DEDICATED TO THE EUG FOUNDER, TED MOORE, G7AIR (SK) – SEE PAGE 24

Restoration of an Eddystone EB35 MkI - by Gerry O'Hara, G8GUH/VE7GUH

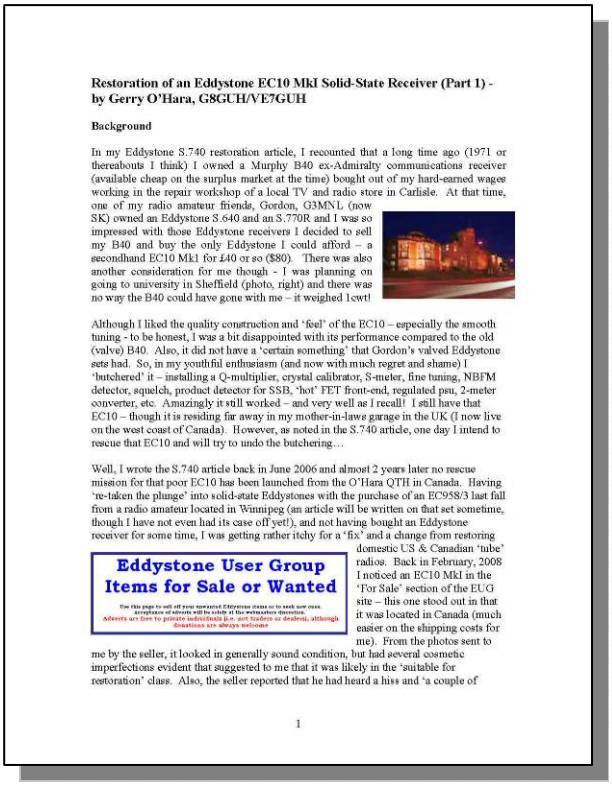
Background

Well, my modest Eddystone collection is growing – slowly but surely, both valve and transistor technology sets – now over 20 in all plus some paraphernalia (S-Meter, Speakers, Edometer, several coils for that up-coming homebrew AW2 project, etc), and even my wife has conceded to allow more of them into the house, but with the proviso of no more vintage domestic sets, unless I part with those I already own one-for one, as space is becoming a premium, even in our 3,800 sq ft house (our basement has even developed that robust and distinctive 'museum odour'). So, I now get around my radio restoration passion by restoring sets for the SPARC museum instead of buying them.

Having the Eddystone 1570/1 working well and completed re-capping/aligning my S.830/4, what next on the Eddystone front? Well, as fate would have it there was a somewhat dilapidated EB35 (MkI) going for sale for a realistic price in the UK, and even with shipping costs from Blighty, it still seemed reasonable, particularly as the set was reportedly working on VHF/FM and AM. So, off went the cheque…

Context of the EB35 MkI

My EC10 article (Part 1) recounted a brief history of the transistor radio through the 1950's and also some of Eddystone's first experiments with transistors around 1960 (see the *Cooke Report*, p18), with the first transistor set having an Eddystone pedigree was reportedly the 'Stratton Portable' produced in 1961. Graeme Wormald in the QRG makes the following comments:



Restoration of an Eddystone EC10 MkI Solid-State Receiver (Part 1) - by Gerry O'Hara, G8GUH/VE7GUH

Background

In my Eddystone S.740 restoration article, I recounted that a long time ago (1971 or thereabouts I think) I owned a Murphy B40 ex-Admiralty communications receiver (available cheap on the surplus market at the time) bought out of my hard-earned wages working in the repair workshop of a local TV and radio store in Carlisle. At that time, one of my radio amateur friends, Gordon, G3MNL (now SK) owned an Eddystone S.640 and an S.770R and I was so impressed with those Eddystone receivers I decided to sell my B40 and buy the only Eddystone I could afford – a secondhand EC10 Mk1 for £40 or so ($80). There was also another consideration for me though - I was planning on going to university in Sheffield (photo, right) and there was no way the B40 could have gone with me – it weighed 1cwt!

Although I liked the quality construction and 'feel' of the EC10 – especially the smooth tuning - to be honest, I was a bit disappointed with its performance compared to the old (valve) B40. Also, it did not have a 'certain something' that Gordon's valved Eddystone sets had. So, in my youthful enthusiasm (and now with much regret and shame) I 'butchered' it – installing a Q-multiplier, crystal calibrator, S-meter, fine tuning, NBFM detector, squelch, product detector for SSB, 'hot' FET front-end, regulated psu, 2-meter converter, etc. Amazingly it still worked – and very well as I recall! I still have that EC10 – though it is residing far away in my mother-in-laws garage in the UK (I now live on the west coast of Canada). However, as noted in the S.740 article, one day I intend to rescue that EC10 and will try to undo the butchering….

Well, I wrote the S.740 article back in June 2006 and almost 2 years later no rescue mission for that poor EC10 has been launched from the O'Hara QTH in Canada. Having 're-taken the plunge' into solid-state Eddystones with the purchase of an EC958/3 last fall from a radio amateur located in Winnipeg (an article will be written on that set sometime, though I have not even had its case off yet!), and not having bought an Eddystone receiver for some time, I was getting rather itchy for a 'fix' and a change from restoring domestic US & Canadian 'tube' radios. Back in February, 2008 I noticed an EC10 MkI in the 'For Sale' section of the EUG site – this one stood out in that it was located in Canada (much easier on the shipping costs for me). From the photos sent to me by the seller, it looked in generally sound condition, but had several cosmetic imperfections evident that suggested to me that it was likely in the 'suitable for restoration' class. Also, the seller reported that he had heard a hiss and 'a couple of

Eddystone User Group Items for Sale or Wanted

1

> *"…Transistor Radios were new and it was thought that an opening might exist. The radio* [the 'Stratton Portable'] *covered Long, Medium and Short waves up to 30MHz as well as VHF/FM* [quite impressive for its day!]. *It was built into a diecast box with a ferrite rod aerial in a plastic handle and rabbits' ears for HF/VHF.*
>
> *Needless to say, the build quality was far too good for the cut-throat competition of the mail order market. Three sets were constructed. They were raffled off amongst those involve with the development. You never know; one day* [one might turn-up].... *But it gave Eddystone's their first experience of solid state design."*

Building on this knowledge, and staying within their more traditional and familiar territory of communications receivers, Eddystone launched their first all-solid-state general coverage communications receiver in 1962, the S.960. This set looked identical externally to an S.940, though with transistor circuitry replacing the traditional valves. The S.960 sported 12 germanium transistors and seven diodes, had six ranges covering 500kHz to 30MHz and was powered by an internal 12 volt battery pack. The circuit had one RF stage and three 465kHz IF stages, including a bandpass crystal filter. Its performance was apparently (and very believably) not on a par with the S.940 however, and the S.960 was dropped from the Eddystone range after the Bath Tub manufactured only 150 of the sets over 2 years. It is worth noting that the transistors used in the first experimental Eddystone solid-state sets cost the equivalent of around £50 ($75) *each*.

The next solid-state set out the Bath Tub (1963) was the famous EC10 – one of the companies biggest successes in terms of total sales (over 16,000 MkI and MkII series sets combined). This set was an instant hit, receiving favourable radio press reviews and satisfying the need for a more 'modern' and compact communications receiver at a (fairly) reasonable price point. The EC10 was housed in a much smaller case (12" wide) than the S.960, while still retaining the famous Eddystone slide rule dial that made tuning the set a pleasure, as well as the hallmark Eddystone mechanical construction that made it *feel* like a quality piece of kit. The EC10 used an all-germanium PNP transistor line-up that shared many circuit design elements with the S.960, but was constructed on two 'Paxolin' printed circuit boards, with a zener-stabilized nominal 6.5 volt supply to the RF amplifier, mixer, local oscillator (LO) and the beat frequency oscillator (BFO) stages. The set could be powered from a removable battery pack using 6 'D' sized dry-cells to provide a nominal 9 volts, positive earth supply (positive earth was the norm when using all-PNP transistor circuitry). A mains power supply (Type 924) could be substituted for the battery pack.

The EC10 sold on average around 1,000 sets per year - having a ready market in the Amateur Radio, Short Wave Listener (SWL) and ex-pat communities, covering Medium and Short Waves through to 30MHz, having a BFO, an audio filter for CW, and battery or mains operation. However, Eddystone soon realized that they were missing out on another segment of the market – those who were not really interested in the amateur bands or receiving CW traffic. These listeners were more interested in the Long, Medium and Shortwave broadcast bands through to 22MHz, per the traditional marine 'cabin set' market (replacement for the S.870/S.870A), and perhaps also the recently-

introduced VHF-FM band between 88 – 108MHz, especially if the FM tuner could be output to a HiFi unit, saving the owner the expense of buying a separate FM tuner.

Many sets were of course available to do one or more of these jobs in the early/mid-1960's – either from British manufactures or from the increasing number of imports – both valve and transistor[1], however, not many could do all, or be used from battery or mains, and the quality of construction and performance often left something to be desired. An Eddystone set to cater for this market could have simplified controls (eg. no BFO, AF filter or RF Gain), but would usefully include a tone control, AF input/output and retain the momentary dial light facility as on the EC10 to conserve power when operated on batteries. Enter the EB35 – a development of the popular EC10 to do just these things with some re-engineering of a tried and tested design.

The EB35 MkI was introduced in 1965 and was another success, selling in similar numbers to the EC10 (the QRG notes that 2,100 were sold by January, 1967). I also note from the QRG[2] that this is the Eddystone model that Prince Charles had screwed under the dash of his new sports car, not an EC10 per my article on that model[3] – makes sense, as somehow I cannot imagine HRH fumbling with the warbly EC10 BFO listening to CW traffic on 40m while doing a ton up the A1... even when he was a young whippersnapper (was Charles ever young?). Anyway, I really don't understand what took Eddystone so long to develop the EB35 (ostensibly two years, assuming it was the next set on the transistor-set drawing board after the EC10), however, although the chassis, case, front panel and tuning mechanism are identical to the EC10 - the front panel casting on my EB35 even has the cut-out for the EC10 switch bank - it did mean engineering two new circuit boards (albeit both with strong similarities to the EC10) and the VHF tuner unit (an outsourced standard Mullard unit). The EB35 also sports a different fingerplate and the newer-style

Tony Grogan, WA4MRR, reports from North Carolina that in the early sixties he used to work for Bill Cooke and Harold Cox at the Bath Tub. He used to align the 830/4, 830/7, 770R and 770U and 888A as they came off the assembly line.

He also remembers working on the design of the EC10/EB35. An early memory he has of the latter was a 'special' to be installed by Webbs of London in Prince Charles's new sports car. Apparently the EB35, although not made for automobile use, was a "hot ticket item" with the jet set, according to Tony. Well, there's always something new to discover!

[1] See 'Radio Radio' by Jonathan Hill for examples.
[2] Also, see Lighthouse Issue 67, p21 – excerpt shown in the clip on this page.
[3] Prince Charles had an Aston Martin DB6 as a 21st birthday prezzy from the Queen – now that would place it at November, 1969 – if he had hung on a bit he could have had an EB35 MkII. Now, I always thought Charles drove a Scimitar (per my comment in the EC10 article), having seen him in one on TV way back then – but actually, according to Wikipedia, it was Princess Anne who was given a Scimitar for a joint 20th birthday present and Christmas present in November, 1970 by the Queen. Well, you learn something every day eh? So he must have been cadging a ride off his sis' when I saw him. Also, apparently, Charles had his Aston converted to run on bioethanol, distilled from British wine, back in 2008 - no further comment…

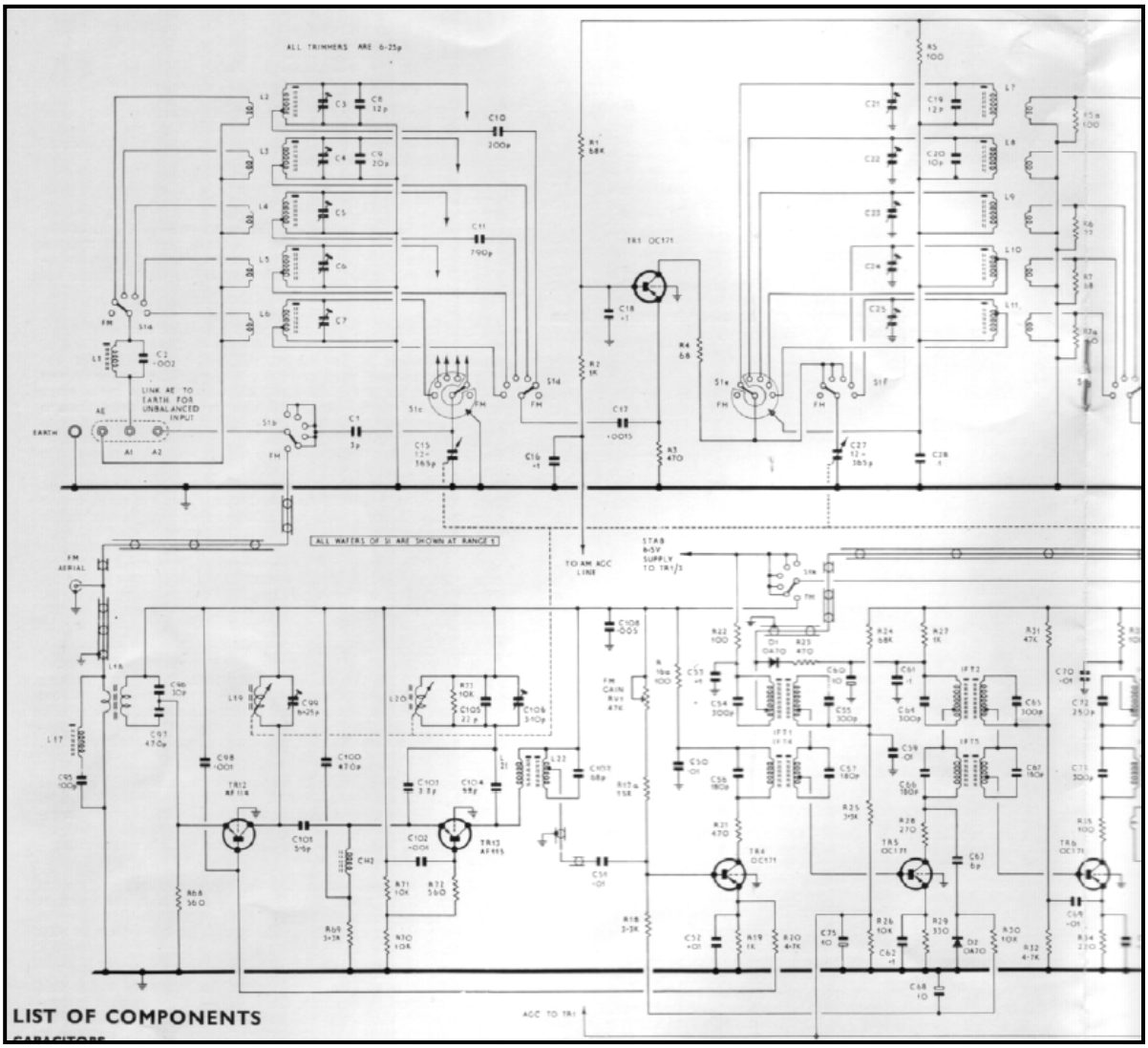
knobs – the smart, tapered, fluted sort with aluminium inserts, colour-matched to the British Racing Green fingerplate and case – probably to be more appealing in the lounge and other domestic/ exotic settings where the EB35 may have been found in the swinging sixties. As noted above, this apparently included under Charles' dash – between the automated emergency Champagne dispenser and the solid gold caviar chiller (photo, left): a bit rough on his passengers knees though (comes with the turf?), but looks really 'fab' don't you think? Anyway, perhaps it was those swanky knobs that took a while for Eddystone to design…

