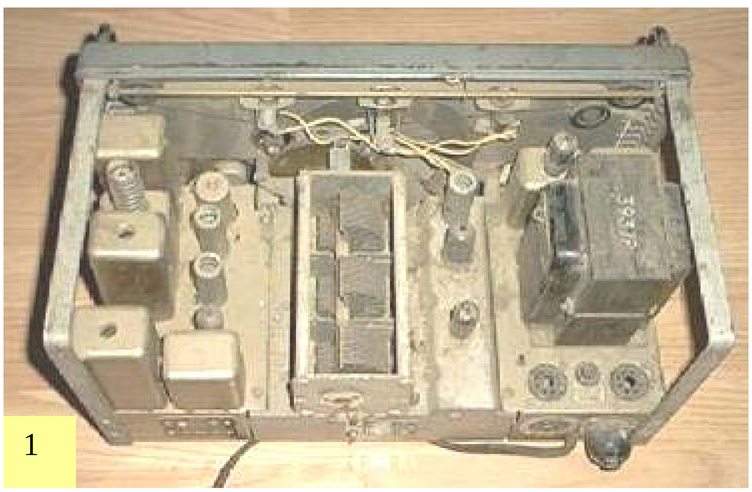
Restoration of an Eddystone S.750 – by Gerry O'Hara, G8GUH

An Eddystone Milestone (or was that Miles of Eddystone?)

Since re-kindling my interest in Eddystone radios, in particular their post-WWII valve sets, I have been keenly studying the history of the company, product lines and all related ephemera: the EUG site has been invaluable in this regard. During my 'studies', I concluded that the development and introduction of the Eddystone S.750 in late 1949 marked a milestone in receiver design for the company, both electronically and cosmetically. It was Eddystone's first double-conversion superhet and was the first set with the distinctive and trademark 'sliderule dial' that lasted for over 30 years in one form or another (the last sets to sport this feature were the solid state 990 series produced into the 1980's). I therefore decided that I must somehow try to acquire one of the 2054 number S.750's that were made – not that easy out here in British Columbia I feared. Other classic sets I am constantly on the look out for are the S.640, S.680X, S.730 and S.888 – though it could be a while before I have my dream 'set of sets'…

EBay and all that…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During the restoration of my S.770R, I entered into correspondence with Mike Cassidy in the UK, who was restoring an S.770UMkII (see various emails posted on the EUG Forum). One day he noted that he had spotted an S.750 for sale here in British Columbia (Winfield in the Okanagan area, about 5 hours drive inland from where I live), reportedly in very poor condition, less its outer case, and suitable only as a 'parts set'. Aghast at having missed this in my 'web-trawling' for Eddystone items, I was right on the case, found the said item and checked it out. Photos 1 and 2 show how the radio looked on the EBay listing: not such a pretty sight, but all the main bits seemed present and the seller's description "*Eddystone S750 from an estate. This unit is for parts. No outer cover. I did not power it up, as the rectifier tubes were not in it. All other tubes are there. No smell or mess that would suggest there is anything wrong with the transformers. This is definitely an "as is" for donor parts. We live in a very dry climate so there is very minimal rust/corrosion*" was enough for me to decide I would 'go for it' as a restoration candidate. I thought I was doing well at ~$40 or so with less than a day to go and no other apparent interest (apart from a few watchers) and then another bidder entered the fray: I ended up paying a trifle more in the end, at ~$121, but as the set was 'local', the shipping was only ~$20, so I was still pleased at 'winning' the auction (it turns out that I actually knew the other bidder but did not know at the time – but that's another story – see Postscript).

So, once again, I thought the story of restoring this classic Eddystone radio to its former glory might be of some interest to EUG folks. As previously, I have kept the description in brief ‘bullet’ form as I find this is easier for folks to digest and have added plenty of photos to help visualize the process. In particular, I have included a very detailed description and several photos of the disassembly/reassembly of the front panel/drive mechanism, plus some tips on this process, such that I hope that it will assist others in tackling what could be a rather daunting task with those niggling questions in the back of your mind as to whether it will all go back together?, will it ever work again? and what on earth the left-over parts were needed for once the thing is re-assembled?...(!)

Preliminary Inspection and Basic Preparation

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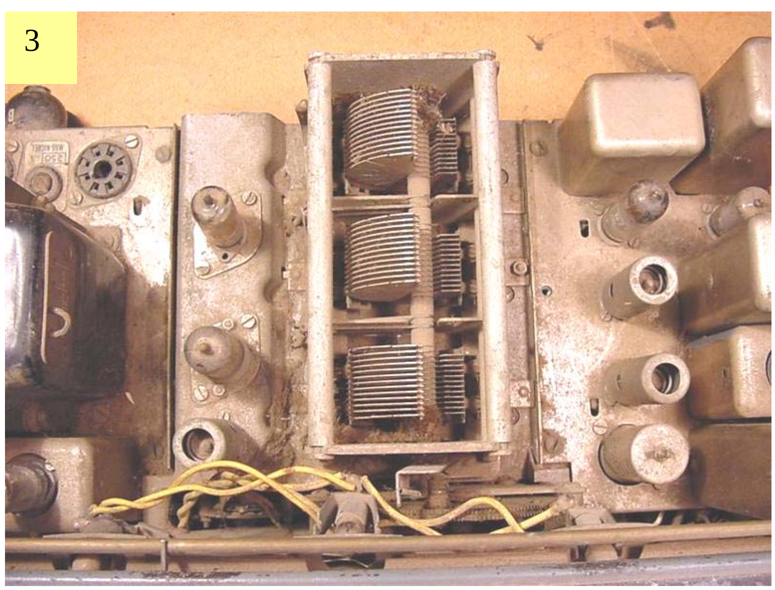
On arrival (very promptly may I add to the seller’s credit), the radio had been well packed in bubble-wrap and a stout cardboard box and had traveled well, apart from the N78 output valve having come loose in the box and with badly bent pins. However, the radio actually looked worse ‘in the flesh’ than on the EBay listing (photos 3, 4 and 6), though a preliminary inspection revealed that with the exception of the rectifier and stabilizer valves (and obviously the case) all the main bits were indeed present and, apart from a dented ‘inner handle’ (the metal bars that wrap around from one front chrome-plated grab handle bolt to the other), possibly indicating it had been dropped or hit at some point in its 56 year history, no obvious mechanical damage (note: I have now concluded that ‘dropping Eddystones’ must be a world sport of some kind, with the contestants either simply curious as to what happens when +40lbs of British metal, glass and electronics hits the ground and/or whether the Eddystone reputation for robustness will stay intact even when hit by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a baseball bat). Worse, it was obvious that a former owner had sprayed the front panel a medium-grey colour (the original black crackle showing through in parts) and, unfortunately, had done this with the front panel still on the receiver with a minimal amount of masking: consequently most of the innards of the radio had been sprayed as well – wiring looms, chassis parts, front of the mains transformer, parts of the IF cans, resistors, capacitors etc, even the top of the trimmers in the coil box – what a mess! On closer inspection, I noticed that one of the dial bulb holders was an incorrect type (screw base) that had been 'encouraged' to fit with plenty of insulation tape and some 'hockey tape' for good measure (this being Canada, what else?), and it looked like it had shorted out to chassis a few times. The tuning mechanism, rather than having that silky smooth Eddystone feel, was almost totally stuck, and when it was turned (forced), I noticed that the tuning gang was not moving. Examination revealed that this was due to the 'ratio arm' mechanism being missing. This should comprise two small springs attached to a crank on the end of the tuning gang, holding a spring-wire loop in place that retains the crank against a small 'boss' located eccentrically on one of the tuning mechanism gears (photos 6 and 21). However, peering into the grime very closely in this area of the chassis revealed that the spring-wire loop was laying on the chassis, retained by fluff and dead spiders, but only one spring was found to be still affixed to the tuning capacitor crank arm. The ratio arm is a clever little device that 'linearizes' the otherwise non-linear readout on the sliderule dial – the ratio arm was one of Bill Cooke's pet inventions, and rightly so – simple yet very effective (page 12 of 'The Cooke Report' on the EUG site).


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The serial number of the set (photo 5), GB0355, indicated that the set was either made in July, 1950, according to my interpretation of the serial number information on Alan Clayton's Eddystone website (www.qsl.net/eddystone, though this site is currently down and under revision), or February, 1955, according to the EUG Quick Reference Guide (QRG), page 26 (always assuming the letters were stamped the correct way around in the first place! – apparently not always the case). I suspect it was the earlier of these two possible dates and my set was probably from one of the first S.750 production runs at the Bath Tub. This conclusion is supported by a date of 'Nov. 1947' on the electrolytic capacitor cans as I would doubt that Eddystone were using eight year old stock? Also, C85 is present across the output transformer primary - noted to be so only on early models by Ted Moore in 'Lighthouse' - and there was no sign of the set having ever sported a cover over the tuning gang, a refinement that was likely introduced later in the production run (an illustration in a [1949?] 'preview' catalogue entry #T1315 shows an S.750 chassis without this cover, noting that "production commences early 1950").


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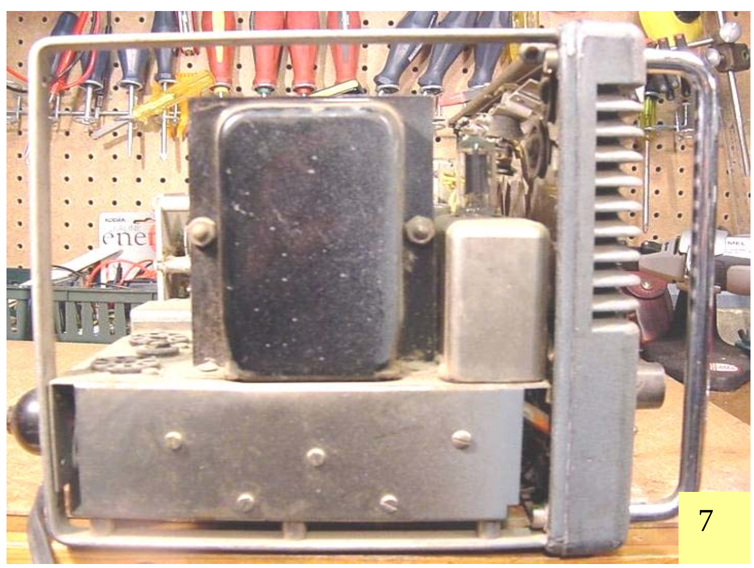
So, I placed the S.750 on my workbench, found the vacuum cleaner, a digital camera, made a cup of tea (essential for human lubrication and brain function when dealing with radio equipment – a tip from Gordon many moons ago), rolled my sleeves up, took a deep breath and…

- Removed the valves, cleaned the glass and pins and stored them away. That was easy… then I thought I might as well test them while I was at it (see 'Valve Testing' sidebar on next page) – two bad 6BA6's and a bad 6AT6. Luckily I had replacements in stock, along with a VR150/30, but no 5Z4G - that was later obtained from the local 'club' (Society for the Preservation of Antique Radio in Canada, SPARC), well, almost, a 5Z4 – metal case variety – that would do for now anyway until I obtain a glass bottle version.
- Vacuum-cleaned the chassis and case, using the small paintbrush to penetrate nooks and crannies – it had been home to generations of spiders from the Okanagan, who had not bothered to bury their dead but instead hung them on component wires for show. A blast of air from my compressor cleaned out the tuning capacitor vanes. For now, I wiped the front panel with cotton wool wipes and warm soapy water and worked on the chassis with isopropyl alcohol (using Q-tips and cloths) to remove the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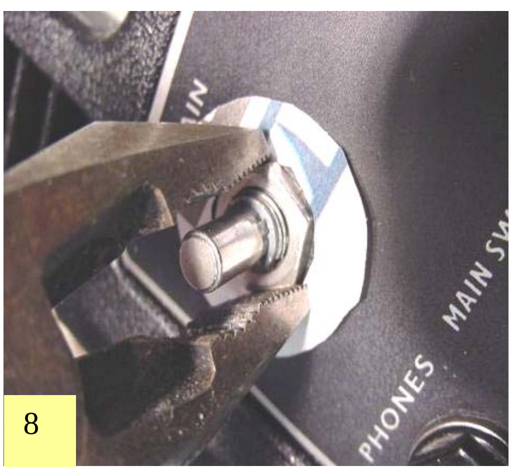
considerable grime, using lighter fluid to dissolve one or two areas of stubborn waxy deposits. The coilbox is the usual trademark Eddystone aluminium casting and the psu/RF and IF/AF sub-chassis flanking the coilbox appear to be nickel-plated brass – all cleaned up a treat. I removed as much of the grey paint overspray from the chassis and components as I could (photo 7) without risking damage, using a combination of a plastic scraper, fingernail, rubbing alcohol and Q-Tips and, for the transformer shroud, Brasso – the latter worked really well. However, the dial glass, pointer and scale plate cannot easily be cleaned without dismantling the front of the S.750, meaning separating the front panel casting from the main chassis was definitely on the cards. That was the next job… a bit of a task, but well worth the effort I thought. Besides, the tuning mechanism was almost totally jammed, with the tuning knob fiction drive just spinning against the drive plate, so it would have to come apart to sort that out anyway.

- Removed the knobs: the grub screws came out surprisingly easily (compared with my experiences on the S.740 and S.770R) – no corrosion on them at all – the 'dry climate' of the Okanagan valley was paying dividends (http://www.travel-british-columbia.com/thompson_okanagan/thompson_okanagan_information.aspx).



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- Carefully removed all the retaining nuts from the controls (photo 8) and prized the fingerplate away from the front panel casting.

- Looking closely at the fingerplate, it was apparent that a former owner had decided to 'freshen it up' at some time by spraying it with a clear lacquer – unfortunately, the finish was like orange peel and was now discoloured with age (photo 9). I spent two hours carefully removing it with cloths, Q-Tips and rubbing alcohol. Underneath, the original finish

Valve Testing

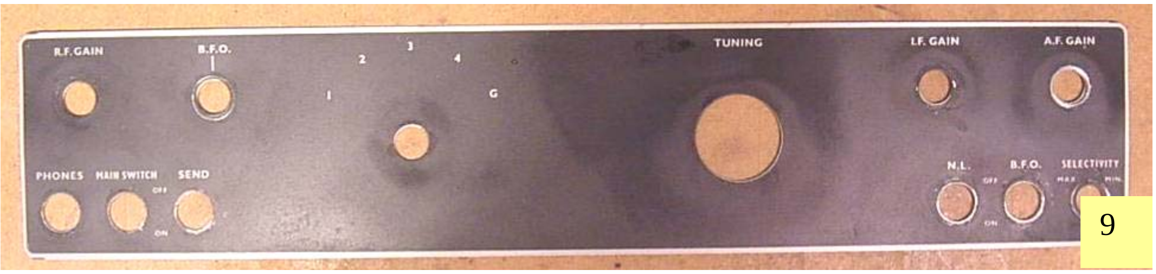
…is a black art and mumbo jumbo (say some) – at least if you intend to check actual valve characteristics on 'testers' normally available to us mere mortals and that do not need a PhD in thermionic science to operate. However, simple valve 'checking' is another matter, and I have acquired both Heathkit and Precision checkers. The Precision unit is really well made and (so far at least) reliable.

It tests by applying pre-set voltages to the various electrodes and measuring emission under these conditions (better than some cheaper models that simply strap all the grids to the anode, but not in the same league as a mutual conductance tester). Good enough for sorting the good 'uns from the bad 'uns though. Strangely, neither unit has a B8A socket, and I had to make an adapter (thanks to Graeme Wormald for the socket) to test the ECH42's (and the EF42's in my S.740) – you can see it at the top of the above photo. You cannot beat testing in the real circuit though and substituting for a known good valve is the best check of all.

is not too bad, with only a slight area of wear to the top left of the tuning knob.

Removing and Replacing the Front Panel and Drive Mechanism

- I took several photos of the tuning drive mechanism from all angles for reference. The drive cord looked in reasonable condition, so I decided to leave it fixed to the spool pulleys at either end and remove them and the cord intact – hoping that I would not have to re-string the dial (see EUG Newsletter #25, p17 for tips on this if you have to do it).



