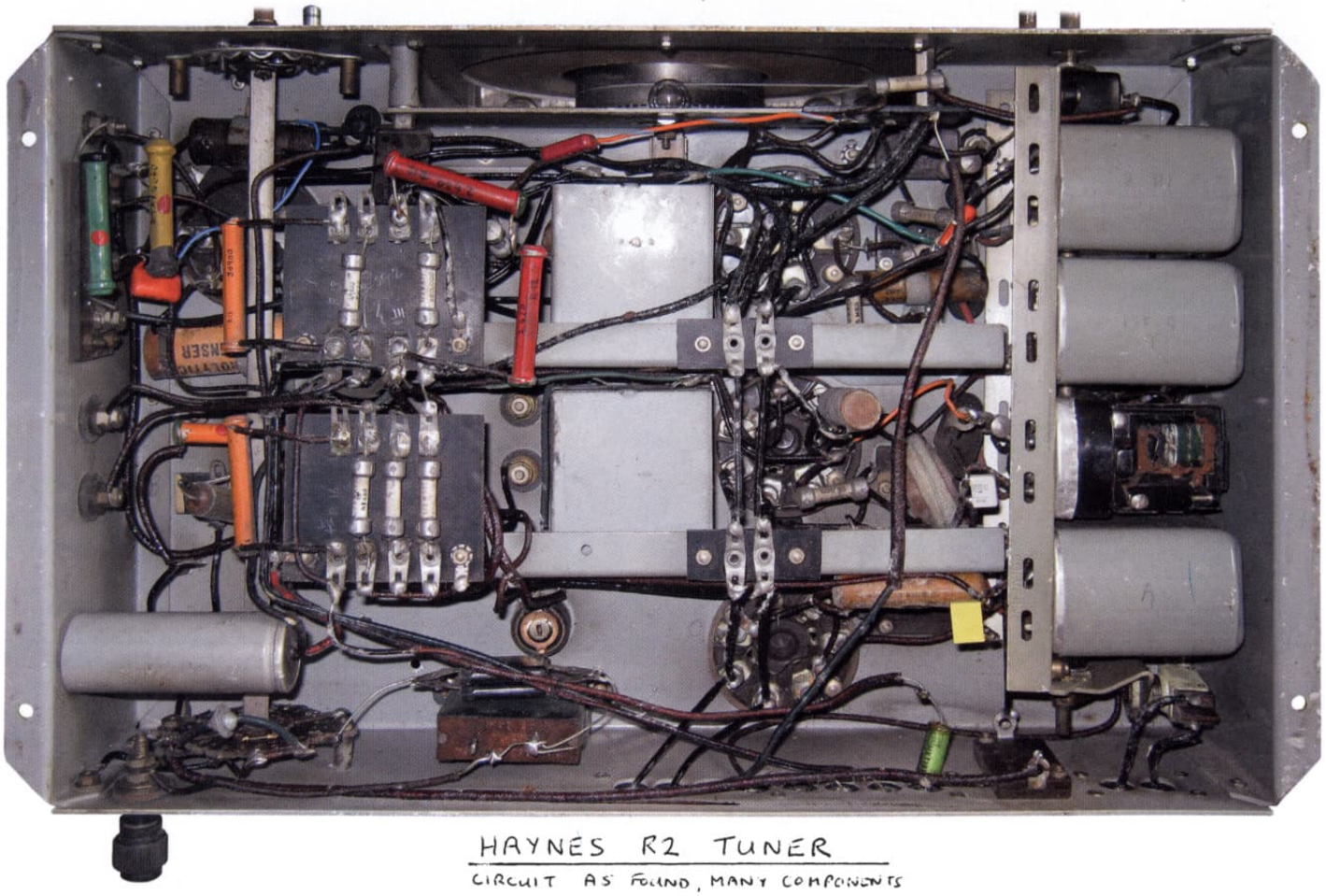
I possess a catalogue of Haynes products from the 1935–1936 season. It gives details of three types of TRF MW–LW radio tuners, two amplifier chassis with push–pull triode output stages, loudspeakers, plus various cabinets and some dignified looking radiograms employing various combinations of the units mentioned earlier. The catalogue claims that the most elaborate tuner featured, the model R, is superior to most superhets in selectivity and quality of reproduction, assisted by amplified AVC.

The chassis I have appears to be a later version of the model R, dating from 1937 or 1938. I believe it to be a model R2, although it is not marked. Two RF stages using VMP4G pentodes, bandpass coupled, are followed by a double–diode detector (D41) and two MH4 triodes, one is an audio amplifier and the other is the AVC amplifier. Power for the tuner would have been obtained from the associated amplifier

chassis, 4 volts AC for the valve heaters and dial bulbs, and around 250 volts DC HT. The chassis is aluminium painted grey.

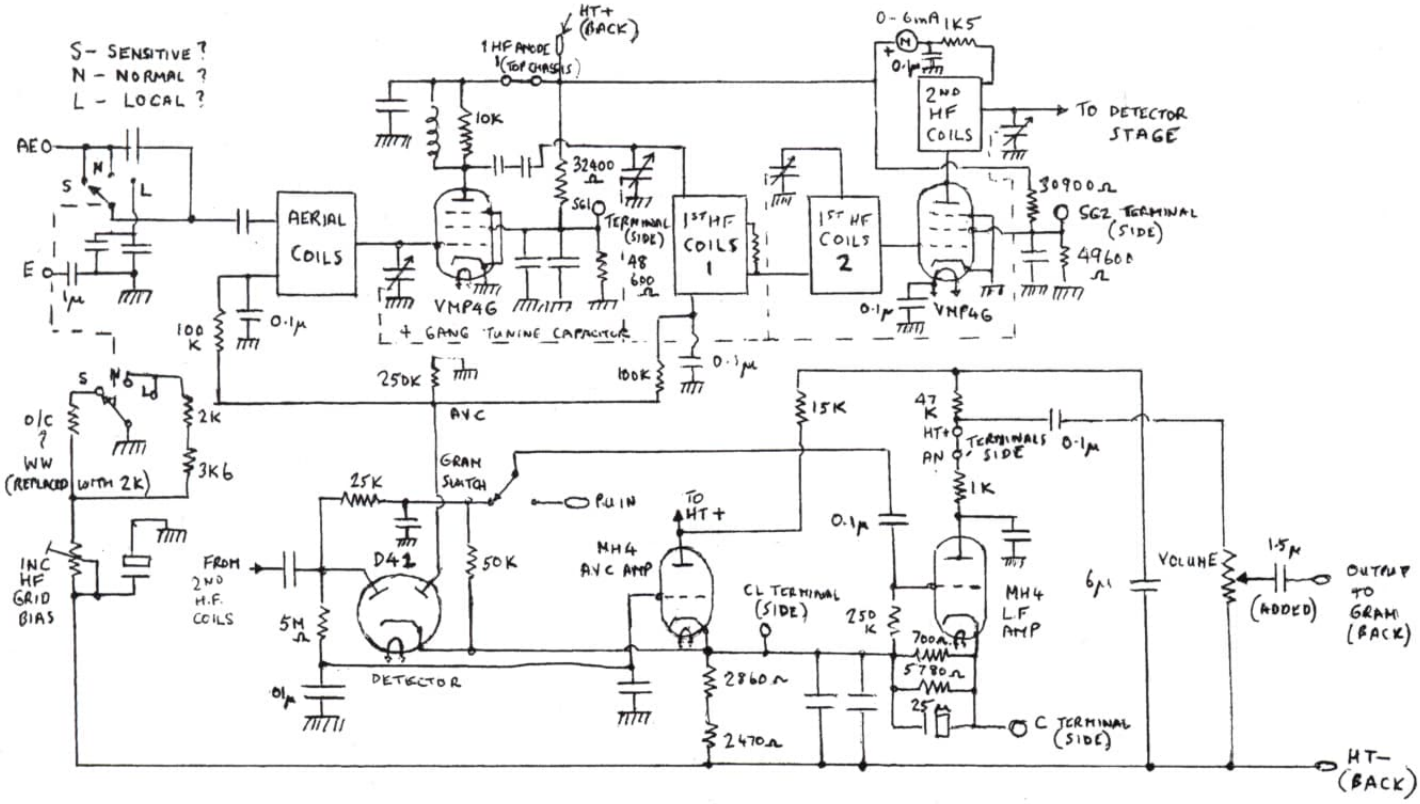
Visually, the most striking feature is the circular tuning scale featuring a central 0-6 mA tuning meter with chromed bezel, resembling a car dashboard instrument. This meter is housed in a circular black anodised aluminium surround, which supports an outer aluminium sleeve to which the tuning pointer is attached. This sleeve runs on a ball–race and is cord driven from a drum on the tuning condenser. The tuner covers the usual medium and long waves, the scale is marked for television sound, for which an add–on tuner was available.

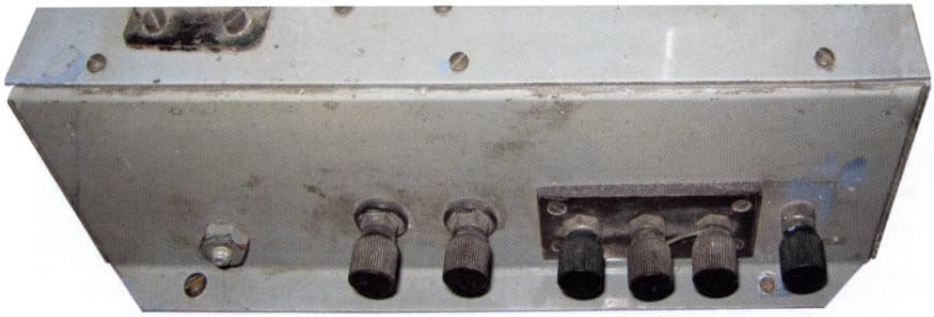
The chassis has a somewhat prototype looking appearance as the terminals and some components are marked in Indian ink, some resistors with very accurate values (see circuit diagram).



HAYNES R2 TUNER

CIRCUIT AS FOUND, MANY COMPONENTS HAVE NO VALUES MARKED. COIL PACK SHOWN IN BLOCK FORM.





Haynes Model R2 tuner terminals on side

Connections to the amplifier are made via a tagstrip on the chassis rear, but there are also a row of screw terminals on one side of the chassis connected to various points, these and the block capacitor on top of the chassis may be modifications by a previous owner or possibly the chassis may have been some kind of prototype.

The can housing the second coil of the Colvern coil assembly (the first coil of the band pass filter between the two RF valves) had been pushed outward by internal pressure. I had to take off the chassis side to remove this can, inside the bakelite former was disintegrating as a result of the swelling of the rusting Ferro cart laminations, the winding connected to the main tuning gang was also open–circuit.

The other coils were affected, but not as badly and all had continuity. I spent some time tracing the circuit diagram and then put the chassis to one side while looking out for a replacement tuning meter, which I thought would be difficult to find. A tuning meter did, however, turn up on eBay and I was lucky enough to win it. The vendor stated that it was open–circuit but may be repairable as the fault was possibly in the internal wiring, which proved to be the case. The meter worked when it was repaired, although the needle was sometimes a bit sticky.

This meter was slightly different to the original but appears identical to the meter appearing in the 1935-36 Haynes catalogue.

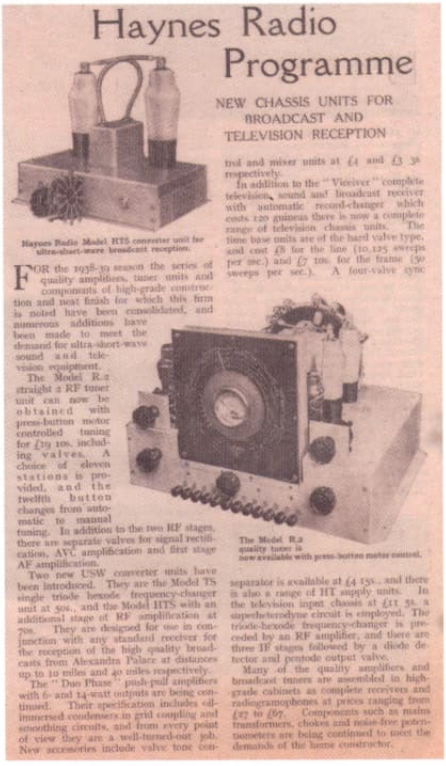
Spurred on by the acquisition of the meter, I managed to get the tuner working. After the usual component checks and replacement of leaky capacitors I connected the anode of the first RF valve to the second half of the interstage bandpass filter, bypassing the open–circuit windings. The tuning scale ball race assembly had to be dismantled and cleaned to run smoothly and the dial drive was restrung.

The tuner chassis was screwed to a piece of board on which I assembled a temporary power supply which gave the required 4 volts AC and 250 volts DC. The tuner now receives all the local stations with good quality, the meter dips quite deeply on strong stations showing that the amplified AVC is working although the tuning is fairly broad. This is not unexpected, with only half the bandpass filter in use and probable deterioration of the Q of the other RF coils.

The MW–LW–Gram switch is sometimes intermittent in action, as this runs through the centre of the coil pack it is not accessible without removal, which would be a major job. If I could obtain another of these Colvern coil packs in better condition I would try to fit it. Whether it was specially made for Haynes or a standard coil pack I don't know. I did find a similar three coil Colvern pack at a Harpenden swapmeet but on inspection it had deteriorated in the same way as the one in the Haynes chassis. Finding a good coil set may be near impossible.

I am quite pleased that the chassis works as well as it does, eventually I hope to house it in a cabinet with a rebuilt power supply and amplifier.

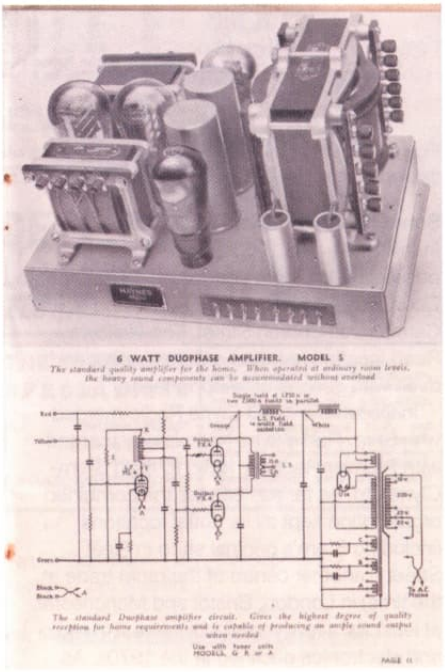
Damp damage to second Colvern coil set



Haynes Radio Programme

NEW CHASSIS UNITS FOR BROADCAST AND TELEVISION RECEPTION

Haynes Radio Programme, Wireless World, September 22 1938



6 WATT DUOPHASE AMPLIFIER. MODEL 5

One of the first Haynes duophase amplifiers

The Clyne Radio Superior Four superhet and TRF Valve Radios

by Stef Niewiadomski

It's not often that you come across the TRF and superhet versions of what seems from the outside to be the same radio, and it's especially interesting when they were both built from kits. I bought the superhet version at Harpenden in June 2013 because it was a good looking radio, its cabinet was in good condition, and it clearly wasn't from an established UK-based manufacturer. Mike Barker had an unidentified TRF radio lying around in a corner until he offered it to me when I immediately spotted the similarity to the superhet's cabinet: looking inside I was delighted that it was the TRF version. Figure 1 shows the two radios together and as you can see, from the front there's no way of telling which one is which.

Figure 1: The two radios posed together. As you can see, from the front there's no way of telling which one is which, the dials and control layouts being identical. In fact the superhet is at the front, with the darker cabinet, and the TRF is at the back. The TRF's cabinet's sides are painted, rather than veneered as the superhet's sides are.

Some history of Clyne Radio Ltd

In the 1950s and 1960s, Clyne Radio Ltd possessed shops in London, at 18 Tottenham Court Road; 162 Holloway Road; and at 9 Camberwell Church Street. The Holloway Road location handled orders by post and dealt with general correspondence.

In December 1963 Clyne Radio merged with Stern Radio (who had already merged with Premier Radio in 1962) to form Stern-Clyne Ltd. As far as I can tell the combined organisation kept all its outlet locations (including Stern's original shop in Fleet Street – another centre of the radio trade at the time) in London, Bristol and Manchester, at least for a few years until interest in radio and electronics declined in the 1970s. As post-war surplus radio supplies gradually ran out, the early-1960s brought an interest in Hi-Fi, and it was this trade that kept many companies in Tottenham Court Road, and other locations, alive for many years to come.

Reference 1 contains an evocative description of the radio shops in London during the post-war period. I'm being a little unfair on the other radio suppliers, both in London and in other cities. Fleet Street (the home of the newspaper industry at the time, of course) was also a focus for many radio shops, and most cities and towns had their own radio shop(s) selling surplus and new radios, and other related equipment and components.

By the late 1960s most of these companies had recognised that the future lay in Hi-Fi, and tended towards having one shop selling brand new Hi-Fi equipment, which would become even more popular, and another selling surplus equipment, which of course would gradually decline and pretty much disappear altogether.

About half way down Tottenham Court Road, on both sides of the road, there is still a concentration of electronics shops, which today means desktop, laptop and tablet computers, digital cameras, TVs, A/V systems, mobile phones and so on, rather than things related to amateur radio. Edgware Road still has some electronics shops, but is now more famous for its Middle-Eastern (especially Lebanese) character. Lasky's old shop at 207 Edgware Road is now a Starbucks Coffee. Of the 'old' names only Henry's survives, at 404

Edgware Road. Lisle Street (a couple of hundred yards or so south of the 'bottom' end of Tottenham Court Road) is now in the heart of Chinatown.

The Superior Four superhet

I was intrigued by the manufacturer, Clyne Radio Ltd, who were not one of the numerous mainline UK manufacturers of radios in the valve era, but a well-known occupant of Tottenham Court Road in London – and other locations – and a vendor of many kits for the constructor to build. The company called itself 'The Component Specialist' and held stocks of components, as well as complete kits, for purchase in its shops, or remotely via mail order.

There was a label on the rather amateurish-looking hardboard back panel of the radio, saying '6 Valve Superhet Radio', see Figure 2. Since my radio has only five valves, it's a good bet that this is from a different model, or that it was used generically for several radios. The 'Clyne Style' model name also does not seem to correspond to my radio.

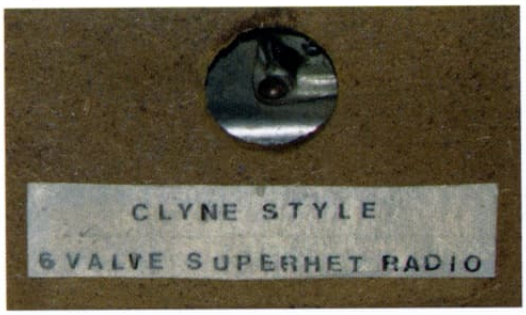
The radio is a standard four valve plus rectifier superhet design consisting of: a Ruco (I hadn't heard of this one before) ECH81 self-oscillating frequency changer stage; an anonymous 6BA6 IF amplifier; a Brimar 6AT6 double-diode triode detector and audio pre-amplifier; a Pinnacle EL91-6AM5 audio output stage; and finally a Brimar 6X4 mains rectifier.

The set contains a mains transformer with flying leads, and a double-pole mains on/off switch mounted on the volume control. The transformer has HT and LT windings, and so the chassis is fully isolated from the mains and therefore was much safer than many transformer-less AC/DC type designs that were around at the time.

A pair of Wearite 465kHz IF transformers, marked 'type M800', are used. I presume the aerial and oscillator coils are off the shelf but I couldn't make a positive identification as to who made them. There is no ferrite rod or frame aerial and an aerial socket is mounted on the rear of the chassis to plug an aerial into, via a hole in the back panel.

Figure 3 shows a detail from Clyne's Wireless World advert for September 1957. The Superior Four kit is offered for £6/9s/6d, and even includes 'sufficient solder for the job'. The valve line-up shown (two 6SG7 pentodes, a 6V6GT audio output beam tetrode and a 6X5GT rectifier) indicates that this design is a TRF, using rather outdated octal valves. The cabinet shown in the advert looks identical to mine and has the same dimensions, so it seems that at some point before my radio was shipped as a kit the five valve superhet chassis, based on B9A and B7G valves, had been substituted for the TRF version.

A typical full page advert for Clyne Radio is shown in Figure 4, taken



THE "SUPERIOR FOUR" KIT

Our superior four-valve receiver A.C. mains, 200/250 v. M. and Long waves. As with our very successful "Economy Four" all required components as supplied. Valve line-up: 2 6SG7, 6 X5GT and 6 V6GT. Chassis ready drilled. Cabinet size 10½in. × 10in. wide. Maximum depth at base 5in. tapering to 3½in. at top. Sloping front. Very attractively finished in light walnut and peach. Each component brand new and tested prior to packing. Complete instruction booklet with practical and theoretical diagrams is provided. Booklet available at 1/6 post free. Our price for complete kit, £6/9/6. Please add 2/6 P. & C. If preferred, we can supply Cabinet Assembly only, comprising Cabinet and bracket wave-change switch; dial, pointer, drum pulleys drive spindle, drive spring and knobs, at 45/-, plus 2/6 P. & C. N.B.—Our kits are even supplied with sufficient solder for the job.

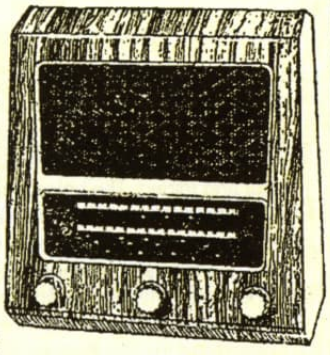


Figure 2 (top): The label on the back panel of the superhet. Since my radio has only five valves, it's a good bet that this is from a different model, or that it was used generically for several radios. The 'Clyne Style' model name also does not seem to correspond to my radio.

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(2) "RAMBLER" Mains Unit (suitable for most portables)	£2 7 6	1/6	9d.
(3) "ECONOMY FOUR" T.R.F. Mains Receiver	£5 10 0	2/6	1/6
(4) "FAMILY FOUR" (our new T.R.F. Receiver)	£3 19 6	2/6	1/6
(5) "SUPERIOR FOUR" (four valve Mains Receiver)	£5 15 0	2/6	1/6
(6) Standard JASON F.M. Tuner	£6 15 0	2/6	2/–
(7) Fringe area JASON F.M. Tuner	£7 15 0	2/6	2/–
(8) JASON "MERCURY" Switch tuned F.M. feeder	£9 19 6	2/6	2/–
(9) OSRAM 912 Printed circuit F.M. Tuner	£8 8 0	2/6	2/6
(10) JASON "ARGONAUT" A.M./F.M. Chassis	£15 5 0	2/6	2/–
(11) JASON "ARGONAUT" A.M./F.M. Tuner	£13 19 6	3/6	2/–
(12) F.M. Power Pack (suitable for most Tuners)	£1 17 6	1/6	1/–
(13) R.C. 3/4 watt amplifier (with Bass, Middle and Treble controls)	£4 5 0	2/6	1/–
(14) 2-amp. Battery Charger	£1 16 6	2/6	3d.
(15) R.C. Transistor/Crystal Receiver (phone extra)	£1 1 0	1/3	3d.
(16) R.C. Super Transistor/Crystal Receiver (Ferrite Rod) (phone extra)	£1 7 6	1/3	3d.
(17) R.E.P. 1-valve Battery Receiver	£2 2 0	2/–	9d.
(18) "CRY-BABY" ALARM (Baby Alarm)	£3 12 6	2/6	1/–
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(20) TELETRON "TRANSIDYNE" Transistor Portable	£11 19 6	2/6	1/–
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(26) JASON J.4-4 Stereo pre-amp	£22 14 0	2/6	3/–
(27) NEW JASON F.M. TUNER with built-in power supplies and cabinet	£8 19 6	3/6	2/6
(28) NEW JASON FRINGE AREA F.M. TUNER as above	£10 19 6	3/6	2/6
(29) PULLIN Series 90 TEST METER	£5 19 6	2/6	1/6
(30) R.C. Super Personal Portable, 1 valve (phone extra)	£1 15 0	2/6	2/–
(31) R.C. Super Personal Portable, 2 valve (phone extra)	£2 1 0	2/6	2/–
(32) R.C. Transette two Transistor Personal Portable	£3 9 6	2/–	2/–
(33) JASON EVEREST 6 Transistor 2-wave Portable	£13 19 9	3/6	3/6
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(35) CLYNE Cathode Ray Oscilloscope	£12 19 6	5/–	10/–
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(37) Car Radio. Printed Circuit. 5-valve Superhet	£12 19 6	3/6	3/6
(38) JASON Audio Generator AG10	£14 5 0	3/6	2/–
(39) JASON Oscilloscope OG10	£22 10 0	5/–	3/6
(40) Super SHORTWAVE RADIO one valve	£1 15 0	2/–	2/–
(41) "WAVEMASTER" 7 Transistor Luxury Portable	£10 19 6	3/6	2/6

Instruction Books which contain full description, easy-to-follow practical wiring diagrams, theoretical diagrams, itemised price lists, etc., are free of charge with all parcels but may be purchased as shown above.

