# Lighthouse

**Founded 1990**

**The Magazine of the Eddystone User Group**

**Issue 78, April 2003**


# *'Everyman' Goes to War*

***Full Specification Inside***

# EDDYSTONE USER GROUP

A non-profit-making group for Eddystone Radio Enthusiasts
Founded in 1990 by Ted Moore
Issue 78, April 2003


**Membership Details:-**
Annual subscription for six bi-monthly magazines:-
United Kingdom; £16
Europe: £19
(or €30 banknotes)
Rest of World: £23
Sterling cheque OR the notes of your country, e.g. US$35,Can$55, Aus$65, NZ$70. We accept notes of any currency but cheques must be in Sterling payable in London. Regret no plastic. ALL OVERSEAS sent by AIRMAIL.

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**FREE TO ANY MEMBER: Eddystone B34/358** in rough condition but WORKING with homebrew psu and most coilpacks. **ALSO FREE, Eddystone 770U,** a bit rough but electrically sound. Willing to bring to NEC (4th May) to be collected from my car. Also **HEATHKIT RA1,** fair condx, working, with manual, £40. David Oakden G3UFO, Tel: 0151 625 1877 (Wirral)

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## *WANTED*

**Eddystone 830/7 or 730/4.** Call Brian on 07966 037 253

**Eddystone 680X** Help!! Can anybody pack and send a nice one of the above to a new home in Canada? Barry Falcon, 91, Remington Drive, Richmond Hill, ONTARIO, Canada L4S 2N5

**Mains Tranny, 230-240v.** Secondary 325/350 volts 200mA, HT winding centre-tapped. Heater supply 6.3v 2/3 amps. Space available 4"x4"x4" Doug Bishop, 17 Russell Street, Bath BA1 2QF

# Chris's Column

**You will see from Graeme's comments elsewhere in the magazine that we have decided to put up the subscriptions by another £2. It has been quite a while since our last increase and costs continue to rise. I do hope that this will not be too inconvenient to most of you. Even at £16 this still represents incredible value for money for a newsletter which is reckoned by many to be the best of all of the vintage wireless publications.**

I have been involved with EUG since the day Ted persuaded me that there was a real demand for a newsletter for Eddystone Users. I believed in Ted then and I have stuck with the EUG through easy times and difficult times.

Ted started this off with an old typewriter and a borrowed photocopier. Now EUG and its newsletter have now earned the right to be an institution and as such we must not always assume that it is going to be there.

There is no large organisation behind the EUG and the newsletter, in fact it is down to the real hard work and love for our favourite receivers of a very few people. Ted is still with us of course, but if it had not been for Graeme the newsletter may well have died some years ago when Eddystone parted company with Marconi.

We do owe Graeme a real debt of gratitude and I think we are in danger of taking people like him for granted.

I was reminded recently that the PC and printing equipment Graeme uses to produce the newsletter and run the EUG was only partially funded some years ago by the EUG, even though it is exclusively used for EUG.

Computer equipment does eventually need replacing and it is not cheap. I don't think it is fair that we should expect Graeme to fund this activity himself, even though he has offered to do so.

Therefore I wish to launch a fighting fund to enable EUG to purchase some up-to-date PC equipment. This will enable us to continue to produce a high quality publication and so continue what Ted started so many years ago.

I know some of you have got more money than sense, because I have seen the length you will go to, to obtain that rare Eddystone set.

To those people in particular and all EUG members in general I ask that you make a donation towards this fighting fund for new computer equipment.

No sum is too small but beware I have difficulty in counting in anything less than the number 5. I shall administer the fund and report regularly on its state in the newsletter. Any purchases made and a list the donors (unless they want anonymity) will also be included.

So please dig deep and make your payments out to Eddystone User Group but send them to me c/o 23 Dark Lane, Hollywood, Birmingham, B47 5BS. (mark on the back ***PC fighting fund*** with your name and address).

We shall have our tin cups out at the Vintage Fair, hope to see you then. (Sunday 4th May)

*73 de Chris GØEYO*

*(Patron)*

# RADIO RAMBLINGS

Jottings from my Notebook

By Graeme Wormald G3GGL

Bewdley, March 2003

"Beware the Ides of March." said the prophet to Julius Caesar in William Shakespeare's eponymous drama.

Well, they're fast upon us and here's the rub: subscriptions to your favourite magazine are about to go up.

EUG is a non-profit organisation so I think a little explanation is in order. The financing of our activities is based on having a 'buffer' of around £5 per member in our bank account at the 'lowest' part of the year (which is the Ides of March!).

The past year has been our most successful and most expensive (we reached 350 members for the first time and published more pages of Eddystonia than ever before). And we've subsidised every UK member to the tune of £1.50 (and others in ratio).

Now the Post Office is bleating about the loss they make and the increases in postal rates coming this summer . . .

That gives us three options: carry on and become insolvent, reduce the size of 'Lighthouse' or increase the subscription. I think you'll agree that it's worth the price of ten cigarettes a year (to put it into perspective) to keep as we are. So we're putting £2 on home members, and £3 on overseas, starting with this month's renewals.

Those of you with renewal forms this month will have the new rates, and so will the rest of you when your turn comes. Don't renew until you get a notice with your 'Lighthouse',

**DEMMED ELUSIVE CONNECTORS**

This little item produced several comments. Doug Bishop (who proudly celebrates his 83rd in July) writes to say that he has four females and three males. I'm assuming that Doug is referring to the non-polarised variety (used on my 680X and 730/4).

He says "I don't claim these to be perfect but if readers would like to contact me I suggest they send a £1 coin for each M & F. I could then buy padded envelopes and first class stamps." Doug goes on to say that having being a 'sparky' since 1935 he still has old-style plugs, adaptors and switches and that any requests will be given due attention. Many thanks, Doug.

May I suggest that members should write first with an S.A.E. and 'book' their requirements with Doug before they send him £1's, to avoid possible embarrassment due to over-demand. He can be found at 17 Russell Street, Bath, BA1 2QF.

Roy Elwen in Sunderland has also sent me three similar vintage females, two of which have double earthing contacts I don't think I've seen those before! Now they are rather chunky and may not fit all sets, but anyone who fancies one could book one from me by telephone (01299 403372) before sending me the same £1 coin

(always on a cornflake packet, please).

The only time anybody sent me £2 loose (for a badge) the envelope had been carefully slit in the corner and the money extracted!

Ray Simmonds writes to say he's not too sure about my advice to hard-wire a set as a last resort. He said this should never be done, on safety grounds and asks if members could come up with a way of re-moulding the Black and Decker garden extension connectors.

I suspect that Ray may have misunderstood my suggestion and thought I was recommending hard-wiring the set to the mains socket. No, no, not at all. I was merely suggesting that we do what 99% of all black box appliance manufacturers do.

**NON-EDDYSTONE DATA**

From time to time members contact me about service information on sets and equipment other than Eddystone.

I don't collect this, of course (with the exception of handbooks for my KW Viceroy and Trio 530), and I always advise them to contact Mauritron Technical Services who claim to have the greatest collection in Christendom.

So they ask me "Where?" and I have to say "I don't know, they've stopped advertising!" Well, EUGer Ron, G8/M3URU, has given me the gen and here I pass it on. Everybody write it down in your diaries/phone books:-

- Cherry Tree Road, Chinnor, Oxon, OX39 4QY
- Tel: 01844 351694
- e-mail enquiries@mauritron.co.uk
- www.mauritron.com

**830 ACHILLES HEEL**

After my little feature on changing the 'difficult' Bakelite push switch on the 830/7 calibrator for a conventional spring-biased DPDT toggle switch, an e-mail arrived from EUGer John Caines.

He pointed out that his 830/3 already had such a switch, which he assumed was standard because his handbook says that it is fitted with a toggle switch in this position.

So I consulted the handbook for my 830/7 (also covers 830/5 and 830/6). The line drawings of the plan and underside of the set clearly show the 'dodgy' push-button switch.

On page 12 it quotes "The calibrator is brought into operation by pressing the small button switch S2 . . . "

BUT ON PAGE 20 it quotes " This is a double-pole switch with one "make" and one "break" biased to the "off" position. On pressing the toggle, . . ."

Well, well, well! It looks as if they started off with my system at the Bath Tub and then changed it, but forgot to re-write the whole of the Service Manual. I did say it looked as if it should have a toggle switch, didn't I?

Oh, and by the way, John peeped inside his 830/3 and said it all looked like original Bath Tub wiring!

**SOLID STATE VALVES**

After seeing Ted's item about the solid-state plug-in rectifier replacement, Dave, GØSKE, e-mailed me a feature he found in 'Electronics World' for April 2001.

In it the author states that "Unable to find a replacement 6V6 audio power valve for my radio, I set about making a high voltage MOSFET substitute which works better than the valve it replaced . . ."

Dave manufactured one of these at the time and found it to be an effective alternative . . .

As he says, it opens up a whole genre of none-intrusive development with possible additional performance benefits!

OK, I see his point, but I must say (a) that 6V6's are very easy to source, (b) that valves are more tolerant of mistreatment, and (c) very few Eddystones use octal valves and I don't think you could get the circuitry onto a B7G base!

Fascinating stuff, Dave, but no thanks. I'll stick with the thermionics I know and love!

**POETIC JUSTICE**

Those of you who do the 'Daily Mail' Codeword puzzle probably let their eyes wander on the page and notice the daily 'Limerick' contribution. Now I'm not a great one for poetry (I failed Eng. Lit.) but I am a Limerick fan. The only trouble is that most of the ones I know are of questionable taste and not fit for a family publication like 'Lighthouse'.

So some weeks ago I let it be known in certain quarters that I was on the lookout for an 'Eddystone' Limerick. And then I spotted the Reader's Question on the same page:-

**"Was the Eddystone lighthouse manned during World War II?"**

As Jeeves would have said: "I'm afraid I couldn't say, Sir", so I was pleased to see the following reply this week:-

**"My grandfather, the late William Roach, was deputy principal keeper of the Eddystone Light in the late Thirties. As war loomed, a Royal Navy exercise, headed by Lord Mountbatten, was staged to assess the vulnerability of the lighthouse, which was indeed 'captured' during the operation.**

**The Eddystone Light was subsequently left unmanned for the duration of the war . . . "**

So there we are and now we know. But what I'm getting round to saying is that the following recently landed on my desk:

**The Keeper of the Eddystone Light**

**Had imbibed well and was a bit tight**

**When he fell off the Rock**

**He had such a shock**

**He went down without much of a fight.**

If you can do better, let me have it!

**LETTER FROM NEW ZEALAND**

In a long and interesting letter from Ross Paton in Auckland he mentions that he has 2 x 770Us and a 770U MkII, all ex NZ armed forces and all have had the mains connector removed and the cable hard-wired, so there's another professional precedent.

He also mentions that he is quite happy with the performance of his S.940 and can't understand why anybody should want to 'muck about with it', as he says in his straightforward antipodean way. (This is one that can run and run!)

He does mention that a previous owner had changed the reverse log RF gain pot (wire wound) with a carbon linear. This he changed to a W.W. but still has the very 'sudden' control that this gives.

Which reminds me that another member has been enquiring about this curious 'pseudo-logarithmic' control. We covered it a few years ago when it was discovered that it was wound in three sections, hence the term 'pseudo'.

The big trick is that nowhere in the (many) Eddystone manuals does it explain the eccentricity of this unusual component. They were advertised in the Wireless World in the 1950's by

'Colvern', et al, but I shouldn't think there's a hope of finding a new one.

Ross goes on to say that when he had drift problems in his 940 a new VR150/30 cured it. The old one was still glowing but it wasn't doing its job.

He also had a period of problems with SSB reception and changed the product detector (6BE6) for a ruggedised version, the CV4012 (6BE6W alias 5750). Problem solved.

Ross notes with interest Ted's 1938 Eddystone E.C.R., Stratton's first 'modern' communications receiver. This has now been passed on to another member but I have been given full opportunity to examine it. I know of only three others in existence but we have quite a bit of info about the set.

Ross asks if we can do a full spread feature on the set "with modern PCs and scanners". Yes, yes, Ross! I promise, just as soon as I can get round to it!

He'd like one on the 380X as well. In the fullness of time . . .

**SABRINA FAIR**

Ross also asks (and he isn't the first) who Sabrina Drive was named after. It so happens that I have the full story on this one and it's nothing to do with Norma Sykes, Arthur Askey's big-bosomed small-screen partner.

It so happened that, 25 years ago, when this cul-de-sac of 28 bungalows was built on the banks of the River Severn, yours truly was a member of the Highways Committee of the District Council, the body responsible for road-naming. By now, those of you interested in cartography will have tumbled to it!

Well, the developers (Barratt Homes, of cardboard castle fame) wished to call it 'Riverway Close', but there was already a 'Riverway Drive' in Bewdley and the Post Office won't endorse sound-alike names.

So the committee suggested 'Severn Drive' as an alternative, but there was already a 'Severn Way' in the town. Next, a member suggested 'Hafron Drive' (Hafron is the Welsh name for Severn); but there was already a 'Hafron Court' in the town.