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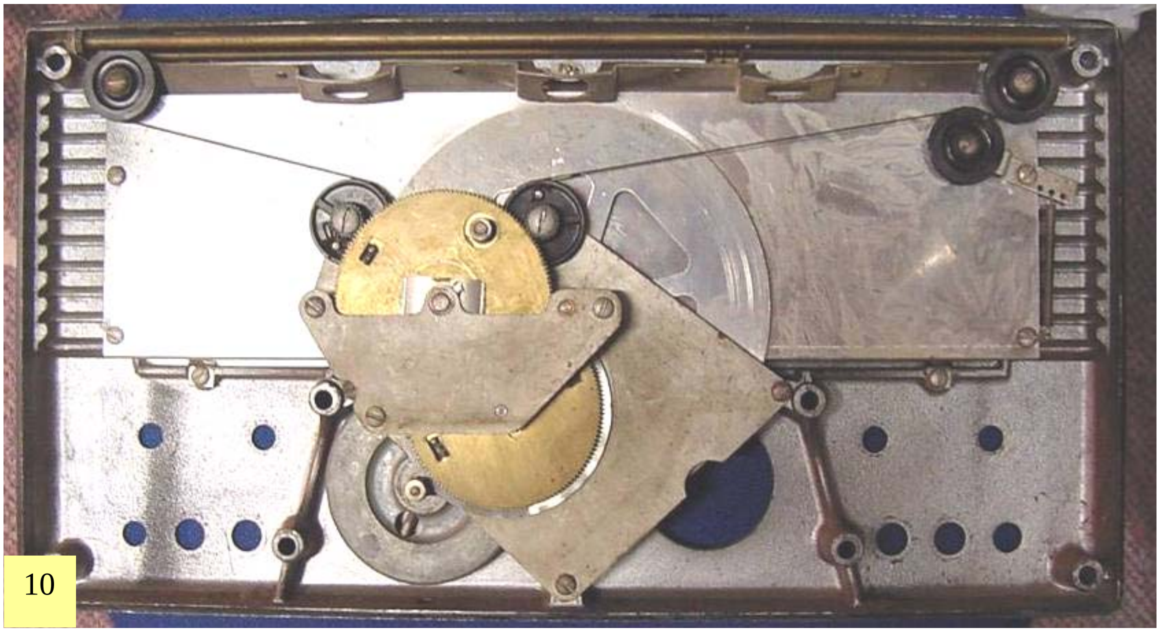
- Removed the front-most spacing bushings from between the side chassis members and the internal 'handles', allowing the lower outer front panel retaining bolts to be easily removed. Removed the upper outer front panel retaining bolts and took the chrome handles away. Removed the four inner front panel retaining bolts (these are removed from the front and are exposed once the finger plate is off). Pulled the front panel casting away, complete with the dial drive mechanism (photo 10). If the ratio arm mechanism was intact, care would need to be exercised at this point to extract the boss from the crank arm (probably pulling the springs and taking the spring wire loop off its hook).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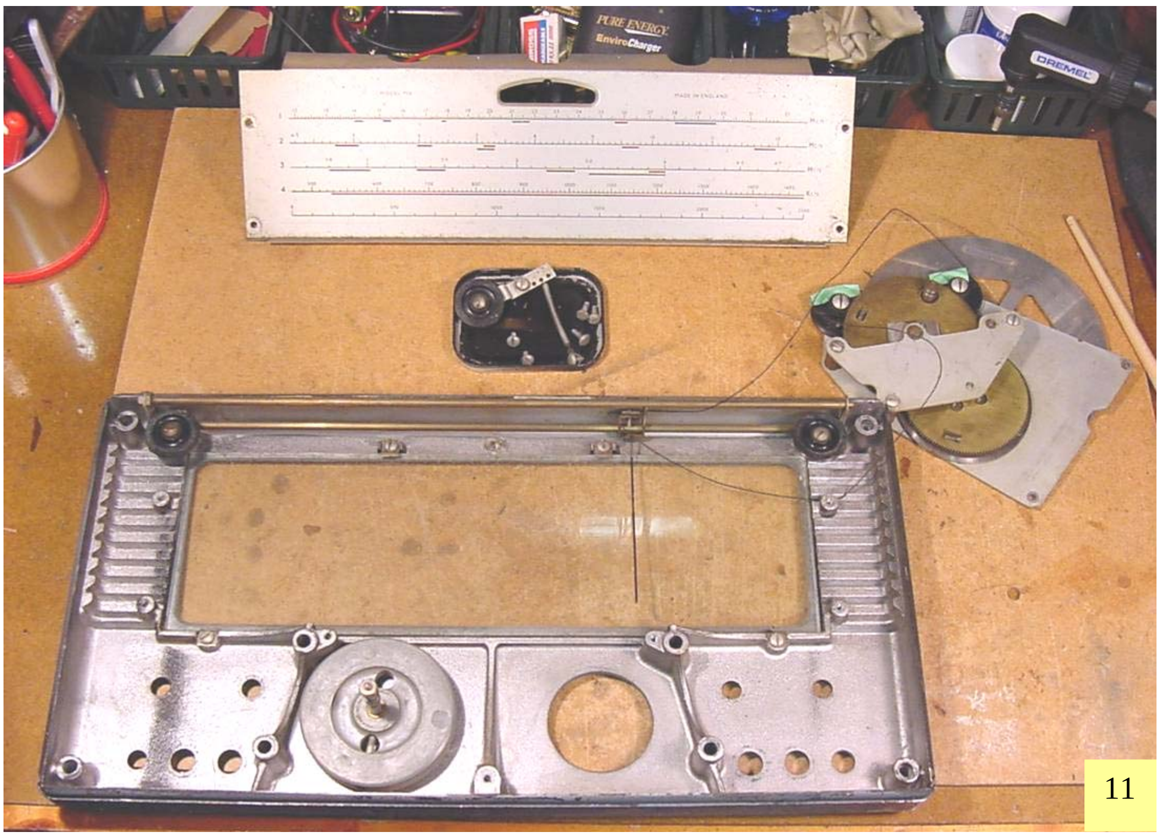
- With some difficulty, due to the mechanism being very stiff, I approximately centered the drive and prevented the cord from leaving its grooves on the spool pulleys using two small pieces of masking tape (photo 11). Careful inspection of the gearbox revealed that nothing was binding or blocking movement of the gears and that the stiffness was due to gummed-up bearings and teeth (age-solidified 3-in-One oil I would say) and, apart from some wear on the brass gears, the only damage noted was that a tooth on each of the spool pulley gears was damaged (photo 12).

- Removed the spring-loaded idler (cord tension) pulley by loosening the pivot screw fixing it to the front panel casting, loosened the three screws holding the gearbox to the front panel casting, tipped it forwards and upwards slightly and then eased the drive cord away from the upper two idler pulleys. The gearbox was then removed with the dial cord intact (photo 11).



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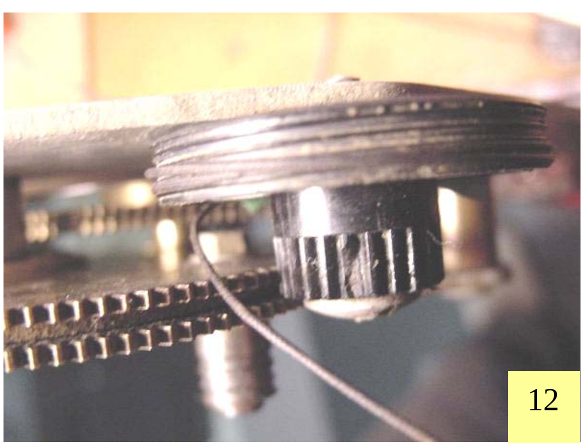
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- Removed the dial plate (four screws) and the dial glass (four screws). Pulled the tuning knob spindle out of its bushing.

- Removed the upper idler pulleys and rear pointer guide bar by removing their screws from the front panel casting. The front guide bar is retained by the rear bar brackets, but sits in a red mastic compound. Removed the all-important

Eddystone logo (photo 13) by unscrewing its small retaining plate and, finally removed the tuning drive bushing from the front panel casting. All the component parts are shown in photo 14.

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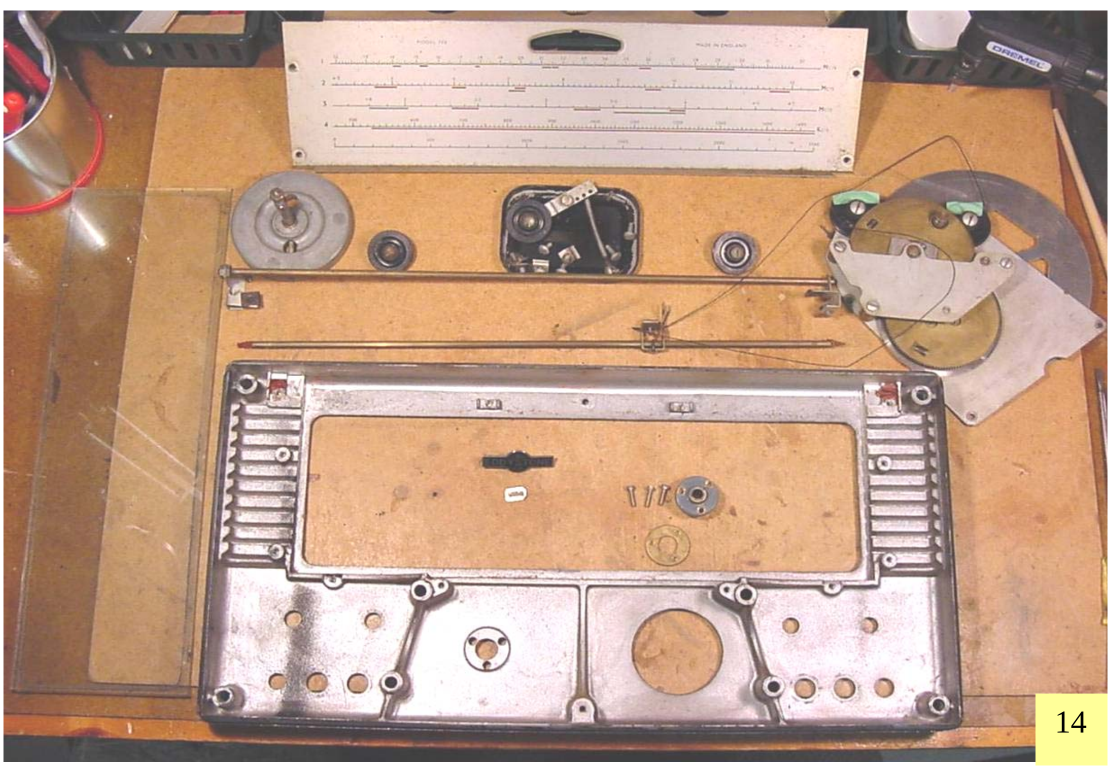
- I removed the logging scale (vernier) dial plate from the gearbox front spindle and placed the gearbox into a smooth-jawed bench vice and then painstakingly cleaned each tooth on each gear and pinion using isopropyl alcohol, a darning needle and Q-tips. I used lighter fluid to remove the stubborn 'gum' and clean out the bearings (bushings). I found that the gears were now freely-turning and I decided not to dismantle the gearbox totally, but to apply a light coating of high-quality light machine oil (not 3-in-One!) to each of the bearings and a smearing of molybdenum ('moly') grease to the parts of the brass gears that did not mesh with the plastic spool pulleys. Tried it out - smoooooth…. The friction drive plate was cleaned using lighter fluid to remove any stray oil or grease, as was its mating surface on the tuning spindle.

- Cleaned the dial plate and vernier dial plate using warm soapy water and cotton wool – these have very delicate silk screen markings (so be very gentle) – photo 15.

- I decided that the grey front panel should be re-finished in its original black crackle. One day I will probably have this stove enameled by a local paint shop, but for now I



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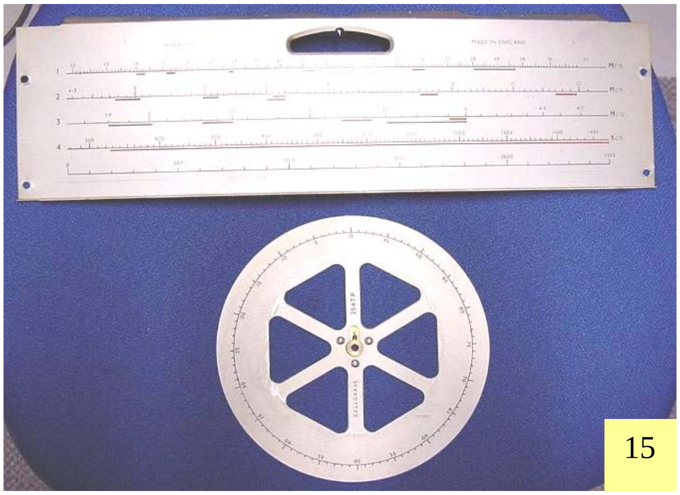

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remembered that I had some black crackle finish spray paint left over from the S.740 S-Meter/Speaker project. I cleaned up the front panel using alcohol and lightly buffed the surface and gave it three coats of the paint (photo 16).

- Cleaned-up all the remaining drive components (idler pulleys, dial glass etc) and re-assembled the drive mechanism to the front panel casting, simply reversing the disassembly order (photos 17 and 18) – the finger plate temporarily held in place with a couple of strips of double-sided sticky tape.

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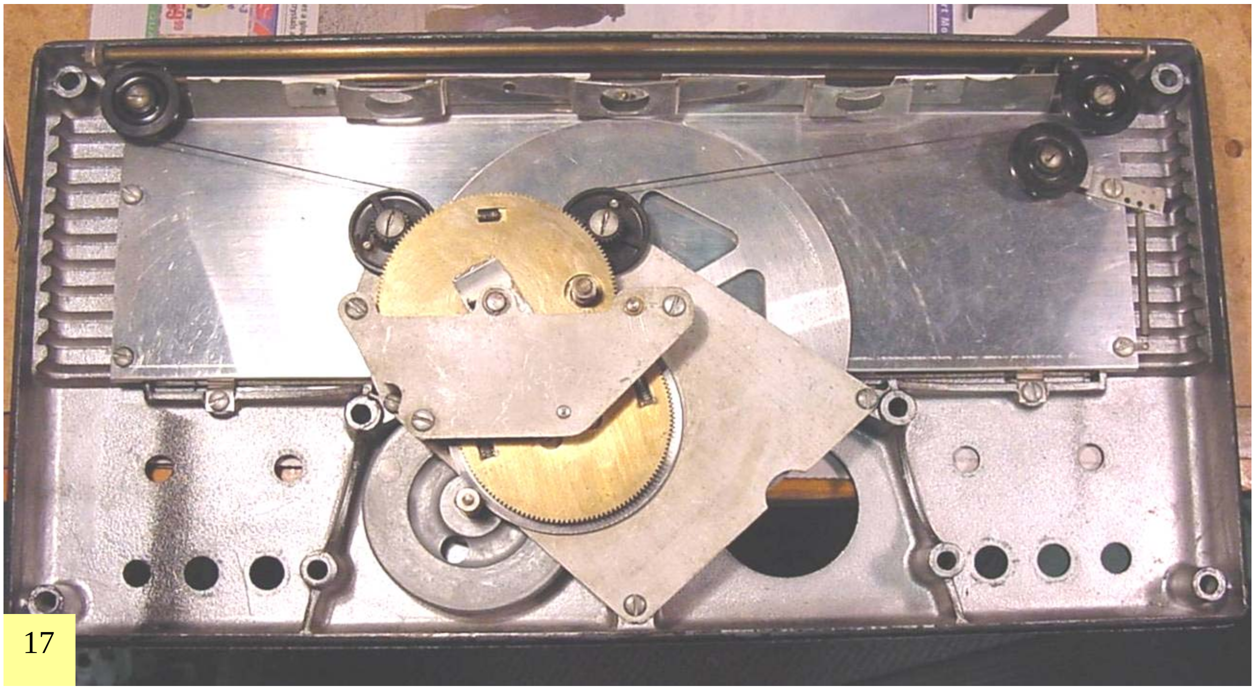
- The tuning knob shaft was coated with moly grease prior to installation in its bushing. The tuning knob was then temporarily fitted and the completed assembly tested for that sensual 'Eddystone smoothness' – yep, it was there in spades, beautiful! - the two damaged spool pulley teeth did not seem to affect the movement – thank goodness. Now for the electronics… temporarily ignored in my eagerness to see if I could at least make the set look ok and work mechanically. I suddenly had cold-flushes thinking negative thoughts like ‘what if the mains transformer is duff?’....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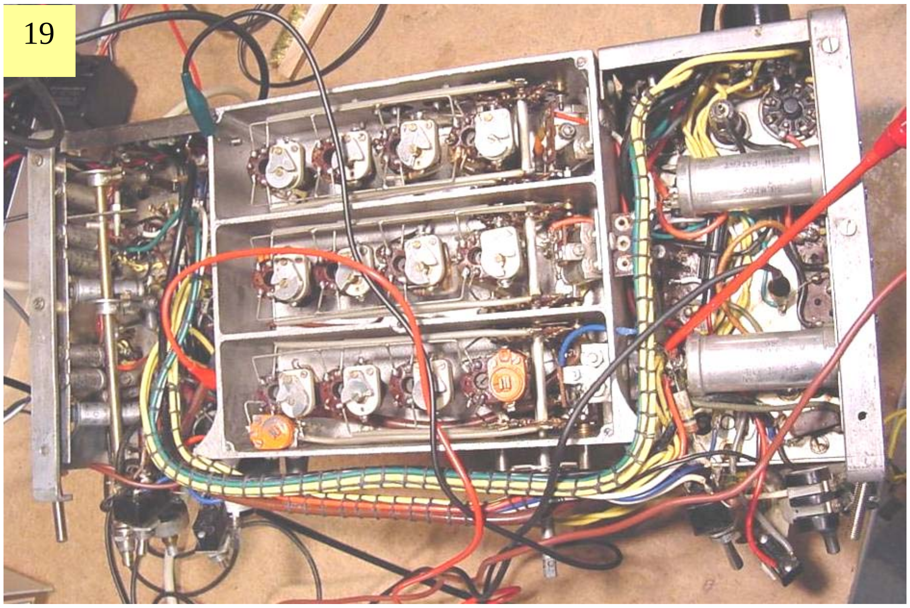
Safety Testing and Preliminary Electronic Restoration

- I decided to start work on the electronics with the front panel still removed from the chassis (photo 19) as this made access to underneath the chassis front much easier: useful if one or more of the gain controls, BFO variable capacitor or switches needed to be replaced or serviced.



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- On arrival, the mains transformer had a piece of bare wire shoved into the 110v tapping socket. I replaced this with the correct type of insulated jumper (for some reason I had one in my junk box).

- Installed a quick-blow in-line mains fuse in the psu compartment. Also, installed a 250mA slow-blow fuse in a chassis-mounted fuseholder wired into the mains transformer secondary centre tap (it had a 3 amp fast blow installed on arrival).

- Checked the general electrical safety of the psu unit – checking for loose wires, poor insulation etc. Replaced a pair of wires who's insulation had been heat-damaged by the stabilizer dropper resistor and re-dressed them to avoid it happening again.

- Installed a new mains lead and chassis grommet, using a plastic cable-tie to retain the lead.

- I made a replacement dial lamp holder to replace the bodged screw-thread one and replaced the long-bulb #47 dial lamps (pretty standard in US and Canada radios) with the correct small globe-type bulbs (the long-bulb #47 lamps interfered with the drive cord).