The following are also available, assembled and tested:—

(2) "RAMBLER" Mains Unit, **£3/5/0**, (12) F.M. Power Pack, **52/6**; (13) R.C. 3/4 watt Amplifier **£5/5/0**; (14) 2-amp Battery charger, **45/-**; (18) "CRY-BABY" Alarm, **89/6**; (19) Mullard 510, **£12/12/0**.

NOTE: (2) The "RAMBLER" Mains Unit is suitable for use with MOST all-dry portables.

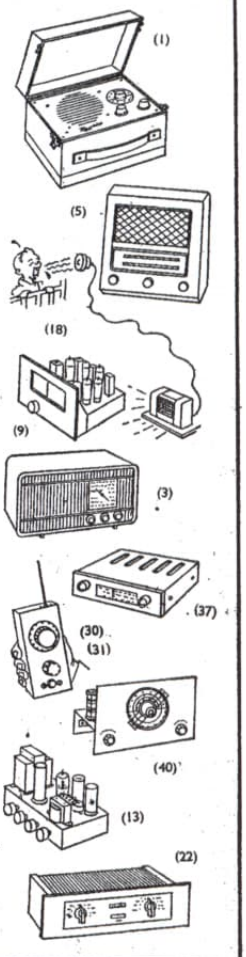

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Figure 3 (left): Detail from Clyne's Wireless World advert for September 1957. The Superior Four kit, clearly a TRF design from its valve line-up, is offered for £6/9s/6d.

Figure 4 (above): Clyne Radio's typical full page advert, taken from Practical Wireless for April 1960.

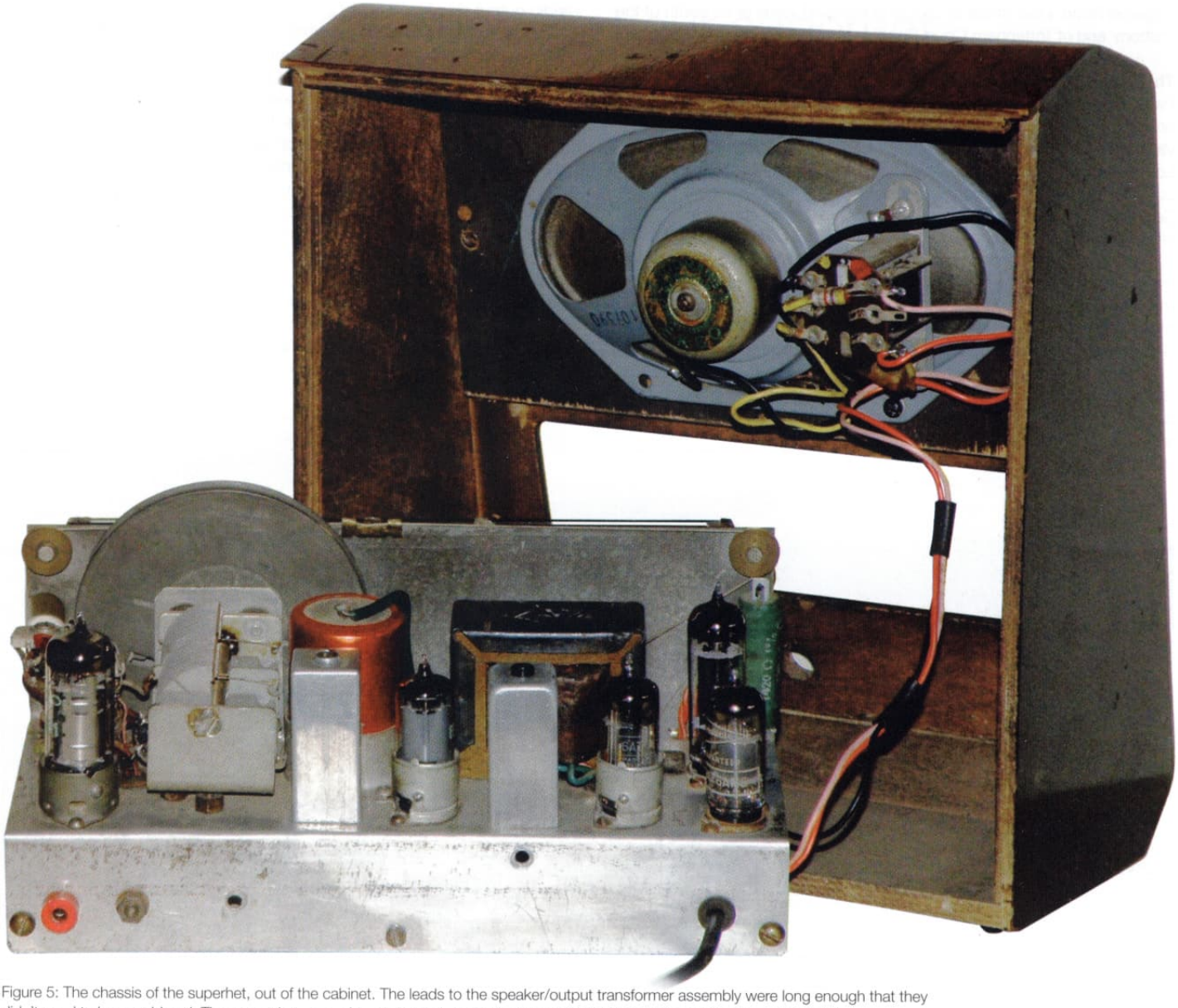


Figure 5: The chassis of the superhet, out of the cabinet. The leads to the speaker/output transformer assembly were long enough that they didn't need to be unsoldered. The green dropper resistor at the extreme right of the chassis is used in the HT smoothing circuit.

from Practical Wireless for April 1960. The emphasis of the advert is on kits 'To build yourself'. Number (5) on the list is the Superior Four, looking very much like my radio, but still specified as having four valves: it may be that they have not included the rectifier in the valve count. Also the advert is not specific as to whether it was a TRF or a superhet, but the TRF description used for the Economy Four and Family Four implies that the Superior Four is a superhet.

In July 1962, Practical Wireless was showing a Clyne Radio advert offering mostly transistor sets, including an FM tuner and car radio kits, but the Popular Four, a three valve plus metal rectifier TRF - a strange throwback to pre-superhet days - covering medium and long waves, and using Denco coils, was still being offered for sale.

The Cabinet

In the advert, the cabinet is described as 'very attractively finished in light walnut and peach'. On my radio the case was still in good condition, with a darkish and shiny finish and not too many dings. It just needed a wipe over and a polish to bring it to a very acceptable finish.

The cabinet is 10-inch wide by 11-inch high and tapers from 5-inch deep at the bottom to about 3¼-inch at the top. I think this shape adds interest to the radio, rather than it being a simple rectangular box. I wonder whether this was bought in, maybe as obsolete stock, from an established radio manufacturer. Whatever the source of the cabinet, Clyne used it for several years, and so they must have had a long-term and regular supplier. Perhaps readers can recognise the style of the cabinet and let me know where they have seen it? The speaker grille is an attractive pattern, and was in excellent condition.

The Chassis

I removed the chassis from the cabinet, which wasn't too difficult to do. A single 2BA screw needed to be undone from the bottom of the cabinet and the knobs removed, and happily their grub screws came loose without a struggle. The chassis was then slid out of the cabinet: the leads to the speaker/output transformer assembly were long enough that they didn't need to be unsoldered (see Figure 5) and were still in good condition. The audio output transformer is attached to the speaker, enabling the chassis to be more compact.

The main part of the chassis was made from sheet aluminium, and rather amateurishly cut and folded. The holes looked like they were drilled, and filed to the final size in the case of the holes for the valve holders, rather than being stamped by machine. The front panel, supporting the controls, the pulleys for the tuning mechanism, cord drum, and the dial (held by four small brass brackets) is made from steel sheet.

The Plessey HT smoothing electrolytic was dated 'Sept 63', so I guess that was the earliest that the kit could have been assembled, assuming that this is original. A beefy 1420Ω dropper resistor, mounted on top of the chassis, confused me at first, and is used in the HT smoothing circuit, rather than as a heater dropper. The dual gang tuning capacitor was mounted on the chassis by a crudely-cut aluminium bracket. The Goodmans 6½-inch x 3½-inch elliptic speaker, marked 'Speaker specially designed for Ekco', was removed with the chassis.

Figure 6 shows the neat underside of the chassis. Whoever assembled the kit made a good job of the general construction and the soldering. A mixture of different manufacturers' resistors and capacitors have been used, as

you'd expect from a kit, where no doubt bits and pieces were assembled as deals were made and perhaps surplus stock was found.

The three metal strips across the bottom of the chassis seem to have been made from whatever was to hand: the left and middle ones are made from brass, and the right hand one is made from steel. One of the holes in the middle strip is drilled and tapped 2BA and the screw holding the chassis in the cabinet engages into this hole. Note also that this brass strip is bent, and this corresponds to the angle of the sloping front panel, so that the controls come out at the correct angle.

Figure 7 shows a front view of the chassis, showing the professionally made tuning dial. Left to right the controls are: volume and on/off (using a double pole on/off switch on the 500k volume control); tuning; and the medium / long wave bandswitch.

Switch On

The radio looked safe to switch on so I attached an aerial and went ahead. The medium wave produced no stations at all so I switched to long wave and a cricket commentary on Radio 4 came through at good volume and tone. I switched back to medium wave and rocked the bandswitch (which looked like a cheap component) and it seemed to be intermittent. I sprayed it with switch cleaner and the medium wave burst into life. I'm not sure how long this fix will last – I think the switch needs replacing for a long term fix.

The tuning mechanism worked well, giving sufficient slow motion action to make tuning stations easy, even at the high frequency end of the medium wave.

I gave the IF transformers a slight tweak, but they were very close to their best settings. The dial calibration was where it should have been, and so I didn't try to adjust the various trimmers and coil cores. Overall I was very pleased with the radio: it's a standard superhet and works very well in its distinctive cabinet.

TRF Version

The TRF version of the radio came to me in rather poorer condition than the superhet. Although the cabinet was reasonable, there was no back to the radio, only one knob, the chassis had no valves fitted (see Figure 8) and I didn't have a schematic to guide me through what was actually on the chassis. The chassis wasn't attached to the cabinet, and only the last remaining knob stopped it from sliding out backwards. After I removed the knob and unscrewed the two woodscrews that were fastening the elliptical speaker to the front panel, out came the chassis, enabling me to get a good look at it. The chassis uses an identical front panel, pulleys for the tuning mechanism, cord drum, and dial as the superhet.

This radio seems to have been the original Superior Four: an August 1955 advert in Practical Wireless shows a company called Superior Radio Supplies, located at 37 Hillside, Stonebridge, London, NW10 selling radio kits, including the 'Superior Four TRF Receiver' and the Superex 55 attaché portable. It would seem that Clyne bought this company, or at least much of its stock, and incorporated it into its own range.

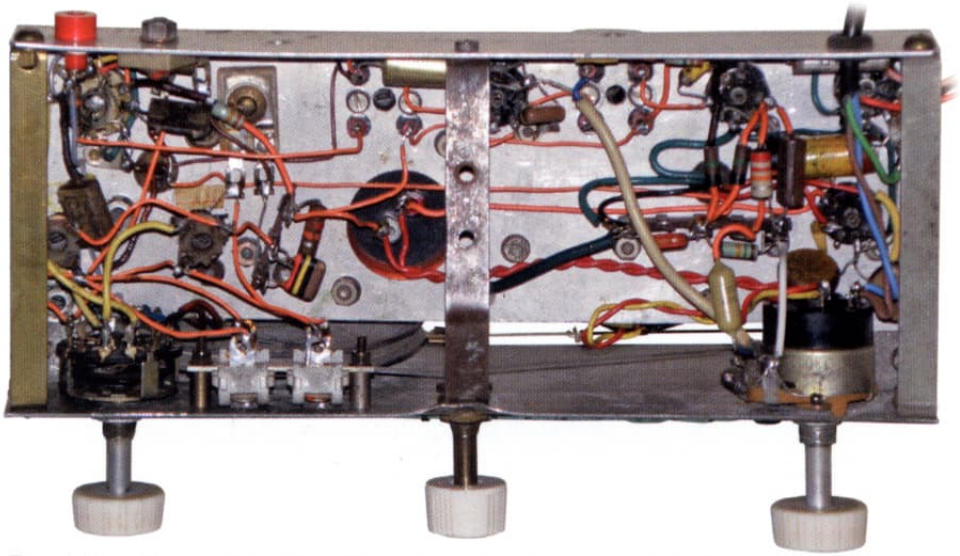


Figure 6: View of the neat superhet chassis from underneath. The metal bar with two fixing holes for securing the chassis into the cabinet can be seen running from top to bottom along the centre of the chassis.

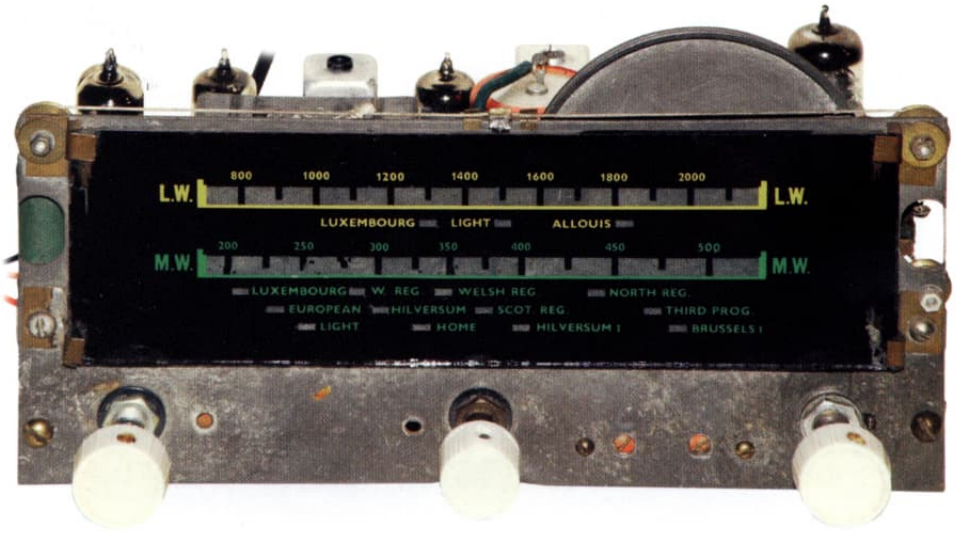


Figure 7: Front view of the superhet chassis. At this stage I hadn't replaced the dial lamp, which fits into the hole to the right of the dial. Left to right, the controls are: volume and on/off (using a double pole on/off switch on the 500k volume control); tuning; and the medium / long wave bandswitch. An identical dial was used for the TRF version of the radio.

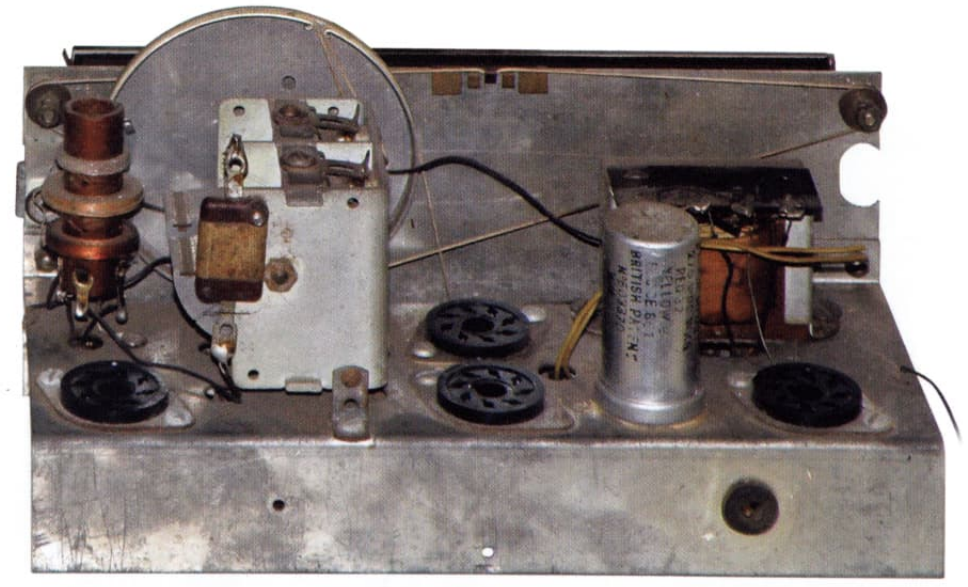


Figure 8: The chassis of the TRF version of the radio as it came to me. The transformer behind the smoothing capacitor is the 6.3V heater auto-transformer. The stringing of the dial cord can be seen, which luckily was in good condition.

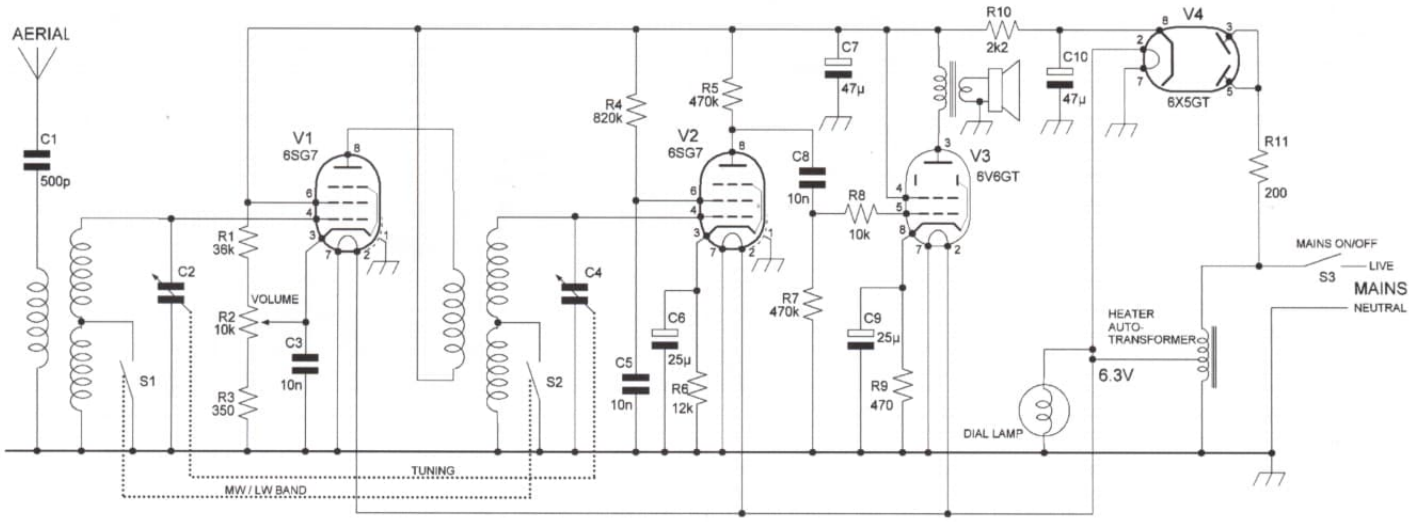


Figure 9: My traced version of the circuit of the TRF radio.

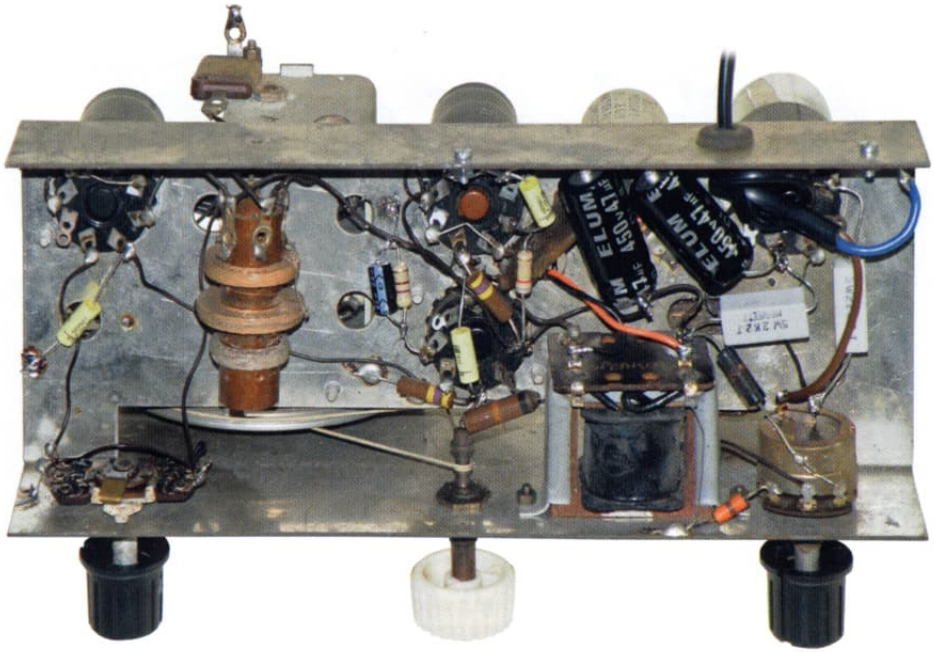


Figure 10: Underneath of the TRF chassis after restoration. The coil assembly carries the RF to detector stage coupling coils, for long and medium waves. The small transformer is the audio output transformer, and the bandswitch is at the lower left of the picture

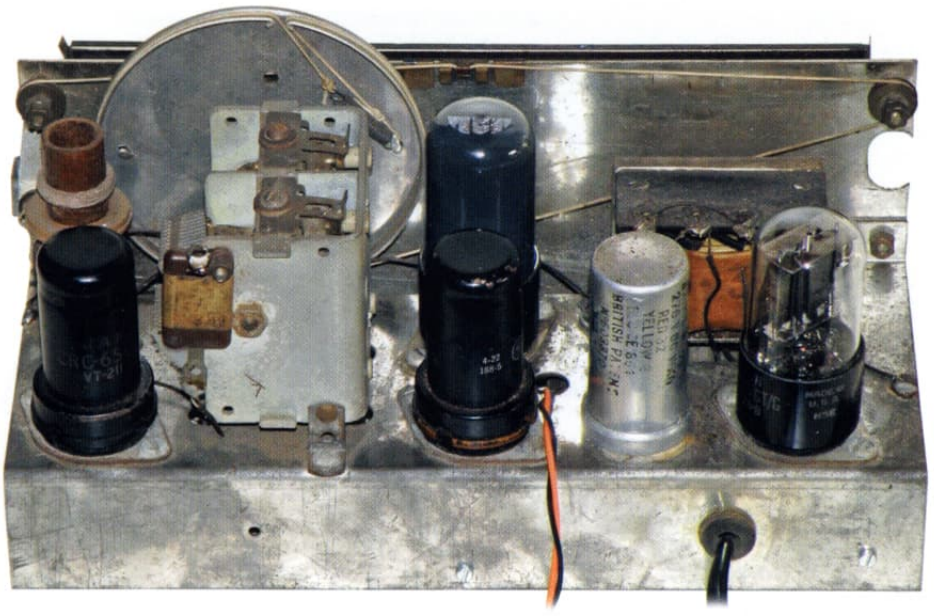


Figure 11: Top view of the TRF chassis with the new valves inserted. The bulging electrolytic can has been cut out of circuit, but left on the chassis for its appearance.

My radio obviously needed a set of valves: the starting point was the advert for the radio which showed me what the valve line-up should be. I obtained a pair of 6SG7s (metal versions), a 6V6GT and a 6X5GT. The first 6SG7 obviously plugged in close to the tuning capacitor and the above-chassis aerial coil, and it was fairly obvious which sockets the 6X5 rectifier and 6V6 output valves should plug into, and hence the second 6SG7 plugged into the remaining socket.

Under the chassis things were in reasonable condition, and all the soldered joints looked good. I traced the circuit of the radio, checking the integrity of the coils in particular, and the resulting schematic is shown in Figure 9. Most of the wiring used thin brown plastic-covered wire, which didn't help very much in tracing connections.

