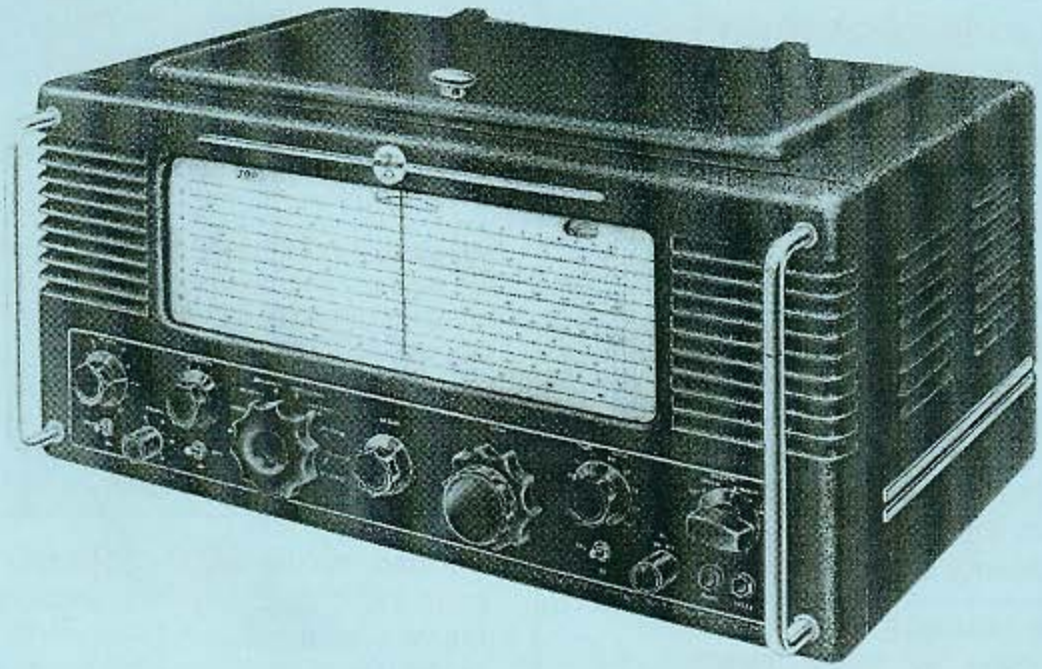
Lighthouse

Founded 1990

The Magazine of the Eddystone User Group

Issue 92, August 2005



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Fondly known as the "Queen Mary"
Coverage 15 kc/s to 31 Mc/s
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A non-profit-making Group for Eddystone Radio Enthusiasts.
Founded in 1990 by Ted Moore, G7AIR
Issue 92, August 2005

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FOR SALE

Eddystone 830/7, exc condx, £300. Also 990S, exc. condx, £200. Both with handbooks. Telephone John Howard, G3KQI, 0116 259 7243, Tilton, Leics

Eddystone EC10 (Serial KP0001, November 1964) Validated by EUG as the first of the production run. A real collector's item looking for a real collector. Price guide £95. Bob Ellis, 3 Derwent Park House, Darley Abbey, Derby, DE22 1JJ. Call 01332 551398

National HRO and 6 coilpacks. Not currently working. Converted in the early 1960s to use small B7G valves. Photos of Rxcan be viewed at http://www.struthio.org/hromx/ Good restoration project for the winter months? £60 ono. Call John GM8CVN on 0131 441 7277 (Edinburgh) Please note postage will be an extra charge by agreement.

EXCHANGE

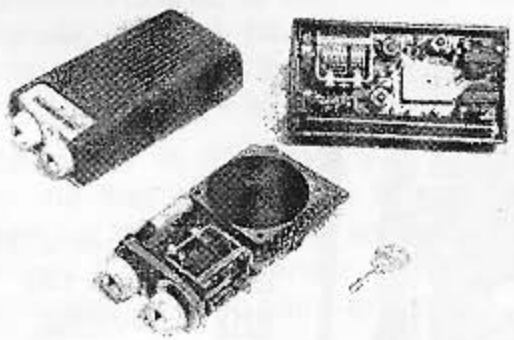
Wanted, Eddystone EA12 in exchange for **Model 710 Yachtsman** (very rare, see QRG). Call Walter, GØXEM on 01326 281167.

WANTED

Wanted: mains input connector 2 point and plug 2 pole fixed, and or mains socket polarised with earth comtact and its mains plug for an Eddystone 870A receiver project, also the finger plate blue/grey in colour. **Also Wanted mains transformer** drop through chassis type for Eddystone E.C.R. receiver to fit a 2.5" square hole, or would consider a burnt-out one. Also does anybody have the knobs for a B2 receiver and its transmitter? Please, if you can help in any way. Please telephone Andrew Humphriss on 01789 262 872. ♠

Wanted 1957 Perdio PR1 (MW only), 1958 Perdio PR2 (MW/LW) transistor radios, pocket portables in coloured plastic cases that all measure 5½" X 3¼" X 1¼"; *(see Perdio advert picture below)* also Perdio sales literature of 1950s. Also c1959 'Henry' (Radio) Ltd 'QUINTET' transistor pocket radio in kit or in built-up form (these were surplus Perdio PR2's).

ALSO Wanted: Peto Scott transistor radio, a pocket portable measuring 6" X 3" X 1¾"; it has two knobs at one end with the tuning dial just below them. *(shown here)*



ALSO 1957 Cossor transistor radio, a pocket portable measuring 6" X 3¼" X 1½". Any transistor sales literature of the 1950s. Please contact :-
Gordon Bussey.
Tel. 0208 660 2240 ♠

BACK NUMBERS OF LIGHTHOUSE are available on CD-rom and DVD: -

On CD (Acrobat with program):- Issues 1-15; 16-30; thereafter in bundles of six issues (i.e. one year) up to Issue 84 (April 2004); £5 each incl. p & p to UK, overseas £6 or equivalent in local banknotes ($ or €) airmail.

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Order all CDs from Graeme G3GGL details on opposite page.

IMPORTANT MESSAGE FOR E.U.G. MEMBERS : -

Ted Moore G7AIR has successfully undergone surgery to replace a faulty heart valve.

He suffered a set-back on 26th July when he responded unfavourably to medication.

An allergic reaction to a new analgesic caused him to hallucinate and he was re-admitted to Papworth Hospital.

He has now been discharged and is progressing satisfactorily.

We shall welcome back his "MailBox" feature in our next issue.

He would like to thank the many members who have sent him their good wishes.

Chris's Column

Welcome to another excellent edition of the Lighthouse. Voted Britain's best Vintage Radio journal by me and clearly supported by many of our readers if the comments from them in the last edition are anything to go by. Thanks for all the kind words.

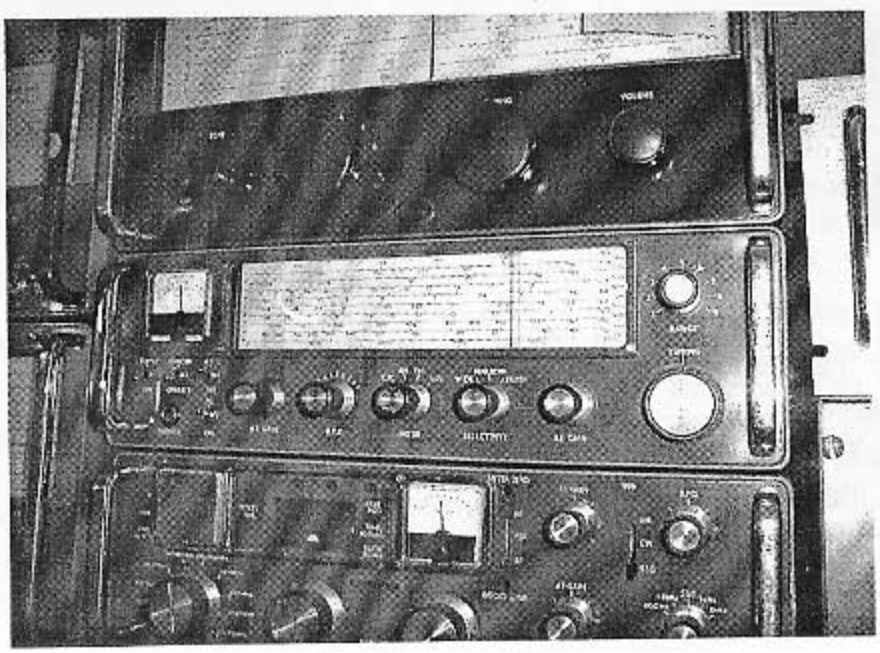
Many of you will know of EUG member Alan Ainslie. I first met Alan some twenty years ago when I was MD of the company.

He was introduced to me by another collector, Richard Baker who was in the process of building a museum at his house in Crich to house his collection of Eddystone Radios.

Alan was a serious collector of the marque and I would suggest that he has become the owner of the largest collection of Eddystone sets in the world, having purchased both Richard's collection when he went abroad and the old Eddystone collection from Marconi.

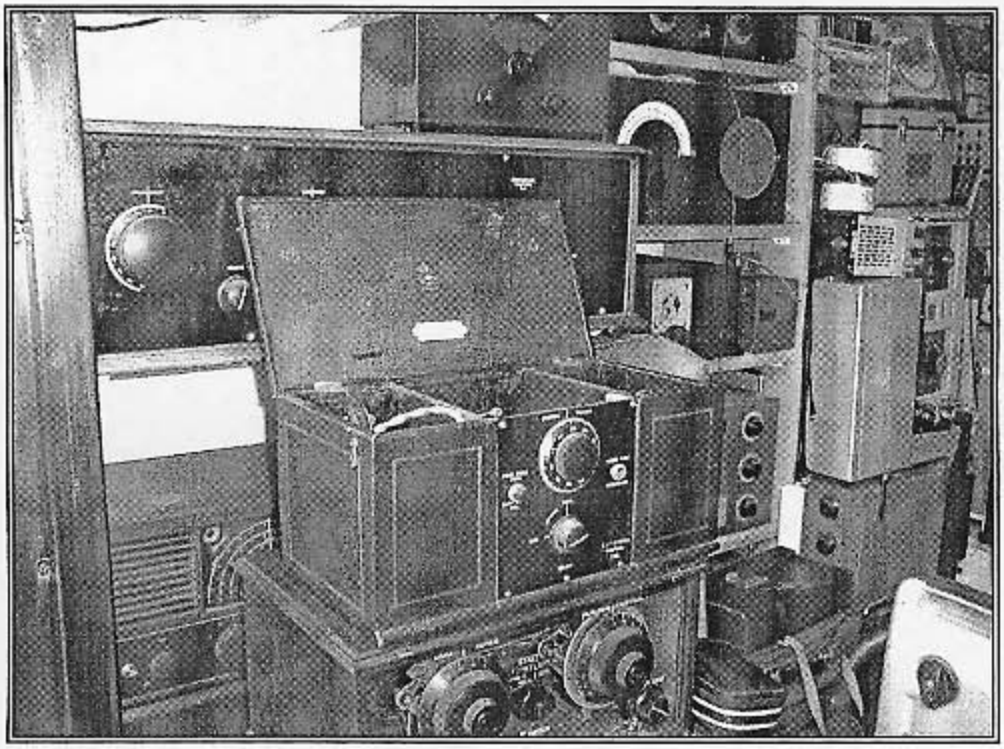
Alan is still collecting and travels all over the country acquiring new sets for his collection. It has long been his wish to set up an "invitation only" museum of Eddystone sets and Graeme and I were fortunate enough to get a preview of what that collection may look like when Alan and his wife June invited us down to their house in Surrey one Saturday. We were joined by James de la Mare and Dave Simmons.

It is hard to find the words to describe this collection. It must run into thousands. Far more than can be displayed in the space that Alan currently has available. His long term plans include a new building which will be purpose built to house and display the collection. He had a number of sets which do not appear in Graeme's QRG booklet and we took a few pictures to show them to members.



This 990 look-alike covers from 150 kHz to 180MHz.

A prototype that never got into production perhaps?



The "Eddystone Regional One" has long been heard of but this is the first time we have seen it. Believed to have been manufactured in 1925. But no record has ever been found. The two boxes either side of the tuner are for batteries.

This Eddystone Crystal set (the upright box in the middle with the cat's whisker on top) is probably "bought in" and badged, like the horn speaker to the right. No record of it has yet come to light

Alan and June have certainly got a lifetime's work setting up their museum but I for one think they will do it and boy! will that be worth a visit. Graeme, James, Dave and I had a really great day. Alan's not just a collector of Eddystone's and he really does have some big boy's toys, but I will let him tell you all about that when the time is right. Thanks Alan and June.

Enjoy your read, I know I will,

Best 73s

Chris GØEYO Patron of Eddystone User Group ♠

Another Way to Align the Front End

By Gerald Stancey G3MCK

I imagine that many EUGers will already know this method but others may not. Firstly two good maxims about aligning receivers:

- firstly, don't unless it is necessary

- secondly, follow the advice given in the manual.

However, sometimes needs must and this happened to me. I had a front end that had been well and truly poked and for some reason, that I still don't understand, following the manual was getting me nowhere. Time for a radical approach.

The first thing was to get the oscillator to cover the correct frequency range and a bit of simple arithmetic gave me the answer. The manual said that the IF was 465 kHz and that the oscillator ran HF of the signal frequency. They usually do but not always. I believe that on the BC342 the oscillator is LF of the signal on some bands!

I used a BC221 for this task. An appropriately calibrated receiver would do as well. A frequency counter would be excellent if you do not have to make a direct connection to the oscillator. If you do have to connect it to the oscillator some error may be introduced.

The next stage was to tackle the signal frequency circuits and for this I used a noise generator and my ear. This may seem odd but it worked well. This is the method described in the HRO manual but there they just use the internal noise of the receiver. My receiver was fairly quiet and the internal noise needed a boost.

The noise generator circuit was the well-known one using a Zener diode and a wide band amplifier. It is the one that many of the noise bridge circuits use. The exact method of adjusting trimmers etc. was that given in the manual. If you find that the trimmer setting is a bit flat the trick is to set it in the middle of the flat range. Subsequent checks showed that this aural method of aligning the signal stages was very good. Those who may have doubts about relying on their ears are invited to consider just how good, or bad, is the tracking on their receiver. Also think about the high quality receivers, e.g. Collins 75S, G2DAF, that have independent RF tuning.

The receiver in question was an HRO and there is an oddity. There is no provision for changing the inductance of the signal frequency coils. Alignment consists of setting the oscillator to cover the right range then peaking the signal frequency coils at the HF end of the range using trimmers alone.

The only other receiver that I know where the front end is aligned in this way is the Eddystone 358. Both these receivers use plug-in coils. Is there something about the physical layout of such receivers that allows this very simple method to be used?

Somebody out there must know. ♠

R.S.G.B. Visits Eddystone's

Thanks to the sharp eyes of Louis Meulstee, PAØPCR, we are able to bring you this news item, first published in 'Practical Wireless' for July 1947.

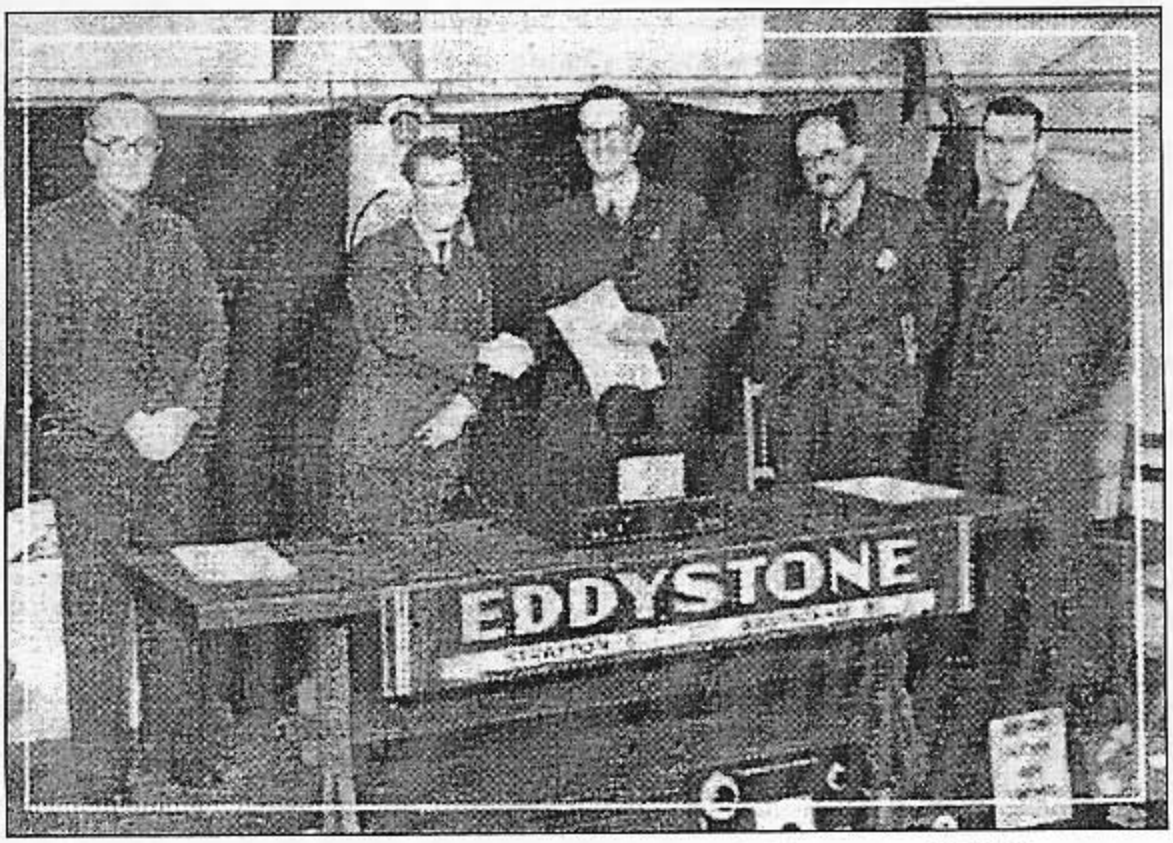
During the morning of Sunday, April 20th 1947, the president, council and regional representatives of the R.S.G.B. inspected the works of Messrs. Stratton & Co Ltd.