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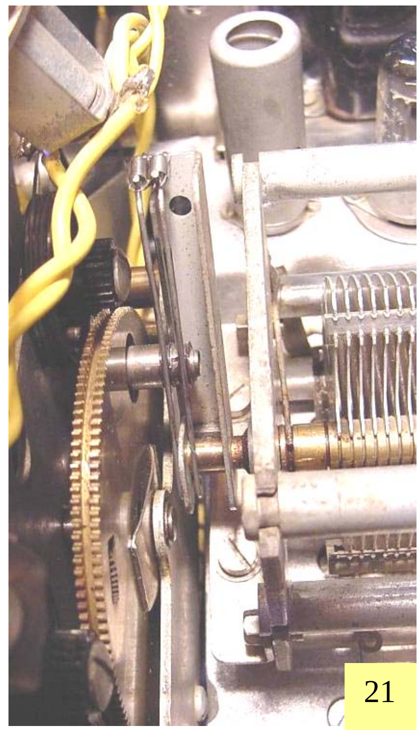
- I noticed that both the AF and IF gain pots were non-original components: the IF gain was a 10kohm linear carbon track unit and needed to be replaced with a wire wound (ww) unit as it carries a small DC current – carbon tracks don't like that. A 'period' Colvern ww pot was found in my junk box (ex-Blue Streak I think) – it tested ok and was fitted (photo 20). The AF gain pot tested intermittent, as well as having a cracked front plate, so that was also replaced with another 'period' unit

(250kohm log pot), this time recovered from a defunct radio chassis and cleaned using 'De-oxit'. The RF gain pot looked original and tested ok after cleaning, and all the switches checked ok. The BFO variable capacitor bushings were cleaned with 'De-oxit'.

- Then I re-attached the front panel to the chassis. This is easier said than done, as getting all the switches and other controls into the correct holes at the same time takes some doing! Re-attach by reversing the disassembly routine, inserting the four centre bolts attaching the coilbox and then the four bolts attaching the chrome handles, followed by the spacers between the lower side chassis members and the 'internal handles'.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- I cleaned the main tuning capacitor contact 'fingers' using 'De-Oxit' on the rotor contacts and re-packed the ball bearings with moly grease. Re-assembled the ratio arm (photo 21), making two new retaining springs from junk box parts and applied a little moly grease to the sliding surface of the crank arm.

- Next, I re-fitted each of the control retaining nuts, taking care not to gouge the fingerplate. I used a small home-made 'washer' to do this with a regular pair of pliers (photo 8), but I believe that a purpose-made tool can be obtained (or made) for the round switch nuts, as can a large hex 'nut runner' for the pots and BFO capacitor nuts – though I do not possess either. The protective washer can be made out of paper (as shown) or plastic – a good choice is the thin, 'non-stick' and durable Teflon sheet sold for lining baking trays (my XYL is still wondering why 'mice' apparently chewed on it)… replaced the knobs and the set was ready for a few basic power-on checks.

- With all valves still removed, I applied power to the set, slowly increasing to 117v through a variac. Checked the transformer secondary voltages - all good – phew!

- Time to find out if the set will work…

Electronic Testing and Repairs

- Cleaned up each of the valve sockets in the set, including the two octal sockets on the rear, marked as 'Vibrator A/S-Meter' and 'Vibrator B' on my set, using 'De-Oxit'.

- Resistance checks on the psu filter capacitors (C81 and C83) indicated almost short-circuit, as did C60 (1^{st} AF anode decoupler). I decided to try to re-form these rather than install replacements (for authenticity) as I had for my S.740. The capacitors were re-formed over a day by slowly increasing voltage from the variac, monitoring the HT current draw (all valves still removed except the 5Z4 rectifier) - increasing the voltage in stages, holding for up to an hour and also switching off/on a couple of times at each stage. As current draw fell off at each voltage increment, I increase the applied voltage by 25v, up to the full HT volts of ~250v. Leakage current at the end of re-forming was acceptably low on all capacitors – quite amazing for 59 year old units.

- Undertook leakage checks on a few of the metal-can 0.01 and 0.1uf by-pass and AGC line capacitors - all appeared ok.

- Re-installed the remaining valves and attached a speaker. Slowly brought the set up on the variac over around 15 minutes, checking the HT current draw (transformer secondary fuse removed and the fuseholder bridged with a milliameter) - about 100mA draw (the manual says 96mA) – seemed ok. Checked key voltages using the voltage table in the manual – all within acceptable ranges (I used a homebrew 1000ohm/volt meter adapter that allows quick switching-in of the correct range shunts – see sidebar). Audio was heard – though this was only a slight hum and a faint hiss. However, injecting an audio signal (finger) at the AF gain pot slider resulted in plenty of volume – a few voltage checks around the AF section revealed that all was in order AF-wise - time to check the detector and second IF stages.

- Whilst fiddling with my signal genny tuning dial, setting up for an IF test, I heard a click from the speaker. After a bit more fiddling I realized that the receiver was actually working, though with very low gain. I attached a piece of wire to the aerial connector and sure enough, genny signals were faintly audible on each band.

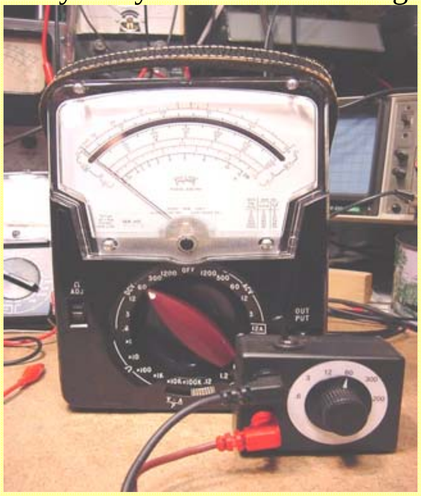
- I tried the BFO – it was not working. Found that no HT was present on the HT pin of the BFO unit. This was traced to an open-circuit R45 (1kohm) anode dropper resistor. Replacing this brought up the BFO.

Re-Alignment

- The set was very 'deaf' on all bands at this point, with only very faint signals from known local very strong

1000 ohms/volt Meter Switchbox

In my S.770R restoration article, I described a simple gadget to convert a 'modern' 20kohms/volt meter into a 1000ohms/volt unit as specified in many Eddystone manual voltage tables.



This has been improved to allow rapid switching between ranges – took about an hour to construct and works really well – every bench should have one!

All you need is a box, two banana plugs and sockets, a multi-pole switch and some resistors to suit your voltmeter ranges (eg. for my Triplett meter, I needed 600ohm, 3kohm, 12kohm, 60kohm, 300kohm and 1.2mohm resistors for its 0.6, 3, 12, 60, 300 and 1200 volt ranges). Arrange the switch to have the correct resistor shunt the voltmeter on each range. I also added a switch to allow the unit to be quickly switched out of circuit for all other measurements ranges.

stations, so I decided to attempt a full re-alignment. Inspection of the IF transformer and coilpack dust cores ('slugs') and trimmers showed signs that the 'mad twiddler' had probably been having a field day - oh dear… (photo 22).

- The re-alignment procedure as detailed in the manual was followed to the letter. Neither of my RF signal genny's go down to the second IF frequency of 85kHz, but I found that my Heathkit audio signal genny worked a treat. The second IF transformers peaked-up nicely injecting 85kHz into the grid of V4 (outer corner pin of the first IF transformer), as did the second oscillator (1535kHz) and the first IF, injecting 1620kHz into the same point as the 85kHz – they were all found to be 'miles' out of adjustment. I then tweaked the BFO to the new (proper) IF: zero beat with the BFO tuning capacitor vanes half mesh. Straightforward so far… now for the RF stages.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- First the oscillator section (nearest the front panel). Again, I followed the instructions in the manual to the letter, using a crystal calibration marker to supplement the 1950's valve RF genny and 1980's digital frequency meter combination I was using: I had no problems on Ranges 1, 3 and 4, but Range 2 proved impossible to track correctly. I concluded that I was probably tuning on an image or the oscillator was tracking on the wrong side of the signal (or both). After listening for the S.750 first local oscillator (LO) signal on my 830/4 (the tuning of which is very accurate) I confirmed that this was the case. I understand that the LO on the S.750 should always track above the signal frequency (Radio and Television Servicing, Molloy and Poole, Vol. 1, p250). Radical tweaking of the Range 2 core and trimmer eventually allowed proper tracking to be obtained across this Range – phew. It is useful to remember that '*if the oscillator frequency is higher than the received signal*" [as in the S750], *"the lower-frequency position on the signal genny dial or the higher frequency position of the receiver dial is identified as the proper signal at which to align'* (Radio and Television Receiver Troubleshooting and Repair, Ghirardi & Johnson).

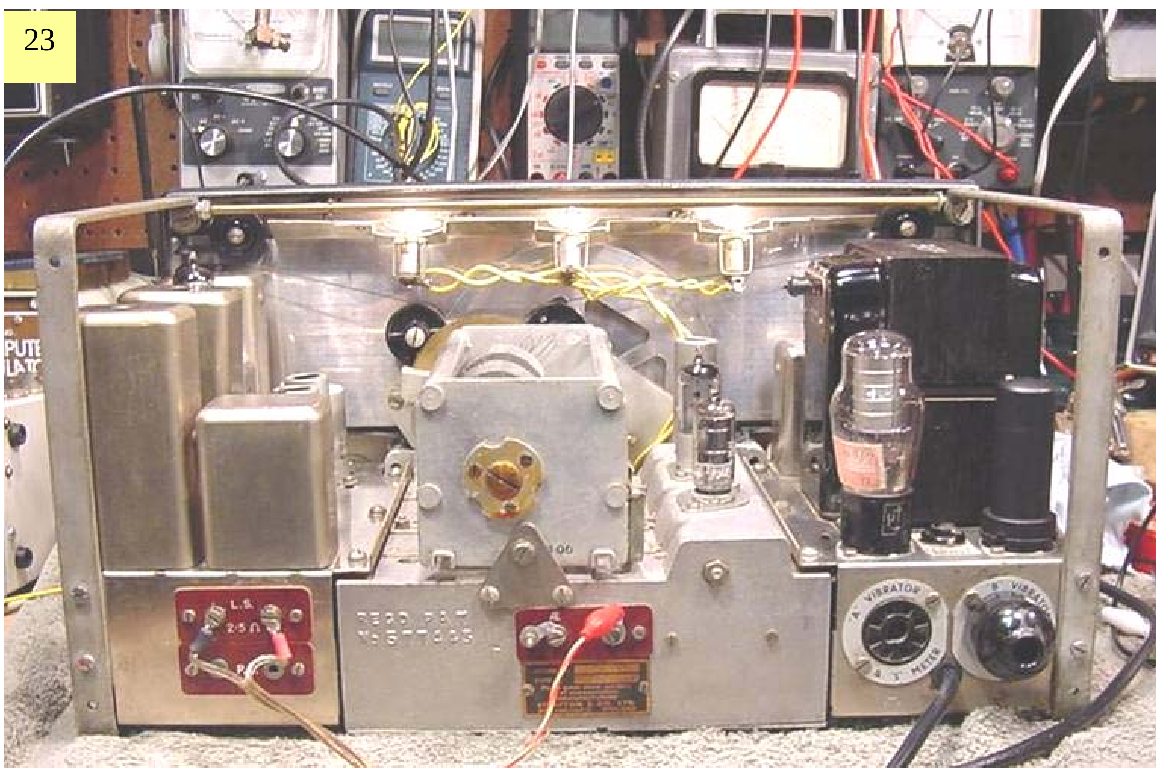
- During adjustment of the iron dust cores (for low-frequency settings), where these were found to be loose, I removed the core, cleaned it and the former and inserted a thin rubber filament extracted from a short piece of 'knicker elastic' to introduce some friction (works a treat). Unfortunately several of the cores were found to be damaged at their bottom end and/or gnarled at their top end due to the ‘mad twiddler’ screwing them down tight using a large screwdriver or similar ‘tool’ (please –use the correct trim tool – or at least obtain a plastic knitting needle and carve one! – it takes all of 5 minutes). I must locate some replacement cores some day, in the meantime, I recovered and cleaned up what I have.

- The mixer and RF stage coil/trimmer combinations were straightforward to align, although I noted that one or two of the dust cores are fully engaged at (or close to) their peak - this may warrant some investigation in the future.

- The set was now performing satisfactorily on all bands, receiving weak signals almost as well as my 830/4 (I am particularly impressed by the low noise level on the S.750). Also, the set is remarkably stable after warming up for an hour or so.

Conclusion (almost)

- I left the set on ‘soak’ test for a few hours and tuned around the bands – I was rather impressed, especially with the smooth tuning, the variable selectivity control and the amount of control the three stage gain pots give to winkling out a weak signal. Then, out of the blue, it developed a loud crackling noise that I found was still present with the AF gain fully turned down. This was traced to a noisy anode load resistor on the triode



section of V5 (6AT6) - a 270kohm part. Replacing this fixed the problem. My next job will be to re-check all the key voltages as listed in the manual following some prolonged use of the set and then, unless I need to change out a component or two to mitigate any anomalous voltages, I will call it a day (for now).

- At this point I would have ‘boxed the set up’, except I do not have a case. I am currently toying with the idea of making a Perspex case so the innards can be seen while the set is working (they are so pretty now!) – this should not be too difficult to do: heated metal bar to bend the correct-radius corners and drill plenty of ventilation holes. Alternatively my S.740 could loan the S.750 its case for special occasions….

- Having no case, I settled for an external cosmetic job of simply cleaning all the knobs (with alcohol) and polishing them using "Armor-All' (plastic polish for car interiors), touched up the one or two small scratches and the tiny wear patch on the finger plate using a black permanent marker – looks ok, but if anyone knows how to re-finish finger

plates I would be very interested to hear. I also re-blackened the mains transformer core laminations and a couple of scuffs on the shroud using the permanent marker, carefully drawing around the part number stamped on top – looks much better (photo 25).

That’s it really – a fairly straightforward, but very time-consuming, exercise in fault-finding and repair (mainly spent cleaning the chassis and gearbox, as well as re-aligning Range 2). The cost of restoring – except in terms of hours and tea – was effectively ‘zero’ (the pots and resistors were from my junk box – but would cost only a few dollars to buy) and some very enjoyable hours spent in my little workshop retreat. Photos 23 through 29 show the set post-restoration.

Once again, I hope this article was of some interest to EUG folks and that others will be encouraged to contribute to the ever-growing EUG website in this way (remember to always keep your camera handy when fixing stuff!). Of course, I am now on the look out for yet another challenge…. wonder when that S.640, S.680X, S.888 or other magical Eddystone classic will appear wanting some TLC?

I would be pleased to discuss this article or any other radio-related topics with EUG folks, either by email, the EUG forum or phone (I am on 'Skype').

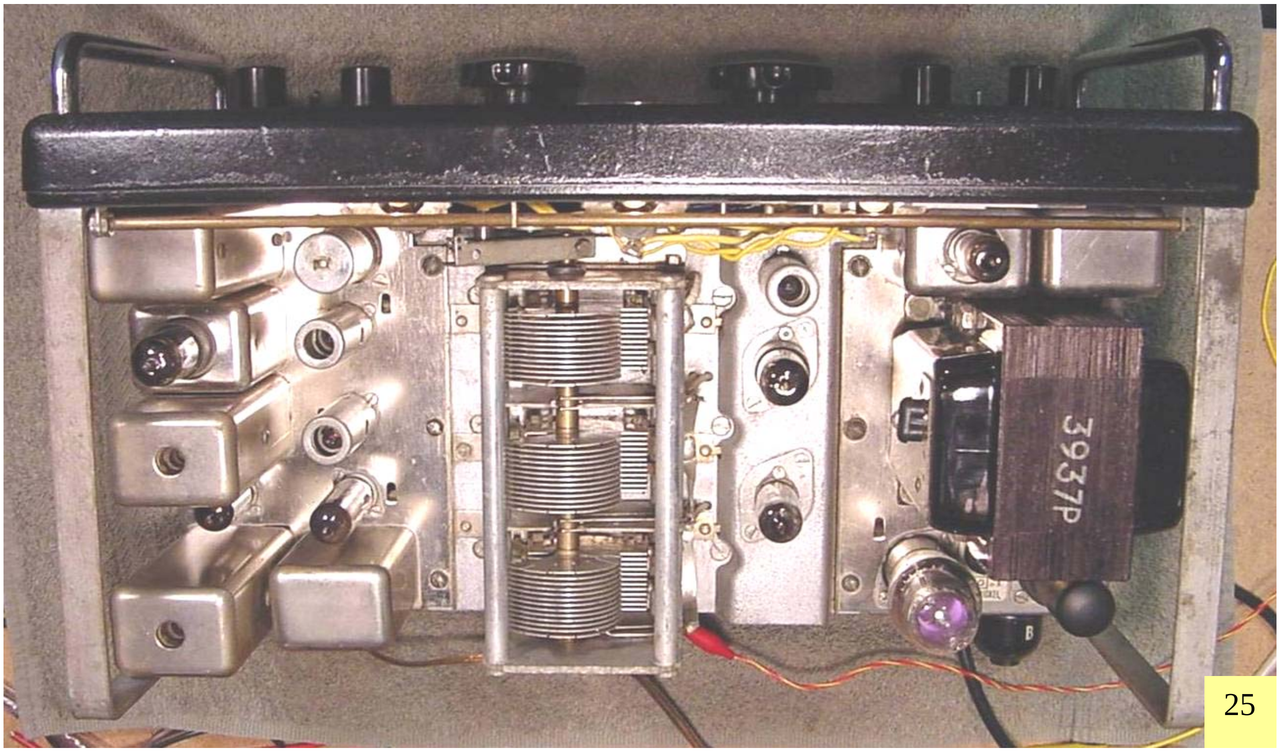
73's

Gerry O'Hara, G8GUH (gerryohara@telus.net), Vancouver, BC, Canada, October, 2006

Postscript

The other EBay bidder on the S.750 turned out to be one of the SPARC members who already owns an S.750 and who indeed wanted the one I bought to provide parts for his own, which has a 'foreign' mains transformer and a missing BFO unit (although it has a case and a matching Model 688 speaker!). The good news is that he has recently acquired an S.940 as a 'parts set' and this has the correct mains transformer (but alas, not the correct BFO) and even better news (for me) is that he donated a correct dial bulb holder from this set for my S.750 – now fitted and looking good, as well as a valve screening can – many thanks Pat (you're forgiven for driving the EBay price higher!).