Yours truly then caught the chairman's eye and proposed 'Sabrina Drive'. Twenty pairs of eyes swivelled towards me with furrowed brows above.

"I'm sure you all know that 'Sabrina' is the Romano-British name for the Severn" (students of language history will know that the letters 'B' and 'V' are commonly interchanged in Latin languages, c.f. 'caballero' and 'cavalier').

And so it was named. I moved into a bungalow here ten years later!

Cartography? Just look at John Speed's atlas of England & Wales. (1611). You will see the longest river in the land described as 'Sabrina flu'.

**AMATEUR RADIO FORUM**

I attend the above, held by the Radio Agency on Saturday 28th March at Bristol and was gratified to meet several EUGers from of an attendance of some two to three hundred.

Not enough space (or time) here for a report (see the radio press) but it was chaired most ably by Alan Bett, Chief Executive of the R.A. supported by Peter Kirby, GØTWW, General Manager, and Dr R.C.Whelan, G3PJT, President of the RSGB.

I was very interested to hear that the reduced use of the HF spectrum in recent years is about to go into reverse! Commercial, military and (dare I say it) broadcast users are starting to cast their eyes back to the good old short waves. I wonder why? ♠


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This improved "Everyman" Short Wave Receiver is ideal for the listener who is looking for a simple yet reliable and efficient short wave set that is set at a cost below that of the more elaborate and complicated Superheterodyne models. The "Everyman" gives a splendid all-round performance and has the professional appearance of the latest communication type sets ; and what is more, it "puts the World at your finger-tips" – it gives an amazing variety of stations from all over the World whenever you choose to "switch-on." The circuit has been based on a previous "Eddystone" model which has already achieved a

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With this receiver you will be able to hear American, European, far Eastern and other long distance shortwave broadcast, also amateur experimental stations at good loudspeaker strength and quality, an **ever-available** performance providing keen interest and education.

This Receiver enables you to tune from 9.85 metres to 2,000 metres and covers all popular wavebands including the Empire transmitters at Daventry, such stations as Rome, Moscow, Berlin, Pittsburgh, Schenectady, etc.; also ships at sea, coast stations, trawlers, aircraft, police and the medium- and long-wave broadcast – lively interest all the time. The set can also be used for receiving Morse signals which means many more interesting stations for the code enthusiast.

A 2-volt battery should be used for low tension supply, the Exide "DFG" being suitable. High tension should be at least 120 volts and can with advantage be increased to 150 volts. Low tension current consumption is .5 of an ampere and high tension 8 milliamperes at 120 volts. Grid bias to the last two valves is automatically provided so no grid bias battery is needed.

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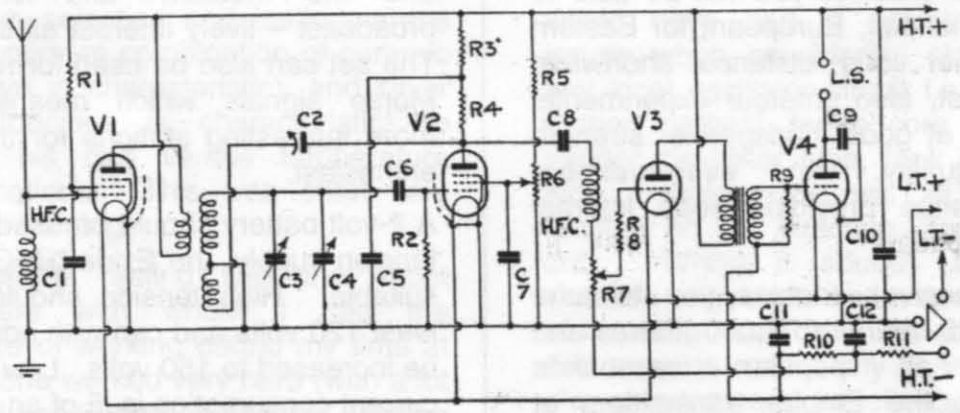
---

***The leaflet reproduced above*** *was recently discovered in the proverbial heap of rubbish being scrapped in last year's clearout at Eddystone Radio. It was the first time I knew the set was produced as a factory item and didn't included it in QRG/3! (Other than a mention in the contents of Eddystone Short Wave Manual No 4 of 1938, where it is presented as a D.I.Y. item – not even a kit!)*

*The company's copywriter (Arthur Edwards ? G6XJ – sales manager) was certainly letting rip for a circuit first introduced in 1932 as "The Kilodyne Four" and now refined with the use of HT droppers, auto-bias and bandspread tuning. Somewhat surprisingly the "Kilodyne" used a chassis construction in 1932, whereas the "Everyman" is baseboard, very dated for 1938.*

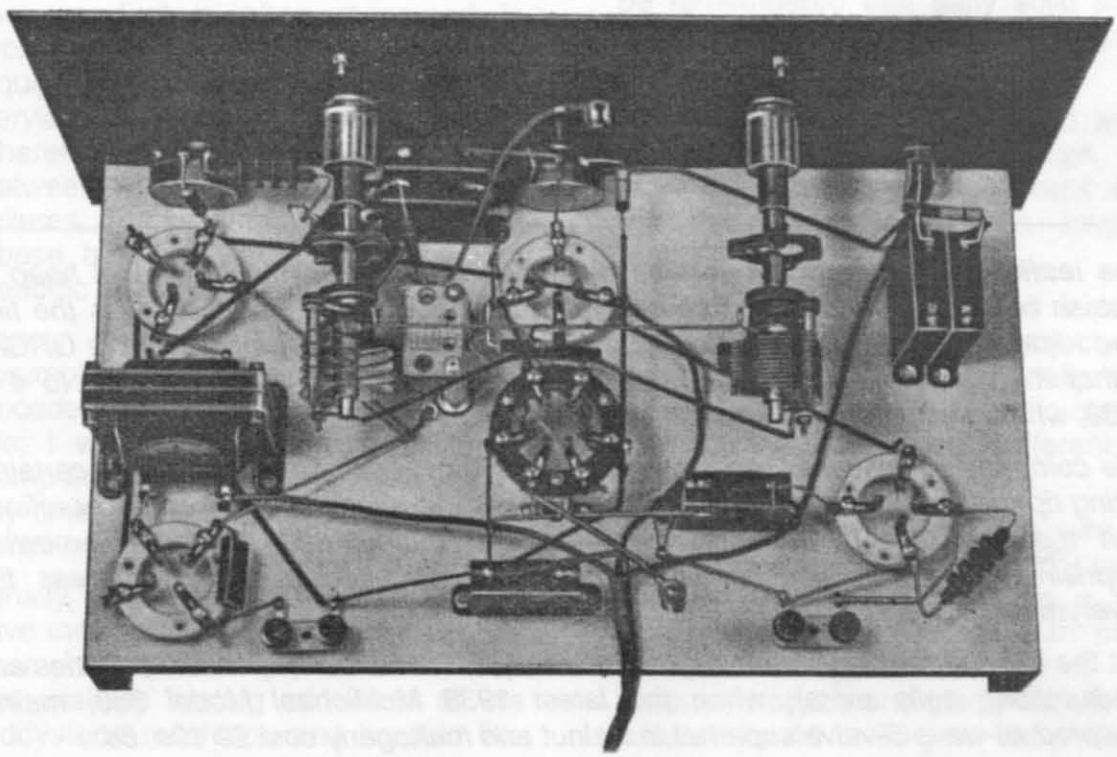
*But the most surprising statement is "Price only £10 15s. 0d" (Speaker, batteries and medium/long coils extra), when the latest 1938 McMichael Model 380, mains-powered all-wave 5-valve superhet in walnut and mahogany cost £9 19s. 6d. !*

*I suppose Stratton was aiming at a completely different market – the technically-minded, well-to-do professional. Turn over for the cct and innards of the "Everyman".*




**Theoretical circuit diagram. Improved Everyman Short Wave Receiver.**

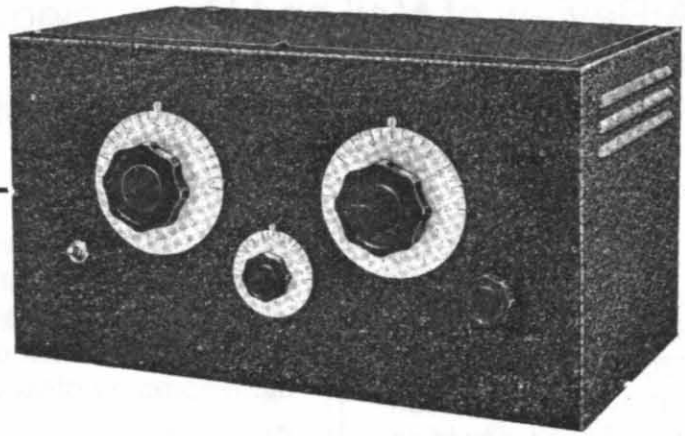
*The full Constructional Details of "The Improved Everyman" are available in Eddystone Short Wave Manual No 4 from EUG Archivist Dave Simmons, see address and phone / fax number on page 2.*



**Baseboard photograph showing component layout and wiring.**

*Graeme – G3GGL*

# AN EMERGENCY SET IS VITAL



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The first audio stage is resistance-coupled and is followed by an L.F. transformer. The bandspread method of tuning makes the receiver easy to handle and facilitates the thrill of long distance reception on the short wavebands—which this Set provides in ample measure.
This Receiver enables you to tune from 9.85 metres to 2,000 metres and covers all popular wavebands including the Empire transmitters at Daventry, such stations as Rome, Moscow, Berlin, Pittsburg, Schenectady, etc.; also ships at sea, coast stations, trawlers, aircraft, police and the medium and long-wave broadcast—lively interest all the time.
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Name.....

Address.....

Stratton's were still advertising the 'Improved Everyman' two months before the fall of France. *(R.S.G.B. T. & R. Bulletin, April, 1940 (now RadCom) courtesy of Angus Graham, G3TXL)*

# Ted's MailBox

## A Review of Mail and Happenings

## By Ted Moore, G7AIR, Founder of EUG

**DEAF 770s**

Well like all myths this one will never go away ! At the time of it's design and manufacture the 770 series really was state of the art, and even today it can give a good account of itself providing it is in good condition. Both my 770R (I) and my 770RII are now good performers - but only after much work done to put them back to original condition.

There are a number of reasons why the 770s got the name for being deaf. Most of those traded around are not just second hand they are fourth, fifth or even sixth hand. Each owner will have tried to improve on the performance and will probably have ignored the simple answers.

Going instead for a clumsy effort at 're-alignment' when none was necessary. Or maybe changing all sorts of condensers and resistors when those in the set were okay.

Remember in those 'hollow-state' days many resistors were of 10% tolerance anyway, condensers too were almost always of wide tolerance.

Many of today's solid-state sets quote figures for sensitivity of a ½ or even a ¼ µVolt but this is not very often usable given the levels of QRM & QRN in this modern technological world. The more realistic figures of 2 - 5 µVolt obtainable with hollow-state sets are quite enough so long as one uses a suitable aerial which can more than make up for a few dBs of gain. Anyway, why opt for a receiver which will die on you if it so much as smells a bit of static when one can have an atom bomb proof valve job ?

From my observations of a number of both 770R and 770U receivers I have found that the deafness that is so often found is due to one or more of three causes.

Number one must be the loss of emission in aged valves - more especially is this true for the V1, V2, and V3 as used in the turret tuner RF, Mixer and Local Oscillator.

These three are closed in, high up on the chassis and so besides their own self generated heat they have to suffer from the ambient heat produced by all of the other valves. After maybe twenty or thirty years or more their emission levels are bound to have been considerably reduced.

For the 770R those 6AK5s can be sourced if you are willing to phone around. Or, as happened to me recently, you meet up with a very helpful fellow EUGer. (thanks Ken).

All of the other 'bottles' will have lost emission, just swopping a worn rectifier will raise your HT levels back to normal.

Those 6BA6s in the IF strip are enclosed in screening cans which means that they get overheated, well above the recommended operating temperatures as I have found by using

a caterer's probe thermometer to check them after a few hours of operation. They will rarely show 'in the green' on a valve tester.

Next on my list is that elusive character the 'Phantom Twiddler' who will have gone about his self-imposed task with great joy and little dexterity, and even less knowledge.

A ferrite core in an IF transfo which has been damaged and lost maybe 10% of its mass will affect stage gain noticeably - honest, just try it. Those IF cores should never really need touching - unless somebody has previously had a 'go' at them.

I have often found damaged cores have been replaced by 'alien' cores which have a different chemical make-up thus changing the transformer Q figures. Sometimes bits of the old core have been found lying inside the coil former between the upper and lower cores - this is a real puzzler of a fault to locate - believe me !

Even worse is trying to remove for replacement a badly damaged core which somebody has obviously been 'attacking' with a steel screwdriver, the worst thing you can do as when trimming the steel will seriously affect the results.

