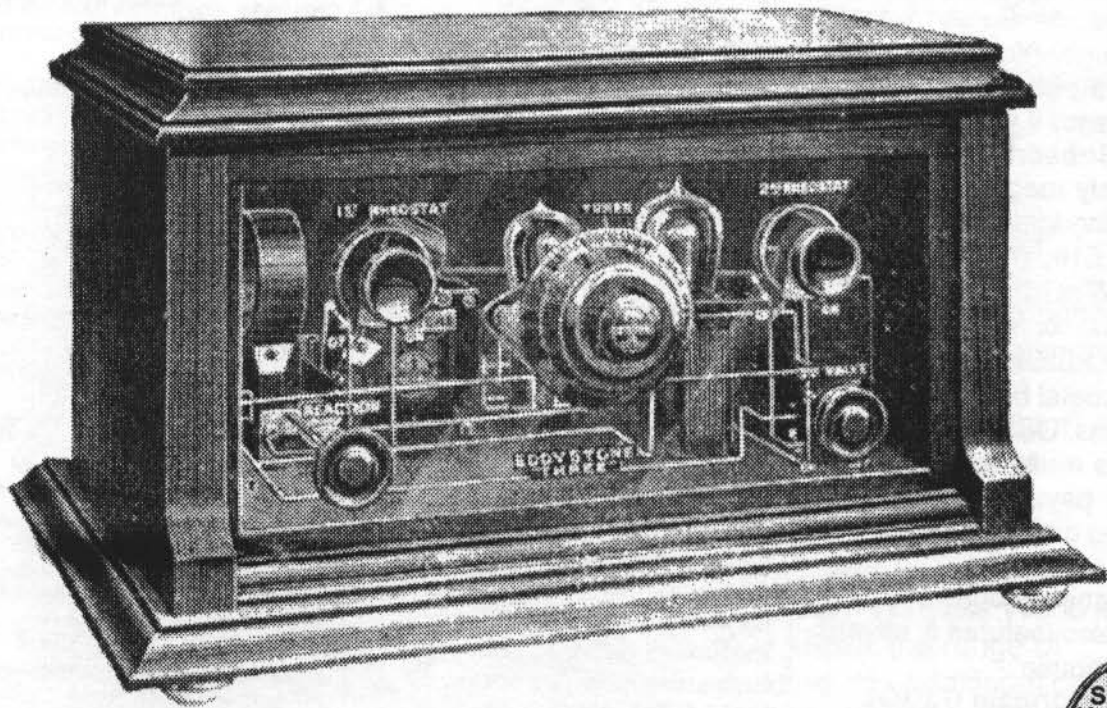


# Lighthouse

Founded 1990

The Magazine of the  
Eddystone User Group

Issue 71, February 2002



**"EDDYSTONE THREE" 1926**

*Can this be Stratton's first HF Receiver?  
See inside for more . . .*

# EDDYSTONE USER GROUP

A non-profit-making  
group for Eddystone  
Radio Enthusiasts  
Founded in 1990 by  
Ted Moore  
Issue 71

February 2002

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## WANTED

**Manual or circuit diagram for**  
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Call Tom on  
01794-514057 (Ansafone OK)

**Cabinet to fit 680X; colour match**  
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set of same style (730/770). Also  
wanted round Eddystone speaker,  
must be 3Ω and in working order.  
Also wanted power cord with  
matching connector for 680X.  
Reasonable price paid. Will work out  
shipping details. Call Peter Knowles

# LIGHTHOUSE

FEBRUARY 2002

ISSUE 71

**W**elcome to issue 71 of 'Lighthouse'. This is bound to be another bumper read. I think it just gets better and better. A number of things have happened to me recently to make me think of the past. I had an e-mail from a chap called Ernesto Starri who used to work for me at Eddystone and was part of the Italian mafia here in Birmingham.

Starri was a tester when I joined and I am sure he will not mind me saying that he could be a bit difficult to work with. In talking to him one day I found that he was mid-way through an Open University degree course. As one of those who was the first to try the OU I know what this kind of commitment means and I found my attitude towards Starri changed over the coming months. I gave him the opportunity to work on FET Power Amplifiers and eventually he became recognised as an authority. Well of course Eddystone could not keep him and he emigrated to the 'States.

Over the years I would hear from him and it was clear that he was rapidly progressing up the career ladder in the companies he worked for. In his latest e-mail he tells me he has his own company, Delta-Sigma RF Power Amplifiers (see photo). I feel pleased that I helped him achieve his ambitions. By the way he is on the look out for a 1650 receiver as he worked on the development of it in the early eighties.

In a way this links into another recent event. Some of you will have heard of a web site called Friends Reunited which aims to put old friends in touch with one another. Well I had an approach from a chap who was two years older than me, and one of my closest childhood friends.

It was this chap who got me involved in radio when he bought an old Sputnik special, the 10-60MHz R208 receiver. I bought this off him and so started my own passionate love affair with radio. My family moved away when I was 13 so I only had occasional contact over the next 5 years and I haven't seen him since 1965.

Well we met up this weekend and had a very

pleasant day together. I asked him how come with his interest in radio he never got involved in it professionally. He told me that when he was 15 his parents insisted that he leave school and take up a trade so he became a plumber like his Dad, and regretted it ever since.

He really wanted to be a sound engineer with the BBC. He is a good example of someone not being given a fair chance and not being able to achieve his ambitions. You forget with this modern age of opportunities for everyone, that for my generation and the ones before one's whole life could be determined by one's success in one exam and the attitude and financial status of your parents. I hope the ever-rising cost of further education doesn't take us back to those old days.

Actually I have a mint condition R208 in my garage. When I was at Bletchley in the 60's we first learnt our operating craft on HRO's and AR88's. I have decided to look out for mint examples of each of those radios to build up a bit of my own history.

Another bit of nostalgia will be to put G6SL on the air. I have been discussing this with Graeme and I hope to be able to organise a weekend on the air to celebrate the 90<sup>th</sup> anniversary of the formation of Stratton and Laughtons the founders of Eddystone Radio. Probably sometime in June, HF/VHF, with some connection with the old Laughton factory if at all possible. Watch this space.

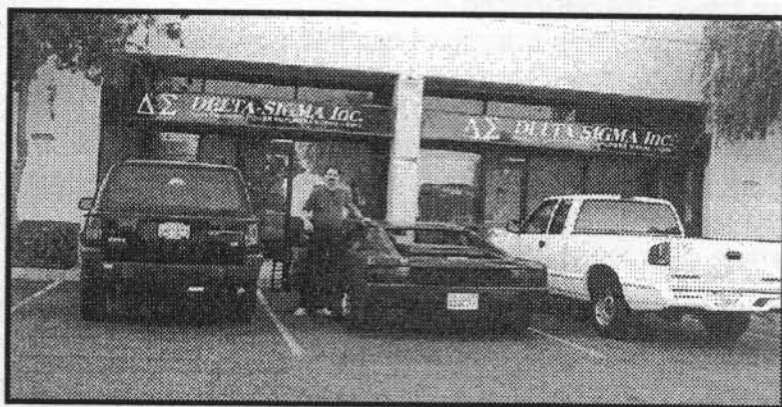
Finally I have agreed to give a talk on Eddystone to the Bromsgrove and District Radio Club. Simon has offered to help with digital photos of some of the older equipments as I hope to make it a Powerpoint presentation which can be put on disk.

Enjoy your read, all the very best, and see you at the next Vintage Fair (Sunday, 5th May)

My best 73's

*Chris Pettitt - GØEYO*

Patron (g0eyo@blueyonder.co.uk)



# Personal reminiscence about living with ". . . an Eddystone" at work and at home, (and related history!)

By Tom Toth, G4ORF.

The author of this two-part bio-history was born in Budapest, Hungary, during World War Two. His radio-related technical education started at the age of 13 when he became interested in HF radio, especially listening to the BBC World Service. At the age of 16 he escaped through the Iron Curtain during the Hungarian Uprising of 1956. Settling into school in Farnborough he soon integrated into the Western World. His working life has been entirely within the orbit of semiconductor development, in which he has become something of a specialist in the test equipment design field. Tom tells me that his *essential* hobby is 'Work', followed by his *affordable* hobby of 'Radio'. He then follows this by a great, but *non-affordable* interest in Flying! We are grateful to Tom for his memoirs from the world of science. GRAEME - G3GGL

In the distant past a young man left school, complete with his 'A' level Physics, confident in the knowledge that he was reasonably prepared to start scratching the surface of science.

His time in the futuristic world of the Semiconductor Development Laboratory of Standard Telephones & Cables was nothing short of sheer bliss. Monday mornings could not come round fast enough. All the new scientific equipment to learn about and the wonderful measuring gear!

Then, one day, in an adjacent bay, he came across a rather interesting-looking grey instrument with a slide rule dial of frequency display. It reminded him of a radio receiver, but then why was such an instrument employed in a solid state physics laboratory? Eventually he plucked up enough courage to ask the question. The conversation went something like this:-

"...What's that instrument up there and what's it used for?"

"...Ah, well, it's an **Eddystone**. A radio receiver. It's used to measure feedback capacitance of a transistor!"

"...But capacitance is measured by a bridge circuit, isn't it?"

"...Ah, you are puzzled, aren't you? Well, it's used as a tuned amplifier and detector after an r.f. bridge. The bridge input signal is modulated r.f. and the output is displayed on a low frequency indicator. When the r.f. is balanced out, so is the modulating signal and you have a null!"

"...Oh, how interesting, using a receiver in such a mode, why didn't I think of it?"

So your writer met a 680X and it was the beginning of the slippery slope, the lifelong interest in Eddystone receivers. It was interesting to learn that radio receivers are more versatile, than one gives credit for.

Soon two significant events occurred. He was put in charge of the equipment and a young technical assistant, Richard, joined the

department. He was a licensed radio amateur with the callsign of G3TFX.

Often, during lunch breaks, the 680X was restored to its original purpose, as a receiver.

Richard supplied his home made 10W output a.m. transmitter, initially on "top band" and later on at 28MHz, with an output power of 2.5 W. The antenna was just a long wire, conveniently stretched out above the River Cray, which was flowing about 10 ft from the laboratory window.



Tom Toth, G4ORF

While most of the engineers enjoyed their lunch we were having our sandwiches and attempted to talk to the world.

One 28MHz contact with a Californian station is still a vivid memory today, as being an interesting and amusing occasion.

We called CQ and the US station replied. Good signal both ways, although the strong link was at his end. He had the usual set up, tower, beam antenna and linear and as far as I remember his output power well above our own limit.

During the QSO we told him about our set up. He thought we had a good

signal for 2.5kW. Sorry OM, we replied, it is only 2.5W, same as a torch bulb !

..."Holy smoke, just 2.5 watts"? An ausing time was had by all, including the acquired audience, returning from lunch.

During a visit to an electronic exhibition in May 1964, I came across an 870A and an EC-10. Naturally, they were both out of my price range, but the EC-10 left a very deep impression on me. Here was a neat, portable, general purpose receiver, with an RF stage, BFO etc., and the urge was too great.

Saving of funds had started in earnest and on Christmas Eve I returned home, via Home Radio of Mitcham, with an EC-10 under my arm! (Remember the name?) Life was never going to be the same again. Even articles from the technical press relating to Eddystone were saved.

Some while later, when, among other problems, I had mastered the technique of low level d.c. measurements (currents much less than 1nA), it was suggested that I carry out some high frequency fT test on my devices in our Measurement Laboratory.

(fT = transition frequency = hfe x f(MHz). It is the frequency at which the extrapolated common emitter current gain is 0dB or 1.)

In the laboratory I was introduced to the test equipment and....yes, you guessed it, there was an Eddystone 770R (19-165MHz) receiver included in the set-up. This time I tried to work out its purpose myself.

My memory is a bit hazy (or immersed in "time-noise"?), but the principle of the measurement was something like the following:--

The set-up was designed to measure the common emitter gain of the device, in an amplifier circuit. Test jig input and output ports were shorted out to R.F. and the equipment tuned to the signal frequency. The amplifier

output attenuator was set and noted. Receiver R.F. gain adjusted to a certain point and noted on the S-meter. When the transistor is plugged in and its gain is balanced out with the attenuator, i.e. the same S-meter indication is obtained again, then the gain is equal to the increased attenuation.

Soon I had come across a 770U, used for the same purpose, but at a higher frequency (150-500MHz).

They were also used for noise measurements. If I remember correctly, the method was to have the test transistor as a low level pre-amplifier, the output being fed to the Eddystone. The noise figure of the Eddystone was measured first, then the total noise figure was measured.

The test used the classic technique of doubling the output noise with a calibrated noise source. The amount of increased input noise that created the double output is the system noise figure.

From these readings, noise figure of the transistor or the preamplifier was calculated.

In the meantime I carried on with my studies at the local Technical College.

[A bit of digression here. I worked in solid state physics and enquired from my work department head, which was the best subject to study for my work, physics or electronics. There was a good case for either but perhaps you ought to do electronics - he replied. The college said that they didn't do electronics, as such, but did do telecommunication engineering. So I enrolled and ended up earning my wages with physics and learning my hobby! ]

The class was full of people who were working for various companies and the amount of experience shared by our

This fact was not lost on our Department Head, Mr. Reed. [He was an archetypal (English) gentlemen and his three dimensional drawings on the blackboard, particularly of transverse electromagnetic waves were better than prints in books.]

One day, during a lecture, he asked us if we know of a reasonably priced, modern radio receiver for demonstration purposes and for students to make measurement on. There was no contest, "...Sir, you ought to try the Eddystone EC-10. I will bring in some details for you...."

By the time next term arrived, the college was the proud owner of an EC-10 and you can guess who was the first to be given an assignment of making measurements on it.

It was "home from home" for me. (Well, apart from getting used to the Marconi 144 generator, which was completely new to me.)

The college course got me thinking about the subject even deeper. Laboratory experiments were just not enough and I started experimenting with all manner of things at home. "Ah, I could do with a receiver that could measure r.f voltages...."

And here I must confess that I have committed the unmentionable. I have opened the EC-10 case and started poking about!

The first project was to design an outboard S-meter. Not having metal-working facility, the case for it had to be made of a small, high grade painted cardboard box. It worked well, especially after calibration at a number of frequencies. (Later on it was properly encased with the Q multiplier -q.v.)

**Tom Toth, G4ORF, continues his adventures of hobby and industry in the next edition of**

# Ted's MailBox

## A New Year, and - -

For me a new start too as later in the year I move to a new QTH near Cambridge, at last ! I hope that I can then play a more active role in helping EUGers with their problems and maybe help some with 'GGL's workload. Somehow though I have begun to realise that Graeme is like myself and enjoys being continually occupied.

The New Year too will mean that I can go ahead with my collecting, not just Eddystones but also a few chosen aliens, both communications type and broadcast receivers.

I recently picked up a nice old Grundig table model with a slide rule type scale almost as long as those on our later model Eddystone valve types. It covers an extended Long and Medium bands plus the full VHF/FM band.

Can anybody out there supply me with the service sheet for this ? A model type RF420 GB, I shall happily refund all expenses if I can get hold of either a copy of the service data or a photocopy of the same.

On a similar matter, Bush brought out a small, tidy, radio cassette clock radio which they called the "Dream-Breaker" for obvious reasons. The clock/alarm digital readout is an LED display and the case is cream plastic with loads of chrome type decor, anybody out there know it ? My request is the same, HELP, a service sheet please.