It was interesting to compare the two sets side by side. Pat's set is serial number FC0839, indicating either a June, 1951 (Alan Clayton method) or a March, 1954 (EUG QRG method) manufacturing date, I think that it is most likely younger than my set, and I noted that it has the valve locations stamped into the chassis, screening cans fitted to V1 and V5 (my set only has screening can-type valve holders on V3, V6 and V7, and the others do not look like they have ever been replaced). Pat's set also has the cover fitted over the tuning capacitor gang. I noted that my set has circular identification labels around the octal 'vibrator' sockets and Pat's set does not.



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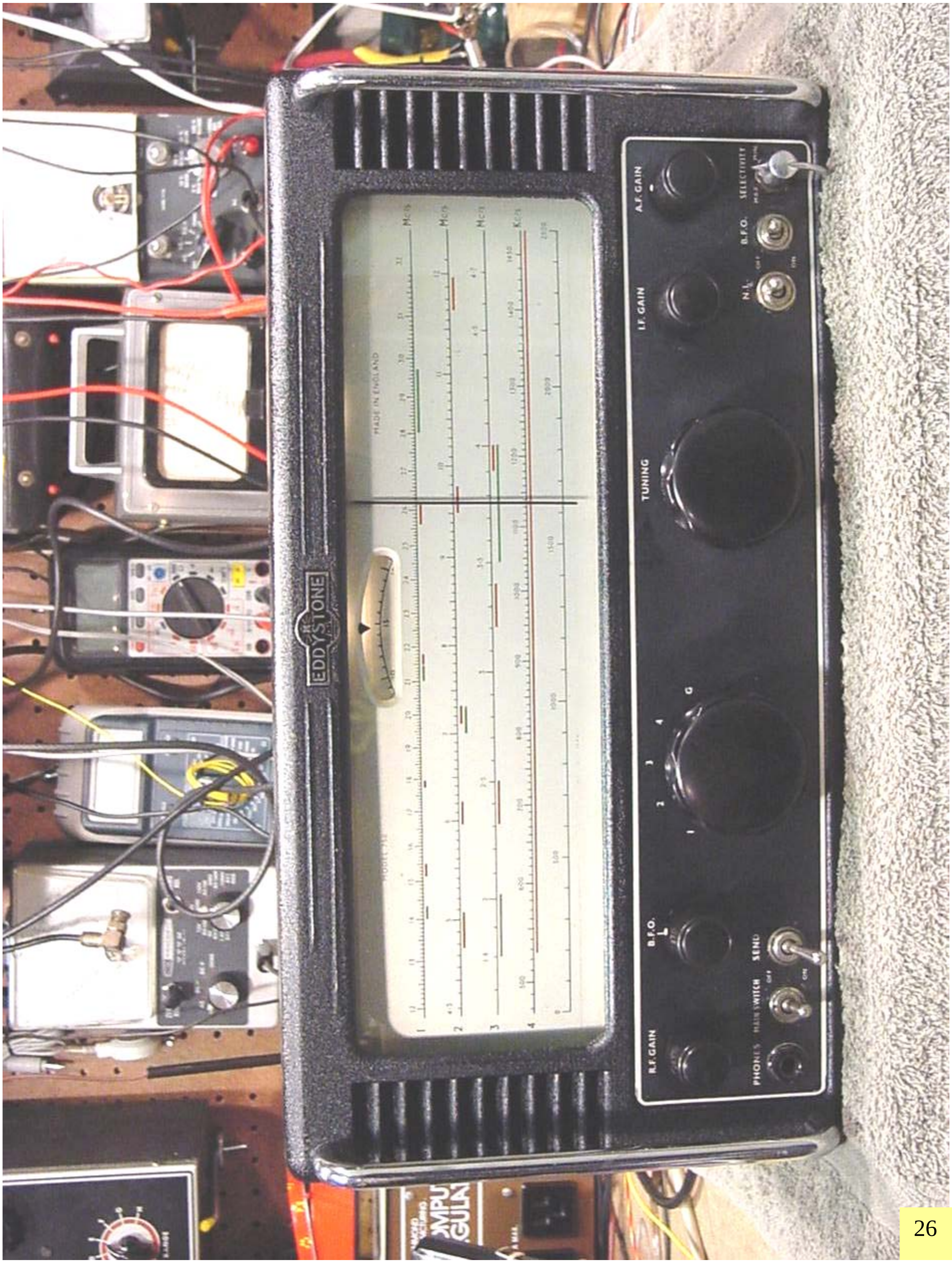
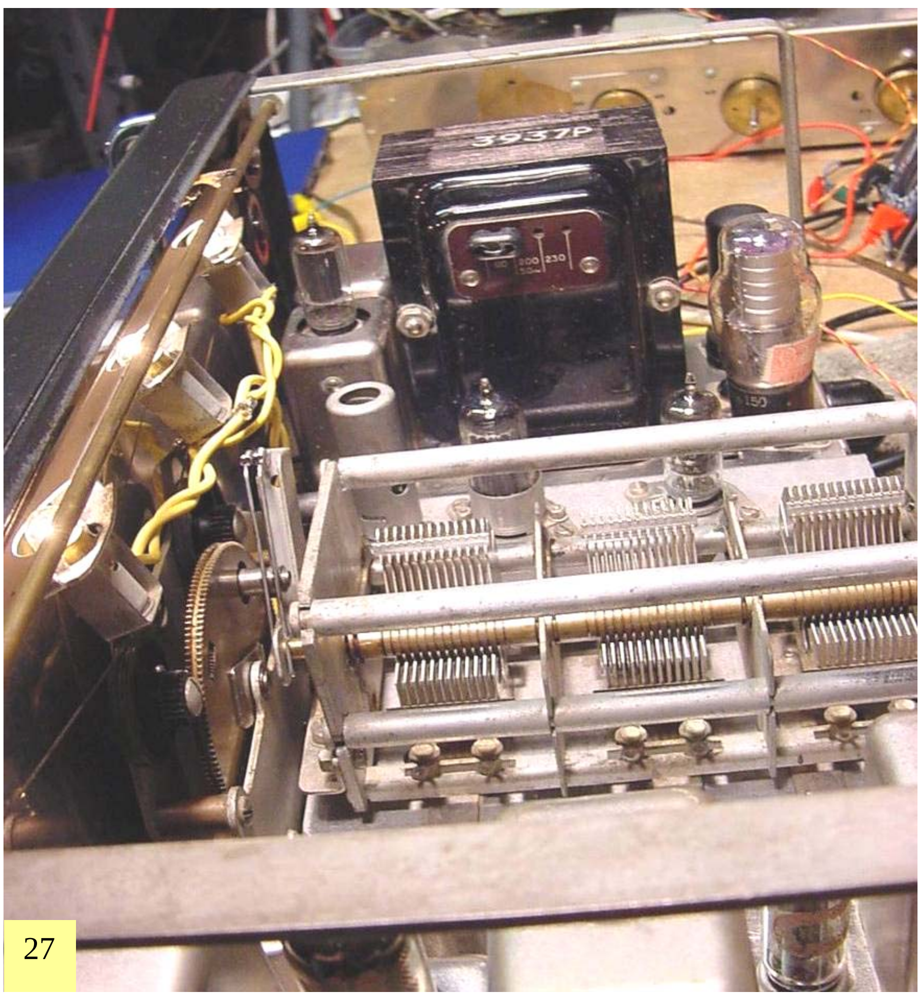

EDDYSTONE
MADE IN ENGLAND
R.F. GAIN
PHONES
MAIN SWITCH
SEND
B.F.O.
TUNING
I.F. GAIN
A.F. GAIN
N.L.
SELECTIVITY

26

References

EUG Newsletter/Lighthouse (from 'Super Index')

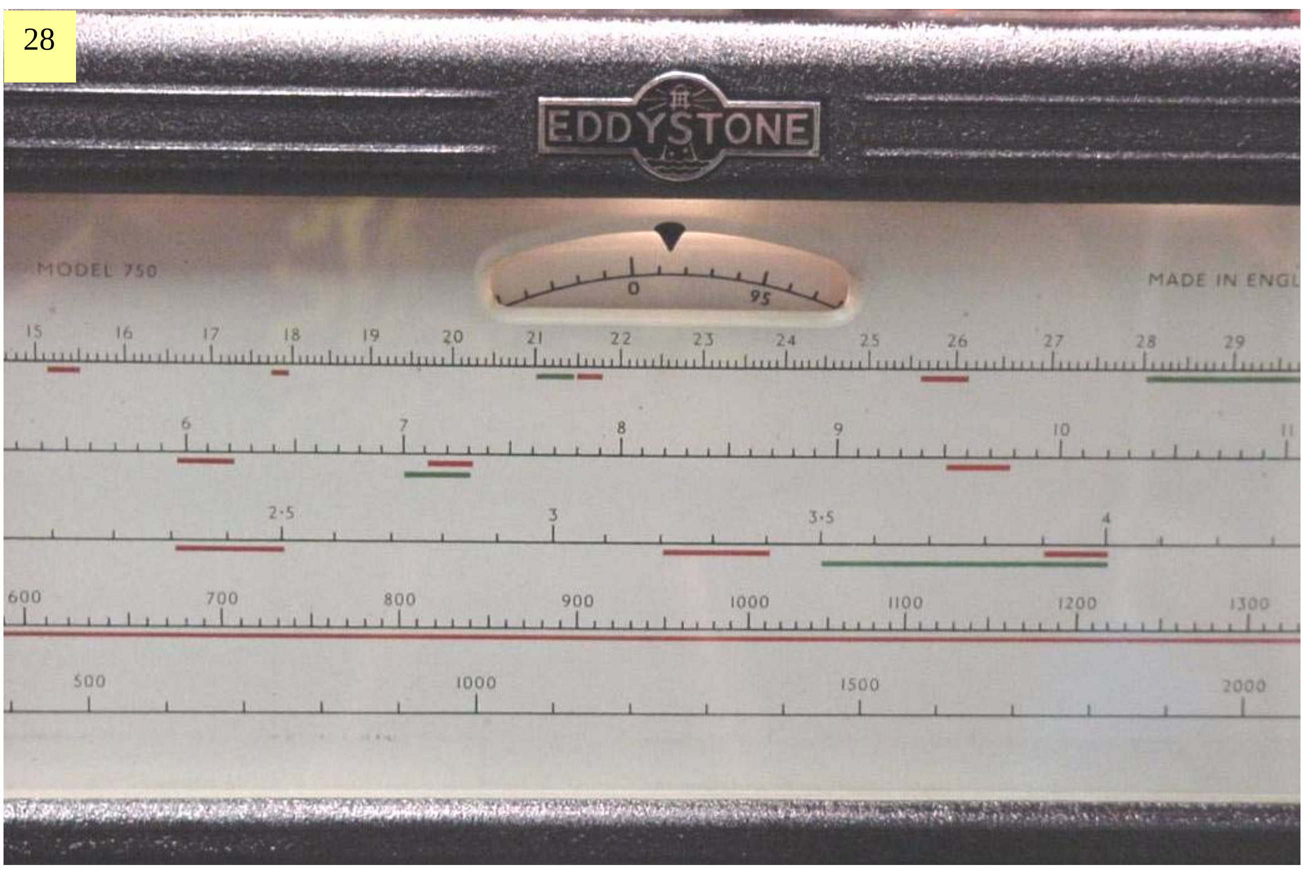

27

Web:

http://www.eddystoneusergroup.org.uk/ (the best – of course!)
http://bama.edebris.com/manuals/ (hereby acknowledged as the source of the one of the manuals attached to this article)
www.qsl.net/eddystone (hopefully back on line soon)

Some Useful Books on Radio Circuitry and Repairs:

- Radio and Television Receiver Circuitry and Operation, Ghirardi and Johnson, 1951
- Radio and Television Servicing, Molloy and Poole, Vol 1
- Radio and Television Receiver Troubleshooting and Repair, Ghirardi and Johnson, 1952
- Radio servicing: Theory and Practice, A Marcus, 1948
- Radio Receiver Servicing, JT Frye, 1955
- Servicing Superheterodynes, JF Rider, 1934
- Radio Servicing Manual, EINY
- Elements of Radio Servicing, Marcus and Levy, 2nd Ed. 1955, Ch 24 and 25 (the first edition of this book can be downloaded in pdf format from http://www.archive.org/details/Elements_Of_Radio_Servicing)



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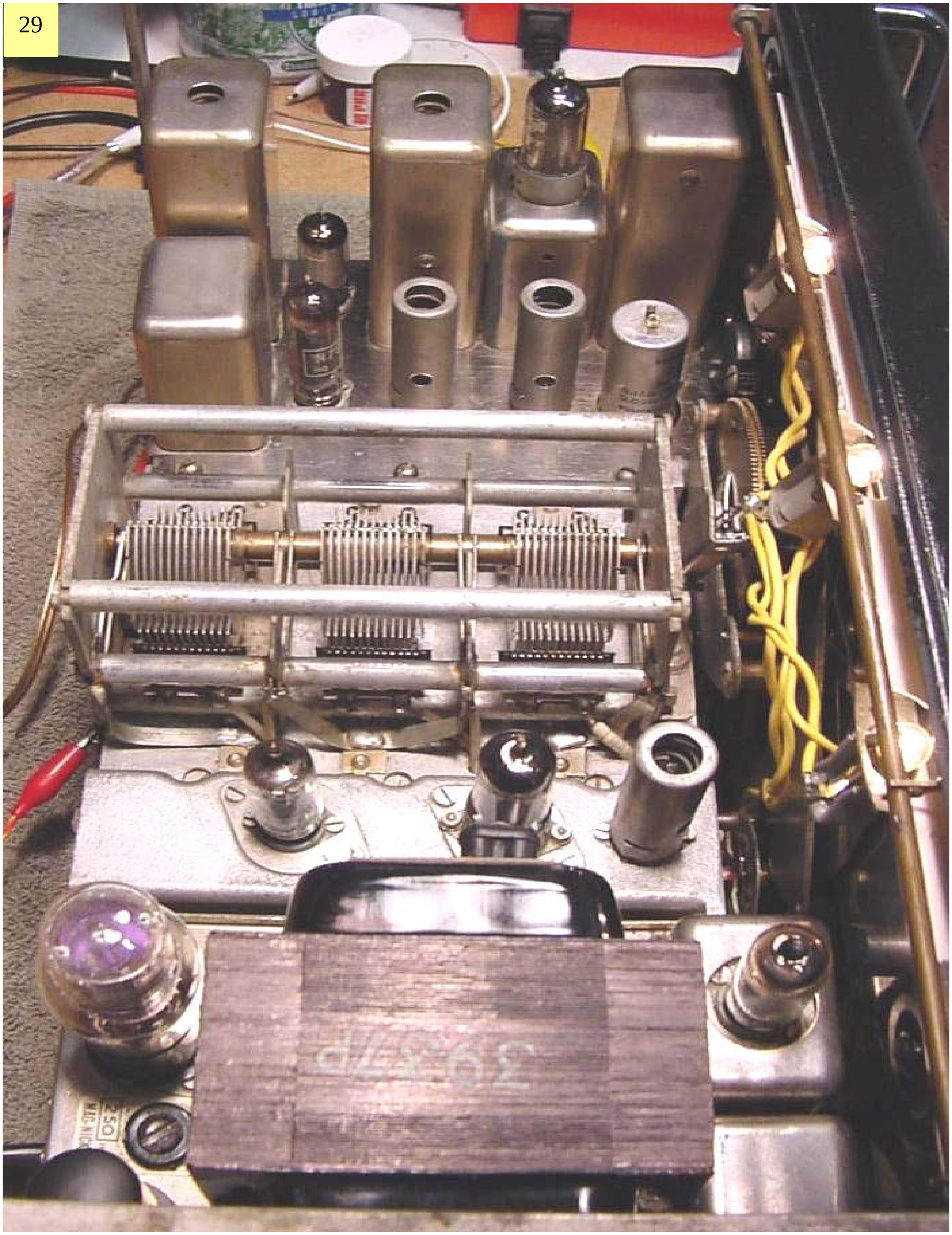
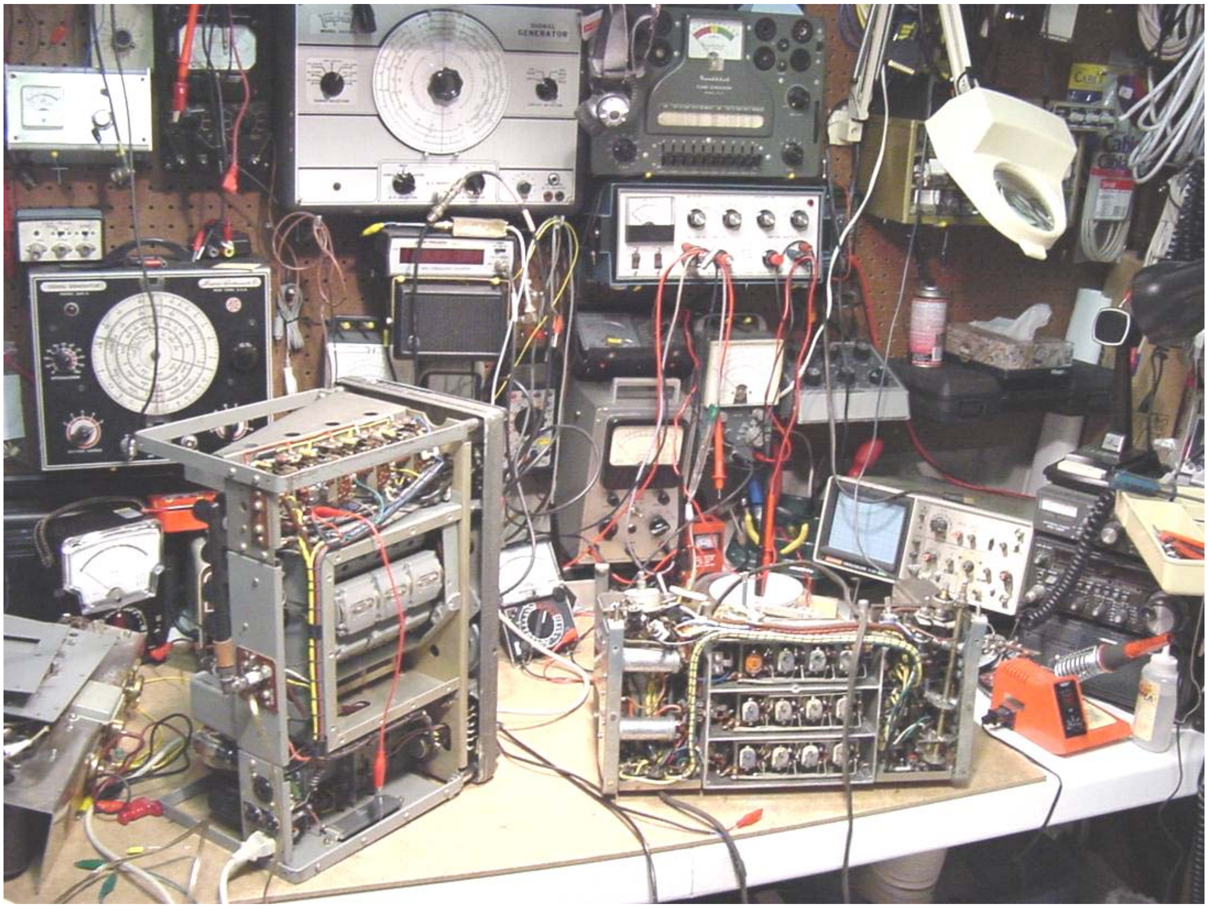
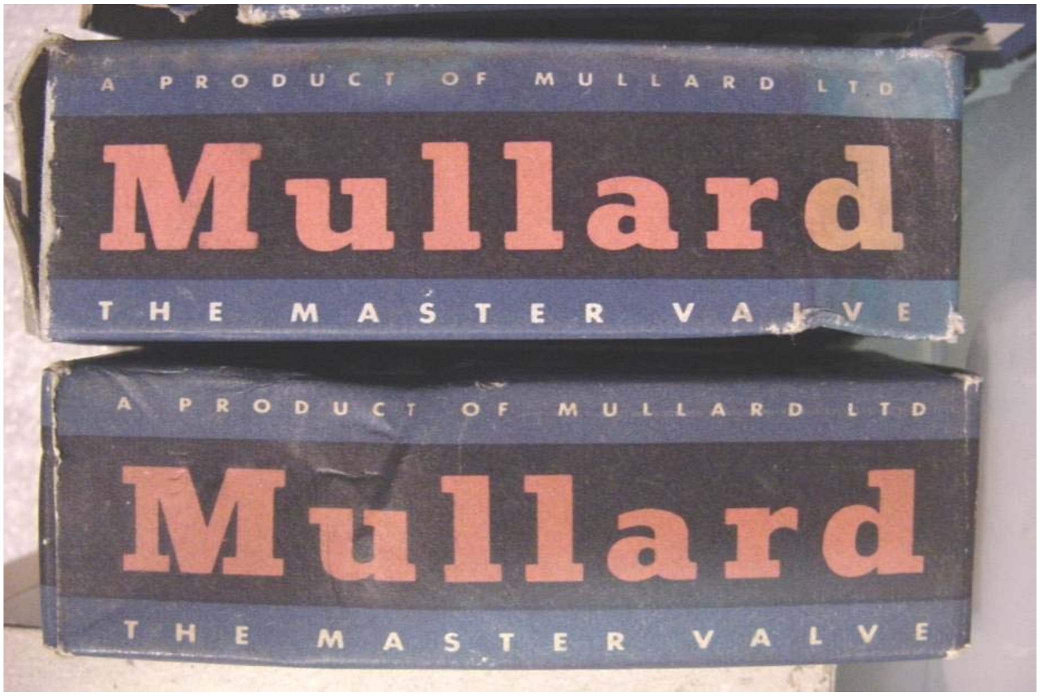


