

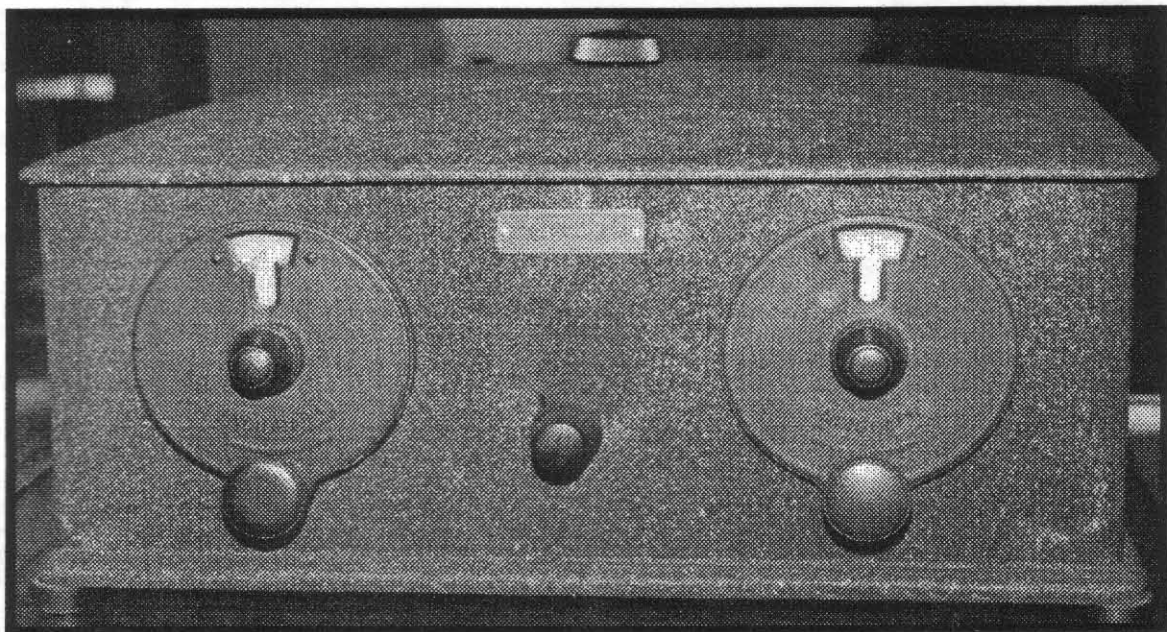
# Lighthouse

FOUNDED 1990

ISSUE 65  
FEBRUARY 2001



## The Magazine of The Eddystone User Group



**The Big Breakthrough – the new 1930 Model –  
Eddystone All-Wave Four**  
“ Undoubtedly the best Short-wave set we have  
yet examined ” — *Wireless Magazine*; February 1931

# EDDYSTONE USER GROUP

A non-profit-making group for Eddystone Radio Enthusiasts

Founded in 1990 by Ted Moore

Issue 65. February 2001

## MEMBERSHIP DETAILS:

Annual Subscription for six bi-monthly magazines:-

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Bradford, West Yorkshire, BD2 1LN

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WE CARRY WANTED adverts for members only, but we carry FOR SALE adverts for ANYBODY, all FREE. Send to Graeme at above QTH.

## FOR SALE:

Eddystone 940 c/w spare valves, manual, and wooden plinth speaker, just overhauled. £190. Variable transformer 110V input £20. Global AT-2000 £45. 8 off 6AL5, 4 off VR150/30, 2 off 5Z4GT, 2 off 5Y3GT, 4 off EL91, 3 off ECC189, 4 off EC1181, 2 off 6BE6, 2 off 6AU6, 2 off 12AU7; all around £2, all boxed. 0141 562 4571. (Glasgow)

ALL WAVE FOUR 1933 model, 4 pairs of coils, manual, serious offers. Eddystone 640, £150. 670, £110, 5" round diesast speaker £80. Buyers to inspect & collect. Phone Robert on 01276 513450 (Surrey/Hampshire border).

Continued>>>>

Eddystone 770R (R213) Good mechanical condx, very clean, believed to work OK – belonged to my late grandfather. No power lead or speaker, buyer to inspect & collect. Bring power lead and speaker if you wish to test, £100 ono. Julian White 01483 456293 (Guildford).

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Richard 01789-293375 (Stratford-upon-Avon)

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EDDYSTONE 640, superb working order. Also 640 working but needs dial restringing, £100 the pair. Model 659 AC/DC marine receiver, good condition, excellent performance, £60. Free 659 (not working) to purchaser. REALISTIC PRO 2042 AM/FM scanning Rx 25-1300 mHz, 1000 channel programmable, boxed as new £100. REALISTIC DX394, 150kHz – 30mHz comms Rx, Boxed as new £70. Peter (G4IXY) St Albans 01727 839908.

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Call Ron G8URU (Carlisle) 016977 48672.

EDDYSTONE 1650 Model /6 rescue!! USB & LSB with Spin-tuning 10khz-30mhz, Channel display and scanning, main display correct to 5Hz, monitor spkr. Superb RF performance. 100kHz IF aux o/p (DSP ready!) Remote control (PC software in preparation). £460 plus delivery at cost (or collect – Leeds). Also conversion kit for desperate /6 owners! (about £90-100) (Unconverted models available around £250, ask me) SAE for details or phone (Leeds) 0113 2696527 Geoff MØBGS (QTHR) or e-mail, please: 100664.3417@compuserve.com

ALL WORLD EIGHT, 1938 (Serial: CO335) complete with all valves and three coil packs. Original condx. Also 659(670) with BFO & S-meter fitted, working order. Swap for good classic communications Rx or best offers. Mike 01964 533478 (East Yorks)

Eddystone EC958 Rx 10kc/s-30mc/s GWO, in table cabinet with homebrew plinth spkr. Price £200. Prefer buyer inspect & collect or RV can be arranged due to weight. Also the following 830 spares: front panel c/w glass, dial, drive, S-meter, incremental drive & scale plus fingerplate. Tuning drive for 2<sup>nd</sup> IF incremental. Tuning flywheel 5174P. Crystal sel. unit D3010. Mode switch am/cw/ssb D3467. cw/ssb detector unit D3001. (Continued in next column>>>>)

Crystal calibrator with xtal LP2806/6099P. 2 off AGC/NL switch unit D3082. Mains transformer 5339P. Output transfmr D3004. 1<sup>st</sup> IF transfmr. 2nd IF transfmr. 3<sup>rd</sup> IF transfmr. The following IF transfmrs are thought to be for the model 730: D3686; D1453E; D1454E; D1545.  
Price: reasonable offer(s) plus postage.  
Call Jim M5AIP On 01708 340304, (Essex).

## WANTED:

EA12 in good clean order, prefer restored 'as new'. Contact C6ANI, PO Box N4106, Nassau NP, Bahamas.

670C Receiver, condition & price please to 0141 562 4571. (Glasgow)

MODEL 840C or any model with BFO and Medium Waves. Swap or part exchange considered for any my 'For Sale' advert (to the left.) Also wanted;; R1155 & PCR receivers. Peter (G4IXY) St Albans 01727 839908

Movement for Model 8 AVO. Call Jim Boal 02890 283789.

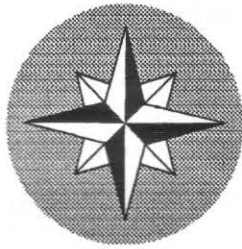
Finger plates for 670A (Brown – 4 holes) and 840A.. To buy or swap for other Eddystone components, knobs, coil holders etc. Maybe I can help with bits you are after? Richard: 01789-293375 (Stratford-upon-Avon).

680 (not 680X) and either EP15 or EP20 Panadaptor, any condition, working or not. Mike 01562 72 2262 or e-mail please: m5acs@arrl.net

Eddystone cabin model 670C. Must be in good working order; will collect from mainland UK address. Also colour photo of "Eddystone" Bulleid Pacific Class loco. Replies by e-mail please: cpadon@emirates.net.ae (Dubai, UAE).

Eddystone 730 or 750. Prefer good condition. Please call Stuart on 01434 681469 (Northumberland).

Eddystone variable Condensers (2 off) type 1131, (160 pf). Tor Mathinsen, PO BOX 2061, 3103 Tønsberg, Norway, or phone Graeme, G3GGL, on 01299 403372.



# LIGHTHOUSE

Happy New Year to all our readers and subscribers. This issue of the **Lighthouse** will no doubt be full of interesting items that Graeme, Ted and others have cobbled together for our education and amusement. We have a new season of rallies and fairs at which we can indulge our desire to collect yet more treasured items for our collections, known to our wives and others as "junk".

I find the contrast between yester-years radios and the modern "DC to light" transceivers, now available to the amateur market, truly amazing. Having bought an FT847 160m-70cm rig two years ago, I now find myself lusting after the latest Kenwood which does all that plus 1.3GHz. How do they do it and where will it end?.

This month's leaflet is the Orion 7000 which is still a current model at the Eddystone factory. It had its origins in the very successful crystal controlled Orion 5000 introduced in 1984/5. We were selling in excess of 1000 units per annum when all of a sudden the market died on us.

This was due to Codan and Barrett (both from Australia) coming in with low cost synthesized sets and sweeping up the NGO ( non-governmental organisations – or aid agencies to you and me). We got permission from Marconi to spend some serious money on a synthesized transceiver and the Orion 7000 was the result.

We sold quite a few to another Marconi company for a very important project whose destination escapes me now, but we ran late on the development and I had to shield an awful lot of flack from senior people in both my parent company and the other Marconi company . The Orion was a great technical success but we never got it into full volume production (i.e. with auto-placement of the components) for reasons I really can't go into yet ( parties involved still living etc.,).

The truth is that this market is dominated by US and Australian manufacturers where HF still plays a part in everyday life. Funnily enough the Japanese have never really tried to crack it even though they offer incredibly good value for money with their amateur radio transceivers.

I had quite a few enjoyable lunch-time sessions at the Selly Oak factory working the world on the Orion 7000 and have asked Matt Parkes to let me have the last one they ever make for my own collection. Read the data sheet, it was quite a model, pity it never had a tuning knob though! I hope to see you all at the NEC Vintage fair on April 29<sup>th</sup>, assuming I get back from the NAB show in Las Vegas in time.

My best 73's

*Chris Pettitt - GØEYO*

Patron (chris@g0eyo.freemove.co.uk)



# Eddystone User Group

Issue 65, February, 2001



Founded and Presented

by TED MOORE

Formatting and distribution by

Graeme Wormald G3GGL

Computer processing by

Simon Robinson M5POO

## TED's MAILBOX

### 2001

The first issue of the REAL new millennium. Despite what others would like us to believe. A suggestion from one EUGer that the 'unmentionable' Dome should be inverted and reconfigured as a vast dish for some super radio telescope, well I guess it would be no more hair-brained than the original idea.

Seriously though, the advances made in the use of radio telescopes over the past fifty years are stupendous. However the latest idea is to be a telescope looking for LASER signals from alien civilisations, based on the assumption that they, the aliens would be using lasers to signal to us.

If they get a message from space saying "Hiya Bud ur sigs S7" then I believe that they should be suspicious. A recent article relates how some enterprising Amateurs in the U.S. of A. are having QSOs by laser, bouncing the signal off the surface of the moon.

Whether this is legal or not it does add a new facet to our hobby. How can the signal be reflected from such a non-reflecting and dust covered surface?

TED.

(hp)

To those of us who have been in the radio and electronics profession the logo heading this item will be significant. Who has not used, or simply coveted a piece of test gear manufactured by the great HEWLETT PACKARD Company?

Since before World War II their test gear has dominated the market worldwide. Be it the humble audio test oscillator which they started with in 1939 or the large and vastly complicated oscilloscopes which in the later years of the valve era dominated the industry.

William Hewlett, who has just died in California at the age of 87, was one of the joint founders of the company. In 1939, together with David Packard, they began a business in a rented garage at Palo Alto, California. With a loan of \$538 they started by designing, and constructing their first ever model, an audio oscillator.

This all took place in the 12 x 18 foot garage. Before this they had tried to design, of all things, a machine which flushed a urinal whenever somebody stood in front of it. Their first commercial success however was to be the AF oscillator which was designed to test sound equipment. Business effectively took off when Walt Disney bought eight of them for use in the making of the film Fantasia. They never looked back from that day; scopes, to calculators, to computers, to printers. The death of Bill Hewlett means the loss of one of the giants of the electronics industry. TED.

Tor

We have heard little of Tor Marthinssen lately, now we know why. He has produced what must be his grand Opus.



Graeme terms it a 'ginormous chart' which converts almost every valve in the world into its Eddystone use. Did Eddystone use the 813 Graeme ? Just joking Pal, I know that Graeme has been working with his mentor Jesse to produce a version for EUG use, we hope.

TED.