To my relief the coils around V1, the 6SG7 RF amplifier, were in good condition, with no obvious damage or breaks in their windings. For long wave coverage, the secondary coils on each of the formers are connected in series. When the band switch is in the medium wave position, it shorts out a significant part of the total inductance of each secondary, leaving enough to cover the medium wave.

The method of controlling the volume of the radio was interesting: the volume potentiometer seemed to control the cathode voltage of the RF amplifier valve: see later for how well this worked and what voltages I measured at the cathode.

Power Supply

I thought I'd tackle the power supply first. Unlike the superhet version, this radio uses an auto-transformer (marked '6.3' on its body, so that was a strong clue) to generate the 6.3V LT for the valves and the dial lamp. The neutral side of the mains is soldered directly to the chassis, making it potentially live, if the mains were to be connected the wrong way round.

The mains live input feeds the strapped together anodes of the 6X5GT via the on/off switch and a 200Ω resistor, which was open circuit and so was replaced. The cathode of the rectifier originally fed a 32µF + 32µF HT smoothing capacitor can which was bulging, and made me unsure that it was safe to apply power to. It was soldered onto the chassis and so I left it in place, but removed its connections below chassis and replaced the capacitors with

a pair of new high voltage 47µF electrolytics. The chassis was made of tinned thin steel, making it easy to solder the 'earthy' end of component leads directly to the chassis without the need for tags in most cases.

The resistor between the two electrolytics was open circuit, and I couldn't read its value, and so I fitted a 3W 2k2 resistor, which is typical of what's used in such a circuit. The dial lamp was broken and so I fitted a 6.3V 0.2A bulb. At this stage I thought I'd test the 6.3V transformer: I fitted a new mains lead and plug, and switched on at the mains. To my relief the dial lamp lit up, and the LT voltage measured 7.1V, which seemed about right with no valves plugged in.

The second 6SG7 (shown as V2 in my schematic) is operated as an anode bend detector: many examples of this type of detector use a triode, but the designers used a pentode in this instance. The valve's screen grid was connected to the cathode of the 6V6GT audio output valve, which seemed rather strange to me. I've recently seen this arrangement in other radios, so I presume it would work, but I decided to change this to an 820kΩ resistor to HT and a 0.01µF capacitor to chassis.

No reaction - controlled positive feedback - is applied to the detector valve. This can give a very useful increase in sensitivity and selectivity, but needs an extra control on the front panel to be most useful. By the 1950s, a reaction control was unacceptable on the front panel of a domestic radio, and if reaction was included at all, it would have been set to some compromise value internally.

A few of the resistors in the radio were rather high in value compared to nominal, and were changed for new ones. Any 0.01µF coupling and decoupling capacitors I could see were changed for modern components, as were the two 25µF cathode bypass electrolytics. Figure 10 shows the underneath of the chassis after restoration.

Switch On

After a thorough check that the underside of the chassis looked good, I inserted the four valves (see Figure 11). I connected an aerial to the isolating capacitor and switched on. To my relief the radio came to life within about ten seconds, and worked well on the medium and long wave bands, with no discernible hum. The long wave calibration was way off, with Radio 4 coming in at about 1200m on the dial. Medium wave calibration was similarly off, with Radio 5Live transmissions on 693kHz and 909kHz coming in at 345m and 255m on the dial, about 100m higher than they should have been.

Because the coils are air-cored and there are no trimmer capacitors in the circuit, the trimmers on the tuning capacitor were the only way of affecting the tuning range. Figure 12 shows the RF end of the chassis. I fiddled with the trimmers a little, but they were both set to peak the received signal, and were pretty much fully screwed in, and so I couldn't adjust the tuning down in frequency by any measurable amount. Maybe the kit as received included trimmer capacitors to set the tuning lower in frequency, and these were never fitted? I decided to leave the radio as found, and be content with the restricted tuning range and its very good sensitivity.

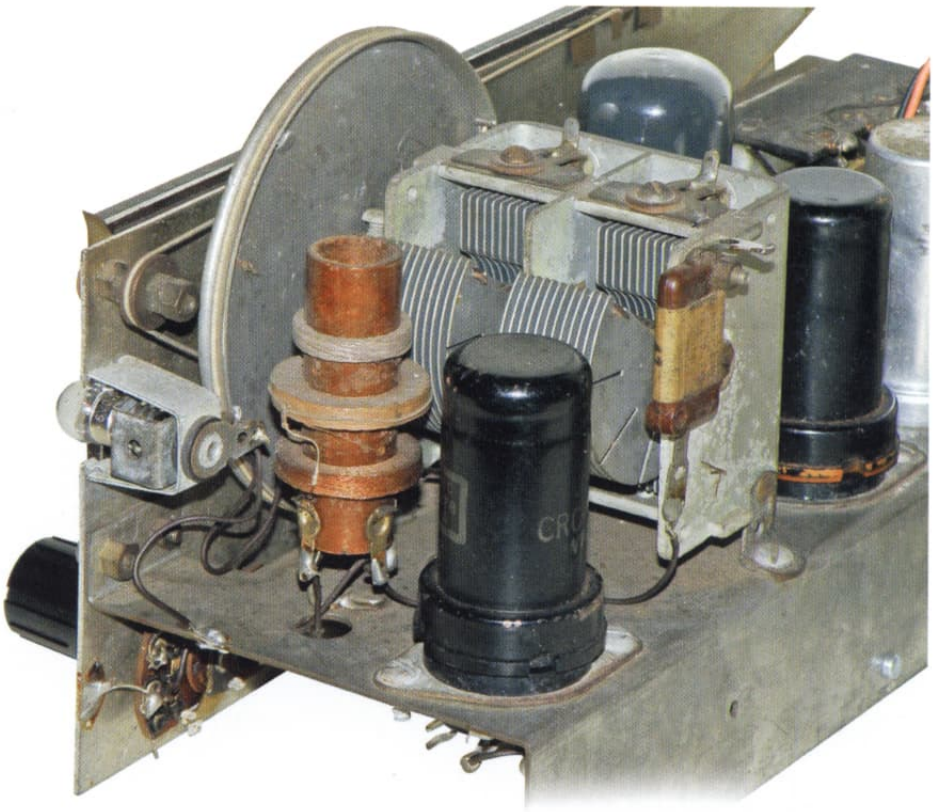


Figure 12: The RF end of the TRF chassis, showing the aerial coil assembly and the metal cased 6SG7 pentode RF amplifier. The aerial isolating capacitor can be seen attached to the rear of the tuning capacitor.

As is typical with TRFs, the radio was a little critical to the length of the aerial. If the aerial was too long, strong stations tended to 'spread out' across the dial and obliterate weaker signals. I saw this especially with Radio 4 on the long wave, which seemed to be audible across a wide part of the tuning range when I connected my long aerial, especially when the RF gain / volume control was set to a high level. A shorter length of aerial cured this effect.

I was concerned that the RF gain / volume control would be very crude and only work effectively over a small part of its range, but I was pleasantly surprised that it worked very well, and controlled the volume over most of its travel. I measured the cathode voltage of the 6SG7 RF amplifier and it varied between about 60V (no audio output at all) and 5V (maximum volume, with some distortion). Reasonable volume and audio quality was obtained at about 12V.

As a final check, I measured the HT voltage at either end of the 2k2 resistor, and about 195V was being fed into the radio, with about 68V dropped across the resistor, equating to about 31mA being consumed by the radio and 2W dissipated by the resistor. All of these values sounded reasonable and indicated a healthy power supply. The heater voltage with all the valves fitted and the dial lamp working was 6.0V – perhaps a little low - but perfectly acceptable.

After giving the cabinet a good clean, the chassis and speaker were assembled back into the cabinet and a new set of knobs fitted. The radio was given a good soak test during which it showed no signs of malfunction or overheating.

Summary and conclusions

It's difficult for me to pin down the exact model and date of assembly of my two Clyne Ltd radios. The superhet version showed an earliest construction date of September 1963, and it's interesting to see that constructors were still purchasing valve radios at this date, rather than choosing a transistor-based radio. Browsing through some mid-1960s issues of Practical Wireless, there were still plenty of valve radios for sale.

The chassis of the Superior Four domestic radio seems to have had several incarnations, and Clyne's adverts weren't very clear as to when the TRF version was superseded by the superhet. Over the years, several models, both TRF and superhets, seem to have used the same attractive walnut case. The label on the back panel of the superhet hints at the existence of a six valve version of the radio. It would be interesting to find one of these and add it to my line-up of Clyne's radios.

The chassis of both radios were made from a mixture of materials and looked to have been built by hand, rather than stamped out by machine as would have been the case by a 'volume' manufacturer. The cabinets however, look more professional and may have been manufactured by a mainstream radio company and have been acquired by Clyne Ltd as surplus stock.

Reference

Reference 1: 'Leicester House, Lisle Street and Beyond' by Albert Noble. Published in the BVWS Bulletin for winter 2006. The article is an evocative description of the radio shops in London during the post-war period. An online version can be found at: www.retinascope.co.uk/lislestreet.html

A new dial for a Philips Aachen Super D57, monoknob set from 1938/39

by Gary Tempest

The restoration is ongoing for the radio and it maybe some time before it's completed. Taking any Monoknob radio apart is challenging to say the least, and this one is no exception.

When it is finished, and the article is being written as I progress, it will be lengthy as there were many problems but also much of interest. It has become common in the Bulletin to treat re-creating dials as a subject in their own right so here I'm continuing the trend. It will also make the radio article shorter which is a good thing.

Monoknob radios

There are a bewildering number of Philips Monoknob radios as they made them, in variants, in many of the countries of Europe. To some now they seem a typical Philips complicated gimmick but back in the 30's they sold well and every report I've read says they all worked and sounded amongst the best of the equivalent radios of the time. For those that haven't seen one, they have a large knob at the front of the set controlling, by Bowden cables, several functions depending upon the model. It integrates tuning and fine tuning by rotation, and by up and down and side to side movement, volume and tone (in joystick style but usually not too much joy to would be repairers). But it's a little bit of a cheat saying it's all controlled by a single knob. Depending upon the model there will be other controls around it such as a rotating ring or levers. These are used for switching wavebands and IF bandwidth for example.

The dial and the "Cap"

The dial, mounted in the top of the set, is in a 'flip up' Bakelite moulding that Philips call the "Cap". There is not a lot inside this really: mountings for the dial, the pointer, the eye valve, the waveband indicator and a single scale bulb reflected by a long mirror.

The original dial

It wasn't perfect although the lettering was at first sight. The problem was at the ends, where glue had been used to stick felt pads, for the eye valve and for the screen for the waveband indicator to move up and down on. This is a common fault on most of this range of radios. Over the years the glue has contaminated the gold paint and the first thing was to remove the pads. Unfortunately they were stuck firmly and the glue was not water soluble. So I just had to peel them off and lose the paint. I was concerned by this but trusted that I could clean up and create decals in black on clear and then over paint with gold and black paint.

Firstly I took high resolution scans of the dial. Then the idea was to slice through the now brittle paint using a scalpel trying not to scratch the glass. This allowed scraping away the old waveband and eye valve markings and cleaning with IPA (No! not beer, that came later but Isopropyl Alcohol). From the scans I recreated the ends in CorelDRAW and made decals. It wasn't easy to get these exactly in the right place and keep the lines straight that are determined to go S shape? Once they were mounted, I used model oil paints on these areas and the wonderful thing normally; however bad it looks at the back, the front through the glass will be perfect. However, this time it wasn't, with the gold metallic coming out streaky. So I tried to find a yellow ordinary paint but these didn't look right and even the parts painted black didn't match the original of a now aged paint. The picture of this effort looks much better than when seen up close.

But I could have saved myself a lot of time and effort anyway if I had tried the dial in the Cap, along with the glass rod pointer (that slides on a tube) and the pilot light. There is only one, of 0.8W, covered by a metal reflector with a mirror underneath that disperses the illumination. In the dark the effect was lovely with two black lines that are reflections of the rod edges, and one crisp bright line in the centre. But turn

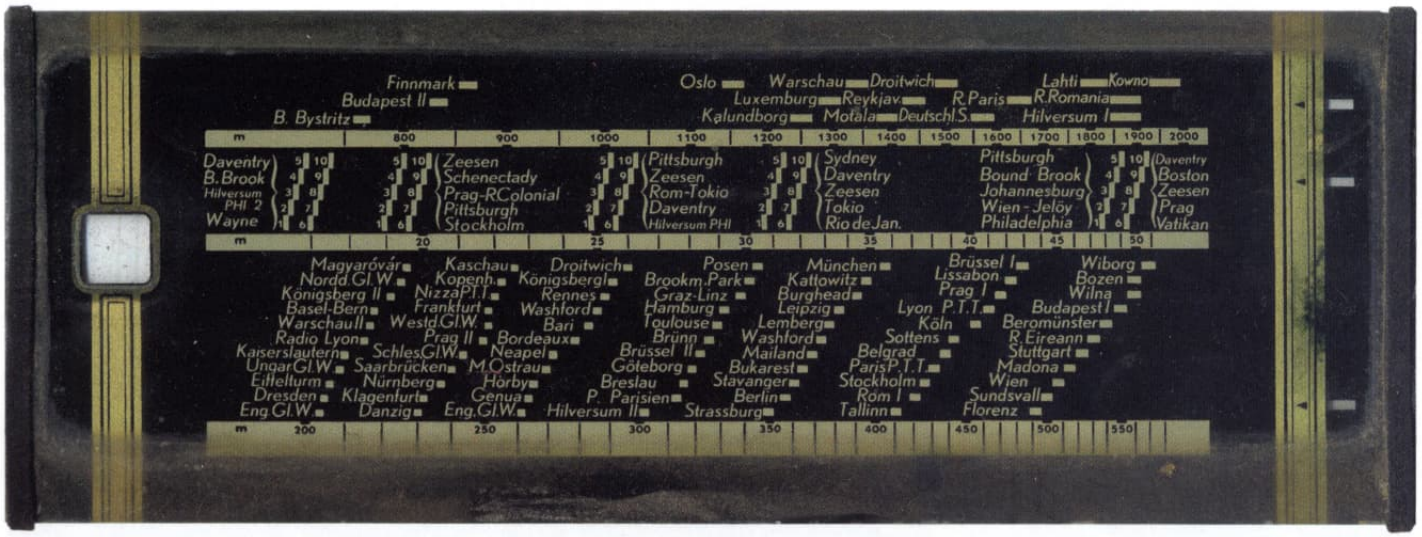
on even very low lighting and the pointer could barely be seen and in daylight it was a "Guess that station" game show. The once translucent white paint, that has faded non-uniformly, is now opaque.

So it was time to do artwork for a silk screen. After some thought I reasoned that it could be done with one screen of black. Philips almost certainly did it with two to include the gold. The white looks like an overall spray of the back now turned a milky coffee colour. For me, one screen would keep the cost down as setting up would be easy with only alignment to the glass. The gold and white could be done with masking and spray cans. The white has to be translucent and so I used glass frosting paint by Plasti-Kote. Doing it this way I had control of the amount of translucency and gold colour rather than trusting to what the silk screener might be able to give me.

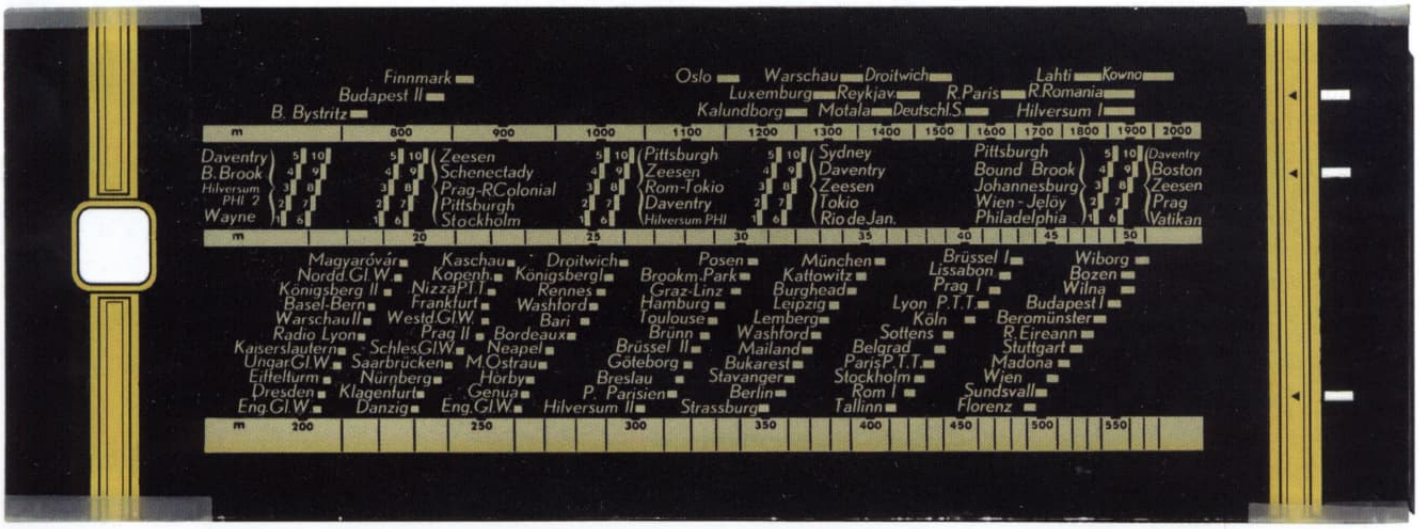
I did experiment with a piece of plain glass with the frosting and it gave me some idea that it might possibly turn out alright. But I was relieved when tried on a real dial that it turned out as beautifully as it has; the pointer shows up clearly in all positions on the dial including the ends. I used three medium coats of the paint.

The pictures of sections of the old and new dials, that clearly show the difference, were taken in identical conditions, in daylight in a north facing room.

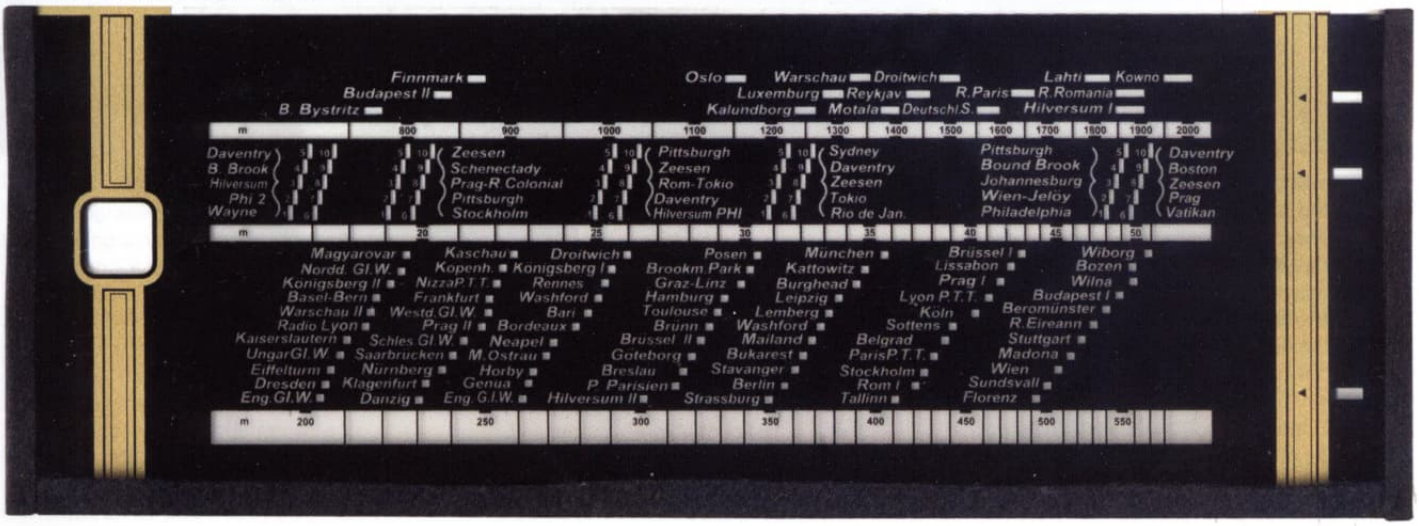
The areas for the gold paint were masked off and sprayed with three to four coats of Plasti-Kote 620/452. A good tip



The original dial



The original dial enhanced with decals



The new dial with felt packing

PlastiKote frosting

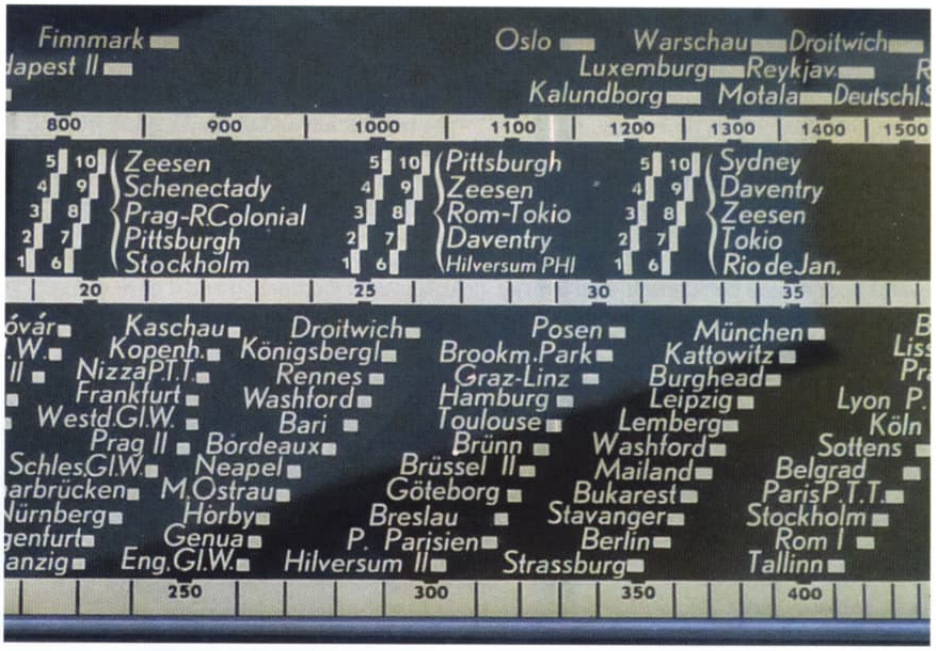
here is to hold the dial up to the sky: if you can see light through any speckles then it hasn't got enough paint on it.

What to do about the felt that was on the dial

For the 'magic' eye valve it is more about keeping extraneous light out of the valve than anything else. Depending on the valve a cardboard tube, painted black, and slid forward so as to touch the dial before the valve front would work. In my case I had a NOS EM1, with a square end to the tube, which is a smaller diameter than the original AM2. A single wrap of black felt, slightly overlapping the front, made it a snug fit in the mounting. The operating voltages are similar to the AM2 apart from it having a 6.3V heater. It could be run on DC, using a diode and an electrolytic, to raise the voltage. However, the anode current is so low it will still be bright enough run on 4V and is so in the picture "The Cap as it will look".

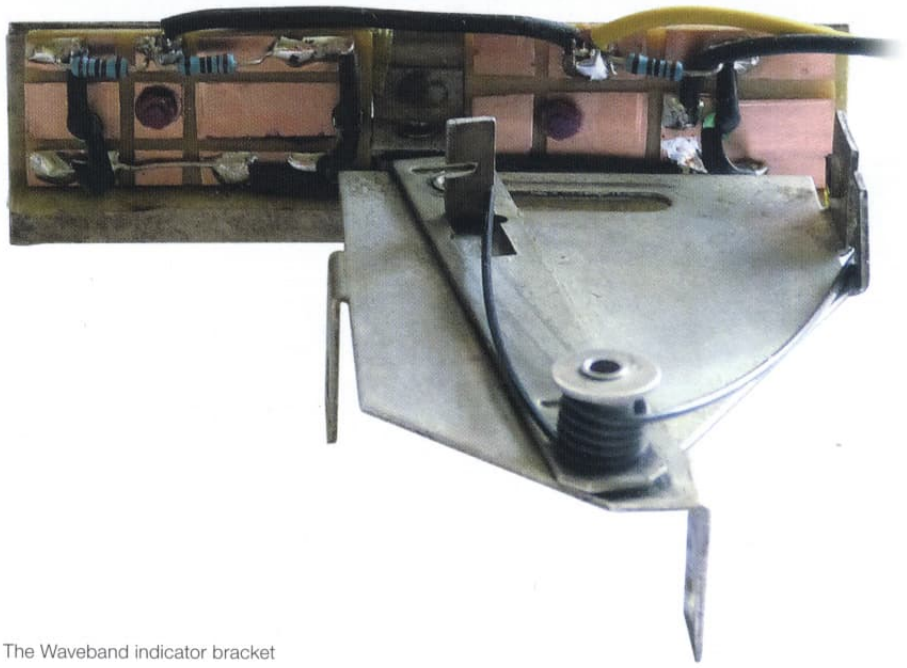
The waveband indicator was more difficult and is poor on all the models that use this design. Basically, it is a sliding metal panel, faced with celluloid that is a translucent green over cut outs, which, via the Bowden cable, line up with clear slots on the dial. The single bulb, some distance away, really hasn't adequate illumination to give clear indications.