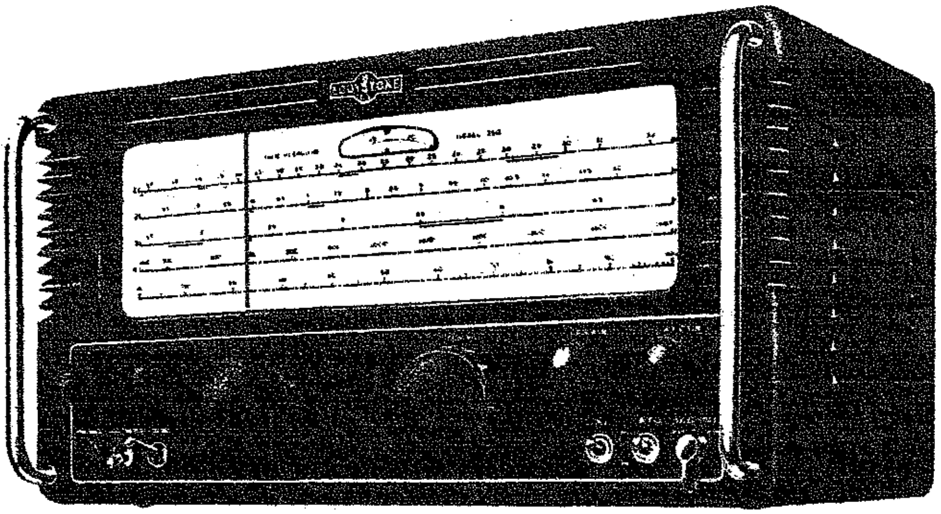
'Bath Tub fresh?' – almost…



'Move over big guy' – my S.770R and
S.750 fight for bench time... and space



Only the best for my boys… 'new old stock' spare
Mullard ECH42's sourced from Argentina!



EDDYSTONE

COMMUNICATIONS RECEIVER

Model "750"

Instruction Manual

The Eddystone "750" receiver is of the double superhetrodyne type and combines high sensitivity with an unusually good signal-to-noise ratio. All but two of the eleven valves are of the miniature type, details being provided with the circuit diagram. The selectivity is continuously variable over wide limits and this feature, in conjunction with the separate RF, IF and AF gain controls, enables maximum results to be secured under varying conditions of operation.

The four ranges are as follows :

Band 1	....	32 Mc/s. to 12 Mc/s.
Band 2	....	12 Mc/s. to 4·5 Mc/s.
Band 3	....	4·5 Mc/s. to 1·7 Mc/s.
Band 4	...	1465 Kc/s. to 480 Kc/s.

The fifth position of the wavechange switch desensitises the RF section of the receiver to permit a pick-up to be used without break-through.

The Amateur Bands are distinctively marked in green, on the basis of the International allocations made at the Atlantic City Conference in 1947. The broadcast bands are shown in red. It should be noted that the scale markings (all in frequency) are linear and also that the International Distress frequency of 500 Kc/s. is covered.

INSTALLATION and OPERATION

The receiver has been carefully aligned and calibrated, and thoroughly tested before despatch. The only adjustment that may be necessary is the mains input voltage. The plug in the selector panel on the transformer is fitted normally in the 230 volt position, where it should remain for voltages between 220 and 250 volts. If the mains voltage is between 195 and 215 volts, the plug should be changed to the 200 volt position. The 110 volt tap is suitable for mains supplies between 100 and 125 volts.

D.C. mains supplies are entirely unsuitable and if connected will cause serious damage. **Ensure** that the **octal plug is in place** in the octal socket " B " (nearest the side of the cabinet) as shown in the drawing, Fig. 2.

A loudspeaker of 2·5 to 3 ohms impedance should be connected to the two upper terminals at the rear (the Eddystone Cat. No. 688 is especially recommended for use with this receiver), or alternatively high resistance (2,000 to 4,000 ohms) telephones plugged into the jack at the left of the front panel.

The fuse fitted between the H.T. secondary centre tap and chassis is a " Magnickel " delayed type. A standard type of fuse is liable to blow if the receiver is switched off (mains switch) and immediately switched on again without giving the rectifier valve time to cool.

AERIAL CONNECTIONS.

If a single long wire is used or any aerial with a single wire type of feeder, connection is made to the rear terminal marked " A," the other terminal marked " AE " remaining strapped to the chassis. A good earth connected by a short lead to the second terminal will improve results, particularly on the lower frequencies, but if there is any doubt about the efficiency of the earth, it may be better to leave it off.

For optimum performance, both as regards bringing in weak signals and for keeping noise down to a minimum, an aerial cut to resonate over the frequency band in which the user is mainly interested is strongly recommended. The lengths for dipole aerials to give optimum results at certain frequencies are tabulated below. For details of other types of aerials and feeder systems, the reader is advised to consult the various Handbooks which deal with these specialised subjects.

	Broadcast							Amateur		
Wavelength (Metres) ..	49	31	25	19	16	13	11	40	20	10
Frequency (Megacycles) ..	6·1	9·6	11·8	15·1	17·8	21·5	26	7	14	28
Length of each arm (feet)	40	26	20	15·5	13	10·5	9	33	16·5	8·25

RECEPTION OF TELEPHONY.

With the BFO switch in the " off " position, the automatic gain control circuits become operative and for full effectiveness, both RF and IF gain controls should be set at maximum (full clockwise rotation) and the volume controlled with the audio gain potentiometer on the extreme right. On very strong signals, particularly with a large aerial and on medium waves, it is possible for overloading to occur and it then becomes necessary to reduce the RF gain.

To begin with, the variable selectivity control should be to the extreme right, giving minimum selectivity. In this position, reasonably good quality of speech and music will be obtained but, as the selectivity is still considerably higher than that of an average receiver, a certain amount of side-band cutting occurs and high fidelity reproduction is not to be expected. A minor point to be noted is that the loudspeaker or telephones should be capable of responding to low audio frequencies (down to 100 or 150 cycles), otherwise the middle audio register is likely to be unduly emphasised.

When heterodyne interference is experienced, the selectivity should be increased by rotating the control to the left, thereby reducing the bandwidth and weakening the strength of the interfering whistle. It is not advisable to operate on telephony with the selectivity control at maximum (except perhaps on a very crowded amateur band) because sideband cutting then becomes severe and speech quality deteriorates in consequence.

Because of the high selectivity, it is important to tune carefully to the centre of the received carrier. It should be remembered also that the AGC action results in the sensitivity increasing as the receiver is tuned slowly away from the centre of the carrier, giving rise to distortion and apparently reducing the actual selectivity. The Cat. No. 669 " S " Meter is a valuable adjunct when the main interest lies in telephony reception since it aids correct tuning and also gives a comparative idea of the strength of the received carrier.

RECEPTION OF CW SIGNALS.

Switching on the BFO (also thereby cutting out AGC) applies H.T. to the beat oscillator valve (V9) and reception of CW Morse signals is then possible.

The adjustment of the controls depends on a number of factors including the strength of incoming signals, amount of interference present and the efficiency of the aerial. If the latter is poor, it will be advisable to use maximum RF gain at all times but, if good, often the RF gain can be reduced somewhat with advantage, particularly on strong signals.

A certain amount of skill will be called for in adjusting the IF gain and selectivity controls. When receiving telephony, the IF gain is automatically controlled according to the strength of the signal but, with CW, manual control of IF is important.

The IF gain varies to some extent with the setting of the selectivity control and is greatest when selectivity is minimum. It will rarely be desirable to employ full IF gain with minimum selectivity. As the degree of selectivity is increased, gain should be maintained by advancement of the IF gain control.

It is advantageous to employ a high degree of selectivity because the noise output from the receiver is partly dependent on the IF bandwidth and the narrower this is made, the less the noise for the same amount of gain. When the receiver is operated with the selectivity control at maximum, signals very close to one another can be separated and weak signals made to stand out clearly against the extraordinarily quiet background. Naturally the tuning control must be handled gently under such conditions.

Another control which calls for attention is the BFO pitch. This gives a swing of 3 Kc/s. each side of the centre point (white spot at the top). Normally it will be set to give a beat note of 1,000 cycles (or near) but careful handling of this control will often enable a desired signal to be separated from an interfering one. Also, it is sometimes of benefit to rotate the knob from one side of zero beat to the other when interference comes up on a signal.

BANDSPREAD.

The mechanical bandspread device is available over the whole range covered by the receiver. The vernier logging scale gives an effective length per range of approximately 32 feet. This scale is graduated from 0 to 100 divisions and is read in conjunction with the lowest scale on the main dial, the latter being marked off with 25 major divisions, each representing 100 divisions of the vernier scale (i.e., one complete revolution).

The actual amount of bandspread on the amateur bands depends of course on the width of each individual band. The following details apply :

Band (Mc/s.)	*Vernier Scale Length (inches)*	*Number of Vernier Divisions*
29·7 — 28	34·375	208
21·45 — 21	7·5	45·5
14·35 — 14	6·45	39
7·3 — 7	15	91
4·0 — 3·5	61	364
2·0 — 1·8	30	182

NOISE LIMITER.

In a quiet situation, it will not be necessary to make use of the noise limiter but when electrical interference of a staccato nature is experienced (on telephony or CW), switching on the noise limiter will effectively remove a high percentage of the interfering noise, with little effect on the strength of the signal and without introducing distortion. The noise limiter must not be expected to act effectively with noise of a mushy type, as generated by vacuum cleaners and other electrical equipment incorporating motors — these should be filtered with suppressors at the source.

In a noisy location, it is well to erect an aerial well in the clear and as far as possible from electric light wiring. The stronger the incoming signal, the more the gain of the receiver can be reduced (automatically on telephony, manually on CW) thereby reducing also the effect of any interference being picked up.

USE OF THE STANDBY SWITCH.

The Standby switch, in the "off" position, desensitises the receiver very considerably. This system is considered preferable to cutting the H.T. supply, for several reasons. The oscillator valves continue to operate under normal conditions, thereby preventing any change of frequency during standby periods and, since the audio stages remain "alive," a monitor signal can be fed into the pick-up terminals and become audible on the loudspeaker or telephones.

The receiver itself also becomes available as a monitor of the outgoing signal. It is necessary to prevent excessive RF voltage reaching the receiver aerial terminals during transmission and the wires to these terminals should be kept as short as possible. If a separate aerial is used for reception, arrangements should be made for disconnecting or earthing it during periods of transmission.

CONNECTION OF "S" METER.

The Eddystone Cat. No. 669 "S" Meter is recommended for use with the "750" Receiver. It incorporates a sensitive moving-coil meter of 200 microamperes full scale deflection.

The flexible lead from the meter terminates in an octal plug which should be inserted in the socket marked "A" in Fig. 2 at the rear of the receiver.

Reference to the circuit diagram of the receiver will show that one half of the double-diode V7 is in series with the meter movement. This prevents reverse current flowing through the meter when the balance is disturbed and the meter can be left in circuit under all conditions of operation without likelihood of damage. The bottom bend characteristic of the diode results in sluggish action at low signal strengths and, to overcome this, the needle of the meter is purposely offset below the zero mark on the scale by means of the mechanical adjuster.

With the receiver controls set for reception of telephony, the aerial and earth terminals (or doublet terminals) should be shorted and the "S" Meter needle made to coincide with zero by adjustment of the electrical balance control at the rear of the meter. On removing the short, the meter will indicate comparative carrier strength.

OPERATION FROM 6 VOLT ACCUMULATOR.

The "750" receiver may be operated from a 6 volt accumulator in conjunction with a special Vibrator Power Unit, Cat. No. 687/1, which is fitted with leads and plugs ready for immediate use. Installation details are provided with the Power Unit.

STRATTON & Co., Ltd., West Heath, Birmingham, 31

Cables : "STRATNOID" Birmingham Telephone : PRIory 2231-2-3-4

EDDYSTONE '750'

ALIGNMENT INSTRUCTIONS

It is assumed that test instruments are available — in particular, a Signal Generator covering 85 Kc/s. to 32 Mc/s. and provided with internal modulation (30%) and a calibrated attenuator ; and an audio output meter, calibrated in milliwatts and decibels and adjustable to match an impedance of 2.5 ohms. Trimming should be carried out with a non-metallic tool such as the Eddystone Cat. No. 122T.

IF STAGES.

The controls should be set as follows :

RF Gain minimum	Band Selector Range I.
IF Gain maximum	BFO Off.
AF Gain maximum	Noise Limiter Off

Selectivity maximum.

A 30% modulated input, at 85 Kc/s., is applied between chassis and the grid of V4* (the second frequency changer), and the four cores in the IF transformers marked "2nd" and "3rd" in Fig. 1 adjusted to give maximum output, as indicated on the output meter. The attenuator of the S.G. should be adjusted as necessary to prevent the needle of the output meter going off the scale. An input of about 280 microvolts will normally be required to give 50 milliwatts at the speaker terminals.

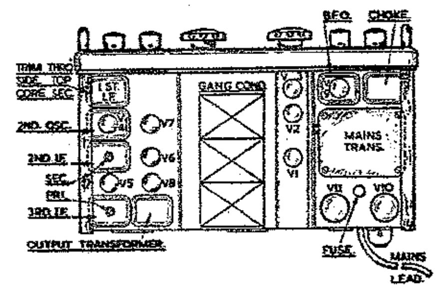


Fig. 1

Leaving the controls and connections undisturbed, the input frequency should be changed to 1620 Kc/s. and the second oscillator adjusted, by moving the core in the V4 screening can (see Fig. 3), until output is maximum. Because of the slight loss in conversion, a greater input (by some 2 or 3 db) will be required to give 50 milliwatts output. The change to 85 Kc/s. can be obtained with the oscillator on either the high or the low side of 1620 Kc/s. and two positions of oscillator core will give output — the lower frequency position, with the core furthest in, is the correct one.

The band selector switch should now be moved to "G" and the 1620 Kc/s. input applied between chassis and the stator of the centre section of the gang condenser. The primary and secondary cores in the first IF transformer (see Fig. 1) are then adjusted to give maximum output and a further very slight and very careful adjustment of the V4 oscillator core may give an improvement. The final IF sensitivity should be such that 50 milliwatts output is produced for an input (at 1620 Kc/s.) of between 5 and 10 microvolts.