One more cause is passive components such as resistors gone high with much hot and cold cycling and leaky condensers. I mentioned to GGL recently the 'noise generator effects of the base bias resistors in the EC10 and EB35 series. The same thing applies in valve circuits.

Replacing grid, screen, and kathode bias resistors with more modern types does effect a marked reduction in circuit noise, especially in the early stages of a receiver. However 'paper' type condensers can also be the culprit, leaky they will drop grid, screen, or kathode voltages and they are prolific noise generators, almost as good as the zener diodes in modern gear.

I have one TCC 0.1µF which when put across the input terminals of an AF amplifier produces a wonderful imitation of Niagara Falls, just imagine having that on the input of your high-gain voltage amplifier AF stage !

My 770R is now almost permanently left on 126.6 monitoring London Volmet, with occasional excursions up to monitor the local Harbour Services in the Marine Band.

My MkII is always to be found on 137.2 - Mildenhall 'Departures' and strangely enough for a USAF base it is in the Civil Airband, but operated in parallel with the UHF channel.

What exotic ærials do I have ? Well just two DIY multi-dipoles in the loft feeding into an 8 dB gain amplifier as sold for domestic FM/Tv use, this feeds the signals down to my Playroom via about 25 feet of co-ax. I also take two spare feeds from this amplifier to feed my pair of 990s but that is another story.

Both 770Rs have had extensive TLC since I got them, both have required new front-end valves and a few others too. The MkII is now running with a solid-state rectifier 'valve' made up from four 1N4007s and a small value ballast resistor mounted on an octal base cannibalised from a duff 12SK7 valve.

The HT is only 12 volts higher than with a brand new 5Z4 so no problems there. The 770 (I) had a fault on the AVC circuit and for a while I was tempted to just diss the AVC as no matter what I did it reduced the small signal sensitivity, then I found the culprit was a decoupling condenser which was fine when cold but when the set's innards reached ambient operating temperature this condenser

started to leak, took a fair few hours to sort that problem out !

So when you hear that hoary old myth about deaf Eddystones just disregard it. You may become frustrated whilst trying to cure this deafness, but there is a cure.

**MY LATEST TOY**

Courtesy of GGL I have a very nice 556 to repair. Early postwar and yet the tuning mechanism must be, if not the smoothest, then one of the smoothest of any Eddystone which I have encountered. Needed no re-lubrication and it spins so freely that you would find it hard to believe without trying it out. That is the good bit !

It had a burnt out mains transfo, what a mess. Every bit of wax appeared to have boiled out onto the chassis, enough to start one's own dirty brown, smelly candle manufactory.

Getting rid of all traces was a laborious task but I discovered from a lady friend who actually makes REAL candles for a hobby that acetone based fingernail varnish remover works wonders. I have had a few queries though as to why I have a large plastic bottle of Nail Varnish Remover in my Playroom, think what you like.

**A corner of Ted's Playroom**

After several trips up into my loft, much humping about and unbubble-wrapping of sets of that era I have discovered that whilst the 740 mains transfo is identical down to the part number the 640 is also a good replacement, same physical size, same voltages and power rating with just a different primary voltage tapping system.

Since a 640 transfo was offered I opted for that. Until I collect this I carried on with checking the 556. The burnt out primary was evidently caused by perished rubber insulation dropping away from the tightly twisted wires feeding the rectifier heater. A full short ensued on this 5 volts at 2 amps winding and the primary could not take the overload.

The potted HT smoothing choke was o/c, well not quite as it read 130 Kilohms ! Very strange this as it was helpfully marked on the side of the can as being of 375 Ohm DC resistance.

Drilling out the rivets and removing the top, which held the connecting tags, showed a dry and corroded soldered joint. Reheating and the application of some new solder cured that, although apparently sound the other tag was similarly treated.

In order to get at the transfo and it's associated wiring on the 556 it is very much easier to remove the whole power supply chassis, just four bolts but you must also unsolder the connecting wires to the other chassis.

And to the tone control/mains switch on the front panel ! This latter bit had been omitted by the previous owner when investigating the fault and so he had torn asunder the tone control pot. The front, spindle, half remaining attached to the front panel and the back half with mains switch remaining attached to the p.s chassis.

Not to worry, these pots do frequently need changing as besides becoming noisy they also go high in resistance due to wear on the resistive carbon track. In the event this supposedly 50 Kilohm pot now read out at about 300

Kilohm, a big enough change to cause havoc with a well designed tone control circuit.

Thanks to a well meaning EUGer in Sth Wales I have a selection of new unused RS pots and Eureka ! There is a 50 Kilohm with DP switch. An improvement over the SP switch on the original.

Now one design discrepancy which irked me no end about this set, it also occurs on a couple of others of that era, is the total lack of any kind of fuse!

None in the AC mains input, none in the centre lead of the full-wave HT secondary either. Well okay you might say there is one in the 13 amp mains plug. There wasn't though in the 40s era when we still had those dinky 5 amp round pin plugs of either 2 or 3 legged type. So what was there to protect the transfo ? Just blind faith in British Manufacturing I guess. In this instance not good enough.

Whilst awaiting a free day to go and collect the spare transfo I have had the 556 powered up using my home built HRO-5 psu as an outboard psu.

It works wonderfully well without need to swop any passive components at all, even the electrolytics coped well without the need for any re-forming of the dielectric. And as I said the tuning mechanism is still first rate.

The original scale markings have faded badly, but then they always do on these oldies. I have a plan of action to remedy that, hopefully. That is it, just waiting for the transfo and then it can be boxed up and used. This is one which may not be embalmed and exiled to the loft for a long time.

**SUMMAT for NOWT PRE-AMP**

And it is too ! I visited an old pal up near Skegness recently and was admiring his collection of American valve receivers. Then came the question as to his ærial system. His garden is of what he calls the 'postage stamp' variety - very minimalist. What he has though performs very well on MF HF and even up the domestic FM band.

He has about 25 feet of wire going from a bedroom window to a tree at the bottom of the garden. This is fed via a small grommet into a diecast box similar to those made by Eddystone but bought from Maplin, as were most of the bits in the box. Now read on !

The system has been in use for eight years now but he recalls that he obtained the circuit before then from an old magazine, possibly either PW or SWM. It consists of a single FET pre-amp drawing its power to operate from the RF currents developed between his short but high length of ærial wire and the earth rod he has installed.

Without the circuit he re-constructed verbally for me the circuitry involved, the lead-in comes into the diecast box and to the piece of stripboard where it splits. One leg goes to a low pF condenser to feed the gate of the FET whilst the other leg goes via a decoupling resistor of a few Kilohms to a voltage doubling rectifier circuit using two of the 'OA' series of germanium diodes - silicon will not work he says.

This is followed by an RC smoothing network before the resultant DC is used to power the Drain of the 2N3819 FET. Output is via what Tony called an 'UNBALUN' of several turns bifilar wound on a small toroid. The resultant broadband signals are fed via coax to his Rx.

So now go on, lets see who replicates this pre-amp first. It does work as he showed me with a one to two S point increase on his station Rx. I did suggest that induction from powerlines might be responsible for some of the DC produced by the rectifier but he

**Mains Transfos**

I got quite fed up recently over having to scratch about looking for, even begging for replacement transformers for those sets which I have awaiting a transplant. It was FOUR but I managed to get one from East Coast Radio, almost a neighbour to me here. Thanks pal !

Anyway I find that my needs always appear to be for those early 'half-round' dial sets such as the 556, 640, 740, etc; and can but conclude that this problem of overloaded transfos existed before the 680 'burn-out' prompted a rethink of that model. Even the 1938 ECR had needed a transplant at some time.

Both 556 sets and the recently acquired 740 from GGL had transfo problems. This 740 was donated to me so that I could extract the mains transfo for use in my first 556.

Fine enough except that whilst it still worked, producing HT and powering the 740 once I got it working, there was a large mismatch in the voltages produced across the two halves of the transfo secondary.

One side gave me 258 volts AC on load and the other gave me 226 volts on load, swopping the leads over proved it was a transfo fault and not a rectifier circuit fault. Sure enough after a half hour of use the transfo case was too hot to touch. Not much use putting that into the 556 then.

I had resort to the local Thomson's directory and after a few wasted calls I got on to a transformer manufacturer who was willing to have a face to face chat about the possibility of producing a batch of 'standard' (to us) mains transfos of the wattage and size to replace those in the above mentioned models.

What I was asking for was 275-0-275 @ 80mA, 6.3 @ 3A,5 @ 3A with a 230 volts input. Say, about 65/80 watts loading. What I needed was prices - to me - for batches of various sizes. I suggested batch sizes of 20, 50, 100 so that I could see what I could afford.

I would have to fund this at the outset and just hope that others would place orders sufficient to repay my outlay, plus costs. There have been many occasions when I have, like GGL, had anguished EUGers, and others, on the phone or writing asking for a source for such items. Those in later models of the 940, 830, 770, even the 730, seem to go on forever.

Well after some discussion it turns out that the minimum batch for which he would quote was 25. And that for this I would be paying £24 per unit, including VAT.

This would go down to £20 for a batch of 50 and to £18 for a batch of 100. I also had to accept that they would be 'open-frame' type and that there would be but a 240 or 230 volt primary, no tappings.

Having discussed this with several others I fear that it just would not be a feasible operation, shame really. I shall persevere though and try elsewhere. Who would buy one for a set which they have had lying around awaiting a transplant ? Let me know if you will, but no promises.

**Goat Fell Mountain, Arran**

Well as some of you will already know I went on holiday to the Isle of Arran, some 17 miles off the coast of Ayrshire.

A very special holiday too. I took an EC10 with me, carried it in my rucksack up to the summit of the highest mountain on Arran, together with full set of batteries, headphones, roll of ærial wire etc; and operated it up there. Photos to prove it too, as

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several friends will have by now seen.

I have climbed Goat Fell seven times before but I was considerably younger then and did NOT have an EC10 on my back, still it was a very enjoyable holiday.

**Ted plus EC10 at 2,866 feet a.s.l.**

Where shall I take it next ? No not Ben Nevis or Snowdon, and definitely not K2. A clue maybe is that I have started taking Flying lessons !!!

If anybody wants to read the full unexpurgated story then get in touch by mobile as previously published in this journal or by landline on 01945 467356.

**Log-Periodics**

Since writing the piece about the aerials in use with my 770Rs and 990s and 1990R I have had a bit of a change. I guess that my interest on VHF/UHF is almost all centred on earwigging the Mil Airband and given my location most of the signals of interest are coming at me from the south or west of the UK. My QTH is but a 'good spit' away from the North Sea and there is little of interest coming from the north on VHF/UHF, so read on.

Looking through an ancient ARRL handbook recently for something totally unrelated I spotted these tables and formulae plus a nice diagram for DIY log-periodic aerials. The price of commercial types is around £130 to £170, heck I could get a couple of new receivers for that or have an hour and a half of flying time ! So I set to and made a home rolled version tailored to my needs from the data in the book.

I aimed for 100 to 400 Mc/s and for an eight element array. I used only galvanised baling wire for the elements and a length of white plastic electric conduit for the boom. The elements were cut to length allowing for a small overlap for soldering them together, made a couple of inches over size to allow for trimming when all other work was done.

Absolutely gob-smacked is the only way I can describe myself when I tried it out on my 990s and 770s. I can get Cottesmore ATIS on 242.325 Mc/s and Marham ATIS on 261.2 Mc/s at good readable strength WITHOUT A PRE-AMP ! The array was mounted up in the loft as were my previous nests of dipoles.

Anyway construction took part of one evening and so I made ANOTHER. This took less time and worked just as well so I now have one aimed due west and one aimed due south. You ought to try making one. Satisfaction guaranteed.

