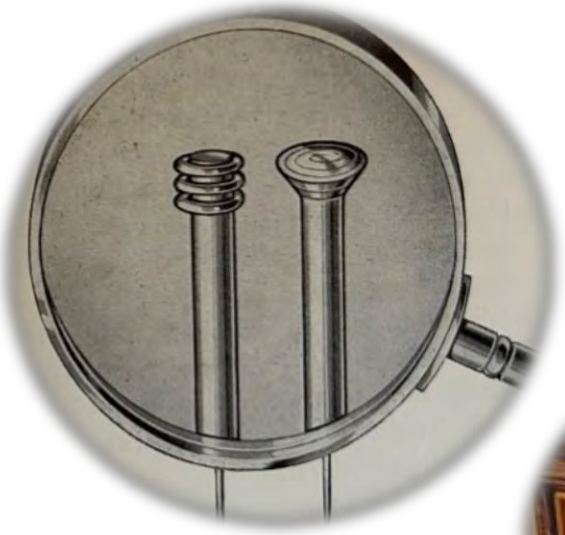
From Hairpins to Radios – Eddystone



Outline of Presentation

- History of Eddystone Radio
- Pre-WWII
- WWII
- Post-WWII
  - ‘Tea Planter’ radios
  - Marine radios
  - Communications radios
  - ‘Speciality’ radios
- Restoration Projects

Introduction

- Gerry O'Hara BSc. MPhil. P.Eng (Ret.) C.Eng
- Retired consulting geologist/environmental engineer
- Licensed radio 'ham': G8GUH, VP8BDE, VE7GUH
- Trustee of the Eddystone User Group (EUG)
- President of the Canadian Vintage Radio Society (CVRS)
- President of the Society for the Preservation of Antique Radio in Canada (SPARC) - Museum