No, have no fear. I am not going off Eddystones, the above are just a small diversion as you will see elsewhere in this issue. My latest

acquisition is a rare-ish bird indeed. It came to light just a few months after I had bought a very nice 940 from Jim and the urge to have the rare bird as comparison was too great to resist.

Now then, of Christmas cards I had many and thank-you to all. Several did not have any more than a first name and so I am unable to say a direct 'tnx' but thanks to all and may this coming year be kind to all EUGers and their families.

The urge to say Bah, Humbug ! did come at one point over the holiday break when a sudden snowstorm and freeze-up meant that we had a power cut just when I was QAPing on my 1002. It happens to be the only solid state model I have with me that was not set up to work from a 12 volt supply.

All of my other s/s stuff runs from a DIY re-chargeable battery pack giving me plenty of ergs for a couple of days listening. I made do with my DX394. This was bought at the recommendation of 'GGL and I have to agree with him, it is a nice toy and the buttons and knobs are just about big enough for my podgy fingers to work okay.

Now my usual, lifetime practice has been to open up any new 'goody' and have a good look at what I have got to play with. The arrival of this item coincided almost with the acquisition of my 940, and the repair of a serial input dot matrix printer. So, I put off looking inside the 394, especially as I was also fixing an 870A.

I detailed my problems with the 394 in last issue and now I know what it was all about. Honestly how can a

receiver be described as a Comms Receiver when it has a built-in ferrite rod aerial for the bands up to 1700 Kc/s?? What operating position for either SWL or amateur has the facility to rotate the station rx so as to orientate the ferrite rod for best signals ?? And what upset me even more so was to find that even when an external aerial is plugged in this ferrite rod aerial stays in circuit. My problems with noise on the ERA preader all stem from the fact that I was trying to use it sitting right on top of the 394, just an inch away from the same ferrite rod which was pulling in the Navtex etc. that I was trying to print out - hence the vast amount of microprocessor garbage coming into the rx front end. All is now well and many txns to P.J.Marshall for his very helpful letter.

On to happier matters, Stan who lives down in the West Country has been able to buy an S.640 complete with matching speaker and a set of S.G.Brown 'phones of the era. Having paid £100 for the lot I think that Stan still got a good deal. No work is needed on the 640 as the late owner had recently done a major refit including a new set of valves. The only slight wear noticeable is on the 'fingerplate' and this is evidence of much loving use. Stan is now attempting to install an aerial worthy of the 640 in lieu of his present bit of wire.

\*\*\*

## My Slinky Tip

I did start something here, seems that I am not the only person though to have tried this out. Peter has been using one hanging down from his flat window (fifth floor flat too !) It is as he says 'blowing in the breeze' at this time of

it with his 730/4 or his EB35. His list of stations heard proves the point.

Alan writes from north of the border to say that he has been using two slinkies in a dipole arrangement mounted in his loft, good results too over the past six months so that Alan wonders why ever did he bother putting that long wire up last year ?

It seems the idea of using a Slinky (or two, or more) is not new as Bill sent me a cutting from a long ago magazine published in the 1970's where the idea was explained, giving many different configurations for their use as aerials. The idea also appeared in a recent magazine issue too, either PW or SWM.

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## Higher Local Oscillators?

Richard has written to remind me (us ?) that the local oscillator, as stated by 'GGL, is not always higher than the signal frequency. Well the exception does serve to keep us all on our toes. In this case he was doing some much needed re-alignment on his newly bought 880/4 and noticed that in the cabinet was a sticker warning those who worked on the set that on some bands the LO was lower than the signal frequency. *(With respect, gentlemen, I said the oscillator is always higher on a CONVENTIONAL general coverage Rx. The 880-series is the LEAST conventional valve set Eddystone ever made! - 'GGL)* He also mentions a venerable RAF receiver that he has, an R.1475 and says that it is the only set he has found which has an IF well inside the medium wave band. It is 560Kc/s if the notes he has are to be believed. *(The R 1155 also has a 560 Kc/s IF - 'GGL)* This set is awaiting the arrival of a manual before he 'digs'



## **A Ready made Chassis**

From Jim comes a mention of the Maplin catalogue and the fact that they sell a nice aluminium chassis with base cover plate for those small valve type projects. At some 6 x 4 x 3 inches it can be used for many small one or two lunger receivers. They also sell valve sockets and a selection of NEW manufacture valves. Yes, they are still being manufactured both in the former USSR and in other middle European states. I think we owe this to the increasing use of valves in modern HiFi gear. (Took them a long time to catch on to the true worth of the 'old' technology).

\*\*\*

## **Phones for CW**

From a friend who is a keen CW listener comes his latest wheeze. He has fitted up a defunct pair of padded earmuff phones with two ceramic piezo sounders. Just the two inch diameter discs fastened firmly to the plastic case where the moving coil unit used to fit. These are wired in parallel and when used with the high impedance jack on his Eddystone receiver they give a pleasing 'noise'-free signal which is tuned by his BFO.

I have heard of this one before and have used it myself. This really is why those old moving iron headphones with a tuned diaphragm are still a good buy for both CW and SSB work - they reproduce the speech range extremely well whilst NOT reproducing the hash above or below it in the wider audio range. I have myself said many times that the use of modern Hi-Fi type headphones is self-defeating since their very wide band reproduction simply fills your ears with a lot of unwanted

noise.

You have to experience the effect of listening to CW or speech on a pair of old phones to appreciate the difference in communications speech quality as compared with all the noise reproduced by modern hifi phones. To try it is to be converted.

\*\*\*

## **Joke on Ted !**

Okay out there, it was a good joke and very much appreciated. And many thanks too as I enjoyed reading the very latest copy of the still published BEANO ANNUAL.

I assume that this was as a result of my mention on page 14 in the Xmas issue - I honestly did not know that they still came out and this one I shall keep in my 'technical library' with books such as the ARRL Handbook.

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## **Broadcast I.F.s**

The mention of an Eddystone fitted with what appeared to be 1950s type IFTs has brought this item of info from one EUGer. According to Chris it is possible to greatly improve the selectivity of these by carefully increasing the distance between the primary and secondary windings on the common former.

The windings are usually 'sealed' onto the former with shellac. By softening up the shellac with 'turps' and sliding the bottom winding down the former by about 5 mms and the top winding up the former by the same amount a noticeable improvement can be achieved as shown by before and after tests on the crowded MW band.

## Stratton Vibrator Pack

Tom has written in anent the article by Graeme on his restoration project on one of these 6 volt vibrator packs.

His interest has been aroused because some years ago he was running his small AC only domestic receiver (a Pye) from a two valve DC to AC convertor unit which was in turn powered from a commercial 110 volts battery supply.

Where did the DC-AC convertor come from ? Tom says that it was originally supplied on its own small chassis inside a 1947 model radiogram. Many of us forget, or ignore, that in the late 1940s there were still large areas of the UK which had DC domestic mains supplies. The manufacturers of the then popular radiograms had to cater for this. Even as late as 1959 one of the largest Hotels in Liverpool - The Exchange Hotel - was all DC mains supplies and many were the visitors who ignored the many warning notices, plugged in their equipment and blew a fuse or ruined the equipment.

\*\*\*

## An E.R.A.

No not the synonym for epoch, nor the preader previously mentioned. This was a 1930s Eddystone Communications Receiver and it is a pretty rare one these days.

Phil has written to me from Belgium asking for information on this model. His is an ERA7/E and he is asking me in what way the previous versions (/A, /B, /C, /D) differed from his ERA7.

My recollections from the few I have seen and handled is that the /A

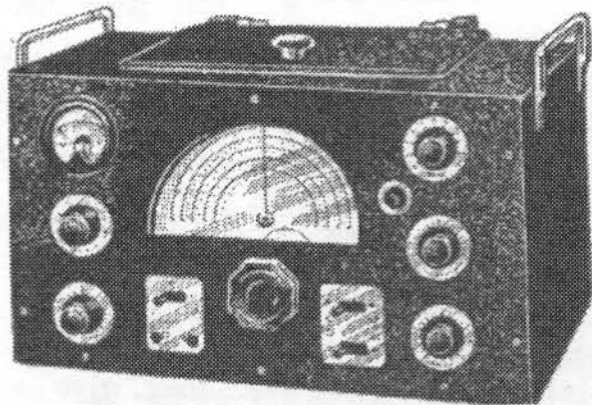
had a LW band plus the same MW/SW coverage as the /E but of the others I know zilch, can anybody help out here ?

Phil why not join EUG and tell us about your ERA7 ? There are one or two of this model in the hands of EUGers and so it is possible that we shall hear from one of them, but then how will Phil hear if he does not read this ?

\*\*\*

## S.358X

The set in the hands of Peter is apparently unmodified and covered by the Strattons Handbook for this model, with one exception. It came to him after the demise of a local SWL who himself received it from his father, an ex Cranfield Boy.



The meter in the top left hand corner of the front panel which reads out valve stage voltages and carrier strength is a square meter of the typical - for that era - MoD type. It is mounted on a round plate quite evidently made to fill over the round hole in the front panel, which should have been occupied by a round meter.

Peter has been able to compare the set with another held by an ex RAF friend and they are identical except for his square meter and the other having the round meter portrayed in the handbook. From the serial numbers the

set Peter has must have been made some 10 months after the other, so I am presuming that Peter's 358 was one of those first sets to go over to the square meters which had by that time come into almost general use for MoD equipment.

After all of these years the only restorative work he has so far found necessary is the replacement of some resistors which have gone high in value, way beyond the then normal 20%. In many cases they measured in at more than 50% high.

Since one of these was in the part of the circuit which would nowadays be called the 'BITS' circuit he felt it necessary to get the job done. The meter measures stage current by inserting a series resistor which measures the volts drop across said resistor. He has now got this done and has also replaced one or two 'iffy' decoupling condensers.

The slight oxidisation on the skirts of the knobs has been cleaned off with a tissue and toothpaste so all looks once more pristine and the 358X is again working in the shack and giving a good account of itself alongside the HRO-M and the old RAF model R.1124. The crystal filter is a delight to use and copes well on the crowded CW bands.

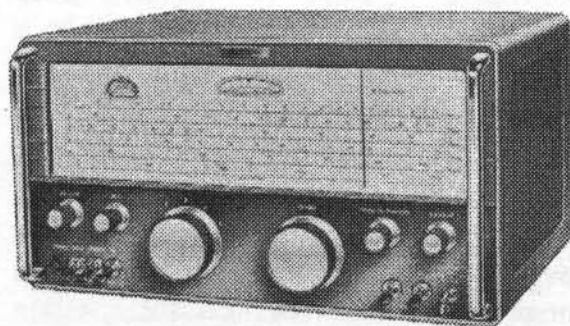
Peter adds that if you are using one of these sets then by all means do get yourself a pair of high resistance 'phones such as were intended for use with these old sets. He uses a pair of ex Air Ministry phones which have a 2000 ohms impedance at 1000 c/s. Ted.

\*\*\*

## The Mysterious 940HF ?

Well maybe we now know where the 940HF bit came from, or went to.

Shortly after I had bought my very nice 940 from Jim, as detailed in a recent issue, I had this customer come into the shop where I am working. A conversation ensued when he spotted both my RSGB badge and my EUG badge, the outcome of it was the offer of what he called a 'basket case' Eddystone receiver for £35. I took the chance of it really being fit only for spares and accepted. The set was brought in next day and proved to be another 940.



Not just any old 940 though, as I realised when I had time to get it into a good light on the bench. Yes it did have just '940' on the scale plate as do all of these models. What made me sit up, was the rear chassis plate which designated this as a 940HF.

For some years now there have been mention amongst some of us Eddystone fanatics of the existence of such a version, in the same way that we have heard talk of the rare /1, /2 & /3 versions. This is my first acquaintance with one though 'in the flesh' so to speak.

A manual typewritten mods list and a lot of eyeballing and headscratching later, I believe that I have fathomed out all of the differences between this set and my other 'bog standard' 940.

The mains goes in directly without the usual female plug and male

socket arrangement, tough rubber sheathed mains cable going in through a grommet in a hole on a blanking plate which is bolted over the hole in the rear chassis where the mains plug and socket are normally fitted.

The cable goes directly to a mains filter with an air cored choke in each leg of the mains supply, both the input and the output of the choke circuit is bypassed to chassis using metal cased 800 volts paper dielectric condensers. Thence to the two pole mains switch. This is quite certainly a factory fit as can be seen by the workmanship of the fit.

Next came the surprise of a preset pot adjustment on the rear panel at the bottom right hand corner. This proved to be a variable attack level control for the NL circuit, again definitely factory fitted, it works too in so far as those diode limiters can work.

The BFO tuning condenser swing on this model was always a wee bit wide for SSB use and this model has had a beehive preset such as is used in many Eddystone models fitted in series with the normal tuning condenser.

Compared side by side with my other 940 this is a great improvement. Since it goes along with my ideas of mods which can be removed without trace I intend retro-fitting it to my good 940.

Good 940 ? Well I may end up with two good 'uns since I now have the basket case working and intend to persevere with its restoration.

There is no AF input on this new set, the panel markings indicate that its place is taken by terminals for a 'LINE OUTPUT' at 600 ohms which comes from

One as yet unsolved mystery is the presence of a small right angled bracket with two 4 BA tapped holes which is attached by one end to the bottom of the rear bearing plate of the main tuning condenser. The other 4BA hole shows signs of having been used at some time but what was it supporting ??

All of the fitted valves are of the CV type and the missing valves are the two output bottles and the local oscillator. I cheated by borrowing from the set of spares I received with my other 940 and have had the set going, results poor compared with my other 940 but then I have as yet done no checks on R and C components.

The Factory fit brackets and the special case with side cutouts indicate that this set was intended for rack mounting, some marks on the paintwork at each side of the case show that at some time it has been slid into and out of a rack assembly. The one excellent point considering the spares situation is that the finger plate is almost unmarked, just one graze in the top left hand corner.

A small sheet of paper which was tucked into the gap between the tuning condenser and the RF strip has a list of what I can only assume to have been faults found by a previous owner-prospective restorer. The list reads;—

valves

Ht

output x 2 cathodes

screen feeds

AVC condenser

VR150 resistor

It is safe to assume that the anonymous writer of the above list is referring to

faulty and needing attention. Something to bear in mind when I get time to delve into the 'innards' of this set. The good thing is that the RF and IF trimmers do not appear to have been damaged. One or two may have been twiddled but they appear in good condition. For me this is always my one big worry when I get a new (to me) set.

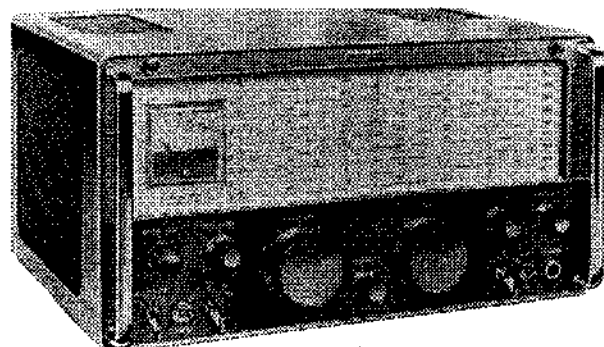
In conclusion, it looks like the so called 'basket case' may not be so bad a deal after all. It already works with borrowed valves, it does appear to be slightly off frequency on all ranges but then I note that the drive cord has been replaced at some time by monofilament nylon such as anglers use and this is a bit over-taut. It is clean both inside and out. And for a special model it has the advantage of using no parts which are not-standard either on the 940 or on other Eddystones. More on this set in a later issue.