They were then taken on a conducted tour round the various sections of the factory and were greatly interested in the many mechanical and electrical processes involved in the production of modern high quality radio equipment and components.

Following the tour of inspection, they saw a new item, the model "640" amateur communications receiver, an all-British product incorporating the latest methods of manufacture. This receiver has been designed as the result of close collaboration between a number of leading amateurs of wide practical experience.

Then came the presentation to the society (by Mr. Malcolm Laughton, a director of the company) of an Eddystone "640" receiver, for use at the new headquarters station GB1RS.

In preliminary speeches, Mr. A. C. Edwards (G6XJ), commercial manager of Stratton & Co., Ltd., said that many amateurs were on the staff of the company, which devoted much of its business to the needs of the amateur.



Mr. Laughton presenting the new Eddystone "640" to Mr. Lewer, president of the R.S.G.B.

The Duffers' Guide to Valve Set Fault-finding – (part seven).

By Graeme Wormald G3GGL

We're now starting the second year of "Duffers' Guide", a mini-series which I expected to run for about four issues. It seems as though one subject automatically leads to another and you end up having covered the "Main Features" but with lots of loose ends floating about.

Remember that this column is about the blind leading the blind. I've never had a day's formal training in radio receivers. Having being a SWL and home-brewer since 1946 I acquired the RSGB handbook and persuaded my father to cough up for the ARRL handbook in 1948. I got my ham ticket in 1949 and never looked back. Apart from a course in BBC techniques at Wood Norton Hall in 1954, in which I failed dismally to grasp the significance of "Operator J", I've never had formal training in matters radio.

I realise that many of our members are similarly placed and that it is quite difficult to find information dealing with *OLD* valve receivers. That was the spur to this series and this month we'll pick up one of those loose ends.

It's another of those old-fashioned terms which dates from the nineteen thirties and then got magically changed by the meddlesome terminology brigade some time in the early 'sixties.

I'm referring to that essential adjunct to valve superhet receivers which I still call Automatic Volume Control, or AVC for short.

The terminology brigade then moved in and decided that on grounds of precise interpretation it should be referred to as Automatic Gain Control (AGC). For anybody wondering just what the difference is between the two I shall make it quite clear, here and now, that we're talking about the same thing. Exactly the same thing.

And what was good enough for the Eddystone 730/4 is good enough for me. I know. I'm looking at one now and it says "AVC" plain and simple.

There were three main reasons for the introduction of AVC.

The first was based on the massive increase in performance of radio valves in the early 'thirties coupled with the near universal adoption of the superhet. At the same time broadcasters were increasing the power of their transmitters a hundredfold. A set capable of receiving weak DX would overload massively when tuned to a local signal.

Secondly, this offended the listeners' ears as they tuned from one end of the band to the other. All most unsatis-factory.

And thirdly, fading (QSB) on short waves can be most distracting. AVC reduces or even eliminates QSB.

So the notion was born that if a portion of the rectified (DC) carrier signal was fed back from the detector stage to earlier amplifiers it could be used to reduce some of the incoming signals and "smooth things out" when tuning.

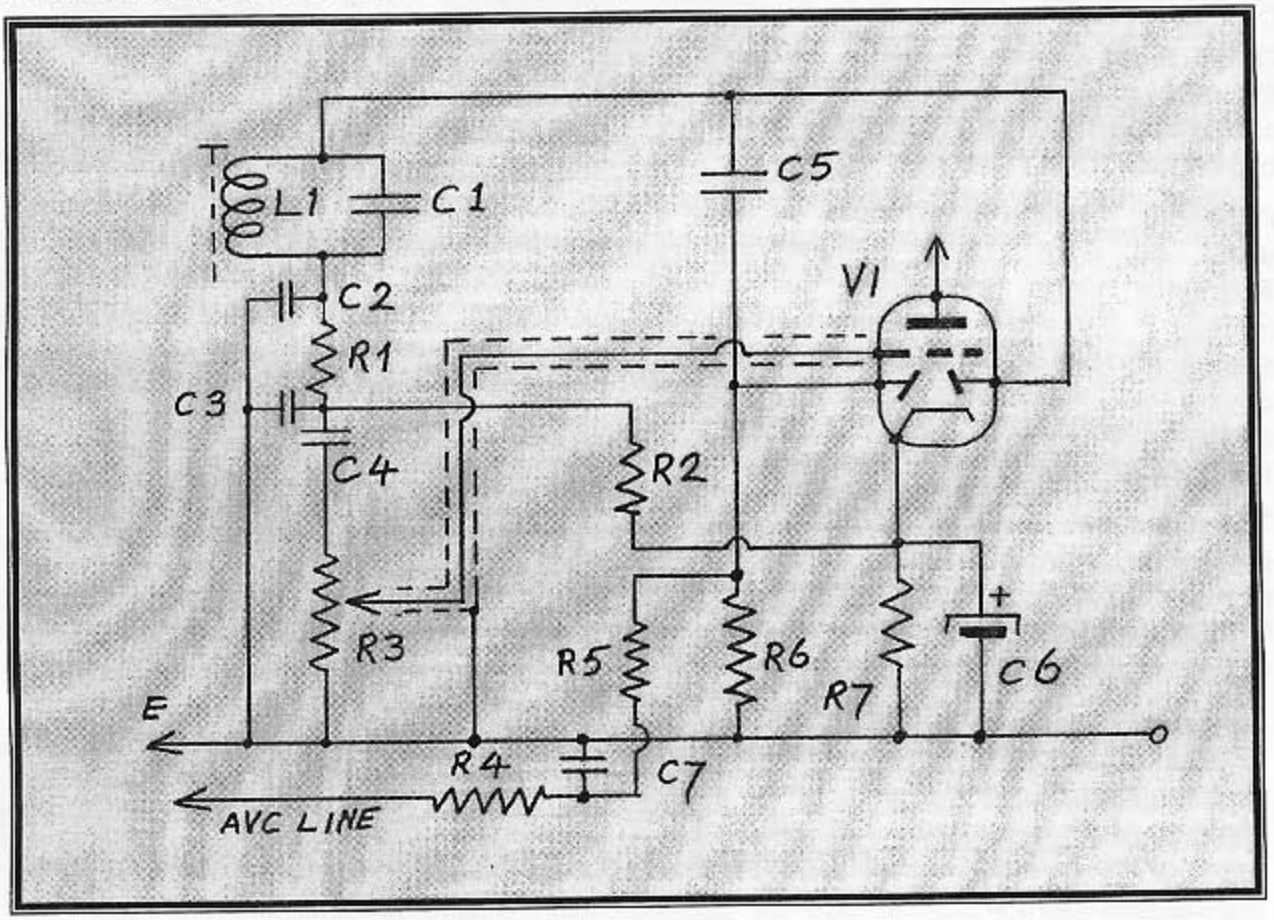
The designers obligingly invented pentode valves that would change their amplification factor according to the DC bias applied to the control grid. The more negative the grid, the less

the amplification.

The technical term for amplification factor is the Greek letter μ, pronounced "mew" and spelt in English "mu". Thus these valves were referred to as *"variable-mu"*. Most of them had fixed-mu near-equivalents. For instance, the EF39 may be considered as a variable-mu version of the EF36. Likewise the 6K7G and the 6J7G. A good AVC circuit could typically reduce a strong signal by a factor of, say, 100.

At this point I'd better mention that another term for a *"variable-mu"* valve is a *"remote cut-off"* valve. This refers to the fact that a fixed-mu valve may be biased to run at minus four volts and be completely "cut-off" i.e. not drawing any anode current, at minus ten volts. A remote cut-off valve will still be drawing some anode current at, say, minus 30 volts. This is to accommodate the negative AVC voltage and (when fitted) the negative voltage from the RF gain control.

However, let's accept all such details as read and examine a typical AVC and detector circuit.



The above circuit is typical of a multiple valve known as a double-diode triode. It was pretty much established in this form by the mid nineteen-thirties and continued with little change until the end of the valve era in the late 'sixties. Let's examine it step by step.

The signal input appears on the secondary of the final intermediate frequency transformer (IFT) which is shown as L1 and C1. It has acquired its signal from its own primary, which isn't shown here because it's irrelevant to this debate.

Forget about the microvolt and millivolt signals you're used to hearing about when RF is discussed. At this end of

the chain we're talking about VOLTS of RF, and more than one of them.

The value of C1 will typically be of the order of 100pF in a general coverage set having an intermediate frequency of about half a megacycle. It will almost certainly be silvered mica. Once the core of L1 has been tuned to resonance it should be a fairly reliable component.

As with all IFTs the only likely faults are mechanical by nature. There may be a break in the fine wire of L1 or there may be a short in the silver of C1. Silver has been known to migrate to the edge of the mica and short to the other side. This is uncommon but can happen to any silvered mica condenser. Don't overlook it.

I'd better mention the nature of the wire in IFTs (and medium/low frequency signal coils). I think I missed it out when discussing RF/IF stages in Part 2. We start off by saying that High Frequencies only flow through the "skin" of wire, not through the body of it.

There are two ways of increasing the amount of "skin" in a wire. One is to turn it into tubing, and this is done with high power transmitters but we don't have enough room in our receivers.

The second answer to this problem is to use *"litzendraht".* As this is a German word *("draht" is "wire" in German and I suspect "Litz" is the name of the inventor. No doubt one of our DL members will let us know.)* I'll start again – as this is a German word we make it acceptable in English by shortening it to "litz" wire.

So much for the name of it but what is it? Well, it's a conductor made up of a number of strands, each separately insulated and interwoven, and connected together in parallel at the ends. Its RF resistance is much less than the equivalent cross-section of solid conductor.

Hence its use in tuned circuits will produce greater efficiency and narrower bandwidth. Its use was almost universal in coils wound for frequencies below about 2 Mc/s. But, and it is a big BUT, if it comes adrift the chances of a successful repair are minimal.

The soldering of litz wire has always been a black art; I've never successfully done it. Some people will tell you that the insulation can be carefully scraped off. Some will tell you that you can burn it off in an alcohol flame. Others will say you can use a "special" solvent.

Quite frankly, I've no idea which is the "magic process". When I get a broken litz coil I know it's a goner. Incidentally, this brings me to a pet theory of mine. If, say, half the ends of a litz-wound IF coil have become open circuit, the set will still work but with reduced efficiency. I wonder how many vintage radios suffer from this virtually untraceable degeneration?

Anyway; back to business, let's see what goes on with this signal after it leaves the IFT.

The top end of L1 is "hot" to RF and is connected directly to the demodulator diode. In our cct it's the RH diode anode but they're both the same. A feed is taken via C5 (20pf – 100pf) to the diode anode responsible for AVC.

The lower end of the unit is the "earthy" end RF-wise but "hot" DC and audio-wise. This means that the three voltages (one DC, one RF and one AF) have to be separated.

This is done for RF quite simply by taking C2 straight to earth. The typical value will be 100pf which is rather low compared with normal RF decoupling condensers, but it is in a high impedance circuit and it is necessary

for it not to bypass audio frequencies to any extent. R1, typically 20k to 100k, "forces" the radio frequency to earth via C2 but passes the DC and audio components down to the ganglion junction of R1, C3, C4, and R2. Let us now examine each of the three new components from this point.

C3 is another RF by-pass condenser, to get rid of any last traces of the IF which may have squeezed through R1.

R2, typically one megohm, has a twofold job. One is to present a high resistance to the recovered audio component and "force" it through C4, typically 0.01 mfd, which presents a low impedance to AF thus allowing it access to the top of R3 which is the AF gain control. This is typically 500k, but must be logarithmic in characteristic. This is because the human ear is logarithmic which means, in simplistic terms, that when the AF gain control is set at 50% of its travel the resistance (and actual AF voltage level) has only increased by 10%.

The recovered audio is then fed via a screened cable direct to the grid of the triode section of V1. At this point go back to Part One of "Duffers' Guide" and follow the rout to the loudspeaker.

R2, typically 470k, has what may seem to be a rather abstract function in this operation and I must pause now to explain another term which can often cause confusion. This is the word "delay" when used in the term "delayed AVC".

Now when I first came across it I assumed, not unnaturally, that it meant a delay in time. It usually does. But on reflection it makes no sense at all. Who would want to be deafened for ten seconds before the AVC swung into action and reduced the caco-phony?

No, the term relates to a voltage delay or standing bias in the AVC. This "delay" is used to negate the action of the AVC on weak signals and only deploying the facility when a signal reaches a reasonable strength. This is self-evident upon consideration.

And this is how it works. By a happy coincidence the cathode bias on V1, which is developed across the auto-bias resistor, R7 (say 1k or 2k), is about the value required (a volt or so). The cathode is common to the diodes as well as the triode and thus the bias will be applied to the AVC diode (the left-hand one) and cause it to be inoperative until the signal level rises above this. R2 provides half of this link.

R6 (470k) provides the other half and is the AVC diode anode load. The negative rectified (DC) carrier voltage appears at the top of R6 and is fed to the preceding amplifiers via R5 (470k) and R4 (470k). C7 (0.01mfd) ensures that the audio component is filtered from the AVC line.

The only component so far not mentioned is C6 (25mfd), the triode cathode decoupler. It is mentioned more appropriately in Part One. Its purpose in the AVC role is to ensure that no audio enters the line.

If you're confused by now, perhaps you should go back to the start and read it slowly!

Of all the items likely to cause problems in this circuit none rates higher than C7. The slightest leakage will short out the AVC and cause awful distortion on strong signals. This is a near certainty on an old valve set. Replace it.

Not shown in our mini-circuit is the continuation of the AVC line to earlier stages (anything up to five). Each will have its own equivalent of R4 and C7 to separate it from its neighbour. The same comment applies.