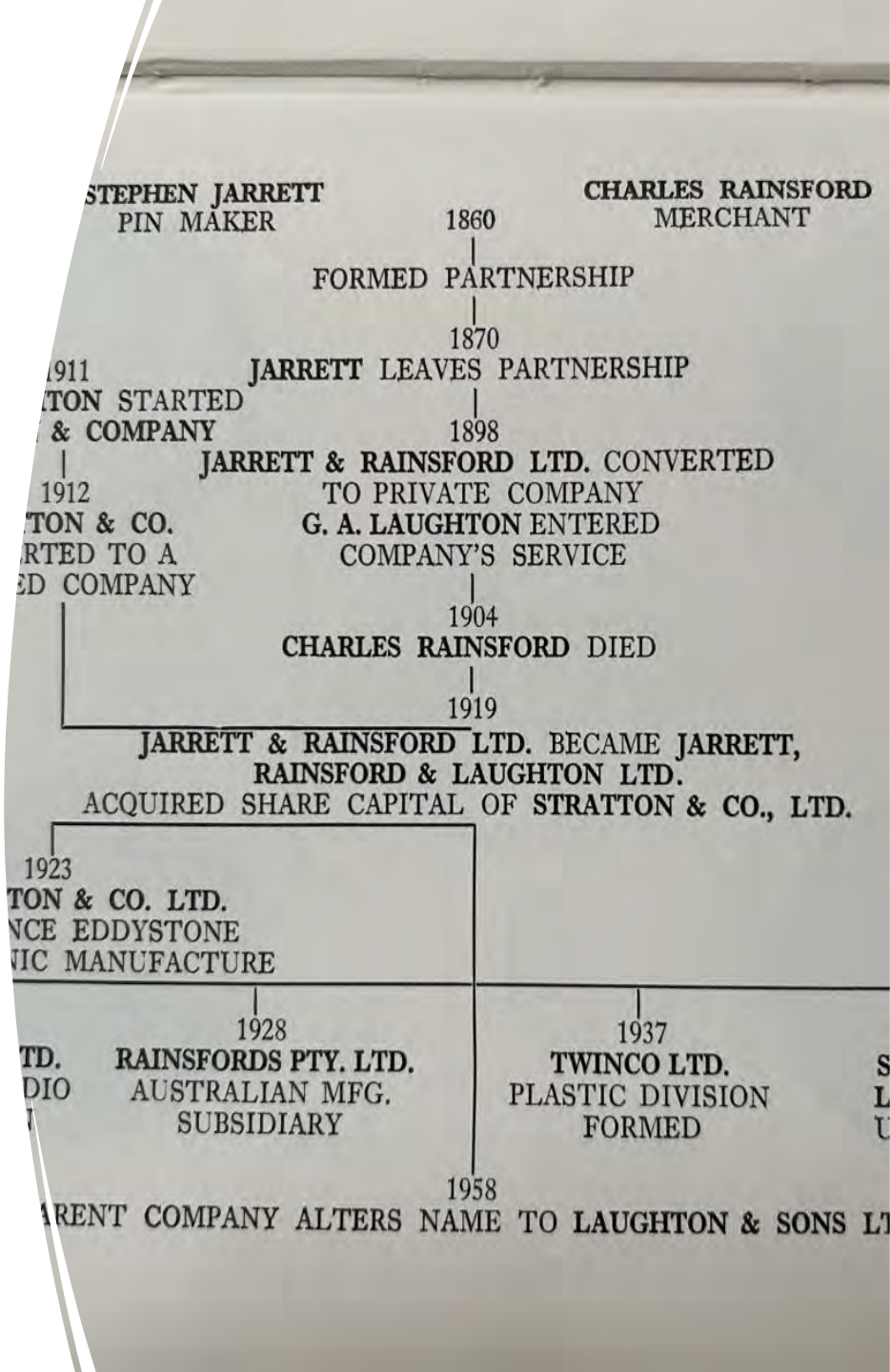
Introduction

- My intro to Eddystone Radios:
- 1971 – a ham friend
- 1973 – off to university (with an Eddystone!)
- 2004 – the SPARC radio museum
- 2005 – a radio fleamarket
- 2006 – my first Eddystone ‘restoration’
- 2007 – Eddystone User Group

History*

- Stephen Jarrett (pin/jewellery maker) & Charles Rainsford (merchant) partnership (J&R) in 1860
- George Laughton joined J&R as the company 'office boy' in 1898
- Laughton running section of J&R by 1911, bought out unreliable supplier - called it 'Stratton & Co.' (reportedly named after character in a book!)
- In 1919, company became J.R.&L. - acquired Stratton & Co.

*Info from 'A Century of Achievement' (a book issued to J.R.&L. employees in 1960 to celebrate the 100th anniversary of the founding of the J&R partnership), the Eddystone User Group website, and the 'Ultimate Quick Reference Guide'



History

- BBC formed in 1922, Laughton's eldest son (George Stratton Laughton) became a wireless fan
- 'Flaming Youth' movie staring 'Jazz Baby' Coleen Moore – made female 'Pageboy', 'Bob', 'Shingle' and 'Crop' short haircut styles popular
- 1923 - bottom dropped out of the hairpin market 'overnight'
- Diversified into radio components in 1923/4 on suggestion from eldest son
- Developed first receiver in 1925 and marketed the 'Two' in 1926 under trademark 'Eddystone'

Pre-WWII

- ‘Eddystone’ named after the Eddystone Lighthouse located off Plymouth, UK – signified endurance and reliability (and made for a good logo!)
- 1927 – start of the ‘shortwave revolution’
- Experimental BBC transmissions on 20M
- Demand for shortwave receivers from ex-pat Brits overseas and radio enthusiasts in the UK

Pre-WWII

Multi Wave Switched Coil Units

These units are intended for use in the design of all wave receivers. They are supplied with two or three separate windings which are independently switched over five wave-ranges. The switch is two or three way, according to the number of windings, and has five stud positions. The coils are mounted around the switch so that the leads from each coil to the switch contacts are very short. The short wave coils are the conventional "EDDYSTONE" pattern and the higher wave coils are honeycomb wound, mounted on paxolin formers. The switch gives a positive connection with wiping contact, the control knob comes out to the front of the panel and an engraved wave-range dial is supplied.

Cat. No. 960.	Code LUMIT.	Price
Multi wave coil unit, 3 windings, 5 wave-ranges, covering wavebands 13-5/25, 23/48, 44/91, 260/520, 1100/1900 metres		
Cat. No. 961.	Code LUMAT.	Price
Multi wave coil unit, 3 windings, 5 wave-ranges, covering wavebands 13-5/25, 23/48, 44/91, 150/300, 290/600 metres		
Cat. No. 962.	Code LUMOT.	Price
This unit is identical with No. 960 but is supplied with 2 windings only		

The above wavelength ranges are taken with an "EDDYSTONE" Scientific ·00016 mfd. Condenser.

EDDYSTONE

Universal Short Wave Valveholder

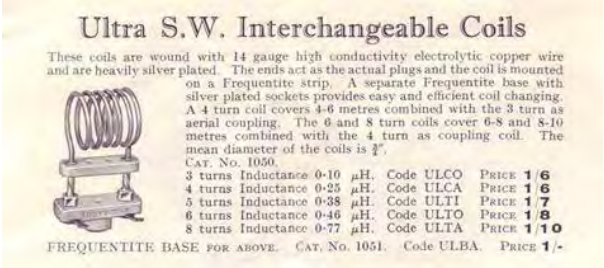
D.L.-9. DIELECTRIC

(Pat. Pending)

A real low loss valveholder for above or below baseboard mounting. The valve enters from either side and so at last gives to the constructor a low loss valveholder for under baseboard use. The holder adds practically no increase of self-capacity to that already in the valve base. The spring legs make excellent contact and are in one piece to prevent noise. The insulating ring is of D.L.-9 low loss dielectric and is raised by means of small pillar feet.