(See p.19, but be sitting comfortably – Graeme)

## Eddystone Stamps

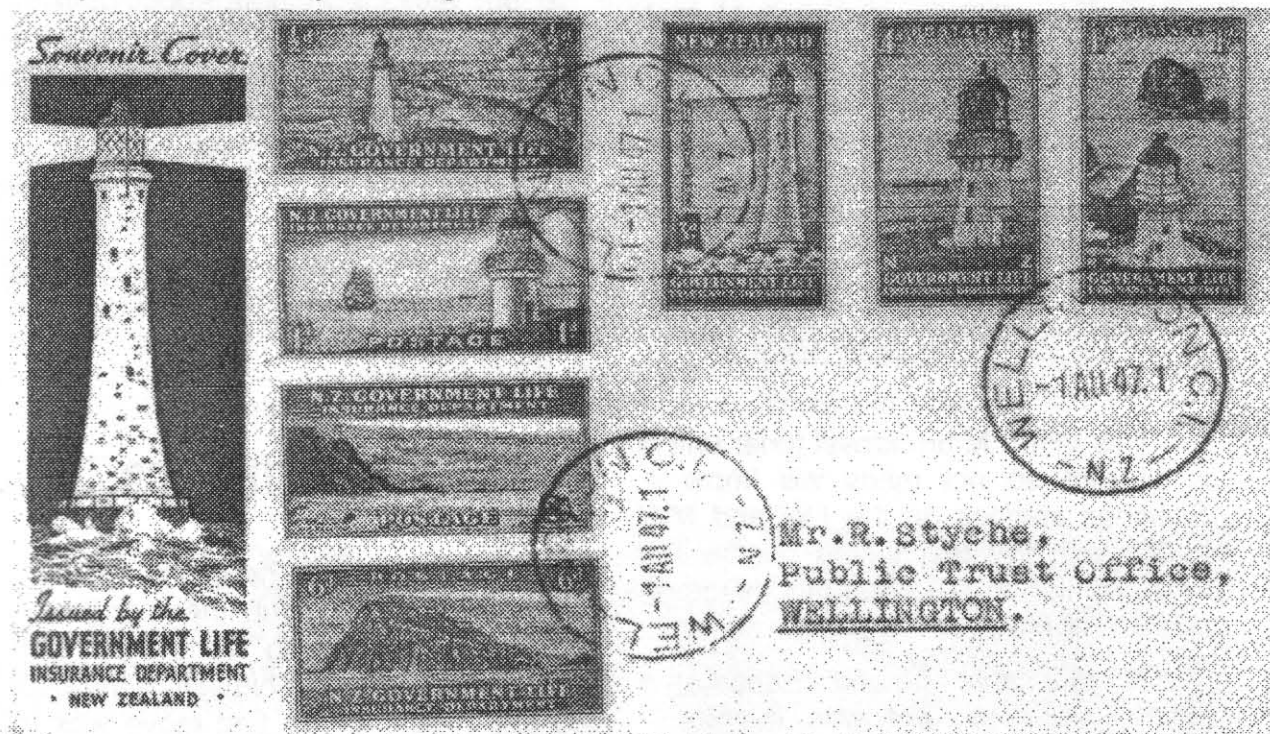
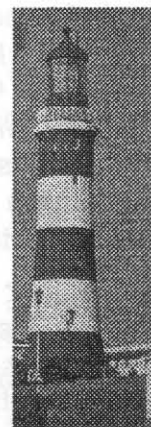
From New Zealand we have a letter and an enclosed page from a periodical for philatelists. In 1947 the N.Z government issued a series of stamps depicting various famous lighthouses, naturally 'ours' was one of those used. The 3d stamp shows the Eddystone Light.

the West Country. So far the incoming mail has brought to light just the one possibility for the origins of this story.

The remains of the last, previous, lighthouse (1759) to be mounted on the Rocks prior to the present Edifice (1882) were dismantled and brought back to Plymouth where the full upper part, from foundations up, was rebuilt on Plymouth Hoe.

Known locally as "Smeaton's Tower" after its designer and builder the brightly red and white painted lighthouse is a lasting memorial to Smeaton.

TED.



These stamps were intended for postal use by the Government Life Insurance Dep't. The same picture featured on the First Day Cover for the series. The Eddystone Light was the only overseas (to New Zealanders) one used in the series. All the others depicted lighthouses around their own coastline.

Several issues back there were comments re a supposed full scale replica of the Eddystone Lighthouse, somewhere in

## Binary Coding

Ian writes in with one of his usual 'to the point' observations. From deepest Lincolnshire he remarks, *à propos* the REAL Millenium. The first day of this year when written as 01/01/01 may be rendered into binary format as 010101. This converts into 21 in our more usual everyday decimal figures. So it must indeed be the start of the 21<sup>st</sup> Century, QED.

TED.

## 440/450 Tx/Rx

The complementary units of this mobile transmitter-receiver have been un-earthed recently by Don. He says that they have been in a dry attic store room for more years than he cares to remember. He knows that they were bought from Clydesdales originally and used after modification according to — he thinks — a SWM article. Everything is there from cabling to the home constructed mains psu, even the old carbon mike.

He is no longer a licensed amateur but is determined to have a go at getting the units working again, this will be a long time retirement project so he asks other EUGers not to hold their breath.

TED.

*(I remember having an S.440B Tx and the matching S.441B mains psu from Clydesdale in 1952; it did sterling service on the 'new' 2-metre band. About 6 watts output on a good day! - Graeme)*

## Remember the 820 ?

This VHF/FM broadcast tuner unit is a bit rare so not many will know it. Switched stations on the LW and MW bands with flywheel tuning on the FM band from 85 to 101 Mc/s this needs an add-on AF amplifier for use.

This unit came into Jed's hands as a simple repair job but was eventually sold to him for a fiver. His first problem was that whilst it worked after a fashion on MW/LW it was dead as a doughnut on FM. Some voltage checks showed that the specified HT was nowhere near that, just about 140 in fact. A further visual check showed that a replacement resistor of much higher ohmic value and lower wattage had been fitted in the place of the 500 ohm 1 watt dropper in the HT power supply. This R36 came

out pronto and a 470 ohm 3 watt replacement went in, the HT was now okay but still no FM.

Next job was to obtain a replacement for V2 the Frequency Changer valve on FM, this is a 12AT7 (or ECC81 — see page 20) and as they are readily available one was obtained by post, just two days to come. When fitted the FM band came back to life, plenty of signals, including some local garage hands chatting together on about 86 Mc/s AM ???

The FM band covers most of the present day broadcast band and so the unit was installed in the shack, fed into the AF input/PU sockets of a 670. The 820 output seems a bit low for this AF amplifier but with the volume about halfway up good signals can be heard on all the National stations on FM. None of the cores or trimmers appear to have been touched from new and so no attempt has been made to re-trim the tuned circuits.

TED.

*(The original 'Wireless World' review of the Eddystone 820 is in my 'future features box' for Lighthouse Magazine. Keep watching, - Graeme.)*

## Double Superhet, the 750

Nothing serious here, the 750 had been bought by a club member and it stubbornly refused to work. Now Don has been caught out himself in the past by this model so his first move was to inspect the rear of the set.

Sure enough the octal chassis plug was missing. As this couples the HT and LT supplies out of and back into the set it is a vital component. A DIY replacement was made up from an old octal valve base and the set burst into life. Nothing else wrong with it and the owner had a nice set for £55; sorry, plus £15 for the diecast speaker.

Now Don mentions another similar 'boo-boo' that often arises on Eddystone sets. Look at the back of the set and you will usually see a paxolin panel containing the various aerial and earth sockets, usually marked A1, A2, and E or else A, AE and E.

Is there a small two-pin plastic link plugged in between AE and E, or a link between A2 and E? Well there ought to be if you are using a single longwire aerial, but not if you are using a twin down lead as from a dipole or doublet. The failure to fit one of these links is one of the commonest reasons for low gain and seemingly inefficient aerials. If not fitted then the bottom, or earthy end of the aerial coils in use will be left floating.

Fit the link and this bottom end of the coil will be connected to Earth, as it should be. Don says that he has been caught out by this 'Missing Link' so many times over the years that it long since ceased to be funny. (know what you mean Don — Ted).

TED.

### The 888 Calibrator Unit.

This set had been bought at a Rally in the North West and whilst it performed okay the quality of the calibration pips left a lot to be desired. They were fine on the lower frequency bands but above 21 Mc/s — ZERO.

A look at the circuit showed nothing very exotic, just a one valve crystal controlled oscillator, but what is this? A tuned circuit in the screen circuit of the pentode valve? Faint glimmerings of a similar circuit in some item of WWII equipment meant that this became the immediate suspect

The idea is for this to be so tuned so as to boost the oscillator output at the higher frequencies. Guess what ? The

slug had definitely been QRMed (get it, QRM means interference!) C109 is the trimmer condenser used to calibrate the crystal oscillator frequency but those "messers" who operate without a circuit assume that the slug also performs this function. BUT IT DON'T ! The slug was re-adjusted to increase the level of output of the calibration pips up to the 30 Mc/s mark.

This had a very slight effect on the actual oscillator frequency which had to be re-set against WWV, just a matter of a few tens of cycles at 15 Mc/s. How to do this on a set which doesn't cover the sft bands?

It was easy enough to calibrate the BC221 against the WWV on 15 Mc/s and then to tune the 888 pips fed into the BC221 via a piece of wire dangling over the 888 chassis. Yes, even though the 888 doesn't cover the full spectrum the pips do. TED.

*Well, I'm going to pause here for a little breather, you'll see more pages from my MailBox further down these pages.*

*In the meantime may I say that I hope to be doing my copy for the next issue from a new address; never fear, your mail will follow me wherever.*

*73 to all.*

TED

**Ted's Mailbox  
C/o Jim Murphy  
63, Wrose Road  
BRADFORD  
BD2 1LN**



# A TALE OF TWO RADIOS

**AS TOLD TO GRAEME WORMALD BY JIM BOAL, EX-GI2FIC**

This is the tale of two radios. Only one of them is an Eddystone but the other one saved the life of one of our members and is so unusual that it deserves recording here, even if Jim wants to kick me for telling it!!

One evening just before Christmas I was woken from my Lighthouse musings by a phone call from EUGer Jim Boal. He had been reading the Christmas issue and his memory had been triggered by Simon's feature about the pre-war Eddystone 'All World Eight'. (page 55) He remembered owning one, many, many years ago and the letter on the next page tells it all.

Then we started yarning as old soldiers (and hams) do. Jim had his AA (artificial aerial) licence as a teenager before the War. That's when you had to pass your 12 wpm and then persuade the Postmaster General (PMG) that you were a worthy individual to hold a ticket. No City & Guilds exam in those days, but a letter of technical intent, telling him about the experiments you would perform. You also needed letters of support from your local nobility supporting you as a suitable person!

If all was well you were then granted the privilege of an AA licence, and a 2 plus three callsign (no 'G'). If, after a suitable apprenticeship, the PMG so wished it, you were granted a Gx plus

two letters licence and away you went. Well, before Jim reached that elevated state World War II came along and all his rig went into the Post Office store-room, just in case some wicked enemy agent should get his hands on it.

In the fullness of time Jim found himself as a signaller in the Army, participating in that dreadful disaster in Holland which was enshrined as 'A Bridge Too Far'. Arnhem.

Jim, being a company signaller, was 'wearing' one of those now highly collectable items, the Wireless Set Number 18. Weighing in at 32 lbs and mounted on a rucksack frame, it ran a rather quiet 1/4 watt on AM and CW, the Morse key being strapped firmly to the upper leg.

As a German Panzer (battle tank) came sweeping round the bend ahead Jim decided that discretion was the better part of valour and that a quick exit was indicated. He took off his headset, unstrapped the waist-belt and flipped the radio back off his shoulders into the canal.

The next thing was an almighty splash and Jim was talking to the fishes. He'd forgotten to unstrap the Morse key.

He may have got an unexpected ducking, but by the time he'd been rescued by his mates the Panzer had passed!

Telephone:  
Priority 2231-2-3-4

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Telegrams and Cables:  
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## STRATTON & CO. LTD.

Manufacturers of Short Wave Radio Equipment

EDDYSTONE WORKS, ALVECHURCH ROAD, WEST HEATH.

BIRMINGHAM, 31.

OUR REFERENCE KRW/GT/87

YOUR REFERENCE



8th July, 1957.

Mr. J. Boal,  
114 Tamar Street,  
Belfast.

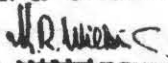
Dear Sir,

We thank you for your letter dated 28th June, and would advise you that all copies of the Instruction Manual which initially accompanied the Eddystone "All World Eight" receiver were destroyed by enemy action during the war years.

We have recovered from our files however, a circuit diagram, and have enclosed this with our compliments.

For your further information we would advise you that our Distributors in your area are Messrs. Stevenson & Co. 30-34 Church Street, Belfast, who we know will be pleased to advise you regarding the current range of Eddystone receivers.

Yours faithfully,  
For STRATTON & COMPANY LTD.

  
K.R. Wilkins.  
Technical Sales & Service.



***When EUGer Jim Boal (ex-Gi2FiC) acquired a 1936 Eddystone All World Eight after the war he wrote to Stratton's for a copy of the handbook. This is the delightful letter he received from that most helpful of all companies. He later sold the set for £5!***

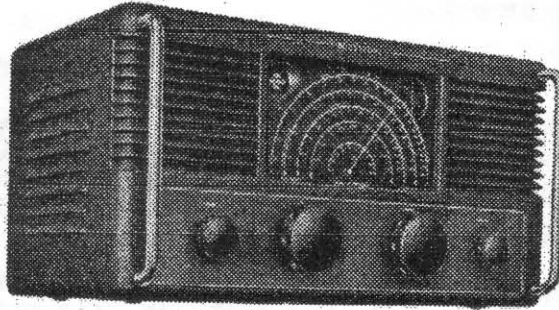
## **The 710 aka 'ALL WORLD SIX'**

Although the 710 is never called the All World Six this was the name it was advertised by. The problem occurred when this caravan-based set began acting silly over the Xmas break, not a superfluity of liquid cheer as its owner suffered several times, just plain refusing to fire up. Valve heaters were on, but no sound at all.

In the twenty odd years since it was bought, already second or third hand, nothing had gone wrong despite much use and a few longish periods when the operator had to be hospitalised. Now though something was seriously amiss and so the set was opened up. Dust and even some sand was removed using one of those car type battery operated Hoovers.

The set was then powered up again. Now it could be heard that apart from a thump at switch-on the vibrator unit was not buzzing. So why did the inline fuse not blow? Whatever; the unit was unplugged and some phone calls were made to obtain a replacement. The mini-

mum asking price being well over £20 it was decided to attempt DIY resuscitation. The crimped-over edge of the FORD manufactured unit was carefully folded back with a pair of pliers and by carefully pulling on the four base pins the whole sponge rubber enshrouded unit



came out of the outer aluminium case. Removing the close-fitting sponge rubber covering was easy since it just peeled off.

A bit of poking with the tip of a screwdriver showed that both sides of all three contacts were badly pitted and corroded. Now the following may draw howls of anguish from the more puritan-minded service engineers but remember when you are living on a pension every penny counts.

A sheet of the finest grade of sand paper was bought, a whole 10 pence this. A strip of this was glued onto the stick left from some lucky kid's choc-ice and the device now in hand was used to carefully work on the contact surfaces. It was impossible in this way to remove all of



the pitting but a good job was done and the resultant dust was blown away or wiped away before a tissue impregnated with a slight drip of new oil was used to lubricate the contact surfaces.