My solution was to mount three 3mm, 2mA LEDs, on single sided copper board in each of the sliding panel slots. Each LED has a 2K2 feed resistor that are

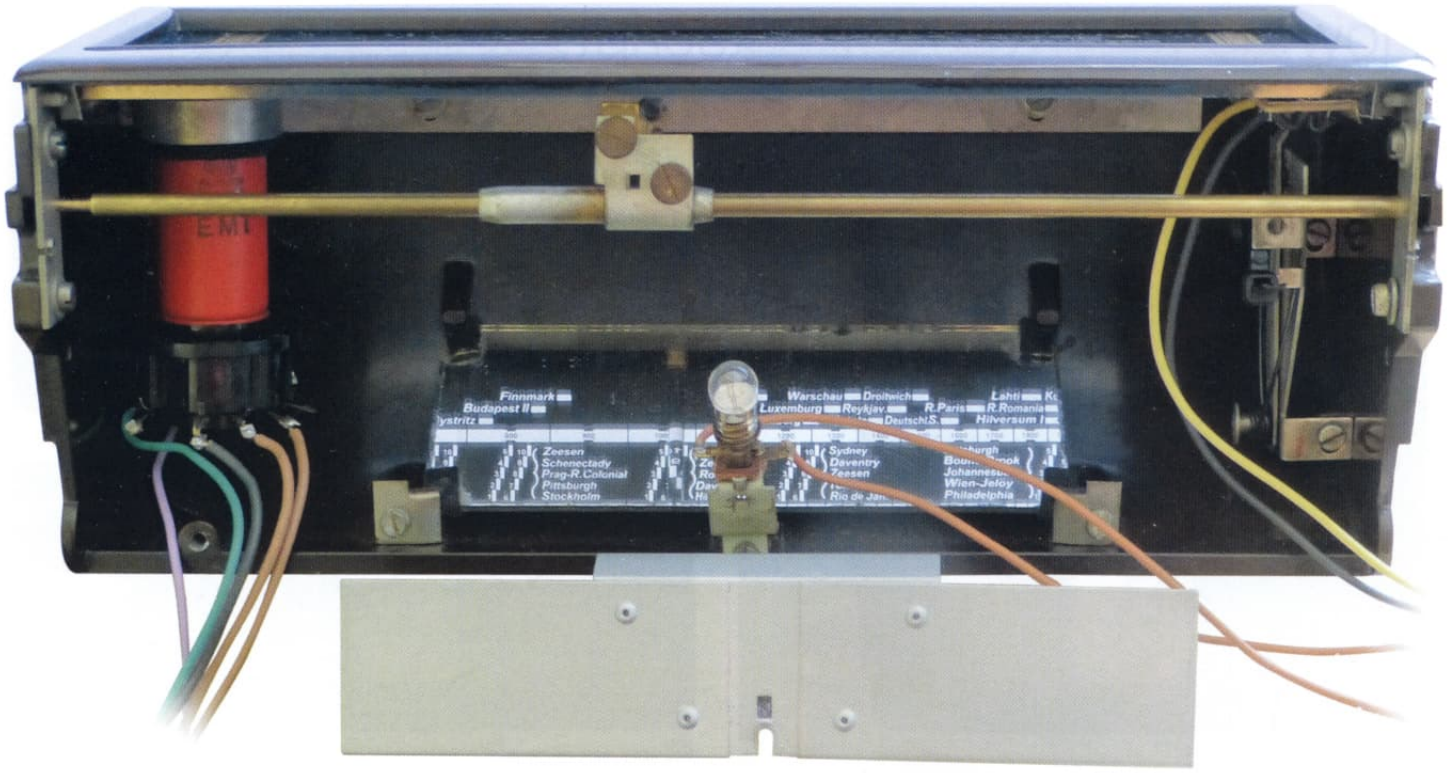


A section of the old dial

A section of the new dial

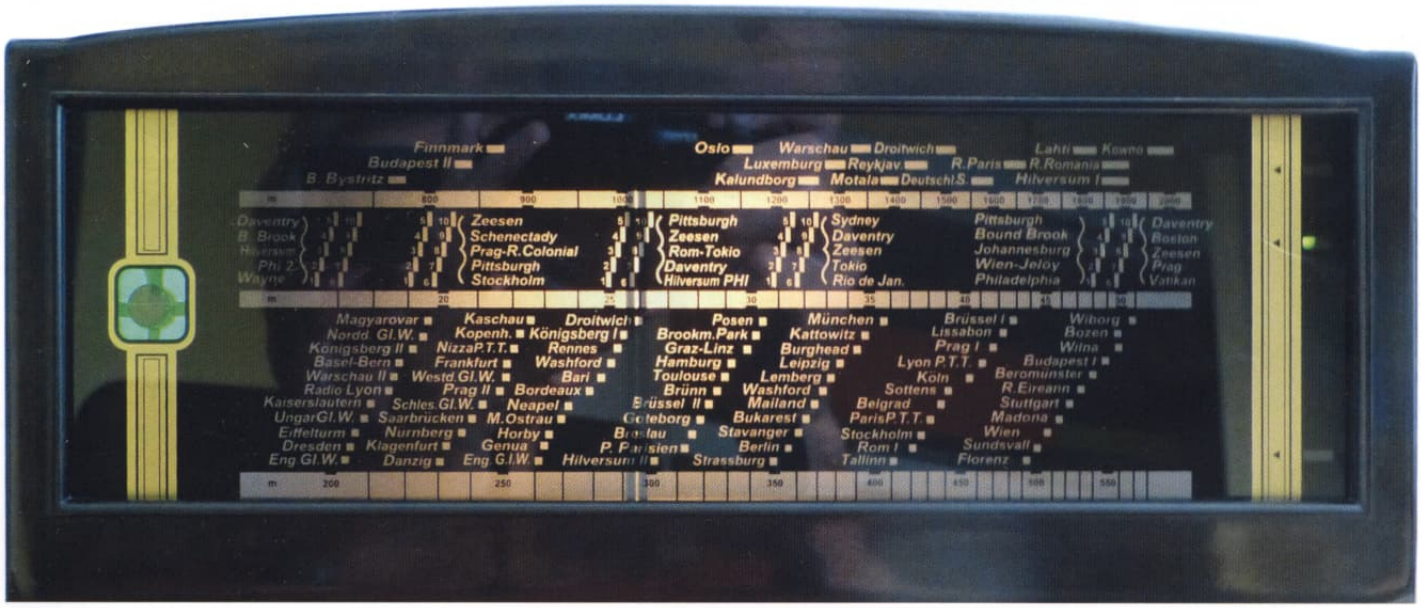


The Waveband indicator bracket



Inside the cap (not finalised)

The LEDs



The cap as it will finally appear

wired in parallel. I cut away copper on the board using a narrow file to create lands as I don't have facilities for etching.

The LEDs could be powered from a nice smooth DC source such as the output valve cathode. If this were done the value of the cathode resistor would be increased to allow for the extra drain. It does mean running another wire to the Cap but that seems better than rectifying the heater supply and adding an additional diode and electrolytic capacitor, although I have this as a possibility.

No felt was attached to the dial but the sliding metal panel was covered with holes punched out for the front of the LEDs. There is actually a gap between the panel and the glass but with the felt used it can wobble a little. However, if it touches the painted glass occasionally the wear should be minimal.

The picture "Inside the Cap...) does not show the rear mounting for the eye valve and of course the cabling will be tidied up and run through a clamp.

Conclusions

I have spare dials, so if there are any German readers with a D57 (the radio is a lot more common in the German speaking countries) who want one at a reasonable price then please contact me.

Recommendations

Screen printers were Premier Inks, Stock Road, Southend-on-Sea, Essex SS2 5QF

How do they work? Postscript, and repair and calibration of meters

by J Patrick Wilson

The aim of this article is to illustrate items not available at the time of writing the original series and to describe some repair and calibration procedures for electrical instruments. As I have no training in instrument making I would welcome comments, corrections and any further hints.

Figs. 1-5 Series 3 Megger (a) prototype views and (b) corresponding views of bakelite version

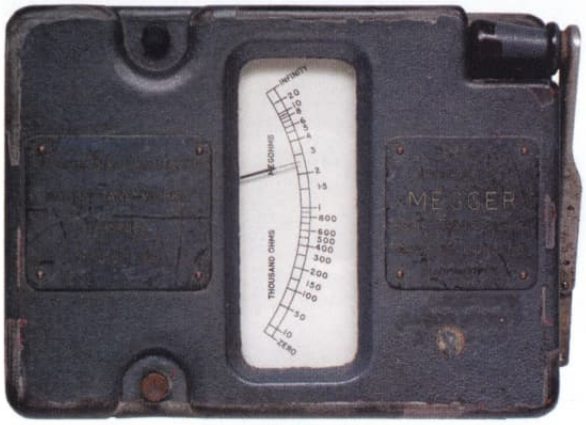


Fig. 1a

Fig. 1b

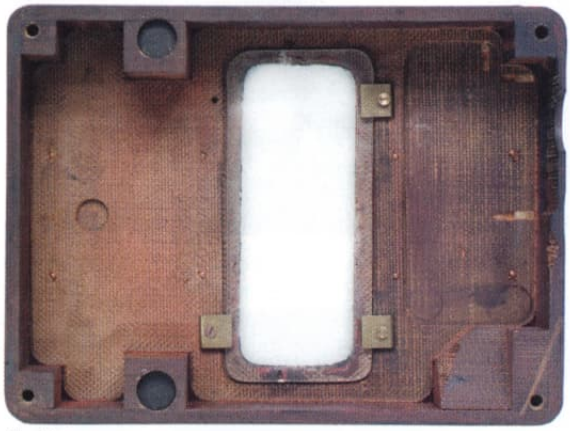


Fig. 2a

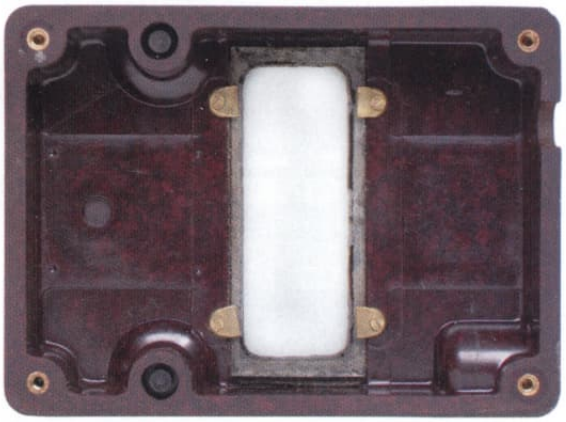


Fig. 2b

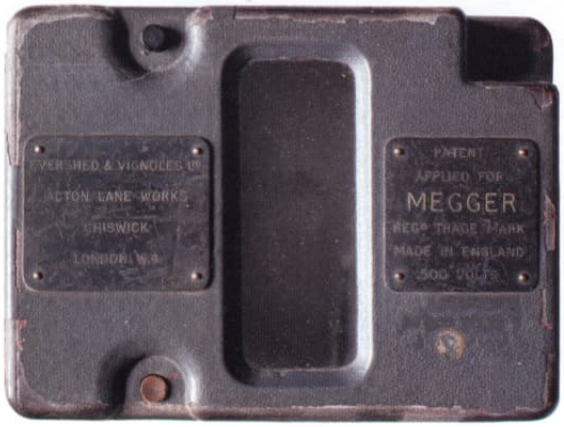


Fig. 3a

Fig. 3b

Series 3 Megger

I was recently given a manufacturers prototype for the Series 3 Megger by Lorne Clarke and managed to pick up the same version in its regular manufactured form at a Golborne meeting, allowing direct comparison to be made. They are both 500V test with zero to infinity scales marked from 10kΩ to 20MΩ and with centre scale at about 1MΩ (Fig. 1a&b). The scales are very similar except for additional markers at 15 and 50MΩ in the manufactured version. For the principles of operation see Part 3 in Spring 2014 Bulletin.

Bakelite mouldings are cheap when mass produced but costly to set up so the prototype case has been fabricated and milled from sheets and blocks of tufnel, a bonded fibrous material easy to machine, and the pieces screwed and glued together. The internal dimensions appear to be the same for both versions (Fig. 2a&b), but presumably the bakelite manufacturer has recommended a slightly thicker moulding so that the outside dimensions have been increased from 13.45 x 9.95 x 5.70 to 13.65 x 10.05 x 6.00 (cm). A slight lip has been added to the perimeter of the lid where it joins the base, presumably to give better grip, and the inside of the moulding has been rounded and tidied up.

The labels on the prototype are brass plates engraved by pantograph (Fig. 3a) whereas they are moulded into the bakelite (Fig. 3b) and the 'PATENT APPLIED FOR'

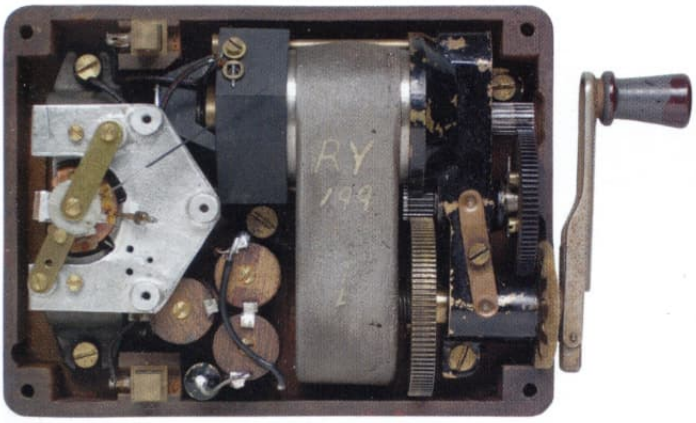


Fig. 4a

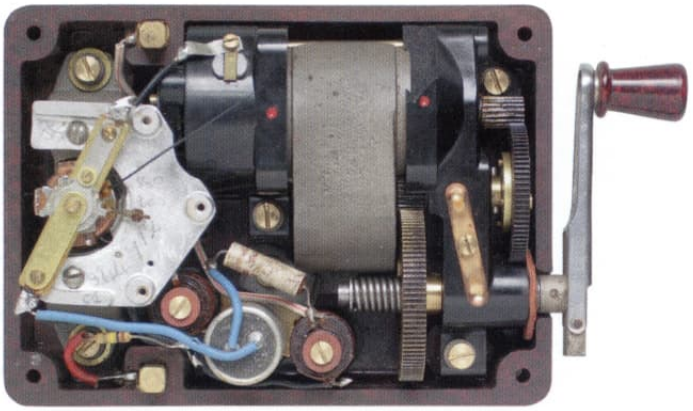


Fig. 4b

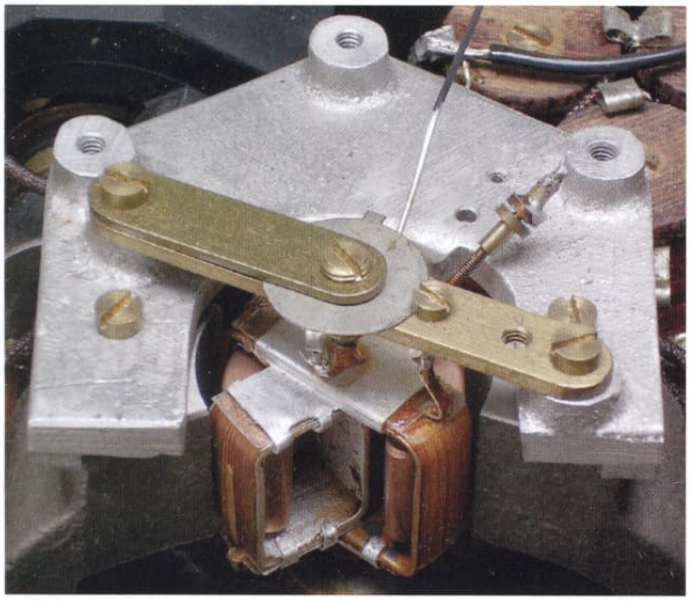


Fig. 5a

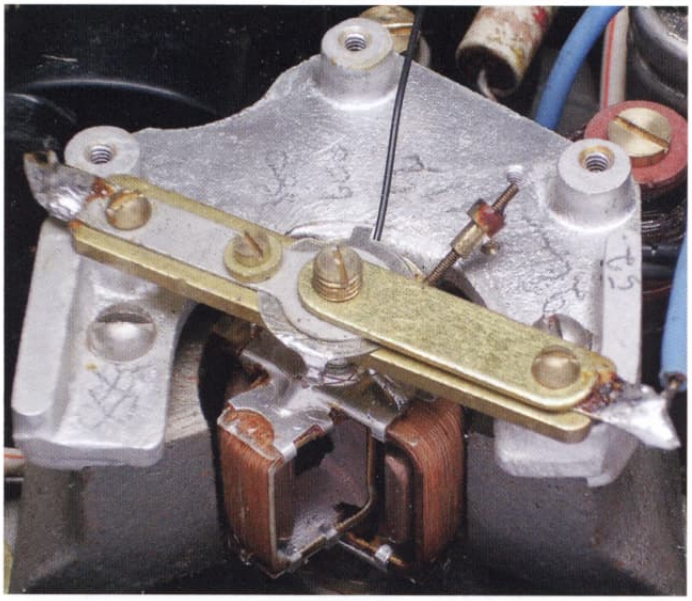


Fig. 5b

has been granted as 'PATENT No. 400728' by the time of manufacture. '500V' is moved to the dial so that the same case moulding can be used for all Series 3 versions.

The generator and gearing are very similar (Fig. 4a&b) except that a shorter magnet has been used and a brass mount for the gearing and end of the generator has been replaced by a bushed bakelite moulding. The movements are very similar (Fig. 5a&b) with only minor differences in the coil mounting and top plates. The polarity has been reversed so the positive potential is at the rear.

Both instruments have undergone repair in the past and even after further attention are not accurate over the whole scale range. I assume that the capacitor and resistor which has been wired across the generator is not original but has been added by a previous owner for spark suppression. A small paper disc on the prototype is marked '8' which could indicate that several were made and distributed for assessment. It is interesting that prototypes for a miniature version of a popular instrument were deemed necessary and I wonder how universal this practice was for other instruments?

Metropolitan Vickers kWh meters

Figs. 6&7 show two versions of DC kWh motor meter. Fig. 6 is Type 'Y' for 300A and 220/230V and has current coils of thick copper strip of two turns on each side with a rotor consisting of three pairs of coils of fine wire set at 60 degrees. The torque is proportional to the product of the current and armature fields and therefore to the power being used. The total energy is recorded by the number of rotations. See Part 5, Fig. 20, in the Autumn 2014 Bulletin for a similar meter. The small diameter commutator can be seen in Fig. 6b between the brass cheeks at the top of the axle with its thin spring brush strips clearly designed to minimise friction. Fig. 7 shows a lower current version with more turns on the current coils. Fig. 7b shows the commutator again at top left and an adjustable small coil behind an aluminium disc which appears to be a sensitivity adjustment. In both cases the large horizontal aluminium disc behind the dial with embracing magnet constitutes the eddy current brake controlling the speed of rotation.

Fig. 8 shows a Metropolitan Vickers Polyphase Meter Type 'N' and appears to contain two stacked induction type units. This would suggest that it monitors a two-phase quadrature supply. Single phase versions of induction type meters are also described in Part 5.

Repair, restoration and calibration of instruments

Cases

In general I prefer to keep the original finish of an instrument case even if far from pristine. In many cases, however, modification and stripping by previous owners render this pointless. Normally I would fill any small holes in wood by the appropriate colour of furniture restorers wax. This stays in better if run in with the aid of a soldering iron leaving a surface bulge which can be shaved off after it has cooled and shrunk. Varnished wooden cases often become badly scratched and quite frequently acquire blobs of paint or other detritus. Rather than strip the surface, careful use of a hard plastic scraper for the blobs followed by vinegar and elbow grease can work wonders. When dry, rub over with a cloth and linseed oil which after a few minutes miraculously removes the scratches and dries after a day or so. This does, however, darken some woods such as light oak but otherwise represents a vast improvement, leaving it looking original.

Lacquered brass presents a bigger problem. Originally the brass surface would have been given a grain which is finer than that produced by lathe turning as can be obtained with wire wool. This would then have been heated over a bunsen and a coloured lacquer applied by brush but it takes many weeks of practice to get a uniform finish and is certainly a skill that has eluded me. If a substantial amount of the original finish remains I normally leave well alone. Otherwise I use colourless varnish or shellac lacquer (French polish) and after this has thoroughly dried apply a wood dye

to the surface which can be removed if overdone but of course is not very resistant to future cleaning. I must say I hate to see an instrument that has been highly polished and lacquered or simply left to tarnish afterwards. It is, however, an advantage to leave a grained surface to tarnish slightly to gain some colour before lacquering.

Ebonite is another problem both because it tends to lighten and go greenish yellow if exposed to light and its surface becomes dull. A slightly damped cloth and a lot of elbow grease normally removes dirt and improves the colour and texture of the surface with a final rub with a dry cloth some time later. Its surface often still remains smeary looking though. I have tried oil but think this probably soaks in and damages the surface. Any suggestions? I would have no objection to polishing bakelite but am quite happy when the surface is simply clean.

Movements

I shall restrict my suggestions to the moving coil movement because these are by far the most common and similar principles and techniques apply to most other types.

The first question is whether the instrument is open-circuited. If it is one of the hair springs it should be possible to tackle this with a fine pointed soldering iron but almost certainly it will be the moving coil which is broken. With luck it will be one of the end connections as these are most vulnerable and should be possible to repair but I would not attempt a rewind because the wire is so fine. I have on occasion managed to unwind to the break and reconnect here with reduced resistance and sensitivity. Clip-on high power lenses or a stereo microscope are extremely useful but it is difficult to use a soldering iron under a microscope.

If a meter has been opened previously it is quite likely to have acquired iron debris in the gap, impeding free movement of the coil. These can be removed with a small piece of preferably double-sided cellotape moved around the gap with non-magnetic tweezers being careful not to damage the coil or springs. It normally takes several goes to clear completely.

With fixed pivots there should be a slight amount of play. Tightening must be done vary carefully in order not to damage one of the sharpened and polished pivots. Some of the better instruments use spring-mounted bearings which allow the jewels to retract so that if the instrument is dropped the force will be taken by a solid part of the arbor rather than the bearing surfaces. If a previous owner has been foolish enough to apply lubricant to the bearing, it will now have accumulated dust and become a sticky mess, and it will be necessary to remove the cups and clean them with a cocktail stick and the pivot points with solvent on a fine brush.

The next stage is to check the balance of the movement. It should ideally indicate the same reading on its back as with pointer up or down, left or right. Errors are most likely to be due to the pointer having become bent and the cure is to reverse the process using a pair of forceps near the base of the pointer. This would be most obvious in the pointer up and pointer down positions. With pointer up, a reading to the right would indicate it to be heavier on that side and therefore that the pointer is bent in that direction. When corrected the next stage is pointer left and pointer right. If the pointer indicates beneath its mean position it is too heavy and the counterweight needs increasing. In some movements this can be done by unscrewing the counterweight, being careful not to bend its arm. Where this is not possible I have applied a small blob of adhesive to increase the counterweight but it may be necessary to repeat once the solvent has evaporated.

For ohmmeters it is slightly more complicated because the infinity position depends on the voltage coil finding the position of zero radial field at which angle the pointer should indicate infinity. If this relationship between coil and pointer is not also the condition of mechanical balance the latter would have to be obtained by adding an appropriate weight to the lighter side and not by bending the pointer. Unlike a simple moving coil meter in which it is constant, an ohmmeter suspension is very soft at infinity and very stiff at zero. Its stiffness is of course being produced magnetically and not by spring forces.

If after the above adjustments it shows an error at zero it is necessary to add a small resistance to the current circuit if it is beyond zero or to put a very high resistance in parallel with the current swamp resistance if a positive resistance is indicated.