Showing valveholder mounted under chassis.

Cat. No. 1015.	4-pin.	Code UNIV.	Price 1/3
Cat. No. 1016.	5-pin.	Code ONIV.	Price 1/5
Cat. No. 1024.	7-pin.	Code ANIV.	Price 1/8



Ultra S.W. Interchangeable Coils

These coils are wound with 14 gauge high conductivity electrolytic copper wire and are heavily silver plated. The ends act as the actual plugs and the coil is mounted on a Frequentite strip. A separate Frequentite base with silver plated sockets provides easy and efficient coil changing. A 4 turn coil covers 4-6 metres combined with the 3 turn as aerial coupling. The 6 and 8 turn coils cover 6-8 and 8-10 metres combined with the 4 turn as coupling coil. The mean diameter of the coils is 2".

Cat. No. 1050.

3 turns	Inductance 0·10 μH.	Code ULCO	Price 1/6
4 turns	Inductance 0·25 μH.	Code ULCA	Price 1/6
5 turns	Inductance 0·38 μH.	Code ULTI	Price 1/7
6 turns	Inductance 0·46 μH.	Code ULTO	Price 1/8
8 turns	Inductance 0·77 μH.	Code ULTA	Price 1/10

FREQUENTITE BASE for above. Cat. No. 1051. Code ULBA. Price 1/-

- Introduced the 'Short Wave Two' receiver covering 15 – 85m in 1927
- 1930 – ceased making broadcast band sets and focussed production on shortwave sets (and kits/parts)
- Used in scientific expeditions, eg. British Arctic Air Route, Hudson Strait Settlement & Mount Everest Expeditions
- 1935-8 – development of VHF equipment intended for police

Pre-WWII

Selection of Pre-WWII models

1. All-Wave Four
2. Atlantic Two
3. Kilodyne Four
4. Homelander
5. Amateur Bands Two
6. All World Two
7. All World Eight
8. ECR

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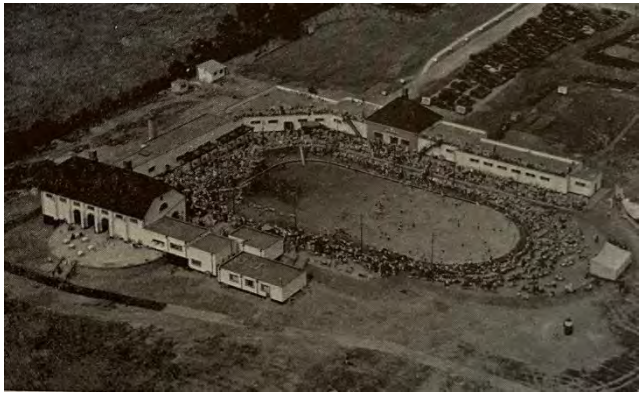
WWII



- Supplied automatic wireless telephone exchanges to police forces in London, Birmingham, Glasgow and Edinburgh
- Moved into the 'Bath Tub' (pre-WWII 'Lido') in West Heath after Birmingham factory bombed in November 1940 (destroyed much of the company's records)
- Manufactured radar 'IFF' system components for the RAF
- Produced Type S.358 and S.400 communications receivers
- Total of 4,500 transmitters, 7,264 receivers and 45,000 other pieces of equipment produced during WWII for the RAF, Army, Admiralty and Police, PLUS…..

FROM PEACE AND BEAUTY—

Magazines	31,416,280
Cotter Pins	77,721,640
Valve Pins	242,721,000
Washers	10,823,000
Laminations	15,675,128
Domes	46,018,400
Copper Plugs	95,156,900
Tracer Cups	7,376,000
Washers	8,136,000
Fuse No. 246 (components)	1,458,000
Nose Caps	2,864,000
Disc Washer	1,586,000
Rear Disc	903,100
Aluminium Tube	689,000
Centrifugal Bolts	5,437,000
Shutter Blanks	428,000
Brass Caps	774,000
Anchor Plates	1,621,000
Steel Sleeves	1,512,850
Brass Plugs	437,000
Striker Covers	1,803,000
Septums	2,480,000
Belt Slides	1,651,000
Plug Screws	2,028,000
2¼" Hook	515,000
Brass Buttons	669,000
Detonator Tubes	4,441,465
Steel Primer Tubes	1,107,681
Copper Tubes	313,000
Supporting Plates	1,678,000
Stop Pins	215,000
Top Discs	10,185,600
Safety Clips	628,470

Plate 38

Brass Ferrules	3,574,600
Shroud Rings	2,016,500
Closing Discs	7,982,982
Fuse Caps	317,468
Wire Links	1,802,000
Belt Tips	2,595,000
Buckles	1,715,000
Mine Exploders	386,876
Arming Sleeves	331,584
Demolition Primers	458,596
Explosion Bodies	22,000
Capsules	1,583
Creep Springs	655,626
Steel Slides	61,000
Haversack Slides	614,000
Screen Caps	1,498,000

TO MUNITIONS OF WAR!