The unit was plugged in and tried before it was refitted into its wrappings. The set worked fine and after about twenty very noisy minutes there appeared to be no further problems. The unit was removed and refitted into its sponge rubber wrappings and then into its can, the edges were crimped down and it was re-tested. Maybe it was imagination but the hum

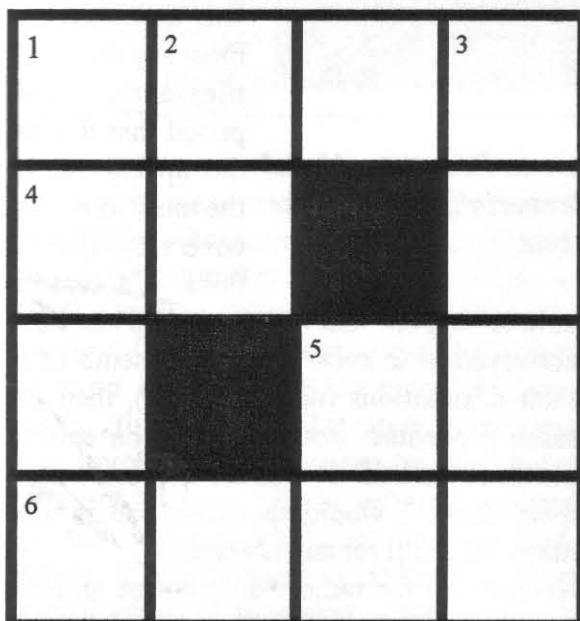
sounded ever so slightly louder than in the past. Maybe this was because the set was out of its case, anyway a double winding of masking tape was put around the whole can including the top surface.

This did certainly help and the whole set was put back together and put into use immediately. How long will this last? Five weeks of almost daily use and no problems, anyway it HAS to last until the owner's saved up the wherewithal to buy one of those newfangled solid state units.

**TED.**

## Graeme Presents

### The Smallest, Hardest, (Radio) Crossword in the World (with apologies to the Daily Mail)



#### ACROSS

1. Big bucks for the cycle?
4. 6V. F/C (*abbr.*)
5. Causes 'I' to flow. (*abbr.*)
6. Power to carry (*acronym*)

#### DOWN

1. Remedy
2. Say again? (*interj.*)
3. Universal (*abbr.*)
5. Supplies dBw. (*abbr.*)

Answers on Page 16 .

# Eddystone 730/1a

A Diplomatic Wireless Service Special

By Roger Bebbington MØBWP

An advertisement in the September 1999 issue of the RadCom Magazine, offering Eddystones for sale, (and some time to spare) led to a trip to Wales and the purchase of two Eddystone receivers, an EA12 and a 730/1a, both in need of some obvious external repairs. Both receivers were top of the range Eddystones in their day, indeed both are still highly regarded for use in today's conditions.

With a mind to using them for some CW DXing, and with my limited spare time to look for better examples, I considered them to be a worthwhile purchase (from Anthony Richards GW4RYK of course).

For various reasons I decided to start on the 730/1a first. It had been mentioned to me that the 730/1a was quite a rare

receiver, but it slowly became apparent over the coming weeks that this was an unusual receiver indeed!

The case on this Eddystone was in five separate pieces, the main area of damage being to the top cover. Every enquiry to either obtain another top cover or information on repairing the existing cover brought the same puzzled reply. No one had ever seen an Eddystone Receiver with a five piece case!

## THE MYSTERY SOLVED.

A Phone call to Bill Cooke by Graeme finally solved the mystery; my 730/1a turned out to be a Diplomatic Wireless Service Special, made to be carried secretly in separate pieces in Diplomatic Bags to its intended destination and then reassembled into a complete set.

As the photographs show there are various

multi-way connecting plugs and sockets in the wiring looms and standard TV coaxial plugs and sockets in the screened RF lines. This allowed the three chassis sections to be carried separately and then bolted and plugged together when the radio was assembled. I must say that I am pleasantly surprised that this radio appears to be the only one discovered. But I think it's reason-



*Hands up everybody who's seen an Eddystone Model 730 with a case like this, made specially to put in the Diplomatic Bag!*

able to suppose that if these radios had been conveyed in secrecy and then assembled at their destinations (no small task), then the same procedure would have to be carried out in reverse if it was wished to remove them again. I would speculate that is why many may still remain abroad.

Assembling the radio would not be an altogether straightforward task, and I wonder if a tool kit would be supplied together with any instructions, or even any training

given? I believe the radios would be delivered in a total of TEN separate main pieces as follows.

#### CASE.

The case consists of five separate panels, secured together with a total of 26 4-BA screws.

#### FRONT.

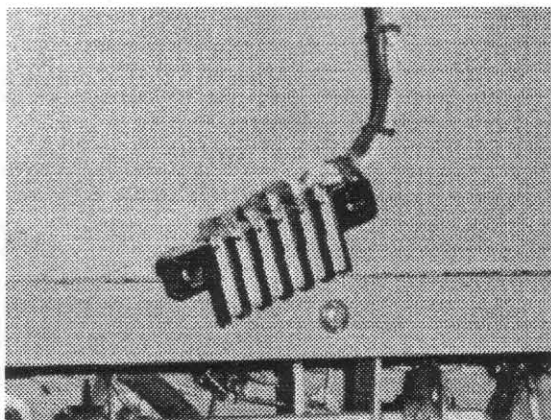
The front panel complete is secured with 4 brass taper head screws, and to the main tuning condenser via a flexible spider coupling. The escutcheon plate would have to be fitted, secured by the control fixing nuts and finally all the control knobs fitted.

#### CHASSIS.

The chassis would arrive in three separate pieces, then be bolted together and the plugs and connectors joined up.

#### COVER.

The tuning condenser cover, which holds Valve 10 (crystal calibrator) and its accompanying crystal, is also fitted with a multi-way connector. There are other small tasks such as connecting the dial and wave change lamps.



*The DC links from chassis to chassis are made using the slide connectors later used on the EC10 battery box*

#### TUNING CONDENSER.

At first I thought that the main tuning condenser would be fitted separately as well, but I now think that the knurled thumb screws are there to align it to the dial coupling after the front panel had been fitted. Also I cannot decide if all the valves would be fitted before the radios were dispatched

or after they had been assembled.

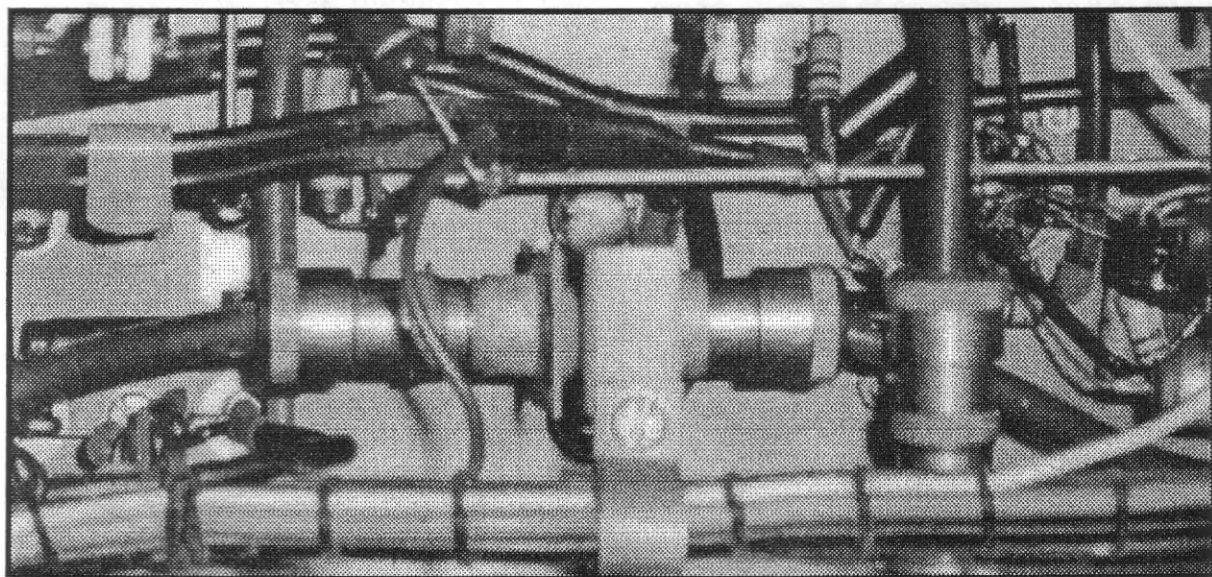
#### HISTORY.

I think there is only the briefest mention of the model 730s that were produced especially for the Diplomatic Wireless Service in any of the EUG newsletters, so information on them is scarce. I wonder how many were manufactured?

#### ACKNOWLEDGEMENTS.

My thanks to all who have kindly provided help and information, without which the restoration of this radio would not have started.

*Roger Bebbington, MØBWP*



*The RF links from tuner to IF strip are joined with Belling-Lee co-ax connectors*



# RADIO RAMBLINGS

*Gottings from my Notebook*



By  
*Graeme  
Wormald  
G3GGL*

February 2001

Greetings, and may I start the New Year by thanking all those of you who sent Seasonal Salutations to the Bewdley Office of EUG. And also to those who continue to send packets of postally-used stamps; these are passed on to the RNLI, close associates of Lighthouses!

There are several subjects to cover this month so let's get cracking with the first.

## LIST OF MEMBERS

This is a recurring request, specially from newer members who feel they would like to know of any kindred spirits nearby. In practice this suggestion runs foul of the 'Data Protection Act' which guarantees anonymity to all those whose details are kept on a database for purposes of administration.

The only way round it is to ask each member if he is prepared to have his name and QTH published. If permission is so given, then the details may be divulged.

So I've decided to compromise and ask members who are prepared to be so named to let me know (see enclosed questionnaire). I will then devote a page in the Lighthouse to giving their details and it's then up to members to make contact or otherwise, as they wish.

I shall also put the question to new members, so there will be an ongoing feed of information; rather like the 'New QTHs' column in the old 'Short Wave Magazine'.

## SURVEY OF MEMBERS' SETS

It's now well over two years since we last completed such an exercise and several members have asked for another go! May I remind you that the last such action

was disappointing in that less than a quarter of members responded (anonymity was guaranteed, nay offered, as members were given the option of returning a blank report). 63 members out of 260 made returns. The number of sets owned by each varied from none to over a hundred!

So I've decided to kill two birds with one stone, so to speak, and make the enclosed questionnaire a double one. Please note; there is no question of members' holdings of sets being revealed, unless they specially wish it (eg they write us a feature about it). The sets will merely be included in a table of sets extant (thus giving a clue as to the scarcity of any particular model).

## EUG MEMBERS' H.F. RADIO NET

This takes place on the First Sunday of each month at 10.00 hrs UK local time. Since I last mentioned this we have had a decided upturn in joiners and a few changes. I will elucidate.

The 'chaimanship' of the Net has been vested in Chris, G3XFE, (Watford area). He has a regularly good signal and is well heard in all parts of the UK. So far as which band to use, we are between the Devil and the Deep Blue Sea!

Traditionally we have used 80 metres, although the reliable daylight range is only about 200 miles with suburban aerials. We now have members calling in who are 300 miles apart. As the morning wears on condx usually get worse, and will tend to do so more and more into summer.

The February Net only had about three members reporting after fifteen minutes and condx were mediocre. It was decided to move to forty metres, around 7090. Chris made the call and contact was re-established with improved reports all round.

As time progressed we were joined by several more members and condx kept up. The problem was that so did band occupancy! Forty is only a third the size of eighty and with the greater range the Net



thanks, Mike. Incidentally, last October's issue (No 67) carried a full feature on the Eddystone EA12. Contact Mike on 01202 881749 for back numbers and subscription details (he DOES take plastic!).

### NATIONAL VINTAGE COMMS FAIR

We have now had confirmation of our booking for this year (Sunday, 29th April) at the NVCF at the Birmingham National Exhibition Centre. (Junction 6 on the M42) We shall be on Row G, Tables 2 and 3. All being well I shall be there with Simon, M5POO and Dave Simmons (who will take orders for handbooks and spares). Look for the LIGHTHOUSE.

Those of you who have read Chris Pettitt, GØEYO's Introduction will have seen that he is away at the NAB Fair the previous week (and for those of you who are as puzzled as I was when I first saw that, it stands for the National Association of Broadcasters (as in 'NAB-Spool', those huge open-centred audio 1/4" tape spools). He is due back from Las Vegas the day before the NVCF . . . Have good trip, Chris! We'll have the coffee ready.

### ALL WORLD EIGHT

In the last issue of 'Lighthouse' Simon 'POO (in his 'Ponderings' column) featured the Eddystone All World Eight (AW8) and its connection with the British Army R101C.

A telephone call from Tor Marthinsen, our Scandanavian watchdog in Tønsberg referred me to Louis Meulstee, PAØPCR's superb work of reference 'Wireless for the Warrior Vol 1', (Pub 1995).

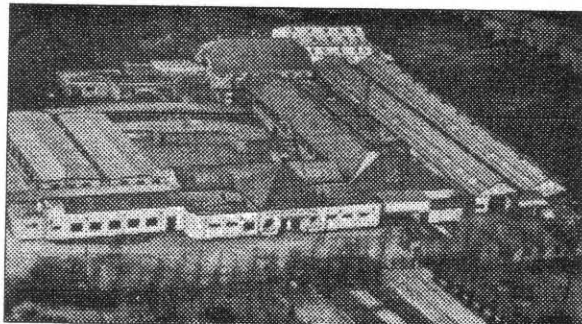
One of the items covered, the Wireless Set No 5 of the late 'thirties, was a rather chunky (2kW and 20 tons) MF/HF transmitter intended for fixed DX point-to-point communication. Apparently it was intended to use this set with the receiver R100 (of which nothing is known to me).

In the event however, economy measures forced the use of a modified version of an existing commercial receiver, the Eddystone type LPC, which was itself the 'communications' version of the AW8 (i.e. it had a BFO). Something like 70 sets

were produced by Stratton for the War Office. Later in the war these were replaced in W.S. No.5 Station use by the R106 (otherwise known as the National HRO), the Marconi CR100/2 and the RCA AR88.

Perhaps the story of the Tank, the Gun, and the shattered filaments is part of the Bath Tub folklore!