♠

Wireless Magazine. April. 1931

VALVES TO USE IN YOUR SET

Make	Type	Impedance	Amplification Factor	Filament Current	Mutual Conductance	Anode Current at 150 volts	Grid Bias at 100 volts	Grid Bias at 150 volts
Two-volt Three-electrode Valves								
Mazda ..	H210	59,000	47	.1	.8	.5	.5	1.0
Lissen ..	H210	58,000	35	.1	.6	1.1	—	1.5
Six-Sixty	210RC	55,500	39	.1	.7	1.6	1.0	1.5
Mullard	PM1A	51,000	36	.1	.7	.75	1.5	1.5
Cossor ..	210RC	50,000	36	.1	.72	1.5	—	1.5
Tungsram	R208	50,000	35	.1	.7	1.0	—	1.5
Marconi	H2	35,000	35	.1	1.0	.5	—	1.5
Osram ..	H2	35,000	35	.1	1.0	1.0	—	1.5
Six-Sixty	210HF	25,000	19	.1	.75	2.75	—	—
Eta ..	BY2023	23,000	20	.12	.85	1.5	—	—
Tungsram	H210	25,000	25	.1	1.0	2.0	—	—
Mullard	PM1HF	22,500	18	.1	.8	1.0	3.0	4.5
Lissen ..	HL210	21,000	18	.1	.85	2.2	1.5	4.5
Mazda ..	HL210	21,000	26	.1	1.25	3.0	1.5	3.0
Cossor ..	210HF	20,000	22	.1	1.2	1.2	1.5	3.0
Marconi	HL2/c	20,000	22	.1	1.1	—	—	—
Mullard	PM1HL	18,500	28	.1	1.5	1.2	1.5	3.0
Osram ..	HL2/c	20,000	22	.1	1.1	—	—	—
Eta ..	BY1814	14,000	18	.12	1.3	3.0	—	—
Cossor ..	210D t.	13,000	15	.1	1.15	—	—	—
Six-Sixty	210LF	12,500	10.6	.1	.85	5.4	4.5	7.5
Cossor ..	210LF	12,000	10	.1	1.1	3.5	3.0	4.5
Mullard	PM1LF	12,000	11	.1	.9	3.0	4.5	7.5
Six-Sixty	217D	10,700	13.5	.17	1.25	7.0	—	4.0
Mullard	PM2DX	10,700	13.5	.2	1.25	3.0	3.0	6.0
Eta ..	BY2010	10,000	20	.12	2.0	4.0	1.5	3.0
Lissen ..	L210	10,000	10	.1	1.0	3.5	3.0	7.5
Marconi	L2/b	10,000	15.5	.1	1.55	4.0	—	—
Osram ..	L2/b	10,000	15.5	.1	1.55	4.0	—	—
Mazda ..	L210	10,000	15.5	.1	1.55	5.0	2.5	4.5
Tungsram	LG210	10,000	10	.1	1.0	4.0	—	—
Six-Sixty	220P	4,800	7.2	.2	1.5	7.0	10.0	16.0
Lissen ..	P220	4,700	7	.2	1.5	5.0	9.0	15.0
Mullard	PM2	4,400	7.5	.2	1.7	4.0	7.5	12.0
Cossor ..	220P	4,000	8	.2	2.0	7.5	4.5	9.0
Cossor ..	215P	4,000	9	.15	2.25	—	3.0	7.5
Eta ..	BW1304	4,000	13	.2	3.2	6.0	1.5	4.5
Marconi	LP2/c	4,000	8	.2	2.0	10.0	—	—
Osram ..	LP2/c	4,000	8	.2	2.0	10.0	—	—
Mazda ..	P220	3,700	12.5	.2	3.4	11.0	3.0	6.0
Mullard	PM2A	3,600	12.5	.2	3.5	12.0	1.5	4.5
Tungsram	P215	3,300	5	.2	1.5	12.0	—	—
Six-Sixty	230SP	2,750	5.5	.3	2.0	32.0	12.0	23.0
Eta ..	BW303	2,700	3	.32	1.1	11.0	15.0	25.0
Mullard	PM252	2,600	5.4	.3	2.1	14.0	9.0	15.0
Marconi	P240	2,500	4	.4	1.6	12.0	15.0	24.0
Osram ..	P240	2,500	4	.4	1.6	11.0	16.0	24.0
Tungsram	SP230	2,500	5	.3	2.0	15.0	—	—
Lissen ..	PX240	2,000	4	.4	2.0	14.0	12.5	22.5
Eta ..	BW602	1,900	6.5	.32	3.4	12.0	4.5	12.0
Mazda ..	P240	1,900	7	.4	3.7	18.0	6.0	13.5
Marconi	P2/b	1,850	6.5	.2	3.5	15.0	—	—
Osram ..	P2/b	1,850	6.5	.2	3.5	15.0	—	—
Cossor ..	230XP	1,500	4	.3	2.3	18.0	12.5	22.5
Two-volt Screen-grid Valves								
Tungsram	S210	430,000	300	.12	.8	—	—	—
Mazda ..	215SG	400,000	450	.15	1.1	—	1.5	1.5
Cossor ..	215SG	300,000	330	.15	1.1	—	—	—
Eta ..	BY6	300,000	300	.15	1.0	2.5	—	—
Mullard	PM12	230,000	200	.15	.87	—	—	—
Six-Sixty	215SG	220,000	190	.15	.87	2.0	—	—
Cossor ..	220SG	200,000	320	.2	1.6	—	—	1.5
Lissen	SG215	200,000	180	.15	.9	—	—	1.5
Marconi	S215	200,000	170	.15	.85	—	—	—
Osram ..	S215	200,000	170	.15	.85	—	—	—
Two-volt Pentode Valves								
Lissen ..	PT225	64,000	90	.25	1.4	7.0	3.0	6.0
Six-Sixty	230PP	64,000	80	.3	1.25	17.0	6.0	10.5
Mullard	PM22	62,500	82	.3	1.3	10.0	6.0	12.0
Marconi	PT240	55,000	90	.4	1.65	9.0	6.0	9.0
Osram ..	PT240	55,000	90	.4	1.65	9.0	6.0	9.0
Lissen ..	PT240	22,500	45	.4	2.0	12.5	7.5	10.5
Cossor ..	230PT	20,000	40	.3	2.0	15.0	6.0	7.5
Mazda ..	230P p.	—	—	.3	1.8	13.0	9.0	9.0
Four-volt Three-electrode Valves								
Cossor ..	410RC	60,000	40	.1	.66	1.0	—	1.5
Marconi	H410	60,000	40	.1	.67	.5	—	1.5
Osram ..	H410	60,000	40	.1	.66	.35	—	1.5
Lissen ..	H410	60,000	40	.1	.66	1.6	—	1.5
Six-Sixty	4075RC	58,000	37	.075	.64	1.35	1.0	1.5
Mullard	PM3A	55,000	38	.075	.66	.3	1.5	1.5
Marconi	HL410	30,000	25	.15	.83	1.0	2.0	3.0
Osram ..	HL410	30,000	25	.1	.83	1.25	1.5	3.0
Lissen ..	HLD410	21,000	25	.1	1.2	2.5	1.5	3.0
Cossor ..	410HF	20,000	20	.1	1.0	1.75	1.5	4.5
Mullard	PM3	13,000	14	.075	1.05	2.0	3.0	6.0
Six-Sixty	4075HF	12,500	13.5	.075	1.1	7.0	3.0	5.0
Cossor ..	410LF	8,500	15	.1	1.76	3.2	3.0	6.0
Lissen ..	L410	8,500	15	.1	1.8	3.5	1.5	4.5
Marconi	L410	8,500	15	.1	1.76	3.0	2.0	4.5
Osram ..	L410	8,500	15	.1	1.77	3.5	3.0	4.5
Mullard	PM4DX	7,500	15	.1	2.0	2.0	3.0	6.0

Make	Type	Impedance	Amplification Factor	Filament Current	Mutua. Conductance	Anode Current at 150 volts	Grid Bias at 100 volts	Grid Bias at 150 volts
Four-volt Three-electrode Valves—Continued								
Six-Sixty	410D	7,250	14.5	.1	2.0	8.0	—	3.5
Marconi	P410	5,000	7.5	.1	1.5	6.0	6.0	10.5
Osram ..	P410	5,000	7.5	.1	1.5	6.0	6.0	10.5
Lissen ..	P410	4,500	9	.1	2.0	5.0	6.0	12.5
Mullard	PM4	4,450	8	.1	1.8	6.0	7.5	12.0
Six-Sixty	410P	4,200	7.7	.1	1.85	18.0	6.0	9.0
Cossor ..	410P	4,000	8	.1	2.0	17.5	4.5	9.0
Marconi	P425	2,300	4.5	.25	1.95	14.0	9.0	16.5
Osram ..	P425	2,300	4.5	.25	1.95	14.0	9.0	16.5
Lissen ..	P425	2,250	4.5	.25	2.8	28.0	12.5	19.5
Cossor ..	415XP	2,000	4	.15	2.0	18	12.0	22.5
Cossor ..	425XP	2,000	7	.25	3.5	—	6.0	13.5
Mullard	PM254	2,000	4.2	.18	2.1	10.0	13.5	22.5
Six-Sixty	420SP	2,000	4	.2	2.0	41.0	12.0	22.0
Mazda ..	P425	1,950	3.5	.25	1.8	26.0	14.0	26.0
Cossor ..	4XP	1,100	3	.6	2.75	20	15	30
Marconi	PX4	1,050	3.5	.6	3.3	30.0	13.0	23.0
Osram ..	PX4	1,050	3.5	.6	3.3	30.0	13.0	23.0
Four-volt Screen-grid Valves								
Mullard	PM14	230,000	200	.075	.87	—	—	—
Six-Sixty	4075SG	220,000	190	.075	.87	3.0	—	—
Cossor ..	410SG	200,000	200	.1	1.0	—	—	1.5
Marconi	S410	200,000	180	.1	.9	3.5	1.5	1.5
Osram ..	S410	200,000	180	.1	.9	3.5	—	—
Lissen ..	SG410	200,000	180	.1	.9	—	—	1.5
Four-volt Pentode Valves								
Six-Sixty	SS4Pent.	53,000	83	.275	1.55	17.0	10.0	14.0
Marconi	PT425	50,000	100	.25	2.0	8.0	4.7	7.5
Osram ..	PT425	50,000	100	.25	2.0	8.0	4.0	7.5
Mullard	PM24	28,000	62	.15	1.75	16.0	6.0	12.0
Six-Sixty	415PP	27,000	60	.15	2.2	—	6.0	10.5
Mullard	PM24A	25,000	50	.275	2.0	15.0	6.0	21.0
Lissen ..	PT425	22,500	180	.25	2.0	15.0	7.5	10.5
Cossor ..	415PT	20,000	40	.15	2.0	14.0	6.0	9.0
Mazda ..	425Pen.	—	—	.25	2.0	14.0	14.0	14.0
Six-volt Three-electrode Valves								
Mazda ..	H6 7	90,000	40	.07	.45	1.0	.8	1.5
Cossor ..	610RC	60,000	50	.1	.8	1.0	—	1.5
Lissen ..	H610	60,000	40	.1	.66	1.0	—	1.5
Marconi	H610	60,000	40	.1	.7	.5	1.5	1.5
Osram ..	H610	60,000	40	.1	.7	.35	—	3.0
Six-Sixty	6075RC	58,000	42	.075	7	1.1	1.0	1.5
Mullard	PM5B	53,000	40	.075	.75	2.5	1.5	1.5
Marconi	HL610	30,000	30	.1	1.0	1.0	1.5	1.5
Osram ..	HL610	30,000	30	.1	1.0	.9	1.5	3.0
Marconi	LS5B	25,000	20	.8	.8	—	—	—
Osram ..	LS5B	25,000	20	.8	.8	—	—	—
Lissen ..	LHD610	21,000	25	.1	1.2	2.5	1.5	3.0
Cossor ..	610HF	20,000	20	.1	1.0	1.75	1.5	3.0
Mazda ..	HL610	20,000	20	.07	1.0	1.8	1.5	3.0
Mullard	PM5D	20,000	26	.075	1.3	—	1.5	3.0
Six-Sixty	6075HF	15,200	17	.075	1.1	4.1	2.0	4.0
Mullard	PM5X	14,700	17.5	.075	1.2	1.0	3.0	4.5
Six-Sixty	D610	9,250	18.5	.1	2.0	8.0	—	4.0
Lissen ..	L610	9,000	18	.1	2.0	2.0	3.0	4.5
Mullard	PM6D	9,000	18	.1	2.0	2.0	3.0	4.5
Cossor ..	610LF	7,500	15	.1	2.0	3.4	3.0	4.5
Marconi	L610	7,500	15	.1	2.0	3.0	2.0	4.0
Osram ..	L610	7,500	15	.1	2.0	3.5	1.5	4.5
Marconi	DE5	7,000	7	.25	1.0	3.0	4.5	10.0
Marconi	LS5	6,000	5	.8	.8	—	—	—
Osram ..	LS5	6,000	5	.8	.8	—	—	—
Lissen ..	P610	4,000	8	.1	2.0	6.0	6.0	16.0
Marconi	DE5A	4,000	3.5	.25	.87	9.0	12.0	15.0
Mullard	PM6	3,550	8	.1	2.25	7.0	6.0	9.0
Cossor ..	610P	3,500	8	.1	2.28	8.0	4.5	7.5
Marconi	P610	3,500	8	.1	2.28	6.0	6.0	9.0
Osram ..	P610	3,500	8	.1	2.3	7.0	6.0	9.0
Six-Sixty	610P	3,400	7.8	.1	2.3	19.0	6.0	10.5
Marconi	LS5A	2,750	2.5	.8	.9	—	—	—
Osram ..	LS5A	2,750	2.5	.8	.9	—	—	—
Cossor ..	625P	2,500	7	.25	2.8	13.0	6.0	9.0
Lissen ..	P625	2,500	7.5	.25	3.0	8.0	7.5	12.0
Mazda ..	P625B	2,500	7	.25	2.8	11.0	6.0	12.0
Marconi	P625	2,400	6	.25	2.5	11.0	6.0	24.0 (at 250v.)
Osram ..	P625	2,400	6	.25	2.5	11.0	6.0	12.0
Cossor ..	610XP	2,000	5	.1	2.5	22.0	12.0	22.5
Six-Sixty	625SP	1,950	6.5	.25	3.3	50.0	12.0	24
Mullard	PM256	1,850	6	.25	3.25	—	9.0	18.0
Marconi	P625A	1,600	3.7	.25	2.3	20.0	13.5	36.0 (at 200v.)
Mazda ..	P625A	1,600	4	.25	2.5	27.0	10.0	20.0
Osram ..	P625A	1,600	3.7	.25	2.3	16.0	13.5	24.0
Lissen ..	P625A	1,500	4.5	.25	3.0	12.0	13.5	24.0
Six-Sixty	625SPA	1,500	3.9	.25	2.6	60.0	12.0	22.5
Mullard	PM256A	1,400	3.6	.25	2.6	—	—	—
Marconi	LS6A	1,300	3.0	2.0	2.3	—	—	—
Mazda ..	P650	1,300	3.5	.5	2.7	30.0	12.0	25.0
Osram ..	LS6A	1,300	3.0	2.0	2.3	—	—	—
Marconi	DA60	835	2.5	4.0	3.0	—	—	—
Osram ..	DA60	835	2.5	4.0	3.0	—	—	—

EUGer John Gomer G8UNZ is into the real old valve stuff and thought members might like to have this very early reference list from 1931

A Tale of my Vintage Eddystone 940

Graham Sutton G4EVW

"I bid for my Eddystone on E-Bay in May, and obtained it for £120 in working order."

As a young engineer with the Midlands Electricity Board many years ago, I saw my first Eddystone when I visited the Edgbaston Met Office, and since then I've regarded them as a great example of skilled engineering, and superb electronics. It was obviously an important tool for the Met Office staff, as it burbled away at the side of the room.

I powered up my new acquisition with its plinth speaker attached. Sure enough it was working on all bands, but in my opinion it was a bit deaf. The bands appeared flat and muffled. It was in need of a bit of tender loving care.

While exploring the Internet looking for Eddystone information, by accident I came upon a link to the Eddystone User Group, and was able to contact Graeme G3GGL.

A short conversation later and I was appraised of several things to check.

It was common, I discovered, for 40-year-old resistor values to change significantly. Sure enough, resistors I checked around the RF and Oscillator stages were all over the place.

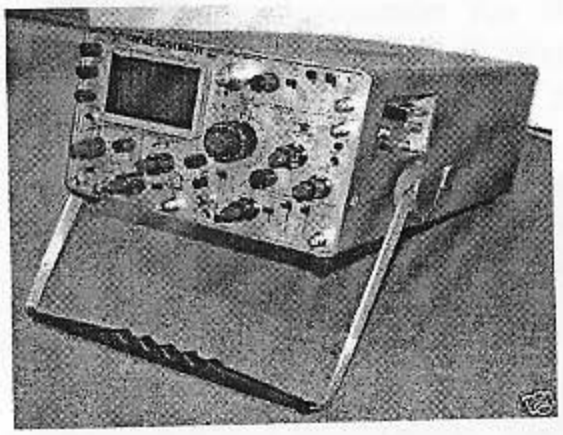
I had sold off all my stock of components and instrumentation a couple of years ago.

With eyesight not as good as it used to be, and components getting more difficult to source, I was thinking I might give up amateur radio.

A visit to our local component shop (R.F. Potts of Derby), found them also struggling to supply my pick list – whereas years ago, they had a seemingly unlimited supply of parts. However I did manage to get most of the resistors I wanted.

I also bought their last remaining frequency counter, a Wisher WFC 327 (0 – 2.7Gc/s) for £30, and signal generator, a Leader LSG-17 for £50.

I was still short of a most important tool – an oscilloscope. I searched E-bay, and finally located a Tektronix 453, 60Mc/s scope for £135.



I'm very pleased with this. It works perfectly, and the manual / user guide is the best I've ever seen, being in a very detailed US Army format.