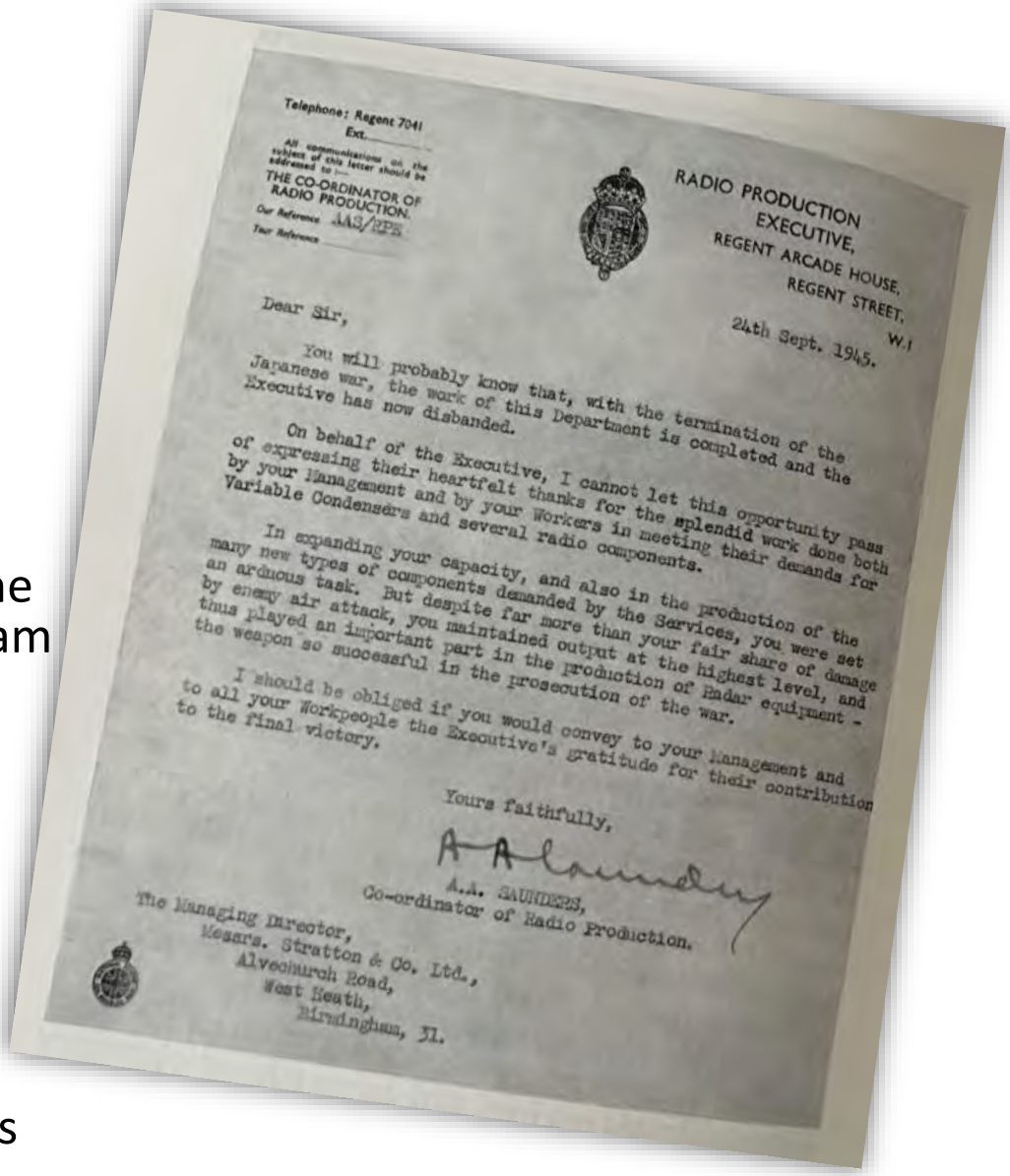
Magazine Liners	420,986
Tracers	1,342,000
Ignition Cups	28,300
Copper Washers	1,607,000
Pellets	509,120
Helmet Vents	174,000
Rifle Drill	653,000
Resistor Terminals	28,452,000
Nickel Screens	1,351,500
Body Caps	146,820
Box Catches	237,000
Box Hinges	177,000
Badges	857,000
Combs	347,000
Studs	338,000
Thimbles	45,000
Mirrors	29,000
Tinplate Labels	307,900
Tablet Pins	246,000
Wire Leaves	762,000
Conversion Fuse	43,049
Cap Assembly Wires	5,457,000
Bungs (Bomb)	7,000
Brass Sleeves	50,000
Hinge Assembly	42,000
Con Rod Housings	287,000
	648,419,274