BFO ADJUSTMENT.

With the BFO switch at "off," a modulated signal should be applied and tuned in accurately on the receiver. The modulation is switched off, the BFO switched on and, with the pitch control at half-mesh (white spot at top), the core in the BFO unit (see Fig. 3) is set to give zero beat.

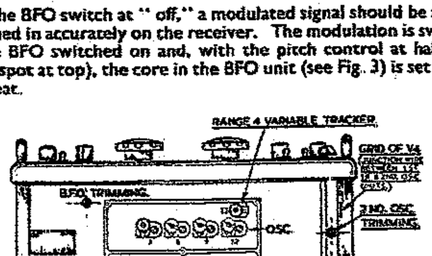


Fig. 3

RF ALIGNMENT.

The controls remain as before but with the RF gain also turned to maximum. Should it be found necessary to correct discrepancies in the scale calibration, the output from a Crystal Frequency Standard should be applied to the aerial terminals (the calibration of most Signal Generators is not accurate enough). Adjustment is then made to the cores and trimmers appropriate to each range, in the oscillator section of the coil box (see Fig. 3). Checks and adjustments should be made at the frequencies given below, using the TRIMMER CONDENSER at the higher frequency end of the scale and the CORE at the lower frequency end. The BFO should be switched on for these tests, with the pitch control at "12 o'clock." The ceramic tracker condenser shown in Fig. 3 has been very carefully adjusted for proper tracking on Range 4 and it is not advisable to touch it.

Range 1.	13 Mc/s. and 31 Mc/s.
Range 2.	5 Mc/s. and 11 Mc/s.
Range 3.	2 Mc/s. and 4 Mc/s.
Range 4.	500 Kc/s. and 1400 Kc/s.

To proceed with the alignment of the RF and Mixer stages, the BFO is switched off, the crystal oscillator removed and the modulated output from the Signal Generator connected to the aerial and earth terminals, via the dummy aerial. The attenuator is set to give an output of between 10 and 20 microvolts.

A signal on 13 Mc/s. should be injected and tuned in on Range 1 of the receiver. The CORES in the RF and Mixer stages are then adjusted for maximum output as indicated by the output meter. Next, the S.G. is set to 30 Mc/s. and the output peaked by adjustment of the TRIMMER CONDENSERS. Adjustment is again made at 13 Mc/s. and the procedure repeated until no further improvement is possible.

The other ranges are aligned in the same way, using the following high and low frequency alignment points on each range :

Range	*Trimmer Frequency*	*Core Frequency*	*RF Coil*	*Mixer Coil*
1	30 Mc/s.	13 Mc/s.	1	2
2	11 Mc/s.	4.7 Mc/s.	4	5
3	4.2 Mc/s.	2 Mc/s.	7	8
4	1350 Kc/s.	550 Kc/s.	10	11

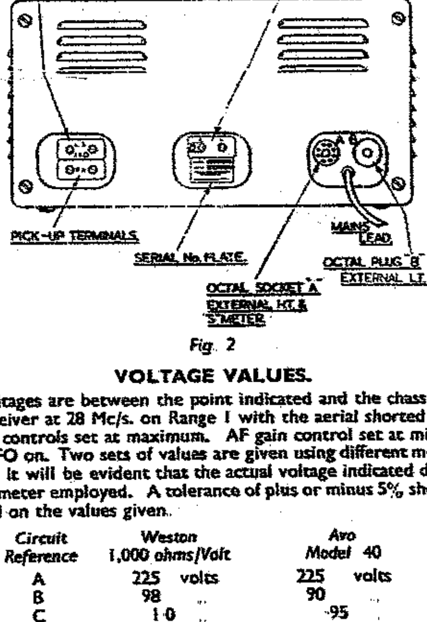


Fig. 2

VOLTAGE VALUES.

The voltages are between the point indicated and the chassis. Set the receiver at 28 Mc/s. on Range 1 with the aerial shorted out, IF and RF controls set at maximum. AF gain control set at minimum with BFO on. Two sets of values are given using different meters as shown. It will be evident that the actual voltage indicated depends on the meter employed. A tolerance of plus or minus 5% should be allowed on the values given.

Circuit Reference	*Weston 1,000 ohms/Volt*	*Avo Model 40*
A	225 volts	225 volts
B	98 ,,	90 ,,
C	1.0 ,,	.95 ,,
D	82 ,,	80 ,,
E	235 ,,	236 ,,
F	1.6 ,,	1.5 ,,
G	98 ,,	73 ,,
H	78 ,,	75 ,,
J	232 ,,	230 ,,
K	1.4 ,,	1.2 ,,
L	85 ,,	80 ,,
M	235 ,,	235 ,,
N	85 ,,	80 ,,
P	0.9 ,,	0.9 ,,
Q	65 ,,	13 ,,
R	1.0 ,,	0.7 ,,
S	235 ,,	235 ,,
T	227 ,,	225 ,,
U	4.2 ,,	4.1 ,,
V	150 ,,	150 ,,
W	235 ,,	235 ,,
X	275 ,,	272 ,,
Y	75 ,,	70 ,,
Z	2.0 ,,	0.9 ,,
A—	250 ,, A.C.	250 ,, A.C.
B—	250 ,, A.C.	250 ,, A.C.

HT Consumption – 96 mA

*Accessible under the chassis (see Fig. 3)

EDDYSTONE "750" RECEIVER

The following alterations to the circuit should be noted:-

A resistor of 100,000 ohms (½ watt) has been inserted between the HT line and the junction of R18/R19, to give greater control of RF gain.

The range 4 oscillator circuit is modified. C37 becomes ~~80 pF~~ 2-40pF ± 5%, silvered micas, and C39 a 3/23 pF air trimmer. The primary winding on the coil no longer exists, the lead from the switch wafer(oscillator grid) being connected to the point where C37/C39 join the tuned winding.

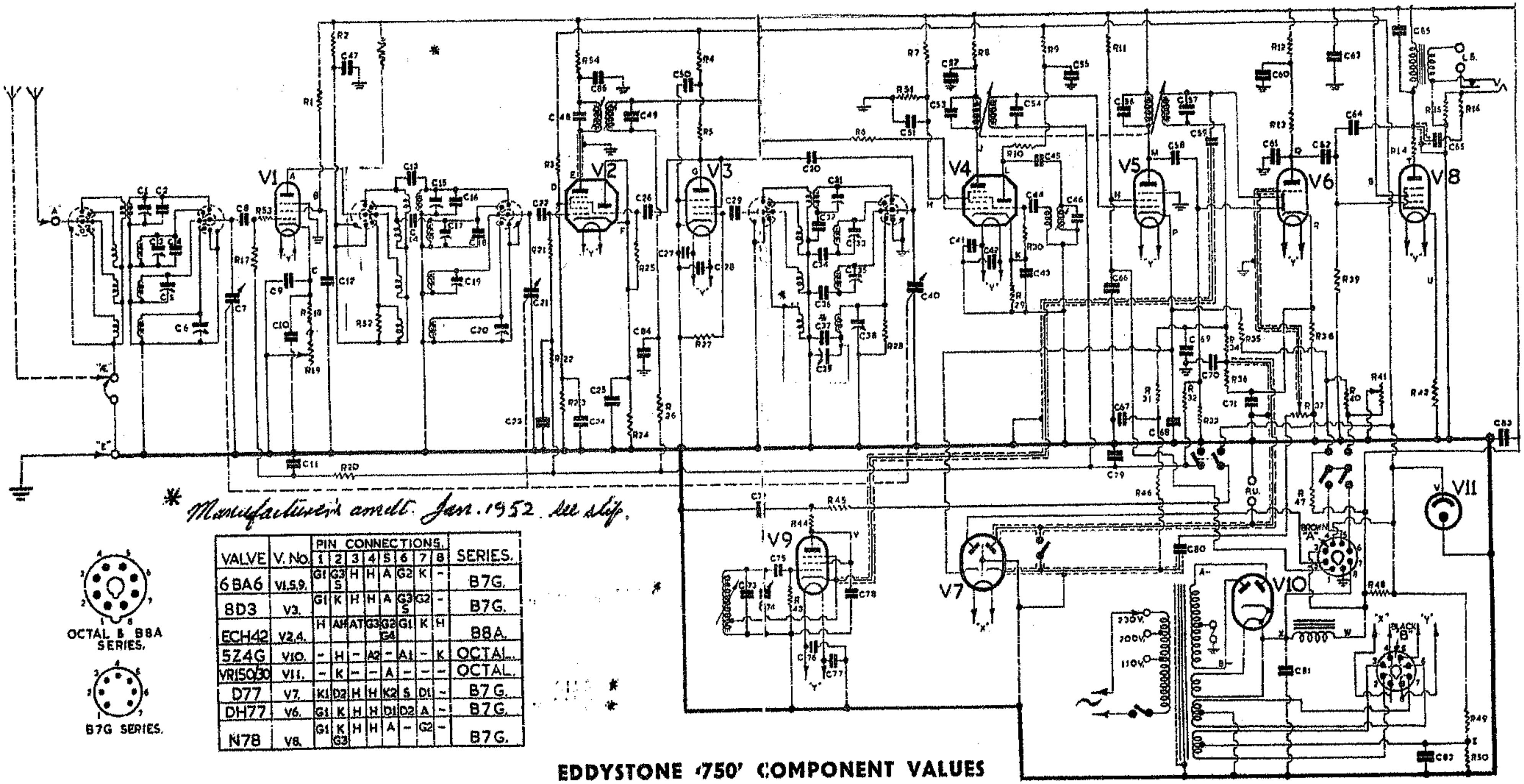
Owing to variations in the valve supply position, equivalents to the valves specified in the Instruction Manual may be fitted, as follows:-

V3	Oscillator	6AM6(8D3)	or	Brimar
		Z77		Osram
V6	Audio Amplifier etc.	DH77	or	Osram
		6AT6		Brimar
V7	Noise Limiter etc.	D77	or	Osram
		6AL5		Brimar

The performance is not in any way affected by the use of these equivalents.

January.1952.

Stratton & Co. Ltd.
Birmingham 31



* Manufacturer's amdt. Jan. 1952 see slip.

VALVE	V. No.	PIN CONNECTIONS. 1	2	3	4	5	6	7	8	SERIES.
6BA6	V1,5,9.	G1	G3 S	H	H	A	G2	K	–	B7G.
8D3	V3.	G1	K	H	H	A	G3 S	G2	–	B7G.
ECH42	V2,4.	H	AH	AT	G3	G2 G4	G1	K	H	B8A.
5Z4G	V10.	–	H	–	A2	–	A1	–	K	OCTAL.
VR150/30	V11.	–	K	–	–	A	–	–	–	OCTAL.
D77	V7.	K1	D2	H	H	K2	S	D1	–	B7G.
DH77	V6.	G1	K	H	H	D1	D2	A	–	B7G.
N78	V8.	G1	K G3	H	H	A	–	G2	–	B7G.

EDDYSTONE '750' COMPONENT VALUES

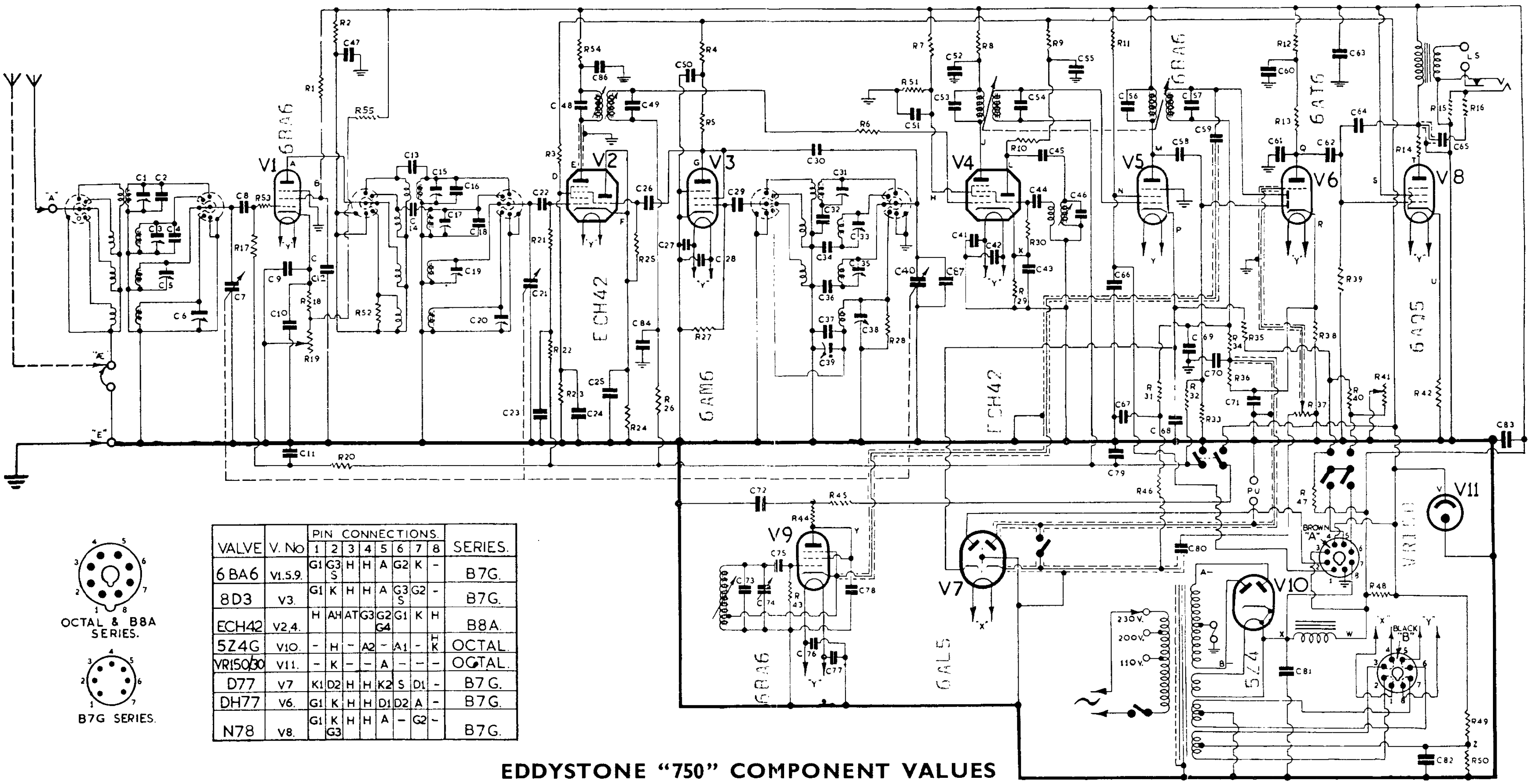
RESISTORS.

R1	33,000 ohms.	½W.
R2	1,000 ohms.	Type 16.
R3	10,000 ohms.	½W.
R4	1,000 ohms.	Type 16.
R5	10,000 ohms.	Type 16.
R6	12 ohms.	½W.
R7	27,000 ohms.	1W.
R8	1,000 ohms.	Type 16.
R9	1,000 ohms.	Type 16.
R10	10,000 ohms.	Type 16.
R11	33,000 ohms.	1W.
R12	27,000 ohms.	Type 16.
R13	270,000 ohms.	Type 16.
R14	47 ohms.	½W.
R15	1,000 ohms.	½W.
R16	33,000 ohms.	½W.
R17	470,000 ohms.	Type 16.
R18	68 ohms.	Type 16.
R19	10,000 ohms.	Potentiometer.
R20	470,000 ohms.	Type 16.
R21	470,000 ohms.	Type 16.
R22	470,000 ohms.	Type 16.
R23	15,000 ohms.	1W.
R24	330 ohms.	½W.
R25	100,000 ohms.	Type 16.
R26	470,000 ohms.	Type 16.
R27	22,000 ohms.	Type 16.
R28	10,000 ohms.	Type 16.
R29	220 ohms.	½W.
R30	47,000 ohms.	Type 16.
R31	1,000,000 ohms.	Type 16.
R32	470,000 ohms.	Type 16.
R33	470,000 ohms.	Type 16.
R34	100,000 ohms.	Type 16.
R35	68 ohms.	Type 16.
R36	100,000 ohms.	Type 16.
R37	500,000 ohms.	Potentiometer.
R38	3,000 ohms.	Type 16.
R39	470,000 ohms.	Type 16.
R40	51,000 ohms.	½W.
R41	10,000 ohms.	Potentiometer.
R42	150 ohms.	½W.
R43	47,000 ohms.	Type 16.
R44	47,000 ohms.	Type 16.
R45	1,000 ohms.	½W.
R46	2,000,000 ohms.	Type 16.
R47	100,000 ohms.	Type 16.
R48	2,700 ohms.	± 5% W.W.
R49	100,000 ohms.	Type 16.
R50	6,800 ohms.	½W.
R51	27,000 ohms.	1W.
R52	3,900 ohms.	Type 16 or Type T.
R53	12 ohms.	Type T.
R54	1,400 ohms.	½W.

CONDENSERS.