### THE BATH TUB NO MORE



Seasonal communications from Bill Cooke (past Chief Engineer & M.D. of Eddystone) and Christine Surman (past Factotum of Tech Pubs at Eddystone) both lament the fact that the old Bath Tub site, home of Eddystone from 1940 to 1996, has now been razed to the ground pending redevelopment. In this picture of the Stratton factory the outdoor swimming pool can clearly be seen amidst later additions.

## NO PEEPING

### HERE ARE THE ANSWERS TO THE SMALLEST HARDEST CROSSWORD

- ACROSS
1. Mega (as in Megacycles & megabucks!)
  4. EH (the euro valve coding for a 6 volt heater (E) pentagrid (H), as in the EH90 frequency changer - F/C.)
  5. PD (abbreviation for Potential Difference i.e. voltage, which makes electric current, symbol 'I', flow in a circuit.)
  6. DEAC. (The name of the internal nickel cadmium battery fitted to certain portable Eddystone radios.)
- DOWN
1. Mend. (as in 'cure a fault')
  2. Eh (?)
  3. ACDC (as in Eddystone Model 870 Universal AC/DC radio.)
  5. PA (Power Amplifier; dBw refers to wattage output.)



# 870A Cabin Receiver

A rather nice maroon-coloured 870A was recently bought by Joe for £30, this whilst on holiday in Scotland. It had previously belonged to a former MN Officer who had passed it on to his daughter. She had kept it stored for some years but was happy to part with it to 'a good home'.

It had been demonstrated as working before purchase but Joe being of the cautious type decided to investigate things more closely once the prize was at home.

The old style mains lead was in very poor condition and had to be replaced by more modern cable. The tuning appeared to be stiffer than is usual and some slight lubrication sorted this out. Using his Avo Signal Generator and calibrating against pips from WWV he found nothing wrong with calibration, it was well within the Company's advertised spec; and so was left alone.

More worrying though was the noisy Range switch. Not just noisy when switched but also when simply flicking the knob hard with a finger. It was necessary to clean loads of 'gunge' from all the wafer contacts and to then re lubricate the whole switch assembly, switch contacts and shafting.

The set was by now much better than when bought but Joe felt that

there was not quite enough Selectivity (Is there ever, Ted).

Eventually it was found that the primary winding of the first IF transformer was much higher in DC resistance than the second IF primary. Yet they were evidently precisely the same part. He had to remove the IFT

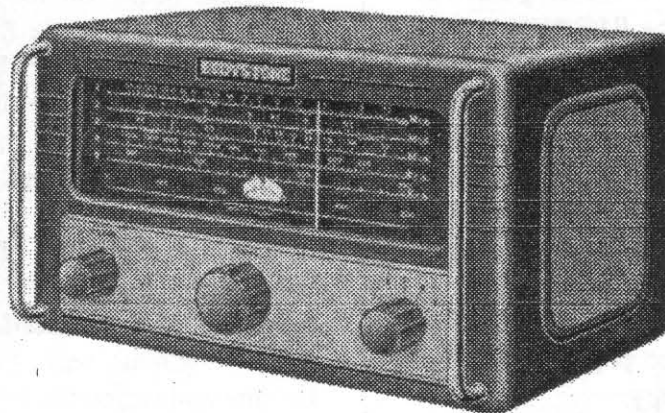
and open it up to discover why. The soldered joint where the winding and the padder condenser met was a typically 'dry' joint, at the point where they met the tag leading out of the IFT. A proper job was made of re-

soldering this and the other lead-out joints and the IF stages were realigned. He was happy to be proved right as selectivity was improved, this was most evident on the crowded MW band.

One last job to be done, a replacement thermistor was fitted as the original, whilst showing no problems electrically, had loose end leads where the wires are wrapped around the thermistor body and soldered. In fact when the component was removed from the circuit both end wires simply slipped off the ends of the thermistor body.

The 870A is now a fully restored functioning part of Joe's shack equipment, alongside the main receiver, a 940HF.

**TED.**



# All You Ever Wanted to Know about Valve Types

*(But didn't like to ask!)*

By Graeme Wormald G3GGL and Tor Marthinsen – *who did most of the legwork*

**L**AST MONTH a large chart arrived from Norway at the EUG office. It represented an enormous amount of research by Tor and showed the valve complements of most post-war Eddystone receivers. The **BIG IDEA**, says Tor, is to photocopy the table, highlight your own models, and carry it around the rallies. In this way, when you see valves going cheap, you can check up on what you need for stock.

After playing around on my PC I finally discovered how to re-create the table in a reasonably readable way. I then added a few absentees and over the next page is a double-spread ready for you to copy.

The first problem is to decide which way up to use it. Answer: whichever way suits you best! At the top of the table are three rows of valve types, 'European' nomenclature uppermost (or at the left-hand side if you're reading it that way), followed by 'American' equivalents.

Then comes the 'C.V.' column. For the past fifty-odd years I've been calling them 'Common Valves' because I'm sure I've seen them so described, but recent reading of an academic treatise describes 'C.V.' as standing for 'Communication Valve', and who am I to argue!

Anyway, whatever it stands for it was a British Government wartime invention (more on this later). I had to write the valve-types sideways to get them in. Sorry!

So, if holding the page as you open it, you highlight the line across from, say, 680 on the left, to 680 on the right, then all the valves used in that model will be co-

ordinated. The numbers represent the quantity of that particular valve in the 680. And so on . . .

A brief mention may be made here of historical background. The modern multi-electrode valve made its breakthrough very rapidly in the early 'thirties. American manufacturer RCA set the pace and the rest followed quickly.

By some magical arrangement the American industry standardised type numbers throughout. They used their own bases (known as 'UX') at first and then around 1935 introduced the American Octal (8-pin) which was (slowly) adopted in Europe and called the International Octal.

In 1936 the 'European' nomenclature was introduced, entering Britain via Philips-Mullard. The Dutch giant had bought the British valve company in the 'twenties.

The American octal numbering system had the advantage of letting you know the heater or filament voltage by its first digit, but the rest of it meant little.

Metal envelope valves emerged at the same time and these carried no suffix (e.g. 6V6). If it had a conventional glass bulb it would be suffixed 'G' (e.g. 6V6G). If it had a smaller glass bulb (tubular), it would be suffixed 'GT'. (e.g. 6V6GT).

All these types would do the same electrical job, the only difference was physical, and the fact that all the metal ones used 'pin one' to connect the metal case to earth. (640 users beware!)

This system was used in parallel with other numbers-only nomenclature, e.g. '807' and '5763', mainly to confuse the ignorant, I

suspect! When miniature valves came on the scene (c. 1939) they carried on using exactly the same system, except the 'G' and 'GT' were dropped, because all valves were glass! Unless you know the numbers by rote there is no way of telling one American valve from another.

British and Continental manufacturers had never attempted to join in a common nomenclature until 1936 (described above). Philips introduced to Britain a European standard, which was much more descriptive.

The first letter was a code for the heater voltage (e.g. E=6.3V.). The next letter indicated the sort of valve (e.g. F = R.F. pentode). These may be doubled up (e.g. CF = triode plus R.F. pentode). And so on. (see fuller codes on p.24)

The first number following this sequence indicated the type of base used (unless there was only one number following, in which case it was a pinless side-contact base! - e.g. 3 = International Octal; 9 = B7G - usually called miniature 7-pin).

The final number gave the unique type (e.g. 9) Thus the valve type EF39 was a 6.3V. heater RF pentode on an octal base, sub-division type 9. Before WW II, Mullard, Philips and Tungram were the only manufacturers to adopt this system in Britain (the last two being Continental). Some British makers steadfastly stuck to their own types, some of them until the end, some adopted American numbers, but by this time almost all were the equivalent of some other type! Hence the alternatives in the table. Valve types on the same line are identical equivalents.

Which now leads us on to the third column of valves, mysteriously labelled 'C.V.' and being numbers which tell you nothing. To understand the history of 'C.V.' it is necessary to go back to the nineteen-thirties and consider the British armed services. Due to the remarkably jumbled and unconnected method of numbering used by the British valve industry, each armed service had its own reference system!

Once WW II got under way confusion reigned (each valve having four numbers), and so the British Government rationalised the matter and gave all valves a C.V. Number. (e.g. CV1053 = EF39). That made five numbers because, for the rest of the war, each service was loath to abandon its own system!

But once peace returned the matter was tackled seriously and the C.V. nomenclature became universal on all valves used by any government agency (not just the services). And they're still with us; some transistors have C.V. numbers!

In the 1950s 'Special Quality' equivalents of existing types were produced for professional users. I recall these in the broadcasting industry in the late '50s and '60s. (see page 23).

The table overleaf has the European nomenclature in alphabetical order (almost), with U.S. and C.V. equivalents alongside.

On the page following that, there are tables for converting US tubes (valves) and C.V. numbers to (almost) anything else! On page 24 you will find an alpha-numeric table of other makes which are Eddystone-capable. Change them into EURO, and then, if your handbook specifies US types, convert them again on the main table. Got it??

The system isn't 100% foolproof. Remember that Eddystone mixed and matched valves as well as passive components from time to time.

For instance, the later 680 models had valves used in the 680X; the later 670 had types used in the 670A. And I'm sure that many of the numerous variants of 730, 830 and 930 slipped something else in somewhere.

But all in all, it's better than nothing and we hope it helps you to see through the mists of the thermionic world.

Happy hunting!



EUROPEAN VALVES	USA TUBES	C.V.	504	556	640	670	670A & C	680	680X	700-IMR54	710	730	740	750	770R	770R MkII	770S	770U	770U MkII	820	830	840-840A	840C	850	870-870A	880	888	888A	909A	910	890-930	940	EA12		
EL91	6AM5	136																																	
EM34	6M2	394																																	
EM80	6BR5	1352		1																															
EZ40	6BT4	3891											1																						
EZ41	-	-																																	
GZ30	5Z4GT	2748	1	1																															
GZ34	5AR4	1377																																	
HF93	12BA6	1928																																	
HK90	12BE6	-																																	
HBC90	12AT6	-																																	
HL90	19AQ5	-																																	
HY90	35W4	-																																	
UAF41	-	-																																	
UAF42	12S7	-																																	
UCH41	-	-																																	
UCH42	14K7	-																																	
UL41	45A5	1977																																	
UY41	31A3	-																																	
-	6AM4	-																																	
-	6V6GT	151	1	1	1																														
-	6Q7GT	589			1																														
-	6X5GT	574			1																														
-	6BJ5	3711												1																					
-	6BR7	2135																																	
-	7S7	-																																	
-	25L6	552																																	
QV03-12	5763	2129																																	
-	6849	-																																	
VR75/30	0A3	3798																																	
VR150/30	0D3	216																																	
108C1	0B2	1833																																	
150C4	0A2	1832																																	

EURO VALVES	USA TUBES	C.V.	504	556	640	670	670A & C	680	680X	700-IMR54	710	730	740	750	770R	770R MkII	770S	770U	770U MkII	820	830	840-840A	840C	850	870-870A	880	888	888A	909A	910	890-930	940	EA12			
A2521	-	2453																																		
DET22	-	273															2																			
DM70	1M3	2980					1										1																			
E180F	-	3998															3																			
EAF42	6CT7	3883									3																									
EB34	6H6	1930	1	1	1																															
EB41	-	3881																																		
EB91	6AL5	140																																		
EBC33	-	1055	1	1							2	2	1																							
EBC90	6AT6	452								1																										
EC90	6C4	133																																		
EC94	6AF4A	5074																																		
ECC81	12AT7	455																																		
ECC82	12AU7	491																																		
ECC83	12AX7	492																																		
ECC189	6ES8	5331																																		
ECF82	6U8	5065																																		
ECH35	-	1347	1	1	1																															
ECH42	6CU7	3888																																		
ECH81	6AJ8	2128																																		
EF39	-	1053	5	4	4																															
EF91	6AM6	138																																		
EF93	6BA6	454																																		
EF94	6AU6	2524																																		
EF95	6AK5	850																																		
EF732	-	3929																																		
EK90	6BE6	453																																		
EL42	-	3980																																		
EL90	6AQ5	1862																																		

<u>USA</u>	<u>EURO</u>	<u>C.V.</u>	<u>EURO</u> (OR USA)
0A2	150C4	-	EC90
0B2	108C1	133	EL91
0D3	VR150	136	EF91
1M3	DM70	138	EB91
5AR4	GZ34	140	(6V6GT)
5Z4GT	GZ30	151	VR150-30
6AF4A	EC94	216	EB91
6AJ8	ECH81	283	EM34
6AK5	EF95	394	EBC90
6AL5	EB91	452	EK90
6AM4	-	453	EF93
6AM5	EL91	454	ECC81
6AM6	EF91	455	ECC82
6AQ5	EL90	491	ECC83
6AT6	EBC90	492	(25L6)
6AU6	EF94	552	(6X5GT)
6BA6	EF93	574	(6Q7GT)
6BE6	EK90	589	EF95
6BJ5	(N78)	850	EF39
6BR5	EM80	1053	EBC33
6BT4	EZ40	1055	ECH35
6C4	EC90	1347	EM80
6CT7	EAF42	1352	GZ34
6CU7	ECH42	1377	150C4
6ES8	ECC189	1832	108C1
6Q7GT	-	1833	EL90
6V6GT	-	1862	GZ30
6X5GT	-	1863	HF93
7S7	(X81)	1928	EB34
12AT6	HBC90	1930	UL41
12AT7	ECC81	1977	ECH81
12AU7	ECC82	2128	QV03-12
12AX7	ECC83	2129	(6BR7)
12BA6	HF93	2135	EF94
12BE6	HK90	2524	GZ30
12S7	UAF42	2784	DM70
14K7	UCH42	2980	(6BJ5)
19AQ5	HL90	3711	VR75-30
25L6	-	3798	EB41
31A3	UY41	3881	EAF42
45A5	UL41	3883	ECH42
5763	QV03-12	3888	EZ40
6849	-	3891	EF372
		3929	EL42
		3980	ECF82
		5065	EC94
		5074	

These Alpha-numeric tables may be used with the chart on the previous pages for cross-reference identification.

(The USA type) numbers in the far right-hand column have no EURO equivalent



From the 1950's some manufacturers started to make 'Special Quality' or 'Ruggedised' versions of valves.

These were for professional users.