Now I could start the work. Access to the inner works is easy – 4 chrome screws, and the case slides off. A few more screws, and the coil pack is visible. I was going to say 'accessible', but it's hardly that. It's a wiring achievement of great skill.

Getting a soldering iron on the valve base connections was not going to be easy.

Graeme had also mentioned that the original assembly method was to pre-wire the valve bases, insert them into the coil pack casting from the top, and complete the wiring from within the coil pack. It's a job for very nimble fingers.

I made detailed sketches of the component layout for valves V1 to V4. Then carefully slid out the wavechange switch shaft from the rear. This is easily done, but a bit scary as the earthing springs snap back from the shaft as it slides out. This done, there is a much better access to the components.

Replacement of all resistors with modern metal film versions proceeded easily except for V2. It was necessary to remove this from the top of the coil pack – reversing the original assembly sequence. Fortunately, most of the components connected to this valve can easily be disconnected within the box, and the earth tag is released when the holding bolts are removed. The resistors were soon replaced, and I took the opportunity to insulate the wire ends with insulation stripped from spare wire. The connections pass very close to the coilpack casting, so it seemed advisable.

When I bought the radio, I was told there was noticeable oscillator drift downwards.

I noticed the oscillator 100pF feedback capacitors were the old tubular ceramic type with red covering. I've never trusted anything but silver mica capacitors for oscillator work, so I changed them.

All changes were now complete, so the wavechange shaft was now carefully re-inserted. The earthing springs are alternately facing inward and outwards. The inwards ones are easy – just a push with a slender screwdriver bends

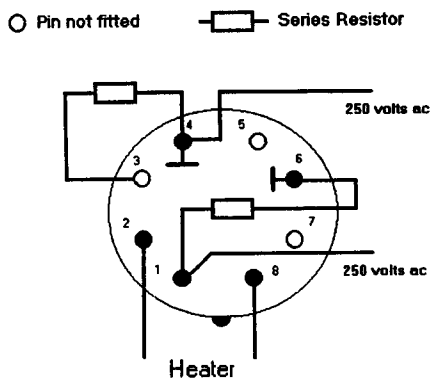
them to allow the shaft to pass. The outwards ones need a bit of ingenuity in the shape of a cut-down bicycle spoke, which can be inserted behind the springs and pulled outwards to allow the shaft to pass.

Checks on the rest of the circuitry outside the coil pack showed all resistors were still holding their correct values.

While checking voltages though, I noticed they were out of spec on the high side. I checked the HT lines and HT1 was running at 255 volts. So what was wrong here?

I looked carefully at the GZ34 rectifier, and found this:

There are two things wrong here. Pin



1 is designated as 'internally connected', and in the Mullard version connects to internal metalisation. I've been unable to determine the purpose of this. Certainly it should not be used as above.

The second thing wrong, which explains the high voltages, is that the top series plate resistor is by-passed. I had to check several times to make sure I was seeing it correctly. The solder was dull grey, so it must have been like that for some time.

It was easy to reconnect the series resistors to unused pins, leaving pin 1 clear. A check of the HT1 voltage showed all was now correct, and so were the other designated voltage test points.

Now it was time to check the alignment. I followed the sequence given in the manual.

First the IF transformers, so I disabled the oscillator section, switched in the crystal filter, and connected my signal generator to the mixer. The oscilloscope was connected across the speaker, in place of using an output meter.

Now carefully tune the signal generator to produce maximum output – in my case at 454.0 kc/s. Then tune all top and bottom cores of T1 to T4 to give maximum output.

Several cores were off tune and my output increased significantly. Then I switched off the modulation, reset the oscillator to crystal frequency, and checked the BFO for zero beat – it was slightly off.

Then the simple bit – checking the RF alignment at the lower and higher frequencies given in the tables. All went well, with a few trimmers needing adjustment and the padding cores adjusted to suit. The only problem here was that someone had used black paint to 'seal' the trimmer capacitors, and this had dried very hard. Thankfully, the paint cracked when I rotated the capacitor tops.

All alignment work was now complete, and I connected the aerial to test the reception. The bands were now 'alive' with stations, and I have a receiver in top working condition, which might well go on for another 50 years.

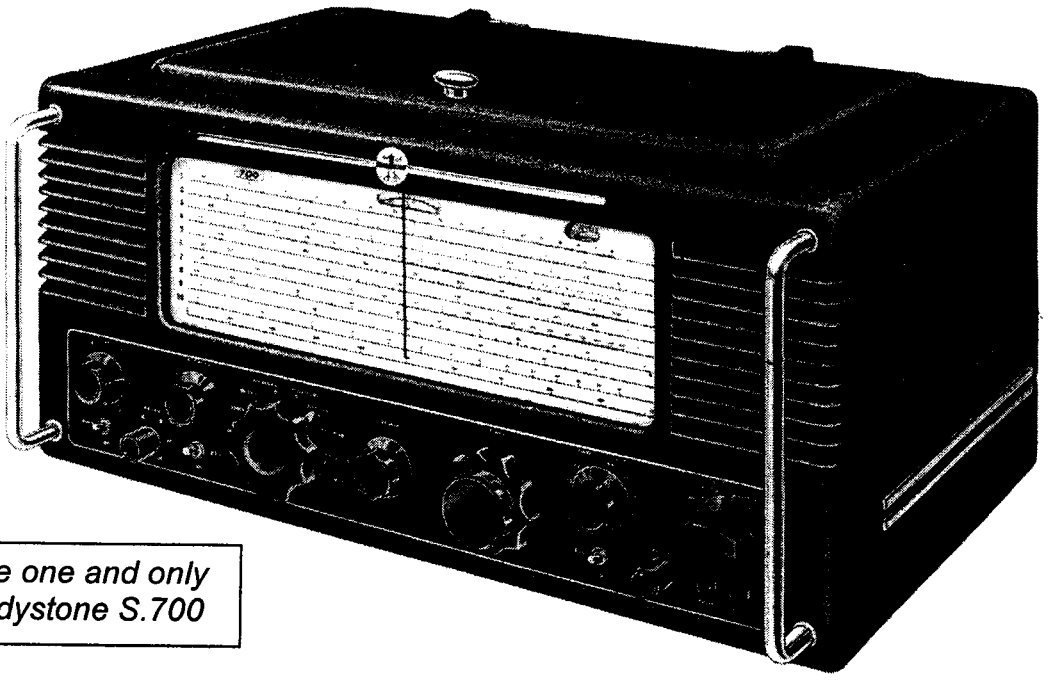
I also have some really good test equipment, which I can use on other projects. In fact I've ordered a Drake TR-4 valve transceiver, so I'm looking forward to trying that out on AM.

There's life in the old hobby yet . . .

♠

Eddystone's "Queen Mary"

Those of you with long memories (or long teeth) may recall those adverts in the popular press for "K.B." domestic radio. It stood for "Kolster Brandes" and the punch line was that they were used in that most famous of ocean liners "R.M.S. Queen Mary".



The one and only Eddystone S.700

Quite frankly this was what we would call "creative advertising" these days. The fact was that K.B. Radio was a subsidiary of S.T.C. *(Standard Telephone & Cables),* which itself was a subsidiary of the giant American I.T.T. *(International Telephones & Telegraphs).*

They were rivals of Marconi's and in the world of ocean liners had beaten them in the race to win the contract for the fabled Cunard White Star liners. This was achieved via another S.T.C. subsidiary, I.M.R.C. *(International Marine Radio Company).*

The two famous Cunard "Queens" *(Mary and Elizabeth),* built in Belfast, had hardly established themselves as Atlantic winners before World War Two commenced and they were re-fitted as troopships.

The greater part of the American D-Day landing force crossed the Atlantic in them and by 1950 the original pre-war radio equipment was badly in need of replacement.

I.M.R.C. was hard pressed for creative capacity and they contracted the design and construction of the new receivers to Stratton. The final result, styled I.M.R.54, was instantly recognisable as an "Eddystone" but was a good 50% larger.

Due to its size and use in the greatest liners in the world it acquired the nickname of "Queen Mary" at the Eddystone factory. They were so proud of it they built a special 230v AC version for the Stratton Board Room and labelled it the Eddystone S.700. (The I.M.R.54 was 110 V. AC/DC).

Graeme – G3GGL

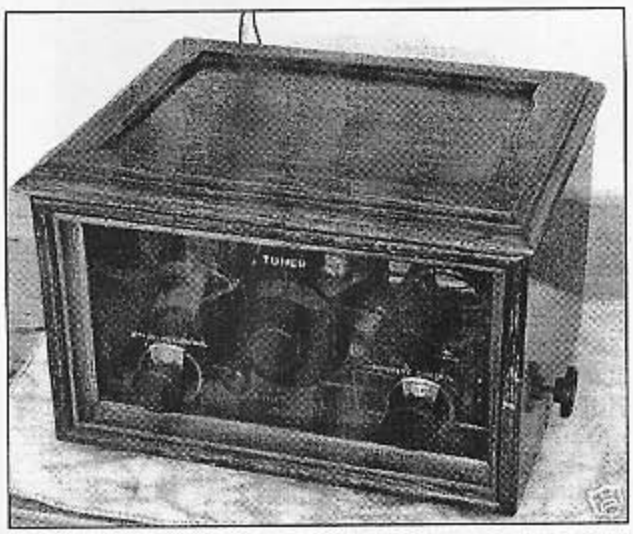
E Bay Watching –
July 2005

By Chris Pettitt GØEYO

This has been an interesting couple months for Eddystone fans on E bay, not too much in the way of quantity but some real quality in what has been offered for sale.

Top of the list goes to an Eddystone Twin from 1925/26 which went to an EUG member for a very healthy £1220. The seller gave a really good description and this and good photographs always help an item sell at top price. I think the seller is a dealer as he is a regular seller on E bay and may even be an EUG member but I wonder where this little treasure has been hiding for the past 75 years . . .

"The Twin is one of Eddystone's earliest receivers and is a very rare item, with only a very few known to have survived. This particular one is an early variant as it has two filament rheostats and plug in coils. It is being offered for sale as a collector's item, I have made no attempt to restore or renovate it. The Twin was made in two cabinet styles, a single height cabinet (the type offered for sale here) and double height, (lower compartment for batteries).

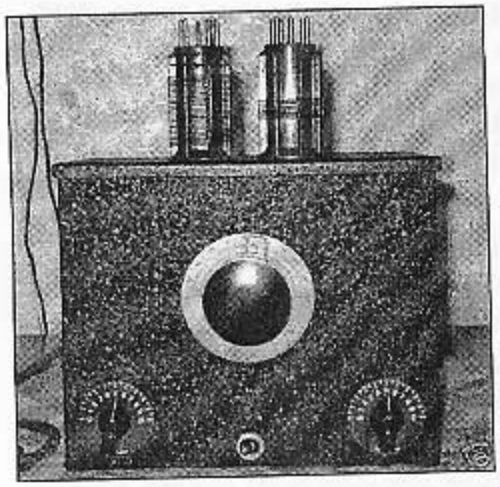


This Twin includes both valves, a pip top Marconi DE5 and a PM5X, both have filament continuity but I have not tested them further. Four two pin plug-in coils are also included, two marked 'Eddystone' '50' and '75', and two marked 'Genie' '25' and '35'. The fragile glass front panel is in one piece and the labelling is correct and intact. All control knobs are present and correct, and the case (Jacobean Oak?) is in really excellent condition save for a small nick on the right hand side front edging (visible in the photos). The top cover hinges are correct and undamaged, the Eddystone transfer is still present inside the lid. All components appear original and the wiring is also original (though one wire from the left hand rheostat to the inter-valve transformer is broken). Both the Intervalve Transformer and the fixed resistance are genuine Eddystone items, that is both have 'Eddystone' stamped on them at least once."

"This twin is complete except for the rear terminal strip and terminals. All of the wires to the strip panel are present; it is just the strip (probably originally ebonite) and the terminals (for connection to batteries, antenna, headphones etc.) that are missing. This panel would only be visible when viewing the rear of the set. It should not be too difficult for the new owner to make a suitable replacement."

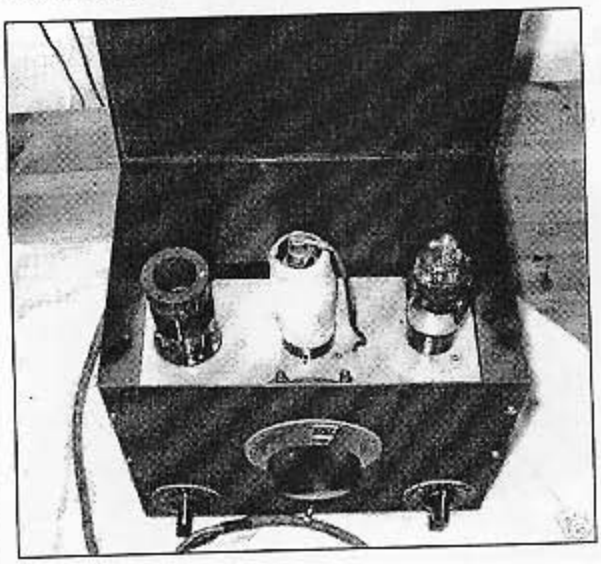
Another vintage Eddystone that came from the same seller, and went under the electronic hammer, was an "All World Two" which was also knocked down to an EUG member for a reasonable price of £323. Again a full description from this vendor:-

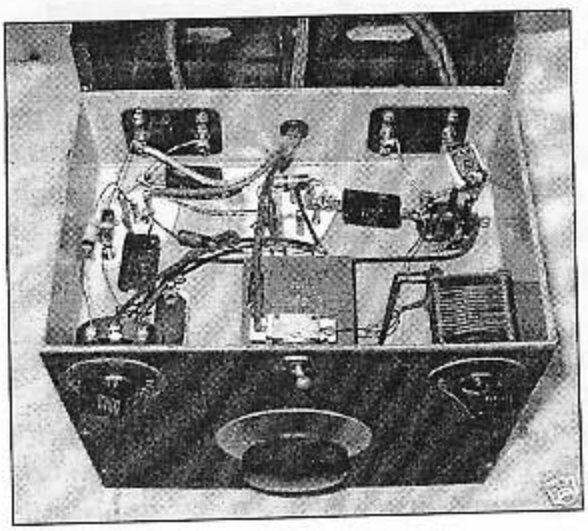
"The Eddystone All World Two was produced in the late 1930's, it is a simple battery (2v LT, 90/120v HT) 0-V-1 short wave receiver. It was designed to be home constructed but was also available ready built (from the standard of construction and the parts used I believe this example was supplied ready built). It was famously used by Voluntary Interceptors during the early years of WW2.



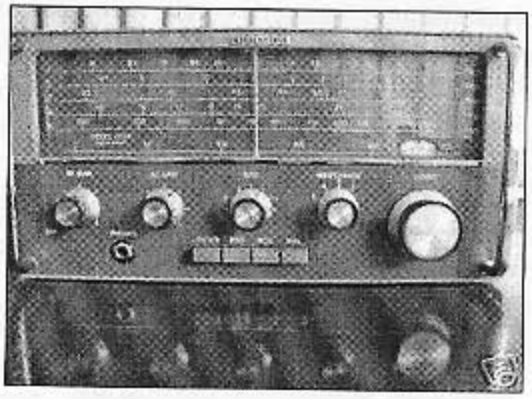
This Eddystone All World Two is complete, original, in working order and in really excellent cosmetic condition. It includes three coils (red, yellow and blue spot), both valves (Mazda SP210 and Osram KT2) and a pair of SG Brown high impedance headphones.