***Endit***

**That's all, folks, and I shall be looking out for you at the NEC. Look for the Lighthouse on Sunday 4th May! 73. Ted.**

**21 Prince Street, Wisbech, PE13 2AY**

**New Landline Number**

**01945 467 356**

**Mobile 07957 951998**

# Model 830 "Help Report"

*Joe LeKostaj K9LA*

**Hello, Graeme.**

**Just wanted to let you know that I enjoyed the "830 Special" issue of Lighthouse very much. The 830 is my favorite among the receivers in my small collection. It's a pleasure to operate and its styling is very pleasing. To me, it looks just the way a professional shortwave receiver ought to look!**

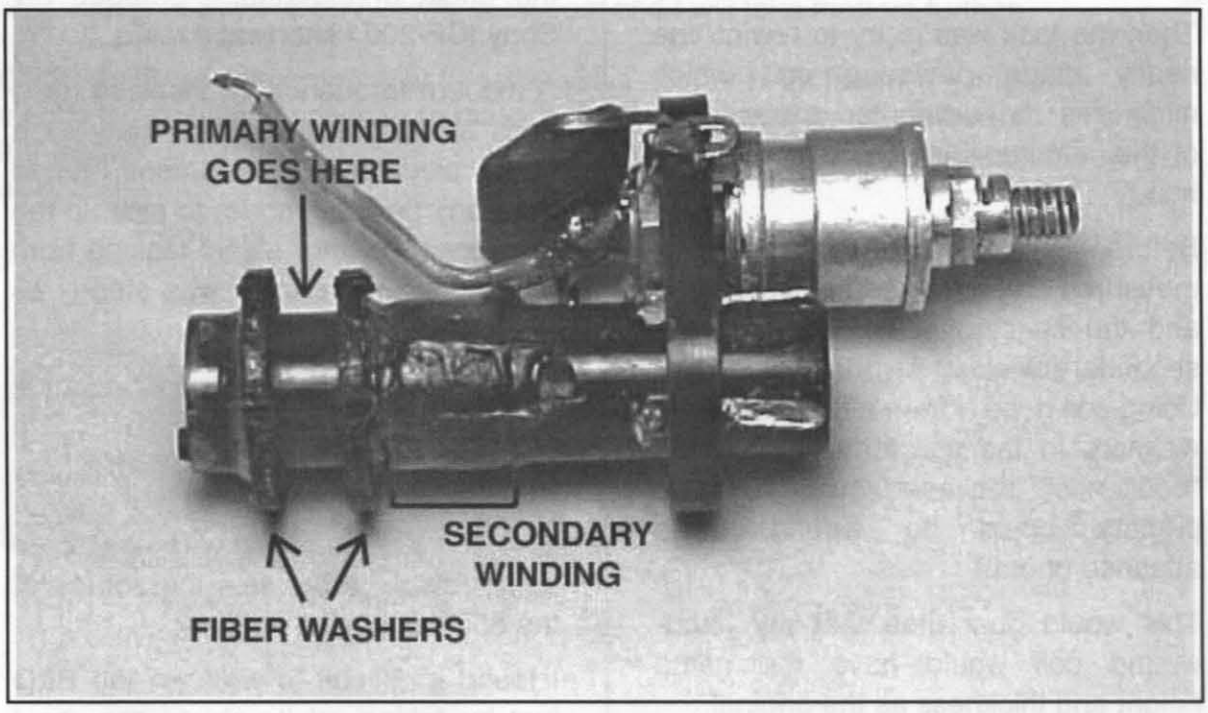
**Having restored a sad-looking 830/4 last year, I'd like to report two tips that other 830 owners might find useful.**

One of the first things I noticed when the receiver arrived was that the coil box cover was missing and there were two jumper wires kludged in between the RF and mixer sections. Not a good sign!

I proceeded with the typical repairs first, such as replacing a dud filter capacitor in the power supply and replacing many out-of-tolerance resistors.

When the time came to apply power, the receiver sprang to life and was very sensitive except on ranges 2 and 3 which were quite deaf. Probing with the voltmeter revealed that V1 (RF amp) plate voltage was nearly zero on those two bands.

Ohmmeter checks eventually revealed that the primary windings of mixer coils L17 and L18 were open. Then I realized that the two kludged-in wires were a previous owner's attempt to jumper around these faulty coils.



I carefully removed the two coils from the diecast coil box, hoping to find the primary windings had simply broken off at the solder lugs. Unfortunately this was not the case; the breaks were buried within the windings!

At this point I felt kind of down, as these coils obviously were not off-the-shelf items that could easily be replaced. However, I figured that I couldn't do any more harm to the coils if I attempted to repair them myself

So I started to carefully unwind the primary winding, writing down the number of turns for rewinding later. The break in one of the coils was nearly at the innermost end of the winding (of course!), while the other coil had three breaks.

As I recall, one coil had about 85 turns and the other had over a hundred turns. The wire diameter was measured as 0.005 inch, (this is about #40 Imperial s.w.g or #36 American w.g.) and I soon obtained a small spool of it from a mail order company.

Then the task was to try to rewind the neatly made pi-wound coil which minimizes the distributed capacitance of the winding. But how to do this by hand?

Before unwinding the primary I measured and recorded its dimensions and the spacing between it and the secondary winding on the coil former. Using coil dope, I then affixed two fiber washers to the coil former to act as "bookends" between which the new primary could be wound. (See attached photo.)

This would guarantee that my hand-wound coil would have the same height and thickness as the original.

I quickly found it impossible to make the pi-wound pattern by hand. So I simply scramble-wound the wire over the form between the two fiber washers and hoped for the best.

Then L I7 and L I8 were carefully re-installed into the coil box. Now came the final test! The receiver was warmed up, and the alignment procedure was performed on range 2 and 3.

I was very gratified to see the sensitivity return to full spec compliance. Now the 830/4 was back to normal sensitivity on all 9 bands! This goes to show that even the failure of a specialized part can often be overcome.

**The other tip I'd like to offer was found after a few weeks of enjoying the newly-restored 830/4.**

While listening to SSB or CW, I noticed a slow but annoying frequency drift even after the receiver had been running for an hour or more. To trace the origin of the drift, I grabbed my Sony ICF-200 I shortwave radio.

A modern frequency synthesized radio such as this serves double duty as a handy piece of test equipment! I tuned the Sony (in SSB mode) to pick up the first local oscillator signal leaking from the 830/4, and found it was steady as a rock.

Then I tuned in the 830's second local oscillator signal; also rock-solid. The only other possible source of drift was the 100 kc BFO, so I tuned the Sony to 300 kc (3$^{rd}$ harmonic of the 100 kc BFO). Bingo, there was the source of the 830's annoying drift!

I found it difficult to work on the BFO just by taking off its shield can, so I

removed the whole BFO assembly from the chassis.

I had already replaced some out-of-tolerance resistors a few weeks earlier, so I focused instead on capacitors C 173, C 178, and C 179. This turned out to be the wrong path. Replacing these parts did not stop the drift.

This left the oscillator coil L38 and tuning diode DI as suspects. If DI was at fault, what could I replace it with? Its metal "top hat" package led me to think this diode was probably just a common (for 1966) power rectifier diode pressed into service as a tuning diode.

So I replaced it with a plastic 1N4005 rectifier diode from the junk box. No more drift! After a slight touch-up of the USB and LSB calibration trimmers, the 830/4 was then back in service.

As much as I enjoy using the 830/4, there are still two small quirks that I'd like to fix if possible:

1) On range 1 (18-30 Mc), turning the Peak RF control pulls the first L.O. by about 5 kc. This doesn't happen on other ranges, not even at the high end of range 2 which overlaps with the low end of range 1.
2) There seems to be leakage of the AM audio detector into the AF preamp, with the result that you can still hear audio even when the AF gain control is turned fully down. I suspect this is a limitation of the 6AT6 which incorporates the AM detector, AGC rectifier, and audio preamp all in one tube.

Any suggestions on how to fix these quirks?

By the way, my 830/4 came from Canada as you'd expect for this model.

There is a nomenclature plate on the rear of the chassis with the following wording:

**TUNABLE RECEIVER**
TYPE CRC/CRA-09
SERIAL NO. 131
EDDYSTONE RADIO LTD.

There is also an adhesive sticker titled:

**M.O.T. FIELD MODIFICATIONS COMPLETED**

followed by 99 boxes that can be ticked. Only box #1 is ticked on this 830/4. Perhaps one of your Canadian readers can suggest what type of service this receiver was used in.

OK Graeme, that's all for now. Keep up the good work with Lighthouse!

Best regards.

Joe K9LY

***Notes from Graeme; -***

Thank you, Joe, for a first-class practical lesson in repair-work which is not only applicable to any version of the 830, it's applicable to **ANY** post-war Eddystone general coverage valve receiver (with the exception of the very specialised 880 series).

Can any of our Canadian members (or anybody else for that matter!) give us an insight into the use of the 830/4? It was a special model made to a Canadian Govt spec, which had LF bands instead of the MF bands.

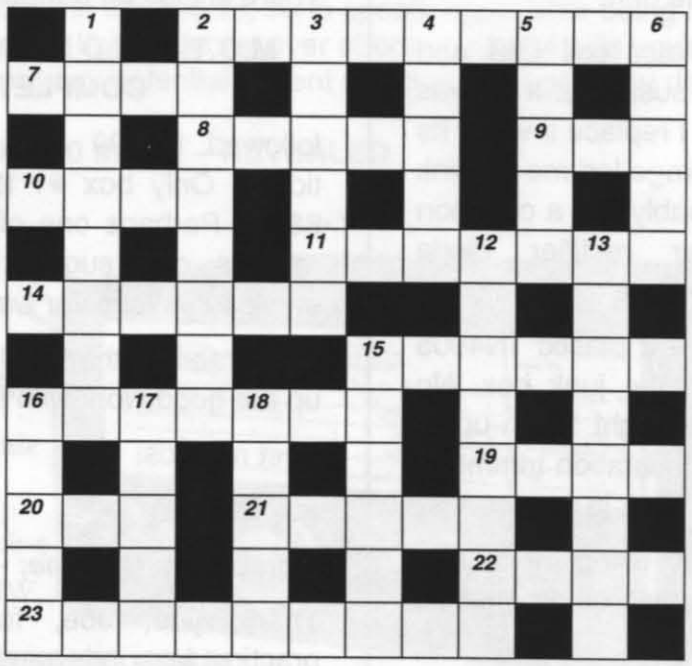
As far as Joe's small quirks go, I think they are inherent in the 830. They are in mine. What about anybody else? Check up and see if you can confirm or refute this!

♠

# E.U.G. PRIZE CROSSWORD No 13

## COMPILED by COLIN CRABB G4HNH

*Photocopy or write out the answers so as not to spoil your copy. Send to Graeme Wormald, G3GGL, at 15, Sabrina Drive, Bewdley, Worcestershire DY12 2RJ, England, to arrive not later than 25th May. See next page for further details. And don't forget to include your surname on the entry!*



### ACROSS

**2) Sounds like this Eddystone was developed for overseas use as well (6,3)**

**7) Valve rig riddle solved by identifying control electrode within (4)**

**8) Basc building block of modern electronic control systems (2,3 pt. abb.)**

**9) EMC problem in up-market video machine (3 abb.)**

**10) A mast rotator may be required to achieve success with this one (4)**

**11) One bite turns out to reveal vulcanised insulating material (7)**

**14) Decade counted by junior op. (3,3)**

**15) A lever, perhaps to uncover (6)**

**16) Compact type of barometer with moving pointer (7)**

**19) Antenna support (4)**

**20) Technical term for an inoperative thermionic device! (3)**

**21) Integrated circuit laboratory, in short (2,3 abb.)**

**22) Tone controlled for posh boys' school (4)**

**23) Patch cable (9)**

### DOWN

**1) CRT electron firing assembly in an RGB colour tv receiver (one of 3) (5,3)**

**2) Eddystone dip oscillator (8)**

**3) Work Table of a machine tool usually slotted to accommodate clamping bolts (6)**

**4) A wireless from yesterday is not what it seems (5 abb.)**

**5) Altogether now for a fruity Italian ice-cream (5)**

**6) Compound with which a thermionic cathode can be coated to increase emission (5)**

**12) Fourteenth phonetic identifier (8)**

**13) Ted Moore speak for inductive couplers (8)**

**15) Identification of confirmed reception in a Radio Data System (3,3 pt. abb.)**

**16) British equivalent of Sonar (5)**

**17) Possible elevation of a component drawn in projection (3,2)**

**18) Drab military radio guise (5)**

# E.U.G. CROSSWORD NEWS

## Common Error Floors Champions

### *14 Entries, only Four Correct!*

E.U.G. Prize Crossword No 12 incorporated the unusual property of having two crossing answers which could, by stretching the imagination, produce two errors.

This unusual combination meant that, having got one answer wrong, the other had to be wrong! I'm referring to **18 Across; Successful outcome for an EMC trouble-shooter.** The correct answer **is "Cured RFI",** but no less than four entries managed to get the near miss of "Fixed RFI".

Once this was entered it meant that he only answer for **9 Down; Simple VHF front end** was "Basic mixer", whereas it should have been **"Basic tuner"!**

Even more entries managed to trip up on **5 Down; Cure for dry joints**. The correct answer is **"Reheat",** which eight entries rightly answered but five others managed to submit as "Remelt". Strictly speaking this could be termed a suitable answer, but of course we must take our PuzzleMaster's answer (sorry!).

The remaining clue that produced more than one incorrect answer was **2 Down; Generic US equivalent of the Avo meter (3 abb.).**

The classic British "Avo" is an acronym of the initials of the units **Amps, Volts & Ohms**, used as a trade name. Across the pond our American cousins use the term **"VOM"**, (standing for **Volt & Ohm Meter**), which is the correct answer.

So "Well Done" the Famous Four who managed, against the odds, to make a correct entry. Here's the roll of honour:-

**John St Leger, G3VDL, of Devon.**

**Bruce Murray of Winchester, MA, USA.**

**Jack Read of Nantwich, Cheshire,**

**David Skeate, GØSKE, of Bungay, Suffolk.**

Thank you, everybody who entered. Don't be discouraged, consolation prizes are on the way for the anonymous majority!

Here's the full list of answers for the shy ones who didn't send in their entries . . .