Ted.

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## A Sick EA12

Almost nil output from this one, just a faint whiff of audio on both speaker and phones. The signals were there as one tuned over the bands as was evidenced by the movements of the carrier level meter, — but they were not coming out of the case.



Some basic diagnostics with a small signal injector, home made and

that V11, the EL90 output valve stage was functioning AOK and so backwards one stage to the input of the AF amplifier, half of the ECC83.

From pin 2 there was absolutely zilch output and so a few voltage checks were made on this valve. Somehow my analogue meter was showing a very slight negative voltage at pin 1 the anode. Yet the anode decoupler electrolytic C129 had a healthy, but much too high HT voltage on it.

An old friend here, a fault which occurs so often that it has to be characterised as 'USUAL'. The 270 Kilohm anode load resistor was as near as possible open circuit, it read out at 18.5 Megohms on a digital test meter. Not quite within tolerance eh ?

This was replaced and the AF stages functioned normally again but a further problem appeared, a non-working AVC circuit on very strong local signals, in this case the MW BBC World Service outlet on 648 Kc/s. With a new condenser in the place of the 0.1 muffs for C86 the problem was cured.

Cleaning up of the sockets for the crystals and of the actual crystal pins cleared up the fact that several bands appeared a bit 'under-populated'.

One last task was to re-adjust the BFO/CIO. This was done by setting zero beat of WWV so it was zero beat with the station BC221 and then retune the BC221 to 14 Mc/s and reset the BFO/CIO to zero beat. A job well done says Ian.

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## The 870A

This does appear to be a popular little set and from my mail there seem to be a fair number of them out there, in

David has this maroon-coloured 870A which has been pretty reliable so far despite being transported half way around the world several times, regular holiday trips to Scotland, and occasional use in the garden shed on wet days when he says that the 'telly' drives him out of the house.



A recent need to replace the rectifier valve made him wonder about the advisability of his AC/DC set being used in the wet and windy garden shed. The outcome was the purchase of a double winding isolation and step up/step down transformer which had been donated to the club bring and buy sale.

Now not only has he the benefit of an isolation transformer but he is also able to run his 870A on the 110 volts tapping which allows part of the 'dropper' to rest whilst generating much less internal heat. He says that this must benefit the rest of the set too.

His one major repair has been the replacement many years ago of the speaker unit which had become slightly scratchy. A suitable replacement was obtained from a London dealer. Ted.

\*\*\*

## MIMCO 6689

Do you recognise this model? A sure bet that not many will but it is a MIMCO version of the EC10 Mark 2. With the famous MIMCO badge it does

look a bit out of place among Mark's all-Eddystone line up but it has pride of place for its general all around easy to use convenience.

The grey colour is much darker than is the norm for this model but apart the badge and this the set is a clone for our normal EC10s. He has made many enquiries but can trace absolutely no other 6689s and is so far unable to track down any of the past history of this particular example. Can anybody out there assist him? Info via Ted please so we can all read about it. Ted.

\*\*\*

## The Orphan

I often feel that the 770 series is the most neglected and least loved of the whole Eddystone range. For this reason hearing from an EUGer who has a 770RII and what's more — who is proud of it, well it does cheer me up.



Andy says that his 770RII is in very good 'nick' and that he uses it almost daily fed from the AR60 active antenna he gets good reception of many of the area utility stations. He is able to rapidly tune them in since he has a calibrator which gives 1 Mc/s, 0.5 Mc/s and 0.1 Mc/s pips through the range of the set. The local airband stations are his usual stuff and living close to Leeds & Bradford Airport on what he calls a 'bit of a hill' he has no problems

following the signals.

He did a complete re-valve job a couple of years ago but found that this made little difference to his signals so he has kept the old set of valves for future spares.

The AR60 is not meant to give full gain at the airband frequencies but he finds the coverage better than when using a broadband FM/VHF Tv aerial amplifier. This has now been relegated to use with his ancient 1132 receiver.

Ted.

\* \* \*

## Super Six Receiver

This model which came out in 1935 exists only in the one example to my knowledge. The owner is an EUGer but he asks not to be named. His Super Six is in a nice Teak wood cabinet and whilst not yet complete - lacking the Westector and one of the valves - has been the object of quite a bit of intense restoration.

Several years ago I was able to obtain and provide him with the factory schematic (BP252), from this the restoration work has been carried out as and when time permits. Time however for such work is scarce, hence the long delayed job.

The Super Six is a table model meant obviously for the discerning 'listener' who did his wireless listening from the comfort of the living room. called the 'parlour' in the Company brochure which accompanies the set.

With coverage from 550 metres on the medium wave band up to the low wavelength of 12.5 metres - with gaps, this would have given the owner the pleasure of listening in to practically all

Used with the then almost obligatory 100 feet long aerial the six valve superhet circuitry was quite in advance of the general run of the mill domestic receiver.

No RF amplifier though. The first stage was a well-screened and designed Mixer stage using a metallised SP4 pentode valve. With a 354V as the local oscillator the IF of 465 kilocycles was amplified by the VP4 vari-mu pentode IF valve. As with the mixer valve these last two were also metallised to prevent interaction.

Detection, or second detection as it was then called was accomplished by a double diode triode type TDD4. This was a clear glass 'bottle' and the diodes were utilised for detection and AVC (so why the Westector ? Ted.) with the triode section giving the needed audio voltage amplification to feed the output valve. This output valve was one of the better known types of the era, a PM24M which fed the usual energised loudspeaker unit.

Mains power was becoming the norm in the mid thirties and so this set utilised a directly heated DW3 rectifier to produce the HT. Smoothing was by paper-cased electrolytics combined with the large coil of the energised speaker.

When first obtained this set was in quite poor condition and the cabinet has had to be professionally restored. Real french polishing !!! The chassis was not so bad and cleaning by hand sufficed here. No valves were with the chassis and so the present set of valves has had to be bought as and when available. The large, almost eight inches diameter speaker was in very good condition apart from a slight cut in the diaphragm. It gives surprisingly good

Mullard amplifier. The bass reproduction especially is surprising when compared with modern eight inch speakers. (By Ted, from a letter).

\* \* \*

## The S.400

Since Graeme has a project going to get a write up on this specialised version of the S.358 receiver I have delved into my paper data banks and retrieved a couple of letters received about ten years ago from a late 'Bathtubber' as he once described himself to me. The letters are provided to Graeme to use as he wishes.

Geoff provided me with many old blueprints and other schematics from the early years of Strattons/Eddystone and he was a mine of information, having many memories of his work there.



This 400 version of the more well known 358 is different not only in that it was designed for limited coverage of from 130 to 2200 kilocycles in four bands using the DD, CC, BB, AA set of coils, it also featured a 110 kilocycles IF so that coverage of the then MF marine bands could be complete.

This means that the above mentioned set of coils cannot be used with the normal S.358 receiver due to

the differences in IF (465/110 Kc/s).

So far as my information goes there were three versions of the S.400. These were the 400 basic, the 400X (with xtl filter) and the 400B which was for CW only and had no demodulator stage. TED

★

*(See further along this issue of 'Lighthouse' for an interesting review of the wartime Eddystone S.400B, otherwise known as the Air Ministry R1448 - Graeme)*

★

**Write to TED's  
MailBox  
C/O Jim Murphy  
63, Wrose Road  
BRADFORD  
BD2 1LN**



**DON'T FORGET THAT  
'LIGHTHOUSE'  
BACK-NUMBERS ARE  
AVAILABLE ON CD-ROM,  
ALSO POST-WAR  
SERVICING 1946-1956  
SEE p.56 OF XMAS ISSUE  
FOR FULL DETAILS.**

★



# EDDYSTONE RECEIVER REPAIRS FOR BEGINNERS – PART 4 PRELIMINARY CHECKS

BY PETER LANKSHEAR, ENGINEER, NZBC, (RETIRED)

**So far we have covered the importance of reference material, how to determine if the receiver's power transformer is intact and repairs therefore viable, and also suitable tools and test equipment. Now we look at preliminary checks and diagnosis.**

## Doctor's Orders

The chances are that your Eddystone will be in indifferent health, - that is to be expected, but I advise against taking on a really ill patient until you have some experience and confidence. Actually, receiver diagnosis has a parallel with medicine.

Your G.P. uses a minimum of equipment in his initial assessment - probably only his stethoscope and perhaps a blood pressure measurement, but he is also observing symptoms. Similarly the experienced technician can learn much with his multi meter and powers of observation. Indeed, a majority of faults in valve equipment are located with voltage and resistance measurements. The main requirements are a methodical approach and taking nothing for granted.

## Essential Reading

If you do not yet have a manual, now is the time to contact Dave Simmons (*see page 2*) and arrange for him to send you a copy. Don't attempt any serious work without one. On this score, compared with restorers of domestic radios, who may have to work with little or no data, EUG members have it made.

Spend time with the manual

first efforts are with a receiver that has not been badly mutilated.

It is important to check for modifications, as these may impair the performance of the receiver and at best make checking more difficult. People can do nasty things to Eddystones.

As related in the EUG newsletter a couple of years ago, I was given a 640 that someone had attempted to change into a double conversion superhet, a sort of super model 750 - and rectifying that modification was a major exercise. (I am pleased to say that it is now once again a healthy 640).

It is not desirable, even if it were possible, to list all faults and their remedies. The best way to fix receivers is to learn how they operate and adopt a methodical habit of checking and testing. However, I think that a bit of guidance for the important initial switching on procedure is in order.

## Hold Your Breath!

You are now almost ready to switch on your Eddystone but, unless you know for sure that the receiver has been operating recently, be very alert. Although you have already ascertained that the power transformer is OK the initial switch-on period after a long period of inactivity is when a set is most prone to electrolytic capacitor faults.

it is a main filter capacitor, seriously damage the rectifier valve and/or the power transformer. Furthermore, although it is fortunately rare, defective electrolytic capacitors have been known to explode, - violently. To be completely safe, after a long period of inactivity, an electrolytic capacitor could need "reforming" before it is put into service.

Ideally, although the filter capacitors after a period of inactivity should first be disconnected, their dielectric reformed and then tested, I suspect that this is rarely done in practice. Electrolytics of the type that Strattons used have proved to be very reliable and provided a few precautions are taken it can be assumed that it is safe to apply power.

### **Safety First**

Of course, If you have a capacitor checker, it would be a good idea to first test the main filter capacitors for capacitance and leakage, but remember that leakage (resistance) tests with low voltage multimeters won't necessarily provide a reliable assessment of a capacitor's true condition.

There is one other check to be made before the big switch on moment. Check the resistance between the H.T. line and the chassis. A suitable place to measure is from the rectifier cathode, pin 8 in the case of most octal based rectifiers, pin 7 on Rimlock rectifiers, to the chassis, but in any case the circuit diagram will have a chart of connections.

If this resistance is less than about 10k ohms, unsolder the connections to the filter electrolytics and check again. If the resistance reading is still low, check the bypass capacitors in the H.T. feeds to the R.F. and I.F.

isolate various stages by disconnecting them in turn from the main H.T.

### **Keep A Close Watch**

Incidentally, careful reading of your multimeter can often assist in pinpointing a fault. For example, you note that the resistance reading from the H.T. line to chassis is 5 kohms, but a measurement on the valve side of one of the decoupling resistors shows a very low resistance.

A study of the circuit shows that a decoupling capacitor is connected from the valve end of a 5k resistor to earth. It is very likely that this capacitor is faulty.

Assuming that the resistance check of the H.T. line is OK clip the positive lead of the multimeter on to the rectifier cathode, the other lead to the chassis. Check with the manual as to the expected voltage to be found at the rectifier cathode and set the meter switch on a suitable range.

**BE VERY CAREFUL - SOME VOLTAGES FOUND IN VALVE RECEIVERS CAN BE LETHAL.** Be especially careful with transformerless models such as the 670, 840 and 870, remembering that the chassis can be alive to the mains.

Make sure with transformerless sets that neither you nor any metal object can touch the chassis whilst it is alive. A double wound isolating transformer can be a good investment here. With these sets it is a good idea to develop the habit of working with one hand in your pocket whenever the set is alive.

Now, apply power to the receiver, and watch closely for any suspicious behaviour. The valve filaments and pilot lamps will light up, and after about 15-20 seconds the meter should indicate

Look, listen and use your nose for any suspicious behaviour. Watch especially for any flashing, sparking or anode hot spots in the rectifier or smoke and nasty smells.

If all seems well and the H.T. voltage is within 10% of that shown in the manual proceed systematically through the set, checking voltages. **Voltage tests are one of the most important in receiver servicing and will provide an important clue in many faults.** If the H.T. voltage is low, the rectifier valve could be defective, or the input filter capacitor (sometimes called the reservoir capacitor) could have lost capacitance.

This is readily checked by bridging a known good capacitor across it, being careful to connect it the right way round. Another clue to a faulty filter capacitor may be a low-pitched hum from the loudspeaker. For the first hour or so of operation, **check the temperature of the filter capacitors frequently.** Heating indicates trouble and the offenders should be replaced or possibly reformed. Reforming electrolytics will be explained in a later article.

If a voltage reading is incorrect, there is obviously a problem. A study of the offending stage on the circuit diagram should provide some clues.

### **The Key To Success**

For example, if there is no screen voltage, suspect a defective bypass capacitor or voltage divider resistor. If the anode and screen voltages are correct, but there is no cathode voltage, it is likely that the valve is faulty.

Remember that if you are using a modern digital readout meter, which does not draw much current, the voltage at the anode of the first audio stage, being fed through large value resistor,

with moving coil meters, which take more current than a digital meter, causing an extra voltage drop in the anode load resistor).

There is no magic or black art in servicing receivers. Any radio consists of a number of discrete components.

A set that is not working properly has one or more of these that is not performing its correct function, and familiarity and understanding of components' functions will help in fault location.

**To be continued.**

.....

## **Do you know your Eddystone Colour Code?**

The majority of Eddystone receivers manufacture from 1946, when post-war models were introduced, until the more complex models of the '60s appeared, used a standard wiring colour code.

It is worth printing this out on a card and checking it with your set when carrying out Peter's investigations. Here it is:-

A.C. Mains	Grey
High Tension	Red
Anodes	Light Blue
Grids	Green
A.G.C. lines	Pink
Heaters	Yellow
Negative to chassis	Brown
Chassis potential	Black
Other leads	White

# Letter from Tønsberg

Our Norwegian correspondent, Tor Marthinsen, makes a speciality of collecting Eddystone-related documentation. Graeme's recent postulations about the early dating of Stratton's have caused Tor to go into dispute! This letter was written following the Christmas Edition of *Lighthouse* and does not take into account Graeme's feature "*Is This Stratton's First Short-wave Receiver!*" published in this issue.

The 'Lighthouse' is getting better all the time and I'm very pleased to see so much about the early Eddystones and the company's history. It must have been very exciting to get hold of the 1926 catalogue and scan the contents!

However where you draw conclusions is where our opinions differ! I agree that one has to be sceptical about information leaning heavily on memory alone, but consider this — on the inside front page of the handbook for the Scientific Three of 1928 we are told that Eddystone were producing short wave components in 1924.

Then I would like to draw your attention to page 26 of issue 54, where the founder of the radio business himself tells us that the start was in 1923. I can see no reason to question his authority. Also the dating system makes sense to me if it starts in 1923, looking at the numbers on my own sets. Now having said 1923 this could be December or January — who can tell?