All components appear to be original, authentic and correct, including an almost spotless Eddystone brown crackle/wrinkle (I am never sure which is which) case, diecast chassis, tuning capacitors, (including the special band set one), even the paper block is stamped Eddystone. The braided power cable is undamaged. I suspect that this has had very little use. I have powered it up today and connected to my long wire it works as well as any 0-v-1 set I have used, (that is it works as it should). Also included in the sale (but not shown in the photos) is the original four page instructional leaflet supplied with the set. The only downside that I can see is the 'band-set' knob is slightly loose on the capacitor shaft and the grub-screw will not shift, patience and the application of WD40 or similar should fix that. "



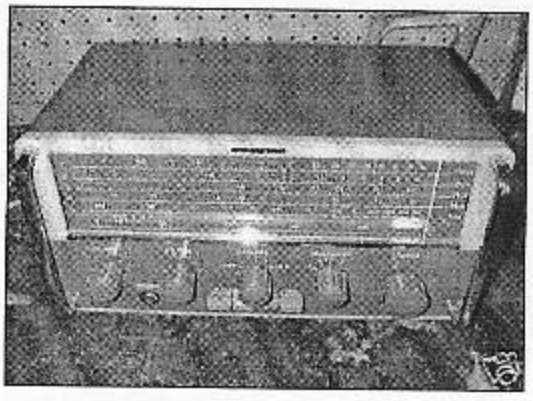


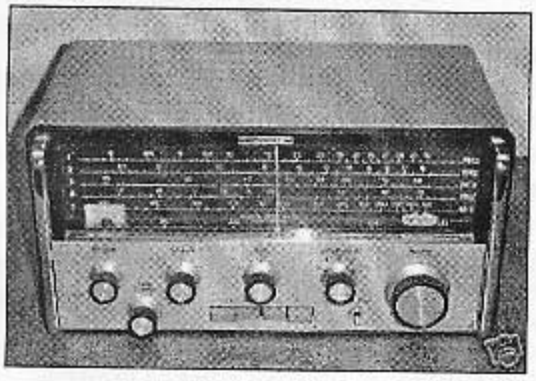
It has also been a month for EC10 sales. Both Mark 1 and Mark 2 have made good prices. This example made £142.→



Strangely enough this was the same price that was obtained for this Mk 1 example

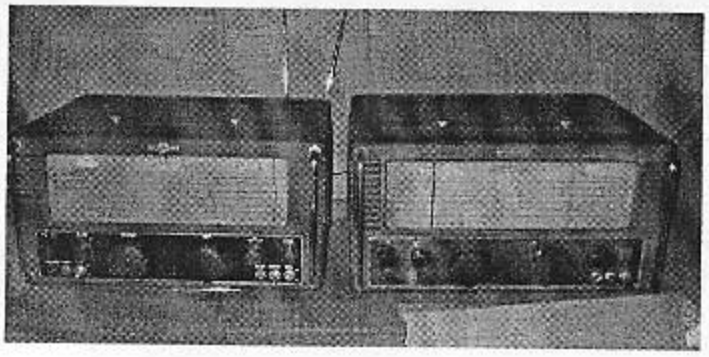
The same vendor only got £57 for a similar set →





← A Mark 2 EC10 went for £107 and this certainly looks to be a very nice example

Sometimes, like policemen, Eddystone's come in pairs. This pair of 770's went for £132 which would seem to be a bargain as both were sold as working. One was a 770U and the other a 770R.



Well that is all for this month. Happy bidding and good E bay watching,

73s Chris GØEYO

E.U.G. Masters' Crossword News

By Colin G4HNH

THE MASTERS' GUIDE (Part 2)

Following on from last month, we continue with our exploration of typical devices used by cryptic (and not so cryptic) crossword compilers.

ANAGRAMS

Suspect that an anagram is involved if the clue uses a word implying movement, irregularity, uncertaintly or disorder. This is known as an anagram indicator. Troubled, chaotic, dancing, perhaps etc. could all be used. EUG crossword No. 26 had the clue "Gunners team up to learn, as mixed up supplies are discovered". "Learn as" is an anagram of "arsenal" which was the answer. We also had the subsidiary parts comprising of "Gunners"(the Arsenal football team) and "supplies" which in this clue would suggest an "arsenal" of ammunition. Here are some further anagrams for you to ponder:

Here come dots = The Morse Code
Moon-starers = Astronomers
Bob Carl inc. = Colin Crabb
A mad growler, me? = Graeme Wormald

DOUBLE DEFINITIONS

This is where two definitions are given for the answer word. The clue may be only two words, as in:
Unnatural dwelling? = Flat
or two phrases as in:
60 per minute? Not so good = Second rate.

CONTAINERS

The answer to one part of a clue may be nested in another part: Make departure in art, in a manner of speaking = Argot (Ar-go-t). Vegetable to stick in the shelter. "To stick" is a definition for "gum", "the shelter" is "lee". "gum" in "lee" gives "legume" which is the answer.

PUNS

These play on words clues are usually single definitions i.e.
He's taking stock = Shoplifter.
Sometimes they can be more complex:
It put Smith, that mighty man, in the shade = Chestnut tree.

REVERSALS

Turn around the word "peek" and you get "keep". This fact can be made the basis for a reversal clue: Have a little look round part of fortification. "Have a little look" = "peek", put "round" i.e. backwards and we get "keep" which is part of a castle.

Now we come to the most important part of Crossword News, the latest results. Here is the solution for EUG Masters' Crossword No. 26:

Across:
1) Junk box baby. 6) Arsenal. 8) Lull. 9) Flamingo. 11) Adieu. 13) On cob. 14) Cogwheel. 16) lamb. 17) Married. 19) Astronomers.
Down:
1) Jar. 2) Kung Fu. 3) Oil can. 4) Balti. 5) Yellow band. 6) Antarctica. (7) Spring. 10) Nuclei. 12) German. 13) Old Ram. 15) Weber. 18) Eis.

We had twenty enties again this time, seven e-mails of which three were correct. Thirteen postal entries of which eleven were correct making a total of fourteen correct entries. Congratulations to the following entrants:

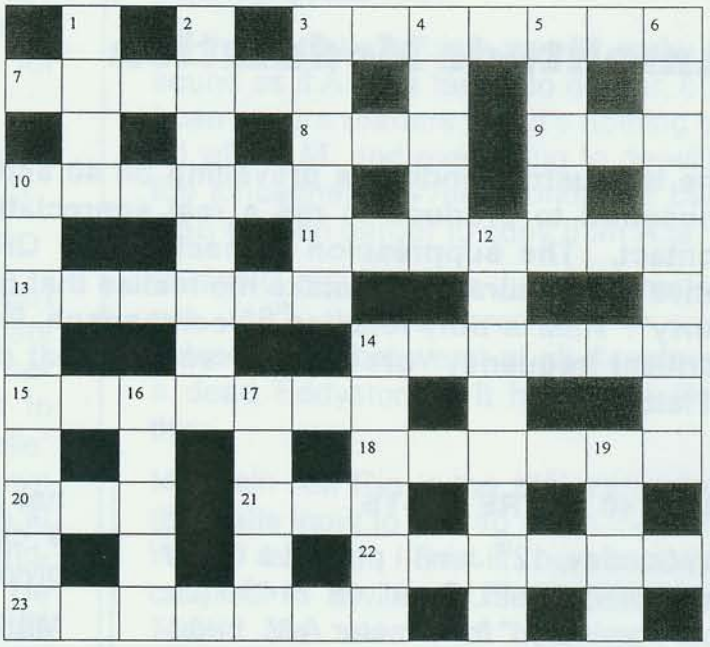
Ted Moore G7AIR of Wisbech (Cambs)
Roger Bracey G4BZI of Crewe (Cheshire)
Tor Marthinsen of Tønsberg, (Norway)
David Skeate G0SKE (location unknown)
E. L. Beamer G4TKY of Lincoln
Oliver Barnes M1DYW of Wivenhoe (Essex)
Keith Seddon of High Peak (Derbys)
Dave Jones M1DUJ of Llanelli (Carm)
Roger Roycroft G1NXV of Macclesfield (Cheshire)
David Fletcher G3TVM of Gt. Shelford (Cambs)
Garry McSweeny Gi4CFQ of Belfast (N.Irl)
Liz Gaskell G0RJX & Richard Gaskell G0REL of Oxford
John St. Leger G3VDL of Okehampton (Devon)
T. Emeney G3RIM of Claygate (Surrey)

More crossword tips and in-depth analysis next time.

Vy 73, Colin G4HNH.

EUG MASTERS CROSSWORD 27

Compiled by Colin G4HNH



ACROSS

3) Re-design sink, put it into orbit as an antique satellite (7)

7) The birdie cheeps, perhaps via the loudspeaker coil (6)

8) Ian Smith's Rhodesian Front declaration of independence of 11th Nov. 1965 (3 abb.)

9) A system of constructing logic ICs using bipolar transistor techniques (3 abb.)

10) Sounds like this atomic particle of small mass was "thrillingly discovered" (6)

11) Have another go (3,4)

13) Computer data archiving media (2,4 pt. abb.)

14) A transducer, meter and potentiometer could all contain this durable alloy (6)

15) Herbaceous Eurasian plant with hooded blue-mauve flowers otherwise known as Monkshood (7)

18) Yes teas, alternatively, could be enjoyed instead of alcohol, brewed with these ingredients (6)

20) Stimulus to perception in the snooker room (3)

21) Circuit that uses the uses the principle of charging a capacitor to the peak signal voltage to operate a clipper (3 abb.)

22) This definition of direct current is simply streets ahead (3-3)

23) Each part of boat is oriental in appearance (7)

DOWN

1) French fencer perhaps (4)

2) Meld now't to discover atomic catastrophe (8)

3) These components are always connected in parallel (6)

4) Number one (5)

5) Uk coastal radio station (5)

10) Georges --------- 1839-82, French engineer and inventor (9)

12) Lay person's reference to the medium of radio transmission (3-5)

14) The former name of Sri Lanka (6)

16) QSO tx periods (5)

17) ----- impedance, that which is measured at the input of a filter network with the output open circuit, or vice versa (5)

19) Resonant tuned circuit designed to reduce the amplitude at one particular frequency (4)

Please send your entry, to arrive not later than 15th. Septemer, direct to:-

Colin Crabb G4HNH
41 West Drive
Edgbaston
Birmingham
B5 7RR

e-mail (no attachments please):-
g4hnh@smartemail.co.uk

Your name.....
(Call sign).....
Address.....
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In Consideration of Amplitude Modulation

Graeme Wormald G3GGL

The lacklustre conditions prevailing on 40 and 80 during recent months have conspired to produce in me a real appreciation of the elegance of an A.M. contact. The suppression of background QRN by the carrier and the pure tones of a natural voice make me realise that SSB is the mode for "people in a hurry". A.M. is truly relaxing by comparison. But we have been plagued by this "critical frequency" problem for so long that enthusiasm has been dampened of late . . .

JUNE 40 METRE TESTS

On Sunday, 12th June I put out a rather protracted CQ-EUG call on 7143 kc/s, the "nominated" forty-meter A.M. frequency. The previous two months' calls on 40 had produced zilch (although we had been heard by listeners in Germany and Orkney). Conditions were unpromising with only a few distant SSBers in faraway places (Croatia?) and I had little hope of raising a UK reply.

Imagine my surprise when EUGer Ron, G8URU, came straight back at 5/9+ as sweet as a nut. I used to work with Ron in the old ITV studios in Birmingham almost 50 years ago but time has passed and I live in Bewdley while Ron lives in the wilds of reaver country on the Scottish boarder; about 200 miles from me as the crow flies. (Reavers, by the way, are border cattle rustlers.)

MODULATION MEASUREMENT

A breaker coming in at only 2 by 2 with me turned out to be Ray GMØKET in Aberdeen. His modulation on the 'scope looked very low, no more than about 20%, but it's not a thing you can discuss at Q2/R2 (R2/S2 in modernspeak).

That's one of the advantages of using the Eddystone professional 730/4; it has a 450 kc/s IF output at 70 ohms on a cathode follower. Very handy for giving objective A.M. reports.

MILITARY PRESENCE

Another breaker at 5/9+20dB was Dave, G8YFH in Olton, Hants, using a WS19 set with the "High Power" linear strapped on. This consists of four 807s in parallel Class 'A' and gives every ounce of 12 watts to Dave's dipole. 20dB over the nine from the topside of 100 miles away! It looked as if the "critical frequency" had graced us with its presence on forty metres at last.

Ted G3PNU in Seascale, Cumberland, nearly as far away as Ron, rolled in at 5/9 and then a tiny little signal running at 1 by 2 with me turned out to be EUGer John, G8UNZ, in Essex. I later discovered that he was using a modified CB vertical aerial! Vertical aerials, of course, don't send vertical signals to the ionosphere, so there's no NVIS coming back. I suspect John's signal may actually have been ground wave. A bit far at 100+ miles, but not impossible.

But nothing else; the band was empty! Looks as if hams are giving up the ghost until the sun settles down.

80 METRE TESTS

Sunday the 18th June was our "third

Sunday" A.M. test net on 80 metres. As soon as I made the first call I was serenaded by the phantom music station which hunts around 3625 for A.M. stations and joins them. Sad.

3615 kc/s had the regular "boatanchor" A.M. group, so I moved down to 3606.

OUT WITH THE TIDE

Ted, still recovering from his heart attack and waiting for further surgery (recovering well; see reports elsewhere) had gone down the road to operate /MM from his yacht "Esselle" moored in Wisbech Marina, just down the road from his QTH. He called in at a near-marginal 4/7 with hissy band-noise not much lower in strength. He slowly went down as the minutes ticked by. The tide was going out and he was behind the quay-wall.

By the way; how many of you have noticed that the rather esoteric title with which Ted re-named his yacht is a pronounceable acronym of the initials of the founder of Eddystone Radio and Managing Director of Stratton & Co., Stratton Laughton?

In the meantime Ron, G8URU, up by Hadrian's Wall, called in at 5/7 but wobbled about quite a lot. He was followed by Roger G7JAQ from Purley near Croydon with a steady readable 5/6.

We closed at 9.49 am local after a very scratchy roundup and monitoring checks on UK-SSB stations on the band showed violent variations in strength. The stations remaining were nearly all French. It looks like eighty was as touchy as forty had been in previous months.

An e-mail from Ian GM3OZJ in the Kingdom of Fife (about 300 miles north of Bewdley) reported hearing nothing from anybody, and EUGer Graham Sutton in Uttoxeter, Staffs, about forty miles north of me heard the first five minutes of activity before a complete blackout descended.

All these discouraging reports make it sound as if A.M. is failing to deliver, but I can assure readers that it's nothing to do with A.M. and everything to do with the ionosphere! When condx are bad SSB is often harder to copy than A.M.

COMING NOW to the July forty-metre net (10th, to be precise), I was subjected to that worst of all disasters; a dead Eddystone. It happened like this:

My main AM Rig is the KW Vanguard (60 watts input to a 6146 on all the pre-WARC bands). This is 'permanently' coupled to my very nice Eddystone 730/4, the set which replaced the R.106 (H.R.O.) and R.107 in British Army service in the late 1950s.

It was the second Eddystone I ever acquired, long before I had the faintest idea of what was inside it. It was a happy choice at the time.

But like all 'free-running' valve sets they take a while to settle down from a thermal point of view. In fact in professional use they were never switched off. So it's my habit to switch on both Rx and Tx early the evening before an AM session.

At about 8 pm on the Saturday I fired up the station, waited ten minutes and netted up on 7143. I must confess to cheating here. My trusty BC221 was retired to the loft some years ago and I use the Trio TS-530 as a heterodyne wavemeter.

Happy that the aerial systems were set and tuned up to forty I busied myself with EUG clerical duties (a bit boring but essential to keep us going). As the witching hour drew near I pushed the books aside and returned to the shack to check the gear.

The Vanguard was humming away happily to itself but the Eddystone was

not only silent, it was dead and stone cold! Now I'm not a person given to panic but it was obvious that instant action was needed if I were to be present and correct on forty the next morning.

Some operators (such as our Founder, Ted) are capable of rising in the middle of the night (5 am) and doing a day's work before breakfast. I don't include myself among this happy breed. In fact I'm not ready to do a day's work until lunchtime. I make an effort for the EUG Nets.

So first of all the wayward 730/4 was unharnessed from the rest of the gear. And then the trouble began. The set lives on a shelf two feet above the operating desk and weighs something over half a hundredweight.

Imperial, that is; not American.

Just imagine drawing the set forward by those two great chromium-plated handles *and holding the set horizontal as it comes away from the shelf.* No way, Jose!

What do I usually do?, you might enquire. I organise a working party of young people, that's what. But not at midnight on a Saturday without any warning.

I ended up on a step-stool, kneeling on the desk and hugging the 730 like a baby. A baby elephant, that is.

I then realised that I couldn't see backwards to put my feet down nor was there room to park the 730 on the desk. Somehow or other I just slid backwards onto the floor and upended the 730 in a corner. It's still there.

The choice of a replacement wasn't difficult. Sitting on the windowsill, harnessed to the Junk-Box Baby was my new-at-Xmas Eddystone 888A. About half the weight of the 730. It was up and running in ten minutes. I slept well that night.

When I rose bleary-eyed at 8 a.m. I found the 888A had drifted 3 kc/s from stone cold overnight. I think that's good.

The band was in a very quiet state, both activity-wise and QRN-wise.

I called for 20 minutes and had no response. Neither could I hear any other station in the 'new' part of the band. In the 'old' part of the band I could hear eastern Europeans working UK stations, but not a squeak from UK. Later in the day I had a phone call from Ron G8URU on the Scottish border, about 200 miles north.

He heard absolutely nothing on 7143 kc/s. Then I had a call from SWL Duncan in Ostoft (Orkney Isles, about 500 miles north.) He was hearing me OK at 5/8 with some QSB. Mmmm. Long skip or what!