A Quick Look at the EB35 MkI Circuit and Features

As with the majority of Eddystone valve sets, the early Eddystone solid-state receivers were of generally conservative, almost textbook, design. Whereas in the case of the EC10, the Instruction Manual[4] includes a fairly detailed description of the circuit, not so in the EB35 Instruction Manual – likely reflecting the different target market. The EB35 MkI manual is much more focused on installing and operating, although it does contain fairly comprehensive alignment instructions and a voltage table, plus the schematic and components/spares lists. The circuit contains many similarities to the EC10, differing mainly in the IF strip (includes 10.7MHz IF transformers and Foster-Seeley discriminator for FM), the audio amplifier section and the addition of a VHF tuner module. Later sets (MkIIs) were supplied with an additional 10.7MHz IF amplifier transistor (OC171) on a separate small circuit board to increase sensitivity/limiting action on FM. Of course, my early set (Serial Number '0144' - strange, no prefix, but probably from the first production run in 1965) does not have this afterthought installed and seems sensitive-enough without – maybe there were complaints from 'fringe' reception areas in the mid-1960's as the BBC VHF/FM network was still developing?).

The AM front-end comprises a grounded-base OC171 RF amplifier, this being transformer-coupled to the base of an OC171 configured as the mixer. The local oscillator (LO), tracking above the signal on all ranges, comprises another OC171 in a

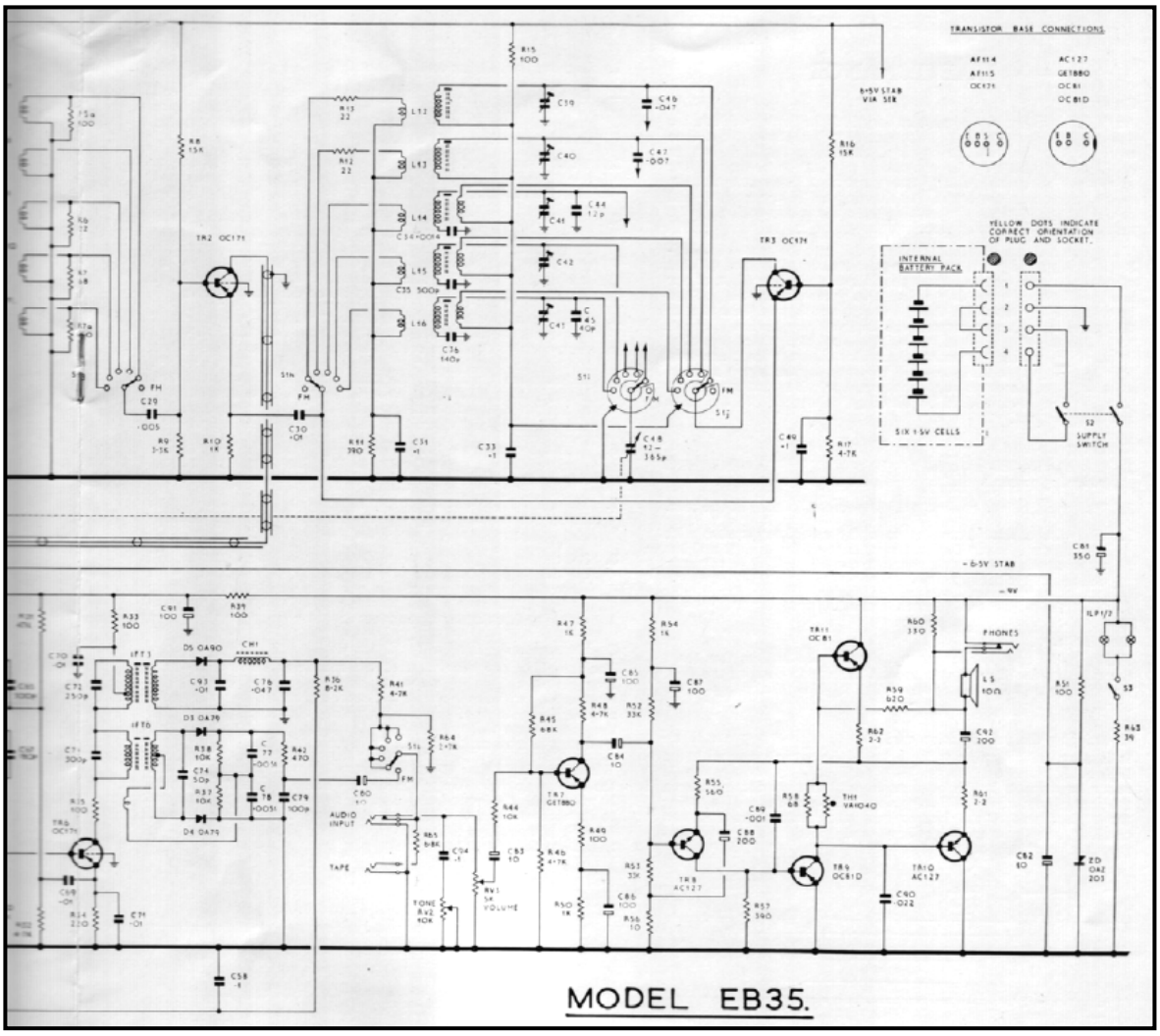
[4] Early EC10's like both of mine were supplied with a blue card cover, spiral-bound book with a pullout schematic per the professional range of Eddystone receives of that period.



tuned-collector configuration, with the LO signal fed to the emitter of the mixer transistor. Five AM tuning ranges are provided, selected by a multi-wafer Yaxley switch. For AM reception, two stages of IF amplification are present at an IF frequency of 465kHz, comprising two more OC171's, each coupled by double-tuned IF transformers. An OA90 diode serves as the AM/AGC detector and an OA70 as a diode switch that introduces a damping resistor across the primary of the first IF transformer to assist the AGC circuit in preventing overloading in the presence of strong signals. An OAZ203 6.5 volt zener diode provides a stabilized voltage supply to the RF amplifier, mixer, LO and VHF tuner stages to enhance stability with varying battery supply voltage.

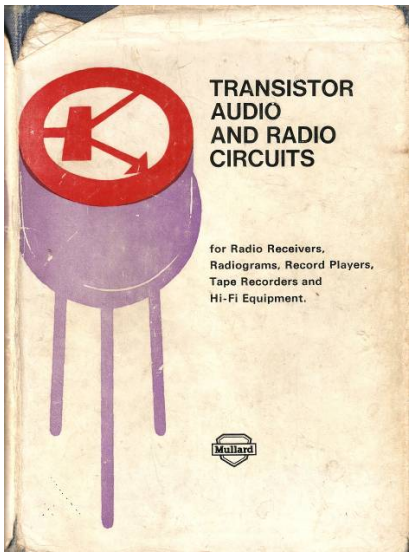
The FM front-end, contained in a screened module, comprises an AF114 RF amplifier in a grounded-base configuration, followed by an AF115 self-oscillating mixer. The 10.7MHz IF is transformer-coupled to the base of the 1st (FM) IF amplifier (OC171), the collector of which is transformer-coupled to the second IF amplifier, which is common to the AM IF section, as is the following IF stage. The amplified 10.7MHz IF signal is fed to a Foster-Seeley discriminator (2 x OA79 diodes). The mode switch is ganged with the bandswitch and selects the correct audio feed to the volume control. Facilities for

external AF source input and a tape recorder output are provided. AGC for FM is provided by an OA70 diode controlling the bias of the 1st (FM) IF stage; the bias condition of this stage is also affected by the signal level at the VHF RF amplifier transistor, its base drawing current through the IF stage emitter resistor, providing a muting function. The gain of the 1st FM IF stage is also controlled with a pre-set pot.



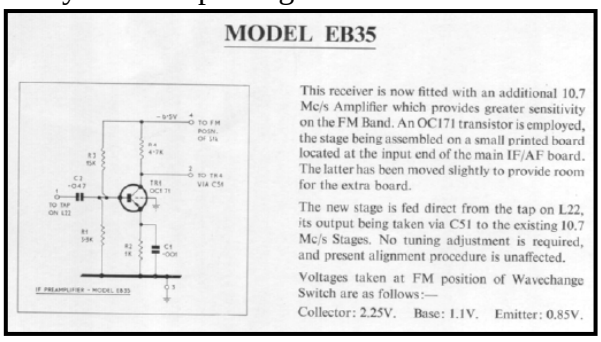
The audio amplifier stages differ significantly from the EC10: whereas in the EC10 the detected signal is fed to an OC71and then to an OC83D driver transistor and a pair of OC83's in transformer-coupled push-pull, the EB35 adopted a more *avant-garde* transformer-less direct-coupled complementary push-pull circuit to be found in a subsequently-published Mullard handbook[5]. Here, the first AF stage is a GET880 feeding an AC127. The latter serves a dual purpose: it acts as a pre-amplifier for AC

[5] Transistor Radio and Radio Circuits, Mullard Limited, August, 1969 – see pp 24-26 and 34-35 '1W Audio Amp'. This tome as purchased for the princely sum of 30 shillings by yours truly in 1970 from "Mison's radio engineers" shop in Carlisle (Tel. Carlisle 22620, according to the 1961 Carlisle Directory) – I can still see it sitting in the window. So bang went my two quid Saturday pay as a radio-mad schoolboy - money well spent, as I still have the (well-thumbed and dog-eared) book…



signals and as a DC difference amplifier in a high gain loop circuit that compares the voltage on its base with that at the junction of the emitters of the output transistors – this compensates for a large spread in output transistor characteristics and component tolerances. The AF output at the collector of the AC127 is applied to the base of the driver transistor, an OC81D, and from its collector simultaneously to the bases of the two output transistors, an OC81 (PNP) and an AC127(NPN), which conduct during alternate halves of the waveform, with the speaker being coupled by a 200uF capacitor to the emitters of these transistors. Mullard claims 0.8W at 4% distortion for this circuit (the Eddystone data sheet notes that the output 'approaches 750 milliwatts' – near enough).

Given the fairly conventional circuitry in most Eddystone sets of the period, the main edge gained over much of their 'competition' was in the superlative mechanical build-quality, the excellent slide rule dial (with the famous silky-smooth feel when the tuning knob is spun), the high-quality inductors used in their tuned circuits, good factory set-up, solid and reliable performance and the prestigious Eddystone reputation. The EB35 was no exception to this – hence the models' enduring popularity some 46 years after it was first introduced into the marketplace. As per the EC10, the models' only real Achilles heel is the longevity and performance, or rather not, of the primitive germanium transistors used in the design, most notably the OC171 small-signal HF transistors used in the RF, mixer, LO and IF stages – in particular the tin whiskers that form inside the housing, eventually causing internal short-circuits and failure of the device. Of course the passive components can also suffer deterioration with age – the most likely culprits being the electrolytic capacitors, though the resistors are not immune to drifting off or becoming noisy with the passing of time. The zener diode also has a bit of a reputation for failing or going out of specification, causing frequency drift/instability.


MODEL EB35

This receiver is now fitted with an additional 10.7 Mc/s Amplifier which provides greater sensitivity on the FM Band. An OC171 transistor is employed, the stage being assembled on a small printed board located at the input end of the main IF/AF board. The latter has been moved slightly to provide room for the extra board.

The new stage is fed direct from the tap on L22, its output being taken via C51 to the existing 10.7 Mc/s Stages. No tuning adjustment is required, and present alignment procedure is unaffected.

Voltages taken at FM position of Wavechange Switch are as follows:—

Collector: 2.25V. Base: 1.1V. Emitter: 0.85V.