ACROSS: (1) Wavemeter. (7) Even. (8) OB man. (10) Magnetic. (11) US of A. (12) Estate. (14) Scopes. (17) Rhone. (18) Cured RFI. (19) Peter. (22) Zero. (23) Lankshear.

DOWN: (1) Who. (2) VOM. (3) Man Made. (4) Toggle.(5) Reheat. (6) Resistance. (9) Basic Tuner. (13) Stripes. (15) Phenol. (16) Screen. (20) TRE. (21) RNR.

Which now brings us to this month's puzzle, the 13th in the series; unlucky for some! Our PuzzleMaster, Colin, G4HNH, has managed to do quite a tricky conundrum for our delectation this time.

The prizes will be another rare find: a two-fold spec sheet of the Eddystone Type B6038E 1kW medium wave AM Broadcast Transmitter.

This completely solid state unit dates from 1980. A rare item for the collector of Eddystone ephemera!

GRAEME – G3GGL

# POO'S PONDERINGS

**'Stray thoughts from an absent mind!'**
**by Simon Robinson M5POO**

It's good to be back in the saddle, so to speak, again after being rather poorly since the end of January. If your doctor ever offers you some pills you've never heard of without discussing any potential patient reaction, I suggest you decline until he does!

**The Saga of the 940 mods. – REVEALED**


Quite frankly I didn't expect my article on the 940 modifications to create such a proliferation of controversy! It really seems to have rattled some big cages complete with mirror, dangly bell, cuttlefish and all! The article was quite simply a reprint of an original document supplied to me by a colleague.

I will now reveal the originator of the information and the brief background behind it as told to me.

When the 940 was first released a sizeable order was placed by the British Post Office for use in their coastal stations. The sets were supplied to fulfil a particular requirement and were sold as such. Upon receipt and subsequent installation of the sets, the operators reported various "problems" with them which they had not experienced with their earlier receivers.

Apparently Eddystone were informed that the receivers were not "fit for purpose" and were to be returned. This was not to be as The Post Office and Eddystone came to

an agreement, whereby Post Office and Eddystone engineers would work together to resolve the "problems" and thus devise a modification schedule to be performed on each receiver. I am also told that Eddystone agreed to pay for the work to be done so the Post Office would not lose out.

On completion of the modifications the receivers were accepted by the Post Office and continued to work for many years. That really is the "bones" of the story.

On one hand we have Eddystone and Post Office Engineers, i.e. the designers of the set and what purport to be professional engineers, telling us the modifications worked. On the other hand we have independent professional and amateur engineers from our group who hold their hands up in horror at the prospect. Who is right? Well, you will have to decide that one for yourself. My suggestion is that if you are happy with your 940 then leave it alone. If however, you feel your set exhibits some of the problems mentioned, make sure it doesn't have a fault before you start ripping bits out. Even then make SURE you know what you are doing.

**Eddystone ORION 7000**

As you are no doubt aware several members, myself included, were fortunate enough to acquire examples of the last 7000 series HF SSB Transceivers ever made at the factory. They also came (eventually) with a certificate to say so.

In use, the Orion 7000 is superb. The AGC is perfect for SSB and CW plus there is NO ringing on the filters. In addition the audio is superb on both transmit and receive. It's built to a standard well above that of most HAM sets with a big heatsink and no fans. The components and design are to military specification so should last a long time. Some members have suggested however that we seek to obtain a kit of spares to service our sets as time goes on. Would anyone interested in this please contact me at *simon@eddystone-radio.com* and I will take matters further.

Being designed for commercial use, the set is not too HAM friendly. I intend to modify the operating software to make it more so. In addition an outboard handwheel would be a big plus. If anyone is interested in this, please contact me also.


That's it for now; short and sweet!

See you next time

73 de Simon M5POO

# EUG 1

***This interesting vehicle registration was spotted for sale in the Sunday Times the other week by Anthony in Cardiff. Interesting, he thought. Then he saw the price tag: £35K !***

Now I know that Ted Moore's been throwing his money about at the rallies lately, but even he would jib at coughing up £35K for a new number plate on his Volvo! And *I've* already got a call-sign number-plate *(snob).*

So how in heaven's name could *EUG* command such a potential? Well, as you know, yours truly is no *www* trawler, but curiosity got the better of me and I typed in "E.U.G." on the BBC Search Engine.

I was taken aback to be advised that 109,000 references had been found. I then discovered that each reference could run to many pages and a feeling of helplessness flowed over me.

After a large cup of hot chocolate I realised that I could get quite enough references for members' elucidation by looking at a few headings, so here goes:

**E.U.G.** *European Union of Geoscience* meets biennially; the next meeting is scheduled to take place in Nice, France, 6-11 April, 2003. Plenty of grant-aid lashing about there for the British delegates to be tempted?

**E.U.G.** *Eastern University Games,* due to be held at Coffs Harbour, Australia, 6-10 July 2003. 3,500 competitors from 28 higher educational campuses in New South Wales and Australian Capital Territory. *I wouldn't think there are many poms involved with this lot.*

**EUG** Aviation Weather Centre at Mahlon Sweet Field Airport, Eugene, Oregon. This takes its name from KEUG, the radio call-sign derived from the first three letters of its location *(Eugene).* After the manner of Simon POO. *I would think they'd never heard of British car number-plates.*

**EUG** *Nickname* of Eugene V. Guenkine, the Russian chess champion. *Not a likely candidate.*

**E.U.G.** *Elite Underground Games.* Powered by PsychoStats. *Pardon?*

**EUG** *Car Rentals*, Lauderdale, Vancouver. *A strong candidate if they open a British branch.*

**E.U.G.** *Electricity Utilisation Group.* Based at Cambridge University, England. *Definitely a contender, I would say. A strong smell of Government funding.*

**EUG** *When a pregnancy is not located in the uterus it is called an Extra Uterine Pregnancy or EUG for short . .* And they can't spell, either. *Certainly not in the running!*

**EUG** *DJ-EUG is a one man band.* He uses acoustic guitars and computer-programmed loops and beats . . . *If he's a success he'd pay.*

**EUG** *The Review Section. Here in EUG we've been warned against being seduced by PROACTION's "latest Electron conversions" because they don't exist . . .* Well, they wouldn't, would they?

So, that only leaves another 108,991 entries for you PC buffs to look up. Good hunting!

*Graeme – G3GGL* ♠

# MODEL S.940

# FREQUENCY STABILITY:

## Another Man's Experience

***Graeme Wormald G3GGL***

***Over the past three issues of 'Lighthouse' various articles have focused on alleged design problems with the very successful Model S.940 general coverage receiver. Some of these are so extreme as to appear risible. This article follows the one on page 42 of Issue 77, in which Alan Robinson described his problems and I made some preliminary notes. I will now enlarge on these.***

We are so used to having cheap new receivers with synthesised local oscillators that are literally rock-solid (being based on a quartz crystal), that we forget the vagaries of free-running thermionic oscillators.

Can any of us, off-hand, state the expected stability of a general-coverage valve set? Can anybody give the warm-up time or settling-down time? No, I thought not!

The 940 spec sheet states:-

**"STABILITY – Negative temperature coefficient compensating capacitors *(sic.)* are fitted to the oscillator circuits and adequate ventilation is provided to prevent undue temperature rise. As a result, an excellent degree of frequency stability is secured after the initial warm-up period."**

That, quite frankly, tells us nothing! (No offence, Bill.) The only compensating capacitor is C62 (15 pf tubular ceramic 350v) and is permanently shunted across the oscillator gang. Nothing wrong with that, (the cheaper models 840C, 670C, don't have one at all).

What is adequate ventilation? This model was first fitted with a solid-topped cabinet (as in all the photos we show). My set has this case. It is serial No JN2421, which in spite of the incredibly high production number (2421) was manufactured in October, 1962. (J – N)

After the set had been on a couple of hours you could fry an egg on it! I wouldn't call it 'undue'. I'd call it 'extreme'. Later models had perforations on top of the case. These run quite cool

How long is the initial settling-down period? Five minutes? Fifty minutes? No? Would you be surprised if I told you it could be up to 12 hours? Well it can. And in the best case it is an hour.

How can I justify these statements, you may say. Quite easily, I'll show you some drift charts *(later).*

Now we come to the definition of **"an excellent degree of frequency stability".** What yardstick are we applying? I don't know, it doesn't say.

But we have got one yardstick from a relative of the 940. I'm talking about the 830/7, which nobody will suggest can be worse than the 940.

So what does the book say? (Actually we quoted it last month in the 830/7 feature, but I'll bet nobody can remember. No?) Here it is:-

**"After a ten minute warm up period, drift with the free-running oscillator is approximately 12 kc/s in the first hour at 28 Mc/s. After a further thirty minutes operation, drift at any frequency will not exceed four parts in $10^4$."**

That's a bit of a mouthful, but simplified it says "One hour and forty minutes after switching on drift will not exceed 4 kc/s in 10Mc/s." *(or 12 kc/s at 30 Mc/s, etc.).*

Does that mean over the next ten minutes, or ten hours, or ten days? I don't know, it doesn't say.

But the 830/7 has provision for crystal control of the first local oscillator (and I think we are beginning to see why). The stability specification goes on to state:-

**"With the first oscillator crystal controlled, drift during the first thirty minutes does not exceed one kilocycle. After this period, drift will be less than 500 cycles in any one-hour period."**

They've said it there: **"in any one-hour period"**. Should this also refer to the first paragraph? In the absence of any figure, I don't know . . .

The next question is this:- "How far will it drift in the same direction before it starts to 'cycle'?" Answer:- don't know; but the limit must be the quoted scale accuracy of 0.5%, which is 50 kc/s at 10 Mc/s . . .

**Now to measure the drift of any general coverage receiver to an accuracy of, say, one part in $10^4$, or one kilocycle in ten megacycles is not an easy matter.**

Forty years ago it would have to be done with a crystal-checked wavemeter, such as the BC221. Splendid though this instrument may be, it is cumbersome to use.

A sequence of measurements involving, say, 50 readings over a 24-hour period would tax the patience (and capability) of even the best-tempered laboratory technician.

So I worked out a new system for my experiments taking advantage of that latter-day aid to accurate calibration, the digital frequency counter. I simply fed the output from my 1960-vintage 'Advance' Type B4B general coverage signal generator to my 1990-vintage frequency counter. I then loosely coupled it to the aerial input of the set under test.

Switch off the AGC, set the AF Gain to maximum and use the RF Gain to adjust suitable levels. Set Selectivity to Max and mode switch to AM.

At the speaker terminals I used the simple output meter described in Lighthouse Issue 68 (Aug 2001). I've no doubt an analogue AC voltmeter across a speech coil would suffice. It's a hell of a lot more precise than the human ear.

I was now ready to feed a signal into my 940 accurate to within 100 c/s. And if you ask "How do you know" I would reply that I check my 'Advance' combination against my local

broadcast transmitters. It's spot on.

I decided, arbitrarily on a signal frequency of 10,000.0 kc/s *(10 megs).* It's easy to remember! I set the sig-genny/counter to this frequency and tuned the set to peak on the output meter (using speaker sound as a guide). I returned at regular intervals for the next 24 hours, re-tuning the sig-genny and making a table of time versus frequency. I didn't touch the Rx tuning at any time.

The frequency counter of course, corrects the drift of the sig-genny. You can interpret the results easily by looking at the appended graphs of time against frequency but first I must say why 10 Mc/s is a worst-case scenario!

I was discussing the case of Alan's problem receiver with Peter Lankshear in New Zealand (via e-mail). If you recall, he wrote one of the '940' articles (page 32, Issue 76, December 2002).

He pointed out that the L/C ratio was paramount in specifying a drift-rate. In other words the drift would be much worse at the HF end of any selected band than at the LF end of the same band.

As an example, take 10 Mc/s on Band 2 of a 940. A 0.5 pf change of capacity in the oscillator circuit will produce **a change in frequency of around 33 kc/s.** Yes, half a puff!

But at the 5 Mc/s end of the same band half a puff change will only produce **a drift of around 3 kc/s.**

That is to say the perceived stability will **be ten times better** at the LF end of the band. I just mention this to show what a variable feast we are indulging in.

All the following experiments were carried out at 10,000.0 kc/s, so the goal posts are fixed.

First readings come from my S.940 in its solid-topped case. It started to drift LF until after an hour it was 4 kc/s down. Then it started to go HF until after 3 hours it was 15 kc/s HF and after 6 hours it was 22 kc/s HF.

It then stabilised for the next 6 hours and then drifted to 27 kc/s HF during the night and about 1 kc/s down in the next 6 hours. Look at it on the first chart.

A hearty series of slaps at 9 hours produced a 'boing' on the L.O. monitor receiver but no 'jump'.. Kicking the table had no effect. After 3 hours the top of the case was incredibly hot and remained so for the rest of the test.

The experiment was then repeated with a ventilated case. (Borrowed from my 830/7). The result was similar except that it took 12 hours to settle down instead of six. (Logical when you think about it). It then remained remarkably steady at plus 20 kc/s for the next 12 hours.