It's a pity that Eddystone did not

with complete receivers, would have saved us much effort today! However you have now a copy of a very early catalogue from 1926 listing three different types. And *Wireless World* mentions only one!

Well, next year Stratton showed the Scientific Four at the exhibition — was this receiver mentioned in the Buyers Guide for this year? No Sir! None of the Eddystone receivers are mentioned this year.

However in 1928 *Wireless World* lists two receivers, the Scientific Three SW and the Scientific Portable Three. In the lists for 1929 we find a single entry from Stratton, the Scientific Four SW.

In 1930 the only receiver from Stratton listed is the All-Wave Four, the Scientific Portable Three is listed among other portables, but we know already that this receiver dates back to 1928.

Now there is more information to be gathered from the WW — in 1929 we learn that there is an improved three-valve receiver, this is probably a variation of the Scientific Three.

Further they tell us about a new

Scientific Four SW — a special export model was also available. Then they tell us about a new three-valve SW receiver giving no name.

This could be the Atlantic Three as featured in the Short Wave Manual No.1. In 1930 we learn that there is a simple four valve kit, this is most probably the Scientific Four SW which was new in 1929, but it could be the Homeland Four.

Then there are the receivers known from catalogues or collections. First of course the two two-valve receivers and the three valve receiver from the 1926 catalogue. Now 1926 may not be the year of introduction, but they were certainly available this year.

The twin was of course known but the other two-valver was a surprise. The three-valve receiver might be the Eddystone Battery Three as mentioned in Teds list, the year given was 1925.

Then we have the Eddystone Short Wave known from the collection at Eddystone. There are two slightly different pictures of this set showing different SW chokes. In the Harrods catalogue of 1928 the picture shows the same receiver, and the name on the set is clearly the Eddystone Short Wave, however it is named the Atlantic Two — perhaps a mix-up of photos? The genuine Atlantic Two must be the New Zealand version covered in issue 61.

Ted lists a few more receivers, namely the Regional One Battery and the Scientific Five, of which I have found no other references.

The Share Certificate dates from

they bothered, as after July 1924 the BBC approval stamp was no longer necessary. So I believe there is a chance that primitive receivers were made from mid-24 and more sophisticated ones perhaps from 1925.

You may find all this rather boring, Graeme, but in fact a Quick Reference Guide for the early Eddystones would be a much-wanted item! Also perhaps a list of available catalogues and receiver manuals.

*Thank you, Tor, for your thorough analysis of the early sets of Stratton & Company. You are never boring!*

*Your final suggestions are indeed very valid and the first one in particular so. In the early 1990's a member was preparing to publish a book on the history of Eddystone and created a copy of his work for the Company. It remained there as a source of reference until the GEC/Marconi owners were preparing to close down Eddystone Radio. Unfortunately, along with the Eddystone Museum collection, this most useful archive was removed from Birmingham and is now in limbo.*

*Our EUG archivist, Dave Simmons, is able to provide set manuals for a wide range of receivers; so many in fact that he has been unable to catalogue them! One day perhaps.*

*You will have seen that Ted hopes shortly to have more opportunity to devote to EUG matters and perhaps these matters may then be addressed.*

GRAEME.

# EUG PRIZE CROSSWORD NEWS

This month I must congratulate members on a record entry of puzzles. Well done! We had no less than twelve entries, almost triple the normal. And most of them were from new puzzlers, too. Now for the details; eight entries were correct and have received their prizes, four-sheet glossy brochures for the 958/7E of 1977. Obviously a good formula for arousing interest. Top winners were:-

Peter Beardsmore, G4IXY, of Herts

Michael Gaydon, of Kent

Mike Maxey, G8CTJ, of Leicestershire

Chris Morgan, G3XFE, of Herts

G. Oakes, G3WRK, of Cheshire

Arthur Owen, G2FUD, of Cheshire

Jack Read, also of Cheshire.

Tony Williams G3MCB of West Midlands

The four who managed to get one word wrong each received consolation prizes which I'm sure will keep them happy, but I'm not going to tell you who they were!

Here are all the answers to Puzzle Number Five:-

ACROSS: 1 Webbs Radio. 8 UFO. 9 Spreader. 10 Taped. 11 Peaking. 12 Hotel. 15 Rhone. 18 Atomise. 19 Ultra. 21 Thru Line. 23 ITA. 24 Watson Watt.

DOWN: 2 ERP. 3 Break In. 4 Red End. 5 Dirt. 6 Output. 7 Load. 9 Super. 13 Ohms Law. 14 Liege. 16 Outlaw. 17 Stereo. 19 Unit. 20 A Tot. 22 Net.

The most common mistake was putting 'IBA' instead of 'ITA' (23 across). Curiously, commercial television (1955) pre-dated commercial radio (1974) in the UK by almost 20 years. The Independent Television Authority, formed to

supervise the former, changed its name to Independent Broadcasting Authority to encompass the latter.

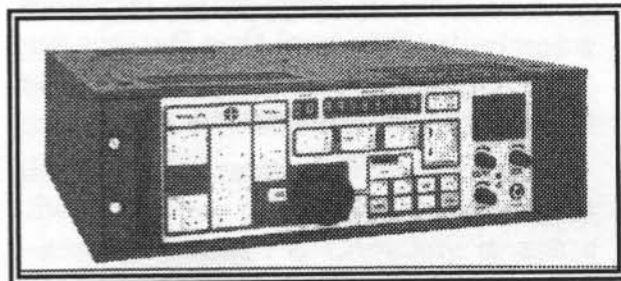
So here we are looking at this month's prizes! Gary McSweeney, G4CFQ, has kindly offered to defray the cost of a prize; much appreciated, Gary, we are keeping it in mind. And our Puzzle-Master Colin Crabb, G4HNI, has suggested a complimentary ticket to the National Vintage Communications Fair (5<sup>th</sup> May 2002).

BUT . . . I can't help thinking that our 'prize for every winner' policy has to be the most popular, especially after the Christmas Issue's record return from members. So I've been looking into the musty old archives which I salvaged from the skip at the Eddystone clearout at Selly Oak last year.

And I've come up with a handful of very vintage leaflets for the Model 1995. This was the type of set, not the year!

I'm afraid it's only a single A4 sheet, not even glossy, but incredibly rare. It was Eddystone's first VHF/UHF set with microprocessor operation, which came out in 1984. It came in two versions and covered 20-1100MHz. A dead ringer for the MF/HF 1650, but I don't think I've ever seen one around. Maybe Chris Pettitt will give us a few words on it next month.

So come on chaps, here's a chance to add to your library of Eddystone Models, which won't come again in a hurry . . .



# E.U.G. PRIZE CROSSWORD No.6

COMPILED by COLIN CRABB G4HNNH

Photocopy or write out the answers so as not to spoil your copy. Send to Graeme Wormald at 15, Sabrina Drive, Bewdley, Worcestershire DY12 2RJ, England, to arrive not later than 20th March 2002. See previous page for further details.

## ACROSS

1. Apocryphal Eddystone, supposedly single ended! (8,3)

6. A possible explanation for the presence of rubber feet on some Eddystones (3-4)

8. Is your Eddystone up to it? (4, abb.)

9. The contents of the purse may lead towards a superior category of radio receiver (8)

11. Some people really dig this connector! (5)

13. Component (1,4)

14. Repulsive magnet (8)

16. In short, an instrument for measuring speed of rotation, especially in the USA (4)

17. A particle within the nucleus of an atom, that has no electric charge (7)

19. A device or system might commonly be said to be —— if its operation ceases to be satisfactory due to overheating or signal distortion (11)

## DOWN

1. Majestic British orchestra, drastically reduced in size (3)

2. The sorry state of some

Eddystones can sometimes be attributed to this cause (3,3)

3. Missing time signal on radio 4 (2,3)

4. An intense beam of light produced by stimulated emission of radiation (5)

5. In valves and tubes, a signal voltage applied to a control electrode (10)

6. Of a transducer, the ratio of available noise power at the output to the noise power at the input (5,5)

7. Oscilloscope fault condition, indicated by the

absence of vertical deflection (2,1,3 inc.abb.)

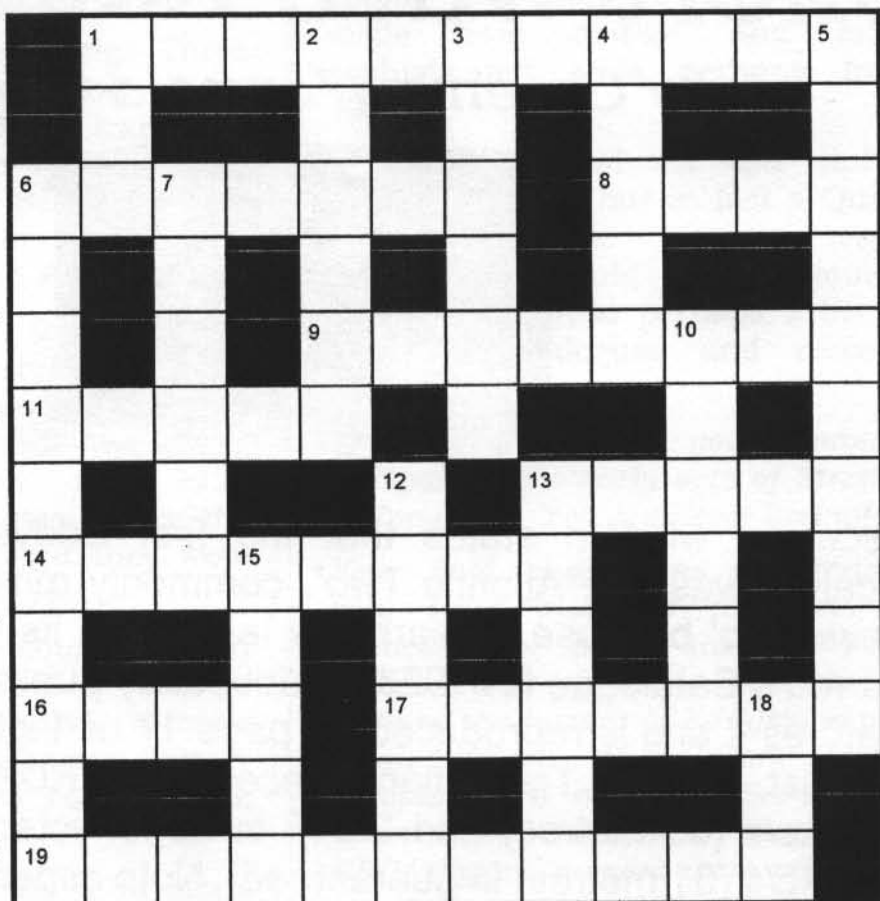
10. The ear, used differently, to facilitate audio valve operation (6)

12. Diligent use of this substance could have avoided a load of bla from the nco (6)

13. Obligatory purchase from the refreshment area at the local radio rally! (1,5)

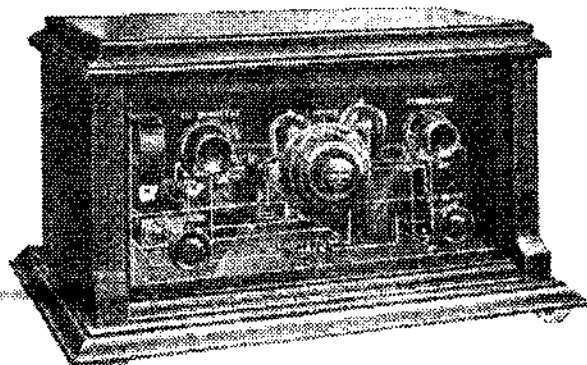
15. Early reference to the radio propagation medium (5)

18. Common internet suffix (3)



# *Is This Stratton's First Short-wave Receiver?*

*By Graeme Wormald G3GGL*



Received wisdom states that the first Eddystone short-wave receiver was the 'Atlantic Two', commonly miscalled the 'Short-wave Two' because it bears this legend on its glass front panel. Harrod's Catalogue for 1928 (undoubtedly published in late 1927) features it and is reproduced on page 17 of 'Lighthouse' issue 62 (August, 2000). Transatlantic reception of KDKA in Pittsburg on 4762kc/s (63 metres) and 2XAF in Schenectady, New York, on 9554kc/s (31 metres) is guaranteed! Note especially KDKA . . .

**T**he performance of the 'Atlantic Two' is highly praised and is quoted as being the result of 'extensive research on short wave working and considerable practical experience'.

Now in the early days of wireless a week was a long time (*the same as in politics, according to Harold Wilson*). So where had Stratton's acquired this practical experience?

They claimed to have started manufacturing short-wave components in 1924. In my own view (to quote the late Professor C.E.M.Joad) "it all depends what you mean by short wave components". If you mean low capacity,

view of Eddystone pre-1925 is sceptical. I've no wish whatever to denigrate the history of the company, but I do look sideways at some of the unsubstantiated claims of operation in 1922/3/4.

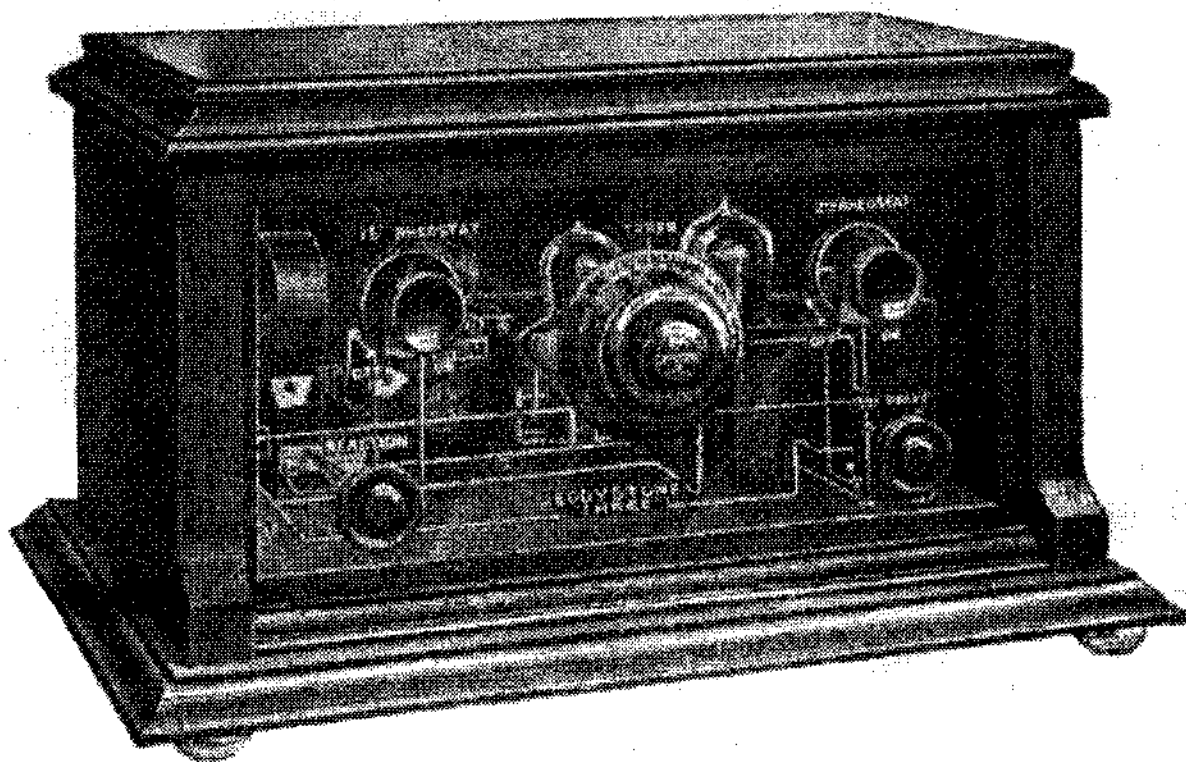
In those early days of the BBC, - and I'm talking about the British Broadcasting Company, not the national corporation which it later became - the first thing that a company wishing to get into the radio business would do would be to join the BBC. In other words, buy shares in it. (In fact, I think it was a legal requirement). By the end of 1923, some 260 wireless manufacturers had joined the BBC in this way.