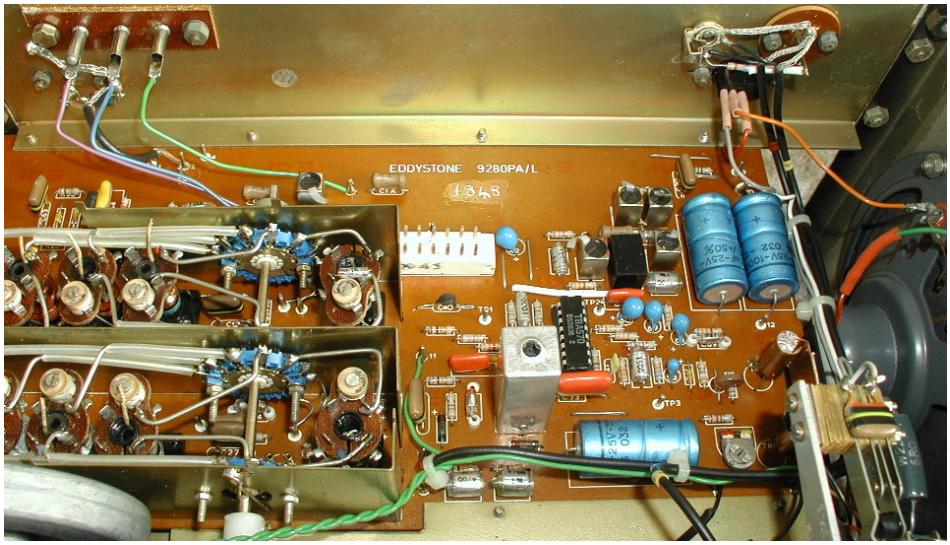
The MkII and MkIII

As far as I can gather, the EB35 MkII, introduced in 1970, included the additional 10.7MHz IF amplifier stage – figure, left (though not the earliest MkII

"…The case is covered with a horrible "wood finish" plastic. Obviously the work of a mis-guided previous owner - but no! the case rivets show that it seems to be original!..."

sets according to the comments made in Lighthouse Issue 16, pp19). Also, changes were made to the case style to make it look more like a piece of lounge furniture (at least for the late-1960's/early-1970's) than a communications radio – modified (plastic) side panel vents, a faux teak-finish (see photo and the excerpt from an email from an EUG forum member, left), a brushed aluminium fingerplate and removal of the handles (photo, below). Judging by some of the examples seen on Ebay, the 'woody' finish has often not stood the test of time too well. An EB35 MkII/S model was also introduced, this having a stereo decoder and sporting 20 transistors.

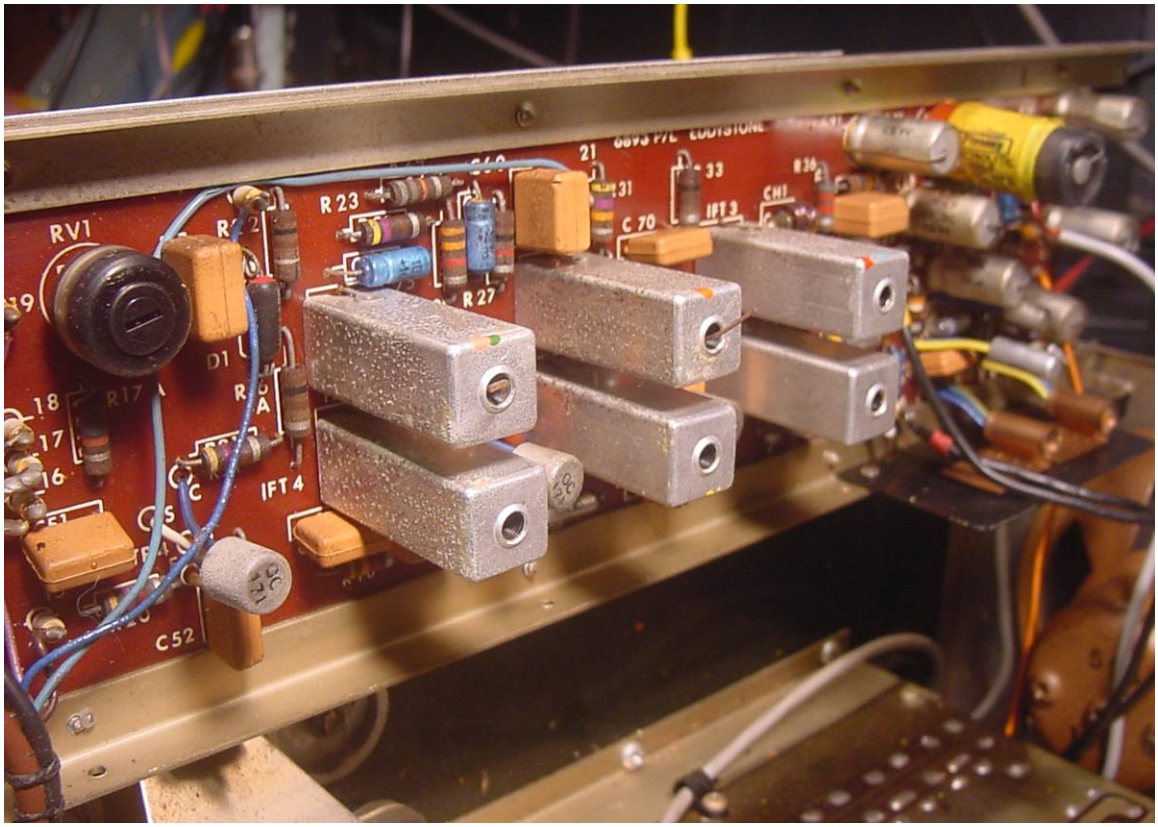
Compared with the MkII, the EB35 MkIII, introduced in 1976 and produced until 1980, marked a radical change (image below). Cosmetically, (black) handles were re-added and the FM band scale moved under the AM scales plus a new-style Eddystone logo adorned the fingerplate beneath the 'Statesman' name. More importantly, the electronics were completely overhauled, but amazingly not with an all-silicon line-up (complementary AC127/AC128 were used in the AF output stage). The circuit included FET AM and FM front-ends and a TBA570 IC IF strip and 1st audio stage (photo, below), the extra switch on the front panel being for AFC – maybe a technical improvement, but not the same character somehow…



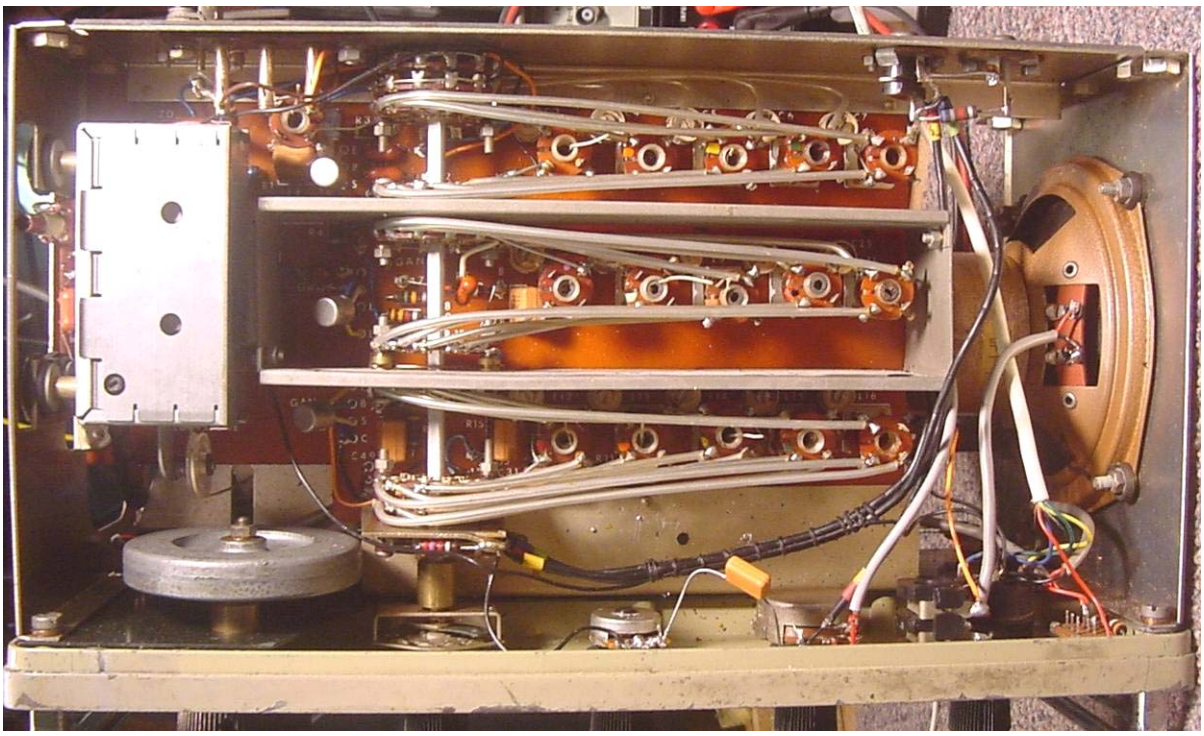
Mechanical Construction

Above: mint EB35 on EBay recently – a role model for my set…

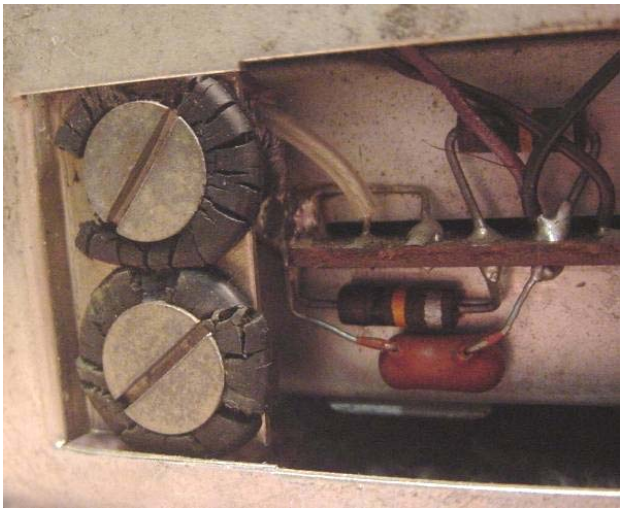
Eddystone retained their 'trademark' diecast aluminium front panel and slide rule dial in the EB35 design. The RF circuit board is bolted to the side chassis member opposite the speaker end, to a bracket fitted to the rear of the dial assembly and to the rear chassis plate. The IF/AF circuit board is bolted to two angled side rails that in turn are bolted to the upper side chassis members. The latter arrangement allows the IF/AF strip to be unbolted, turned through 90 degrees and re-bolted in an upright position, thus allowing extremely good access for servicing and alignment (photo, below). The IF section of this board is



Above: IF strip 'as received' – note the corrosion and pitting on the OC171 transistor can and IF transformers. Most of this wiped off with an alcohol-soaked rag

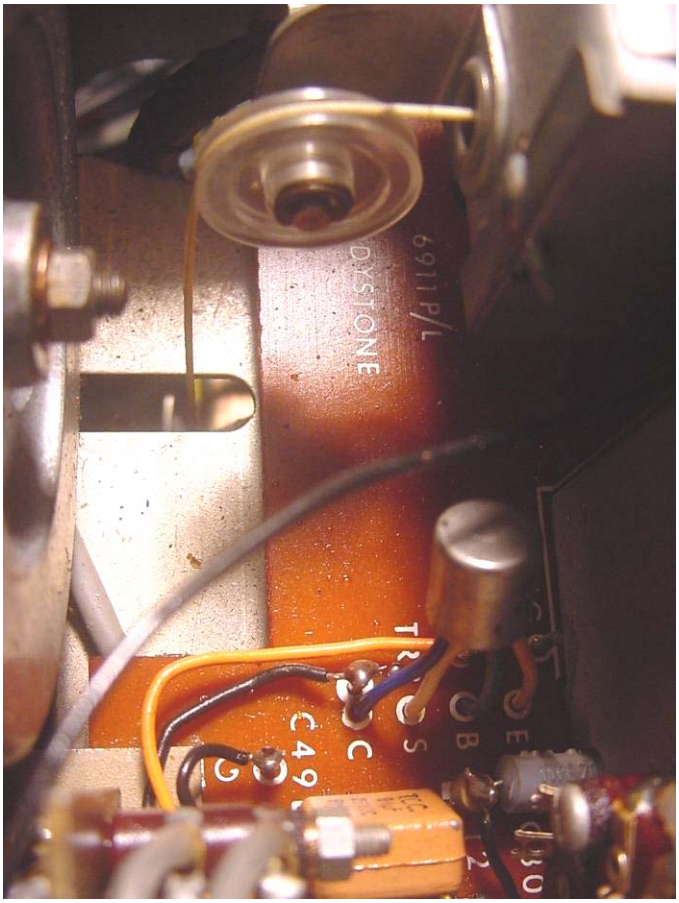


fitted with a metal screen on the print side. The RF board has a central metal box-channel fitted to its component side that acts as a screen between the RF, mixer and LO stages (photo, above) – a functionally similar (but cheaper) format to the diecast structure found in contemporary Eddystone valve sets. The VHF front-end is built into a metal can, mounted at one end of this metal channel (between it and the chassis side plate – left side of photo, above), on bolts that pass through rubber grommets to provide mechanical isolation (photo, right – note the badly perished condition of the rubber grommets).



The one-piece steel outer case is held in place with four chrome-plated large-head 2BA bolts that secure into a return on each of the side chassis panels. Cut-outs are present in the rear of the case for the battery box (or the mains battery power supply as a substitute), the usual Eddystone- style aerial/ground connections plus a Belling-Lee coaxial socket (for VHF), phono sockets for audio in/out and the maker/serial number tag. Perforated sections set into the sides of the case allow for ventilation and one of these serves as the speaker grill. Chrome carrying handles are fitted to the case front and the bolts for these also hold the front panel casting and dial mechanism mounting plate onto the steel side chassis members. Altogether a pretty solid piece of engineering for a commercial/domestic radio.

The slide rule dial is a modified Type 898 dial mechanism as found in the small valved Eddystone sets (eg, S.820, S.870 etc). However, here, as in the EC10, the tuning shaft, vernier scale and gearbox are all offset well over to one side rather than being located centrally. The tuning scale is printed in white lettering on the inside of the dial glass, with the Broadcast bands marked in green.



The VHF front-end is built into a small screened box and tuning of this unit is effected by moving slugs in and out of the RF and Mixer/Oscillator coils via a cord attached to the slugs. The cord passes over a plastic pulley (photo, right) and wraps around a spool which is part of a modified collar on the flexible coupling between the (AM) tuning gang shaft and the dial mechanism. The slugs are drawn back into the coils by a spring.