Plate 39

This approximates 325 items produced per minute despite the delays of bombing, machine converting, etc. In addition, our Radio factory supplied well over 500,000 Variable Condensers, 1,000,000 High Frequency Chokes, over 500,000 Flexible Couplings, 5,000 Short Wave Communication Receivers, 4,000 V.H.F. Radio Telephone Sets and scores of thousands of other vital Radio parts.

Post-WWII

- Decided to focus on communications receivers for the commercial, professional and ham markets:
- ‘Tea Planters’ radios
- ‘Cabin’ and ‘Seafarers’ radios
- ‘Ham Banders’
- ‘Shortwave Listener’ radios
- GCHQ/intelligence services
- Diplomatic Service
- University research departments
- Other professional users



Telephone: Regent 7041
Ext.

All communications on the subject of this letter should be addressed to:—
THE CO-ORDINATOR OF RADIO PRODUCTION.
Our Reference AAS/RPE
Your Reference

RADIO PRODUCTION EXECUTIVE,
REGENT ARCADE HOUSE,
REGENT STREET,
W.1

24th Sept. 1945.

Dear Sir,

You will probably know that, with the termination of the Japanese war, the work of this Department is completed and the Executive has now disbanded.

On behalf of the Executive, I cannot let this opportunity pass of expressing their heartfelt thanks for the splendid work done both by your Management and by your Workers in meeting their demands for Variable Condensers and several radio components.

In expanding your capacity, and also in the production of the many new types of components demanded by the Services, you were set an arduous task. But despite far more than your fair share of damage by enemy air attack, you maintained output at the highest level, and thus played an important part in the production of Radar equipment - the weapon so successful in the prosecution of the war.

I should be obliged if you would convey to your Management and to all your Workpeople the Executive's gratitude for their contribution to the final victory.

Yours faithfully,

A.A. Saunders

A.A. SAUNDERS,
Co-ordinator of Radio Production.

The Managing Director,
Messrs. Stratton & Co. Ltd.,
Alvechurch Road,
West Heath,
Birmingham, 31.

Post-WWII

- Some ‘re-badging’, eg. Under the ‘MIMCO’ brand (Marconi)
- Laughton died in 1964 – decision to sell-off Eddystone from J.R.&L.
  - Markets changing/complexity
  - Arrival of solid-state – took over a decade to fully swap over (last tube set produced in 1973!)
- Sold Eddystone to Marconi in 1965
- 1980 – partnered with BBC for broadcast transmitters
- 1990’s – pioneered DAB
- End of cold war saw large drop in Govt. orders

- ‘Bath Tub’ lease expired in 1995
- Relocated to Selly Oak
- Internet and satellite comms saw further market reduction
- 1999 – Eddystone bought by Megahertz Communications, then to Ring Communications, and then Sound Broadcasting Systems

‘Tea Planter’

- S.556 - produced for ex-pats in the (then) British colonies, eg. India, and dubbed ‘Tea Planters Sets’ (1946)
- Six Volt battery version also produced (S.556B)
- This model, plus the S.504, set the Eddystone style for the next 15 years: heavy diecast louvred front panel, steel case, diecast coilbox

- The ‘half moon’ dial was replaced by the ‘trademark’ Eddystone sliderule dial in the early-1950’s – the S.750, a dual conversion set introduced in 1950, was the first with this superb tuning mechanism (arguably the best tactile feel and smoothest-gliding tuning dial ever!)

Marine

- Produced for cabin entertainment on liners, eg:

1. S670 and S670A
2. S870 and S870A

   EB37 (solid state)

3. EC10 'Seaguide' – direction finding facility (solid state)

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Marine

- Produced for marine communications, eg:

1. EC964
2. 1004 (marine ‘reserve’ receiver)
3. 1680
4. 1964 – 10 fixed channels

- 1630/1 ‘Watchkeeper’ (marine distress frequency monitor)