## “EDDYSTONE” Three Valve Set.



### MODEL 2.

THIS Model 2 receiver has been built to meet the demand for a powerful set which will embody long range with simplicity. It is an ideal set which for positions that are over 5-8 miles from a local station, since, in this case, it is capable of receiving several alternative programmes at first-class loud speaker strength, without local station interference, yet is exceedingly simple to operate. On the local station, and within 50 miles of Daventry, it is exceedingly powerful, and will operate several large loudspeakers at full volume. Quality has been most carefully studied, and is all that can be desired, owing to the high-class apparatus used. Switching is provided for optional two or three valves, since two valves are all that is necessary for loud speaker work on the near station.

The Cabinet is of solid Oak, Jacobean finish, is fitted with shock-absorbing feet, and has a glass Instrument Panel. All apparatus and valves are enclosed, and are thus protected from breakage and dust; while terminals are fitted out of the way at the back of the cabinet. Grid bias is supplied to the last two valves, giving economy in H.T. current consumption and improved



The following is a conservative estimate of the performance of the Set on a good aerial, and should be usually exceeded. Loud Speaker strength having been obtained on stations over 500 miles distant regularly: --

Loud Speaker strength on Relays, 50 miles.  
 " " " on Main Stations, 100 miles.  
 " " " on Daventry, 250 miles.

Or suitable for working on an indoor aerial with earth up to 15 miles of a Main Station, or 80 miles of Daventry.

### PRICE

	£ s. d.
"EDDYSTONE" 3 Valve Receiver as above complete with Coils for Broadcasting and Daventry Stations and including Marconi Royalty. .. .. .	<b>15 15 0</b>

*The following accessories are needed for a complete installation :*

1 Mullard P.M.5 Valve .. .. .	18 6
2 Mullard P.M.6 Valves .. .. .	1 17 0
1 99-Volt Double Capacity Hellesen H.T. Battery .. .. .	1 15 0
1 6-Volt 40 Amp Exide Accumulator with carrier	2 10 6
Leads .. .. .	4 0
"EDDYSTONE" Loud Speaker .. .. .	2 10 0
	<b>£25 10 0</b>

NOTE. – In place of the H.T. Battery listed, H.T. Accumulators can be used. These are more expensive in the initial outlay but have the advantage that they can be charged up when run down, instead of having to buy new batteries.

	£ s. d.
4 Exide 20-Volt H.T. Accumulator Units cost ..	3 0 0.
4 20-Volt Units Smaller Make .. .. .	2 0 0.

We also supply H.T. Units for working from Electric Light D.C. Mains.

SEND FOR PARTICULARS

# A LOW-COST I.F. SWEEP GENERATOR

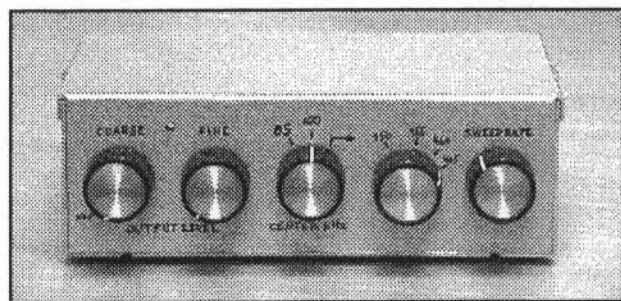
by Joe LeKostaj, K9LY

Occasionally it is useful to have a visual display of the frequency response of a receiver's I.F. stage, when analysis of a fault isolates it to the I.F. area. Perhaps the "peaking" procedure in the service manual doesn't bring the I.F. completely back to normal, and a closer look at the frequency response is called for. This article describes a swept signal generator which can be used along with an oscilloscope to display the response of an I.F. stage. (I believe the term "wobbulator" may apply to this kind of set-up.)

**B**efore going any further, I must repeat what has often been said in the past: Do not "twiddle" the transformer cores in a receiver unless you are sure what you're doing! The transformers in Eddystone receivers maintain their tuning for a very long time and seldom need adjustment.

For the rare occasion when a sweep of the I.F. is necessary, this generator can be very useful. Attractive features of this design are:- operates at the common Eddystone I.F. center frequencies: 85, 100, and 450 kHz; linear frequency sweep of +/- 10 kHz stable over a period; center frequency can be switch-selected or variable and can work at any I.F. up to 1 MHz (the maximum frequency of the function generator I.C.)

An oscilloscope is required for the visual display. It needn't be an expensive one with a high bandwidth. Even an old 500 kHz (horizontal bandwidth) oscilloscope should be adequate, and can be found at ham radio rallies and suchlike for very reasonable prices.



It must have provision to accept a DC-coupled horizontal sweep signal from the "Ramp Out" connector of the I.F. sweep generator. As shown in the schematic, the

voltage at "Ramp Out" runs between 0.70V (min.) and 4.80V (max.).

With proper adjustment of the oscilloscope's x-axis position and horizontal gain, the 'scope should be able to display a trace across the full width of the screen. You may choose to build this circuit for just one I.F. or more than one.

My unit is built with a 3-position rotary switch which selects from 85 kHz, 100 kHz, and a third position which allows adjustment from 440-470 kHz.

Alternatively, more switch positions (and trimpots!) could be used for individual settings such as 450, 455, 460, and 465 kHz if desired.

The main components of the circuit are an LM3900N quad Norton amplifier (U2) used as the ramp generator, and an Exar XR2206 function generator (U3).

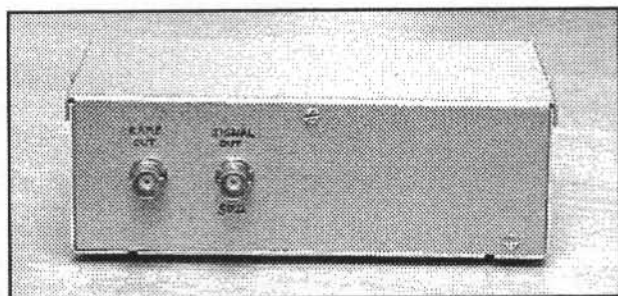
Both of these ICs have been around for a long time and are often carried by suppliers who cater to the electronics hobbyist. Since the output of the XR2206 is in the neighborhood of 4Vpp, an attenuator is used for reducing the signal to a level appropriate for an I.F. stage.

I chose to use two variable resistors as coarse and fine level adjustments. If preferred, a step attenuator could be used instead. An 11dB pi-pad attenuator serves to keep the output impedance near 50 ohms regardless of the settings of the coarse and fine adjustments.

The unit is powered from two series-connected 9V alkaline batteries. This was done just for simplicity. An AC operated

power supply may be fitted if desired. Voltage regulator U1 controls the supply voltage to the other I.C.s so that frequency stability is maintained.

Construction is straightforward, yet I would not consider this to be a beginner's project. Calibration requires a frequency counter, a variable DC voltage source covering 0 to at least 2 VDC with fine voltage adjustment (a ten-turn control is advisable), a digital multimeter (preferably with 1 mV resolution in the 2 VDC range), and an oscilloscope.



An experienced hobbyist or technician should have no trouble building and calibrating this sweep generator. Referring to the schematic, the sweep generator's frequency is controlled by the 1000 pF capacitor between pins 5 and 6 of the XR2206, and the resistors Ra, Rb, Rc, and Rd. (Please note that the terms Ra, Rb, etc. refer to the series combination of one fixed resistor and its associated trimpot.)

It is strongly recommended to use a NP0 type for the 1000 pF capacitor to minimize frequency drift. Metal film resistors should be used throughout for the same reason. Resistor Ra primarily controls the sweep width of the XR2206.

Ra in combination with either Rb, Rc, or Rd sets the center frequency. There is interaction between the two resistors; a certain amount of experimentation was needed to get both the desired center frequency and sweep width.

I chose Ra for a sweep width of +/- 10 kHz (20 kHz total). Other sweep widths, of course, are possible with different resistor values.

The circuit was built on a small perforated board from Radio Shack. (*this is similar to Manlin Trinad Board but*

*Veroboard could be used and would probably be easier for creating the layout - Graeme*) Component layout is not especially critical, but common sense should be used.

Keep leads short around the XR2206 and its trimpots. The calibration procedure is as follows:

- 1) Adjust the 50K trimpot at pin 3 of the XR2206 to get about 4 Vpp sinewave at pin 2.
- 2) Break the path between pin 10 of the LM3900 and the input end of Ra. Use an oscilloscope to measure the ramp at pin 10 and confirm it runs between 0.60V and 1.60V.
- 3) Set the trimpots of Ra and Rb to midrange. (Ten-turn trimpots are recommended.)
- 4) Connect the 0-2 VDC voltage source to the input of Ra, and connect the DC voltmeter (ideally with 1 mV resolution) there as well. Connect the frequency counter to pin 2 of the XR2206.
- 5) With the voltage source set to 1.10 VDC, adjust Rb for the desired I.F. center frequency.
- 6) Set the voltage source to 0.60 VDC and measure the frequency. Repeat for 1.60V. This will tell you the frequency sweep range. If it is not +/- 10 kHz, adjust Ra for lower resistance (if sweep width too small) or higher resistance (if sweep width too large).
- 7) Repeat steps 5) and 6) until the desired center frequency and a sweep width of +/- 10 kHz are achieved.
- 8) If you build your unit with additional resistors Rc and Rd to provide other I.F. center frequencies, those can be adjusted WITHOUT further adjustment to Ra. Set the selector switch to Rc (or Rd).
- 9) With the voltage source set to 1.10 VDC, adjust Rc (or Rd) for the desired I.F. center frequency.
- 10) Set the voltage source to 0.60 VDC and measure the frequency. Repeat for 1.60V. You should find that the

Check-list of components

RESISTORS:

- 1.5 M
- 1.0M
- 88.5K 1%
- 33K
- 10K (2 off)
- 100K
- 25.5K 1%
- 5.6K (2 off)
- 12K (2 off)
- 200Ω
- 18K
- 12K
- 1.8K
- 1K
- 82Ω
- 91Ω (2 off)

VARIABLES:

- 1M log
- 250K log
- 2K log
- 50K trippot
- 5 K trippot 3 off)
- 500Ω trippot

CAPACITORS:

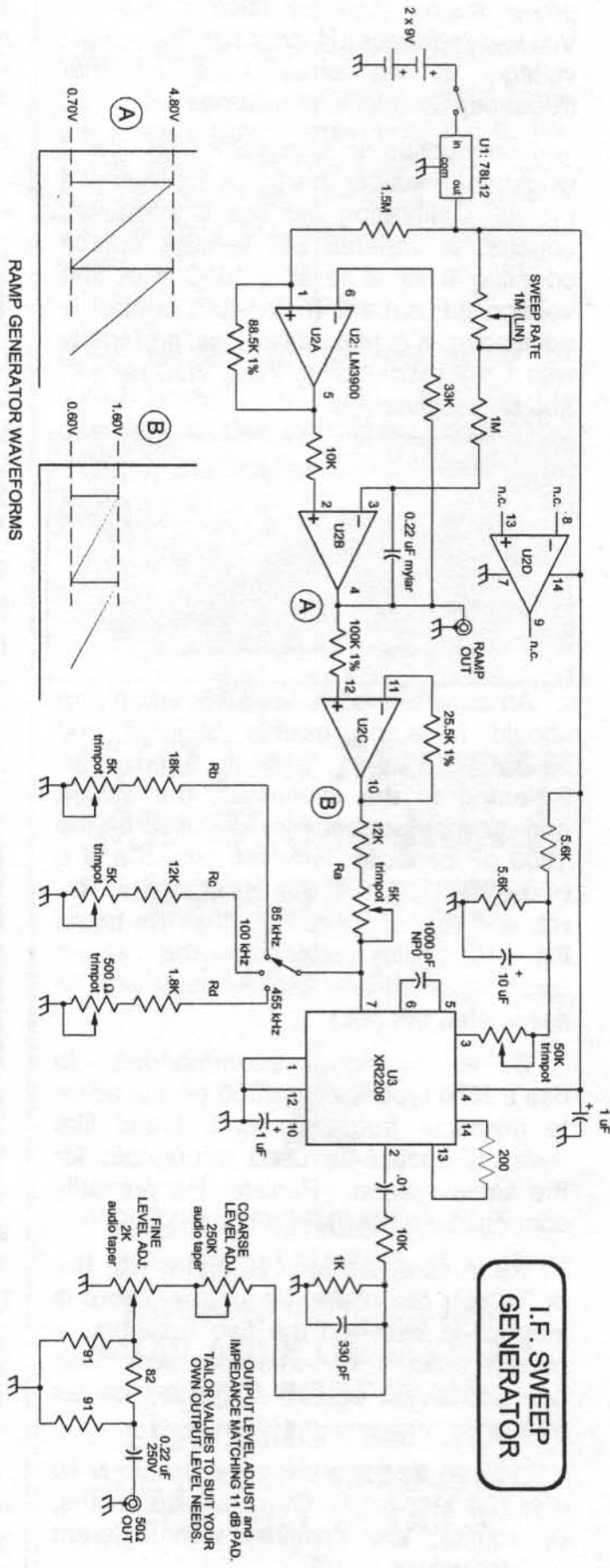
- 0.22 mfd Mylar
- 10 mfd
- 1 mfd (2 off)
- 1000 pf hi-stab
- .01 mfd
- 330 pf
- 0.22 mfd 250v.

MISC:

- Single-pole three-way rotary switch (or see text).
- Four knobs (or five, see text).
- Single pole on-off switch (may be ganged with variable).
- Co-ax input and output sockets.
- PP3 batteries (2 off)
- Battery connectors (2 off)

IC's:

- U1 78L12 voltage regulator
- U2 LM3900N ramp generator
- U3 XR2206 function generator



I.F. SWEEP GENERATOR

frequency range again is  $\pm 10$  kHz from the center frequency.

11) Finally, remove the 0-2 VDC voltage source from Ra and connect pin 10 of the LM3900 to Ra.

**This completes the calibration.**

## OTHER NOTES:

a) I recommend that you obtain the XR2206 data sheet and application notes, which are available via the Internet at: <http://www.exar.com/products/xr2206.pdf>  
<http://www.exar.com/products/tan005.pdf>

National Semiconductor no longer makes the LM3900. However, it was also produced by other manufacturers and can still be obtained.

National's data sheet is still available on-line at:

<http://www.national.com/ds/LM/LM2900.pdf>

b) The 0-2 VDC voltage source for calibrating the oscillator can be any decent variable power supply but it must have fine resolution for setting the voltage accurately.

You can make your own variable voltage supply with an LM317 voltage

regulator I.C. controlled by a ten-turn potentiometer. What NOT to do is to put a potentiometer across the output of a fixed-voltage supply to obtain a variable voltage. This will present too high a source resistance and result in frequency error.