NEW VALVES FOR OLD.

Looking back now to the "Junk-Box Baby", homebrew AM Tx described in our April Issue. When I was seeking a PA valve, the original choice was that old forties favourite the Marconi-Osram TT11, better known as the VT501. ("Valve, Transmitting", the original Air Ministry reference). The TT11 was a small octal-based RF beam tetrode with a top-cap anode.

Hams of the great ex-WD era called it the 'miniature 807', not without some justification.

Its most common use was in the PA of the RAF's first successful airborne VHF R/T, the TR1143A. This used a couple in push-pull over the frequency range 100-124 Mc/s (or thereabouts). My first rig of 1949 used a pair on 40 metres and I knew I still had one in the junk-box. It took me about ten minutes to locate it and slapped it into the AVO VCM. Zilch. It had no emission whatever! That's why the original J-B Baby used a 6V6GT.

The other week I had a call from John, G8UNZ, down Essex way. He'd been to a local rally and discovered our old friend John Birkett of Lincoln selling them for £1.50 apiece (01522 520767). Not bad when you allow for inflation.

By the end of the week I'd done a transplant on the Baby and the TT11 works fine. I know I'm being a bit pedantic but it's nice to use valves in the job for which they were designed! (Although it makes a good job of it, the 6V6 was never actually designed as an H.F. amplifier; the TT11 was.)

CRYSTAL RECOVERY

After reading about my unfortunate experience with a Pierce oscillator circuit and an HC6/U crystal, an EUG member has taken pity on me.

Readers will recall that this circuit, although technically simple, works the crystal hard in terms of current flow. My 3615 kc/s xtal took a turn for the worse whilst under test and suddenly jumped to 3625 kc/s.

This is an alternative nominated AM frequency, but I already have one!

Gerald, G3MCK, a CW buff from way back, sent me a 10X crystal which he had re-ground for 3615 kc/s. This not only gives me the second nominated AM channel but gives it me in a decent holder which I can use to continue my Pierce oscillator experiments.

Way back in the 1960's, which was the last time I did any xtal grinding, I built a transistorised xtal activity meter in a 2" x 4" x 1" die-cast box. (You can guess whose.) It has served me well for 40 years, but what I'm getting round to saying is that I've never seen a 10X xtal with such great 'activity' as Gerald's. It actually end-stops, which very few brand-new gold-plated ones do.

I wonder how many of you recall the origin of the "10X" crystal . . . ?

It goes back to the 1930's when the R.A.F. started to use crystal control on their fighters. I think the TR9D transmitter-receiver was the first widely-used HF radio-telephone, operating around 5-7 Mc/s. It had a single channel Tx with 2-volt battery valves and a Pierce xtal oscillator (sounds familiar?). It also had a 6-valve TRF receiver.

R.A.F. stores numbering in those days was based on a number (one or two digits) followed by a letter, then an oblique stroke and four numbers. *(The 'oblique stroke' is commonly referred to nowadays by the ugly term 'forward slash', which sounds like the word of command for 'urinate'.)*

The first number signified the generic group. For instance "22" was flight instruments, "10" was wireless equipment, etc. The letter was sequential, as were the numbers following. I have an example on the bench beside me.

It's a flying lead ¼" jack socket bearing the legend "10H/7318. It leads to the back of my (defunct) 730/4 to connect it to the round speaker.

But when they got to numbering the quartz crystals the chief equipment officer had a stroke of genius. The reference number was "10" (for wireless), "X" for xtal, followed by the frequency in kilocycles.

Hence 10X/3695 would be the EUG 80 metre calling frequency. You'd never forget it and to this day a 10X crystal is a ¾" pin-spaced xtal in a flat slab disassemblable holder about 1.6" x 1.4" x 0.7" *(Although some hermetically sealed ones were made in the 1960s)*

I think it's time I had a go at re-grinding some of the old 10X xtals which lurk at the bottom of my many junk boxes. I wonder if there's a quicker way than using jewellers' rouge on plate glass?

♠

PATENT SPECIFICATION

Application Date: Jan. 23, 1936. No. 2116/36.
Complete Specification Left: Nov. 16, 1936.
Complete Specification Accepted: May 11, 1937.

PROVISIONAL SPECIFICATION

Improvements in and relating to Variable Electrical Condensers

We, STRATTON AND COMPANY LIMITED, a British Company of Balmoral Works, Bromsgrove Street, Birmingham, and GEORGE STRATTON LAUGHTON, British Subject of the Company's address, do hereby declare the nature of this invention to be as follows : -

The invention relates to improvements in the construction and arrangement of variable electric condensers more particularly those for use in connection with wireless circuits.

The use of rotatable bladed condensers in wireless circuits is well known and it has been found that if a single variable condenser of large capacity is used in a circuit small variations on the setting of the condenser may make a considerable variation in the tuning of the circuit; this is especially the case in short wave wireless apparatus.

Thus it is often difficult to separate two stations having only a small difference in wave length. An attempt has been made to overcome this by providing the condenser with two adjusting means, one giving rapid adjustment and the other fine adjustment.

According to the invention we provide a large variable condenser capable of being set at a number of predetermined positions.

This is used with a small variable condenser large enough to give a total variation in capacity substantially equal to that between two adjacent positions of a large condenser. Thus supposing the steps between the predetermined positions of the large condenser represent units of capacity, then the maximum variation in capacity of the small condenser would be only slightly greater than one unit.

According to a further aspect of the invention a convenient method of positively locating the large condenser in a number of predetermined positions is by mounting on the condenser spindle a disc provided with a number of holes or indentations which co-operate with a ball or other detent. The disc or the detent being so arranged that there shall be a certain amount of resiliency between them.

In a particular construction the main or tank condenser consists of a rotary variable condenser similar to those usually employed and having a number of fixed blades and a number of intermediate semi-circular

465,634 COMPLETE SPECIFICATION 1 SHEET

Fig. 1

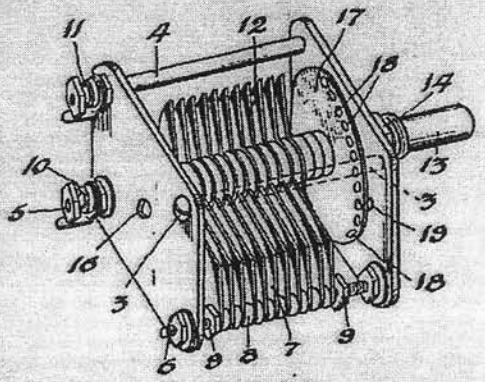
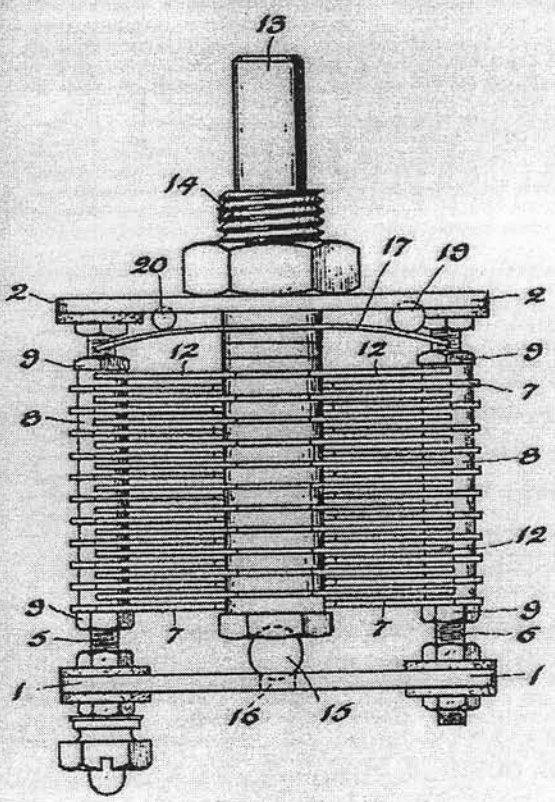


Fig. 2



[This Drawing is a reproduction of the Original on a reduced scale.]

Malby & Sons, Photo-Lith.

blades carried on a spindle rotatable by means of a knob. It differs however, from the known constructions in that mounted on the spindle is a circular disc made of resilient metal and provided with a number of holes. These holes are arranged around part of the circumference of a circle which is concentric with the spindle.

A steel ball, which is soldered or otherwise fixed to a plate that forms part of the frame or supporting members of the condenser, is arranged to co-operate with the holes in the disc. So that as the moving blades are rotated, this ball which tends to flex the disc will enter the holes and form a series of stops or detents to locate the blades in predetermined relative positions. The first hole locates the blades in the position of maximum capacity and the last hole locates them in the minimum position.

The intermediate holes are arranged to give equal steps of capacity between these two extremes. A second and smaller ball is arranged diametrically opposite the first ball in a position where it will not enter the holes but will ride on the disc and provide a thrust to balance the thrust of the large ball and prevent it warping or inclining the disc.

In use, the improved positive step tank condenser is used in conjunction with what is frequently called a band spreading condenser; for example a smaller single blade or other convenient variable condenser giving a total range of variation in capacity slightly greater than one of the steps of the tank condenser. In tuning the circuit the tank condenser would be set in one of its predetermined positions and the tuning effected by the smaller condenser. If there was still insufficient capacity in the circuit the tank condenser would be rotated into its next predetermined position and the tuning adjusted by means of the smaller condenser.

An advantage of the invention is that a fairly large movement of the small condenser will be necessary to effect small changes in tuning and this will assist the operator in obtaining a correctly tuned circuit and with separate stations which would appear to be so close in wavelength as to be on top of one another if the tuning was adjusted as is usual at the present time by means of a large variable condenser.

An advantage of the preferred construction is that the ball co-operating with the resilient disc forms a simple and effective way of locating the movable blades of the tank condenser in a number of predetermined positions.

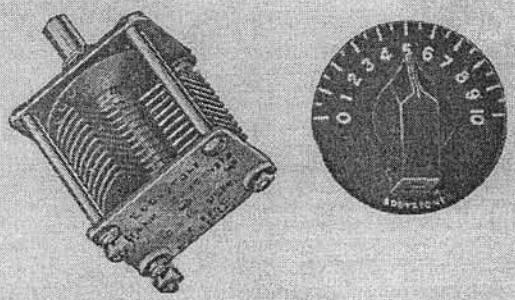
Dated this 22nd day of January, 1936. BARKER, BRETTELL & DUNCAN, Chartered Patent Agents. 75 & 77, Colmore Row, Birmingham, 3.

♠

6

EDDYSTONE

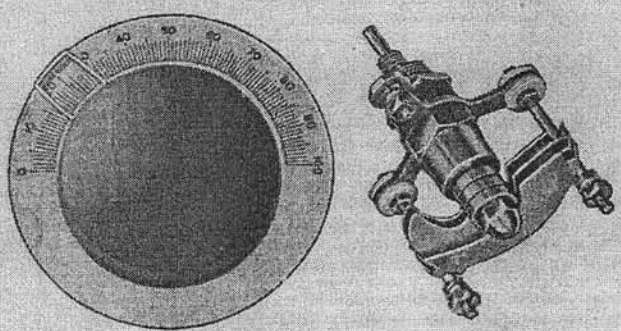
Bandspread Tuning Outfit



PAT. PENDING.

Tank Unit. No. 1042. PRICE 6/-
Code TANKT.

The "EDDYSTONE" bandspread method of short wave tuning is devised to simplify station selection. Two Condensers are used, the first or Tank Condenser being a compact Air Dielectric unit having a capacity range of 10 × 14 m.mfd. This is achieved with a patented stop device graduated in 10 steps. Each step covers a capacity of 14 m.mfd, band settings being accurately pre-determined and controlled by a black bakelite switch knob moving over a metal dial plate graduated 0-10.



Bandspread Unit. No. 1043. PRICE 6/6
Code TRIMT.

Parallel with the Tank capacity, the "EDDYSTONE" bandspread slow motion trimmer having 9-1 reduction ratio is used. It has a capacity range slightly greater than each separate step of the Tank Condenser. This enables each 10th section of the whole to be spread over 180°, and provides a tuning ratio of 90-1. It gives a definite advantage in short wave tuning, in that a fairly large movement of the bandspread condenser is necessary to effect small changes in tuning, thus separating stations which with generally accepted tuning circuits appear too close to one another to allow clear separation. The trimmer is absolutely noiseless in operation and has a smooth positive control action.

Advertisement for the Patent Eddystone click-stop bandspread system from the component catalogue of 1938. So far as I can tell it was never produced after WW2 and its main occurrence is in the "All World Two" of 1936-1940. This was the company's most prolific model of the period, being variously priced at £3.10s. to £5.10s., available on easy terms, which made it the only Eddystone receiver available to most enthusiasts.

The band-set, or "tank" unit is a linear capacity tuning condenser of 140 pf.. It click-stops, like a Yaxley switch in ten divisions. Each division is then covered by the fine-tuning bandspread unit of approx. 15 pf. Unfortunately this was not linear and would make for a rather odd bandspread characteristic. However, it gave an easily re-settable tuning system of 1,000 divisions for each plug-in coil; unique in a simple receiver of such modest cost. Stratton's wisely patented this unique system and the details are given following this review.

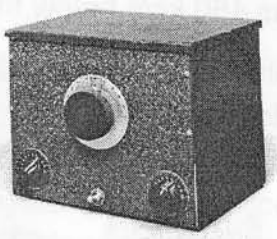
Graeme Wormald G3GGL

The Eddystone "All World Two" receiver of 1936-40 was the only model to make wide use of the patented bandspread tuning outfit. Its performance was greater than the very simple circuit would suggest and it was used to monitor German military nets.

Eddystone and the Secret Service

By Graeme Wormald G3GGL

The forerunner of the Government Communications Headquarters (GCHQ) was created in 1909 when the Administration formed the Code and Cipher School employing 25 cryptologists. The First World War saw the entrenchment of code-breakers in defence policy and by the late 1930s "Station X" was created in the form of Bletchley Park, a huge Victorian pile in Buckinghamshire, 40 miles north-west of London.



This was fed with coded signals garnered from the growing German war machine by the secretly formed Y-Service of military monitors. The first recorded Eddystone connection with this world of espionage was the use of the 'baby' "All World Two", introduced in 1936 and still being sold by Stratton in 1940. It was the only effective set available to many of the 'Voluntary Interceptors', civilian monitors recruited from the hobbies world of SWLs and licensed hams.

The result of all this activity was the breaking of the German's "Enigma" machine-generated code. It also resulted in the creation of the world's first electronic computer "Colossus" by the electronic boffins of Manchester University.

In 1946 GCHQ was created in Gloucestershire to replace "Station X" and was the hub of listening activities employing 6000 experts stationed across the world in listening stations in far-flung outposts of the old Empire. No sooner had world peace been declared following WW2 than the cold war came thundering down Red Square. GCHQ was not short of work.

No decrypted documents have ever been published and the activities of GCHQ remain as secret as ever.

Ever since Stratton started to produce serious professional radio receivers which, in my opinion commenced with the Model 750 in 1949 (although many will differ and say the 680), secret government agencies had been hovering round the Bath Tub.

By the very nature of their work little has come to light about the use of these sets. Stratton employees engaged in such work signed the Official Secrets Act and have been

naturally reticent about their work.

One of the interesting characteristics of the Eddystone wartime model 358 (and its variants) shared with its transatlantic cousin, the National HRO (as well as plug-in coils) was the tendency for the local oscillator to behave as a QRP transmitter.

This meant that (a) the enemy could detect your presence, and (b) they knew the channel you were working. It was 450 kc/s below the local oscillator!

This resulted in the hastily-acquired Eddystone sets being banned from Royal Navy warships early in WW2 and being replaced by the better-screened Marconi CR100s.

It probably explains why 358s survived in the ex-government surplus market. They only had a production run of 5,000 (or 10,000, depending on who you believe) compared with over 2 million army WS19 sets.

Fortunately, in mainland Britain, there were no enemy agents remaining by 1940, they had all been 'turned' or executed. So some local oscillator radiation drifting around the countryside was of minor importance.

In the 1950s, however, the cold war was at its peak and the land was awash with Soviet advisors and fellow-travellers. It was essential that GCHQ used receivers with no tell-tail radiation. Stratton and Company was alerted to the task.

At this point let me tell you a little tale that highlights official paranoia, or vigilance, depending on one's outlook.

My inseparable school chum, Tony Mountford, shared all my interests in things radio and aeronautical. We were called up for RAF National Service together in 1950, just after the outbreak of the Korean War.

Clement Atlee's Labour Government thought it was the start of WW3 (and they weren't the only ones). RAF training of aircrew since 1945 had been much reduced and a great increase was ordered. Tony, being the brains of our duo, was selected for training as a navigator, which he successfully completed.