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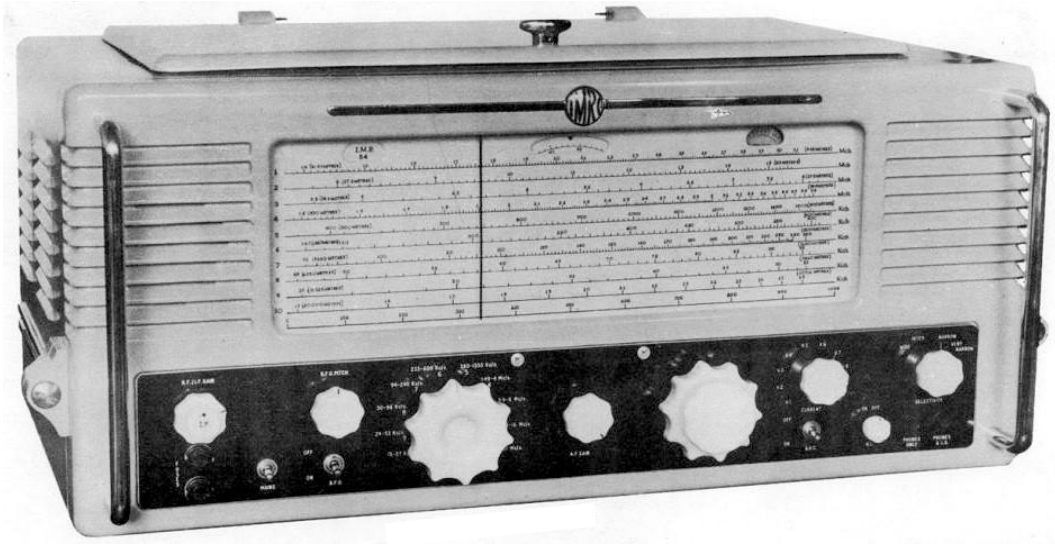
Eddystone version



Marine

- The ‘ultimate’ tube-based Eddystone marine receiver: S.700 (‘IMR.54’)
- Still on the ‘Queen Mary’ located at Long Beach, California
- 12 tubes
- 10 Bands covering 10KHz – 31MHz
- AC/DC
- Only 205 produced
- IMRC ‘fell out’ with Eddystone over price, took back all plans, jigs etc. and produced their own – with flat front panels

IMRC version

Marine

- ‘Queen Mary’ radio room

Communications

S.750

S.770S

1650

- This covered a wide variety of market segments, eg. shortwave listeners and professional (commercial, Government, military, universities, and broadcasters)
- Build quality (and price point!) depended on the market segment
- Specifications of many models were adapted to the needs of the client, eg. the S.830 had at least 13 variants!

‘Ham Banders’

1

- Eddystone catered well for hams and shortwave listeners, with general coverage shortwave receivers at many different price points, but only 2 true ‘ham banders’ (both tube-based):
  1. S.888 and S.888A – dual conversion designs based on the S.750 general coverage set
  2. EA12 – dual-conversion, based on the S.830 series of professional communications receivers (for ‘well-heeled’ hams only!)

2

‘Speciality’

1

2

- Eddystone produced many sets that could be considered ‘speciality’, eg:

1. S.820 FM tuner (domestic)
2. S.930 series (many variants) – FM or AM, designed for radio mics, or ‘intelligence gathering’ (bugging!)
3. 31A – Noise measuring Set (Post Office/Home Office)

3

Other

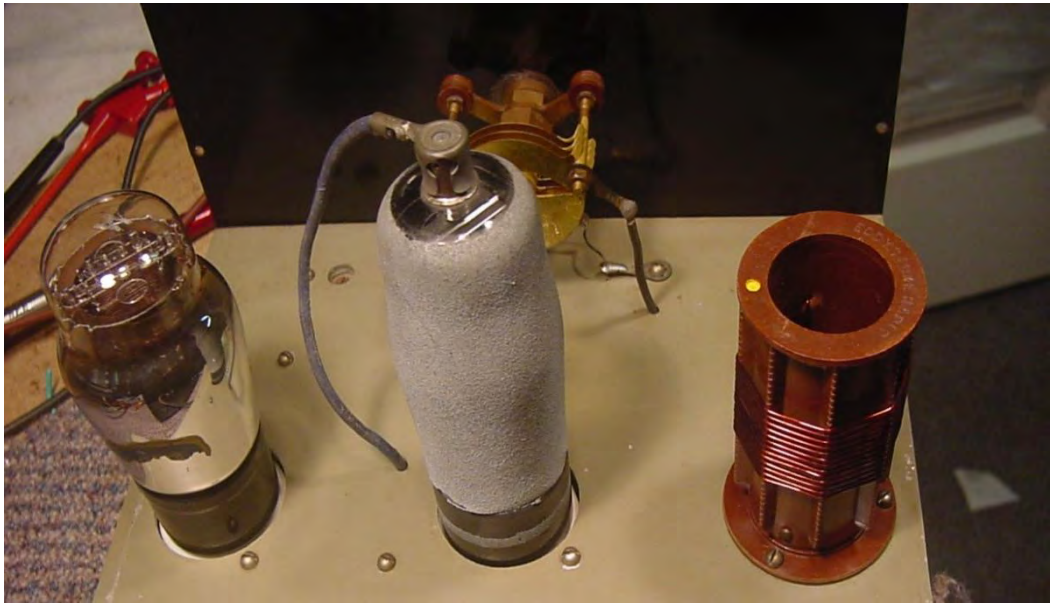
- 5000, 5500, 5600, 5700 & 7000 'Orion' (SSB transceivers) - range of rugged 'go anywhere' HF radio-telephones (150W PEP)
- The Orion 7000 was the last Eddystone transceiver manufactured in Birmingham