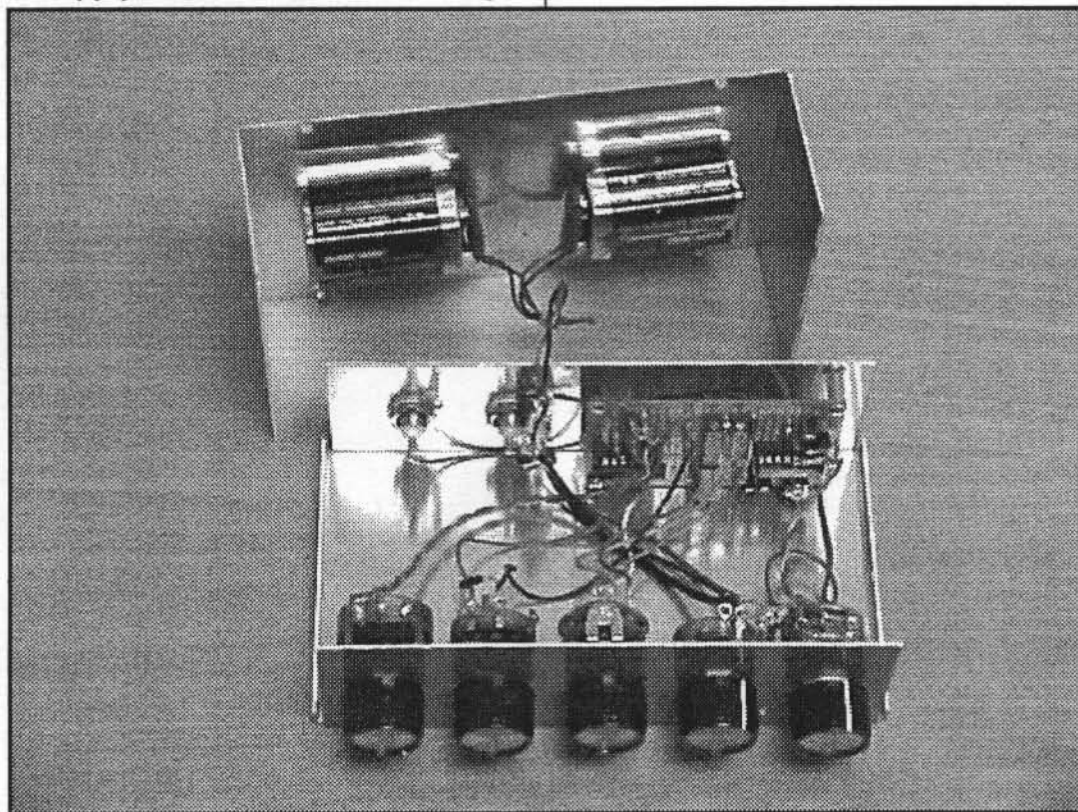
c) A single value of Ra yields a  $\pm 10$  kHz sweep at center frequencies of 85 and 100 kHz. At 455 kHz, it was found that the sweep is slightly narrower, about  $\pm 9$  kHz. This is close enough for my purposes.

However, if one wishes to optimize the sweep width at 455 kHz, I suggest using the second timing resistor input, pin 8, of the XR2206 for another pair of resistors. Pin 9 of the I.C. would then select whether the resistors at pin 7 or those at pin 8 will determine the oscillation frequency.

Refer to the XR2206 data sheet for further details on the use of pins 7, 8, and 9.

d) The author will gladly try to answer any questions about this project. Please send email to [k9ly@arrl.net](mailto:k9ly@arrl.net)

★



# RADIO RAMBLINGS

*Gettings from my Notebook*



By  
Graeme  
Wormald  
G3GGL

Bewdley, February 2002

Writing as I do at the end of January the heavens have opened and pushed the barometer down to 998 millibars, which is all rather damp and depressing. It can only improve.

And while I think about it may I remind you all of the date of the Spring **National Vintage Communications Fair** at the National Exhibition Centre, Birmingham? It is **Sunday, 5<sup>th</sup> May**, and EUG will have a stand there, as usual for the past ten years.

## LONG WAVES IN THE NEWS

I see that the QRO (half a megawatt) long-wave Tx located in the Irish Republic, **Atlantic 252**, has changed hands. With a complete coverage of the British Isles the traditional format of non-stop pop chart-toppers had started to lose listeners. From 1994 its audience of 4.3% had dropped to 0.7% in 2000.

The new owner is TEAMtalk Media Group and the station will be re-branded as **TEAMtalk 252**. The format will be non-stop sports coverage, rivalling **BBC Radio 5 Live** and **talkSPORT** both on medium waves. The target is 20-35 year-old listeners. The formal launch is on 25<sup>th</sup> February but as I write the pre-launch publicity is going flat out. The station has a team of 100 in-house journalists backed up by 270 freelancers. Good listening if you're a sports fan! (Not me, I've never watched a football match in my life).

I see that offshore radio is returning to the Irish Sea. Work has started on a new high-powered rig for the **Isle of Man**

**International Broadcasting Co**, five kilometres north-east of the Island. It will use the novel "crossed field" minimal antenna, the first by a UK broadcaster, I believe. The station is called **MusicMann 279** and will be on 279 kc/s (I'd never have guessed!).

Keep listening; opening date due around the end of this year. The original application to build the station on land was rejected as an eyesore. The cost of building the Tx and aerial on its platform is estimated to be around £5.2 million, or rather less than the flood defences being built at Bewdley to protect about 90 cottages . . .

Even more long wave news is that **North Star International** has submitted proposals to the Norwegian Authorities to operate a station with a power of 1.2 megawatts, no less. **Cruisin 216** will have studios in Bergen, operate in English and be aimed at the 35-75 age group (*that's better!*). Signals are expected to reach as far south as Benelux; proposed launch is 2003.

## MEMORIES OF CORTLANDT STREET

In an e-mail just arrived, Arthur G2FUD tells us that he can't remember ever entering a crossword competition in his life and is very pleased with his EC958/7E brochure!

He goes on to say that Poo's Ponderings in Issue 69, written in the wake of September 11<sup>th</sup>, triggered a flood of memories. He quotes: "Back in my years with Marconi, I used to enjoy visiting Cortlandt Street whenever I was in NYC.



"I bought a National NC-46 comms Rx there once, but its performance fell rather short of expectations. Some months later, I returned to trade it in for a new Hammarlund HQ-129-X Rx, and that served me well for the next 30 years. Until I read Simon's column, I'd forgotten that the WTC towers were built on what had once been the Cortlandt Street area."

Thank you, Arthur, for sharing the memory.

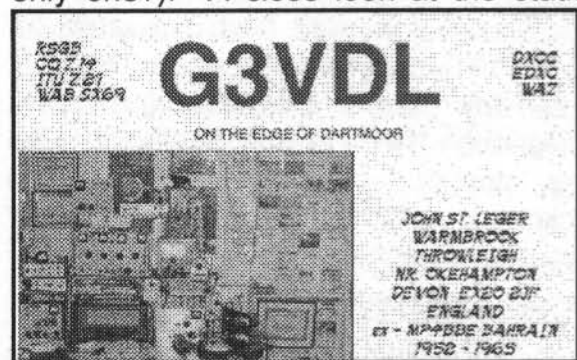
### MORE MEMBERS' QSLs

Another couple of QSL from EUGers, first from Gerhard, DJ2VN, which as well as featuring some interesting townscape



also shows a Tibetan Terrier which looks for all the world like an Old English Sheep Dog! But maybe it's smaller.

Our next card is from John, G3VDL, who is a true 100% Eddystone User (the only one?). A close look at the station



picture reveals an Eddystone 888A as the only Rx.

All the TX's are homebrew valve jobs. "No Black Boxes at G3VDL" declares John's card. And to prove that it all works he has a score of 266 countries worked in DXCC.

One word of explanation: it's all done on the key!

### WHO INVENTED PHILIPS TRIMMERS?

This interesting little announcement was made in the Short Wave Section of **PRACTICAL & AMATEUR WIRELESS** for May 28<sup>th</sup> 1938:-

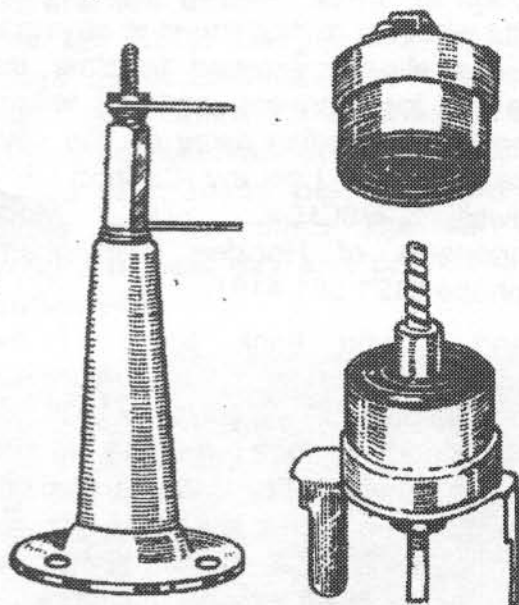


Fig. 2.—Two new Eddystone components which are suitable for ultra-short-wave receivers. On the left is a stand-off plug and socket device, and on the right a miniature trimmer.

Anybody got any bright ideas? Did Philips spot the potential and buy the patent from Stratton?? Or did they just pirate it? Answers on a postcard . . .

### CLEAN SWEEP

EUGer Joe LeKostaj, K9LY, in Illinois has sent us an interesting weekend constructional project "A Low-Cost I.F. Sweep Generator" (elsewhere in this issue). I remember many moons ago (1955, actually) I was working as a Lab Tech at the BBC Engineering Training School, Woodnorton, (Evesham). I had been 'adopted' by the boss, Dr K.R.Sturley, (an ex-Marconi boffin) as his personal artificer. He was at the time absorbed in writing his famous BBC Monograph on Frequency Modulation. He asked me to build him a demo unit to display the then 'new' Ratio Detector.

The idea was to show the beautifully linear sine-wave response on the ubiquitous Cossor Double-beam 'Scope. I was given a brand-new Cossor 10.7mc/s wobulator, which used a

moving coil-activated variable condenser to achieve the sweep. It applied a 50~mains-derived voltage to the coil; sweep-amplitude was controlled by the magnitude of this voltage; very mechanical, but it worked a treat.

But what I'm getting round to saying is that I've already scraped together the parts for Joe's project, and if I wasn't sitting here pounding away on the keys I'd be making it! I got my ICs from Chris Tredwell, G8CHW, alias Mode Components of Hockley Birmingham, telephone 0121 551 4191.

And if you think some of the resistance values (sorry, resistor, it's a solid-state project!) – if you think they're a bit non-standard, don't forget the old trick for getting them. For instance 88.5k at 1% is made up from a low-value 68k and a low-value 22k connected in series and easily checked with a digital multimeter.

I shall report on my success (or otherwise!) in our next edition.

### CHANGE of SITE

A note from Roger Bebbington MØBWP, further to his piece on the 730/1a. He gave reference of a website where decal transfers could be obtained. He finds that this is no longer operative but that an alternative is:-

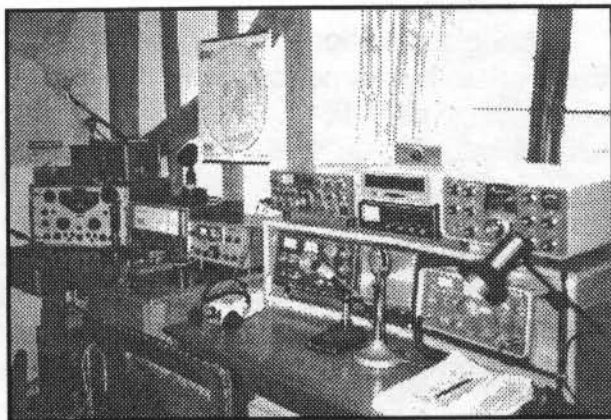
[www.thedecalpaperstore.com](http://www.thedecalpaperstore.com)

Many thanks, Roger.

### WHAT A TIDY SHACK!

EUGer Dave, GØSKF, came up on the January 'First Sunday' net and sends us this snap of his shack. Lots of vintage valve gear, including a nice Eddystone EA12 at the left hand end. But isn't it neat and tidy! I can see that Dave is a serious operator.

Dave also sent some advice about aerial matters for Jack Read ('Where, Oh Where Has My Signal Gone?' further down in this issue). We discussed the matter briefly on the net, but I'll wait until the next Issue and put any suggestions all together.



*Dave's incredibly tidy shack!*

### A VERY RARE BIRD

Included with this issue of 'Lighthouse' is a brochure for the Eddystone VHF Tactical Receiver Model 1810. It was more commonly known as the 'Scimitar R' and was part of the range of 'Scimitar' military radios supplied by Marconi. It consisted of a VHF Transceiver and Power Amplifier for vehicle use. In 1989 Marconi wanted to sell the Scimitar to a Middle Eastern country and part of the deal was that a monitoring receiver was supplied as well.

Marconi didn't have the time or resources so Eddystone offered to do it. They proved to be a very difficult customer; it was a struggle to get it out on time and it was sold too cheaply. According to Chris Pettitt it made the deadline and worked well, but after the first 150 Marconi never made any attempt to sell any more. Eddystone gave it the designation 1810 to see if anyone else was interested but nobody was. Chris reckoned no more were ever made, nor was any money!

### MORE GOOD READING

Dave Pratt, G4DMP, recommends another new book called "Marconi and his Wireless Stations in Wales" by Hari Williams. Paperback format, 110 pages & 24 photos plus circuit diagrams. An excellent little book; just send a cheque for £4.50 to the publishers Carreg Gwalch at 12 lard yr Orsaf, Llanrwst, Dyffryn Conwy LL26 0EH. (The book is in English!) ★

# WHERE, OH WHERE HAS MY SIGNAL GONE?

**L**ike, I suspect, many readers some twenty years ago, with random wire and trusty Eddystone I used to have an HF DX listening hobby. But in recent times with the widespread adoption of the home computer and neighbours' business systems the signals have virtually disappeared under a deluge of broadband hash. With a further generation of processors now advertised at even higher clock speeds the problem is set to extend into VHF.

The signals are still there, as I can demonstrate by setting up an antenna at the very bottom of the garden, as far as possible from all buildings. But it is necessary also to run out a mains lead, and take the receiver to the bottom of the garden too, in order to actually receive them. Getting the signals back into the shack, an upstairs bedroom, is the challenge. Recent articles in 'Lighthouse' confirm that in this problem I am not alone.

The antenna I now use is an ex Anchor Surplus ex Army sectional whip of either 12 or 16 feet, as one sees on Land Rovers and armoured fighting vehicles in transit on the motorways. It sits on a flexible rubber doughnut, which contains a broadband matching transformer, and outlets to a BNC connector for coaxial cable. Since I didn't buy the tank I use instead four radial wires from the base to provide a ground plane.

Like your previous correspondent running 50 metres of UR7O coax up to the receiver, as suggested in the 830 handbook, both loses signal strength and brings all the hash straight back in. The handbook goes on to say 'for optimum performance use simple L/C matching circuits at the aerial or at the receiver.' Well, I haven't found it that

simple.

A straight one-to-one isolation transformer in the coax at the receiver end drops the hash a little, but with an already attenuated signal is hardly an improvement. The best solution I have found to date had been to use some BT standard 120 ohm twisted pair to bring the signal in, with a matching balun connecting to 75 ohm coax just before entering the receiver.

How properly to couple the twisted pair (balanced line) to the ground plane vertical has me guessing. At present it is simply connected one conductor to the whip and one to the ground plane, rather than using the built in matching transformer. This appears to give best results, but doesn't seem right.