Electrical calibration

A critical question is obviously what one uses as a standard. Most people do not have access to accurate standards. I was fortunate to have access to an extremely accurate digital meter (from memory I think it was ±0.005%) so was able to check my electrodynamic instruments which without damage should remain stable. Nowadays I rely on a combination of Weston standard cells (1.01860V @ 20°C) for potential and standard manganin resistors to derive voltages and currents. The standard cell must be used in a bridge arrangement so that no current is drawn.

The first task is to set the pointer to zero in the position in which it is normally used, tapping the case, not the glass, to overcome friction. For any instrument with

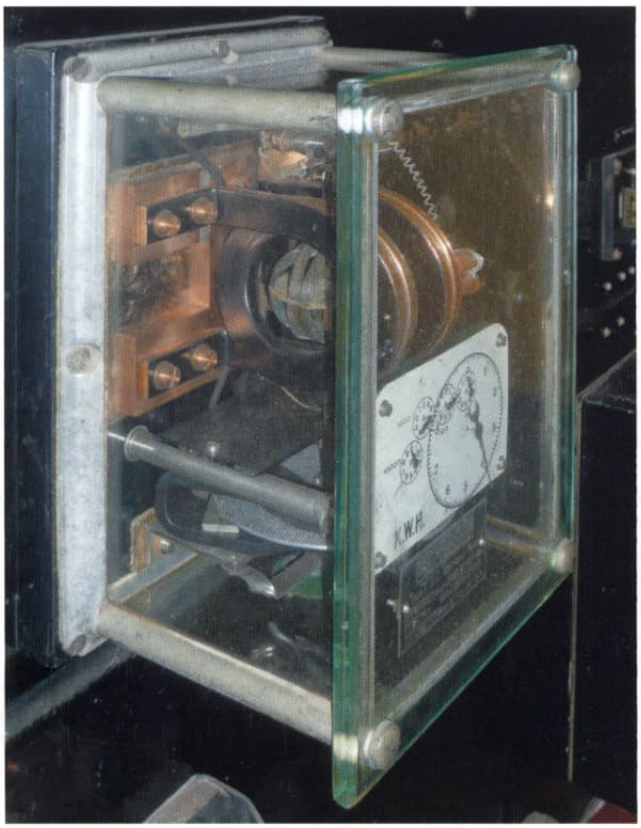


Fig. 6a: Metropolitan Vickers DC kWh Meter Type 'Y'

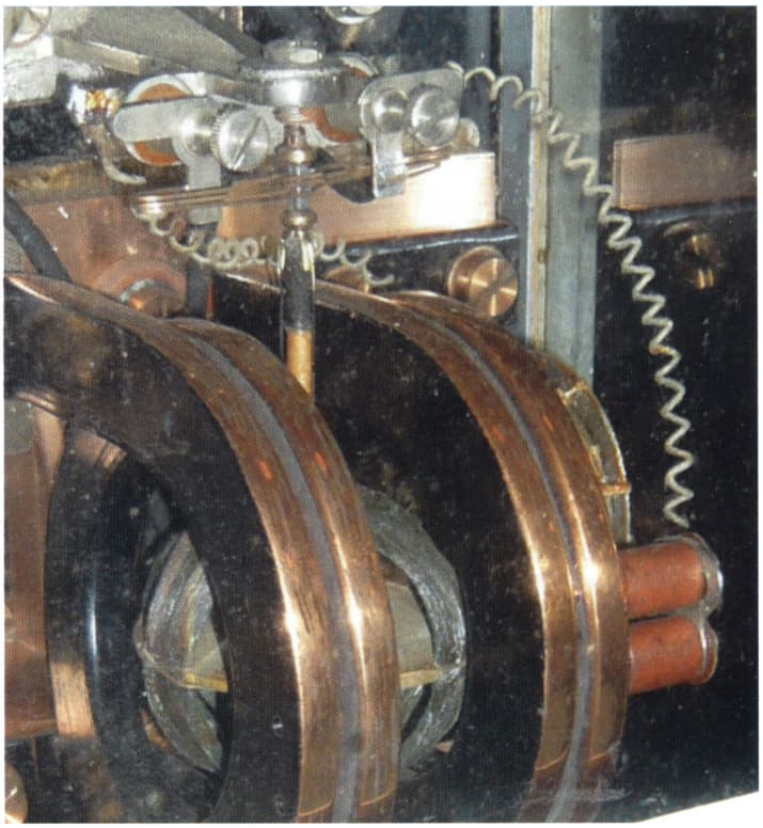


Fig. 6b: Metropolitan Vickers DC kWh Meter Type 'Y'

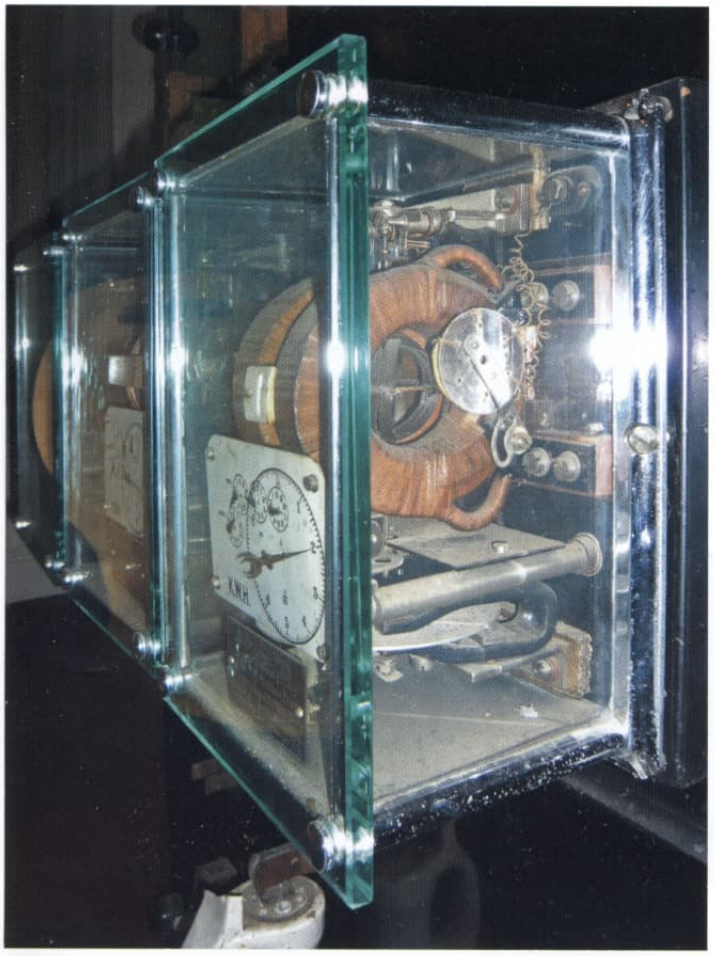


Fig. 7a: Metropolitan Vickers DC kWh Meter lower current version

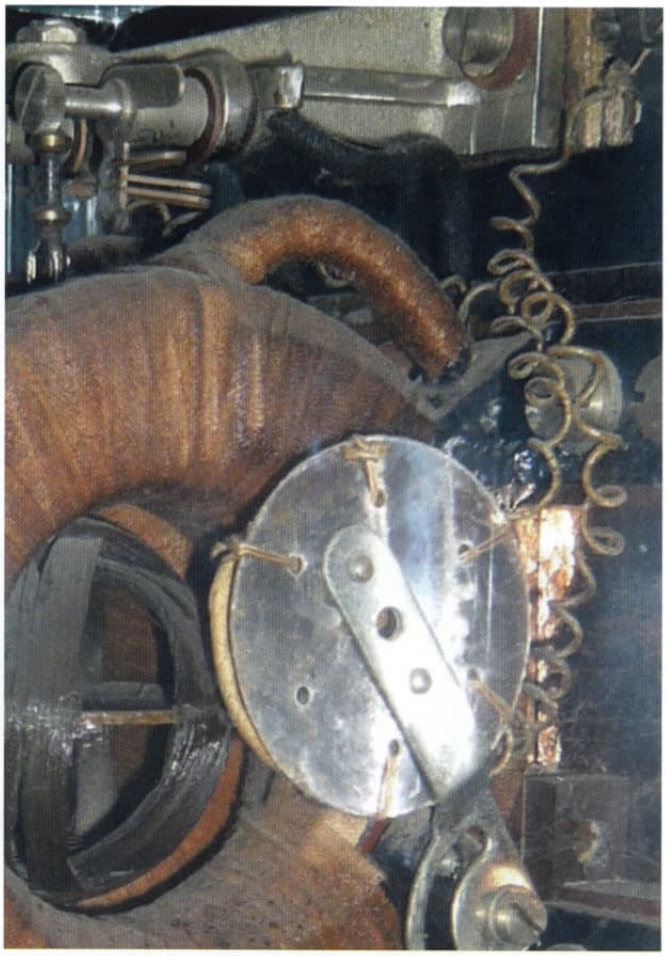


Fig. 7b: Metropolitan Vickers DC kWh Meter lower current version

more than one range the current sensitivity of the movement should then be set. In a moving coil movement the basic sensitivity is adjusted by a magnetic shunt, a piece of soft iron which after slackening can either be rotated or slid across the gap to alter the degree of shunting, which reduces sensitivity (whereas in the old moving magnet ammeter a magnetic shunt *increases* the sensitivity!). Some instruments have a magnetic screening shield which has to be opened for adjustment. Such shields also give some magnetic shunting so sensitivity with and without the shield should be assessed so that this can be allowed for.

The next stage is to check the linearity although, apart from remarking the scale, it is not usually possible to do anything about it. If the instrument is normally used for checking a specific reading it would be better to set it correct at that point rather than at fsd.

For different voltage ranges the total resistances can be checked on an accurate bridge rather than having to check meter readings on each range. If any resistance needs adjusting it can be done by adding a resistance in series of 1/100th of its value for 1% too low or 100X in parallel for 1% too large. It is not necessary to use accurate resistors for this purpose as they constitute only a minor fraction of the total. Current ranges usually need individual checking because it is not easy to measure low resistances accurately. This can done if an accurate high current shunt or four-terminal standard is available. The adjustable test current is passed through the meter and low resistance and the potential across the voltage terminals measured by bridge methods against a standard cell.

Where a resistor needs complete replacement it is necessary to choose one, not only of the correct value, but of adequate stability and power rating. If it is of low value it can be wound using eureka, constantan or equivalent. As these also form effective thermocouples with copper their ends should remain at the same temperature. Although manganin is the preferred material for resistance standards it cannot be soft soldered satisfactorily. Many ordinary high power wire wound resistors do not have low enough temperature coefficients. For higher resistances, the old hi-stab cracked carbon and modern oxide and metal film resistors are very stable. The ordinary radio carbon resistors have a high negative temperature coefficient which depends on resistance value and can change after soldering. For historic items, before the advent of constantan and manganin, an assessment of temperature coefficient can be a useful guide to composition.

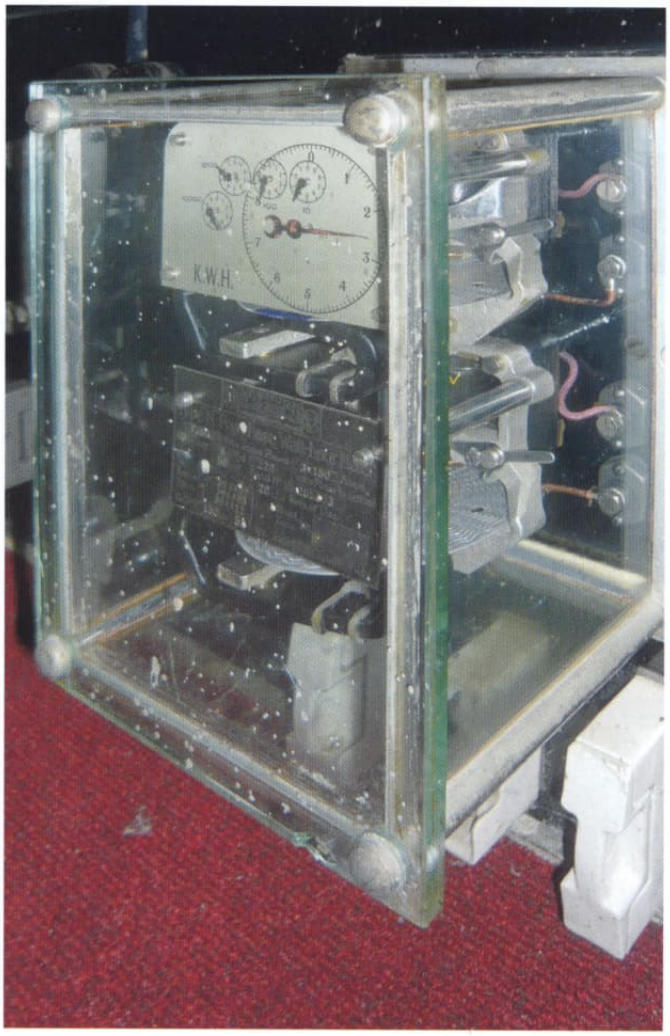


Fig. 8: Metropolitan Vickers DC kWh Meter lower current version

Pictures from Royal Wootton Bassett, July 5th by Greg Hewitt












HMV 907 TV of 1938, sold for £6,200

The Murphy A30C Console radio and its long struggle back to good health

by Roger Grant

This set came from a elderly local couple referred to me by my local antique dealer, the couple were downsizing from a large house with plenty of space. In a corner of the front room stood this large Murphy console radio. The owner said it had been in the family all of his life, and it always lived in the front room, possibly a good reason why the radio had survived in very good condition.

He remembers listening to ITMA and Winston Churchill during World War Two when he was a small boy (I didn't tell him how many times I had heard this story). He hadn't had much luck trying to sell the set and didn't want much for it. It's a bit big for me but owing to it's very good condition and that it still has the instructions and station chart in a pocket on the back, I thought I might play with it for a while before I move it on, not having had a lot experience with 1930s Murphy radios. This very large bland looking set has an air of quality about it. The cabinet is very solid and as it's never been stored in a loft or shed it hasn't suffered any damp damage, although there is some fading on the top and a mark obviously from having had a plant pot sitting on top it for many decades. In the workshop the first thing that struck me was the very large speaker, the biggest by far that I had ever encountered in a domestic radio, it was just under 11" diameter and 8" deep with a cast iron field stator. Removing the back that only covers the top chassis compartment revealed a very dusty chassis. It looked like it hadn't been touched for years, but was intact and in good condition.

Everything about this set is substantial and good quality; even the chassis is made out of what looks like 1/16" steel plate. Now eager to find out what it would sound like I started the pre-run up checks. My antique dealer friend said when he had viewed this set he'd plugged it in to see if it worked, and all he got was a lot of buzzing and a smell of burning and blue smoke. I've warned him about this practice but I get the impression he won't stop until he ends up wearing the innards of an electrolytic smoothing capacitor or starts a fire.

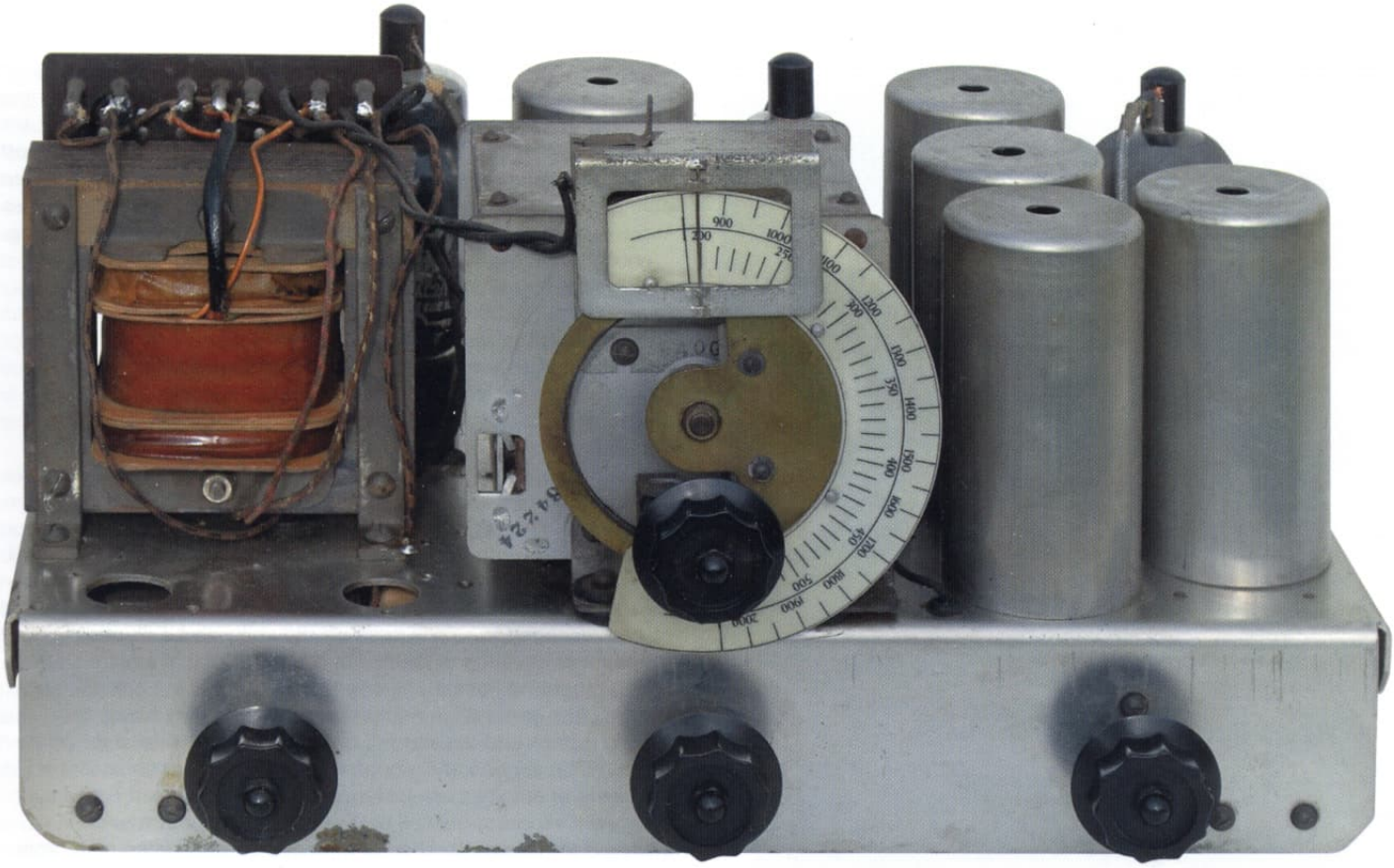
I removed the knobs and the three 1/4" bolts holding the chassis in the cabinet. After a good vacuum cleaning I gave it the once over looking for anything amiss. I noticed that the frequency changer valve had been replaced with a Mazda MO based type, a TH41, and an MO socket replacing the original B9 valve socket. Three smoothing capacitors had been fitted held in place by lengths of wire strung between various points in the chassis. I removed all of the valves for a clean and test and the chassis and tuning cans wiped clean and bright with a damp cloth. I noticed the mains transformer was one of the three separate bobbin type, I had last seen one of these in a Murphy set being restored by fellow collector Mike West, his had short circuit turns and had cooked up, requiring a complete rewind.

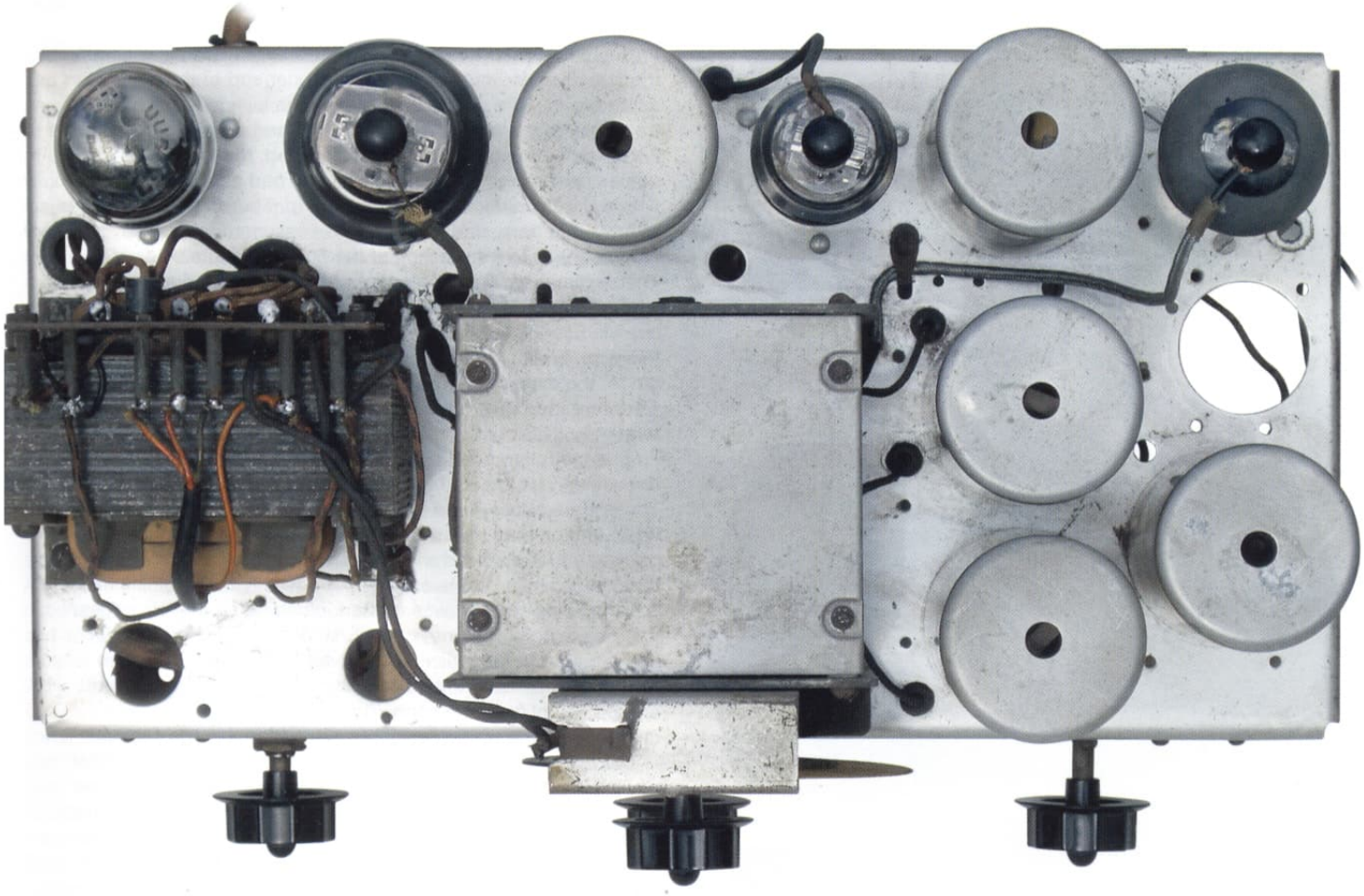
I dragged out the service manual. The set had originally had a single multi smoothing block riveted under the chassis, I removed the wires stringing up the replacement smoothing capacitors and let them dangle out of the chassis. They all had 'May 1946' stamped on them, one of them had a burn mark on one side. With a bit of luck this will be the cause of the buzzing and blue smoke the antique dealer had mentioned. Going by the date on the smoothing capacitors and the valve chosen for the mod, I would imagine this repair may have been carried out some time in the late 1940s.

Running round with the AVO proved the smoothing capacitors to be ok or at least not short circuit. Looks like the burn mark may be where this capacitor was mounted too close to a neighbouring resistor. Everything checked ok, no shorts anywhere, I refitted the smoothing capacitors back in the chassis. I made some clamps out of steel banding tape I had recovered from a packing crate some time ago, this had a dark grey metal plating, and fitted in with the rest of the chassis, just the job.

No shorts anywhere, time to apply some power. I connected up to the bench speaker. The smoothing choke in this set is the speaker field winding, so for convenience sake I fitted a makeshift choke for bench work. I guess this will have DC resistance of about 2k but to check I measured its speaker field winding, whoops! its open circuit, this could be a major problem as this is a very large coil. A little dismayed I returned to the chassis on the bench. I fitted a pair of wander plugs to a 2k 10 Watt wire wound resistor and plugged it into the field socket on the mains transformer.