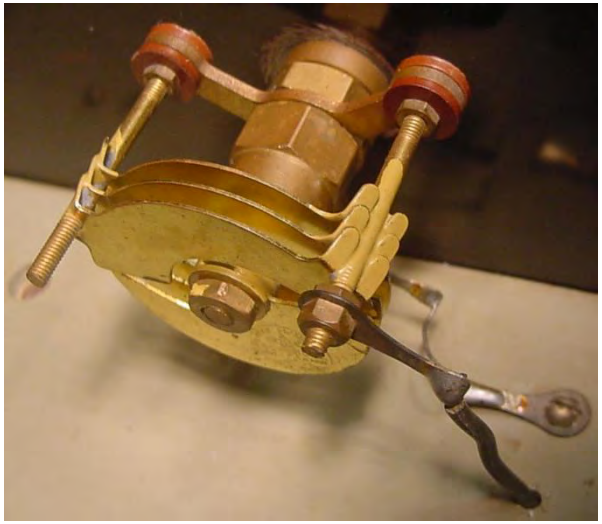
Restoration Projects

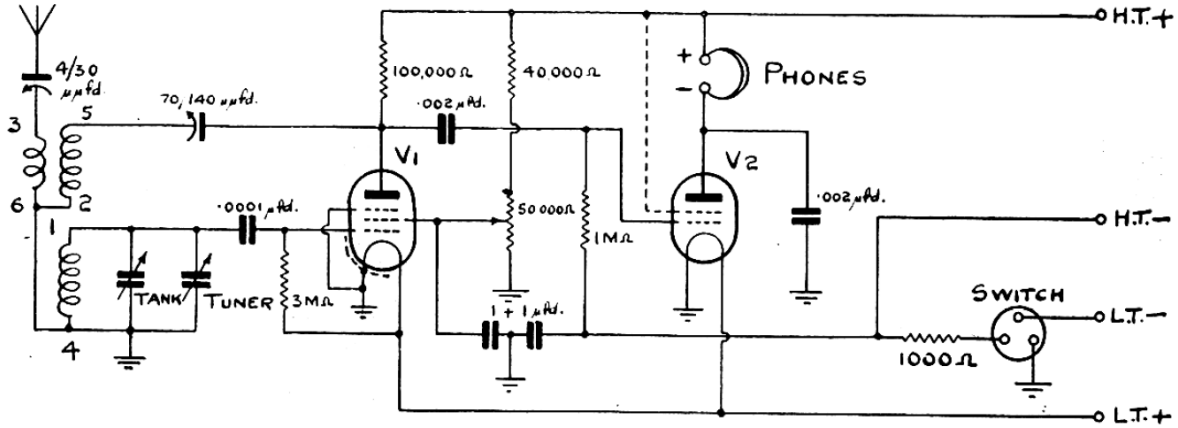
- I have been restoring Eddystone receivers for over 20 years
- Penitence for one of the worst radio ‘hack jobs’ ever in my youth(?)…. 1971 - 1976
- The ‘much-modified’ EC10 (MkI) receiver
- I still own it(!) and look at it every day to remind me what not to do to any radio…
- ‘Act of Contrition’: I restored another basket case EC10 MkI to its former glory!

All World II

- Produced between 1936 and 1939
- Two tube battery set
- Offered as a kit or ready-built
- Used by UK 'Voluntary Interceptors' ('VIs') in WWII until HROs and AR88s were brought in from the USA (an AR88 must have seemed like it was from another planet to a VI!)
- Coils available for 15 – 200M coverage (15 – 52M standard)
- Article in AWA Review Vol. 24 (2011)