My Latest Acquisition Arrives…

Unlike my EC10, which was purchased in Canada and, due to the vagaries of the Canadian postal service took almost two weeks to arrive, the EB35 arrived from the UK overnight courtesy of DHL! – less than 24 hours door to door. Impressive. Very impressive…

Cosmetics

The case looked a bit scruffy at first glance, however, following cleaning and polishing with Novus #2 and #1 most of the minor scratches had vanished and the British Racing Green enamel was looking good – I decided too good to warrant a re-spray – boy am I glad this is not a 'woody'[6] case as found on the MkII and MkIII… I much prefer the enamel paint finish.

[6] 'Woody' is the generic term applied to faux wood finish on 1960's/1970's North American cars – especially station wagons.

The front panel casting was going to be a tougher job though – it looked like it would definitely need either a powder coat or spray paint job to get it looking as it should. It had several areas where the enamel paint had badly cracked and/or detached from the aluminium casting completely – as though the finish had not adhered to it correctly from new, or surface cracking had introduced moisture that had encouraged the enamel to part company with the aluminium, however, no corrosion was noted on the casting surface. Other parts of the paint finish was bubbled as if some agent had been applied and had reacted with the paint. I decided to sandblast the panel (thanks Pat!) and refinish it.

The finger plate was in reasonable condition – only minor wear by the tuning knob catching due to incorrect positioning on the shaft – good news.

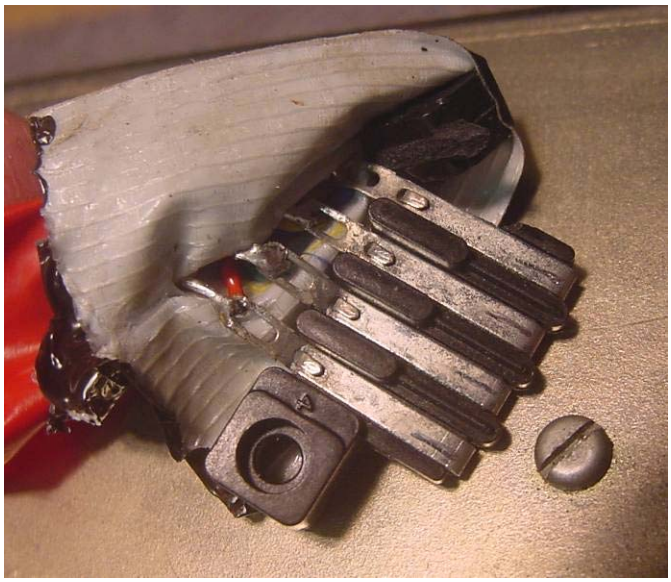
When cleaning the knobs, I noticed that all the small ones were suffering from the dreaded cracking syndrome that I had first observed on my S.830/4, one of my EC10s and as reported by others in 'Lighthouse'. It seems that the plastic surrounding the central brass insert in these knobs either shrinks with age and/or the different thermal characteristics of the brass and the plastic sets up stresses in the plastic that results in the cracks forming. I cleaned-up the knobs and filled-in the cracks using epoxy filler – almost invisible when done

The dial glass/scale was in fairly good condition – only a bit grubby and some of the scale markings deteriorating on the LF end (but not too serious) – as was the tuning

mechanism and dial pointer. Some preliminary cleaning was undertaken, with the intent that the front panel would be removed later to clean the inside of the dial glass (scale) and to allow a more thorough mechanical servicing job undertaken at that time (see below).

The battery compartment was in reasonable condition, and even included two of the polythene sleeves to insert the batteries into – both in good condition. There was no corrosion present and the original paper battery polarity locator stickers were still in place. However, the battery pack lead was a replacement and the (awful) 4 way connector was broken and held together with duct tape (photo, below). I intensely dislike this connector – it's bad enough when using the 9v battery pack (as it can be forced in the wrong way around as noted in p20/21 of Lighthouse Issue 85), but when the mains power pack is used it also connect 240v AC through to the front panel on-off switch via very flimsy wires, with connectors right next to the 9v DC supply – not at all good from a safety point of view… I am continually surprised there have been no reported disasters – either from electric shock or from applying mains voltage to the 9v supply line.

Preliminary Inspection and Electronic Checks



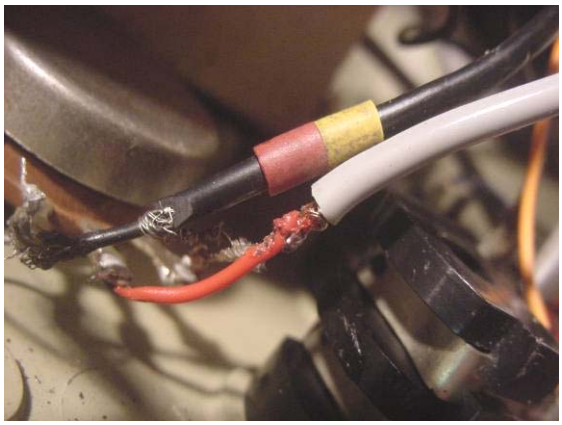
With the case removed, a quick inspection of both the IF/AF strip and RF circuit boards revealed some good news – both appeared almost 'Bath Tub fresh': only a minor amount of obvious re-soldered joints and tell-tale flux residues. There had been some re-work in the audio section that would need some investigation and the wires from the battery connector and some front panel components had been replaced – and not too expertly – see below.

The set was reported to be working, so I decided to power it up from my bench power supply. Well, it did hiss quite a bit but no stations were heard and the volume and tone controls had no effect on the hiss. I tried injecting a modulated 465kHz IF signal into the IF strip – nothing. Same thing with 10.7MHz. I was starting to think that the OC171s had panicked somewhere over the Atlantic and sprouted internal tin whiskers at high-altitude. Anyway, I decided to take a closer look…

Looking carefully underneath of the receiver revealed:

- the tone control pot had been replaced with a small one (albeit of British manufacture), complete with some sloppy new wiring; and

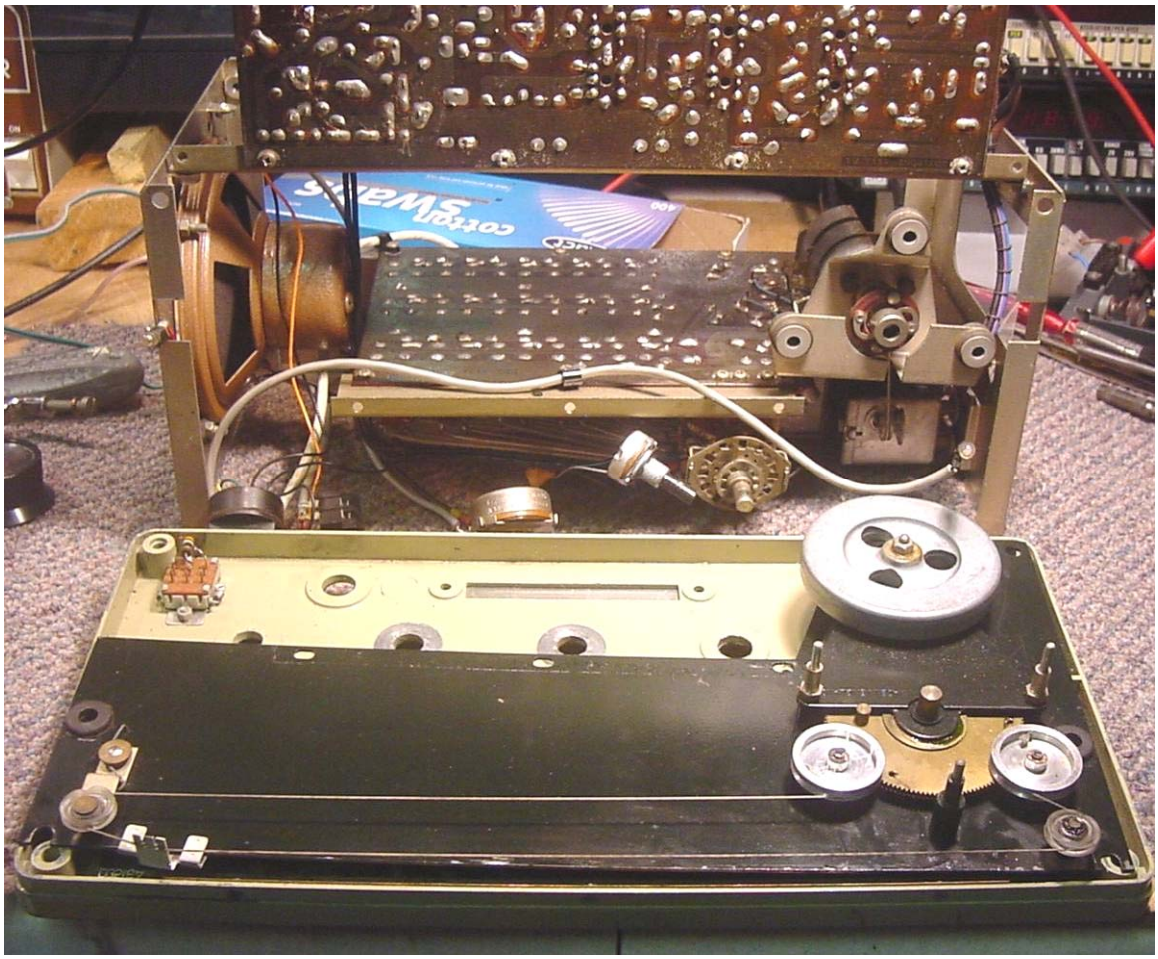
- the wiring to the volume control had been replaced and it looked as if the (screened) wires had been stripped using a soldering iron – this trick works if you do it right, but can be nasty if not (and it gives out toxic fumes – so not to be recommended). Whoever did this here did not do a good job – see photo, left.



I moved the connections to the volume control slightly and the set sprang to life on both AM and FM – phew! - just poor workmanship and easily fixable. Time for a clean-up and closer inspection…

Front Panel Removal/Replacement, Tuning Mechanism Servicing, Dial (Scale) Cleaning

Like the EC10, the EB35 utilizes a modified Type 898 dial mechanism as found in the small valved Eddystone sets (eg, S.820, S.870 etc). For a fuller description of this mechanism please refer to my article on its use and maintenance downloadable from the EUG website. In this adaptation, the tuning shaft, vernier scale and gearbox are all offset well over to one side rather than being located centrally. Also, the spool pulleys in the



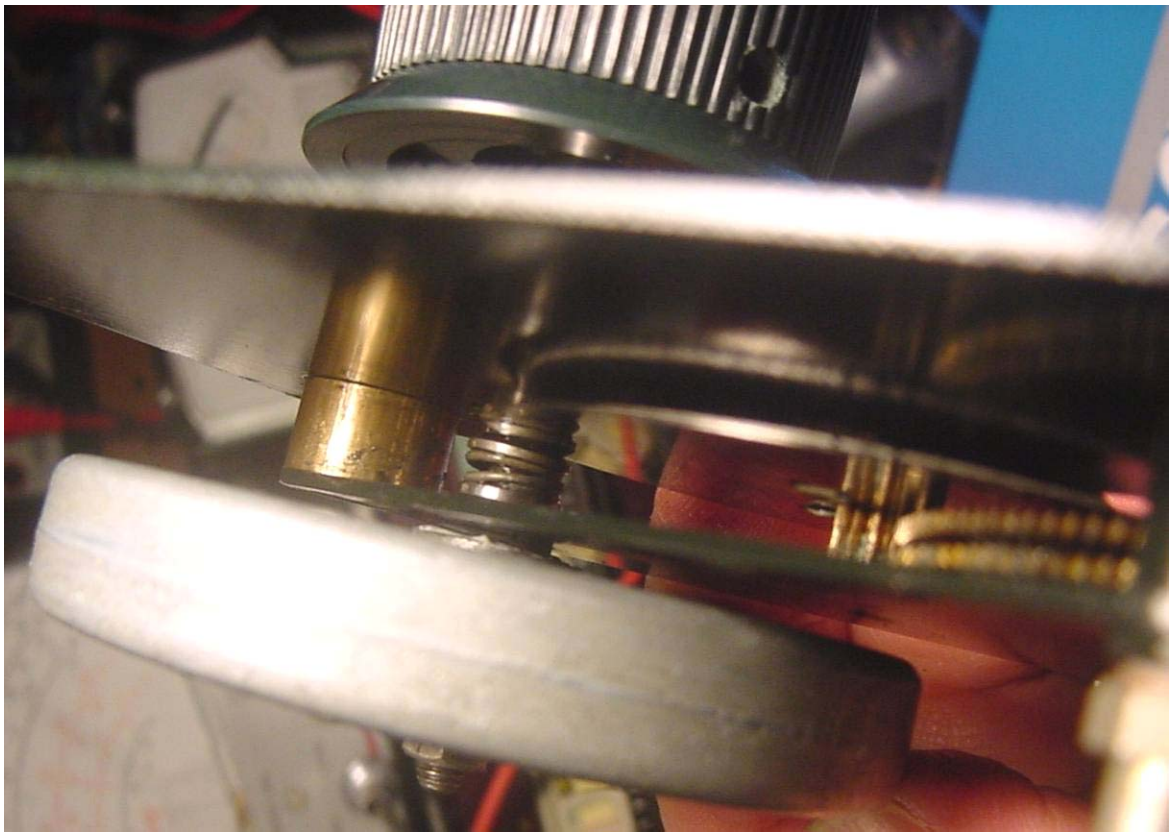
EC10 and EB35 are turned from aluminium rather than brass (as in the Type 898) and are slightly larger.