**DIAGNOSIS:** C62, the negative temp coefficient capacitor was shifting too much, and the solid-topped case was a big problem!

A 'new' C62 was acquired from Dave Simmons and fitted **USING A 125-WATT SOLDERING IRON.**

**RESULTS:** the same test was first applied with the set in the solid-topped case. **Similar to the above result but with only half the drift.**

The test was then done with a perforated top case (as supplied with later models). **Results changed dramatically (see second chart).** During the first hour the set drifted LF by 10 kc/s. It then stayed put within +/- one kilocycle for the 12 hours and

slowly drifted 5 kc/s HF as the central heating switch off, drifting down again when it came back on. Not more than 1 kc/s per hour (at the worst) after warmup.

**CONCLUSION:** There is nothing much wrong with the stability of my 40-year-old 940. In fact it is excellent. Anybody who isn't getting a similar result has got a faulty set.

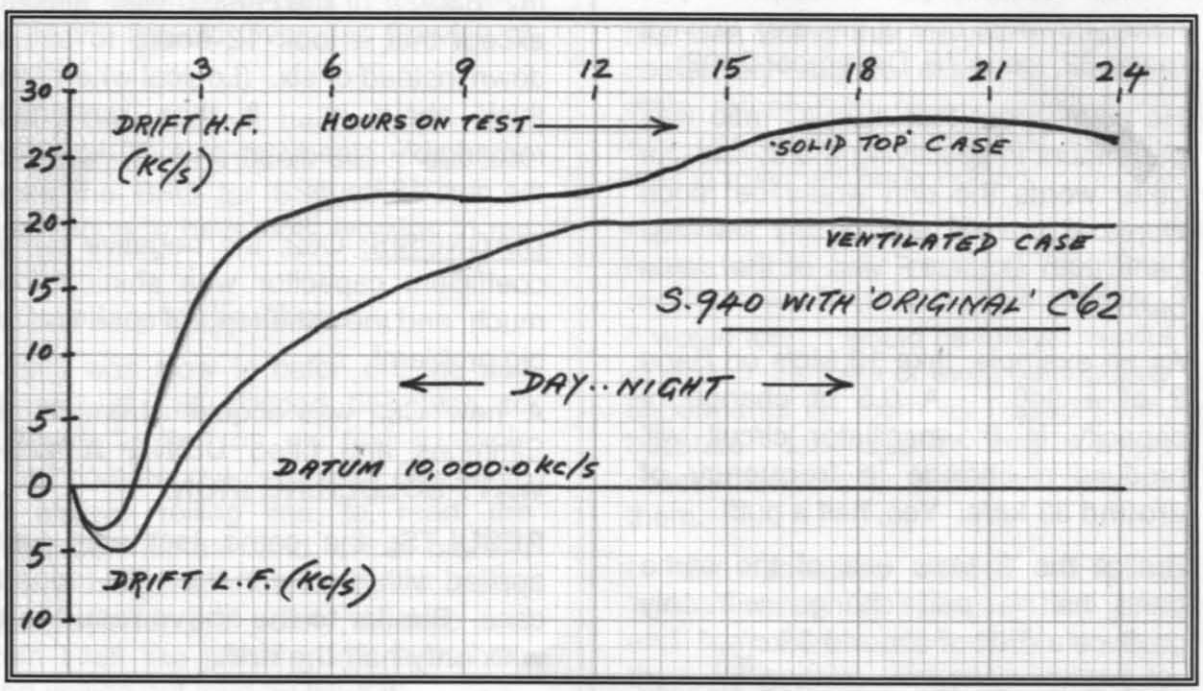
And please, if anybody wishes to make criticisms of stability, **will they give figures** to prove it. And remember that any set in professional use is never switched off.

Once I'd got into the swing of drift testing I decided to try some of my other Eddystones. None of these have had the 'drift' components checked; they're just as they come after 40 years.

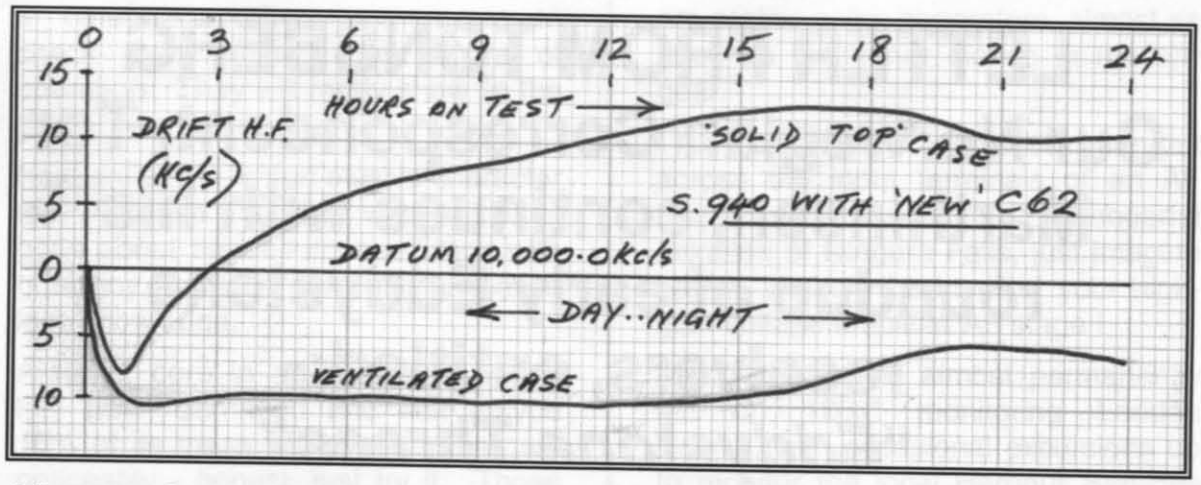
It's interesting to note that the two 'cheapo' sets, the 670C cabin broadcast receiver and the 840C bottom of the range comms receiver both show excellent characteristics.

But I did cheat! I always run my 'universal AC/DC' Eddystones from a 110v isolation transformer. That means that they really do run very cool. But even so, they still take a couple of hours to settle down. I think that this is the penalty that must be paid for such strong metal construction. **The thermal capacity of the front panel and coil box is substantial.**

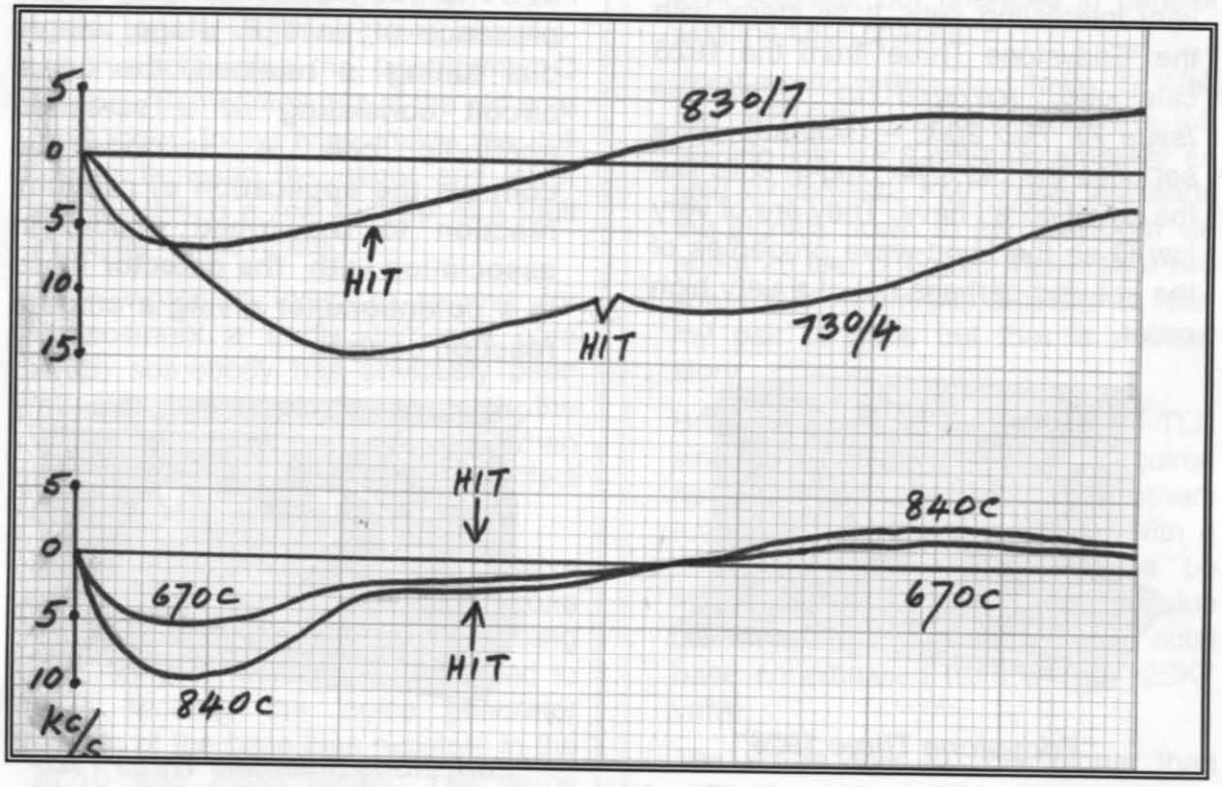
Another factor that emerges is that it's very bad practice to include the power unit inside the same cabinet as the set. The ancients knew a thing or two about that! *(c.f. HRO and Eddystone 358).*




***These are the original drift curves with my S.940 'as found' The top line is with the original solid top case. The lower line is using the perforated top case used on later models. But another problem is showing; the negative temp compensator, C62. This was replaced and a new set of curves plotted (next).***




***After a replacement C 62 was fitted a different picture emerged. The first point was that the 'solid top' case was a disaster. The second was that the 'ventilated top' case brought the set into 'spec'. The receiver takes less than an hour to 'warm up' and the drift afterwards is always less than 1 kc/s per hour, usually much less.***




***These four extra charts, to the same scale as the 940 plots, provide an interesting comparison. The two 'top quality' sets (830/7 and 730/4) both have drift compensators but are actually worse (long term) than the two 'high street' models which have no compensators and take 6 hours to settle! Having said that, the 670C cabin set is excellent. The 730/4 also takes 6 hours to bottom out. These top two both need further investigation. Perhaps all drift compensators go off after 40 years***

***All models show the time of the 'HIT' test but only the 730/4 'old war-horse' reacted by jumping 2 kc/s down and up. Wear and tear?*** ♠

# LETTER FROM TØNSBERG

## Our Norwegian Correspondent, Tor Marthinsen, continues with his roundup of early Eddystone receivers, entitled:-

## *"Eddystone Threes"*

Hello Graeme,

This is about the three-valved Eddystones, not so many of these but very interesting sets. It all starts with the 'Eddystone Three' from the 1926 catalogue. *(covered in Lighthouse Issue 71, Feb 2002 – Graeme)* The set uses the old style plug-in coils like the set of coils I have. They are of very low Q so the short-wave properties of the set was perhaps not of a very high order.

***"Eddystone Three 1926"***

Next one out was the 'Scientific Three' from 1928 sporting a tetrode valve for the input. In the stand to stand report in WW for September 1928 we can read:

**"Of outstanding interest is a short-wave receiver fitted with a screened-grid H.F. amplifier. This set – the 'Eddystone Scientific Three' – is one of the first screened-grid short-wave sets, and by means of three coils covers a wave range of 14 to 100 metres. In spite of the presence of an H.F. stage, single dial tuning is retained, the aerial circuit consisting of a screened aperiodic coil. A second dial controls the application of capacity reaction to the tuned anode. In association with the detector valve is a potentiometer giving a smooth reaction control.**

***"Eddystone Scientific Three 1928"***

**The new application of a pentode to short-wave receiver design, as arranged in this set, marks a development which may later become popular. Though the front panel is of aluminium, it is cellulose finished to match the containing cabinet. A special chassis**

**constructed model is assembled on aluminium front and base panels throughout. As a finished receiver the set is offered at £14 10s., while it is also available as a complete packed kit of parts for home construction at £8 10s. Coils are also supplied for use with this set for tuning to broadcast wavelengths."**

In the list of receivers available in 1928 the coverage is given as 14 – 3,000 metres. In December 1929 Webb's offered this set for 20/- down and 12 monthly payments of 35/4 totalling £9 15s. This included Royalty, which was NOT included in the other prices mentioned.

There is another three-valve set mentioned in 1928, in the same stand to stand report we can read the following:

**"A complete metal-framed unit for portable receiver construction is another new departure, while the design embodies the latest practise of screened-grid H.F. stage, detector and pentode. By means of switches, wave ranges of 300 to 500 and 900 to 1,800 are covered. "**

As you can tell, this was not a complete set, there was a picture of the chassis in the October 3rd issue of WW.

However in the list of sets available in 1928 the 'Eddystone Scientific Portable Three' is listed as a complete receiver offered at £26 15s including all accessories and loud speaker.