Plugged in, switched on and wound up the Variac slowly, as I passed the 100 volt point I could see the pilot lamp beginning to glow and on to 150 volts and the valve heaters began to glow. By now I'm getting a loud buzzing from the mains transformer, this doesn't sound good, I removed the rectifier valve and tried again, no difference. I left it running for a few minutes and then checked the mains transformer, It was getting warm confirming my suspicions that I have some

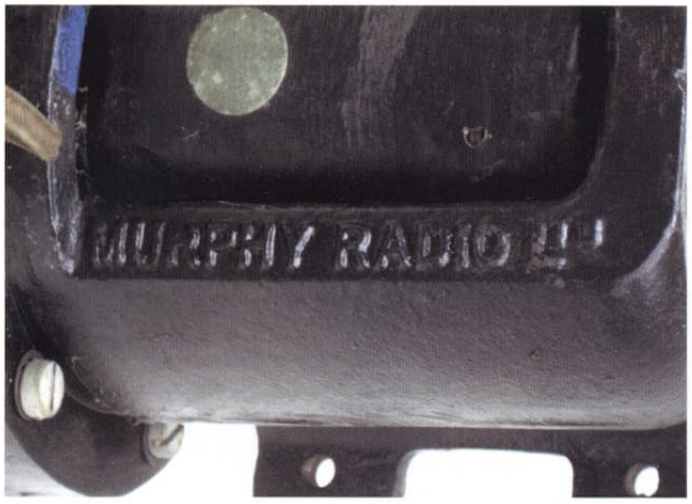




short circuit turns. Now very dismayed, I stopped for a think about how far I wanted to go. A transformer rewind is not impossible just a bit of a chore, and not worth doing if I can't repair the speaker field winding.

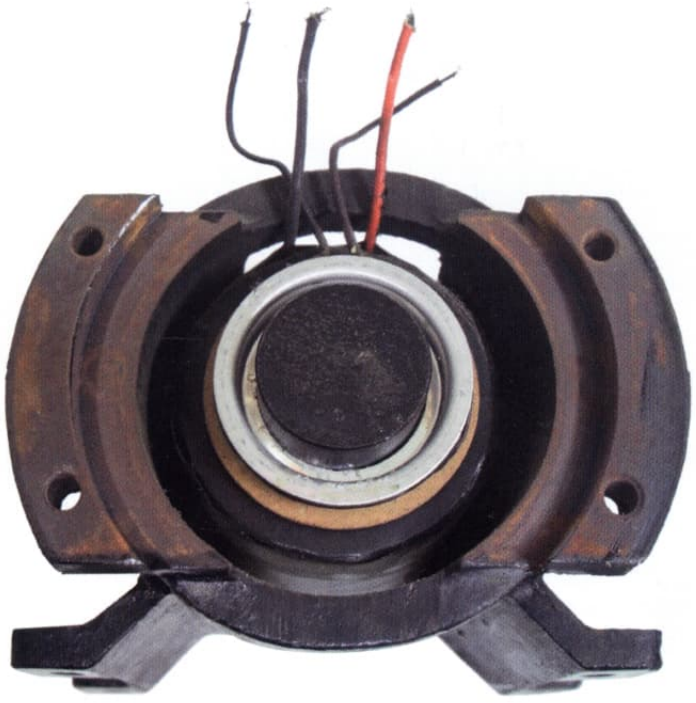
My main interest in this set is the speaker, other than that it's just another 1930's superhet, so I'll rework the speaker first then take it from there.

I removed the four 5/16" bolts retaining the speaker, and lifted it out of the cabinet, it's quite heavy and reminded me of a time



Murphy's own speaker

The field coil removed



The Hum–bucking Coil

assisting a friend lifting the engine out of his vintage Austin 7. I removed the dust cover and inspected the cone, it's as new. I unsoldered the wires from the tag strip, then rolled up some stiff paper about 4" wide into a tube about four turns thick. This was adjusted to the diameter of the central pole piece, as expected in this speaker. It's considerably bigger than most, then narrow strips of paper torn off the end of this paper roll until it fitted in between the speech coil and pole piece. Now with the spacing obtained I put a couple of staples in the other end of the roll to hold it together and stop it unravelling.

Next, I removed the four retaining 0BA bolts from the magnetic pole pieces and lifted the cast iron rear section clear. I then removed the hum bucking coil and its cork separator. I found the field coil stuck fast on the central pole piece. Fortunately the coil is wound on a reasonably substantial paxolin tube. I tried to lightly prise the coil off of the pole piece but applying any pressure might damage the paxolin or the coil as the ends and outer covering are only empire cloth. I could see a very small gap between the paxolin tube and the pole piece and decided to not rush things and apply some WD40 in this gap and leave it overnight. This did the trick, the WD40 softened the pitch like substance between the paxolin former and the pole piece. The coil was a bit sluggish to remove but using a wide bladed screwdriver as a lever between the inner paxolin tube and the cast iron pole piece I managed to slowly prise off the coil without damage.

The outer covering of the coil is a single piece of empire cloth. I ran a modelling knife along one side from front to back and the empire cloth came off in one piece, this being very handy for putting it back and the join will be hidden by the side of the pole piece. I then very carefully cut a window an inch or so square in the layers of empire cloth just around the positive lead out wire, eventually exposing a small brass strip the lead out wire was soldered to. This is attached to a piece of impregnated card, from this about one inch of enamelled wire appeared to go nowhere. Lifting the piece of impregnated card I found the other half of the break underneath, it had suffered from green spot and corroded through. I cleaned this wire and tested again. Still open circuit, the negative lead out wire feeds the inner end of the coil so this might prove more difficult. I removed the layers of empire cloth from around the negative lead out wire and found its brass strip. Fortunately the same thing had happened, the inner coil wire comes up through a systoflex tube and had corroded through where it was soldered to the brass strip. There was no evidence of any other corrosion anywhere so I assumed this green spot may be the long term action of the flux used in its soldering. There was a reasonable amount of exposed wire, I measured its diameter, 0.21mm or 34 SWG just in case I need to consider a rewind. I cleaned off the enamel about 5mm from the end of this wire, I measured the coil again, I now get a reading of 2.2k, bingo! the expected DC resistance. The original brass strips were threaded in and out of the impregnated card used for the terminals. This card is still firmly attached under the undisturbed empire cloth. I cut some new terminal strips from some 12 thou brass shimstock, a lot bigger than the original flimsy thin strips. These were super glued to the impregnated card, and the coil wires and original lead out wires soldered to them.The lead out wires then secured with some very adhesive black duct tape, very similar to the empire cloth. Finally the original outer covering empire cloth was refitted, glued along the join edges.

Re-assembly was uneventful. Using the spacer paper roll I had manufactured earlier. I used two PP3 batteries in series for the field coil and a third to tickle the speech coil and I got a good Bopp! from the cone. The dust cover was vacuum cleaned and the whole assembly placed back in the cabinet.

The mains transformer was tackled next. This has a terminal panel attached. Making copious notes I de-soldered the wires and removed the transformer, further de-soldering the terminal panel I then ascertained which bobbin was doing what. There are three separate bobbins, two small outer with one for each half of the HT winding and one of the heater windings.
The top bobbin is also the RF valve heaters, the lower bobbin the output valve heater and dial lamp. The larger central bobbin is the tapped mains winding and the rectifier heater winding.
Now disconnected from the set and on the bench, I jury–rigged a (fused) mains supply measuring the outputs of the windings to

ascertain which have the short circuit turns. All three of the heater windings read 4 volts, the lower HT winding reads 300 volts, the upper winding only produces around 100 volts, this upper winding also looks a little bit cooked, with a bit of luck it'll just be this one. This transformer uses 'T' and 'C' laminations. I easily wriggled out the 'C' outer laminations, then using a 6" steel rule and a toffee hammer, I knocked out a few of the middle 'T' laminations, the rest practically fell out. The three bobbins are now completely separate. I removed the slightly discoloured empire cloth from the top bobbin, then unwound the outer heater winding. This was 16 turns exactly of 18 SWG cotton covered copper wire. Underneath the HT winding was very cooked, very black with most of the insulation burnt off, I was surprised it wasn't open circuit as well. I then removed this charred mess and measured the wire diameter of the old winding, it was 0.16mm or 0.006" or 38 SWG, The bobbin cleaned up quite nicely and was only slightly discoloured.

The heater winding was 16 turns for 4 volts, 4 turns per volt, 300 volts, 1200 turns, add in 5% as it's nearer the core and call it 1260 turns, this rule of thumb usually works. The bobbin then rewound with 38 SWG enamelled wire, I usually do this 100 turns at a time checking as I go. Next a new heater winding, the original cotton covered wire tired and tatty. For the new winding I've used enamelled wire, as it's lead out wires are covered with systoflex and unseen.

Next the return of the 'C and T' laminations. In this transformer the laminations are in bunches of three interleaved from both sides, starting at the middle and working outwards. I put the first two bunches of three in the middle the same way round, this makes it easier to insert the last three in the middle of the core avoiding damage trying to force it in next to the former. This is done with a 6" steel rule from the other side parting the two middle bunches of T laminations, a bit like a shoe horn. Before refitting the tag strip I'll bench test it to make sure all is ok. The heater windings now read 4.2 volts and the HT windings both 350 volts give or take a volt or two and no buzz. The re-assembly and refitting the transformer back in the chassis was uneventful and I finished the pre-run up cold checks. A closer look at the smoothing capacitors revealed that although they were not short or leaky, they were not doing much either. Replacing the innards of these cardboard block types is very easy, just warm up the wax with a heat gun, undo the end flap while still very warm, insert a large wood screw into the innards, place the screw in the vice, warm up the outer covering and pull it free. All that is then required is to cut some wooden blocks to fill the space around the new capacitor. I still used the original lead-out wires.

I did the valves on the tester next, the line up, TH41 in the place of the 9 pin AC/TP frequency changer, an AC/VP1 IF amp, an AC2/Pen/DD output, detector and AGC diodes. All well within spec, the reference book rates the output valve at 3.5 watts not much for such a large speaker.

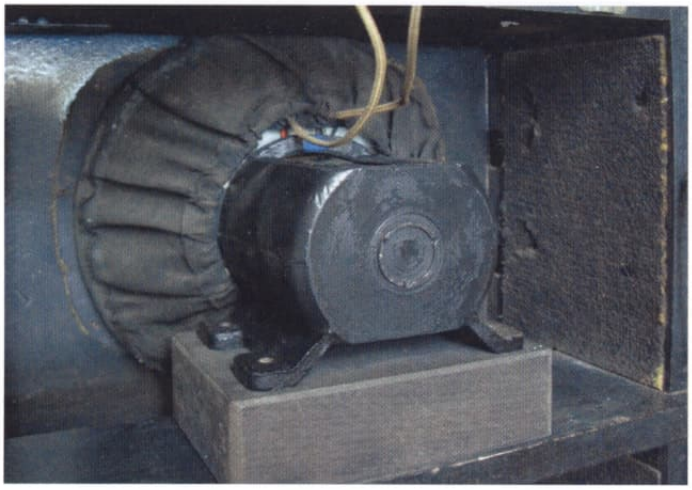
A quick re-check for shorts all now ok and the set crackled into life. A low level background hum from the speaker may be due to the resistor in place of the smoothing choke. The volume control was very noisy and the on/off switch was reluctant to switch off, when it did it was with soggy putt sound. With a good aerial I was able to pick up a few stations certainly not what I would call lively. As I tuned through the band the set would break into instability, making a sound like a machine gun, then occasionally go pop and completely go dead. Checking the paper capacitors I found most of them a bit leaky ranging from around a meg to about 200k. In view of the instability I decided to change all of them. They were the waxed card tube type and reasonably easy, just unroll the end turned over the brass end cap and pull the end cap and innards free by its wire, then remove the old wire and solder from the end caps leaving a clean hole for the new lead out wire. At this point I also dealt with the volume control and switch. I placed a 0.5mm drill in a mandrel with only 2mm of drill exposed, then drilled two holes, one in the thin metal case of the volume control and one in the side of the on/off switch. I applied a very short squirt of Deoxit switch cleaner in both holes and cleaned the four contacts on the wave change switch. The wiring is the impregnated cloth type and was in good condition. The screened lead feeding the frequency changer top cap had its rubber inner separator crumbling and collapsed at the ends, this was replaced.

The corroded field wire

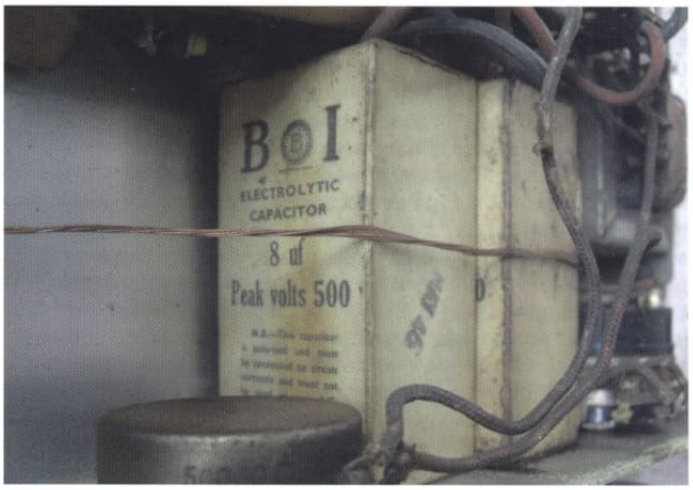
New field terminals

The Outer empire cloth

The speaker finished

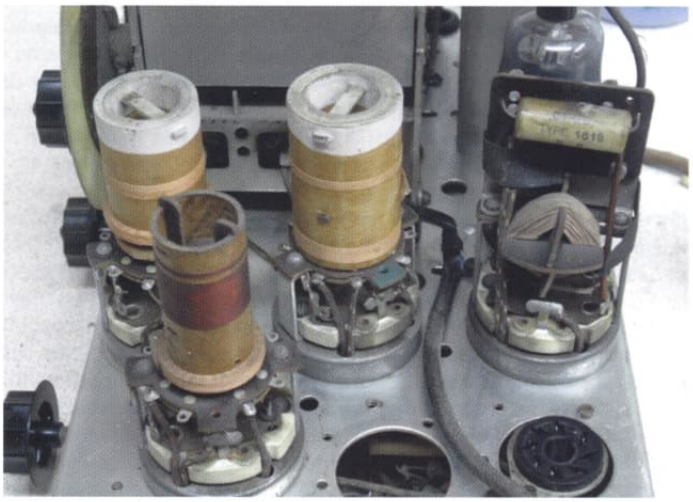


The speaker back in place

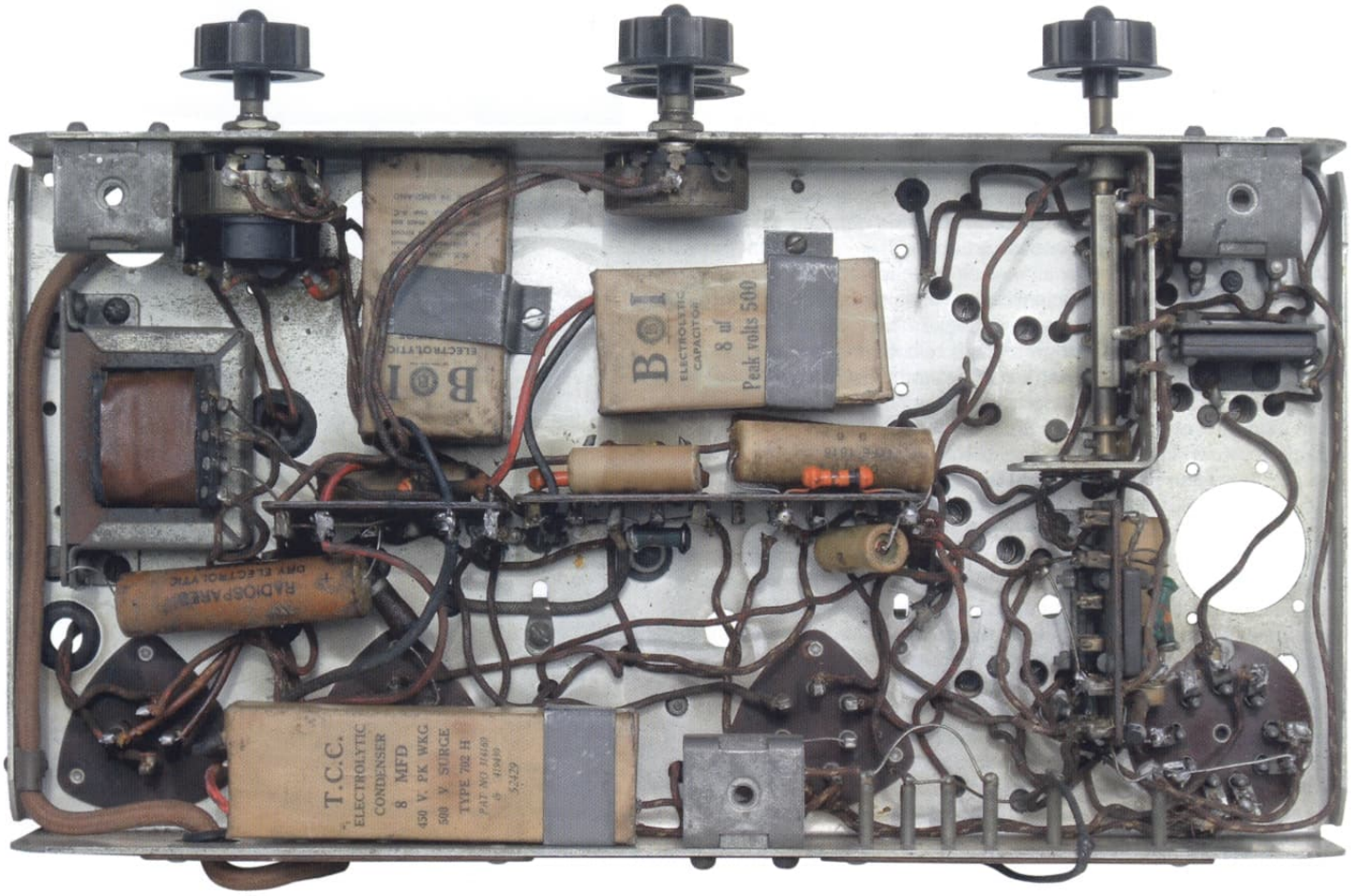


The smoothing blocks strung up

The burn mark



The tuning coils



Under-chassis view

On power up, my efforts had fixed the volume control and switch but made no difference to the RF problems. I next checked all of the coils for continuity, they're all ok, the five screening cans just pull off revealing the very well made tuning coils, all in very good condition.

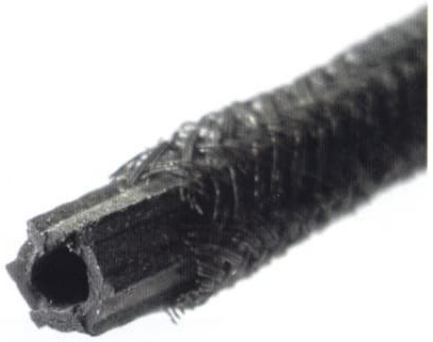
Touching the grid of the frequency changer increased the RF gain but tweaking the RF trimmers proved the aerial coils were not doing much. During this run-up the set would be very unstable and frequently lose what little sensitivity it had. Checking the voltages on the frequency changer anodes proved them very low, the pentode anode read around forty volts and the local oscillator anode only nine volts. Next I checked all the feed resistors, they were all about right, R3 5k resistor feeding the pentode anode and screened grid had had a 10k resistor added in series with it. I assumed this was a mod to accommodate the TH41 in place of the AC/TP frequency changer. The local oscillator triode anode is fed via R2 a 100k resistor, this also checked ok. When a negative bias voltage was applied to the grids (from a battery) the anode voltages returned to what I would expect so the lack of anode volts was due to high anode currents, the cathode was at about 6 volts, a little high.

There was a 0.1 capacitor added between the cathode and the screen grid of the pentode, I couldn't think of a reason for it being there but it made no difference when I removed it.

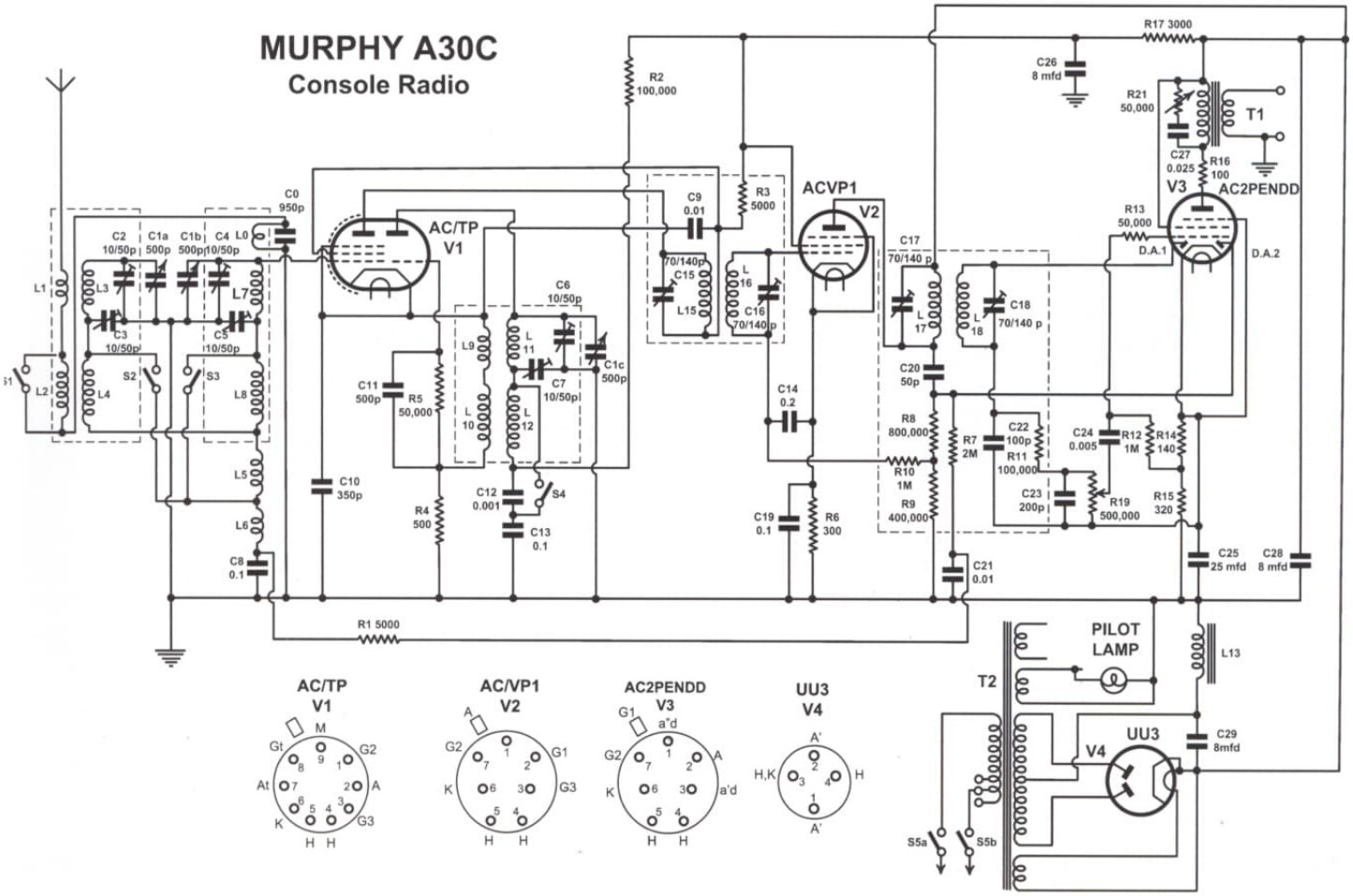
The performance and instability of this set varied every time it was switched on. I had already eliminated any electrical or mechanical intermittences, some times it would appear to work ok then misbehave. I found that touching the screen grid or cathode of the RF pentode would also increase the gain. I found this a bit strange, I assumed that the AC/TP replacement mod must have worked ok when fitted but now I doubt this.