C1	3-23 pF.	Air Trimmer.
C2	20 pF.	Silvered Mica.
C3	3-23 pF.	Air Trimmer.
C4	6 pF.	Silvered Mica.
C5	3-23 pF.	Air Trimmer.
C6	3-23 pF.	Air Trimmer.
C7	10-386 pF.	(RF Sect. Gang Cond.)
C8	100 pF.	Silvered Mica.
C9	·1 mfd.	Tub. Paper.
C10	·01 mfd.	Tub. Paper.
C11	·01 mfd.	Tub. Paper.
C12	·1 mfd.	Tub. Paper.
C13	20 pF.	Silvered Mica.
C14	6 pF.	Silvered Mica.
C15	3-23 pF.	Air Trimmer.
C16	20 pF.	Silvered Mica.
C17	3-23 pF.	Air Trimmer.
C18	6 pF.	Silvered Mica.
C19	3-23 pF.	Air Trimmer.
C20	3-23 pF.	Air Trimmer.
C21	10-386 pF.	(Mixer Sect. Gang Cond.)
C22	100 pF.	Silvered Mica.
C23	·01 mfd.	Tub. Paper.
C24	·1 mfd.	Tub. Paper.
C25	·1 mfd.	Tub. Paper.
C26	10 pF.	Silvered Mica.
C27	·0005 mfd.	Moulded Mica.
C28	·0005 mfd.	Moulded Mica.
C29	50 pF.	Silvered Mica.
C30	200 pF.	± 2% Silvered Mica.
C31	3·5-20 pF.	Ceramic Trimmer negative temp. coefficient.
C32	2,100 pF.	± 1% Silvered Mica.
C33	3-23 pF.	Air Trimmer.
C34	900 pF.	± 1% Silvered Mica.
C35	3-23 pF.	Air Trimmer.
C36 *	385 pF.	± 1% Silvered Mica.
C37	100 pF.	Silvered Mica.
C38 *	3-23 pF.	Air Trimmer.
C39	15-45 pF.	Ceramic Trimmer
C40	10-386 pF.	(Osc. Sect. Gang Cond.)
C41	·01 mfd.	Tub. Paper.
C42	·01 mfd.	Tub. Paper.
C43	·01 mfd.	Tub. Paper.
C44	100 pF.	Silvered Mica.
C45	100 pF.	Silvered Mica.
C46	200 pF.	± 2% Silvered Mica.
C47	·1 mfd.	Tub. Paper.
C48	200 pF.	± 2% Silvered Mica.
C49	200 pF.	± 2% Silvered Mica.
C50	·1 mfd.	Tub. Paper.
C51	·1 mfd.	Tub. Paper.
C52	·1 mfd.	Tub. Paper.
C53	800 pF.	± 2% Silvered Mica.
C54	800 pF.	± 2% Silvered Mica.
C55	·1 mfd.	Tub. Paper.
C56	800 pF.	± 2% Silvered Mica.
C57	800 pF.	± 2% Silvered Mica.
C58	20 pF.	Silvered Mica.
C59	20 pF.	Silvered Mica.
C60	8 mfd.	Tub. Elect. 350v. D.C. wkg.
C61	·0005 mfd.	Moulded Mica.
C62	·01 mfd.	Moulded Mica.
C63	·01 mfd.	Moulded Mica.
C64	6 pF.	Silvered Mica.
C65	·01 mfd.	Moulded Mica.
C66	·1 mfd.	Tub. Paper.
C67	·1 mfd.	Tub. Paper.
C68	·1 mfd.	Tub. Paper.
C69	100 pF.	Silvered Mica.
C70	100 pF.	Silvered Mica.
C71	30 mfd.	Elect. 15v. D.C. wkg.
C72	·01 mfd.	Tub. Paper.
C73	400 pF.	± 2% Silvered Mica.
C74	BFO	Pitch Condenser.
C75	100 pF.	Silvered Mica.
C76	·01 mfd.	Tub. Paper.
C77	·01 mfd.	Tub. Paper.
C78	·01 mfd.	Tub. Paper.
C79	·1 mfd.	Tub. Paper.
C80	·01 mfd.	Moulded Mica.
C81	50 mfd.	Elect. 450v. D.C. wkg.
C82	30 mfd.	Elect. 15v. D.C. wkg.
C83	50 mfd.	Elect. 450v. D.C. wkg.
C84	·01 mfd.	Tub. Paper.
C86	·01 mfd.	Tub. Paper.

Early Model Circuit



VALVE	V. No	PIN CONNECTIONS. 1	2	3	4	5	6	7	8	SERIES.
6BA6	V1.5.9.	G1	G3 S	H	H	A	G2	K	-	B7G.
8D3	V3.	G1	K	H	H	A	G3 S	G2	-	B7G.
ECH42	V2.4.	H	AH	AT	G3	G2 G4	G1	K	H	B8A.
5Z4G	V10.	-	H	-	A2	-	A1	-	H K	OCTAL.
VR150/30	V11.	-	K	-	-	A	-	-	-	OCTAL.
D77	V7	K1	D2	H	H	K2	S	D1	-	B7G.
DH77	V6.	G1	K	H	H	D1	D2	A	-	B7G.
N78	V8.	G1	K G3	H	H	A	-	G2	-	B7G.

OCTAL & B8A SERIES.

B7G SERIES.

EDDYSTONE "750" COMPONENT VALUES

RESISTORS.

R1	33,000 ohms.	1W.
R2	1,000 ohms.	Type 16.
R3	10,000 ohms.	½W.
R4	1,000 ohms.	Type 16.
R5	10,000 ohms.	Type 16.
R6	12 ohms.	½W.
R7	27,000 ohms.	1W.
R8	1,000 ohms.	Type 16.
R9	1,000 ohms.	Type 16.
R10	10,000 ohms.	Type 16.
R11	33,000 ohms.	1W.
R12	27,000 ohms.	Type 16.
R13	270,000 ohms.	Type 16.
R14	47 ohms.	½W.
R15	1,000 ohms.	½W.
R16	33,000 ohms.	½W.
R17	470,000 ohms.	Type 16.
R18	68 ohms.	Type 16.
R19	10,000 ohms.	Potentiometer.
R20	470,000 ohms.	Type 16.
R21	470,000 ohms.	Type 16.
R22	470,000 ohms.	Type 16.
R23	15,000 ohms.	1W.
R24	330 ohms.	½W.
R25	100,000 ohms.	Type 16.
R26	470,000 ohms.	Type 16.
R27	22,000 ohms.	Type 16.
R28	10,000 ohms.	Type 16.
R29	220 ohms.	½W.
R30	47,000 ohms.	Type 16.
R31	1,000,000 ohms.	Type 16.
R32	470,000 ohms.	Type 16.
R33	470,000 ohms.	Type 16.
R34	100,000 ohms.	Type 16.
R35	68 ohms.	Type 16.
R36	100,000 ohms.	Type 16.
R37	500,000 ohms.	Potentiometer.
R38	3,000 ohms.	Type 16.
R39	470,000 ohms.	Type 16.
R40	51,000 ohms.	½W.
R41	10,000 ohms.	Potentiometer.
R42	150 ohms.	½W.
R43	47,000 ohms.	Type 16.
R44	47,000 ohms.	Type 16.
R45	1,000 ohms.	½W.
R46	2,000,000 ohms.	Type 16.
R47	100,000 ohms.	Type 16.
R48	2,700 ohms.	± 5% WW.
R49	100,000 ohms.	Type 16.
R50	6,800 ohms.	½W.
R51	27,000 ohms.	1W.
R52	3,900 ohms.	Type 16 or Type T.
R53	12 ohms.	Type T.
R54	1,500 ohms.	½W.
R55	100,000 ohms.	½W

CONDENSERS.

C1	3-23 pF.	Air Trimmer.
C2	20 pF.	Silvered Mica.
C3	3-23 pF.	Air Trimmer.
C4	6 pF.	Silvered Mica.
C5	3-23 pF.	Air Trimmer.
C6	3-23 pF.	Air Trimmer.
C7	10-386 pF.	(RF Sect. Gang Cond.)
C8	100 pF.	Silvered Mica.
C9	·1 mfd.	Tub. Paper.
C10	·01 mfd.	Tub. Paper.
C11	·01 mfd.	Tub. Paper.
C12	·1 mfd.	Tub. Paper.
C13	20 pF.	Silvered Mica.
C14	6 pF.	Silvered Mica.
C15	3-23 pF.	Air Trimmer.
C16	20 pF.	Silvered Mica.
C17	3-23 pF.	Air Trimmer.
C18	6 pF.	Silvered Mica.
C19	3-23 pF.	Air Trimmer.
C20	3-23 pF.	Air Trimmer.
C21	10-386 pF.	(Mixer Sect. Gang Cond.)
C22	100 pF.	Silvered Mica.
C23	·01 mfd.	Tub. Paper.
C24	·1 mfd.	Tub. Paper.
C25	·1 mfd.	Tub. Paper.
C26	10 pF.	Ceramic.
C27	·0005 mfd.	Moulded Mica.
C28	·0005 mfd.	Moulded Mica.
C29	50 pF.	Silvered Mica.
C30	200 pF.	± 2% Silvered Mica.
C31	3·5-20 pF.	Ceramic Trimmer negative temp. coefficient.
C32	2,100 pF.	± 1% Silvered Mica.
C33	3-23 pF.	Air Trimmer.
C34	900 pF.	± 1% Silvered Mica.
C35	3-23 pF.	Air Trimmer.
C36	385 pF.	± 1% Silvered Mica.
C37 *	80 pF.	Silvered Mica.
C38	3-23 pF.	Air Trimmer.
C39	3-23 pF.	Air Trimmer
C40	10-386 pF.	(Osc. Sect. Gang Cond.)
C41	·01 mfd.	Tub. Paper.
C42	·01 mfd.	Tub. Paper.
C43	·01 mfd.	Tub. Paper.
C44	100 pF.	Silvered Mica.
C45	100 pF.	Silvered Mica.
C46	200 pF.	± 2% Silvered Mica.
C47	·1 mfd.	Tub. Paper.
C48	200 pF.	± 2% Silvered Mica.
C49	200 pF.	± 2% Silvered Mica.
C50	·1 mfd.	Tub. Paper.
C51	·1 mfd.	Tub. Paper.
C52	·1 mfd.	Tub. Paper.
C53	800 pF.	± 2% Silvered Mica.
C54	800 pF.	± 2% Silvered Mica.
C55	·1 mfd.	Tub. Paper.
C56	800 pF.	± 2% Silvered Mica.
C57	800 pF.	± 2% Silvered Mica.
C58	20 pF.	Silvered Mica.
C59	20 pF.	Silvered Mica.
C60	8 mfd.	Tub. Elect. 350v. D.C. wkg.
C61	·0005 mfd.	Moulded Mica.
C62	·01 mfd.	Moulded Mica.
C63	·01 mfd.	Moulded Mica.
C64	6 pF.	Silvered Mica.
C65	·01 mfd.	Moulded Mica.
C66	·1 mfd.	Tub. Paper.
C67	·1 mfd.	Tub. Paper.
C68	·1 mfd.	Tub. Paper.
C69	100 pF.	Silvered Mica.
C70	100 pF.	Silvered Mica.
C71	30 mfd.	Elect. 15v. D.C. wkg.
C72	·01 mfd.	Tub. Paper.
C73	400 pF.	± 2% Silvered Mica.
C74	BFO	Pitch Condenser.
C75	100 pF.	Silvered Mica.
C76	·01 mfd.	Tub. Paper.
C77	·01 mfd.	Tub. Paper.
C78	·01 mfd.	Tub. Paper.
C79	·1 mfd.	Tub. Paper.
C80	·01 mfd.	Moulded Mica.
C81	50 mfd.	Elect. 450v. D.C. wkg.
C82	30 mfd.	Elect. 15v. D.C. wkg.
C83	50 mfd.	Elect. 450v. D.C. wkg.
C84	·01 mfd.	Tub. Paper.
C86	·01 mfd.	Tub. Paper.
C87	10 pF.	Ceramic.

* The 80 pF. may be silvered-mica or a ceramic condenser or a combination of both connected in parallel to obtain the correct temperature co-efficient for drift compensation.

Later Model Circuit

THE EDDYSTONE '750' COMMUNICATIONS RECEIVER.

BY

J. N. WALKER (G5JU)

Introduction.

The Eddystone '640' Receiver introduced in 1947, is well known in Arabia and has earned excellent reputation for good sensitivity, low background noise and well-engineered construction. Production of the '640' ceased some time ago and the manufacturers, Messrs. Stratton & Co. Ltd., Birmingham, England, have introduced an improved receiver, the model '750'. The following paragraphs discuss present-day amateur requirements and show how they have been met in the '750' receiver.

Selectivity.

Undoubtedly, with the considerable increased activity on practically all amateur bands in many countries, a most essential requirement is selectivity of a very high order.

As many readers will know, the overall selectivity depends (in a superheterodyne receiver) to a large extent on the design of the IF stages and such design covers many factors, including number of stages, frequency, degree of coupling between coils, and types of valves used.

By suitably designing the coils, a very steep IF response curve can be secured if the frequency is made rather low, that is, in the region of 80 to 110 Kc/s. It is not feasible, however, to employ low frequency IF stages immediately following the frequency changer for the reason the image interference will then be so serious as to be intolerable, particularly on the higher frequencies, where the RF stage, no matter how well designed, will not tune sharply enough to permit adequate rejection of the image signals.

One of the best methods of eliminating image interference is to employ a fairly high intermediate frequency and 1.6 Mc/s is in common use. This is the IF in the '640' Receiver and although, because of their exceptionally good design, the IF stages in the '640' give better-than-average selectivity, a still higher degree is desirable.

The answer to the problem of obtaining high adjacent channel selectivity with freedom from image interference is to adopt the double superhet principle as has been done in the '750' Receiver. The first IF is 1629 Kc/s and the second 85 Kc/s. In the 85 Kc/s transformers, the coupling between the coils can be varied mechanically to give a wide range of selectivity. At the extreme, the response is 60 db down at 5 Kc/s off resonance, giving a very sharp "noie" and almost the highest usable degree of selectivity. This position is for CW reception—telephony is still readable but the side bands are cut to a considerable extent.

With the selectivity control at minimum, the response is 30 db down at 5 Kc/s off resonance. This still represents a much higher the average selectivity and telephone stations only a few kilocycles apart can be separated easily, whilst maintaining moderately good audio quality. As a matter of interest, provided a loudspeaker of adequate size is used, properly mounted, the quality of speech and music from broadcast stations will satisfy all but the most critical.

Problem associated with the Double Superhet.

The construction of a double superhet receiver is not quite such a straightforward job as it might seem. It must be remembered that there are altogether three oscillators operating when CW signals are being received—one variable according to the signal frequency, one at 1535 Kc/s and the BFO at 84/86 Kc/s. Obviously, very careful attention is necessary to avoid interaction between the fundamental and harmonic frequencies and the screening and decoupling must be beyond reproach. The manufacturers do not claim that the '750' is completely free from occasional heterodyne beat—it would involve vast expense to ensure complete immunity—but they do claim that on the two higher frequency ranges spurious signals are to all intents and purposes non-existent and so weak on the other two ranges as to cause no difficulty.

Sensitivity and Signal-to-Noise Ratio.

These two features are being dealt with as one, since it is pointless to quote only sensitivity, without reference to the noise level. By adding valve after valve to a receiver, the absolute sensitivity can be increased but whether any worth while improvement in actual reception of signals takes place depends on how much the noise level increases. Which leads do a point about specifying sensitivity. Most well designed communications receiver will render audible signals having a strength of one microvolt or possibly less, but the information is really useful only when a figure is quoted in comparison with noise. In the '750' the *minimum* sensitivity is quoted as 5 microvolts for a 20 db signal-to-noise ratio - which is an extremely good figure. It simply means that a comparatively weak signal is audible against a very quiet background and this is one of the most noticeable and most appreciated features which immediately claim attention when one comes to use the '750'.

It is normal for the sensitivity to vary to some degree over each range of a receiver. Sometimes, the variation is great but in the '750' the interstage couplings have been adjusted so that the variation is small. Maintenance of accurate tracking of the ganged condenser also assists considerably in this respect.

Valves.

Of recent years much research has taken place in the development of improved valves and the modern miniature types have many advantages over older types. One is the short lead-out wires, resulting in low inductance, another the lowe anode/gris capacity, achieved by reason of better internal screening—two factors which materially assist in improving the high frequency performance. In the '750', nine miniature valves are employed, plus a rectifier and a neon stabiliser, the two latter being of the octal type.

Circuit Line-Up.

By reason of careful design and the use of a high slope 6BA6 valve, the RF stage gives amplification of a high order. The gain is more than sufficient for all normal purposes and the addition of a second stage is not justified.

Then follows the first frequency changer, in which position an ECH42 triode-hexode valve is used. The anode of the triode portion is earthed and the oscillator voltage, developed by a separate valve (a 6AM6) is injected into the grid. An increased degree of frequency stability is thereby secured.

The output at 1620 Kc/s from the IF transformer in the anode circuit of the ECH42 is fed direct to the second frequency changer, another ECH42. Now some may question the absence of an intermediate amplifying stage, so a few words on this will not be out of place. Whether or not an amplifying stage will be of benefit depends on the signal voltage required at the grid of the second frenquency-changer to ensure a high signal-to-noise ratio. In the '750', the high gain given by the RF stage, the good conversion efficiency of the first frequency-changer, and the high "Q" of the voltage magnification given by the 1620 Kc/s IF transformer result in the voltage at the grid of the second frequency changer being adequate without further amplification.

The oscillator section of the second ECH42 operates at a fixed frequency of 1535 Kc/s and the resulting output at 85

Kc/s is fed to a high "Q" transformer and amplified by the 6BA6 high slope valve. As mentioned earlier, the coupling between the windings in both transformers are continuously variable by a mechanical leakage controlled by a butterfly knob on the front panel.

There follows a double diode triode. the diode being employed one for signal detection, the other for AGC, the triode section amplifying the audio signal before it is passed on to the high slope N78 output valve. The latter is a new type of Osram manufacture and is capable of giving in excess of 3.5 watts output at a low level of distortion.

One diode of a type 6AL5 valve is used as a series noise limiter, and, as a result of the careful attention given to the design, this limiter is strikingly effective and is a great boon in situations where automobile ignition and similar interference is prevalent. The noise limiter has only a slight effect on the general audio level.

The second diode is connected in series with the external "S" Meter (when used). By its normal rectifier action, it prevents the flow of current in a reverse direction, and thus prevent possibility of damage to the 200 microampere movement fitted to the "S" Meter.

The BFO is a completely screened unit, utilising a 6BA6 valve and designed for high stability.

The VR150/30 stabiliser valve regulates the HT voltage to the anodes of the oscillator valves, to the screen of the first frequency changer valve and also to the resistor network associated with the "S" Meter when the latter is used. Finally, there is a 5Z4G rectifier valve.