The metal pointer slider runs along the top edge of the sturdy green-painted metal mounting plate that forms the support for the idler pulley wheels, gearbox (with cut-out for the circular vernier scale), grommets for the dial lights and an angle bracket that supports the RF circuit board along its front edge. The front of this plate is visible behind the dial glass. This assembly is mounted onto the cast aluminium front panel, which is in turn bolted to the two chassis side-plates. Removal of the front panel in this simplified form of 'traditional' Eddystone construction is fairly straightforward (though please study the photos very carefully before you start). Here is my recipe:

- Remove the retaining nuts from the front panel controls and phones jack. Take care doing this - use the correct nut-spinner if available and an over-size thick paper or Teflon washer to act as a guard to prevent scratching the fingerplate;
- Remove the four 2BA bolts securing the chassis side plates to the front panel (these are screwed into the carrying handles – watch out for the washers);
- Carefully remove the finger-plate (it will likely be stuck down with some double-sided adhesive tape), clean with soapy water and store safely;
- Loosen the two grub screws nearest the front panel in the flexible coupler on the tuning gang shaft (not the ones on the tuning capacitor side as these lock the VHF tuner actuating cord spool extension on the flexible coupler onto the tuning gang);
- Remove the three 'Posidrive' self-tap screws holding the RF circuit board front mounting bracket to the drive assembly mounting plate;
- Pull out the two dial lamp holders from their grommets;
- Remove the three 6BA locknuts securing the tuning capacitor rubber mounts to the gearbox and drive assembly mounting plate;
- Remove the two retaining screws holding the dial light slide switch onto the front panel; and
- Gently pull the front panel casting away from the chassis, with the tuning drive assembly attached;
- To separate the casting from the tuning drive mechanism, remove the single 4BA bolt that passes through the mounting plate just beneath the tuning shaft. This may have some locking compound applied to its nut, so may be difficult to loosen.

Take this opportunity to carefully clean the front of the dial glass with luke-warm slightly soapy water and a cotton wool ball. The dial glass can be removed from the front panel casting to facilitate this by removing the three small screws holding its angled retaining strip along its upper edge. Be very cautious cleaning the rear side of the glass as the lettering and line work does not adhere well. I used a soft dry cloth and Q-Tip to wipe away the grimy film, being very cautious around the lettering. On my dial, the lettering on the low-frequency end of the dial was already flaking-of and so was not touched.

This is also a good time to clean any hardened oil/grease from the gearbox bearings and gears, the friction drive spring (photo, top of following page) and to re-lubricate the gears



and tuning shaft bearing with suitable grease (I used a very sparing amount of white Lithium-grease, but Molybdenum grease is also good for this). Clean the friction clutch mechanism and try to keep the outer edge of the drive plate and mating surface on the tuning shaft grease-free. The friction drive on this set was making a strange creaking noise when rotated – traced to some cloth fibres entangled in the compression spring (photo, above) – these were teased out with a soldering pick and this cured the noise. A touch of high-quality machine oil was applied to the gearbox bearings and the mechanism then ran very smoothly – but there was still an annoying squeak! - this was traced to the idler pulley not rotating as it was distorted (photo, right). In a larger Eddystone this would have been a fairly straightforward fix, but in the sets using a Type 898 derivative, this is hard as rivets are used to fix the idler mechanism to the mounting plate and to attach the pulley to the spring-loaded idler arm. In this case I opted for the quick and easy fix – a touch of moly grease on the part of the dial cord that passes over the pulley. No more squeaking and a very smooth (and silent) feel to the tuning at last.

Re-assembly of the front panel and drive mechanism is simply a reversal of the above, but care is needed to ensure that when the dial pointer

is at the '0' mark on the logging scale the circular vernier scale is also reading '0' and the tuning capacitor gang is almost fully meshed (maximum capacitance). Also, check that the spring-tensioned cord operating the slugs in the VHF tuner is working correctly. You may need to adjust the position of the flywheel on the tuning shaft to get the correct amount of float such that the knob spins smoothly – the center hole on the flywheel is threaded and mates with the rear of the tuning shaft. When this is set correctly (apply a little lithium grease to the side that faces the brass bushing on the rear gearbox plate), a locknut holds the flywheel in place.

Re-finishing the Front Panel

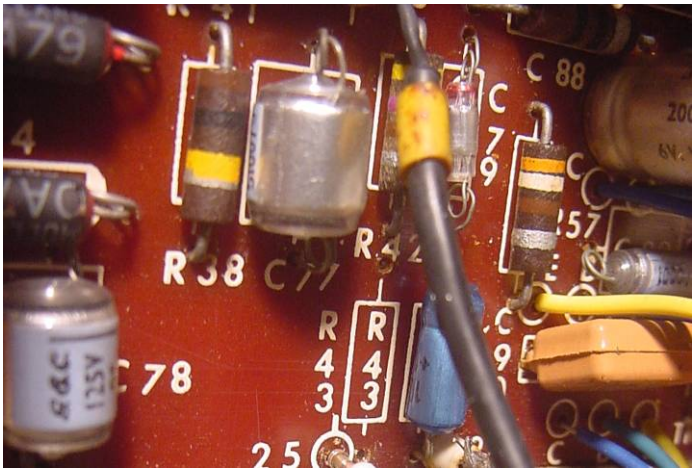
As for my EC10, 'to powder coat or not to powder coat' was the question. Powder coating provides a hard, very durable finish. Locally there are several small coating shops that provide this service, often for a very minor cost if you can accept the same colour as the current batch of parts they are coating. Grey is popular for electrical equipment – which seems to constitute 'bread and butter' work for these shops, but beige much less-so. Given this and the small size of the exposed areas of the panel casting (most is covered by the fingerplate), I decided to just spray-paint the casting, thinking that if it did not work too well I could always strip it all off and powder coat it at a later date – noting that painting had worked well for my EC10. I took a trip to one of the local car spare shops (Lordco) and selected a large can of beige enamel finish spray paint manufactured by PlastiKote for about £7 ($10) – strangely labelled 'Antique White'.

This colour was a close-enough to look the part and provide a good contrast to the dark green case and fingerplate enamel. The original enamel paint finish was removed by sandblasting and then prepped using a suitable primer (light grey etching primer).

I gave the panel a total of six coats of the beige spray enamel in the SPARC spray booth, this giving a nice thickness that closely resembled the original. I was pleased with the finish and decided that I would not bother with powder coating.

Electronic Repairs

As noted above, the set was actually working reasonably well, apart from a significant calibration error on all bands, plus some noticeable distortion on FM. So the question was whether any (preventative or 'performance-enhancing') repairs were needed or should I just leave well-alone and maybe just re-align? – the adage 'if it 'ain't broke, don't fix it' springs to mind here. Well, as a minimum, the previously-replaced wiring had to be replaced as it was tending to short-out and cut the audio. The broken battery connector also needed repairing (I used industrial-grade superglue) – although I was very tempted to replace this connector with something better, I resisted.



While inspecting the IF/AF circuit board, I noticed that there were some components missing (ie. holes drilled and component numbers silk-screened adjacent to them). Checking on the schematic revealed that there are a number of resistors that were not used in the final circuit: R14, R40, R43 (photo, left), R66 and R67- maybe this is testimony to the early serial number of my set and perhaps later production sets had the circuit board cleaned-up? Anyway, it was a relief to see that these had never been fitted. I also noticed that some of the solder-pins had been removed and new ones had been installed.

The electrolytic capacitors in the set are a mixture of Plessey, TCC (photo, above) and an un-marked manufacturer: blue-sleeved 10uF and white-sleeved 1uF (the latter on the AM

AGC line) - all axial leads, with the larger values being mounted vertically to fit into the available space on the circuit board. They are all low-voltage types, with the two 200uF ones in the AF amplifier stage being only 6vw. Having completed the essential re-wiring and gluing the battery connector, I unsoldered a sample of the larger electrolytics (350uF 12vw and 100uF 15vw, and 200uF 6vw) to check their capacitance, leakage and equivalent series resistance (ESR[7]) – the first few tested were all actually ok (reasonable leakage, at or over the specified capacitance and a low ESR – quite

I chose an ESR meter manufactured by PEAK (see features summary below), though there are several others on the market. The PEAK unit also measures capacitance and has an auto discharge function as well as audible warnings – all very useful in practice.

Feature Summary

- Measure capacitance and ESR.
- Enhanced ESR range from 0 to 40 ohms.
- Resolution down to 0.01 ohms.
- Analyses at industry standard of 100kHz.
- Capable of In-Circuit testing.
- Special tones for >40Ω, <5Ω, <1Ω, OC.
- Audible alerts can be turned on or off.
- Polarity free, connect any way round.
- Protected against highly charged capacitors.
- Supplied with comprehensive ESR look-up chart included in the user guide.

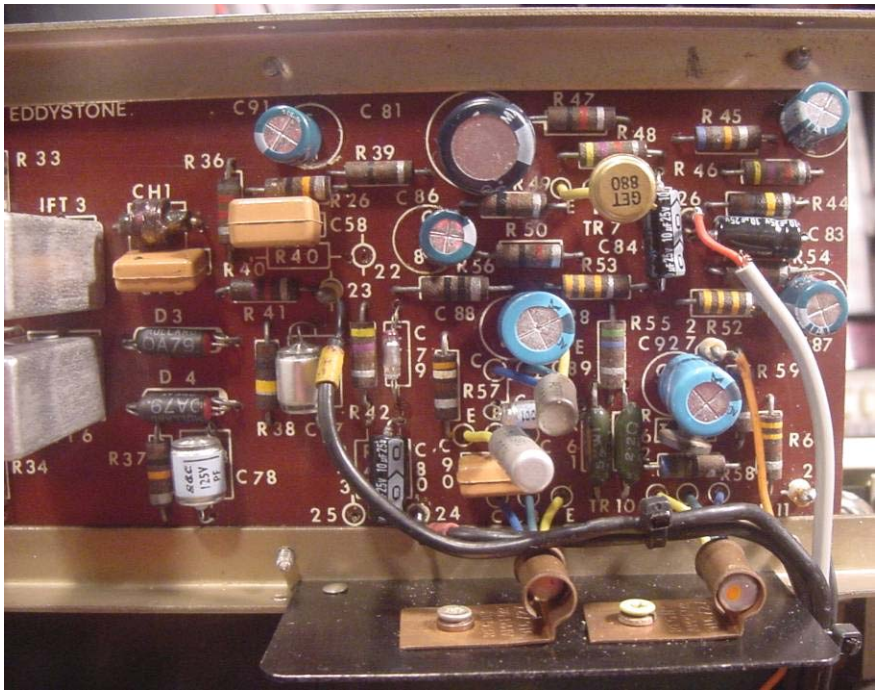
PEAK electronic design ltd

Above: using a PEAK ESR meter to check the capacitance value and ESR of some electrolytic capacitors removed from the EB35 – shown here are the 350uF (Plessey) and samples of the 100uF (TCC) and 10uF types. The 100uF under test here is probably fine, showing a capacitance of 243uF (though outside its specified +100%/-20% tolerance) and an ESR of 0.92ohms. DC leakage was measured on VOM at some 450kohms which is very good.

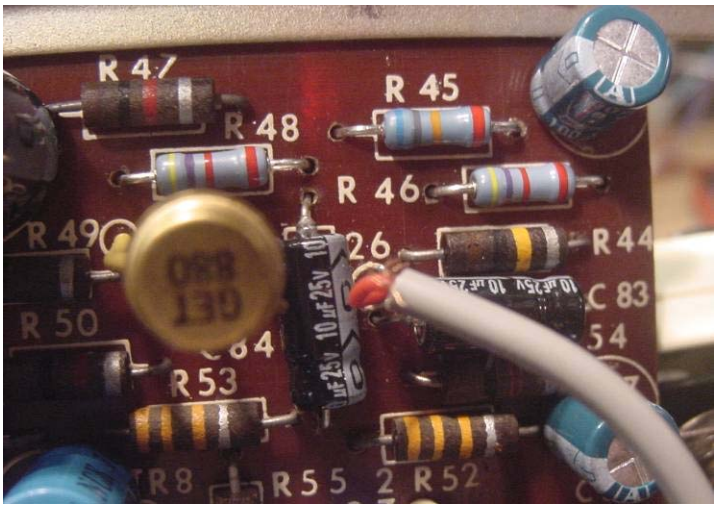
An ESR meter is simply a low resistance range AC ohmmeter. The ESR of a capacitor is an indicator of its 'goodness' – many electrolytic capacitors can measure correct capacitance values and reasonably low leakage, but do not perform well in circuit. 'Golden eared' folks can of course hear the 'goodness' of capacitors in their HiFi amplifiers, but in radio sets this usually manifests itself as instability that even my 56 year-old lugholes can hear quite well…

[7] See http://en.wikipedia.org/wiki/Equivalent_series_resistance

amazing for 45 year old low voltage electrolytics). Then one of the smaller electrolytics (10uF 16vw) was checked – not as good, having a higher than optimal ESR. However, on checking the 1uF 15vw electrolytic on the AGC line, I found this to be less than 0.1uF , around 40kohm resistance and an ESR out of range (>40ohm). So I decided to check a few more and found one of the 100uF to be around 2uF with an ESR of >40ohm. At this point for the sake of an hour and a few dollars-worth of new stock electrolytics, I decided to throw originality to the wind and change-out the lot (photo, above). All TCC polyester, polystyrene, silver mica and ceramic capacitors were assumed to be ok (I have rarely encountered a problem with these apart from occasional failure of silver mica types[8]). Voltage checks on critical circuit nodes indicated that resistors were likely within or close to tolerance.



The hissy audio stage was traced to noisy biasing resistors in the GET880 first audio stage (R45, R46 and R48), so these were all changed-out with low-noise metal oxide types (photo, right). On checking the resistor values once removed, the two 4.7kohm resistors measured around 5.1kohm and the 68kohm measured 81kohm – so drifting high as is typical of carbon composition resistors. This replacement exercise cured the excessive hiss problem.



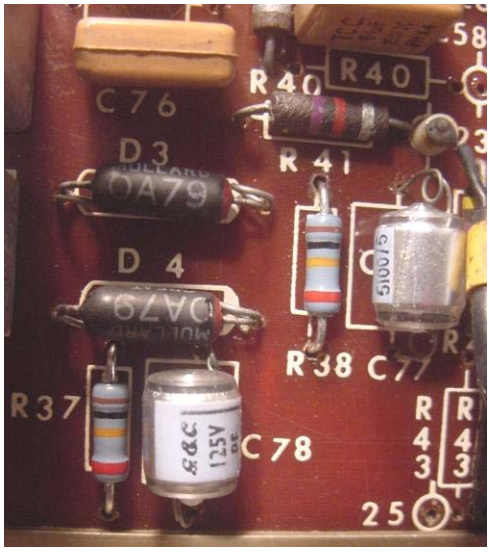
[8] due to 'silver mica disease' (creep of the silver coating on the mica dielectric that manifests itself as loud thunder-like crashes). However, in my experience, this has always been limited to higher-voltage applications of these types of capacitors.