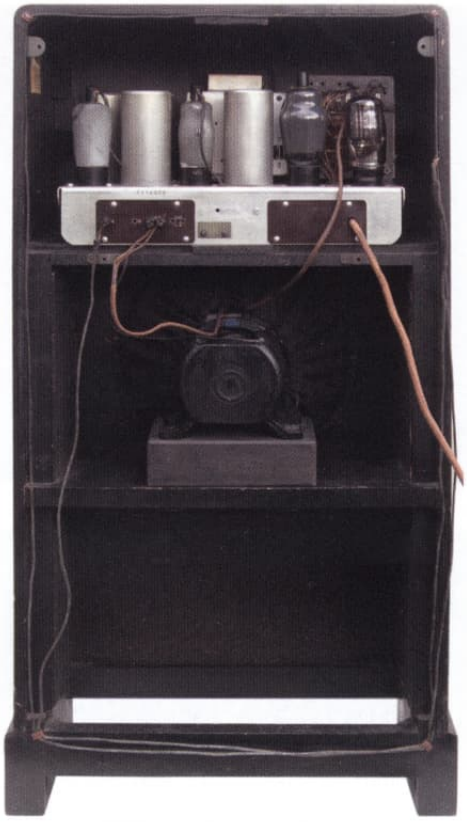
It was always my intention to replace the TH41 with an AC/TP putting the set back to original. Now was a good time, at least then I would be working from the original circuit diagram and might make better sense of it. I had two AC/TP's in stock and the choice of three sockets, I removed the MO socket and the 10k resistor in series with R3. As I was working from the circuit diagram and intended double checking the source of each wire as it was put back on its pin. The taped up wire extensions that reached the modified valve pins alone could be a good cause of instability. The connecting wires should now be the right length to reach the pins of the B9 base in the position they originally came from. The wires were reconnected one at a time starting with pin one, the source of the wire checked then any extension removed before reconnection, reconnecting the first two pins, pins 1 and 2, I feel sure that these wires the pentode anode and screen grid were reversed, identified by one extended and one not and the wrong wire had been extended, they're both the same

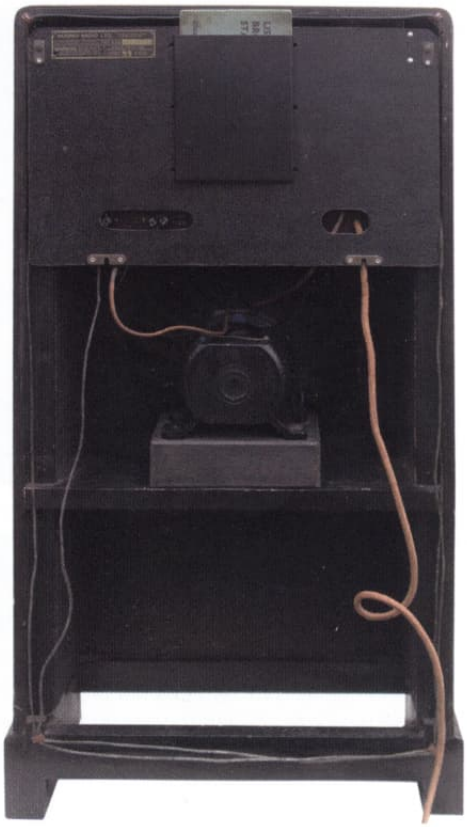
The Mains Transformer

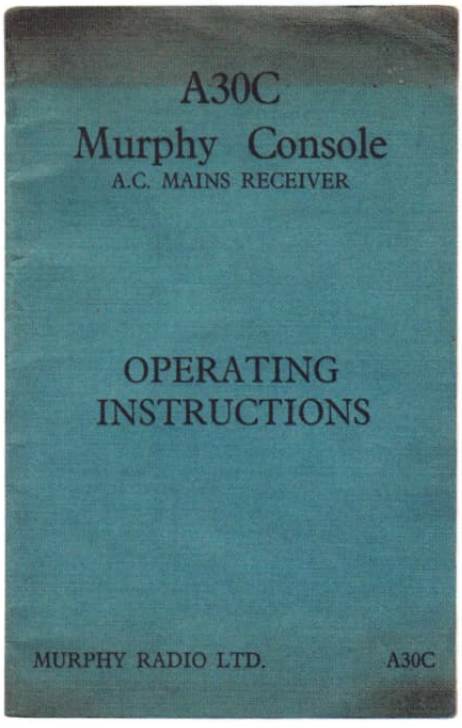


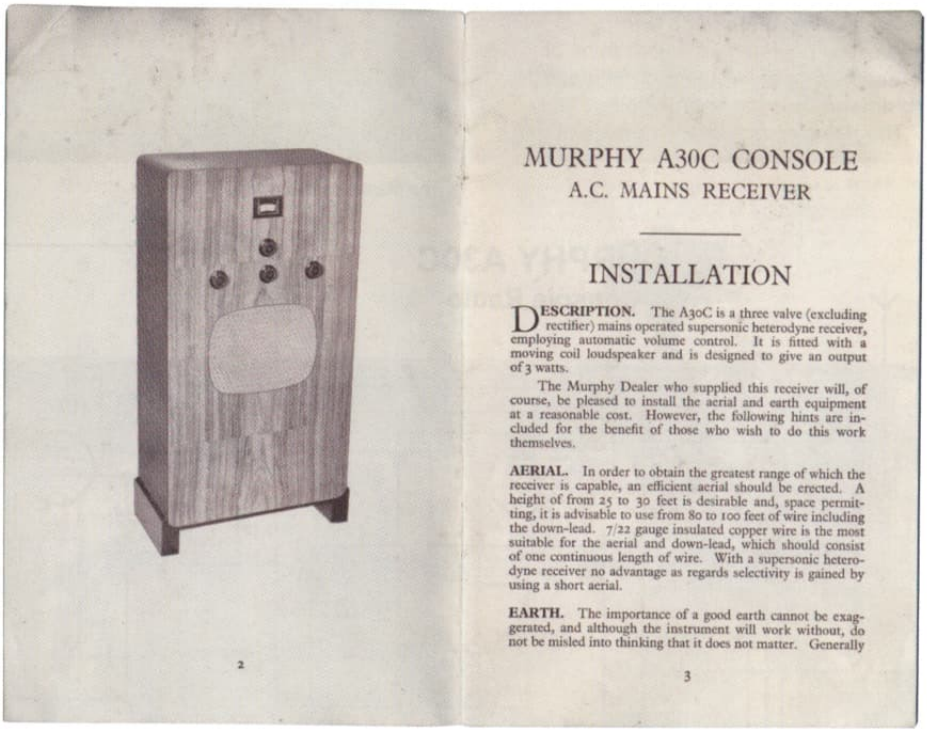
The V1 grid screened lead











MURPHY A30C CONSOLE
A.C. MAINS RECEIVER

INSTALLATION

DESCRIPTION. The A30C is a three valve (excluding rectifier) mains operated supersonic heterodyne receiver, employing automatic volume control. It is fitted with a moving coil loudspeaker and is designed to give an output of 3 watts.

The Murphy Dealer who supplied this receiver will, of course, be pleased to install the aerial and earth equipment at a reasonable cost. However, the following hints are included for the benefit of those who wish to do this work themselves.

AERIAL. In order to obtain the greatest range of which the receiver is capable, an efficient aerial should be erected. A height of from 25 to 30 feet is desirable and, space permitting, it is advisable to use from 80 to 100 feet of wire including the down-lead. 7/22 gauge insulated copper wire is the most suitable for the aerial and down-lead, which should consist of one continuous length of wire. With a supersonic heterodyne receiver no advantage as regards selectivity is gained by using a short aerial.

EARTH. The importance of a good earth cannot be exaggerated, and although the instrument will work without, do not be misled into thinking that it does not matter. Generally

2

3

type of wire, brown with a red fleck, and disappear into the same tuning can L15/16.

On power up with an AC/TP frequency changer the set came on working although a bit deaf. The voltage on the frequency changer anodes was now correct with the voltage chart on the circuit diagram. I had earlier run through an IF alignment and now ran though the RF alignment, this brought the set nearer to the expected performance. I did a complete re-alignment from square one, this improved it a bit, but still not quite what I would call lively and not what I would expect from a quality radio. This prompted a re-check of the wiring and components yet again, all ok. At this point during the re-alignment I had found the RF trimmers functional but not very peaky, I centralised all of the RF and IF trimmers and started a complete alignment again. On completion the set had further improved and was reasonably lively enough now on my 75ft garden aerial but only just about satisfactory on its indoor aerial. This is the couple of metres of insulated wire wound round the back of the cabinet, held in place with insulated staples circa 1940's and looked like it had been there from day one. The set's performance now fitted the description and performance on a short aerial as outlined in the operating instructions, as this set is only a three valve superhet perhaps I was expecting too much.

The set was re-assembled and used for a while but I was still dissatisfied with its performance. I considered it to be only working to about 80-90% of expected performance, and the original owner would not have been able to receive the European stations marked

in the hand book on the loop of wire fitted as the indoor aerial. Perhaps the set originally ran on a full aerial and the indoor aerial fitted later for convenience.

Starting afresh I decided to look at what the AGC was doing. On a 75' aerial and on a strong station the voltage on V1 cathode, generated by the AGC on the grid (reflected in V1 cathode volts) was only about 2 volts. This is half of the expected voltage as quoted in the service manual, (strong signal 0.8v no signal 4.2v) this confirmed my suspicions that the gain of this set was not reaching peak performance.

The IF stage appeared to be working ok with plenty of gain and the IF trimmers peak as expected, so the problem appears to be in the RF stage. The aerial is coupled via L1 and L2 to the band-pass tuner L3, L4, L5, L6 and C1a. L7, L8 and C1b being the V1 pentode grid tuning. The image suppressor is coupled to this circuit via L0 and C0. The low potential end of L6 is returned to chassis via C8, so that the AGC voltage applies a bias to V1 pentode grid via L5, L6, L7, and L8.

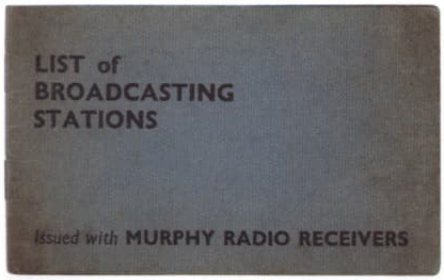
On trimming the RF tuning I had found the four RF trimmers only varied the gain of the stage without the expected usual peaks. C2 and C3 had more effect than C4 and C5, this part of the tuning circuit appeared to be "slugged" in some way. The very well built coils, surrounding components and wiring had already been checked twice and there was nothing else connected to the grid circuit of V1 pentode. This is the top-cap of the AC/TP connected to the rear section of the tuning capacitor via a length of screened lead and then on to the top of L7 in the second RF tuning can. This connecting wire being a bit on the lengthy side with a total length of about 10", with a hole in the tuning can the wire could have been shortened to about 3" or 4" and I wondered why the manufacturer didn't do this. When I did the basic restoration chores, replacing the paper capacitors and cleaning the switches and controls I also replaced the 5" length of screened lead from the tuning capacitor to the top-cap grid of V1. On removing the old very tatty and perished screened lead I had noticed it was a lot thicker than usual so it was resurrected from the bin for closer inspection. The central core insulator was about 5mm thick and found to have a "star" profile, this reducing the capacity of the screened lead. I removed the screened lead I had fitted and measured its capacity, it read 43pf, with the L7 trimmer, C4, being 10-50pf this would seriously effect its tuning. This wire is surrounded by the grounded RF coil screening cans and the metalising of V1 and V2 so I just removed the screening. This did the trick, all of the RF trimmers are still a little "soggy" but they now peak. The strong signal / no signal ratio on the AGC now matches the quoted voltages in the manual and the sets performance was now up to expectations and reasonably lively on a couple of metres of aerial, with no evidence of instability.

The final job was to give the cabinet a clean and polish. The speaker cloth had sagged and looked very tired, on a closer look I discovered it was extremely fragile, dried out and fell to pieces with a puff of dust when touched, (I don't know how it survived the journey home). This is a gold coloured cloth with a distinctive diamond pattern, I replaced the speaker cloth with some similar from stock, the diamond pattern in the weave is much bolder than the original but the colour is about right.

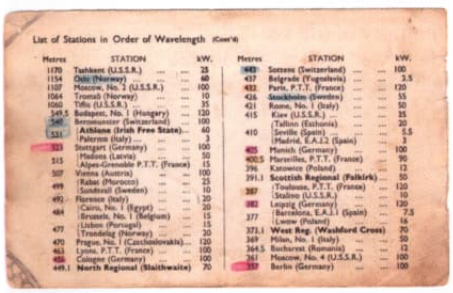
The operating instructions and list of broadcasting stations proved quite interesting, the original owner obviously a keen European listener, and had highlighted lots of stations in different colours, the German stations in red and the rest in yellow or blue. In the late 1930's and early 1940's when this set was relatively new the stations marked in red would have been under Nazi control, this being quite a window in history in itself.

I did consider leaving the frequency changer mod as this also is a piece of history, but it didn't seem to work and was the final push to put the set back to original.

Now finished I need to find it a new home. One of my friends, Graham, has an oak panelled drawing room full of art deco artefacts, not unlike the room this set originally came from. This would be an ideal setting for this set, when asked if he would like it Graham was quite keen on the idea. The set was duly installed and it fitted in to this room perfectly, all it needed was Frank Murphy in the Chesterfield armchair smoking his pipe. Graham was quite enthralled with this 1930's set with its provenance and the mellow tone from its rather large speaker and frequently demonstrates it to his friends, a perfect end to an interesting restoration.

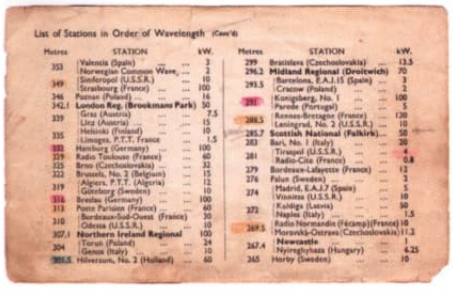

LIST of
BROADCASTING
STATIONS

Issued with **MURPHY RADIO RECEIVERS**


List of Stations in Order of Wavelength (Cont'd)

Metres	STATION	kW.
1170	Tashkent (U.S.S.R.)	25
1154	Oslo (Norway)	60
1107	Moscow, No. 2 (U.S.S.R.)	100
1064	Tromsö (Norway)	10
1060	Tiflis (U.S.S.R.)	35
549.5	Budapest, No. 1 (Hungary)	120
540	Beromunster (Switzerland)	100
531	Athlone (Irish Free State)	60
	Palermo (Italy)	3
523	Stuttgart (Germany)	100
	Madona (Latvia)	50
515	Alpes-Grenoble P.T.T. (France)	15
507	Vienna (Austria)	100
499	Rabat (Morocco)	25
	Sundsvall (Sweden)	10
492	Florence (Italy)	20
484	Cairo, No. 1 (Egypt)	20
	Brussels, No. 1 (Belgium)	15
	Lisbon (Portugal)	15
477	Trondelag (Norway)	20
470	Prague, No. 1 (Czechoslovakia)	120
463	Lyons, P.T.T. (France)	100
458	Cologne (Germany)	100
449.1	North Regional (Slaithwaite)	70

Metres	STATION	kW.
443	Sottens (Switzerland)	100
437	Belgrade (Yugoslavia)	3.5
432	Paris, P.T.T. (France)	120
426	Stockholm (Sweden)	55
421	Rome, No. 1 (Italy)	50
415	Kiev (U.S.S.R.)	35
	Tallinn (Estonia)	20
410	Seville (Spain)	1.5
	Madrid, E.A.J.2 (Spain)	3
405	Munich (Germany)	100
400.5	Marseilles, P.T.T. (France)	90
396	Katowice (Poland)	12
391.3	Scottish Regional (Falkirk)	50
	Toulouse, P.T.T. (France)	120
387	Stalino (U.S.S.R.)	10
382	Leipzig (Germany)	120
	Barcelona, E.A.J.1 (Spain)	7.5
377	Lwow (Poland)	16
373.1	West Reg. (Washford Cross)	70
369	Milan, No. 1 (Italy)	50
364.5	Bucharest (Roumania)	12
361	Moscow, No. 4 (U.S.S.R.)	100
357	Berlin (Germany)	100


List of Stations in Order of Wavelength (Cont'd)

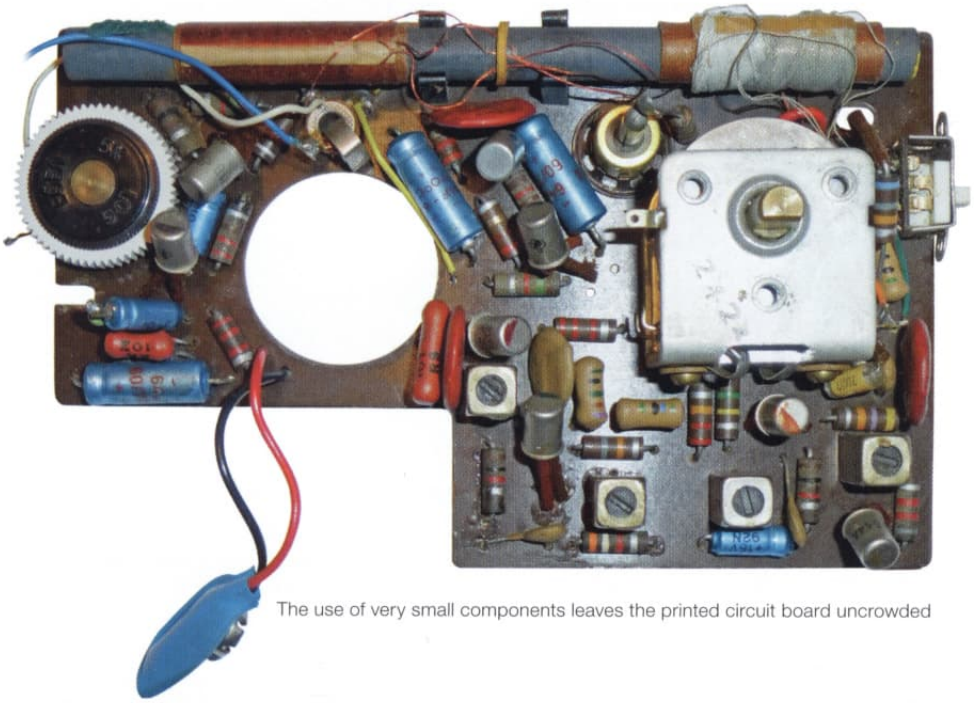
Metres	STATION	kW.
353	Valencia (Spain)	3
	Norwegian Coastal Wave	2
349	Sverdlovsk (U.S.S.R.)	10
	Strasbourg (France)	100
346	Poznan (Poland)	16
342.1	London Reg. (Brookmans Park)	50
339	Graz (Austria)	7.5
	Linz (Austria)	15
335	Helsinki (Finland)	10
	Limoges, P.T.T. France	1.5
332	Hamburg (Germany)	100
329	Radio Toulouse (France)	60
325	Brno (Czechoslovakia)	32
322	Brussels, No. 2 (Belgium)	15
	Algiers, P.T.T. (Algeria)	12
319	Göteborg (Sweden)	10
316	Breslau (Germany)	100
313	Poste Parisien (France)	60
310	Bordeaux-Sud-Ouest (France)	30
	Odessa (U.S.S.R.)	10
307.1	Northern Ireland Regional	100
304	Torun (Poland)	24
	Genoa (Italy)	10
301.5	Hilversum, No. 2 (Holland)	60

Metres	STATION	kW.
299	Bratislava (Czechoslovakia)	13.5
296.2	Midland Regional (Droitwich)	70
293.5	Barcelona, E.A.J.15 (Spain)	3
	Cracow (Poland)	2
291	Konigsberg, No. 1	100
	Parede (Portugal)	5
288.5	Rennes-Bretagne (France)	120
	Leningrad, No. 2 (U.S.S.R.)	10
285.7	Scottish National (Falkirk)	50
283	Bari, No. 1 (Italy)	20
281	Tiraspol (U.S.S.R.)	4
	Radio-Cite (France)	0.8
279	Bordeaux-Lafayette (France)	12
276	Falun (Sweden)	3
274	Madrid, E.A.J.7 (Spain)	5
	Vinnitsa (U.S.S.R.)	10
272	Kaldiga (Latvia)	50
	Naples (Italy)	1.5
269.5	Radio Normandie (Fécamp)(France)	10
	Moravska-Ostrava (Czechoslovakia)	11.2
267.4	Newcastle	1
	Nyiregyhaza (Hungary)	4.25
265	Horby (Sweden)	10

The KB UP11 'Cadet' transistor portable

by Henry Irwin

1962 was a year which saw British manufacturers offering perhaps their widest choice of new transistor models. It was also the year when the influx of imported radios reached a level which signalled the end of the "seller's market" for UK producers and the year that KB released this little radio.

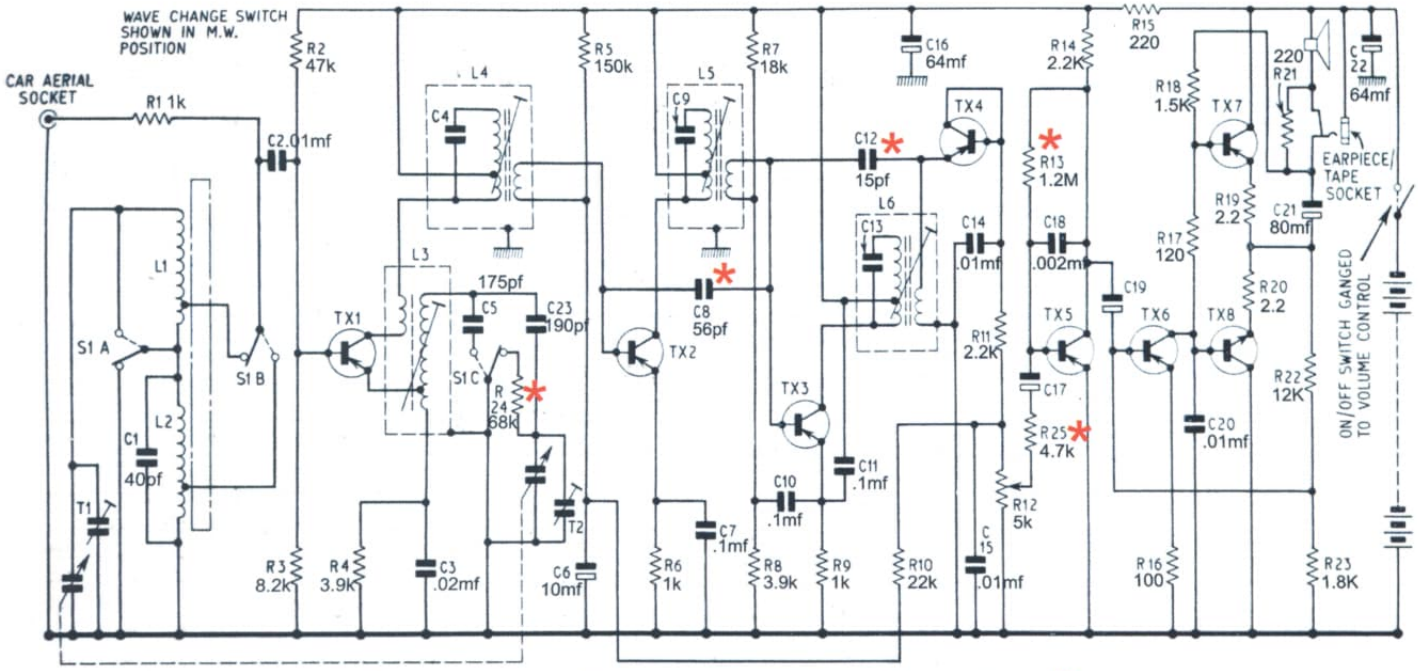


The use of very small components leaves the printed circuit board uncrowded

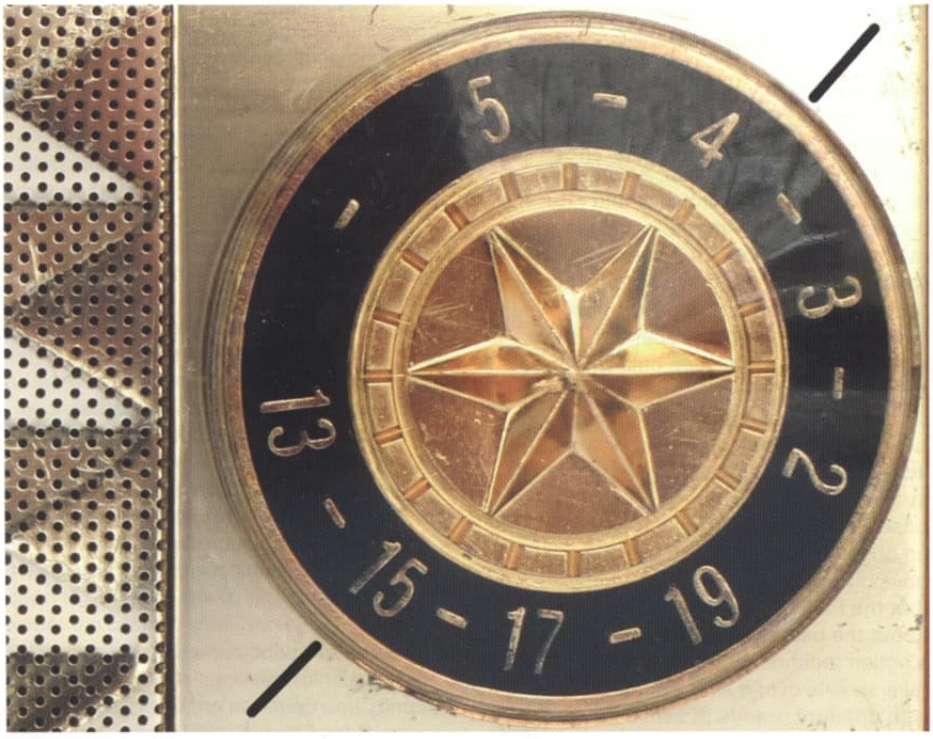
By the early sixties these small personal radios were the thing to have. The Pye 160 BQ was the first transistor I ever handled but the KB Cadet was the first radio that I actually owned. My father bought one for me as a present and early in 1963, tuned into Alan Freeman's Pick of The Pops on Sunday afternoon, I first heard the Beatles on it. I remember also learning the vagaries of medium wave propagation waiting for Radio Luxemburg to rise up out of the noise at the approach of sunset. So, when I spotted a Cadet at Harpenden several years ago in reasonable condition I had to buy it.