On release to civilian life he joined the staff of the Royal Aircraft Establishment (R.A.E.) at Farnborough as a Scientific Officer. He would never tell me what he did but by putting two and two together I made six and realised that he was working on guided missile research. A lot of it in the field and overseas.

In 1977 he finally took out his ham ticket (G4GGQ) and the day after it arrived he had a home visit from Military Intelligence. I don't know which suffix it carried (MI5 or 6 or whatever) but it's irrelevant in this context.

The basis of their visit was this: under no circumstances was he ever to make contact with any of the many amateur callsigns emanating from the USSR on the DX bands. So far as MI was concerned there were no such things as hams in Russia, they were all intelligence-gathering agents. Honest!

They went on to illustrate their concern

by telling him the story of an honest English plumber who just happened to live in a house opposite the main gates of the R.A.E. He had received an unsolicited letter explaining that his name had come up in a draw organised by Aeroflot (the Soviet State airline). The prize was to be an all-expenses-paid holiday by the Black Sea.

No, it wasn't the "Readers' Digest" in disguise, it was the real thing and our plumber went for it. Who wouldn't?

No sooner had he and his family arrived on Soviet soil than they were surrounded by a bevy of 'minders', full of bonhomie and with plenty of vodka to spare. Friendships were made and goodies promised.

When the plumber arrived home he also received a house call from Military Intelligence, who had monitored his stroke of good fortune. He was ordered to report at once should any follow-up contact be made by his Russian hosts. And of course there were. They wanted to see what was passing through the gates at the R.A.E.!

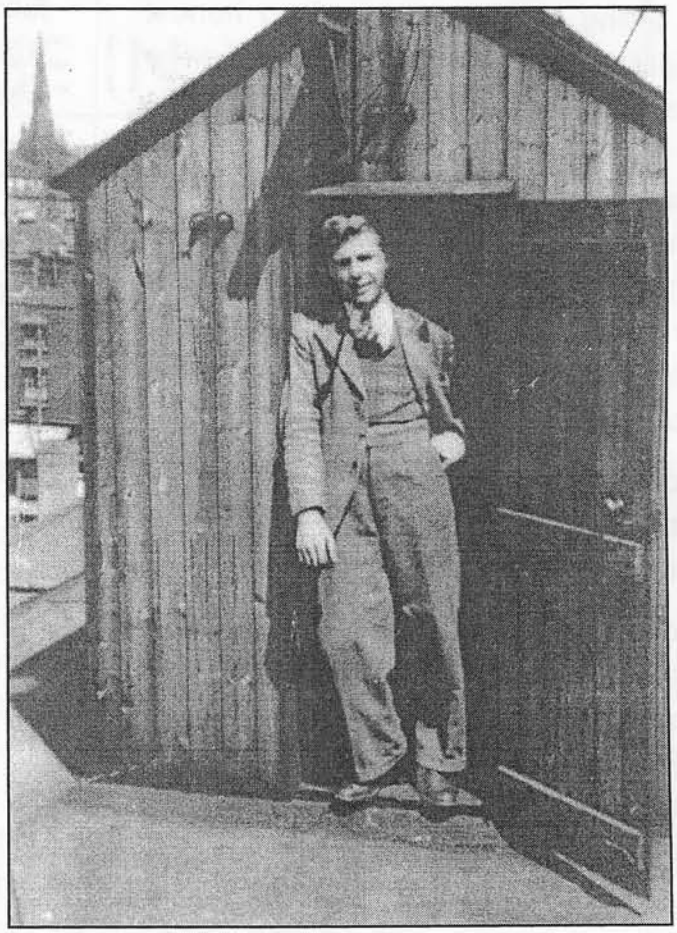
Far-fetched? Possibly, but it's what happened to my old friend (now, sadly, SK). It was in this political climate that Eddystone developed the mighty 880-series of high-stability valve receivers in the late 1950s. *(Shown below).*

Thirty bands covering 500 kc/s to 30.5 Mc/s, each one having a tuneable one megacycle width. It was a double-superhet with crystal-controlled first local oscillator and oscillator radiation undetectable outside the room in which it was operating. It was rock-steady and calibrated every one kc/s. Not bad for almost 50 years ago.

It was the start of a thirty-year co-operation between Eddystone and GCHQ . . . and who knows what else?

♠

A Room with a View



Bill Cooke, GWØION, joined the Eddystone radio division of Stratton & Co (fancy goods manufacturers) as a technical apprentice in 1935.

He became chief engineer in 1947 and retired as Chairman in 1986. He now describes for us the curious history of "a room with a view".

"Eddystone radio became famous in the early 'thirties for their successful range of short-wave radios, aimed at the expatriate Brits working in the far-flung corners of the Commonwealth. The BBC inaugurated the Empire Service from Daventry in 1932 and the race was on.

"Shortly after I joined the Company the technical director, Harold Cox, became interested in the new "Ultra Short Waves" (U.S.W.) as they used to call V.H.F. in those days. It was quite normal for firms to have "amateur" call-signs and Stratton's held the callsign G6SL *(Stratton Laughton)* after the eponymous founder of the Eddystone radio division of this old-established family business.

"The attraction of "U.S.W." held a great pull for many of the staff, several of whom were licensed in their own right. In those days "trial and error" played a big part in radio research and it soon became necessary to consider an arrangement to get a five-metre aerial as high as possible on the roof of Balmoral Works, the home of Eddystone in the wholesale markets district of the City of Birmingham.

"As the short-wave laboratories were on a lower floor it was decided to erect a garden shed on the flat roof of Balmoral works and mount a vertical dipole upon it, thus reducing feeder losses; always a problem at V.H.F.

"This happened in about 1935 and I spent a great deal of my pre-war working life ensconced in this technical garret. You can see me above taking a lunchtime breather in the doorway of our 'mini-laboratory'. The spire of

Birmingham's most famous church, Saint Martin's in the Bullring, is clearly visible in the top left corner.

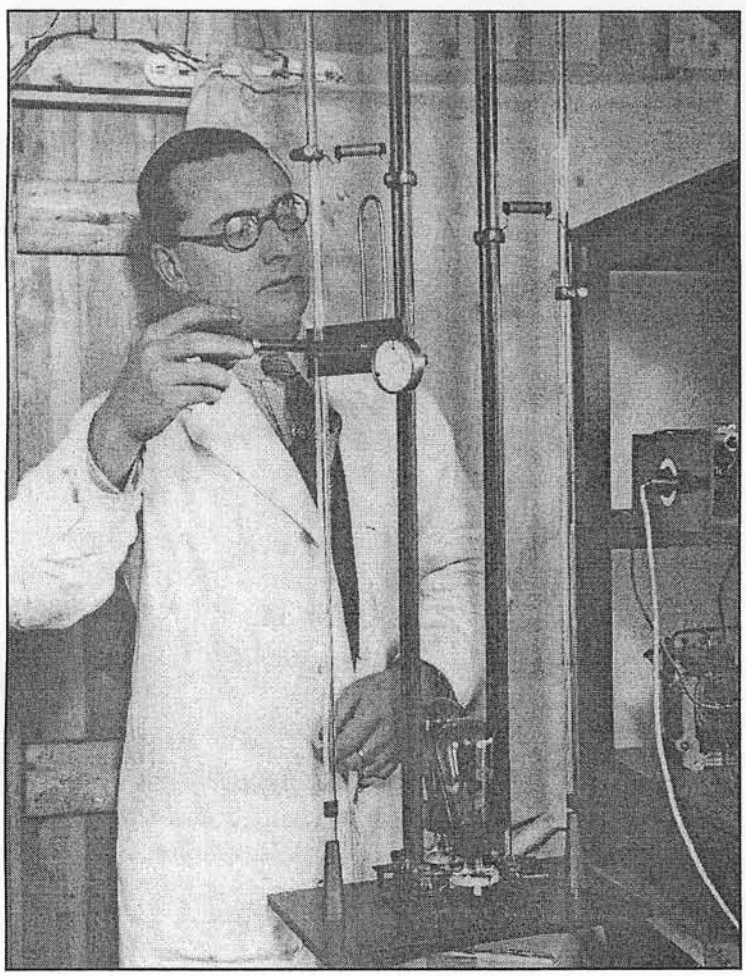
"Access to this laboratory was via a trap-door and ladder in the machine-shop below. This exercise was accompanied by no little risk as all the drills, lathes, shapers and suchlike were driven by belts and overhead shafts, driven in turn by a large electric motor. Once this was started up at eight in the morning it didn't cease until clocking off time. Needless to say, all of us due to work in the lab arrived well before eight a.m.

HAROLD COX

"One day Harold Cox decided to visit the lab during working hours. After a hair-raising scramble up the ladder, dodging the whirling belts, he tripped as he came through the trap-door. He was saved from rolling off the roof at the last moment by Jack Shrimpton. Jack had originally joined the company as a carpenter but had become the general handyman and maintenance technician of our "room with a view" and had been up there checking a leak in the roof. A rather close-run thing.

"A sun-spot peak occurred during 1936-37 and G6SL was often activated on 56 Mc/s during Sunday afternoons, with requests in the "Wireless World" for reports to be made by successful listeners.

"George Brown, G5BJ, was very keen on VHF development and constructed a powerful Lecher Line transmitter for the band. You can see him in this picture (left) tuning up on five metres in our rooftop laboratory. The inside of the shed door is quite clearly seen on the left but with a sheet pinned up on the right! George later left Eddystone to join Birmingham City Police as their radio chief. *(Eddystone, of course, equipped most city police forces with VHF radio telephones by the time WW2 broke out.)*



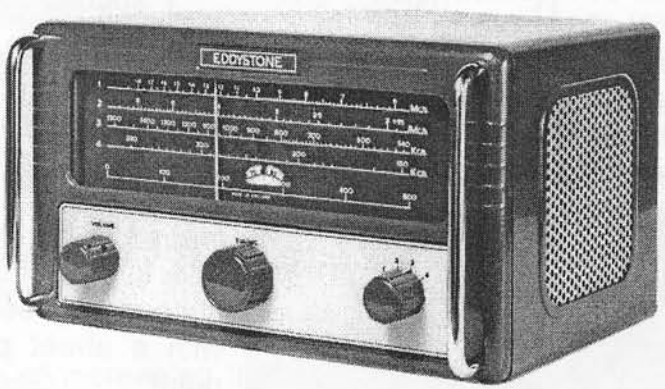
"It was during this period that reports are said to have reached Stratton's of reception of G6SL on five metres in the USA. (a band shared with American hams at the time.) I suspect that such reports would have been a world record for this high frequency (and would still be) but new VHF records were being broken almost daily at this time, and I suspect this one never did get a proper QSL."

♠

The Eddystone 870 and the 19AQ5 valve.

By Peter Lankshear

In the last issue of Lighthouse (Issue 91) Ross Paton laments the use of the relatively rare 19AQ5 in the output stage of the Eddystone 870, rather than the more common 35 and 50 volt heater types that were used in literally millions of small transformerless American radios. This is a classic instance where with Stratton's engineering it is more enlightening to ask "Why did they?" rather than "Why didn't they?" If one delves far enough, it is generally possible to find a reason for Eddystone's designers having done things in a particular way.



They had good reasons for choosing the 19AQ5, but first, a bit of background regarding transformerless receivers. By the late 1920's indirectly heated valves had been developed, enabling A.C. mains operation to do away with messy and expensive batteries. D.C. mains supplies presented some problems however.

Whilst the voltages could be suitable for high tension, they were not so for valve heaters with their low voltage, high current requirements. The solution was, of course, series operation but this was still impractical with 4.0volt 1.0 ampere heaters used in English and European valves because, with a 240 volt mains supply, regardless of the number of valves, the filament line would have consumed 240 watts. The American 6.3 volt 0.3 ampere range of valves was more practical, especially with 110 volt mains supplies which only needed to supply a much more reasonable 33 watts, whilst operation from 240 volts meant a consumption of 80 watts. England and Europe did develop suitable valves, but I will stay with the U.S. series.

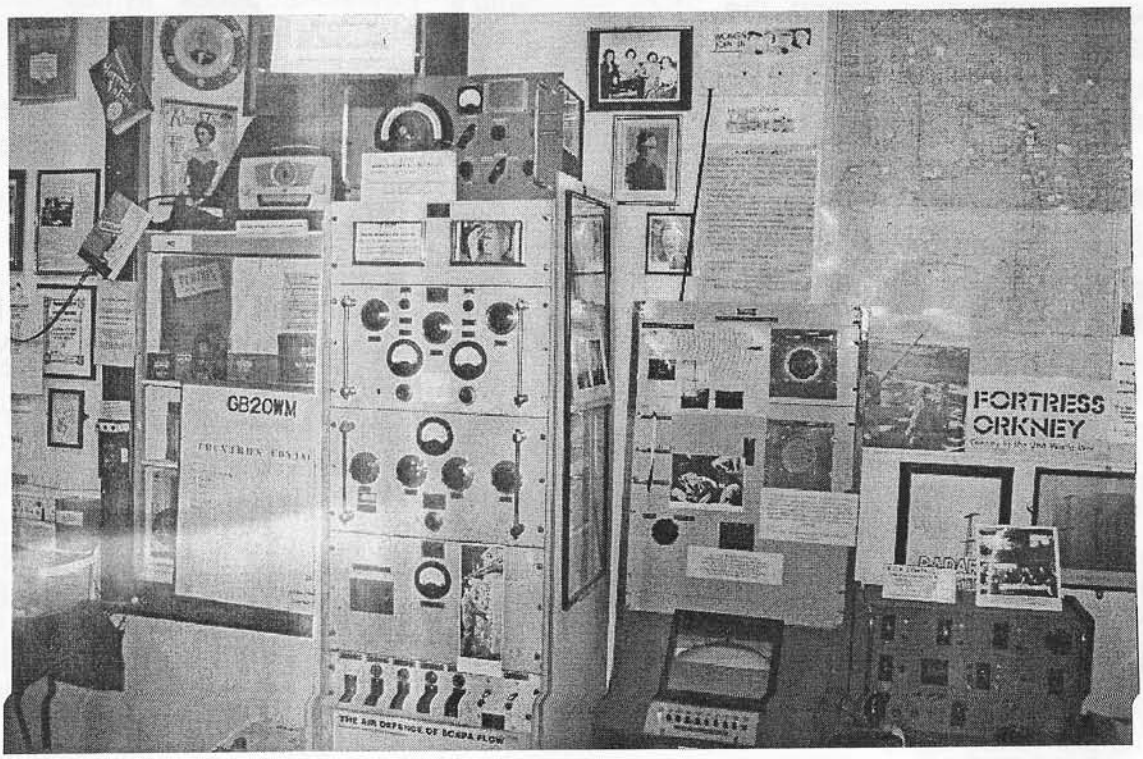
Whereas smaller valves had 1.9 watt heaters, (6.3 volts at 0.3 Amperes), output valves and rectifiers needed larger cathodes and more power to heat them. The obvious solution for

A Visit to Orkney Wireless Museum

By Chris Pettitt, GØEYO

June's RadCom featured some of our Wireless Museums and one that caught my eye was the Orkney Wireless Museum in Kirkwall. This was a stop on a holiday cruise that that Wendy and I were taking in June.

In fact the RadCom feature was about International Museums Weekend which was to take place on 18/19th June at the very time our ship stopped in the Orkneys for a day. Such a combination of circumstances could only result in one thing, a visit to the museum in question. Harry Bloomfield's (M1BYT) RadCom article gives a good description of the museum and its history but I thought readers might be interested in my own experiences.



The Orkney Wireless Museum was founded in April 1983 by the late Jim MacDonald (GM8BFG) after a lifetime passion working with and collecting all things, electric.

Unfortunately, Jim died in 1988 before he could enjoy the fruits of his work in retirement.

these valves was to increase the heater wattage by raising its voltage and suitable valves with 12.6 volt 0.3A heaters were soon developed. Thus in a typical 5 valve receiver, the three early stages needed 19 volts, and the rectifier and power amplifier another 25 volts, a total of 44 volts.. It was recommended practice to allow a margin for mains variations by designing for 120 volts, leaving about 75 volts to be dissipated in a resistor.

To reduce the heating in the cabinet, it was common practice to incorporate this resistor in the power cord. This was fine although the warm cable could cause the uninitiated some concern, and there were disasters when attempts were made to shorten the cable! Before long the voltages of rectifier and output valve heater voltages were increased further, a popular combination being the 25Z5 rectifier and 25A6 output. By now, iron wire ballast resistors were often being used to regulate the filament current and "soak up" some of the excess voltage.