US versions stuck a 'W' on the end of an existing number so these are not listed.

British manufacturers used a different system.

Here it is:-

MULLARD	EURO
M8079	EB91
M8080	EC90
M8082	EL91
M8083	EF91
M8096	QV03-12
M8100	EF95
M8101	EF93
M8136	ECC82
M8137	ECC83
M8162	ECC81
M8223	150C4
M8224	108C1

BRIMAR	EURO
5654	EF95
5749	EF93
5750	EK90
5840	EF732
6005	EL90
6057	ECC83
6058	EB91
6060	ECC81
6062	QV03-12
6064	EF91
6067	ECC82
6073	150C4
6074	108C1
6688	E180F

This is all beginning to look a bit of a dog's breakfast, but unfortunately the tail end of the British valve market always ends up like this.

The reason it is so fragmented is that we only show types that may be used in Eddystone radios. And don't ask about the irregularities you can see that contradict our previous explanations!

It would take another book to explain. (Wait until you see the next page!)

Here is an alpha-numeric list of various manufacturers' valves with their EURO equivalents (or US in brackets)

B309	ECC81
B329	ECC82
B339	ECC83
BF62	EL42
D63	EB34
D77	EB91
D121	UAF42
DD6	EB91
DDR7	EL91
DH147	EBC33
HMO4	EK90
HP6	EF91
L77	EC90
N77	EL91
N78	(6BJ5)
N142	UL41
N144	EL91
N151	EL42
N727	EL90
PMO4	EF93
PMO5	EF95
PMO7	EF91
QS75/40	VR75-30
QS150/40	VR150-30
QS1200	150C4
QS1205	VR75-30
SP6	EF91
U142	UY41

U150	EZ40
U718	EZ40
UU9	EZ40
V741	EBC90
VR75/30	VR75-30
VR150/30	VR150-30
W727	EF93
WD142	UAF42
WD150	EAF42
X61M	ECH35
X65	ECH35
X77	EK90
X81	(7S7)
X142	UCH42
X147	ECH35
X148	(7S7)
X150	ECH42
X719	ECH81
X727	EK90
Y25	DM70(DM71)
Z77	EF91
6C10	ECH42
6C12	ECH81
6D2	EB91
6L13	ECC83
6P17	EL91
7D9	EL91
8D3	EF91
8D5	(6BR7)
52KU	GZ30
62TH	ECH42
66KU	EZ40
141TH	UCH42
150C3	VR150-30
311SU	UY41

**EURO CODES**

D = 1.4V.  
E = 6.3V.  
G = 5.0V.

(high voltage heaters)  
H = 0.15A  
U = 0.1A

VR = neon stabiliser

A = signal diode  
B = double signal diode  
C = triode  
CC = double triode  
CH = triode-hexode  
CF = triode-pentode  
F = RF pentode  
K = pentagrid (heptode)  
L = AF power stage  
M = tuning indicator  
Y = single power rectifier  
Z = double power rectifier

3 = international octal (10)  
4 = miniature 8-pin (B8A)  
7 = micro 8-pin (B8D)  
8 = miniature 9-pin (B9A)  
9 = miniature 7-pin (B7G)

## MORE FROM TED'S MAILBOX

# The Strange Tale of an 840C

When something which is used on a daily basis goes wrong one is left with a gap in the daily round. This is what happened to Peter when his 840C succumbed to old age. (middle age for this model surely ? Ted).

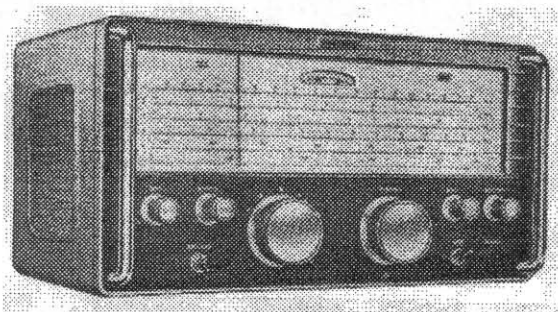
The first symptom was increased hum on the audio output, which increased as the gain was turned up. Now Peter admits that he ought to have latched on to this last fact. Instead he spent several hours checking around the power supply stage, checking electrolytics and the rectifier but finding nothing amiss. A whole evening was spent next, just thinking about the fault, emulating Archimedes as he puts it.

It was next morning when Peter finally got around to the initial fact that the hum increased as he turned up the volume. So this meant his fault was somewhere in the circuit BEFORE the AF volume control. EUREKA !!!

He took all of the valves out and fitted his spare set, all old ones removed some years before when he was flush with cash and decided to splurge on a new set. "Look Ma, no Hum" as Peter said.

And so he began replacing the oldies one by one, starting with V1. Come the replacement of V2, the mixer/oscillator, and he had his hum back again. He put the old valve back

here and carried on trying the present valves but only V2 showed any signs of hum. The set was put back into its case and into use with the old valve in situ.



At this point Peter was about to consign the 'duff' valve to the waste bin when he took a second look at the base of the all glass valve.

A lot of black carbon deposit which could be wiped off with a finger. He cleaned the whole of the base using one of those impregnated 'wipes' — pinched from his XYL's make-up bag. Opening up the set once more he again tried the supposedly duff valve and lo ! No Hum, Mum.

This must have been a case of carbon tracking on the glass base which allowed some slight heater AC to enter the signal circuits via another electrode pin. A final job was to remove all valves again and to clean all of them using the same method, he also cleaned up the top surfaces of all of the valve holders, just to be sure. The set is back in service and functioning normally again. (does the XYL know ?). **TED.**



# Profile **Eddystone 1969**

*We are fortunate that EUGer Tom Toth has an eye for history, and sent us this feature from 'New Electronics' magazine for 5<sup>th</sup> August 1969. It contains a wealth of detail, some of it new to us. We present it here in serial form, reviewing from the '30s to the early '50s.*

**E**ddystone Radio, the Birmingham-based receiver manufacturers are planning expansion on a broad front to meet the challenge of the '70s.

Dick Carroll, managing director, says the company is to develop the existing capability across the whole frequency spectrum from 10kHz, to 1,000 MHz in a price range from £75 to £750. The immediate target is to double turnover during the next two-and-a-half to three years, and this will be achieved by an aggressive marketing policy both at home and abroad, with products with a high performance to price ratio.

## Early Products

**E**ddystone is among the oldest of British radio manufacturers, specialising largely in the professional short-wave communications market. Early products, dating back to the '20s, were in great demand by the radio amateurs of the day, and Eddystone was among the first to market receivers in kit form for home assembly.

The amateur quality market is still catered for by the inclusion in the catalogue of the EA12, a double-superhet covering amateur bands only, and some lower-priced

general coverage receivers.

Broadcast reception is also covered by transistorised receivers suitable for tropical and shipboard use, as well as in less demanding environments. But the big drive is on the 100 percent professional market.

## Wartime Activity

**I**n the purely professional field, the breakthrough started in 1937 with the first production of the R101 for the Services, followed by the 358 at the beginning of the war. This receiver and its naval version with VLF bands, the 400B, had a production run of some 5,000 sets, and introduced Eddystone to quantity batch production. Old-timers in communications will recall the Mullard "E" series valves in the old days, and the plug-in coil packs.

Just before the war the company had designed a 100W base-station transmitter for the Birmingham police network, and this, cleaned-up mechanically was manufactured during the war for naval use. Another war-time activity was the manufacture of many thousands of specialised components, and the company still has a quality component range on offer.

*Continued >>>*

## After the War

**W**hen the war was over, Eddystone, like so many companies who had devoted all their energies to war-time production – they had also been bombed out and had to move to their present site – was confronted with the difficulty of transition to a peacetime economy. A major problem was what to make. The re-introduction of the television service offered some hope of an expanding market. TV receivers, including a direct projection model, were investigated, but this activity was soon abandoned.

The amateur market, in which Eddystone was known world-wide, was also opening up again and this, at least, was the devil they knew. The S640 receiver was designed and marketed and a production run of 4,000 was implemented. The pricing policy and an attempt to offer hire-purchase terms made this a non-event in commercial terms. Almost a disaster, in fact.

## First Double-superhet

**T**he next venture was the S740, a general-purpose receiver of which about 400 were made, and this was followed by the S750, the first double-superhet from the Eddystone labs. This receiver was adopted by Marconi and marketed by them in 1949/50 as the Marconi HR100. About 1,000 of these receivers were taken by Marconi, mainly as a comparatively low-cost receiver for point to point radio links overseas.

A parallel development of this period was a ship's main receiver

designed for merchant shipping of all tonnages. This receiver, cumbersome by today's standards but with a fine performance, was a feather in the cap of Eddystone designers. It was granted full BPO approval on its first application and was adopted by International Marine Radio Co as the IMR54. Some 300 were built by Eddystone before handing over the complete design to STC, the IMR parent company. Many of these receivers, built to the Eddystone design, are still in service.

## The first 'Cabin' set

**A** quick development about the same time was the S670, a low-price AC/DC, general purpose, marine cabin receiver, of which some 7,000 were made over an extended period.

Then came the S680 in 1954-55. It was a straight superhet with two R.F. stages, a 450kHz IF, good AGC characteristics, a low distortion CW mixer and an AF filter. *(A bit out with the date and filter; they're getting it mixed up with the 730! – Graeme)* A good middle-price receiver which was to be adopted by the British army as the 730 Series, it ran to 2,500 production models, and was the first Eddystone receiver suitable for synthesiser drive.

Of the total production, the army took 1,000. A special version was used by the Diplomatic Wireless Service, the exceptional feature being that it could be dismantled into units of suitable size and weight for transport in diplomatic bags and then re-assembled.

**NEXT MONTH WE EXAMINE  
NEW HIGH STABILITY MODELS.**

# STRATTON'S QUANTUM LEAP

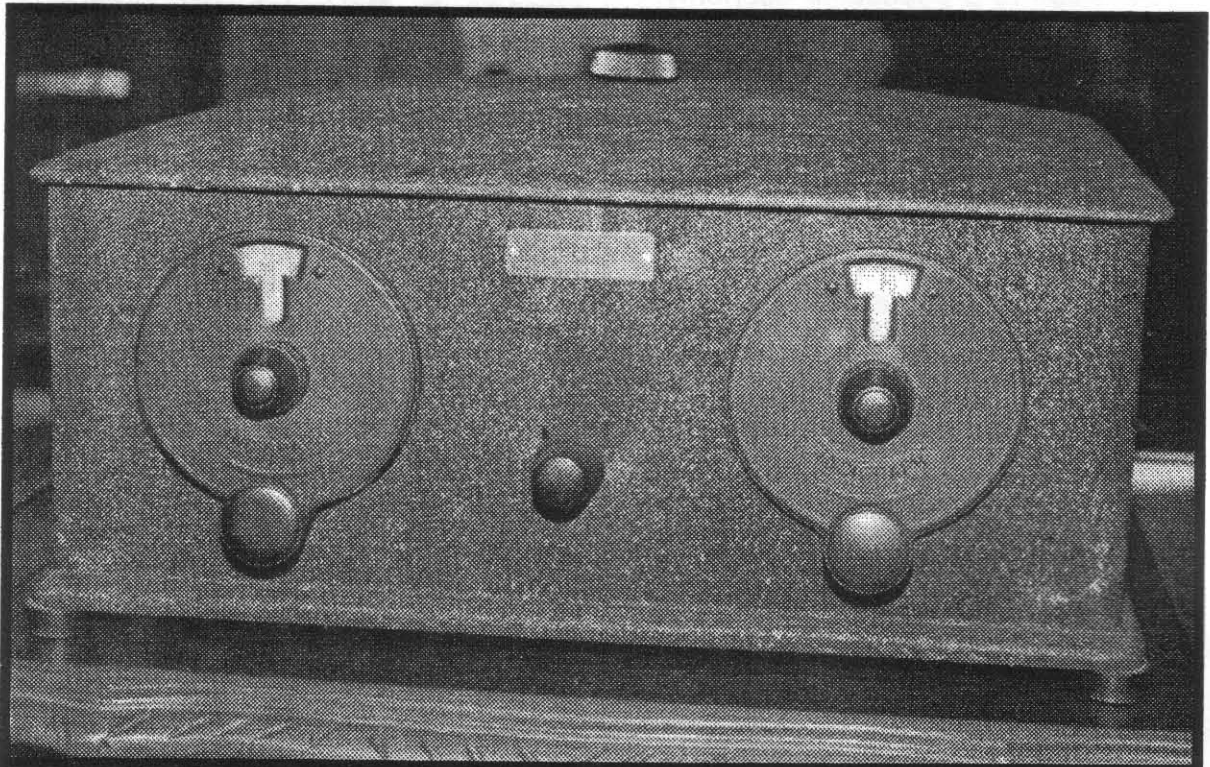
## HOW THE 1930 EDDYSTONE "ALL-WAVE FOUR" LAUNCHED THEM INTO THE NEW DECADE

BY GRAEME WORMALD G3GGL

Virtually all pre-war Stratton records were destroyed by enemy action in 1940. Information from the 'thirties is being built up from surviving private sources, but the 'twenties remain rather grey.

doll's house. The lid was firmly kept in place by a large, Lighthouse-embossed thumb-screw.