In the stand to stand report from September 1929 we can read the following:

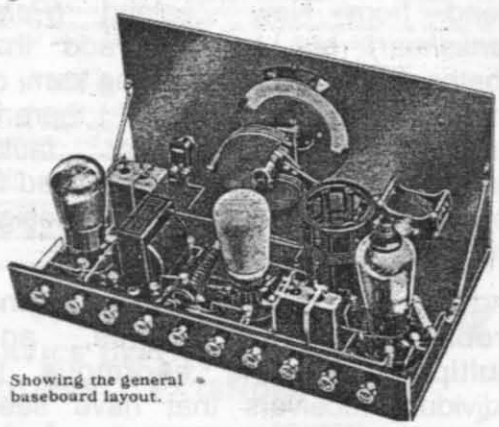
**"The three valve short-wave home constructors' set is produced this year in improved form. It comprises a screen-grid H.F. valve with choke input from the aerial, a grid detector with reaction, and a single L.F. stage."**

This must refer to the 'Scientific Three' from 1928, perhaps the improvement consisted in changing from tuned anode to tuned grid?

However there is more in the 1929 stand to stand report:

**"A new three-valve short-wave set in a crackle-finished metal case has just been introduced."**

I have no idea what this could have been, no idea for a name or anything. However I reckon it belongs to the QRG as much as the mythical 'Regional One' does!



Showing the general baseboard layout.

***"Eddystone Atlantic Three 1932"***

The last of the "threes" is the 'Atlantic Three' kit as presented in the 'Eddystone Short Wave Manual' No. 1 from 1932. *(Available from Dave Simmons – see inside back cover.)*

So there it is, Graeme, five receivers sporting three valves each. The next entry will probably be the two-valve receivers, there will be some explanations here as well! ♠

# *During the 1960s and early '70s EUGer Terry Parker, G4NXN, was Chief of Test at Eddystone. This was the era of the S.940 . . . Terry writes to us about it:*


**I read with interest some of the comments made over the last few months regarding frequency drift on the Eddystone 940 receiver, and component failures.**

The question of drift on the 940 I thought was well answered by our friend from New Zealand *(Peter Lankshear)* but I would add that whether there is a case of long term, or short term drift (i.e "jumping" ) there is far more potential for faulty performance than there is the need to consider any inherent design problems.

Indeed the **opportunities, and probabilities for diverse, and multiple faults is enormous** in individual receivers that have seen service for some 30 to 60 years.

I wondered therefore if some of the following information may be of interest to readers indicating some of the procedures that were in place at Eddystone (from early sixties to mid seventies) to maintain the quality of production, and specifically in some respects looking at stability, and prevent faulty equipment leaving the factory.

Newly designed equipment generally followed a commercial need and may initially have had to meet various authority approval tests prior to release for manufacture.

The initial production rate would be kept low and generally monitored carefully by the design department, teething troubles would be "ironed out", and production spreads monitored.

Clearly for **commercial reasons** at no point would individual **production** receivers undergo drift measurement in an environmental chamber using a laboratory standard as a reference as part of a normal test procedure. N.B this could be a 2 day job in its own right. (There was one exception to this see my comments below)

After the initial "pre-production run", testing of fully assembled Eddystone receivers would be the responsibility of a small team (typically 3 or 4 in number) at the end of the production line but note that there could possibly have been multiple sub-assembly test functions prior to complete assembly.

Most models in production would have a test process that would give 3 quite separate stages where observation of receiver stability was possible. Receivers at various stages of test would be placed in soak racks

(powered 24/7), sometimes they would remain there for several days as part of normal test procedure. Xtal oscillators were available for a variety of checks on the equipment, and I think these were manufactured at Eddystone.

The Development department used a Rhoden Schwartz laboratory standard (If I recall accurate to 1 part in $10^9$), this was quite a large "beast " with an integral printer; this was used in production on one occasion to set up the S964 receivers to specification, and drift test them.

Finished receivers would "wait" on the soak rack for final "vetting" by the senior engineer on that line. For most models they would be then sent to a final inspection engineer (Bill Jennings, and Stewart Davies in my day). These engineers were detached from the production line, and independant of any production rate control mechanism.

They too could also soak test receivers, retaining them for long periods if necessary. Their role was to view the receiver as the customer would receive it, i.e complete with all accessories.

They would have no test equipment but would aerial test the receivers thoroughly; at first glance this seems a menial, almost lacking in engineering task; but with hindsight these engineers were quite "gifted", and could very accurately assess the receiver's performance in a most comprehensive manner.

This final inspection stage formed a "safety net" of quality control, and would hopefully intercept any intermittent faults.

Furthermore there was the possibility (if applicable to any specific order) of receiving visits from other inspection authorities e.g Crown Agents, and various Ministry inspectorate officials. These authorities were at liberty to witness performance checks on any randomly selected receiver from their order, or sometimes they would, by agreement with Eddystone, oversee **all** testing of their ordered equipment.

Other customers, prior to placement of orders, would carry out their own approval tests of the equipment for extended periods, these could be very exhaustive and time consuming, 2 to 3 weeks was not unusual.

During this type of testing stability tests would be performed throughout the whole environmental range of the receiver (temperature, humidity, and mains supply variation). If the receiver has survived all this, further stability measurements would accompany vibration and drop tests.

All of the above procedures would suggest that there is a veritable technical inspection "Colditz" to prevent problem sets from escaping to the "outside world". Sadly it is not a perfect world, sometimes mistakes occurred, but they were rare, and the company acted quickly to maintain customer confidence.

But what of the people involved? There were certain test engineers that really "stamped" their own individuality on their receivers, often giving each equipment a lot of personalised treatment. One engineer in particular (Jack Shrimpton) was quite fastidious in his approach; he had a shelf filled with a variety of oils and greases, and his attention to detail was quite exceptional.

Where stability was a critical requirement, (and I well remember 2 receivers that had 2nd oscillators that received particular attention) a testing procedures would be put in place where the ratio of tank capacity type, and thermal compensation values would be adjusted to optimise drift over a given temperature range.

Here the engineer would have available ceramic capacitors that would range from neg-750k to zero temp

coefficient rating. He would, by judicious selection and testing, arrive at an optimum combination of ceramic (negative in characteristic), and silver mica (positive in characteristic) to satisfy his drift versus temperature specifications. This was often very time consuming.

My general feeling was that most engineers with whom I had the pleasure of working during my time at Eddystone worked very hard (with a lot of local knowledge) to provide working units that were very much better than the stated specification. In short, if the receiver could be made better, then they worked hard to achieve the desired result.

I would also like to comment on some of the "grumbles" of component failures e.g. red Hunts capacitors, and more recently calibration switches.

Unlike many of the "throw away" products of the modern world where the manufacturer's intended life for their product is often measured in working months, any valved Eddystone equipment has exceeded its intended service life many times over. Therefore, there is a clear distinction between premature component failures, and inevitable failures through abuse, hostile environment, and lack of periodic preventative maintenance.

Surely no serious engineer could "grumble" about replacing components decades **after** their intended service life; I would add that both of these components were widely used during my time at the company, and I cannot recall problems with them.

Finally Graeme was kind enough to give me a preview of his current article (see p.27) on the work he had done on the stability testing of some of his Eddystone receivers, and I would like to add some comments to his report.

Firstly the comment about C62 being the only consideration for compensation; it should be remembered that the design authority would have had a combination of issues when considering stability on any local oscillator circuit i.e. the coil former material, ferrite core material, padder capacitor type, tank capacitor type, trimmer type will all have a bearing on the direction, and rate of drift. Whilst it sounds a simple situation of trying to find a combination of opposite "laws" that cancel so that drift remains reasonably constant with changing temperature, often the task is frustrating.

Also as you rightly point out the L/C ratio is important and clearly the design of a narrow band VFO offers less heartache in terms of stability than does a local oscillator in a general coverage receiver that has to cover an octave in range.

At the H.F end of the band there is negligible tank in circuit, and the problems of **maintaining** stability becomes more difficult, and it should be remembered that early solid state equipment generally performed a good deal worse.

However, Graeme, your valued time, and testing shows what can be achieved using basic equipment and the clear advantage of a lengthy "settling" period.

It may also encourage others to seek faults rather than a design project, my own 830 performs exceptionally well after a 24 hour soak, indeed the overall performance feels very different, it seems much "nicer" to handle.

Sadly, in the real world I am sure for most Eddystone owners the duty cycle of use is probably closer to a few hours. But I am sure, as with most collectors, they are aware of the limitations of use and gladly accept the nature of a 40 or 50 year old piece of equipment.

Enjoy your Eddystone receivers,

***Terry Parker G4NXN***

# SILICON DIODES AS VALVE SUBSTITUTES

## *(ARE THEY SUCH A GOOD IDEA?)*

***Peter Lankshear***

In the semiconductor revolution that occurred in the late 50's and 60's, germanium and later, silicon diodes were second only to transistors in importance. In new equipment designs, they rapidly replaced valve rectifiers, as well as selenium, and copper oxide types.

They were small, inexpensive, efficient, didn't wear out and used properly, were very reliable. Because there was no filament to heat, more elaborate power supply configurations that were impractical with valves, and especially the use of bridge rectifiers, became economically practical.

It seemed obvious that diodes would also make ideal replacements for valve rectifiers in existing equipment. Wired in, or built into octal plugs, valve bases or old metal valves, they could substitute for the large family of octal rectifiers, and similar assemblies became available commercially.

The attraction was of course, that they don't wear out, and save typically 10 watts of power because there was no filament or heater to light.

**If all this seems too good to be true, it can be!**

Valves with glass envelopes can be physically fragile, but are very rugged electrically, and forgiving of short duration overloads.

Conversely, semiconductor diodes are rugged physically, but can be destroyed by a voltage overload of only milliseconds duration, and consequently can seriously damage other components, including burning out power transformers.

Furthermore, as we shall see, their high efficiency can cause other problems when used as replacements in equipment designed for less efficient valve rectifiers.

### A Vital Limitation

Semiconductor diodes have a vital limitation rating called the Maximum Peak Inverse Voltage, (PIV) which is the maximum negative voltage that can be applied to the cathode.

A justifiably popular diode is the 1N4007, which has a PIV rating of 1000 volts, about the maximum normally available. This may seem comfortably high, but it is not. In the conventional bi-phase rectifier circuit used in valve receivers, the PIV is 2.83 times the transformer secondary RMS voltage!

A typical Eddystone receiver has a power transformer H.T. voltage of 265, or a PIV of 750 volts! In an ideal world, this would leave an adequate margin, but most of us have to run our receivers from the mains which can be very "dirty".

Those switching transient snaps crackles and pops which are the bane of a DXer's life are often generated by short duration spikes on the mains supply and which are transferred to the H.T. winding of a power transformer. These can momentarily take the PIV well over 1000 volts, with the possibility of diode failure.

It is common practice to fit capacitors across rectifier diodes to bypass these spikes but the capacitors in turn must have a high voltage rating, and are typically 1000pf, 1Kv types.

If a diode or capacitor fails from this type of overload, it develops a short circuit, and will rapidly destroy the power transformer.

Some Eddystone receivers have a fuse between the H.T. winding centre tap and earth. Unfortunately this will not protect the transformer as the remaining diode now has double the voltage applied and it too will be destroyed rapidly, with the transformer soon making nasty smells.

But wait, as they say. There is more.

**Excess Voltage**

Unlike valves, silicon diodes have practically no forward voltage drop. Valve rectifiers introduce an H.T. voltage loss, and their power transformers are designed accordingly.

With its small forward voltage drop, a silicon replacement for a valve will deliver more H.T. than was intended in the original design. This will not necessarily do any harm, but it could result in reduced valve and component life, and it is likely to cause increased heat dissipation, one of the factors we are trying to reduce.

Semiconductors have an advantage in that they are instantly operational, but during the period that the valves are warming up, silicon rectifiers, with no load to hold them down can deliver very high voltages to a receiver.

This condition applies especially to the smaller Eddystone receivers that do not have a voltage regulator valve. (Being without a heater, gaseous regulator valves conduct immediately, and by providing a load, help hold the warmup voltage down).

As can be seen from the test report below, in the absence of a regulator valve, this voltage surge can be nearly 100 volts above normal – greater still for higher voltage transformers. It may do no harm, but to subject 50-year-old capacitors to this sort of stress is something that they do not really need.

**Pinned S Meters**

Yet another problem can be caused by solid state rectifiers when used in some Eddystone receivers. Signal strength meters indicate operating conditions in their associated I.F. valves, and are dependent on a balancing circuit.

To have H.T. available while the valve is warming up throws the meter circuit in some models completely out of balance and "pins" the meter, not a pretty sight and which doesn't do much for the meter.

Indirectly heated valve rectifiers avoid this problem as they don't conduct until the other valves are hot. Some, but not all Eddystone receivers use a diode in series with the meter for protection.

For all these difficulties, solid state rectifiers are frequently used successfully in valve receivers. The problems associated with their use can be overcome of course. Peak inverse voltage limitations can be improved by using in each leg two diodes in series, each with an individual bypass capacitor and a balancing resistor.