The Cadet is not a common model but the market it competed in was that occupied by the Pye 191 BQ and the Perdio Super 7 etc., i.e. small leather (real or imitation) clad sets with a handle that would fit into a coat pocket. The UP11 is in fact clad in vinyl faux leather stitched to a thick card case with a hardboard stiffener at the front. The styling is, I think, quite attractive. The grille catches the light with its faceted diamond pattern while the translucent dial is reverse painted in black and reflective gold against a matt gold anodised backplate. A reverse painted Perspex strip carrying the radio's name runs along the bottom and unites these three elements. It is quite small at 140.5 x 90 x 40mm and sold for £14-14-0p inclusive.

Despite the front nameplate proudly proclaiming eight transistors this is a bit of marketing 'one-upmanship'. It is in fact a seven transistor superhet with the eighth transistor wired as a diode. The case pivots open from behind to reveal the printed side of the circuit and a gap for a cylindrical PP4 9v battery. These were used by only a few other manufacturers and were quickly rendered obsolete. My memory of the set is that it performed quite well with a reasonable quality of sound from such a small case, better than the smaller vest pocket sets that were becoming popular, and pulled in a lot of stations. I also remember that it seemed to go through PP4's quickly, the rattling onset of crossover distortion signalling the need for a replacement every few weeks. So, batteries apart, I was satisfied with its performance but less so with its construction. I soon had it out of its case and discovered why the tuning dial had a habit of rubbing against the backplate at certain points of its rotation. The circuit board was secured at only two points on flimsy plastic stand offs which allowed it to flex as the dial was moved. This could have been remedied by a third standoff just below the tuning capacitor.



CIRCUIT DIAGRAM—KOLSTER BRANDES "CADET" MODEL UP11 * Value varies with transistor type



Datum lines for LW and MW scale

Circuit

The circuit diagram shows how the seven transistors are utilized, that extra device providing additional audio amplification. In fact the KB Cadet was one of the first to use the new transformerless complementary symmetry output configuration. The driver transistor, TX6, is direct coupled to a matched PNP/NPN pair, TX7 & TX8, which conduct on alternate half cycles of the signal, the junction of their emitters going via an 80mf capacitor to a high impedance speaker. DC bias and AC feedback for TX6 comes from a potential divider across the output. TX5 acts as an audio preamp. On the RF side things look much more conventional with alloy junction transistors rather than the new diffused base, AF117 Mullard devices that were coming into use. In fact the circuit sheet states that sets of either Mullard, STC, GEC or Texas devices may be used. My old teenage Cadet had a complete set of Texas Instruments transistors as had the radio I picked up at Harpenden but with one exception. Its line-up is, 2G344, 2G345, 2G345, 2G371, 2G371, 2G381 and AC127

Close-up of tiny IF transformers and Texas transistors

Replacement speaker with series resistor wired direct

(npn) which should be a Texas 2G339! KB, unlike some manufacturers, were not wedded to one brand of semiconductor. In fact with the use of the new diffused base RF transistors becoming the norm, KB were obviously shopping around different suppliers for the best package deal on these older alloy junction devices.

Work required

The little radio from Harpenden, apart from the usual scuffs and a few dents, was actually quite clean when I got it home. That profiled grille as well as attracting the light was also a magnet for damage and the plating had rubbed off at a few edges. However it wasn't too bad for its age and fragility and as most of the stitching had survived, I decided to leave all these minor defects as a record of its history and only treated the case to a judicious application of foam cleaner. Originally the Cadet had two black datum lines on the backplate for the tuning dial scales and these had worn off. I decided not to attempt to replicate these but I have inserted them digitally on one of the photos to show how they would have looked when new.

I replaced the original connectors so that a PP3 battery could be fitted but the result was a completely dead radio so it was put to one side for some time as a mute visual reminder of my youth. Much later, when I eventually got around to testing it, I discovered that not even a slight hiss could be heard from the speaker so when a meter test proved that power was being applied to all parts of the circuit and the local oscillator could be picked up on another radio, it seemed that the problem was in the audio stages. The prospect of having to replace transistors in a complementary output stage wasn't something I was looking forward to. I keep a stock of OC81's etc. which I have removed as matched pairs from other scrap radios and these are taped together in the spares box. You can of course match the gains yourself using a tester but my approach is easier. Also, matching the gains of a pnp and an npn device is more problematical and anyway I didn't have any germanium npn devices at the time. Further systematic probing of voltages around the output transistors showed things to be pretty much in order which indicates that you shouldn't jump to conclusions! In this case the important point, where the emitters of the npn/pnp pair are coupled to the speaker via a capacitor, was correct at approximately half the supply voltage. To paraphrase Mr Holmes, when the obvious has been eliminated it must be the speaker! Sure enough the 35 ohm Celestion speaker was open circuit.

The small circuit board is a bit of a nuisance to remove from the case. Quoting KB's instructions, "Prise open sides of case and withdraw chassis". This is easier said than done as the edge mounted volume control and wavechange switches are reluctant to let go of the vinyl covered cardboard case. The speaker is attached to the circuit board by short leads so this is another pitfall. It's not the first time I have had a high impedance speaker (25 ohms or more) go open circuit so these voice coils with more turns or thinner wire must be more vulnerable. All I had as a replacement was an 8 ohm 3 inch unit. The more modern unit fits well but has a smaller magnet so that it doesn't protrude through the hole in the printed circuit. More importantly it needed to be padded with a series resistor of 27 ohms which I wired directly to one terminal and flush to the speaker to prevent shorts when the circuit was reinserted. This now lets the amplifier see an impedance of around 35 ohms. Capacitor coupled complimentary output stages like this will develop more power into lower impedance loads but this will lead to extra distortion and ultimately overheating of the output transistors.

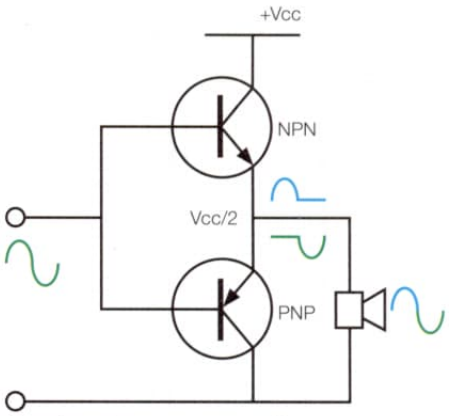
Before the circuit board went back into the case I took the opportunity to glue down some of the vinyl edges on the inside as these had caught on the board on the way out. I then checked the alignment and put the printed circuit back in but not before I added extra washers under one standoff to straighten the tuning dial and prevent it rubbing against the backplate.

Performance

I thought the Cadet performed well for a small radio back in the day but memory can be deceptive. Assessing its performance currently I would rate its audio as clear with reasonable lower mid but a bit bright . That of course has to take account that this isn't the original speaker and the output, despite the series resistor, isn't seeing a proper inductive load with the 8 ohm voice coil. On the RF side, the selectivity is good and the sensitivity, while not up with the very best, is also good, in fact better than would be expected from a design with no special antenna winding and no diffused base RF transistors. This brings me to an observation which is subjective and possibly contentious. It is often stated that the Phillips/Mullard OC44 & 45 were about the best available in the old alloyed junction technology. From working with diverse sets over a long period of time with different brands of semiconductor I would be inclined to say that Texas & GEC devices appear to give in practice better gain and lower noise than the Mullard equivalent and certainly those from STC. Despite what the data books say (15mhz ft* for both OC44 & GET843 and 12mhz for 2G344) this doesn't tell the whole story.

Complementary symmetry outputs

The elimination of audio transformers in transistor radios began in the late 1950's firstly with the output transformer. By using a specially designed phase splitting transformer two pnp output transistors could be connected directly to a high impedance speaker via a large value capacitor. However theoretically, by using output devices of opposing polarity wired with their emitters connected to the load, it was also possible to eliminate



Complementary symmetry waveforms

the phase splitter driving transformer. The first patent for a circuit using both pnp and npn devices was filed by Thomas Stanley of RCA as far back as 1954. However commercial realisation of a Complementary Symmetry circuit had to await the widespread availability of suitable npn transistors in the early 1960's. Mullard published some basic designs which were widely copied.

The advantages were reduced component count in small radios, the elimination of expensive wound components and in the bigger sets improved bass performance, speaker willing! This was pretty much the last development in audio output circuits until the widespread introduction of integrated circuits into radios although the IC's themselves invariably used complementary outputs. Strangely some manufacturers, especially in the Far East, were reluctant to depart from the audio transformer approach right up until the late 60's.

In summary an uncommon and interesting little radio that for me has personal sentimental value. Exact values of certain components were varied for models with different transistors and anyone who owns a set with Mullard , STC or GEC transistors might be interested to make a comparison.

Note*

"ft" is the frequency at which the AC current gain of the transistor falls to unity in a common emitter circuit (quoted from Texas Instruments, Bedford UK.). Manufacturer's data is often unreliable on this parameter.

In the UK Texas Inst. used the coding 2G for their consumer germanium devices, a quaint modification of the American 2N prefix. It is not known if their germanium alloy technology differed from the American parent company.

Letters

Dear Editor,

I enjoyed reading Steff Niewiadomski's article about the Arvin 444 US Midget in the Summer Bulletin. When working with vintage sets we should always remember that safety standards were often much lower when the set was built and some sets have particular hazards. This set is a good example. Not everyone is familiar with the technique of creating a separate HT –ve line for AC/DC sets. This method has significant safety issues which were not fully addressed in the article. With US 110V mains the problems are serious but in the UK with 230V mains even more so. The HT -ve line, the chassis, and in this case the cabinet, are connected via an RF capacitor and shunt resistor, which apart from "prevent(ing) a possible build up of charge" ensure that the capacitor is not left charged when the set is unplugged without switching off. This could be "Ouch!" if the mains connector is grabbed whilst holding metalwork.

It is actually a common technique and I have several US radios that use it. Unfortunately, there are safety aspects that are not emphasised. Looking at the schematic C18 is an important component as it isolates the tuning gang, and other RF components from the HT-ve line which could be at live mains potential. There is a need to inspect the tuning gang insulation, this sometimes being rubber grommets that are now perished, otherwise this capacitor is bypassed and safety lost. For me, just in case, I would also ensure that the gang spindle does not foul the hole in the front panel and the knob grub screw is sub-flush in the knob. It can be wax–filled if you are really cautious after work has been completed.

It might be considered that this would be sufficient but it isn't. The shunt resistor, R26 at 330K in this case, should be disconnected and the insulation measured between the metal work and the HT –ve line. I actually do this first and had one surprise where the insulation at a few hundred volts was down to 50K Ohm due to silver migration across the ceramic valve bases.

Of course the RF capacitor (C9) may be bad but in any case it is wise to change it to a Y type cap (if you are pedantic this would also include C18). I haven't gone through the relevant regulations myself but read this on a Forum thread:

"If failure of a capacitor can expose a person to hazardous voltages then it must be a class Y part. Such uses include between earth and live or neutral."

From this it might make one think that it is OK to connect the chassis / cabinet to earth but it isn't as Utility companies don't like components connected between the supply and earth. The safest solution for UK use is a double wound isolating transformer to step down our 230V to 110V. However, auto-transformers are much more commonly used, as they are cheaper, and here the 230V neutral or live will connect directly to the HT –ve line so the need to ensure high insulation between it and the metalwork remains.

Out of interest if the "strange … resistor" had been taken apart it would have been resistance wire, on the ones I have looked into, wound over asbestos coated string (take precautions).

Gary Tempest

Dear Editor,

I must congratulate you and all involved on the consistent quality of the images in the feature articles of the Bulletin.

I, as an editor and webmaster, can well appreciate the effort involved getting suitable images with correct focus and lighting and then massaging and tracing out the images for insertion into the document printing.
WELL DONE!

Philip Johnstone

British Vintage Wireless Society
Statement of accounts- year to 31st December 2014

		Year ended 31st December 2014		Year ended 31st December 2013
Receipts				
Subscriptions (net)		40539		42620
BVWATM friends group subscriptions (net)		-1757		-1190
Sale of publications		1039		2497
Capacitor sales		4405		4561
Deoxit sales		679		857
Meetings		2861		3136
Estate sales receipts		51138		47535
Valveman DVD sales		70		69
Donations		36		252
Bank interest		5		3
NVCF profit/(loss)		-250		-482
Total receipts		98765		99858
Payments				
General expenses	11474		12289	
Stationery	1883		2286	
Storage facilities	2520		2520	
Postage (net)	2968		9638	
Meetings	2822		1840	
Bulletin costs including postage	28905		23920	
Estate sales payments	53960		43721	
Capacitor costs	461		1815	
Deoxit purchases	549		983	
Valveman DVD sale proceeds transferred to BVWATM	230			
Other publication costs	639		558	
Total payments		106411		99570
Surplus for the period		-7646		288
Total assets at beginning of period		26098		25810
Total assets at end of period		18452		26098
Assets				
HSBC current account		8979		16380
HSBC deposit account		2226		2221
NVCF assets (held for the benefit of the B.V.W & T.V museum)		7247		7497
Total assets		18452		26098

At 31st December 2014 £926 (2013 £936) was owed by the BVWS to the authors of various publications that the BVWS sell on behalf of these authors and £1192 (2013 nil) was owed to the beneficiaries of estate sales. These liabilities are not recognised in the accounts.
The accounts of the Society reflect the receipts and payments on a cash basis and do not reflect any prepaid or accrued income and expenditure. As an unicorporated club, all surplus is passed to members by way of bulletins, suppliments and events. At the same time a prudent asset balance is maintained in order to provide for the unexpected.

.....
Treasurer

AUDITORS REPORT TO THE MEMBERS OF THE
BRITISH VINTAGE WIRELESS SOCIETY

We have examined the above Accounts and the attached Accounts of the National Vintage Communications fair for the year ended 31st Decemebr 2014 together with the accounting records and supporting documents and vouchers and confirm the same to be in accordance therewith.

Anstey House
43 Stennels Close
Coventry CV6 2JG

MAAT
10/6/15
Hodgekins Accountancy

Minutes of the BVWS Committee meeting held at Pound Cottage, Coate, Devizes SN10 3LG. at 7.00 pm on Friday 24th April 2015.

Present: Mike Barker (chair), Martyn Bennett (MB2), Jeremy Day (JD), Greg Hewitt (GH), Paul Stenning (PS), Lorne Clark (LC), Guy Peskett (GP), Terry Martini-Yates (TMY) via speaker phone.

1. Apologies for absence: Jon Evans, Ian Higginbottom, Carl Glover.

2. The minutes of the meeting held on Friday 27th June 2014 were accepted as a true record after apologies for absence by Jeremy Day mistakenly omitted were added.

3. The Chairman announced that he would need to shed some of the tasks that had fallen onto his shoulders and accumulated over the years if his work load was to be sustainable in the long term. The Committee expressed wholehearted agreement with this, being well aware of the exceptional contribution made by the Chairman. As a start the Bulletin proof reading team would now become Jeremy Day and Steve Sidaway beginning with the Summer issue 2015 and the Chairman would withdraw from the team after this issue. The task of arranging Committee meetings will be taken on by the Secretary.

4. The Treasurer tabled three papers; draft accounts for the Society and the NVCF and an explanatory note. As requested at a previous meeting of the Committee he had increased the number of headings and provided more detail. This greater transparency was welcomed. He reported also that he had changed accountants to the firm that looks after his own business, not because the previous ones had been unsatisfactory, but for convenience. The Treasurer also reported on negotiations with the WEC for hall hire for the NVCF. The agreements reached were that (i) the hire charge for the 2015 fair would be the same as for the 2014 fair and (ii) the 2016, 2017, 2018, and 2019 fairs would see an annual increase of 2% + VAT. He also reported that he had negotiated new public liability insurance cover. Previously separate agreements were in force for our Society meetings and for the NVCF for a total fee of £847 for two million pounds of cover. The new combined deal is for £5 million of cover for a fee of £499. The Committee congratulated the Treasurer on these outcomes.

5. The Membership Secretary reported that on the day of the meeting the paid up membership stood at 1174. His projection of the year end membership was 1200 based on previous renewal patterns. He reminded the meeting that previous year end figures had been 1350 in 2012, 1324 in 2013, and 1257 in 2014 showing a clear trend.
A minor contributor to the decline is that holders of three year memberships do not realise their membership has lapsed. This might be alleviated by having distinctly different forms for the two classes of membership and this will be tried. Non renewals will be followed up by MB2.
Action: Chairman and Membership Secretary

6. The Bulletin Editor had sent the rather striking cover for the Summer issue (a valve display) to the Chairman and this was tabled to general satisfaction. A pdf of the issue was also tabled. With the Society accounts included only half a page remained to be filled.
Action: Editor

7. The Chairman gave his assessment of trends in what was now considered to be "vintage" and suggested that interest in the 1950s, 60s, and 70s equipment was growing. He also warned that concentrating only on our traditional areas such as the 20s and 30s might be cutting us off from potential new members with these more recent interests. He urged that our publications of all forms begin to highlight this more modern hardware.
Action: All

8. The Chairman reported to the Committee on the history and negotiations leading up to the formation of the BVWaTM as a charity and the establishment of the Trust. The lease on the house in Rosendale Road was protected for 15 years.

9. The Chairman reported that an event celebrating the life and achievements of Gerry Wells was to be held at the Museum on Saturday June 6th, the day the garden party would have been held in happier times. He had already selected material for a DVD that would make up a more permanent tribute to Gerry and Jon Evans was set to produce it. After discussion it was agreed that the Society would fund an initial batch that could be used as the Christmas DVD this year. After the end of the year additional copies would be donated to the Museum for sale to visitors. It was also agreed to establish an annual award in Gerry's name, possibly a reinstatement of the replica construction contest held in the early days of the Society.
Action: JE

10. The webmaster, PS, announced that his employment would be changing around June 1st and that his server hosting the BVWS website would be shutting down. The society needs to decide what to do about this given that his new contract may contain restrictions on 'out of hours' working. He assured the meeting that nothing was at immediate risk. The situation will be clarified by June 1st.

11. JE remarked that it is important we keep the facebook and YouTube pages active. This year GH's son and a friend will video the NVCF from loading in to breakdown and upload it to YouTube. (The Committee has already been impressed with a video of a previous meeting.) GH agreed to keep the forthcoming events page on facebook up to date.
Action: GH

12. The Chairman reminded the meeting that the garage in the house occupied by Rob Chapple in Swindon contained much new archive material. This needs to be assessed.
Action: archivist

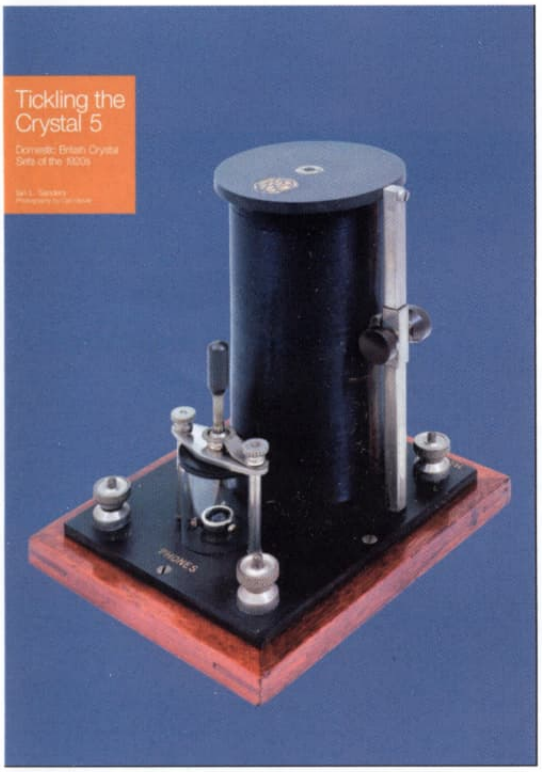
13. The Chairman initiated a discussion on celebrating the 40th anniversary of the Society in 2016. He proposed that the main event be a display at the NVCF recording the history of the Society. Material from Jonathan Hills archive and from Robert Hawes historical records would be important sources. It may also be possible to upload a recording of the 1996 celebration. The year may also feature a high quality auction. Other suggestions were sought from the Committee members and should report these back at the next meeting.

Action: All
14. AOB
(i) The Society will take a stall at an event at the Cinema Museum, a new venue for us.
(ii) MB(2) remarked that Norway were about to switch off VHF broadcasting.
(iii) The Chairman tabled a letter regarding some items from the estate of the late Robert Hawes. These items were being returned for the Society Archive. It was noted that this was quite a big job as much sorting was required. TMY commented on the storage of items at Manor Rd. from a visit once made many years ago.
(iiii) The Chairman described some new 'Flag' styled banners being made for the Society. These will be used at various events instead of, or to complement the normal large vinyl BVWS banner.

Next meeting will be Friday 7th August – venue to be arranged by Guy.

The meeting closed at 10.35pm.

BVWS Books



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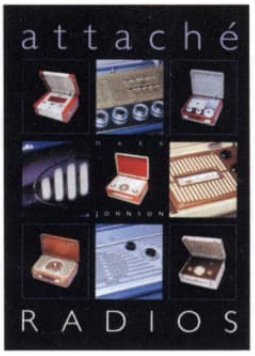

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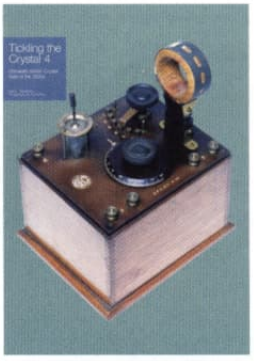

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BVWS Books

The Bulletin back issues

All Bulletins and supplements are priced at £4.00 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'.

Mike Barker, Pound Cottage,
Coate, Devizes, Wiltshire, SN10 3LG
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Events Diary

2015 Meetings

September 27th Harpenden
October 4th AudioJumble
November 1st Golborne
December 6th Royal Wootton Bassett

2016 Meetings

February 21st Audiojumble
March 6th Harpenden (Auction & AGM)
April 10th Golborne
May 15th NVCF
June 4th Garden Party at BVWATM
June 5th Cinema Museum London
July 3rd Royal Wootton Bassett
August 14th Punnetts Town
Sept 11th Murphy Day (to be confirmed)
Sept 25th Harpenden
October 2nd Audiojumble
November 6th Golborne
December 4th Royal Wootton Bassett

GPO 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.

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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 9:30, tickets for sale from 09:00, Auction at 13:00. 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
Royal Wootton Bassett: The Memorial Hall, Station Rd. Wootton Bassett. Nr. Swindon (J16/M4). Doors open 10:00. Contact Mike Barker, 01380 860787
Golborne: Golborne: Golborne Parkside Sports & Community Club. Rivington Avenue, Golborne, Warrington. WA3 3HG
contact Mark Ryding 07861 234364
Punnetts Town: Punnetts Town Village Hall, Heathfield, East Sussex TN21 9DS (opposite school)
Contact John Howes 01435 830736
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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