It was the brain-child of Bill Chaplin, the Company Manager; Harold Cox, the



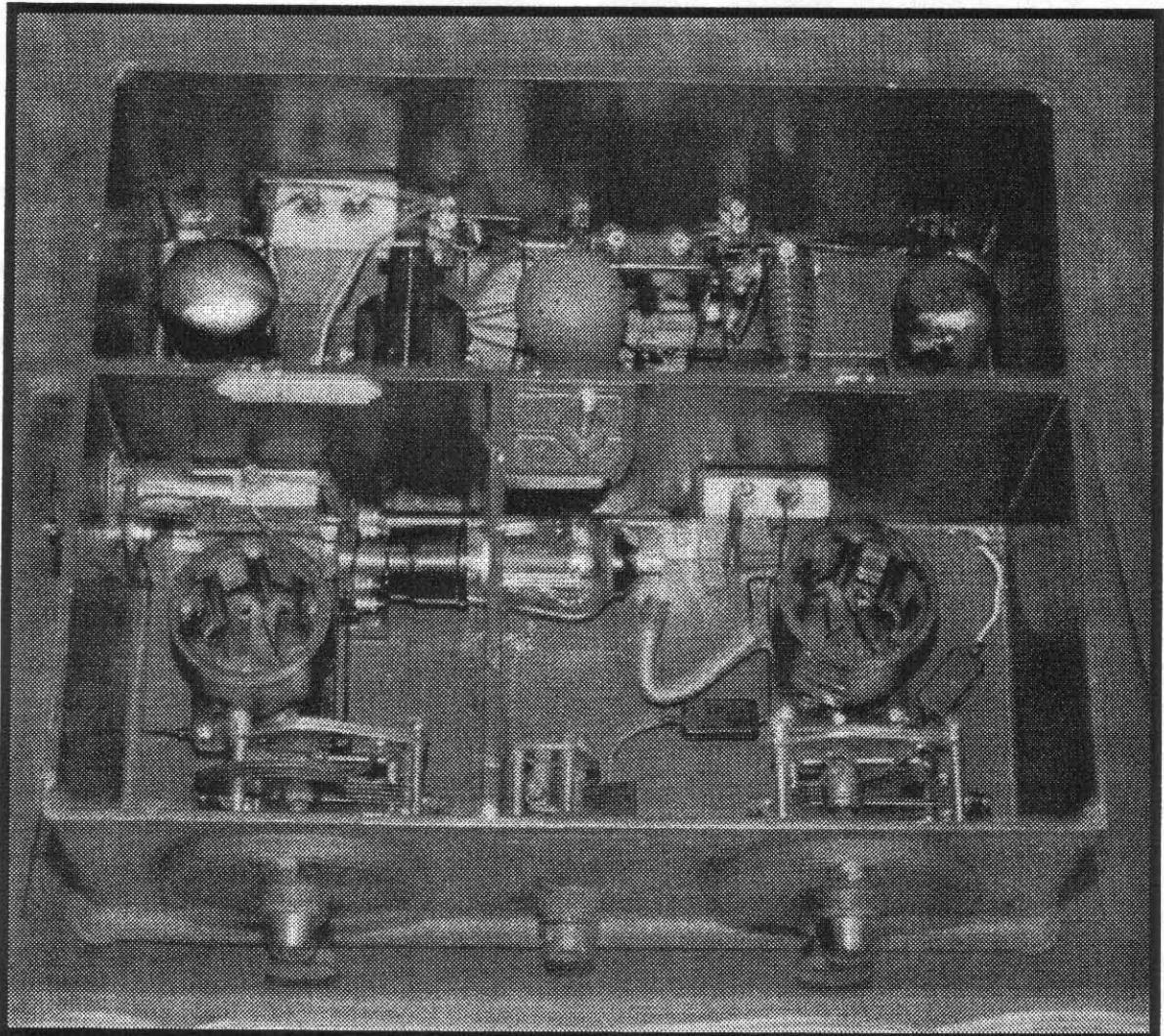
*The Eddystone All-Wave Four was in a tropicalised all-metal case*

Literature and sets from this period are scant. We know (or, at least, we think we know) that the first short wave sets were launched in 1926. They were cased in wood with various front panels; glass, wood, ebonite, and aluminium.

Then in 1930 a whole new concept appeared: the entry of the first 'All Wave Four'. It was of revolutionary design, being entirely contained in a cast two-piece aluminium case. It had a false bottom with a metal plate cover, and the main case was divided up like a

Technical Director; and George Stratton Laughton, son of the chairman, and instigator of radio production at Stratton's, c.1923. Bill Chaplin had been experimenting with casting of small parts but the large divided case was a quantum leap. He was responsible for the introduction of the art of diecasting into Eddystone, but he was forced to leave the company in the mid-thirties due to an indiscretion concerning his secretary, an attractive young lady . . .





*The white ivory label on the left inner panel bears the legend :-  
"This instrument has been manufactured in Great Britain for export under  
agreement with the Marconi Company and the Gramophone Company, for use  
for the reception of sound broadcasts by wireless. 4 VALVES NO E 1821"  
(-a reminder that Mr Baird's television had already arrived!)*

Morals were incredibly strict before the 1960s. Remember the Peter Eckersley scandal at the BBC? No? Well, in 1929, Captain Peter Eckersley, the very talented Chief Engineer at the BBC, had to hand in his resignation to Sir John Reith, the Director General, after getting involved in an extra-marital affair with an actress. Even when I worked for that august company in the mid-1950s, if one married a colleague, then one of you had to resign. Honestly! In 1955, a bachelor Technical Assistant at Skelton Transmitters, living in the BBC

Hostel in Penrith, took up with a young widow living up the street.

One night he failed to return to the Hostel. The following week he was posted to BBC Towyn, the small fill-in transmitter on the Welsh coast, about 200miles away. No option!

However, I digress; back to the matter in hand. Harold Cox and George S. Laughton had, by this time, become as skilled as anyone (and more than most) in mastering the mysteries of short-

wave reception. The real market was overseas, where the weather and the insects were a much greater hazard than at home.

Wood was a failure for these taxing conditions. All-metal was the only answer. A fully tuned screen-grid RF stage, a reaction condenser with slow motion drive, and the craftiest aerial coupling condenser you ever saw, all combined to create this model a resounding success.

The outer case was finished in rich brown wrinkle, inside was the same colour but smooth. The Company abandoned its 'own brand' (rather cumbersome) slow motion drives in favour of the widely-used Igranic 'Indigraph' dials. A very simple, but reliable and smooth, pinch-wheel reduction drive. The LH dial tuned the aerial circuit and the RH one the detector.

In the centre was the epicyclical drive to the reaction condenser and on the LH side of the case was the series aerial condenser of unique design. Try and imagine a piece of 1/2 inch tubing, about an inch long, cut in half lengthways.

This looked rather like a miniature uhf horizontal reflector. It was then fixed to an insulated block and became the stator. A similar, but slightly smaller hemitube (new word just invented - cf. 'hemisphere') has one end mounted on a 1/8" rod or shaft, which is fitted in an insulated bearing so that it may both slide in and out and rotate within the axis of the stator

Thus was created a variable condenser with a maximum capacity of about 10pF and an immeasurably low minimum. This was then placed in series with the aerial and the top of the tuned circuit and straight to the grid of the RF stage. No aerial coupling coil; straight in.

This was undoubtedly the secret of coupling a 100' end-fed aerial to such a set. The article following this one is an original review of the AW4 in the 'Wireless Magazine' for February, 1931. It describes the device as 'the selectivity control'. I suppose it would be, really!

The set used the 'new' vertical-axis plug-in coils, 2.5" diameter, in place of the large horizontal air-spaced ones previously used (in retrospect, more suitable for a QRO Tx!). They only had a short life and were replaced by the smaller 1.25" diameter ones c.1934. These continued without change into the 1960s.

Interestingly, another feature in this edition of our magazine, "Profile - Eddystone 1969", claims that Eddystone's professional breakthrough came in 1937, with orders for the R101 (military version of the LPC/All World 8).

This advert (opposite) suggests, in perhaps a small way, that the Company had already made a breakthrough in the professional market with the 'All-Wave Four'. It was chosen for the "British Arctic Air Route Expedition"; a little known activity of the Air Ministry. In any event the sets worked well enough to persuade the members of the expedition to telegraph Stratton's from Iceland with the good news!

Presumably the outcome was that over-the-pole aviation was not yet feasible. The first scheduled airline crossing of the Arctic was in 1954, when a Douglas DC6 of Scandinavian Airlines flew from Denmark to California, with refuelling stops in Greenland and Canada. The whole trip took just 20 hours; not bad for a piston-engined aircraft almost half a century ago.

*Additional material by Bill Cooke, GWØION, former Chief Engineer and Managing Director, Eddystone Radio Limited.*

**“—exclusively used with unfailing reliability”**

The “EDDYSTONE” ALL-WAVE FOUR SHORT-WAVE RECEIVERS which were exclusively chosen by the BRITISH ARCTIC AIR ROUTE EXPEDITION are more than justifying the confidence placed in them, as this remarkable telegram indicates. To give faultless service throughout the gruelling vicissitudes of an expedition to uncharted Polar regions is testimony to the efficiency and reliability of the

**EDDYSTONE**

**ALL-WAVE FOUR SHORT-WAVE RECEIVER**

A set designed for use in any climate of the world, and adaptable for all wavelengths between 12.5 and 2,000 metres. Provides Loud-speaker reception of short-wave or broadcast stations of all continents. Perfect short-wave reception without capacity effects and with smoothest reaction control. Simple to use and nothing to go wrong. Headphones can be used on three valves only and jack for gramophone pick-up insertion is fitted. Eliminators can be supplied for H.T. from D.C. or A.C. mains.

With valves, leads, grid-bias battery, short-wave coils 12.5-85 metres and broadcast coils 250-550 metres.

**PRICE £27**

Write for list No. W.M. 23 giving full details

**STRATTON & CO., LTD., BROMSGROVE ST., BIRMINGHAM**

THE GREAT NORTHERN TELEGRAPH COMPANY (LIMITED) (INCORPORATED IN GREAT BRITAIN)

CHINA, HONG KONG, JAPAN, MACAO, THE PHILIPPINES, U.S.A., SINGAPORE, SRI LANKA, SWITZERLAND, THAILAND, VIETNAM, YOKOHAMA, POLAND, SWEDEN, DENMARK, FINLAND, LATVIA, ESTONIA, LITHUANIA, BIRMINGHAM OFFICE: BIRCHHILL BUILDING, BIRCHHILL, GLASGOW.

*Argmagssalik Bromsgrove*  
*To Stratton Street 13th Floor*

*Congratulations your receivers exclusively used on expedition with unfailing reliability*  
*Emon Argmagssalik*

“Via WORTHERN”



# EDDYSTONE ALL-WAVE FOUR

*"Undoubtedly the best short-wave set we have yet examined."*

**Maker** . . . . . Stratton & Co., Ltd.

**Price** . . . . . £27.

**Power Supply** . . . . Batteries.

To work the set tested we used a 2-volt accumulator and a 120-volt high-tension battery. A 15-volt grid-bias battery is included in the set.

**Power Consumption** . . . . With the recommended high-tension and grid-bias voltages we found the total anode consumption was 15 milliamperes. For reliable and economical working a triple-capacity high-tension battery would therefore be needed. The low-tension current for the filaments was found to be .6 ampere. A 30-ampere hour accumulator would therefore give 50 hours service per charge.

**Valve Combination** . . . A screened-grid high-frequency valve precedes the detector, which is resistance coupled to the first low-frequency amplifying valve, which in turn is transformer coupled to the pentode output valve. This is a very good combination for a short-wave set. The screened-grid valve provides smooth reaction over the whole available tuning ranges. The pentode power valve at the end of the set gives an extra filip to the many weak signals received from the other side of the world.

**Controls** . . . . Our first impression was the delightful ease of control. There are two tuners, with slow-motion dials on the left and right. A

small slow-motion reaction control is fitted between.

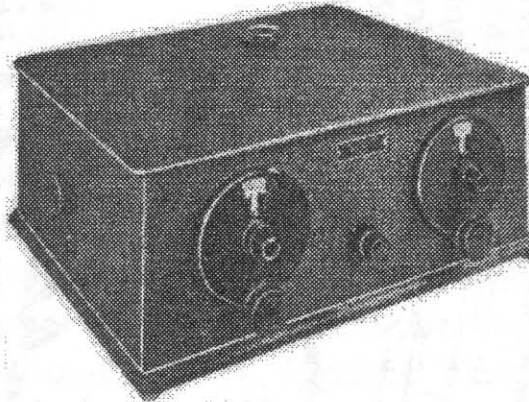
The filament supply is switched on by a switch at the back of the set. Nearby are three jacks, one for the loud-speaker, another for using headphones on three valves only, and the third for a gramophone pickup.

There is a small variable condenser mounted at the left-hand side of the case. This is the selectivity control. In operating this set, by rotating the two tuning dials, we found that the readings of the dials were fairly similar for any given wavelength. The wavelength ranges covered are 13 to 26 metres (blue coils), 22 to 45 metres (yellow coils), 40 to 85 metres (red coils), and 250 to 500 metres (green coils).

For example, on the blue coils we found that 24 metres was tuned at 72.5 degrees on the left dial and 80.5 degrees on the right dial. We found 33 metres was tuned on the yellow coil at 40 degrees on the left dial and 39.5

degrees on the right dial. With the red coils 41 metres was tuned at 19 degrees and at zero on the right dial. These three calibrations are landmarks for short-wave listeners. As five calibrations are supplied for each of the three short wave-length bands we are quite sure the operator would have no difficulty in locating the innumerable short-wave stations broadcasting in all parts of the world.

In tuning this set the reaction regu-



lator plays a vital part. By means of reaction it is quite easy to keep the two tuning circuits in step with one another. For when these two dials are adjusted so that both circuits are in tune, the reaction requirement is at minimum. In practice this means that by setting one dial at any particular point, increasing reaction to about half-way, and then rotating the other tuning dial, a point will be reached where audible oscillation occurs. We found no difficulty in exploring the different wave-bands provided, thanks to an admirable smoothness in the controls

**Sensitivity....** By an intelligent use of the four sets of plug-in coils it is possible with this set to receive broadcasting from all over the world. We ourselves got Buenos Aires at tremendous loud-speaker strength as well as 2XAF, the short-wave relay of the General Electric Company in America.

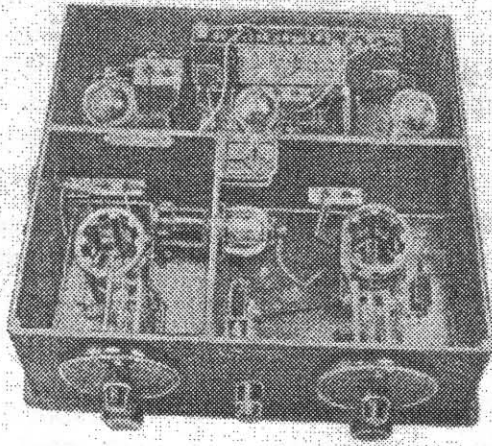
The number of other stations logged on this set would, without exaggeration, make an article. But it will be sufficient for us to say here that if there is anything between 12 metres and 500 metres worth hearing, this set will get it. On the medium waves the Eddystone set gave an excellent account of itself, bringing in most of the more powerful foreign broadcasting stations at full loud-speaker strength. What surprised us was the fact that the plug-in coils for the medium waveband could be tuned from 250-490 metres with the comparatively low-capacity variable condensers.