Re-Alignment

The alignment procedure for the EB35 is fairly straightforward and is detailed in the manual – so is not repeated here. However, you may find that a 'mad twiddler(s)' got there before you, so there may be some nasty surprises lurking in those coil formers – watch out for bits of snapped-off iron dust slug, cross threaded slugs, remnant bits of knicker elastic and even damaged/loose wires to the coils (a sure sign of a cack-handed soldering attempt in the coilbox). Worse, someone may have opened-up the VHF tuner and played around with the components therein… no evidence of that in my case though thank goodness.

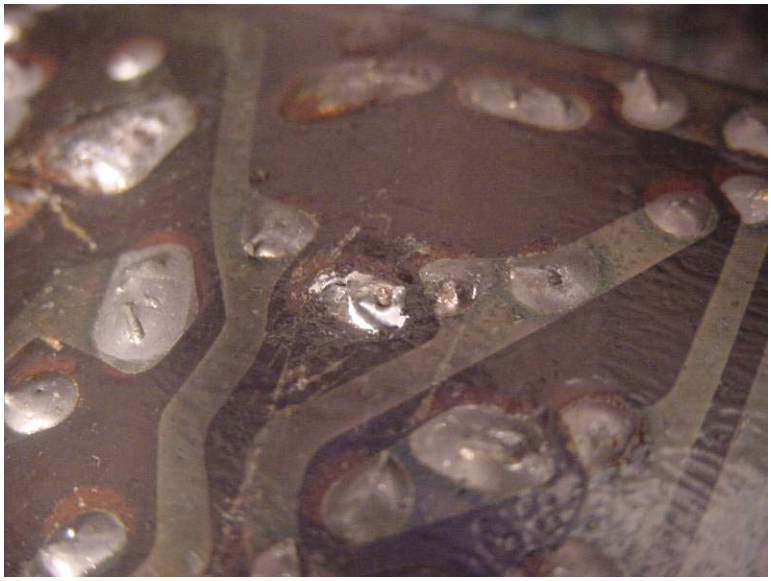
Before aligning, per my EC10, I opted to carefully remove each slug in the RF coilbox one at a time, clean the coil former threads with a pipe cleaner/blast of compressed air, discard the pieces of knicker elastic, wipe the slug clean, dab some Rocol Kilopoise goop onto the slug and screw each one back into its former to approximately the same position as it was before being removed. Broken or jammed-in slugs must be coaxed out slowly with plenty of patience – those small coil formers can break all too easily. Any slugs that appear in any way cracked or damaged should preferably be replaced.

I had no problems in the RF coilbox, but the same exercise on the IF cores proved a little more challenging: the 3rd AM (465kHz) IF transformer only had one slug present and this took some coaxing out, chipping one end of the slug in the process. Two new slugs were installed when I eventually managed to remove the old one. However, the upper slug in the 2nd FM (10.7MHz) IF transformer was jammed tight – no sign of movement at all. Two options here: either leave as-is and attempt re-aligning with all the other slugs only, or, if a satisfactory gain/selectivity cannot be had doing this, bite the bullet and drill-out/pick out the pieces of the old slug. I have done the latter a few times and it can be very time-consuming and there is always the risk that the coil former can be snapped/broken in the process – not good. So, I decided to go with the former. Luckily it seemed to work ok – leaving the delicate slug-removal operation for another day…



The alignment method described in the manual for the FM (Foster-Seeley) discriminator is a bit unusual – it involved shorting-out one of the discriminator diodes and aligning using an AM-modulated signal generator, then removing the short across the diode and tuning the upper slug in the discriminator transformer for minimum audio on the output meter. This worked ok, but it did not fix the audio distortion problem on FM. After some investigation, I decided that the problem was definitely in the discriminator stage – imbalance of the diodes or a bias problem (faulty resistor or capacitor). Re-aligning the discriminator again did not help, and so I decided to replace the two 10k resistors (R37, R38 – photo, left) - these actually

checked-out ok, but one had a dry-joint (photo, right) and this was the cause of the distortion – with the new resistors fitted and the joints re-soldered the audio was fine.



Power Supply

Not having a spare Type 924 mains power supply handy, per my EC10, I decided to improvise again using a mains power 'block' (these power supplies are also known as 'wall warts') plus some additional smoothing and an IC regulator chip fitted into the sets' battery compartment – a project for another day though (see my article on the one I made for one of my EC10s). In the meantime, I installed 6 new Duracell's into a spare black-pained battery compartment (ex-EC10 MkII?) bought at a rally in the UK many years ago I think, which looked much better in the dark green EB35 MkI case than the grey one it had come with.

In Use

Since completing the work on the EB35, I have used the set a fair amount on thirty feet of wire on AM and a four feet of wire for FM (in my basement): I have found its sensitivity and selectivity on AM to be good on the Medium Wave Broadcast band, with excellent audio quality. Sensitivity falls off somewhat on Ranges 1 and 2, and selectivity is just adequate for broadcast station use on the Shortwave bands. The lack of a BFO is annoying at times – but that is the nature of the beast[9].

I have found that enjoyment of VHF/FM operation suffers a little from the rather primitive circuitry: the lack of automatic frequency control (AFC) being the biggest omission. I have found there is a very slight backlash in the slug-tuned VHF tuner in my set (maybe I will investigate this sometime), but having switchable AFC would mitigate this. Still, it is perfectly useable as it is.

Conclusion

The Eddystone EB35 MkI is a great all-round listener's set and I think the colour scheme is great (my favourite in the Eddystone range, along with the maroon and cream of the S.870A). The set has proven easy to use, stable and the audio quality is good. It could have usefully included a telescopic whip aerial as standard – especially for VHF/FM as I have found it's sensitivity to be adequate for use with such.

[9] Several ways to install a BFO unit into the EB35 have been described in Lighthouse – see references.

I guess it's only a matter of time before some of the OC171's succumb to internal whisker growth – but I will cross that bridge when I come to it (I am surprised that none of the transistors have already been replaced or had their screen leads clipped). Anyway, they are still doing stalwart service over 45 years after first being switched on – not bad at all in my book.

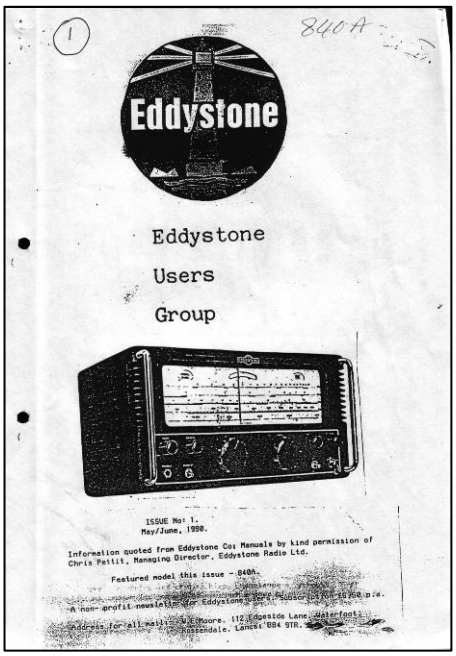
So that's it – an EB35 MkI added to my collection and placed in the 'listening rota' of sets I use most days. Another classic of its time.

73's

Above/below: the tuning mechanism removed from the set. The main issues here were a dirty friction clutch and a distorted idler pulley (on right, below)

Dedication To Ted Moore, G7AIR SK

Just as I was completing this article, Chris Pettitt reported the very sad news of the death of the founder of the Eddystone User Group (EUG) on the EUG Forum. Ted Moore was, of course, the founder of the EUG and he produced the very first Newsletter (cover, right) way back in May, 1990. His opening lines in that issue explained why he took this initiative:



In this the first issue I would like to welcome all those, like myself, who have become dedicated fans of Eddystone receivers. When I first visited the factory some months back I learned with some surprise that there was no group or club in existence dedicated to their products..

I do know of a Collins club, an HRO society and one for the Racals, the Eddystone is far and away more a "users" receiver. The challenge was there, so I shall try to fill the void. Many of you will have one or more Eddystones, in use but not have the necessary know-how or information to keep it going in top condition.

The information is all available, spares are also usually available if one knows where to look. What is needed is a means of disseminating this information, which some of us do have.

Ted also identified the essence of what such a group is about: sharing information, spares, experience and generally helping other Eddystone users:

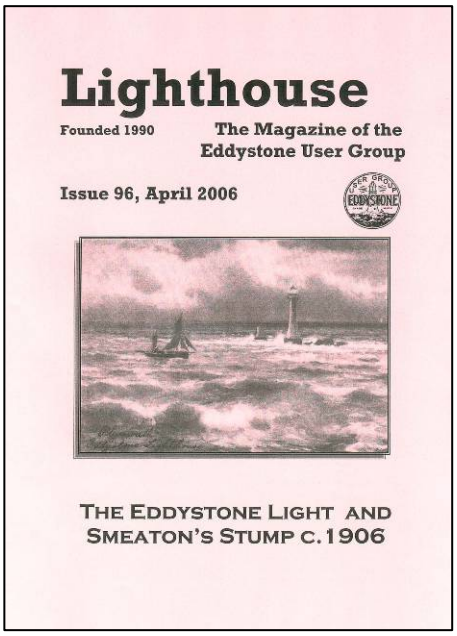
Any group news letter like this cannot be the work of one person, an input from members is vital, even though you might not at this time have an Eddystone, we would all be interested in another users past experiences, whether it be with a past prized possession or as a past professional user. Your hints or tips on operating, maintaining, servicing or sources for spares will be of interest to others.

Myself , I am always willing to share with others any information can be of use. For some years now my telephone has kept me in touch with Eddystone users around the U.K. and one in Canada !

Although I now have more then forty Eddystones in my collection, and have always had one or more since my first 358, ex government surplus, bought in Lisle street for fifteen pounds, my appreciation for the qualities of these receivers is still growing.

Mine is far from being the largest in private hands, one gentleman I meet at rallies cautiously admits to "over one hundred and twenty, at last count."

This simple tenet kept the EUG flourishing for some 16 years as a subscription-based entity, with Ted contributing right up to the final issue in April, 2006 (Issue 96) – latterly in his 'Ted's Mailbox' column. The immense volume of Eddystone-related material, technical tidbits and gems of historical knowledge imparted throughout this period by Ted have helped myself and many, many others in the pursuit of their hobby (and continue to do so) – a fine legacy for anyone. In Ted's own words (from Ted's final Mailbox column):



> I believe that our Patron, Chris has the right idea with his plans for a website, eventually an interactive website. This does seem the only viable way forward as a means of keeping the Eddystone User Group alive.

Thankfully, along with the EUG Forum, this has proven to be the case and will continue to do so…

Thank you Ted. 73, Gerry, G8GUH/VE7GUH

A VERSATILE RECEIVER

COVERING VHF/FM : LONG, MEDIUM & SHORT WAVES

THE EDDYSTONE EB 35

275.00

Finely Engineered : Robust : Transistorised

Introducing the EDDYSTONE "EB35" Receiver

The Eddystone "EB35" Broadcast Receiver is a fully transistorised model of compact dimensions and operating from an internal battery power unit. It is a versatile receiver giving coverage on the long wave band, the medium wave band, the majority of the short wave bands, and the international VHF/FM range of 88 Mc/s to 108 Mc/s, with a high performance throughout.

Features standard to Eddystone receivers are incorporated. The flywheel-loaded tuning knob controls a finely engineered gear drive with a reduction ratio of 110 to 1, resulting in smooth, precise tuning. The main scales occupy a length of nine inches and are clearly marked directly in frequency. Tuning to a given frequency is a comparatively simple matter and a useful additional feature is the provision of a logging scale to permit settings of preferred stations to be recorded for future reference.

The versatility of the "EB35" extends further than the wide range of frequencies covered. A socket is provided from which the signal can be fed to a high fidelity amplifier and the receiver can thus be used as a tuner unit in conjunction with a "hi-fi" system, still retaining the advantage of having a large number of stations from which to choose. The same socket serves when it is desired to use a tape recorder. A second socket enables the audio frequency stages of the receiver to be used as an amplifier with a record player.

An internal speaker is fitted and the telephone jack on the panel can be used either with a pair of low impedance telephones (preferably of the high quality type) or with a large external speaker.

Power is normally derived from a battery of U2 type cells housed in a detachable compartment. An alternative unit (Cat. No. 924), operating direct from AC mains and providing the correct voltage and current, is available separately and is readily interchangeable with the battery unit.

The "EB35" receiver is housed in a metal cabinet, and, with robust construction throughout, it will stand up to hard usage over a long period with a high degree of reliability. Chromium-plated handles are fitted and the finish is an attractive combination of dark green and beige. The receiver is suitable for use in all parts of the world.

A NEW MODEL OF MAJOR INTEREST

GENERAL INFORMATION ON THE "EB35" RECEIVER

Frequency Coverage

Range 1	8.5 Mc/s	to	22 Mc/s.
Range 2	3.5 Mc/s	to	8.5 Mc/s.
Range 3	1.5 Mc/s	to	3.5 Mc/s.
Range 4	550 kc/s	to	1500 kc/s.
Range 5	150 kc/s	to	350 kc/s.
VHF/FM	88 Mc/s	to	108 Mc/s.

Tuning System

The scales are horizontal, occupying a length of approximately nine inches. Frequencies are clearly marked to a calibration accuracy within 1%. The tuning control is flywheel-loaded and operates a gear drive with a reduction ratio of 110 to 1. A logging scale and auxiliary vernier allow dial settings to be recorded.