**Has any reader been through this exercise recently and come up with a simple and reliable technique for getting a signal down a wire and through a modern building, without collecting a load of computer hash on the way?**

Solutions not involving huge arrays, towers, overhead transmission lines etc., both unaffordable and unlikely to receive planning permission from the XYL would be appreciated. Is a pre-amp the answer: increase the signal and forget trying to reduce the noise?

Reports I read of 'working five continents in a morning' leave me bemused, as all I seem to 'work' these days is the neighbours' xxxing computers!

*Jack Read.*

**Any replies, please, to EUG,  
via Graeme Wormald,  
G3GGL, address on page 2**



# STRATTON'S WARTIME SURPRISE

BY GRAEME WORMALD G3GGL

Members may recall my enthusiasm about Eddystone Radio's only wartime family of general coverage receivers, of which the most famous is the S.358.

Well, last month I was going over the history of the series preparing to write a generic article about them. The users' handbook is pretty straightforward and it contains details of all the series, namely 358; 358X; 400 and 400X.

The first two are general coverage from 90Kc/s to 31Mc/s (yes, it even tunes through its own IF of 465Kc/s!)

The second two are similar but are LF/MF only, 130Kc/s to 2200Kc/s with an IF of 110Kc/s. The suffix 'X' indicates the presence of a dual-gate crystal filter.

Then, in my searches I came across the handbook for the 400B. Yes, 400B. And what a surprise! It had the same frequency coverage and dual gate crystal filter as the 400X. But there the similarity ended.

To quote from the handbook:-

**"The circuit which is of the double superheterodyne type comprises one pentode R.F. amplifier, triode hexodes as 1st and 2nd frequency changers, two pentode L.F. amplifiers and a pentode (*sic*) output valve.**

**"The intermediate frequency is 110 Kc/s. The second frequency changer circuit has a mean oscillating frequency of 110 Kc/s, which can be varied above and below this to produce an audio frequency of up to 1,000 c/s ... "**

By this time the little grey cells were starting to get muddled. The specification didn't really make sense. But more clues were to follow.

Reference to the circuit revealed all; the 2nd frequency changer was what we call a "product detector", something like 20 years before anybody else used one! At this stage I sent a copy to Peter Lankshear, former

communications chief at New Zealand Broadcasting. His observations follow (next page).

At the top of the component table the heading of:- "RECEIVER TYPE S. 400B" was followed by "A.M.

TYPE R.1448".

Now I'm not very well up in Air Ministry receiver numbering but I do know that R.1448 was way out of sequence for 1943; something special perhaps? When I spoke to Ted about it he said he thought it was an Air/Sea Rescue special; to use in those RAF high-speed launches which featured two Rolls Royce Kestrel aero engines, totalling about 1,500 horse-power and capable of aquaplaning at around 48 knots (55 mph).

I know; I once went in one at school CCF summer camp. Scared the living daylight out of me! But it was fitted with an 1154/55 rig (& DF loop). No sign of a 1448. But I digress again ...

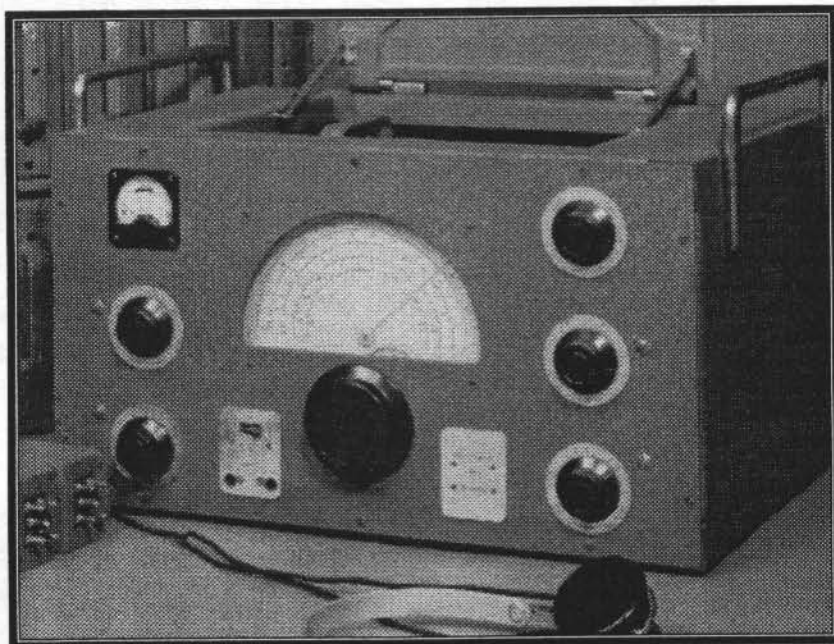
Has any member got access to Air Ministry archives, which can tell us what the R.1448 was really designed for?? I can't help feeling, myself, that it was overkill for air/sea rescue ...

*When I spoke to Ted about this 1943 Air Ministry special he told me that as far as he knew it was designed for Air/Sea Rescue Launches ...*

# AN ANALYSIS OF THE EDDYSTONE 400B

BY PETER LANKSHEAR, COMMUNICATIONS ENGINEER N.Z.B.S. (Retd)

“Although the Eddystone 400B was part of the 358/400 family, its function and technology was very different from its siblings. Indications are that whoever designed it knew what he was about.”



As far as I can ascertain, the 400B is the first example of the use, in a commercially produced receiver, of a frequency converter valve, as what would eventually be known and widely used as a product detector. Its purpose was to produce an audio frequency component directly by heterodyning a local oscillator with the incoming signal.

Also the audio amplifier was tuned to 1kHz, a frequency favouring the sensitivity of the human ear. However, there were no newly discovered principles used in the 400B – it is just that nobody seems to have previously used a frequency converter valve in exactly the same way.

By the way, it was not quite correct for Strattons to describe in the manual that the receiver was a “Double Superheterodyne”. The 400B was really a “Double heterodyne or double conversion receiver”, the first beat

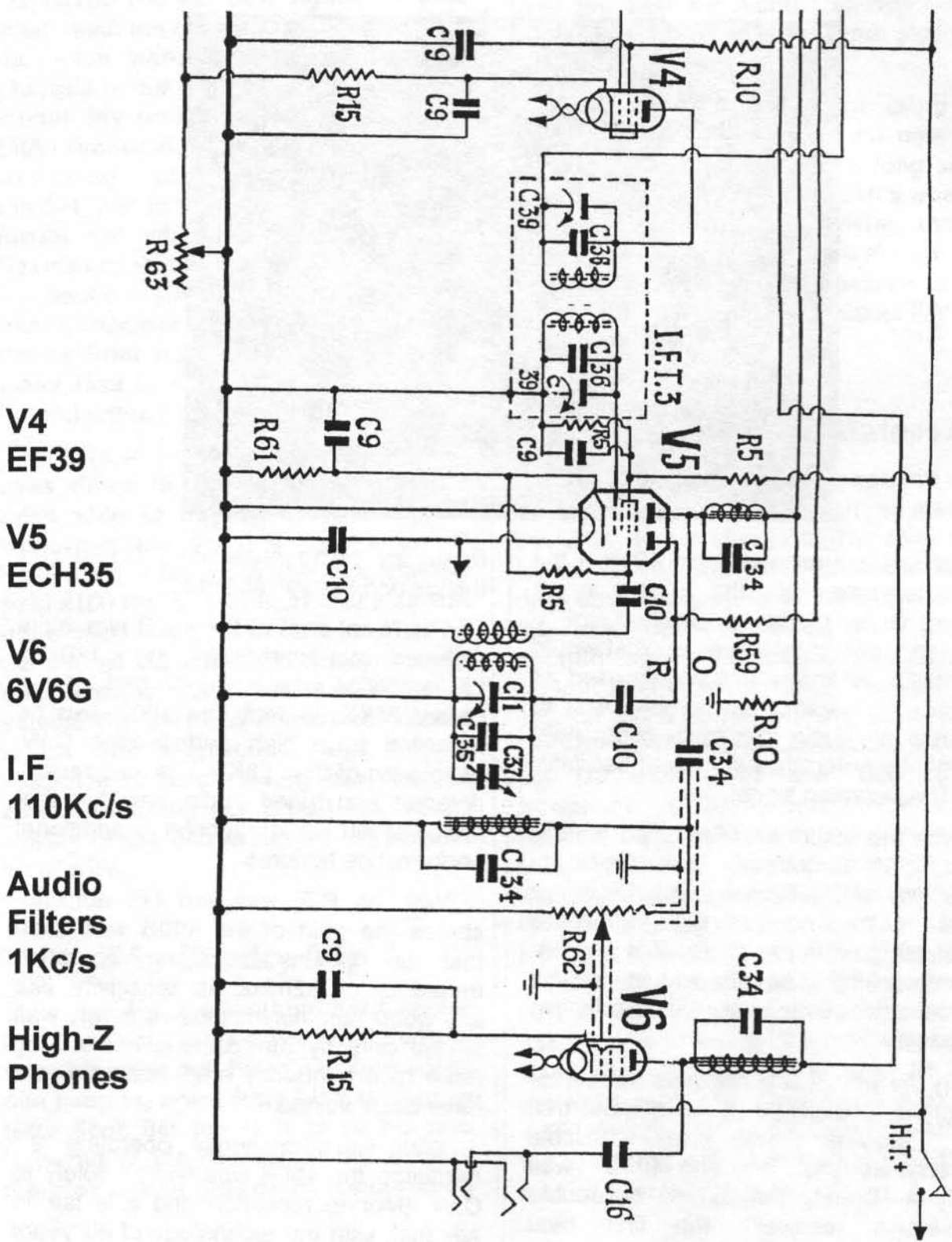
frequency being supersonic (110kHz) – the second is sonic at 1Khz.

The “front end” of the 400B was quite standard, and apart from using a 110kHz I.F. amplifier was basically that of the parent 358X. In fact, the 400B can be regarded as a high performance C.W. adaptation of the 358X. It is the unusual detector and tuned audio amplifier that are novel and confer additional performance features.

With an R.F. and two I.F. amplifier stages the gain of the 400B was such that up to its maximum operating frequency of 2.2MHz, its sensitivity, like any good communications receiver, was limited only by atmospheric noise. Any more high frequency amplification would have been wasted.

With its permanently operating 2<sup>nd</sup> oscillator, the 400B was limited solely to C.W. (Morse) reception and it is fair to say that, with the technology of 60 years

**Circuit of the final IF stage, heterodyne ('product') detector and audio filters of the Eddystone 400B, also known as the RAF R1448, September 1943**



ago there would have been nothing better available for "digging out" weak signals in the presence of interference.

As well as high sensitivity, the 400B had the superior selectivity and gain of a 110kHz I.F. amplifier plus a crystal filter. (Generally, lower frequency I.F. amplifiers have the most gain). Rather than the usual diode detector loading down the final I.F. transformer, additional selectivity came from the use instead of the hexode section of the ECH35, which, at 110kHz, would have practically infinite input impedance. This would have reduced the load seen by the I.F. transformer, providing even greater selectivity.

These factors alone would have made it an excellent C.W. receiver, but the tuned audio amplifier following the 2<sup>nd</sup> mixer would have made the 400B unbeatable. 1kHz tuned audio amplification was common in early marine receivers. Not only did it improve amplification efficiency, but as the frequency separations of low frequency transmissions then in use were often only a few kHz, both undesired and wanted transmissions could be audible and a frequency selective audio amplifier could be of considerable benefit. Note too that the "BFO" oscillator had a very small tuning range, permitting very fine control of the pitch of the audio signal.

The selective audio amplification would have favoured the use of headphones and the 400B was configured for this. However, a loud speaker could be plugged into one of the headphone sockets if required.

It is a shame that, with the demise commercially of Morse, except for one application, the 400B is now useless for reception. The one use is of course ham radio, but with the exception of the top band, a 400B would need a frequency converter to bring ham transmissions into tuning range. With a good converter, it could be a potent combination though!

## SOME FURTHER SPECULATION

After further contemplation, I am beginning to think that maybe Ted is correct in his contention that the 400B was intended for use by the Air Ministry for listening out for ditched pilots. The frequency coverage points to its being intended for marine traffic, but the Navy, - Royal and Merchant did not use it.

Signals from a Gibson Girl\* would have been likely to be weak and being on the 500kHz band they would have been easily masked by what I guess would have been, outside of the silent periods, very heavy traffic.

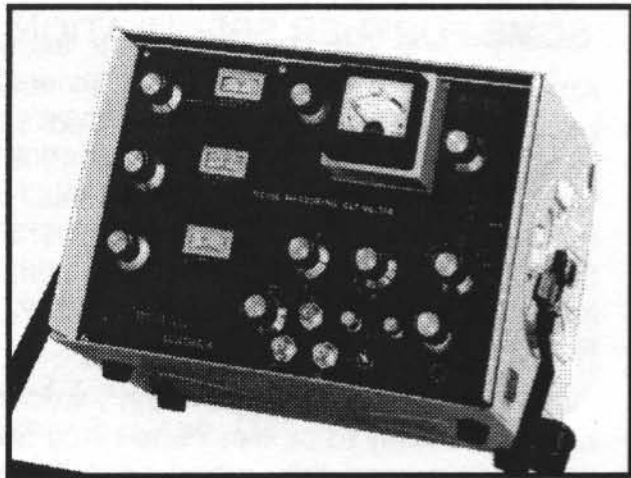
Furthermore, even crystal controlled transmitters could have been many Hz off frequency, and much more powerful ships' transmitters were still often primitive self excited oscillators with poor frequency stability. Under these conditions the 400B could have been invaluable and better than a straight 358X or similar.

Just how many listening posts the RAF would have had I would not try to guess, but given the importance of rescuing pilots, production of even a very limited number of 400B's for searching for them could have been warranted.

By the way, I calculate that the audio inductors would have been 2.5 henries each. Straight iron cored inductors are notoriously inaccurate, especially if ungapped and carrying D.C.. I'd like to know more about them.

*\*The 'Gibson Girl' was the bright yellow self-contained dinghy transmitter carried by all Allied multi-engined aircraft by 1943. It was about a foot cubed with a scooped 'waistline' (hence the name) which could be gripped between the knees.*

*The operator cranked a handle on top and generated HT & LT for a 6V6G crystal oscillator on 500Kc/s. 'SOS' was keyed automatically. The aerial was the dinghy mast or a 300 ft end-fed held up by a box-kite. Pretty dodgy!*



# Eddystone Test Set to the Rescue!

By  
Graeme Wormald  
G3GGL

**M**any of you living in the West Midlands Region (and others with good Band Two aerials and an Eddystone 770 or 990R in the shack) may now be regular listeners to the new "SAGA 105.7 FM" programmes. The target audience is the rapidly-growing "WOOFIE\*" brigade and claims to feature music "from the nineteen-forties onwards" - "Saga", of course, is the well-known national magazine for the over-fifties.

I first heard the test transmissions early last autumn and was taken by the cheerful mix of fifties and sixties music and voices speaking Queen's English instead of garbled cockney. A pleasant change from the jungle drums and glottal stops so prevalent on other popular music stations.

I was so impressed that when I heard my old friend and colleague, Peter Tomlinson, asking for listener reports I gave him a five and nine! At the same time I asked him about his ERP and the siting of the Tx.

Now when I worked with Peter at ATV (remember 'TisWas'?) in the 'seventies he never could understand my predilection for ham radio. He was station announcer and I was transmission controller, so we used to spend long hours together in earnest conversation between links.