Of course, still better efficiency could be achieved by halving the heater current and by 1940, valves with 150 ma heaters intended for series operation were available. The voltage amplifiers operated at 12.6 volts and output valves and rectifiers 35 or 50 volts.

The 19AQ5 seems to have been an orphan in that it needed only 40% of the filament voltage of the 50C5 and 50B5 pentodes, – but why only 19 volts? The popular 6V6 and its later miniature alter ego, the 6AQ5, were very successful and efficient beam pentodes and required only 6.3volts at .45 amperes, or 2.84 watts, to heat them.

Translate that into a 150ma version and we have a proven type of valve needing only 19 volts to light it. (6.3 x 0.45 = 2.84). (2.84 / 0.15 = 18.9).

Three valves at 12.6 volts, plus a pair of 35 volt valves, noted by Ross as being a popular combination added up to just over 108 volts. He has quite reasonably asked why Strattons did not use this combination incorporating one of the readily available higher voltage output pentodes. The answer is in the intended purpose of the 870.

It was transformerless because it was required to work from DC supplies. It was NOT a cheap and cheerful economy AC/DC set for the kitchen or bedroom. Rather it had an exacting specification with all wave coverage up to 25 mHz.

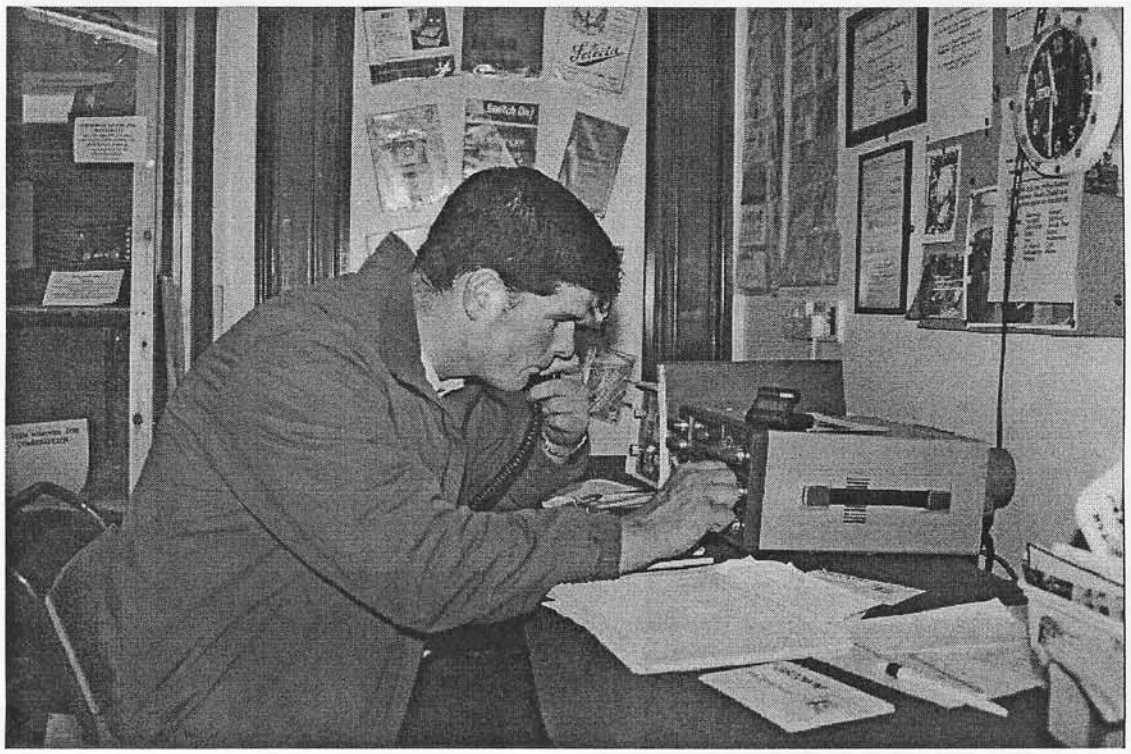
This needed reasonably accurate voltages, preferably regulated, but a prime requirement was operation from ship's power supplies which were notoriously poorly regulated and often well short of 110 volts. Furthermore there was the voltage drop in the mains R.F. chokes and an Eddystone dial needs a pair of lamps, bringing us back to 120 volts when used with a 35 volt output pentode.

With a guaranteed 110 volt supply the 870 could have got by with a 35 volt output stage, except that Strattons wisely included a thermistor to act as a mains voltage regulator, adding a further 18 volts to the filament line. (Add this to 19 volts for a 19AQ5 and we have a figure close to 35 volts.) Had the 19AQ5 not been available, there would have been a problem.

Ross's 870 would not work very well with a 50 volt output valve, but he could use a 35B5 and compensate for the extra voltage required by changing his 230 volt mains input to the 210 volt tap. However, I understand that the 19AQ5 is still available from English suppliers, and to obtain one would still be the best solution. ♠

The museum is in one large room of what I think was formerly a double-fronted shop on the harbour front. It is jammed packed with items both broadcasting and communications all of which have a link with the island.

I didn't notice any Eddystones on display and the chap on the door was vague as to whether they actually had any, however I can't imagine any museum of wireless that did not have one or two so let's assume that they were in store somewhere.



Orkney's wartime history is strongly represented because unbeknown to the public it formed part of an intense communications network involving radio and telephone communications which was operating to protect the Home fleet at Scapa Flow, which is in the southern part of the islands. A radar station was set up at Netherbutton in Orkney and equipped with top secret equipment.

There is also an amateur radio station which is used for special events and GB2OWM was being worked by Steven (call sign unknown) when Wendy and I visited the museum. Some of the displays have to be moved out to make room for the special event station.

Being right on the harbour front, the sloping wire antenna, which was centre fed using slotted twin feeder into a Z match ATU, did a very good job. The museum attracts a regular flow of visitors and is promoted by the local tourist board. It is open daily from April to September and is entirely staffed by volunteers. If you ever get the chance pop in!

Chris Pettitt GØEYO

RADIO RAMBLINGS

Jottings from my Notebook

By Graeme Wormald G3GGL

Bewdley, July 2005.

I wonder? Last February I recall reading a forecast that promised a good summer in the UK. It would commence in late June and would then roast us until September. It has run for a month and now stalled . . .

RENEWED PROGRESS

I have just heard about Ted's set-back (page 3). He was within 3 hours of leaving for France via the Tunnel when the 'malfunction' occurred.

Thank goodness he hadn't set off and was quickly whisked back to Papworth! Thankfully he is back on track and is progressing well. What he needs is a good summer to relax in.

About four days after his heart operation, before they would allow him to speak on the telephone, I rang Papworth Hospital to enquire after his progress. "He's a bit 'low' today" the nurse answered, "but that's quite normal after such a big operation".

I asked her to give him a message from me that would cheer him up. I asked her to tell him they should have fitted an 807. No wonder the rest of the world think radio hams are daft!

MINIATURE 807

That reminds me that in my "Amplitude Modulation" column I made reference to that dinky little transmitting valve, the Marconi-Osram TT11, better known as the VT501 in the TR1143A wartime RAF aircraft R/T, and being offered now by John Birkett for £1.50 apiece. It used to be called the "miniature 807" by the cognoscenti in the 1940s and is a great little valve.

What I didn't say was anything about its vital statistics, such as pin-out and ratings. You'll have to hunt to find such details nowadays and I have one of the few works of reference which contains them, namely the Wireless World Radio Valve Data handbook of 1949. It's on an international octal base with a small top cap anode. Here goes:

Pins:- 1 = N.C. 2 = htr.

3 = beam plates 4 = g1

5 = g2 6 = N.C.

7 = htr. 8 = k

Vital statistics:- htr 6.3v, 0.8 amps

Va = 250; Vg2 = 160; Vg1 = neg 50;

Ia = 30 mA; Ig2 = 8 mA; Ig1 = 1.5 mA;

Drive = 0.12 watts; Max diss. 2.7 watts

R.F. output = 4.8 watts at 100 Mc/s.

All the above ratings are, of course, for Class C operation.

At that price it's worth laying in a few when next you top up with John's high voltage electrolytics and decouplers. (phone 01522 520767).

BEN'S MAGIC LOOP

I keep making reference to this answer to the back-yard dwellers' dream without giving much details. That's because I'm still working out some of them!

To remind you, this is the brain-child of

Ben Edginton GØCWT, a neighbour of mine with just that backyard problem. Look on his website for full details :-

www.magnetic-loops.info/

Back to my experiences. In principal this loop aerial was designed to use on 40, 80 and Top Band by those without the real-estate needed for a λ/2. At the same time it avoids the large metal tubes and huge wide-spaced tuning condensers necessary in normal magnetic loops for these low frequencies

Ben has devised *(and patented)* a simple matching transformer which can be located inside the shack, along with the tuning condenser. It will cover two adjacent bands viz: 160/80 on a 16 ft diameter loop and 80/40 on an 8 ft loop (or anything else going up in frequency and down in size.).

I'll quote now from Ben's discovery of the principle:-

"I first used this aerial in 1985 when I fed it from a loop at the top. It worked well enough to start with but I was always fiddling with the loop and one day it blew down. I decided to improve on it and after some abortive attempts to use a gamma-match I decided to try a transformer to feed in the RF and also match the loop to a 50 ohm feeder.

"I took information from the ARRL Antenna Book which told me the radiation resistance of the loop would be less than 0.1 of an ohm on 80 metres. I took this to be the feed point resistance as does everyone else I have spoken to.

"At 50 ohms to 0.1 ohms the impedance ratio is 500 to 1. The square root of 500 is 22.36 so I would need a 22:1 turns ratio . . . "

Ben then goes on to explain how he achieved nothing until he started to reduce the ratio of his matching transformer. He realised that the feed-point resistance of the loop when fed adjacent to the tuning capacitor was much higher than anyone realised.

In fact the end result was that the feed-point of a quarter wave loop when fed next to the capacitor is 22.3 ohms.

This means that a 64 ft wire loop (circumference, not diameter!) requires a turns ratio of 1.5:1. Using a ferrite core this was achieved with a 3-turn primary and 2-turn secondary to the loop.

As one of Ben's requirements was to operate on Top Band (160 metres) as well as Eighty he researched further and found the feed point to be 2.4 ohms next to the tuning capacitor on 1.9 MHz. He increased the primary to 9 turns, tapped at three (for 80) and bandswitched.

But now listen to this: last month I rigged up a 16 ft x 16 ft 'square loop' festooned from the guttering of my bungalow, in a valley 100 ft a.s.l. 100 miles from the sea. You just can't get any lower in the middle of England.

The ends of the "square loop" came into the shack through pieces of hose-pipe pushed through 5/8 ins holes drilled through the cavity wall. The "tuning unit" was on a little shelf above the curtain rail.

Remember this is a 1/8 wave loop in circumference, or a 1/32 wave loop in diameter. A dipole for Top Band is 264 ft long . . .

Now I haven't had room for such a spread since 1968 and that's the last time I worked 160. So it was a bit of a novelty to tune up this new "magic loop" and listen out for the RAOTA *(Old Timers)* net on 1963 kc/s last month.

There was a group of five stations struggling to cope with a noisy band

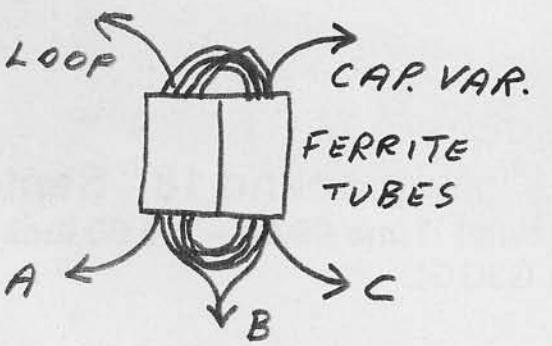
and weak signals at 21.15 local time. The only decent signal was Laurie, G3IUW, the net controller. He was reaching me at 5 & 9. The rest varied between 1 & 4. After a confused round of reports Laurie asked if any other stations were standing by. I gave him a call. *(After all, I am a member!).*

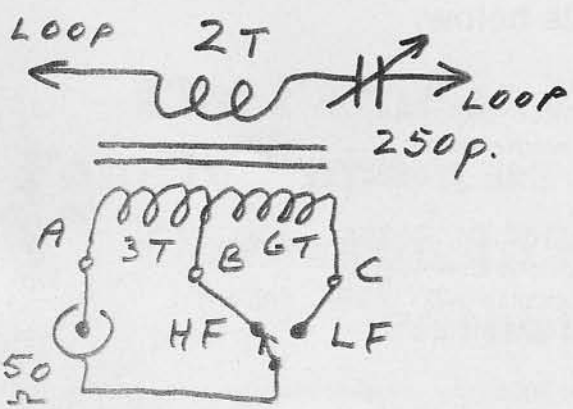
He came straight back to me and gave me 5 & 9, the same as I gave him. He is located in Woking, Surrey, well over 100 miles from me. After 20 minutes of confused exchanges between the other members Laurie asked me to close the net as I was the strongest station.

There's got to be something in a 1/8th wave magnetic loop which works as well as a ½ wave dipole . . .

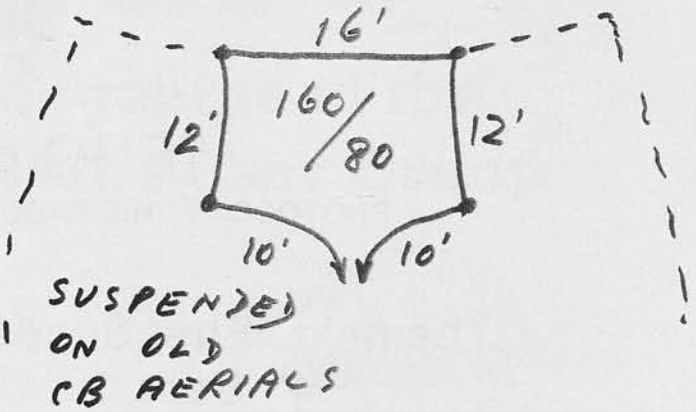
The transformer is wound on two ferrite tubes, Part Number 43-5702 purchased from Mainline Electronics, Leicester, PO Box 235. Telephone 0116 2777 648. Alternatively toroid rings can be used to build up the transformer cores.

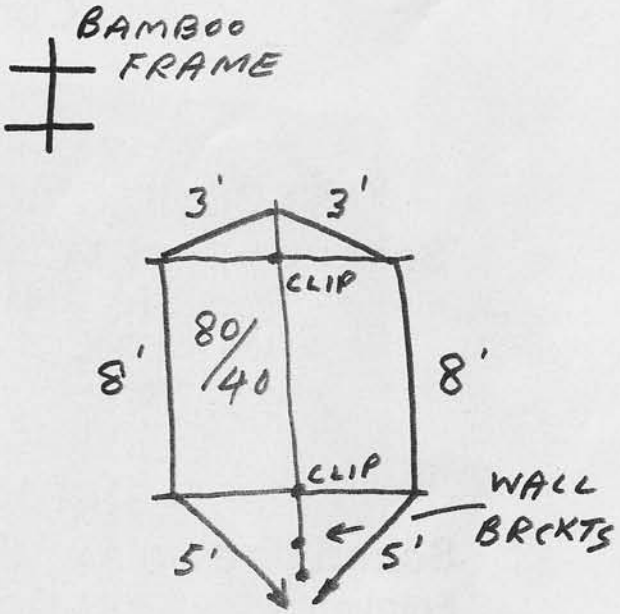
It looks like this . . .





And these are two loops I've tried. They both work ok with the same transformer (separately, of course!).





The one area where Ben and I differ in the detail is the transformer ratio. 3:1 works fine for me on 160 but Ben uses 4.5:1. He reckons this is probably due to my feeding the 'tails' through a brick wall. He is probably right. The fact is that it works; and very well indeed.

And don't forget that the same loop in "80 metre mode" has been tried on the EUG nets with excellent results.

"EUG on the Air"

PHOTOCOPY THIS PAGE AND STICK IT UP IN THE LOO!!

The next "First Sunday" nets will take place on 4th Sept, 2nd Oct & 6th November

Freq. 3695+/- QRM

Times: 09.00 for AM and 10.00 for LSB (local times)

Controller G3GGL

"SECOND SUNDAY 40 metre A.M. Tests"

Scheduled on 14th August, 11th Sept and 16th Oct.

Frequency 7143 +/- if spot in use by other net

Listen for G3GGL on A.M. time 09.00 – 10.00 local

"THIRD SUNDAY 80 metre A.M. TESTS"

Scheduled on 17th July, 21st August and 18th Sept.

Frequency 3605-3025 kc/s. A.M. only! Time 09.00 -- 10.00 local

Listen for G3GGL

Please send listener reports and comments to G3GGL

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