The excess H.T. voltage can be absorbed by a suitable wire wound resistor connected between the rectifier cathodes and the first filter capacitor. This adds up to more than a dozen components to replace one valve.

Of course, the problem with pinned meters can be overcome if you remember to turn the Send/Receive switch (or whatever it is called on your receiver) off for a half minute at switch on.

Frankly, it is safer, and little more expensive to use a replacement rectifier valve. They are readily available still, and will be for some time – in fact 5AR4C/GZ34 rectifiers are still being made.

Suitable 5.0 volt octal indirectly heated rectifier valves for Eddystone receivers are: 5Z4, 5V4, 5AR4, GZ30, GZ32, GZ34. You can buy a lot of them for the price of a transformer rewind!

| RECTIFIER TESTS WITH AN EDDYSTONE MODEL 750 | | |
|---|---|---|
| Transformer H.T. 250v AC | H.T. Volts Developed | |
| | At switch on | After 30 seconds |
| Standard 5Z4G Rectifier | 0 | 250 (Normal) |
| Silicon Diodes with Voltage Regulator | 323 | 294 |
| Silicon Diodes without Voltage Regulator | 347(!) | 300 |

♠

# What you can find on the Web

***Graeme Wormald G3GGL***

As most members will appreciate, I have persisted with using my PC (acquired four years ago) and have slowly gained a certain amount of skill. This magazine is now produced and transferred to CD-ROM by yours truly and taken to the printer's in a small box. But one of the things I avoid in the magic world of PC is the *www, or World Wide Web.*

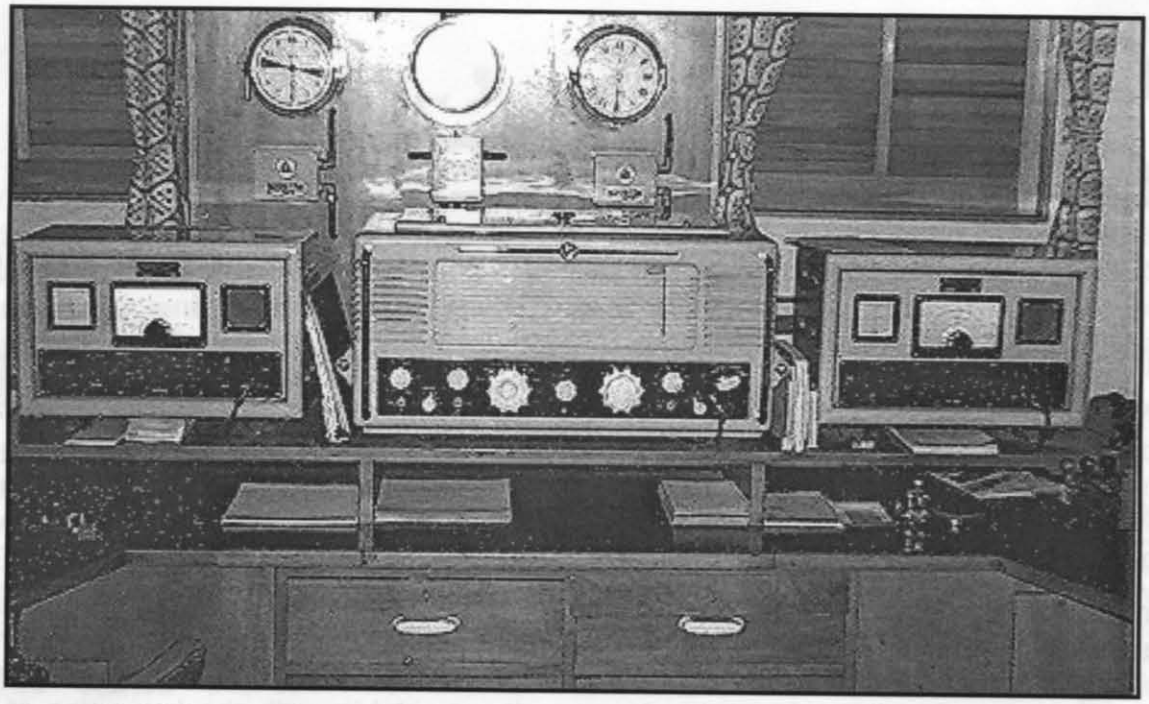
This is a cyber bill-board of truly gargantuan proportion. I am told there are a million, or a trillion, I forget which, sites presented there. This description, as readers will realise, is targeted at those of our members who steadfastly avoid the ownership of a PC *(probably more than we think).*

I suspect that if I hadn't become entangled in EUG I wouldn't have acquired such a treasure. I was quite happy with an Amstrad PCW for my literary endeavours.

But having acquired a 'Tiny' *(silly name!)* I have occasionally been tempted onto the Web, which, in my opinion, is the greatest time-waster since television was invented. I usually get ambushed by people wanting to lend money or sell insurance.

I frequently exit in frustration and leave it for others to do the trawling. Give me a good library any day!

**Just look at that big Eddystone (alias ST&C I.M.R.54) creeping in over the typewriter in the Wireless Room of R.M.S. "Eucadia"**



**And here's another I.M.R.54 in pride of place in the radio cabin of R.M.S. Carinthia (GVDQ) in the 1950's**

But early last year I was enticed into the system by a member who e-mailed me and said "Have a look at this site," quoting me a great jumble of letters which I have long since forgotten.

(I suspect it may have been Chris Pettitt, GØEYO, former MD of Eddystone Radio. Do you remember, Chris?)

After a lot of struggling with my machine I managed to extract the pictures shown above. I 'saved' them for future reference and promptly forgot about them. The other day whilst looking through my documents for some other trifle they caught my eye. After the most violent struggle with my "Windows", comparable with monkeys writing the works of Shakespeare on a typewriter, I managed to convert them into "jpegs" and present them here for members' admiration.

"jpegs" is the only way I can insert pictures into my pages; the system ignores anything else, and somehow I'd managed to "save" these pictures in an alien format.

But what I'm getting round to saying is this:- there must be hundreds of similar photographs showing Wireless Rooms of the Merchant Fleets of the world out there on the Web.

How about some of you computer-literate members doing a bit of trawling? Then e-mail them to me in jpeg format and we can fill another page or two with our favourite pictures.

See if you can get a bit more history of the ships than I managed to pin down and we'll make a feature of them.

It fact, let's make it ANY professional use of our favourite brand. Remember the Mt Everest feature at Christmas? That picture of the Wireless Tent was a complete surprise to us all. The item was written nearly seventy years ago and had been lost to memory.

Mail to: g3gql@euphony.net

♠

# CASCODE CATASTROPHE

**Graeme Wormald G3GGL**

Those of us who were on the two-metre scene fifty years ago will recall the appearance of the cascode (or cascaded triode) RF amplifier. It provided low noise and high stability and was totally reliable. It was adopted for VHF TV. Then in the 1960's Stratton's started using it on HF . . .

In the 1920's triodes were used for HF amplifiers (and IF's too, for that matter) simply because the tetrode and pentode were still waiting to be invented.

The big problem with triodes was that they suffered from 'Miller Effect'. That was the capacity between the grid and anode and was enough to cause spontaneous oscillation.

This was fine if you wanted an oscillator, but no good at all if you wanted an amplifier. So the solution was to feed a signal from the anode to the grid in antiphase (ie at 180° to the grid signal). This was called neutralisation and was easier said than done, especially in a tuneable stage as opposed to a fixed intermediate amplifier.

The screengrid, rapidly followed by the pentode, was the answer to the set designers' prayer. For the next two decades the pentode reigned supreme. But it had one snag. At VHF it could operate as a noise generator. A triode was much quieter. But, oh, the neutralising!

One answer was to use it in a grounded grid circuit. This doesn't need neutralising, but the gain is low. Then around 1950 some bright spark decided that if you inserted a grounded grid triode after a conventional one the phase was changed in the middle and it was stable, with the low noise of a triode and the higher gain of a pentode.

We'd better leave the technical discussion at that stage and find the problems. Instead of returning the grid of the second triode to cathode (like we hams used to do) Stratton decided to return it to a fixed potentiometer across the HT supply. And what happens when you have high-value 40-year-old carbon composition resistors with constant current flowing? Trouble.

The 830, 940 and EA12 use virtually the same circuit. I have an example of each model and they all worked . . . But, and I'll say it again; most top-class Eddystones will work to a degree with quite major faults. And in each of my sets the cascode (V1) had a major fault. The 100k resistors had risen to values varying from 250k to open circuit. All of them!

Now they are very fiddly to change, being located in the notorious coil-box, which was wired by pigmys. But you must bite the bullet. Take the cover off and locate the offending resistors.

First of all find pin 2 of V1, the

ECC189 (alias 6ES8). This is rather crowded and will have four wires attached, two for the 100k resistors and two for the grounding capacitors (one is a 0.1 mfd and the other is a .003 mfd, they seem to be reliable).

They're all hell to get at but to prove the point first locate the HT lead into this part of the coil box. This circuitry is slightly different between the models, but the entry of HT is quite clear.

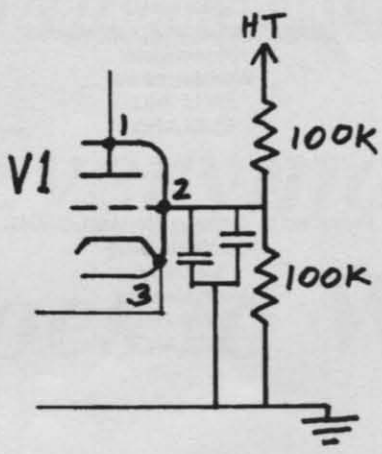
Unsolder one end of the feed resistor and lift it away from the HT feed-through soldering point. Now get out your multimeter and set it on the highest ohms range.

Measure the resistance of these two 100k (very small) resistors. I'll bet you the price of a large pint that they're absolutely nothing like 100k. And I'll bet you that they're nothing like equal, either.

This means the poor old stage is struggling to even give you unity gain, let alone amplification.

Once you've discovered the awful truth, you'll realise that something has to be done. If you're a dentist or a brain surgeon then you have a flying start.

The rest of us have to take a deep breath and closely examine the local layout. The 940 is the most cramped, and I once isolated all the components and drew the valve-holder out with all the tails flying. But now I know better: read on.




Here's the first breakthrough: although the ends of the two 100k resistors which DON'T go to pin 2 are connected to tags which you can't reach, these tags are in turn connected to the 'cold' ends of the coils in the following tuned stage. Take a look at the circuit diagram.

You'll see the top of the upper 100k is actually routed to the strapped untuned coilpack primaries.

The bottom of the lower 100K resistor is attached to an invisible earthing point, but so are the cold ends of the tuned secondaries.

Both these surrogate connecting points are easily accessible on the tags of the coil former nearest the valve.

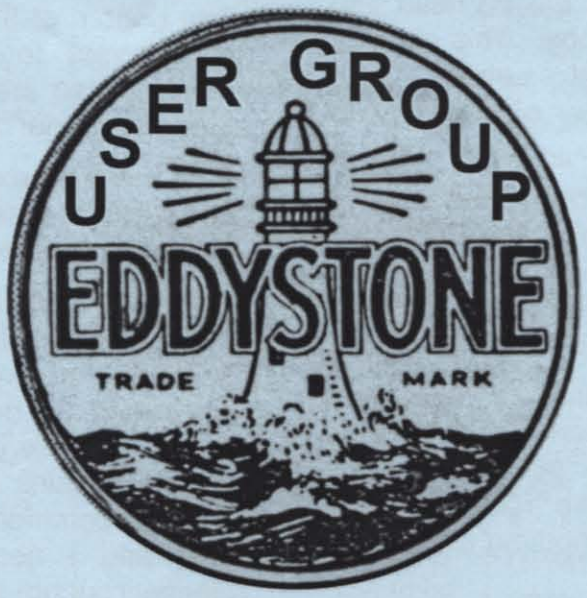
So that covers those, what about pin 2? Well, make sure your toolbox contains a very small pair of sidecutters. The flat pressed variety, not the chunky cast ones. And make sure it contains a pair of long forceps, the sort commonly sold at rallies. Oh yes, and I nearly forgot! A nice, slender, but hot soldering iron.

Locate the valve-base end of each resistor, grip its wire in the forceps, and unsolder. Lift both of them off. Now snip them free at the other ends, making sure that the lost ends aren't shorting to anything.

Take two new 100k 0.6w resistors. Twist one end of each to the other, side by side, and lightly solder.

Holding in the forceps, offer this twisted pair up to pin 2 and solder it, making very sure it's firm and solid.

The two leads that are now sticking back out of the coilbox should carefully be soldered to the coil tags as described above. Either way, it doesn't matter. Reconnect the HT feed. Check for shorts. You're back in business! ♠




Printed by Stargold Limited
Digital House
Stourport Road
Kidderminster
Worcestershire
DY11 7HQ
ENGLAND

Published by Graeme Wormald, G3GGL,
15 Sabrina Drive
Bewdley
Worcestershire
DY12 2RJ
ENGLAND