Anyway, he turned up running the SAGA-105.7 outfit and was delighted to hear from an old mate. He explained that the Tx is located at Sutton Coldfield but he'd never heard of ERP! However, after some confused exchanges he volunteered the fact that SAGA is supposed to have the same coverage as HEART-FM 100.7 (chart pops) and could I possibly check this for him?

"Of course," I said, "I'll use my Eddystone 31A interference tracer!"

Peter didn't understand that, either, but I told him it was the bee's knees and could match any signal, dB for dB.

Well, the 31A is far more sophisticated than needed, so I just used it like a normal set with a built-in field-strength meter. But what should I use as an aerial? The 31A comes with a selection of "add-on" antennae but at 30 miles distance these were rather heavily screened, to say nothing of being frequency conscious.

But of course! My trusty discone at 20 feet, which will receive aircraft flying over central France. It's supposed to cover 25 - 1200 MHz, which I don't believe for a moment, but I'm sure it's pretty flat from 100.7 to 105.7 MHz.

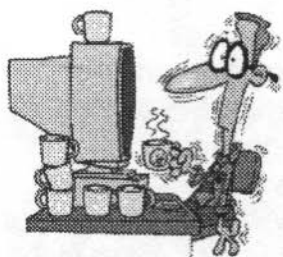
The 31A has a front-end attenuator covering 100dB in steps of one dB. It couldn't be easier; tune one station and set the meter. Then tune to the other station and adjust the attenuator until it reads the same.

The result? SAGA-105.7-FM won by 2dB! Peter was very pleased.

*\*Well Off Over FiftIES. . .*

★





# POO'S PONDERINGS

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

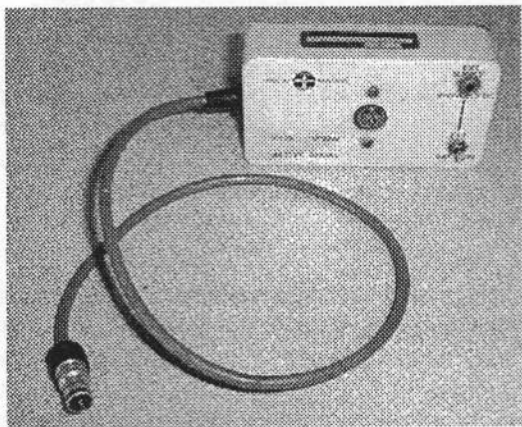
Happy New Year to everyone! I trust Santa was kind to all of you and hope you found time to "Chill Out" over the holiday.

I made a dedicated effort but was outside in the best and the worst of the weather working on my latest project. "POO Corner", a name coined by a member, is now running at 15 degrees Celsius and 55% humidity. I tried running it at 10 degrees but the humidity rose to 75% which is very bad for the health of the occupants. What is "POO Corner"? You'll have to wait and see!

## Better Reception from your Eddystone?

Over the years many manufacturers have attempted to improve the sensitivity of their sets by using R. F. preamplifiers and Active Aerial systems. Although effectively the same principle, the former is located in the set itself whereas the latter is adjacent to the aerial. Both devices *DO* work to a degree depending on the level of local interference and very strong signals; this includes distant stations as found on 40m at night. I live only 5 miles from the main Medium Wave transmitter for Radio 5 Live which puts out 50KW on 693 KHz. I have often thought of putting a tuned loop in the garden to run the house electrics!

Eddystone produced their own Active Aerial - model LP3382.



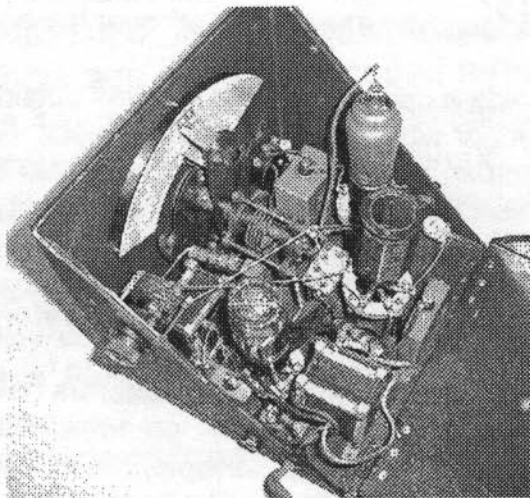
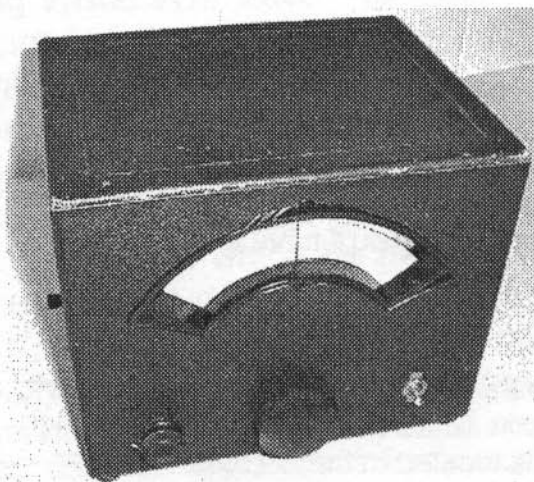
Housed in a small Eddystone Diecast box about four inches long you simply fit a PP3 battery, plug the unit into your EC10 or similar, then extend the telescopic aerial and you are in business. It does actually work quite well and is very convenient if you like to listen in bed or on holiday.

Graeme also has one of these beasts but if memory serves me correctly, his has a small and quite visible PCB inside

whereas mine has a small screened black box inside. Keep your eyes open at rally flea markets and you may come across one. They aren't common but are an interesting accessory to add to your Eddystone stable.

## The Amateur Bands Two – 1935

This unusual set was featured in Issue #68, August 2001, starting on page 15 so I won't go into too much detail here. Typically for the period it is finished in a dark brown "crystalline" paint and is housed in a very tough aluminium diecast box. For ease of access the cabinet opens along a diagonal join for changing coils. The set is quite complex for a two valve radio in 1935 but was capable of good results. I have yet to power this radio up but look forward to seeing how it stacks up against later Eddystones.



The picture on the left shows the neat and uncluttered lines of the Amateur Bands Two which features a full vision dial and little else. There's no DSP on this radio! Once opened up there is a great deal to see. Compare the guts of this set with that of the older Eddystone Twin and you'll see what I mean.

This particular cabinet was available ready cut for fitting a full vision dial and escutcheon. If you come across one at a radio fair or rally, make sure it *IS* an Amateur Bands Two and not simply an old homebrew affair. Just to confuse you further, most of the Amateur Bands Two's were built from kits of parts by their original owners.

## Homebrew Wireless 1920's Style

In the early days of wireless you invariably had to build it yourself.

There were many manufacturers of radio components such as Cyldon, Lissen and Telsen. In those days legal battles over 'Patent Infringement' were commonplace.

Anyone who has read 'Empire of the Air' will know about the struggles of Edwin Armstrong against the mighty RCA.

*Armstrong was the inventor of the Superheterodyne system and of FM.*

SHORT WAVES-MEDIUM WAVES-LONG WAVES!

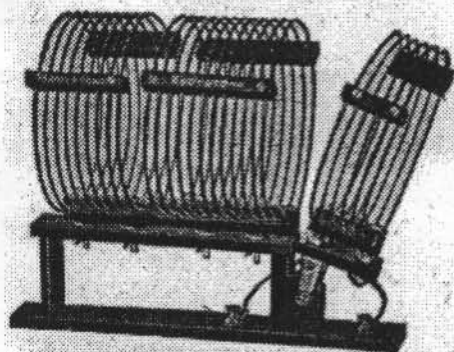
The New

# EDDYSTONE

INTERCHANGEABLE INDUCTANCE UNIT  
SUPPLIES A LONG NEEDED WANT.

New York, Sydney, London, Langenburg etc., Daventry AGR and  
SXX, ALL ON ONE SET.

This new "EDDYSTONE" unit covers the complete wave-length band from 14 to 100 metres, 250 to 550 metres, and 1,000 to 1,800 metres, using a '00015 tuning condenser, and covers it in a manner that will satisfy the requirements of the most exacting enthusiast. The short wave coils are of the famous "EDDYSTONE" pattern, and while embracing the technical requirements necessary for a real Short wave coil, they are strong and rigid. The higher band coils when used in the same receiver give truly remarkable results.



TYPE A.V. UNIT  
with semi-variable aerial coil.

3 coils with stand as shown  
25-100 metres. 20/-

Extra coils for 14-25 metres 5/-

H.R.C. coils with reaction and  
aerial coil. 11/-

SXX coils. (Patent applied for) 8/6

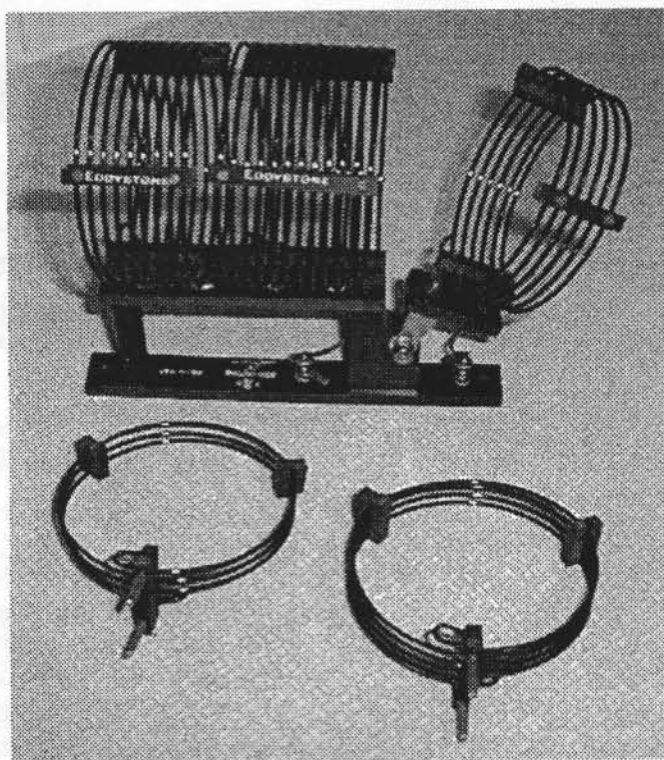


Sole Manufacturers—  
STRATTON & Co. Ltd.,  
BROMSGROVE ST.,  
BIRMINGHAM.

London Service Depot—  
Webb's Radio Electric  
Stores,  
164, Charing Cross Rd.

Mention of "The Wireless World," when writing to advertisers, will ensure prompt attention.

A10



Eddystone ensured their name was prominently displayed on each component with either the patent number or indication of "Patent Pending" or "Prov. Patent" as seen on the coils in our photograph.

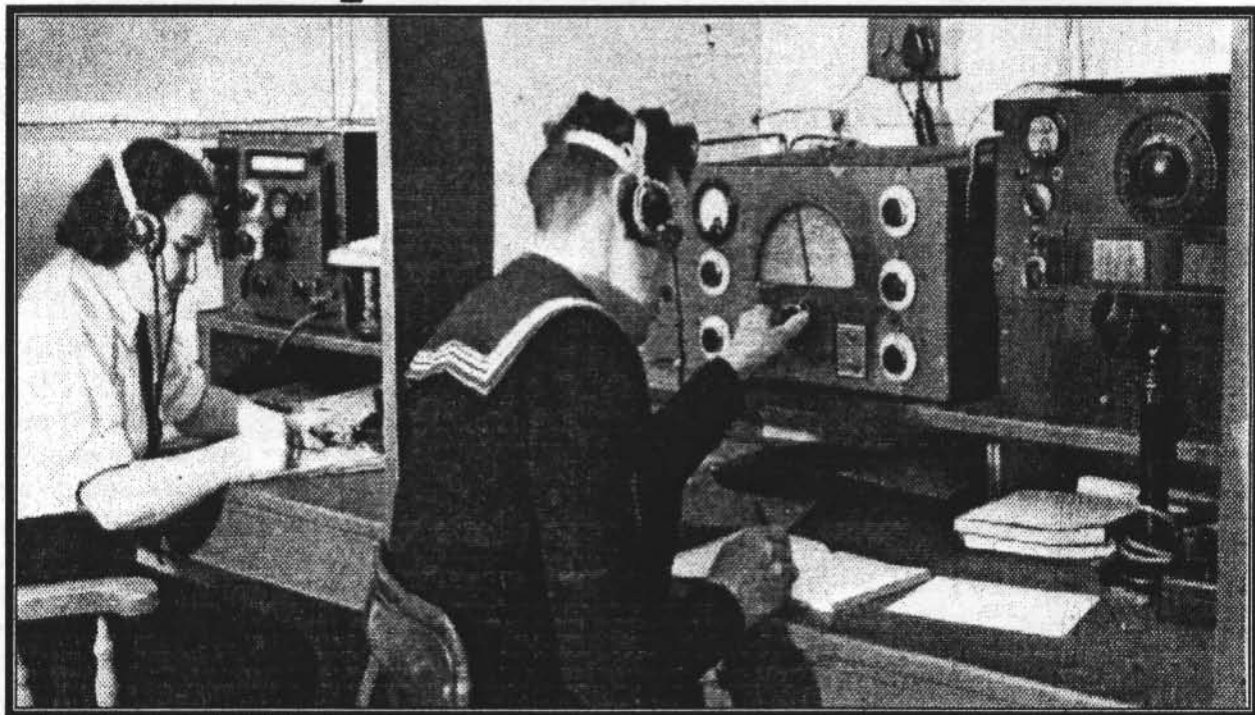
The advertisement above is taken from Wireless World in 1927 shows the range of standard and additional coils available to with the standard coil mount.

On the left is a photograph of the basic set of coils as supplied some 75 years ago.

We'll be planning for the NEC shortly, an event that I for one find fascinating. If you haven't been before do try to make time to attend. Most visitors manage to leave rather more laden than when they arrived! (Sunday, 5 May)

See you next time – 73 de Simon M5POO

# Another picture of Eddystone at War



This photograph was published in "Practical Wireless" and "Wireless World" in March 1943. The young lady 'Wren' (*Women's Royal Naval Service*) is taking copy from a Marconi CR100 receiver, whilst the matelot is tuning his Eddystone 358 (or is it a 400?), leaving the National HRO (top right) to look after itself! Is this another Intercept Station?

In the Christmas Issue of Lighthouse we published a mystery picture of a whole hutful of wartime Eddystones doing their bit with the Royal Air Force (page 53), and asked for members' ideas of where it could be.

Sharp-eyed EUGer James Reilly in Co Down (N.I.) reckons that it's one of the Bletchley Park 'Hut Six' (RAF) Intercept Stations. He tells us they were situated at Chicksands, Cheadle, Kingsdown, Waddington, Tean and Wick.

James hazards the guess that our picture was Waddington, Lincolnshire. I'd just worked out that the sergeant was checking the patch panel of the class 'A' 807 cathode follower aerial distribution

amplifiers, when two other members called me with the same idea, so it must be right!

Now let's look at the picture above; anybody got any ideas there? Although it is suggested that the Eddystones were replaced by National HRO's as the war progressed I don't really see why they should be. OK, the single RF stage would let through more image at the higher frequencies, but how much general working was done above 15 Mc/s during the sunspot minima of World War Two?

And the Eddystone's dual-gate crystal filter was far easier to use than the single one on the HRO. Remember that all 'ultra' traffic was on CW. Morse was King in those days.