Although the construction of the set is conclusive evidence that the short-

waves are intended as the main *raison d'etre*, very little, if any, efficiency has been sacrificed on the normal broadcast wavelengths.

**Selectivity....** On the ultra-short waves the question of selectivity does not often arise, due to the fact that the smallest change in the capacity of the variable condenser means a big alteration in the wavelength received. But certain ultra-short wavelength ranges are so congested that even a good short-wave set must have a good measure of selectivity.

We can say that the Eddystone short-waver is extremely selective, although by no means critical in operation. The two tuning dials do not complicate tuning but actually make it easier, because very critical settings are avoided. On the medium waveband selectivity was such that Langenberg was clear of the Midland Regional and Toulouse clear of the London Regional.



**A WELL-PLANNED SET**

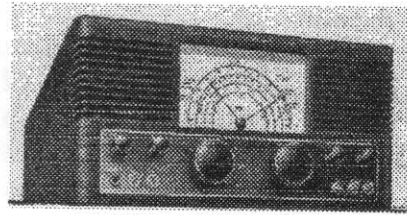
*Much thought has obviously been put into the Design of this receiver*

**Quality...** Presumably due to the inclusion of a pentode power valve the tone was inclined to be high-pitched. But with an average cone loud-speaker the general quality is pleasing. The clear-cut nature of the reproduction was found especially desirable when receiving some of the very distant short-wave stations.

**Summary...** This is undoubtedly the best short-wave set we have yet examined. Its robust construction is fully justified by the stability of reception. For listeners in all countries the set offers scope for world-wide reception.

★ ★ ★

## MORE FROM TED'S MAILBOX



# THE OLD FAITHFUL – 640

Despite their age there are many of this model still out there giving stalwart service. As mechanical and electrical things go they are pretty reliable but the odd one does occasionally fall sick.

John tells me that his 640 has had frequent check ups every couple of years since he inherited it from his Dad, the original owner from new. This last month some jumps in calibration were noted whilst it was in use, they were definitely not vibration induced as he soon proved.

It was thought opportune to have the set out and serviced immediately and so the long drawn out job began. The whole operation took three weeks and cost John some of his, by now, scarce hair.

With the 640 out on the bench it was inverted and then powered up, run (naturally) from an isolated supply via a borrowed transformer. Some further tests to disprove vibration as a cause showed no jumps in calibration but then just ten minutes after power up, it happened again.

Now it was soon found that this fault could only be 'promoted' during the warm up process. Anytime after switch on from cold and up to a half hour maximum, the frequency jump would occur.

Many frustrating hours were spent on verifying every single condenser in the frequency determining circuits of the triode section of V2 the 6K8, all to no avail.

In the end just C24 in the grid circuit of V2 was replaced, not because the one *in situ* showed up as faulty, but simply because reading of back issues of the Newsletter and correspondence with Ted men-

tioned this as being a possibility, from past experience. The frequency jumps still occurred though. Attention was now moved to the switch wafer in this stage.

Proper cleaning techniques were used on ALL wafers whilst the set was on the bench; this was followed by suitable lubrication and still the D\*\*\*\* fault was there. A new valve had been tried right at the beginning but this was tried again, pure desperation of course. But it did not work.

What came next ? Well resistors of course, and these were tested *in situ* and under powered conditions by putting a DVM across each in turn to measure any jump in the voltage across the resistor during warm up.

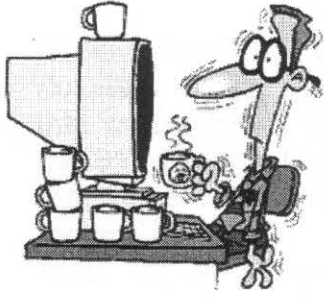
The culprit turned out to be R4, a one watt rated 30 kilohm, one of the old carbon rod types. A change of just 4 volts across this resistor occurred whenever there was a jump in frequency, which was enough to lose the Standard Frequency Signal on 10 Mc/s altogether.

The painted body of the resistor looked intact, as ascertained after the item had been snipped out of circuit. It did warm up slightly as do most resistors but nothing exceptional and certainly not enough to be uncomfortable to a finger touched to it.

The nearest equivalent standard value is a 27K and so one was fitted, amazingly a 2-watt modern resistor was smaller than the original 1-watter, so this value was used. No more jumps in calibration have been observed in two months of use and so it is hoped that the 640 will behave itself for a few more years.

TED.





# POO'S PONDERINGS

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

Welcome to 2001, I trust everyone had a satisfying and enjoyable festive season. There never was a 'Year 0' so in fact 2001 is the *real* last year of the millennium. I think it's best not to argue that one with the media however.

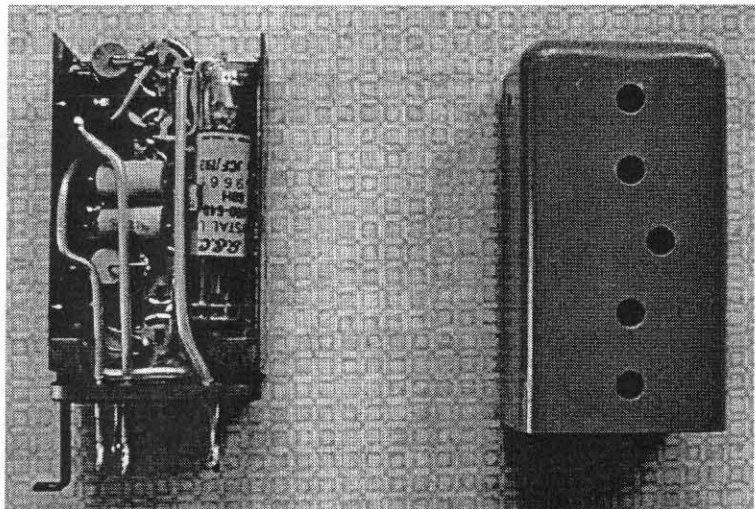
## Surf's Up!

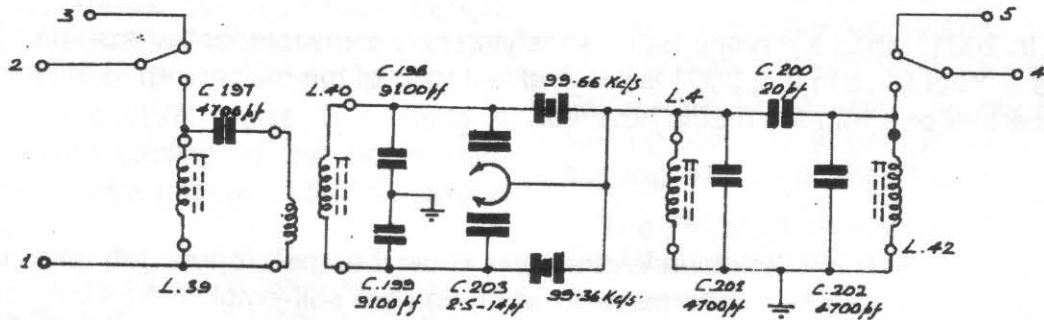
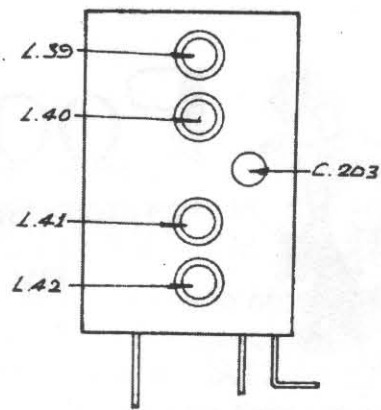
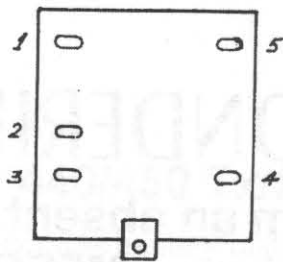
Anyone who has designed their own Website will know that their regular job takes up far too much of their spare time. Even more so when you are self-employed as the normal 9 to 5 routine goes right out the window. Over Christmas I found time to actually publish the Eddystone User Group Website on the Internet. Just to remind you that the URL is [www.nomis.co.uk](http://www.nomis.co.uk) and then select the site. Most of the site is up with the exception of the history, list of models and details of how to decipher serial numbers. Take a look and see what you think. Constructive criticism is always welcome as are contributions.

We will now be posting 'For Sale' and 'Wanted' members adverts on the Website, according to existing conditions, but with the advantage of a colour photograph if you wish. Ads will be posted one week after the magazine drops through your door to ensure any 'For Sale' ads are seen first by members. You can e-mail your ads to me at [eddystone@nomis.co.uk](mailto:eddystone@nomis.co.uk) or send them to me at P.O. Box 66, Corbridge, Northumberland, NE45 5YR. When e-mailing photos please e-mail me first with a text request stating the size of the photo in KB and ensure you use JPEG format only. Posted photos may be mounted slides (35mm), strip negatives (35mm) or standard size prints.

## Piccolo

For some time now I've been searching high and low for the Piccolo filters(s) used in the Eddystone 830/9. The system is now defunct however all 830/9's I have come across have had the filters removed. No trace of a complete unit or diagram could be found. Over Christmas I was tidying a box of spares and came across not one but two rather odd looking IF transformers. On removing the covers I realised I had owned two Piccolo filters for about 3 years! Later that day I came across the circuit and alignment instructions for the beastie, which I am reproducing here for your amusement. Although they are now obsolete they do form an important element of Eddystone history. The picture above shows the unit complete.





### 830/9 FILTER ALIGNMENT

The following procedure should be adopted for the initial adjustment of the filter.

Connect the Valve Voltmeter to the I.F. Output socket.

Connect the generator to mixer section of the tuning condenser.

Switch range switch to range 7.

Set the generator to 99.34 Kc/s. and adjust L42 for max I.F. output.

Set the generator to 99.5 Kc/s. and adjust L41 for max I.F. output.

Set the generator to 99.62 Kc/s. and adjust L40 for max I.F. output.

Set the generator to 99.65 Kc/s. and adjust L39 for max I.F. output.

Set the generator to 99 Kc/s. and adjust phasing condenser for max rejection, repeat for 100 Kc/s.

Check that the response is within 3 dB from 99.35 Kc/s. to 99.67 Kc/s. If outside these figures, slight adjustment should be made to the appropriate core.

#### Filter Specification

Bandwidth	99.35 Kc/s. to 99.67 Kc/s.	< ± 3 dB
Carrier Suppression	100 Kc/s.	> 50 dB
Mid Band Frequency	99.510 Kc/s. ± 200 cycles	> 6 dB
Mid Band Frequency	99.510 Kc/s. ± 750 cycles	> 60 dB

When used in diversity, filter characteristics must not differ by more than ± 3 dB, at any individual Piccolo frequency.

## Recent Finds

On my most recent hunting trip to Birmingham I called to collect a box of Eddystone solid-state bits from an indigenous ham. On arrival they were all spread out for me to inspect or stand all over. On this occasion Graeme was riding shotgun and began to examine a rather average looking 358X, which I had also expressed an interest in. Whilst I was still sorting through the modern stuff Graeme piped up with surprise, "It's development model one". I immediately went to look, indeed it was marked "358X.DEV.1.". Internally it is an absolutely standard 358X and in this case untouched since new except for a horrible PVC power lead.

In my opinion it's very important that these trial models and any other "workshop specials" are recovered and cared for by enthusiasts. Although they may not have a significantly higher cash value they represent either the first of their kind or in many cases a unique design. I hear so many stories of "old radios" being skipped because they are "in the way" or "too old to be worth anything". It's not the cash value that's important here; it's the historical value of these sets. One thing you can be sure of is that there won't be any new ones!

## How to stop rustlers!

A week ago a local member asked me to help sort out a rustling noise on his 770R Mark I (Hi Stuart!) The set emitted an annoying 'rustling' noise even with the volume turned right down. A check on the circuit revealed lots of suspects but a 'scope was used to trace the problem to the first AF amplifier. One by one all the likely culprits were replaced but the set refused point blank to be fixed. Anyone who has worked on the 770R Mk. I audio section will know that one needs the skills of James Herriot to replace almost any component therein. It was decided to remove the audio stage from the set, which surprisingly turned out to be fairly straightforward. Taking the bull by the horns every component in the area of the valve was replaced and mercifully, upon reassembly, the noise was gone. The next task is complete realignment of the set.

If you come across the same problem a) I wish you luck, b) you must be a masochist and c) check the AF coupling capacitor to the output stage which is hidden in the bowels of the audio module.

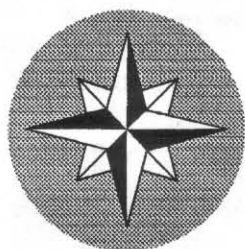
Don't forget the National Vintage Communications Fair on the 29<sup>th</sup> April, as the EUG will have a stand as usual and it provides an ideal opportunity for everyone to get together. This time Mr. Blair assures us there will be no shortage of petrol.

See you next time. 73, Simon 'POO

*An E-mail from Peter Lankshear in New Zealand shows the diversity of our members' interests:*

" ... Another one for the long arm of coincidence. I confess to having a life long interest in railways and naturally the article about Bulleid's "Eddystone" (Austerity version of the Merchant Navy class if I correctly recall) got my full attention. Anyway, it's a small World. Bulleid grew up here in Invercargill. His designs incorporated some interesting ideas, including in one instance, chain driven valve gear! His locomotives could obviously "go" but trials at Rugby defied dynamometer tests to produce meaningful results. Bulleid eventually went to Ireland where he produced a class of remarkable turf burners. . . . "





# LIGHTHOUSE

Happy New Year to all our readers and subscribers. This issue of the **Lighthouse** will no doubt be full of interesting items that Graeme, Ted and others have cobbled together for our education and amusement. We have a new season of rallies and fairs at which we can indulge our desire to collect yet more treasured items for our collections, known to our wives and others as "junk".

I find the contrast between yester-years radios and the modern "DC to light" transceivers, now available to the amateur market, truly amazing. Having bought an FT847 160m-70cm rig two years ago, I now find myself lusting after the latest Kenwood which does all that plus 1.3GHz. How do they do it and where will it end?.