Special Points about the '750'.

Attention has already been drawn to the high selectivity and sensitivity possessed by the '750' receiver and there are a number of other features which deserve mention.

The heater circuits are balanced, the centre tap of the transformer winding being earthed. Heater by-pass condensers are used where necessary and tray couplings through the heater wiring minimised. As a result, there is a complete absence of modulation hum right up to the highest frequency — signals with a T9 note are heard as T9. The smoothing in the HT lines is fully adequate and no hum is heard from this source.

Special attention has been given to the noise limiter circuit, not only to make it fully effective, but also to prevent the introduction of hum due to heater cathode leakage. A separate centre tapped winding is employed for the noise limiter valve and a bias system is arranged to ensure that the cathode is positive to the heater.

The transformer fitted to the '750' is of generous size and is capable of providing more power than the '750' actually uses. The transformer therefore runs cool under any conditions. All components are finished for tropical use, the metal has been specially treated to resist corrosion and reliability of a high order is assured even when the receiver is operated in areas of high ambient temperature and humidity.

Tuning Mechanism.

The train of spring-loaded gears forming the tuning mechanism is a fine piece of small engineering. The control knob spindle is flywheel loaded and the movement is smooth and positive. The mean reduction ratio between control knob and gang condenser spindle is approximately 150 to 1, which makes possible very fine tuning. The scale is directly calibrated, a noticeable feature being the linear spacing of the markings. The dial is large, occupying the major portion of the front panel and it is edge-illuminated by three small lamps fitted along the top.

Band-Spread.

Driven from the main gears is a rotating scale, the gradation on which (0—100 divisions) are read off in the opening at the top of the main scale. For every complete revolution of the auxiliary scale, the main pointer moves the length of one major division printed at the bottom of the main scale. In all, the band-spread scale covers 2,500 divisions over each wave range, equivalent to a length of about 32 feet. It follows that ample band-spread is available on each of the amateur bands, the actual figures being given below. These are based on the allocations made at the Atlantic City Conference.

Band Width.	Tuning Coverage On Vernier Scale.	Vernier Divisions of Band-Spread.	Kilo-cycles in Band.
29.7 Mc/s to 28 Mc/s	34 375"	208	1700
21.45 Mc/s to 21 Mc/s	7.5"	45.5	450
14.35 Mc/s to 14 Mc/s	6.45"	39	350
7.3 Mc/s to 7 Mc/s	15"	91	300
4.0 Mc/s to 3.5 Mc/s	61"	364	500
2.0 Mc/s to 1.8 Mc/s	30"	182	200

Use other than on Amateur Bands.

The total coverage of the '750' Receiver is from 32 Mc/s (below 10 metres) to 480 Kc/s, continuous except for a small gap which must necessarily be allowed on each side of the first intermediate frequency of 1620 Kc/s. It will be appreciated therefore that the '750' is suitable for the reception of short wave broadcast stations on all internationally allocated frequencies, for reception of commercial and ship stations (telegraphy or telephony) and for medium wave reception, in areas where stations operate on medium waves. Provided the loud speaker employed is capable of good reception, excellent quality is obtained from the '750' Receiver with the selectivity switch at "minimum", whilst at the same time, interference from stations on adjacent channels is much reduced, if found at all, because the inherent selectivity of the '750' is considerably greater than the average domestic broadcast receiver.

Absence of Crystal Filter.

The selectivity given by the '750' Receiver with the control at maximum is so great that it is practically impossible to make effective use of any greater degree. It is therefore not necessaiy to go to the expense of adding a crsytal filter, with the attendant complications.

Operation on Telephony.

With its high sensitivity and low noise level, the '750' Receiver is the ideal for those whose interests lie in the reception of weak telephony, either from amateur stations or from far distant broadcast stations. The intelligibility of such transmission can be enhanced by careful adjustment of the selectivity control, which should be at minimum with strong stations and in cases where interference is not present. Unfortunately, under present day conditions, interference is a major problem and occurs only too often. Moving the selectivity control towards maximum will gradually cut it out and only in extreme cases will it be necessary to use the highest possible selectivity.

Automatic gain control in the '750' is most effective and the audio output from a given signal is held within close limits despite severe fading.

CW Operation.

Some experience is necessary with any receiver if maximum results are to be secured and the '750' is no exception to this rule. When the BFO is switched on, AGC is cut out (otherwise the sensitivity would suffer). With minimum selectivity, the IF transformer couplings are optimum and there is rather more IF gain available than is desirable under normal circumstances. Hence IF gain should be reduced manually.

In the majority of cases, it will be advantegeous to use a high degree of selectivity, and, with the transformer couplings below optimum, the IF gain control should be advanced.

The BFO pitch control gives a variation of 3 Kc/s each side of zero beat. Because of the very steep slope of the selectivity curve, it will be found that a signal peaks up, on the side to which the BFO pitch is set. When interference is present, it can often be reduced or removed by moving the BFO pitch to the other side of zero beat and then slightly returning. In effect, single signal reception is possible.

Standby Switch.

The standby switch is fitted with a long "dolly" (operating lever) so that there is no mistaking it from the other switches The method used for muting the receiver is to increase the bias on the IF amplifier valve, with the HT remaining on all stages. Two benefits result - the oscillator valves operate under constant conditions thereby maintaining good frequency stability and the receiver is available to monitor the out going signal from the associated transmitter.

Pick-Up Terminals.

Provision is made for the use of a standard type crystal or magnetic pick-up and, as the audio section of the '750' receiver has a practically linear frequency response from 50 10 10,000 c p.s., the quality of reproduction from gramophone records is excellent.

The pick-up terminals serve another useful purpose— a signal from a separate monitor (CW or telephony) can be fed in and will become audible on the telephone or loudspeaker, thereby rendering unnecessary an external switch.

"S" Meter.

Some operators like to have available an "S" Meter, which instrument can be very useful for comparative reports of telephony transmissions and as a tuning indicator. Other operators, and particularly those whose main interest is CW, do not require an "S" Meter and the latter is therefore made an optional extra. It takes the form of a diecast housing finished to match the receiver and fitted with an octal plug which only has to be inserted in the socket at the rear of the receiver to bring the "S" Meter into use.

Power Requirements.

The '750' Receiver is designed for operation normally from AC mains, 40/60 cycles, a voltage selector panel enabling voltage of 110, 200/220 and 230/250 to be chosen. The consumption from the mains is approximately 70 watts. The transformer is of more than adequate size and runs cool over an extended period. Very generous smoothing is included, with a consequent absence of hum.

On occasions, it may be desired to operate the receiver from a battery supply and a special vibrator unit is available to meet this requirement Listed under Cat. No. 687/1, this unit is contained in a small cabinet which matches the receiver, and is fitted with plugs for connection to the receiver. The consumption from a 6 volt accumulator is in the region of amperes.

Very special attention has been paid to the problem of eliminating the interference-producing "hash" developed by the vibrator itself, provided the instructions supplied with the unit are followed, no difficulty will be experienced from this source.

Construction.

The mechanical construction is most substantial and follows the usual Eddystone standard, with which many readers will probably be acquainted. The front panel is an alluminium diecasting, securely attached to the diecast coil-box. These two units form a solid foundation for the receiver. The very thorough screening conferred by the thick metal coil-box is one reason why Eddystone receivers possess a performance well above average.

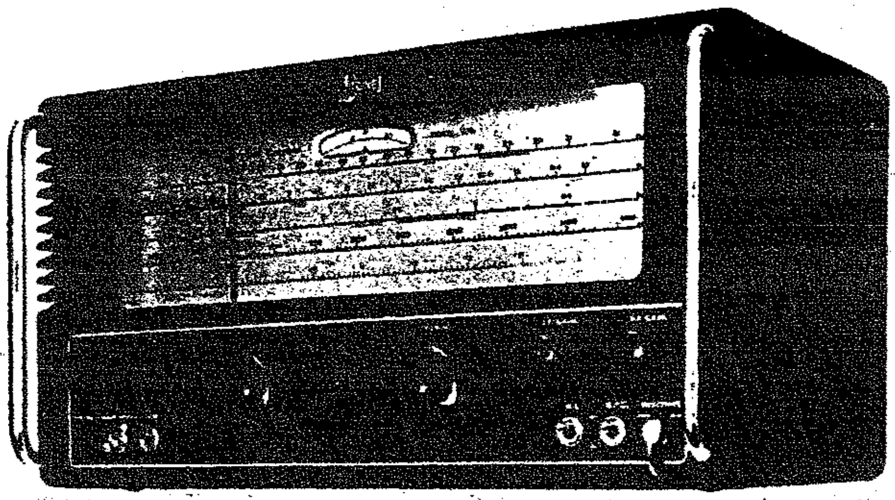
The exterior of the receiver is finished a fine ripple black, the steel cabinet first being specially treated to resist corrosion. The workmanship throughout is first-class, and this high standard is maintained equally in all sections. As the illustration shows, the finished product possesses a most presentable appearance.

Conclusion.

Although the foregoing description of the new Eddystone receiver is fairly lengthy, it still does not cover the subject completely nor do justice to the inherent "know-how" which has gone into the design of the receiver. But enough has been said to enable the reader to judge for himself the suitability of the '750' for use in amateur and professional communications and for broad-cast reception on high and medium frequencies.

C. D. & Bros.' Press, Aden.

EDDYSTONE '750' COMMUNICATIONS RECEIVER



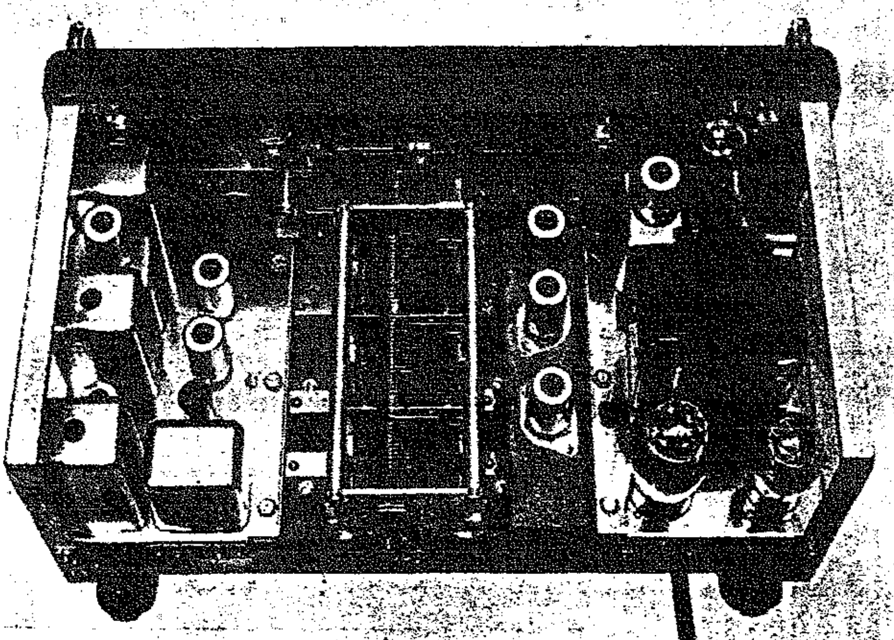
Cat. No. T1315. Eddystone "750" 10 valve (including rectifier) Double Superhet Communications Receiver. Illustrated. A large full vision dial is employed with 5 scales (1) 12 to 32 Mc/s., (2) 4.5 to 12 Mcs., (3) 1.7 to 4.5 Mcs., (4) 480 Kc's. to 1460 Kcs. (broadcast band) and the sixth scale is for logging purposes and when used with the bandspread indicator extremely accurate logging ensures, and as there is only one tuning control once a station has been logged the dial setting can be secured with precision.

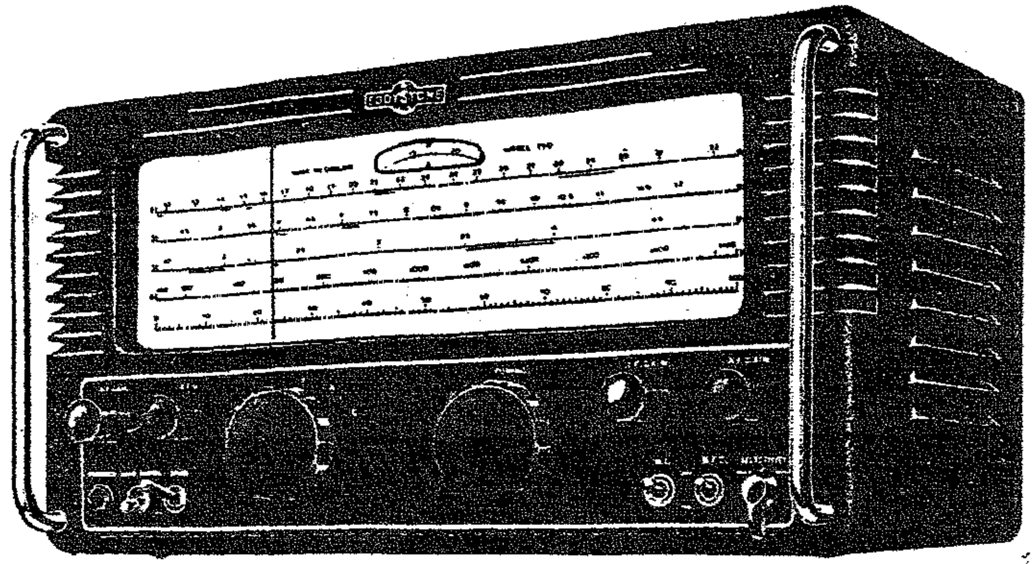
A gear driven (flywheel loaded) tuning mechanism is incorporated with a high reduction ratio—about 200 to 1. There is an auxiliary bandspread indicator, which gives the equivalent of ninety tuning inches per range which is considered adequate on all bands—for example, the scale indication at 30 Mc/s. is equivalent to 240 Kc/s. per inch and six rotations of the tuning knob are required to tune through one megacycle.

The circuit is a double superhet with one RF. stage and the first IF. is set at 1600 Kc/s. and the second at 85 Kc/s. A good image ratio is secured, combined with a high degree of selectivity which is variable to cover telephony and CW. operation. Modern miniature valves are used (except the rectifier and voltage stabiliser) A socket is provided at the rear to enable external units (e.g. a convertor or preselector) to draw power from the "750" power supply, which is provided with a generous margin for this purpose.

Other features include BFO, effective noise limiter, provision for external "S" meter, carefully designed A.G.C. circuits, provision for headphones, separate RF, IF and AF gain controls, provision for single wire or doublet aerial, stabilised HT supply, provision for operation from external HT and LT supplies. The output is over 3 watts audio £45.0.0

PRODUCTION COMMENCES EARLY 1950. ORDERS ARE BEING ACCEPTED NOW FOR DELIVERY IN ROTATION.





THE EDDYSTONE "750" RECEIVER

Of the double superheterodyne communication type, this model possesses very high selectivity with practically complete freedom from image interference. H.T. supply to the oscillators is stabilised.

FREQUENCY RANGE.

Band 1 ...	32 Mc/s. to 12 Mc/s.	Band 3 ...	4·5 Mc/s. to 1·7 Mc/s.
Band 2 ...	12 Mc/s. to 4·5 Mc/s.	Band 4 ...	1465 kc/s. to 480 kc/s.

VALVE LINE-UP.—Eleven valves perform the following functions :

R.F. Amplifier ...	V1	6BA6
Mixer (S.F. to 1620 kc/s.) ...	V2	ECH42
Oscillator ...	V3	6AM6/Z77
Frequency-changer (to 85 kc/s.) ...	V4	ECH42
I.F. Amplifier ...	V5	6BA6
Detector, A.G.C. and A.F. ...	V6	DH77
N.L. and " S " Meter Diodes ...	V7	6AL5/D77
Output ...	V8	N78
Beat Frequency Oscillator ...	V9	6BA6
Rectifier ...	V10	5Z4G
Stabiliser ...	V11	VR150/30

ELECTRICAL PERFORMANCE.—Sensitivity for 50 milliwatts, 15 db signal/noise ratio, 5 microvolts or better on all ranges.

SELECTIVITY.—Is variable over the range 30 db to 60 db down 5 kc/s. off resonance. Image ratio : better than 40 db at 30 Mc/s. and greater at lower frequencies.

AUTOMATIC GAIN CONTROL.—15 db change of output for 90 db change of input, above 3 microvolts at 8 Mc/s.

AUDIO OUTPUT.—Maximum output is 3·5 watts. Pick-up terminals are fitted and audio stages give linear amplification over a wide frequency range.

POWER INPUT.—70 watts. Receiver can be operated from a 6 volt accumulator in conjunction with Cat. No. 687/1 Vibrator Power Unit. (A fuse is fitted).

" S " METER.—A socket at the rear accepts the Cat. No. 669 Signal Strength Meter.

FINISH.—Fine black ripple. Weight 40 lbs. Width 16¾" ; Depth 10" ; Height 8¾".

LIST PRICE IN U.K. : £78 0s. 0d. (Exempt from Purchase Tax)

– 1950.

A True Double-Conversion Superhet . . .

EDDYSTONE 750

— fiine British-made Communications Receiver of advanced design and first class construction.

Measures 16¾in. wide, 10in. deep, 8¾in. high. Inputs of 110 and 200/240 volts; 40/60 cycles are catered for, the power consumption from mains being approximately 70 watts.
FOUR WAVE BANDS — the first three overlapping and covering 32 to 1.7 mc/s. and the fourth covering 1465 to 480 kc/s.— each band selected by a low-capacity switch.

CONTROLS: The controls are —

Tuning	..	B.F.O. Switch and A.G.C.
Band Selector	..	Noise Limiter, on/off
R.F. Gain	..	Standby Switch (with long dolly)
I.F. Gain	..	
A.F. Gain	..	Mains, on/off Switch
B.F.O. Pitch	..	Selectivity Control

Separate R.F., I.F., and A.F. gain controls combined with selectivity variable over wide limits ensure maximum performance under all conditions of operation.

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