Controls

Six conveniently placed and clearly marked controls as follows:—

on/off switch; volume; tone; wavechange; tuning; dial lights.

Circuitry

A total of thirteen transistors, five diodes and a Zener stabiliser is used. A radio frequency amplifier is effective on all frequencies, leading to high sensitivity. The discriminator is of the Foster-Seeley type, for minimum distortion of the FM signal.

Power Supply

Power is derived from a battery of six U2 type cells, housed in a separate compartment and readily detachable. Voltage stabilisation, where required, is achieved with a Zener diode, which feature leads to a consistent performance up to the end of the useful life of the battery.

An AC mains supply unit (Cat. No. 924) is available as an alternative. This unit is identical in size and shape with the battery unit, with which it is readily interchangeable.

Special Features

Two sockets are provided at the rear. One is for taking a signal from the detector stage, at moderate impedance, for feeding into either an external amplifier or into a tape recorder. The second socket accepts a signal from a record player and, with a plug inserted, the earlier stages of the receiver are muted.

Dial lamps are provided for occasional use. the switch being of the self-return type, to avoid unnecessary drain on the battery.

Dimensions and Weight

Height 6⅜ in. (16.2 cm)	Weight (less battery)
Width 12½ in. (31.7 cm)	is 12¾ lb (5.8 kg.) with
Depth 8 in. (20.3 cm)	battery 14 lb (6.3 kg)

TECHNICAL PERFORMANCE FIGURES

The following figures are provided for those wishing to have full technical information on the performance of the "EB35" receiver. In plain language, it can be taken that the receiver has high sensitivity and is designed to give good separation between stations transmitting on adjacent channels. The audio output is ample for the majority of domestic requirements and is of good tonal quality. When desired, a larger cabinet type of speaker (of 10 ohms nominal impedance) can be used, the lead being plugged into the socket on the front panel.

To allow the receiver to make the most of the incoming signal, an outdoor aerial (not necessarily long), erected in the clear, is recommended, and this will help also to reduce the level of local electrical interference. On VHF/FM, an aerial designed for reception on these frequencies should be used.

Sensitivity

For 15 dB signal-to-noise ratio, sensitivity is better than 5 microvolts on ranges 1 to 3, and better than 15 microvolts on ranges 4 and 5. On VHF/FM, sensitivity is 20 microvolts at 22.5 kc/s deviation for a 20 dB signal-to-noise ratio.

Selectivity

On ranges 1 to 5, the bandwidth is 5 kc/s at the 6 dB points and 25 kc/s at the 40 dB points. FM bandwidth is 250 kc/s at the 6 dB points.

Spurious Responses

The image rejection is approximately 50 dB at 2 Mc/s and 15 dB at 18 Mc/s. Breakthrough at the I.F. of 465 kc/s is at least 85 dB down on ranges 1 to 3 and greater than 65 dB down on ranges 4 and 5.

On the VHF/FM range, the image ratio is better than 25 dB, and IF breakthrough better than 50 dB.

Audio Output

The maximum output approaches 750 milliwatts. A 5" diameter speaker is built-in and a jack on the panel is for use with low impedance telephones. Frequency response is level within 6 dB over the range 100 to 10,000 cycles.

Aerial Input Impedances

On ranges 1 to 3, the input impedance is nominally 75 ohms, balanced or unbalanced, to allow the use of a dipole or single wire aerial. On ranges 4 and 5 the input impedance is nominally 400 ohms.

A standard unbalanced coaxial socket, with nominal impedance of 75 ohms, is provided for connection of the feeder from a VHF aerial for FM reception.

Instruction Manual and Guarantee

A comprehensive Instruction Manual is supplied. Our 12 months guarantee against faulty workmanship or components (excluding semi-conductors) applies.

In the interests of continued improvement, we reserve the right to amend this specification without notice.

Manufacturers :

EDDYSTONE RADIO LIMITED

ALVECHURCH ROAD, BIRMINGHAM, 31

Telephone: 021-475 2231 Cables: EDDYSTONE, BIRMINGHAM

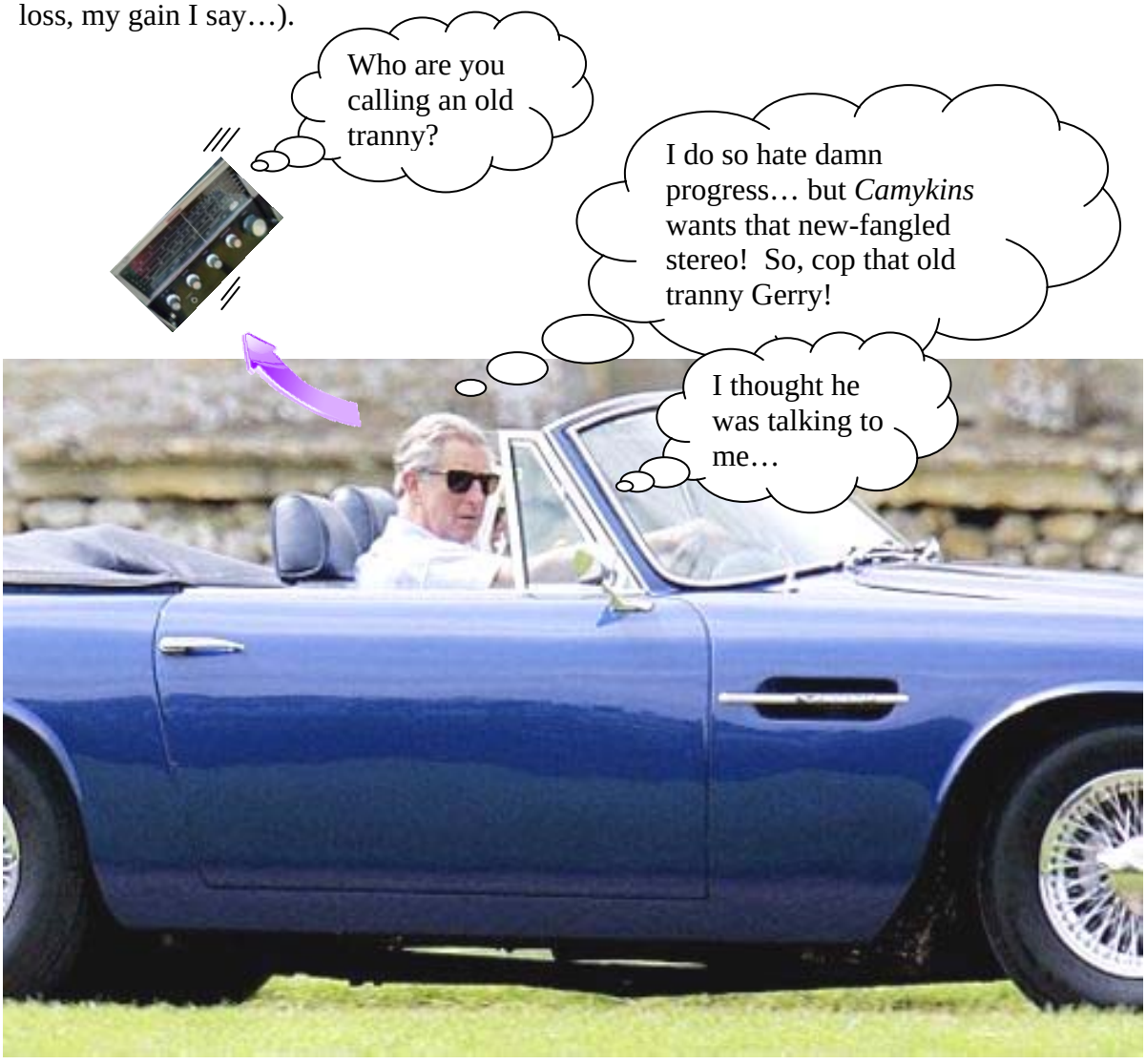
Telex: 33708

Printed in England

Issued September, 1963

Postscript

Wait a minute, what is that strange label under the case? – could it be, no, surely not - mind you, I thought I could detect a faint aroma of leather, caviar and stale Champagne when I took the case off. I guess HRH must have modernized his mobile audio setup to Satellite radio at sometime? (his loss, my gain I say…).



Some Useful Bibliography/References

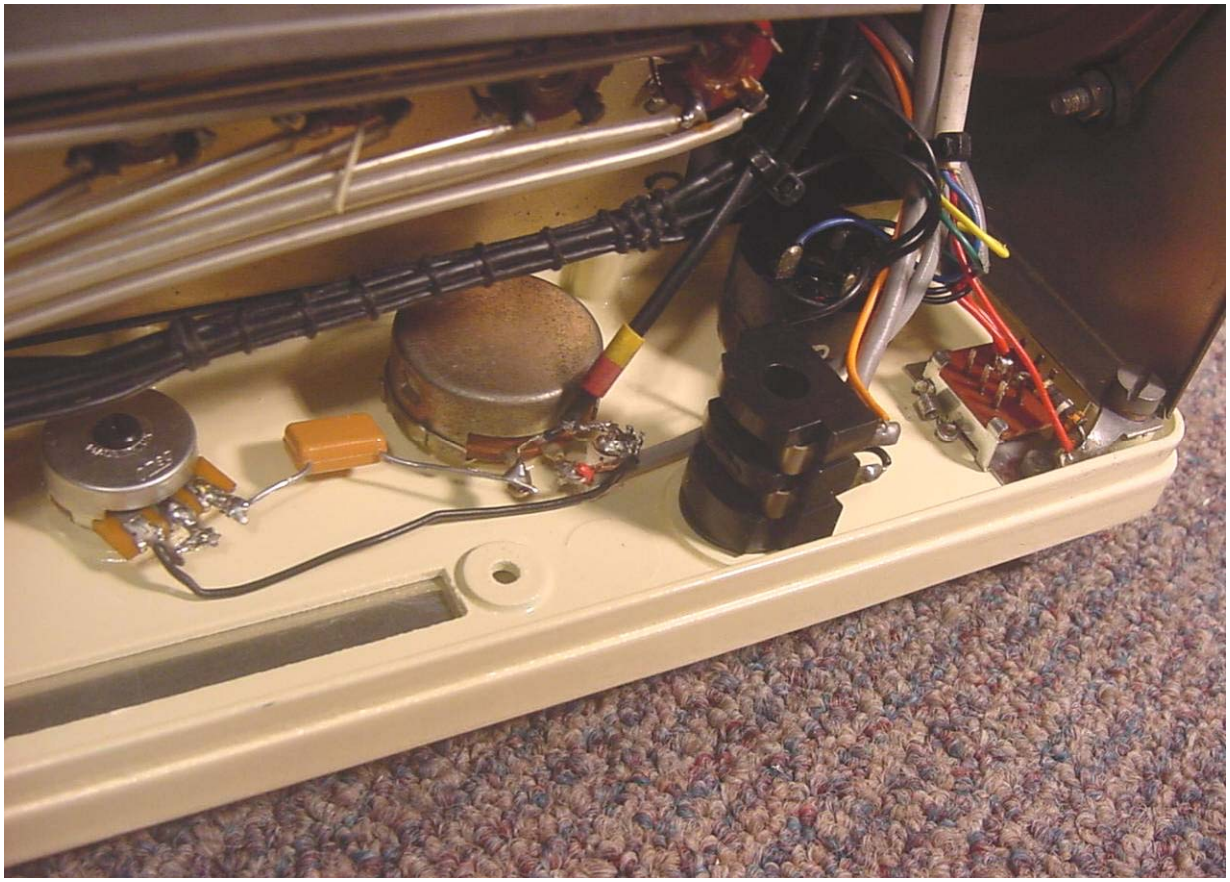
- Lemons, Wayne, *Transistor Radio Servicing Course*, 2nd Ed. 1977
- Patchett, GN, *Radio Servicing Vol 4 Fault Finding*, 5th Ed. 1963
- King, Gordon, *Radio and Audio Servicing Handbook*, 2nd Ed. 1970
- Mullard Ltd. *Transistor Audio and Radio Circuits*, August 1969 pp34-35
- Jonathan Hill, *Radio Radio!*, 3rd Ed. Sunrise Press, 1996
- Various documents that can be downloaded from the EUG website, including:
  - *The Ultimate Quick Reference Guide* (QRG), 2nd Ed., 2005, Graham Wormald, G3GGL
  - *The Cooke Report* by Bill Cooke
  - EC10 MkI and MkII Manuals and promotional literature
  - S.960 Manual and promotional literature
  - *Eddystone 898 Drive Unit in an HBR13C Receiver*, O'Hara, Gerry
  - *Restoration of an Eddystone EC10 MkI* (Parts 1 and 2), O'Hara, Gerry
  - EUG Newsletter/Lighthouse articles featuring the EB35, listed below for convenience (see also articles on other small Eddystone solid-state sets of this era, ie. EC10 MkI and MkII, EB36, EB37 and EY11):

EB35 (cont)

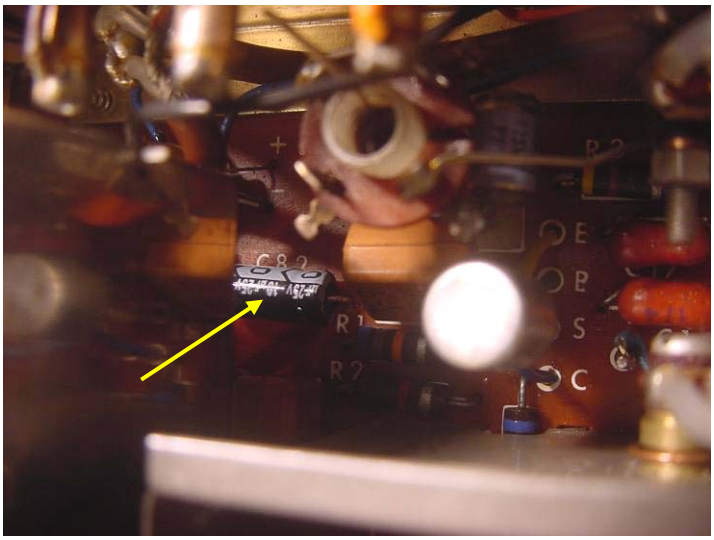
Some Interesting Article-Related Websites:

- http://www.eddystoneusergroup.org.uk/)
- http://www.radiomuseum.org/r/eddystone_eb_35eb3.html
- http://www.museumoftechnology.org.uk/expand.php?key=326
- http://people.msoe.edu/~reyer/regency/
- http://www.vintage-technology.info/pages/history/histpamtr.htm

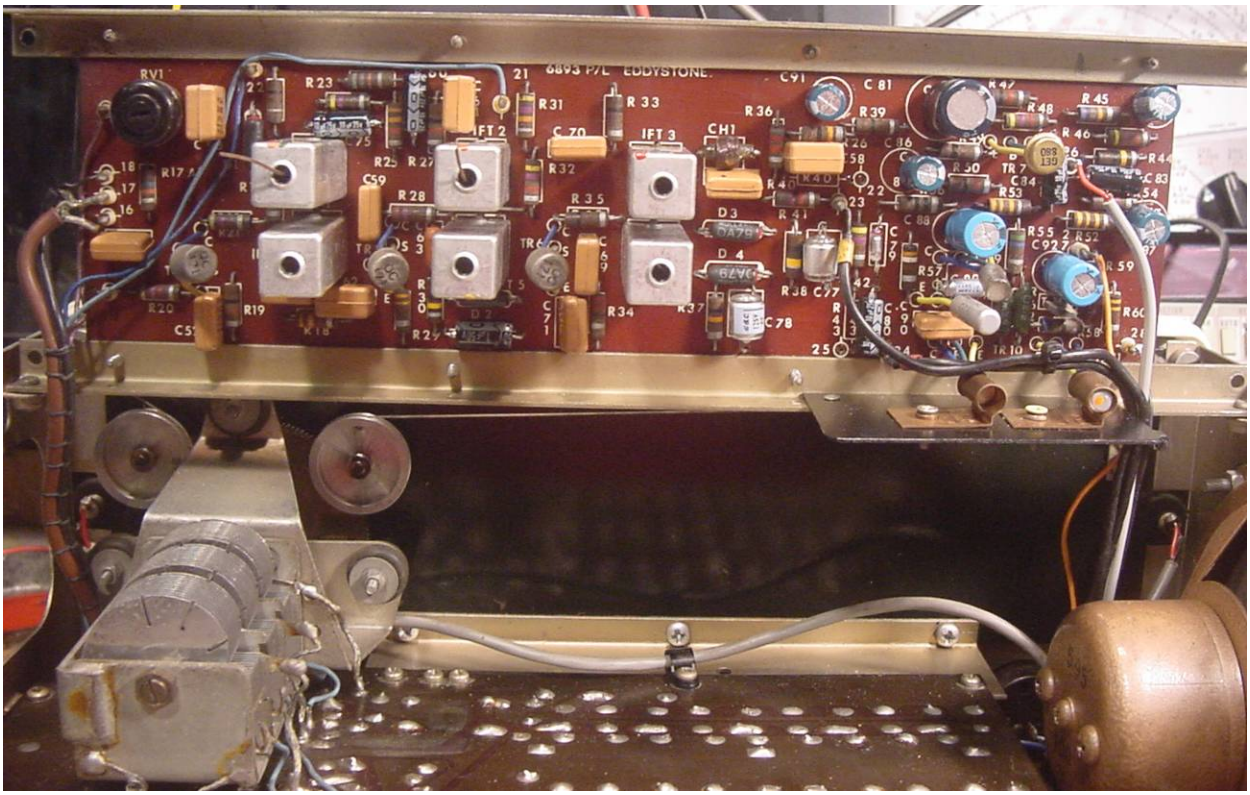
- http://www.vintage-radio.com/repair-restore-information/index.html
- http://users.arczip.com/rmcgarra2/index.html
- http://www.radio-workshop.co.uk/manuals.shtml
- http://www.transistor-repairs.com/print.html
- http://hometown.aol.co.uk/oldradioparts/semiconductors.htm
- http://semiconductormuseum.com/Museum_Index.htm
- http://www.thesun.co.uk/sol/homepage/news/royals/article1361932.ece
- http://www.peakelec.co.uk/



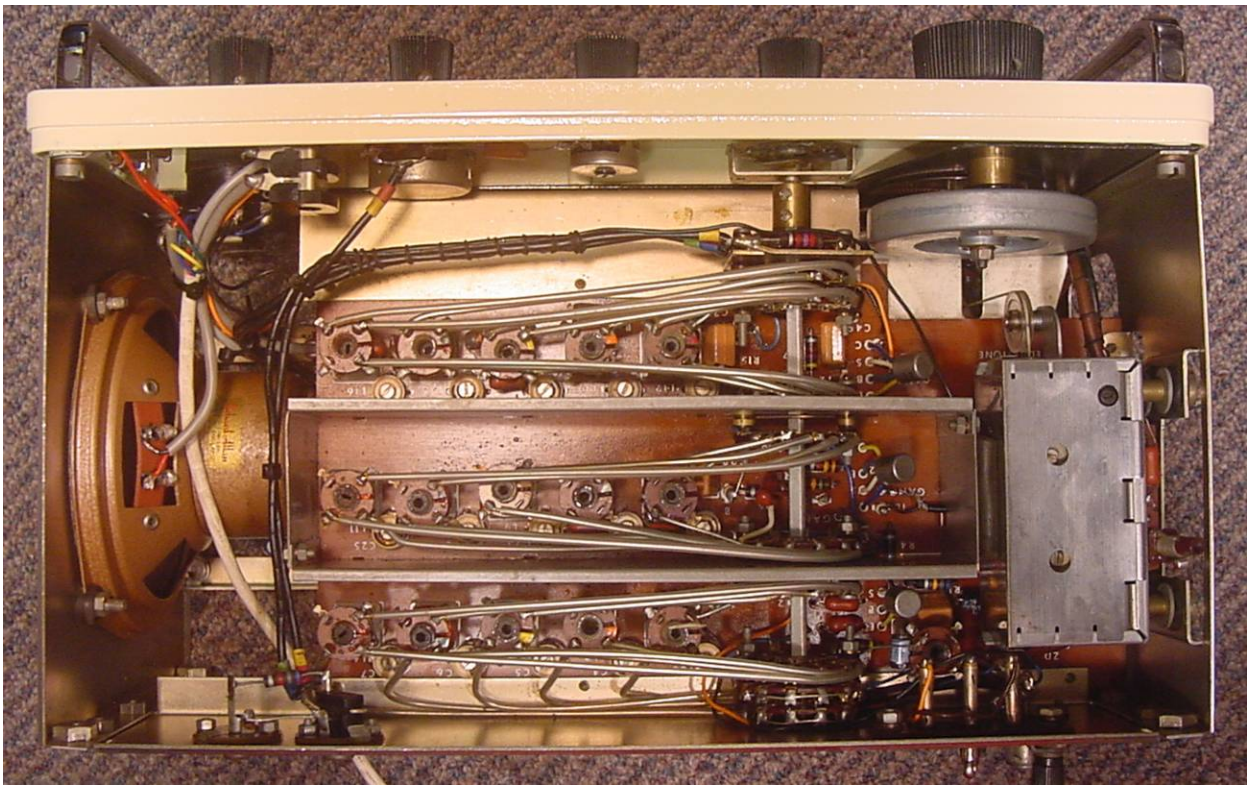
Above: re-wired on-off switch, dial light switch, 'phones socket, volume and tone controls. Note the replacement tone control (small pot, left) – this is a 4.7kohm unit and should be 10kohm – but it works ok, so was left in place.

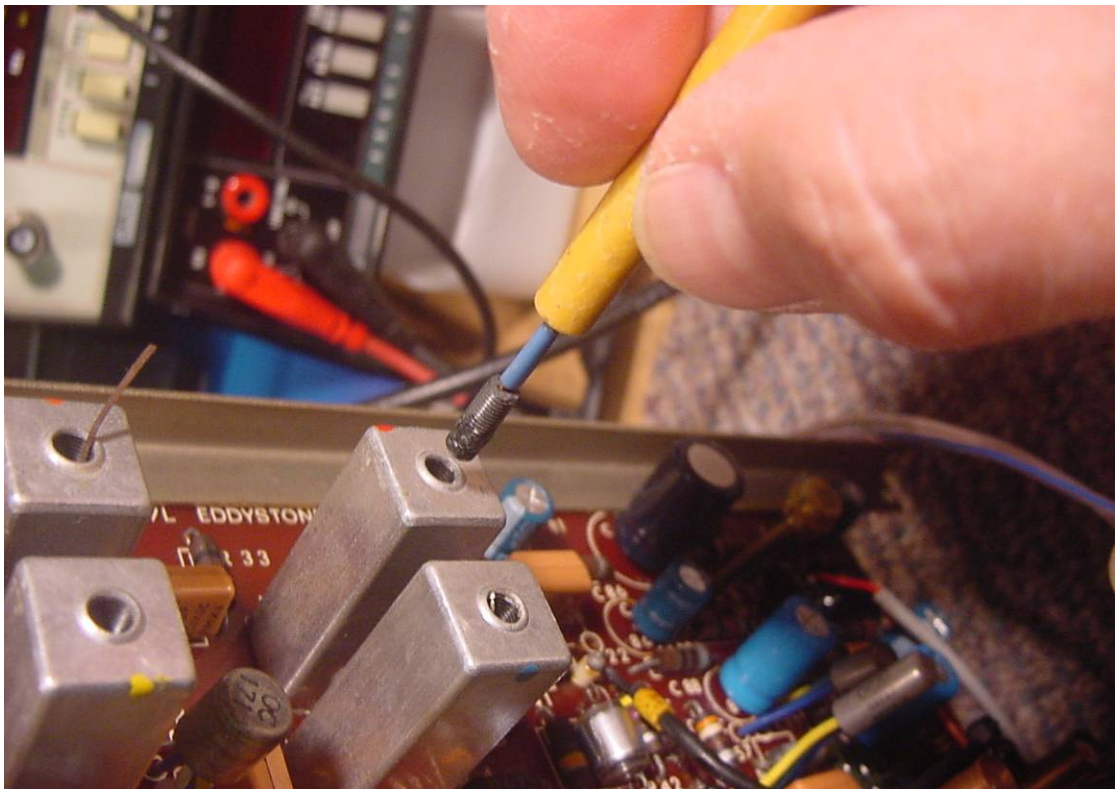


Right: an awkward capacitor to replace - C82, across the zener diode, tucked-away behind the aerial sockets and IF trap coil

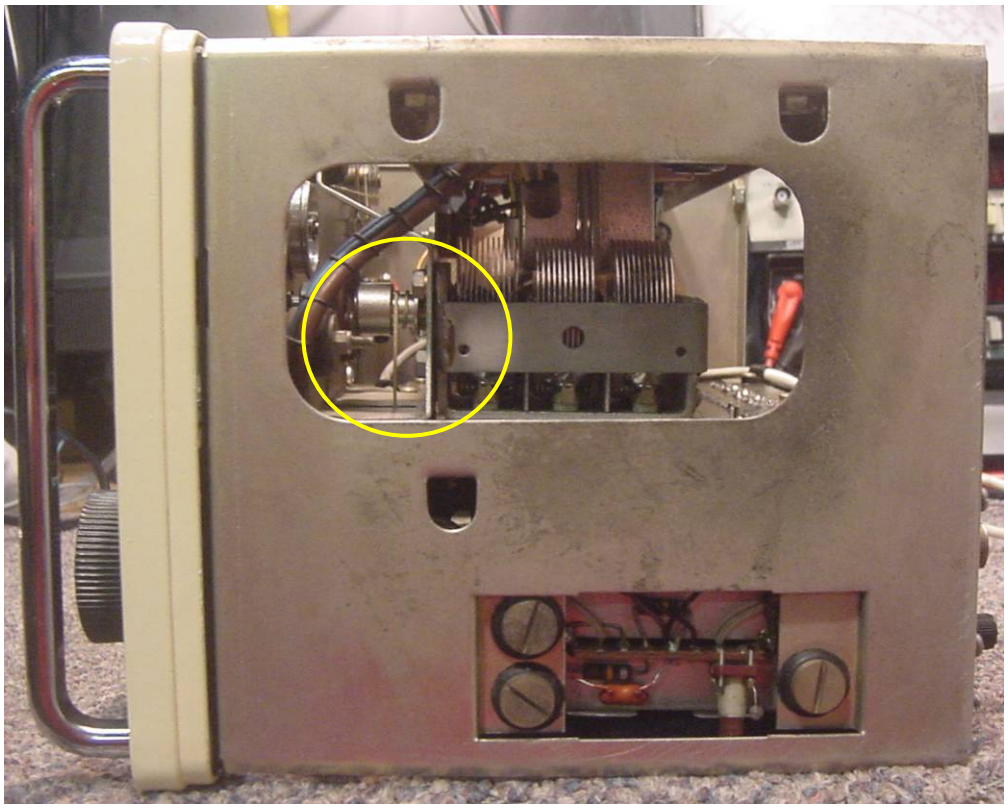


Above: IF/AF board after servicing and cleaning – looking better. Below: RF board after servicing and cleaning – looks much the same as before (!)





Above: new slug being installed in the 3rd AM (465kHz) IF transformer – note the coating of Rocol Kilopoise. Below: end view of the chassis showing the three new rubber mounting grommets installed on the VHF tuner. Note the VHF tuner slug operating cord spooled around the tuning gang shaft (circled yellow)



Above: Richard Allen speaker – proudly Made in England! Below: left – cracked control knob with the crack filled with 'JB-Weld', right – when cured, the JB-Weld was touched-up with a permanent marker pen – almost invisible repair

Above: 'Aaatennn-shun! – must be all those military parades the set had to attend in the 'good old days' in Charles' jalopy… maybe not, but the set has scrubbed-up rather well


EDDYSTONE
MODEL EB 35
MADE IN ENGLAND
FM
Mc/s
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OFF ON
VOLUME
TONE
WAVECHANGE
TUNING
DIAL
PHONES