This month's leaflet is the Orion 7000 which is still a current model at the Eddystone factory. It had its origins in the very successful crystal controlled Orion 5000 introduced in 1984/5. We were selling in excess of 1000 units per annum when all of a sudden the market died on us.

This was due to Codan and Barrett (both from Australia) coming in with low cost synthesized sets and sweeping up the NGO ( non-governmental organisations – or aid agencies to you and me). We got permission from Marconi to spend some serious money on a synthesized transceiver and the Orion 7000 was the result.

We sold quite a few to another Marconi company for a very important project whose destination escapes me now, but we ran late on the development and I had to shield an awful lot of flack from senior people in both my parent company and the other Marconi company . The Orion was a great technical success but we never got it into full volume production (i.e. with auto-placement of the components) for reasons I really can't go into yet ( parties involved still living etc.,).

The truth is that this market is dominated by US and Australian manufacturers where HF still plays a part in everyday life. Funnily enough the Japanese have never really tried to crack it even though they offer incredibly good value for money with their amateur radio transceivers.

I had quite a few enjoyable lunch-time sessions at the Selly Oak factory working the world on the Orion 7000 and have asked Matt Parkes to let me have the last one they ever make for my own collection. Read the data sheet, it was quite a model, pity it never had a tuning knob though! I hope to see you all at the NEC Vintage fair on April 29<sup>th</sup>, assuming I get back from the NAB show in Las Vegas in time.

My best 73's

*Chris Pettitt - GØEYO*

Patron (chris@g0eyo.freemove.co.uk)

# SSB WITHOUT A PRODUCT DETECTOR

**Another sharp-eyed EUGer, Richard Witney G4ICP, spotted this feature from 1973 by that prolific radio (and Science Fiction) writer F.G.Rayer G3OGR. It explains more about the 'lost' art of tuning SSB on a vintage receiver.**

**T**hese brief notes are prompted by seeing the user of a CR-100 failing completely to resolve SSB signals. He had used the receiver for general SW reception for over two years and also often listened to AM amateur signals, when he could find them, particularly on 80m.

The CR-100, in common with many other excellent receivers of the older generation, and such as the 640, 740, 840C, and others in the Eddystone range, has no special provision for SSB reception. The same applies to the AR88, D or LF. Despite this, all such receivers can usually give perfectly satisfactory SSB reception.

## BFO Stability

Receivers of the type considered were, however, intended to cope with CW reception, so have a BFO. With the better designs, this often runs from a regulated supply, and has enough frequency stability to avoid drift being a nuisance. Even with the simpler type of communications receiver, the BFO should settle down after a period, and not require too much adjustment to compensate for drift.

The BFO frequency adjustment coverage is often much larger than wanted, but as these notes deal with SSB reception with an unmodified receiver, this must be accepted, though it calls for a

little more care in using the BFO control. (Note from Graeme: it is not considered vandalous to wire a small condenser in series with the BFO pitch control to make adjustment smooth & easy.)

## Upper or Lower

To avoid a source of possible confusion, it should be remembered that lower sideband is general on 40m. and 80m., and upper sideband on 10, 15, and 20m. This simply means that if satisfactory resolution of SSB signals is achieved with the BFO control off-set one way from zero beat position on 40 and 80, the opposite off-set is used for 10, 15 and 20m. Should the BFO control be put the wrong side of the missing carrier of the SSB, no amount of adjustment will resolve signals

## Injection Level

The SSB and BFO have to provide a signal suitable for the envelope detector. AM reception is usually with RF and IF gains at or near maximum, and adjustment of volume by the audio gain control. Because BFO injection is small, this makes it very difficult, if not impossible to resolve most SSB signals.

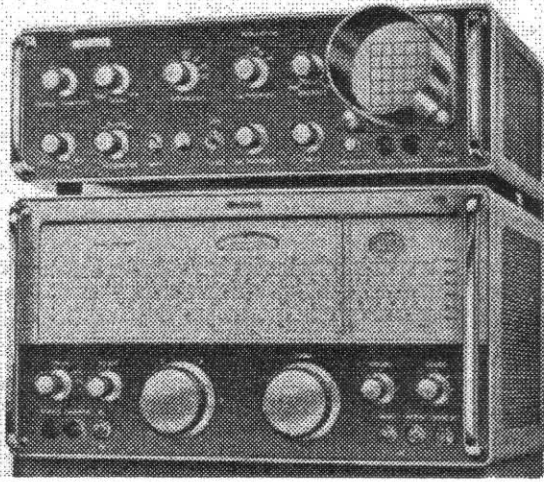
The trick is to turn back RF (and IF, if provided) gains, and put AF gain at maximum. This is to avoid the SSB signal being too strong for the degree of BFO injection provided. The SSB is correctly tuned in, then the BFO is switched on, and careful adjustment of the BFO

pitch control should resolve the signal.

Powerful signals can still be too strong, so locals may need attenuating with a device such as a potentiometer in the receiver aerial-earth circuit. This depends on the aerial, receiver, and whether the interest is in local 9-plus signals, or more distant and weaker transmissions. The effect of too much SSB signal input at the detector can easily be checked by turning up the RF gain, while reducing AF to maintain about the same volume. The SSB signal will take on the character of a badly over-modulated AM signal, then reach a level where it can no longer be resolved.

## AVC or Not

Some receivers of the type mentioned have optional AVC on/off switches; others always put the AVC out of action when the BFO is on. As turning back the RF gain control results in working conditions where the AVC ceases to have much effect, with receivers of the type in mind there appears to be no need to bother about this point. If a separate AVC on/off switch is present, the effect of putting the AVC out of action is readily tried. If there is no such switch merely put the BFO on and adjust as described. A properly handled Rx not having a product detector for SSB can give perfectly satisfactory Sideband results if carefully adjusted - it is just a matter of finding the correct RF gain and BFO settings. ★



**More From  
Ted's MailBox.**

## **EP17R PANADAPTOR**

**T**his panadaptor was bought as part of a 'job lot' of old gear at a club sale. It did not work and so was simply left in a corner for several months. Winter, and the Xmas holidays meant that there was time to examine it more closely.

Removal of the outer case and powering up showed that whilst the interior was absolutely filthy, all valves and the CRT did light up.

Most of the valves bore CV numbers so maybe this had been used by one of the services. Another noticeable fact was that the ventilating fan did not work, although a faint buzz indicated that it had power applied to the motor.

The first job was to remove all of the 'mobile' muck with a vacuum cleaner. The sticky muck was eventually cleaned up with a one inch paint brush and loads of White Spirit. The fan filter was discarded as it resembled nothing so much as one of those handfuls of greasy rag so beloved of real mechanics.

The fan itself was completely dismantled and then, since it all looked kosher, it was re-assembled and lubricated, and it now worked well and what is more, silently.

This is a vastly complicated unit as Eddystone stuff goes, both electronically and mechanically, so much attention went towards checking that the cor-

rect valves were in the correct sockets.

With a non-functioning fan the heat buildup could have been intense. The mains input wiring, and up to the mains switch, was replaced as the insulation looked 'iffy'. Several soldered joints on the mains transformer were re-done as were others around the chassis which looked suspect.

When the unit was finally powered up again after completion of all of these operations it was found impossible to centre the CRT display. It was well off to the left of the screen despite adjustment of the preset controls. Luckily this is a known problem and simply means that the fixed condensers decoupling the DC deflecting voltages from the signal voltages are leaky.

They were all replaced, no time wasted on testing to find which was the culprit. After all, the cost is pennies. Now the display could easily be centred and so a signal was fed in from the shack 770R. Some slight adjustments to the focus and a good 'picture' was obtained.

One last task was to replace the fan filter pad with a piece cut from a spare domestic Ventaxia fan unit. The EP17R is often used nowadays to monitor the FM/VHF band for abnormal reception of signals at the low end of the band, around 87.5 to 88.5 Mo/s.

**TED.**



## ORION 7000 HF SSB TRANSCEIVER

SERIES 7000



- 1.6-30MHz Transmit, 10kHz-30MHz Receive.
- 100W PEP Output Power.
- 99 channel operation, simplex or semi-duplex.
- Improved signal transmission and reception using DSP techniques.
- Remote and extended control facilities.
- Split front panel for mobile operation.
- Multi-mode operation including SSB, CW, FSK, DATA and ALE.
- Built in Test Equipment (BITE).
- Channel scanning.
- Speech scrambler for secure communication.
- Rugged construction.

The Eddystone ORION 7000 HF Transceiver operates on up to 99 simplex or semi-duplex channels in the frequency range 1.6-30MHz with 100 watts RF output power. Dual microcontrollers offer a wide range of local control options in addition to full extended or remote control, and BITE (Built In Test Equipment) for rapid fault identification.

Baseband signal processing is performed digitally, using programmable circuitry, which gives improved squelch, noise blanking, speech compression and agc/alc facilities, particularly important in maintaining communications under arduous signal conditions. Optional facilities can also be incorporated as required to modulate and demodulate a wide variety of data signals, providing easy connection to a computer or teleprinter. This also allows sophisticated adaptive communication systems to be established (ARQ/ALE for example) by suitable programming.

The ORION 7000 can be supplied for mobile use with a detachable front panel control/display module for ease of installation, and can be rack or bench mounted for use in base stations. Operation is from 13.6V DC, or from all normal single phase mains voltages using a separate power supply unit. Complementary HF linear amplifiers, antennas and tuner units, phone patch equipment etc are also available, to provide complete station installations.

## General Performance

### Frequency Range

1.6 to 30MHz Transmit.  
10kHz to 30MHz Receive.  
10Hz Frequency Resolution.

### Modes of Operation

USB, LSB, CW, FSK, AME (AM reception by conversion to USB or LSB).

### Frequency Stability

1ppm standard or 0.1ppm as option (/X).

### User Programmable Channels

99 maximum simplex or semi-duplex. Options to allow the operator to program channels directly or with password protection. Alternatively, transceiver can be supplied programmable only from IBM compatible PC with special software.

### Front Panel Control

Removable front panel with 20 key elastomeric keypad and 'beep' tone. Receiver volume adjustment by separate rotary control. Four line by twenty character backlit LCD display.

### Extended Control

Up to 100m using removable front panel control unit and additional extension kit.

### Remote Control

Using additional front panel control unit or IBM compatible PC, with RS232c level serial asynchronous data at rates up to 2400 Baud.

### BITE (Built In Test Equipment)

In BITE mode, tests can be made using internal test equipment to aid fault finding, general test and maintenance procedures. In all modes, the BITE monitors various key parameters and provides immediate indication of a potential fault which can be investigated in BITE mode, allowing fault finding to module level.

### Power Supplies

13.6V DC (24V optional) with negative ground and reverse polarity protection. Separate power supply unit for AC mains operation.

### Cloning

All or part of the channel settings and functional settings of one transceiver can be transferred to another transceiver.

### Environmental

Operating Temperature: -10°C to +55°C  
Storage Temperature: -20°C to +70°C  
Relative humidity: 95% at +40°C  
Bump and Vibration: Meets MPT1204 and CEPT requirements.

### Dimensions

Height : 105mm  
Width : 305mm  
Depth : 300mm  
Weight : 5kg

## Transmitter Performance

### Output Power

100W pep on SSB and AME, 100W average on CW/FSK.  
Low power setting reduces output below 25W.

### Intermodulation distortion

Better than -25dB.

### Hum and Noise

Better than -50dB.

### Carrier Suppression

Better than 50dB.

### Unwanted Sideband Suppression

Better than 50dB.

### Spurious Suppression (non-harmonic)

Better than 60dB.

### Harmonic Suppression

Better than 43dB, typically 60dB.

### Audio Bandwidth

300Hz to 2700Hz at -3dB (USB/LSB).

### ALC

10dB audio increase causes less than 0.5dB increase in power output.

### Protection

Transmitter fully protected against high VSWR including open and short circuit output. Thermostatically controlled fan operates at predetermined temperature for operation at high ambient temperatures with high transmit duty cycle.

### Speech Compression

Using dsp techniques (switchable).

### Test Oscillator

Two tone generator built-in.

## Receiver Performance

### Sensitivity

Two settings, normal and high. 15dB sinad for 1µV emf signal in normal (USB/LSB mode, 2.4kHz bandwidth), corresponding to a 12dB noise figure. Sensitivity is increased by approximately 5dB in high setting. Sensitivity gradually reduces below 1.6MHz.

### Third Order intercept point

+ 14dBm in normal sensitivity.

### In-Band Intermodulation Products

Better than -40dB.

### IF and Image Rejection

Better than 70dB.

### Reception Bandwidth

-6dB 300Hz to 2700Hz  
-60dB -400Hz and 3400Hz  
Additional bandwidths 300Hz, 600Hz or 1kHz in dsp selected according to reception mode.

### AGC

Less than 3dB change in audio output for 100dB increase above agc threshold. Variable or fixed threshold, audio derived using dsp. Attack, decay and pedestal time constants selected according to mode of reception.

### Audio Outputs

3W at less than 5% distortion into 4 Ohms. 1mW maximum preset into 600 Ohm. Separate low level phones/handset output.

### BFO

+/-300Hz to 2.7kHz in 100Hz steps (CW/FSK modes).

### Cross Modulation

With a wanted signal of +60dBµV emf producing standard output, an unwanted signal of level +100dBµV emf at 20kHz off-tune, modulated 30% at 1kHz, will produce an output at least 30dB below standard output.

### Input Protection

Overload protection provided for continuous application of 30V emf from 50 ohm source.

### Squelch

Speech and/or tone recognition using dsp techniques (switchable).

### Noise Blanker

Using dsp techniques (switchable).

### Scanning

Receive only scanning of any of the 99 channels with selectable dwell (100mS to 9.9sec) and hang (0 to 9sec) times.

### Ancillary Equipment

Base station antennas and masts  
Mobile antennas  
Antenna Tuners  
Microphones  
Mounting kits  
Extended control kits  
AC power supply units  
Power amplifiers  
Phone patch Interface units  
ARQ/FEC for data operation  
ALE (Automatic Link Establishment)  
Scrambler Facility

This document gives only a general description of the products or services offered, and shall not form part of any contract. From time to time changes may be made in the products or the conditions of supply.

# Eddystone Radio



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