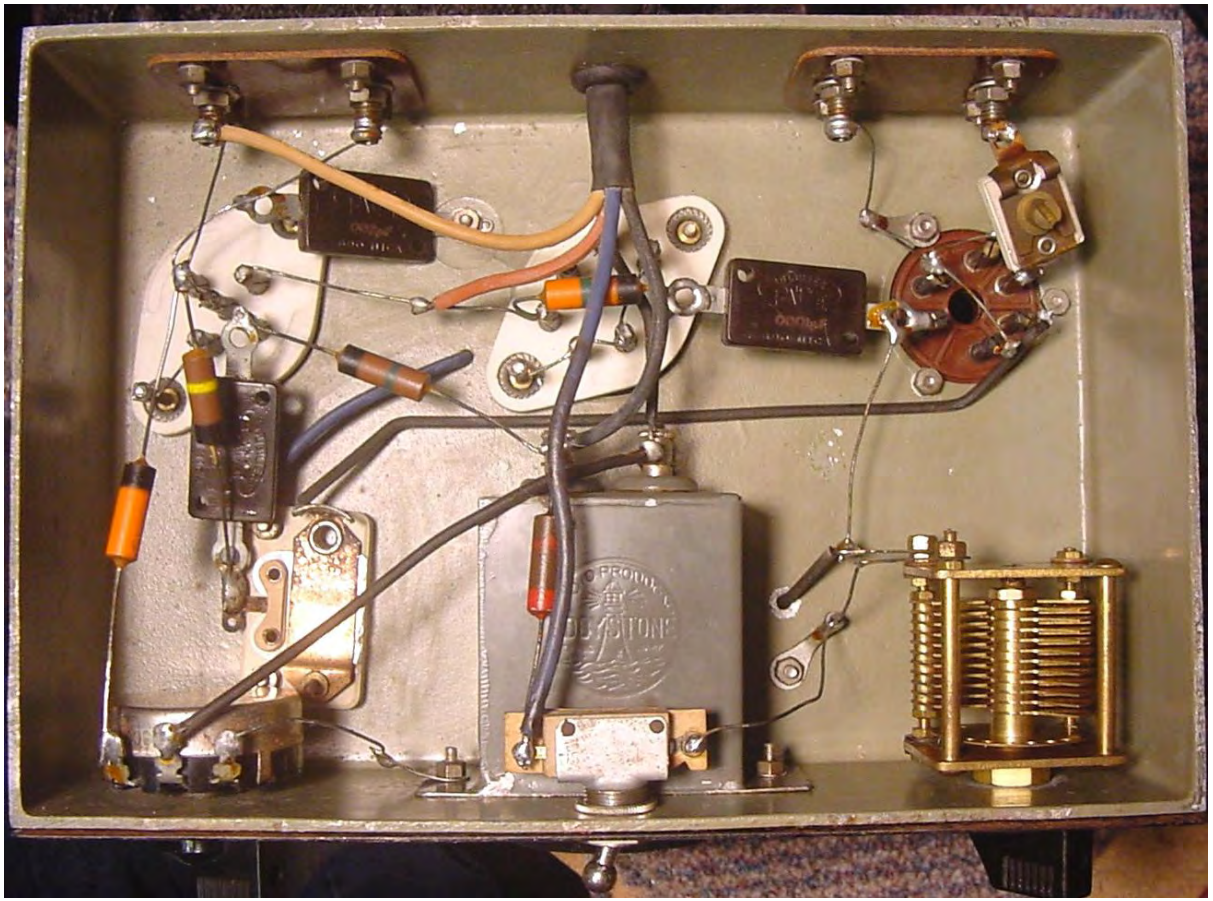






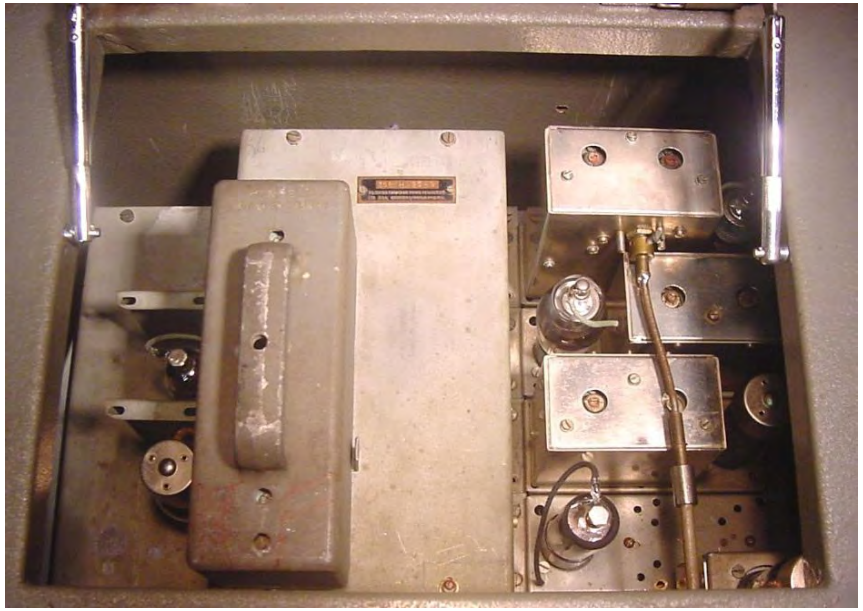
All World II

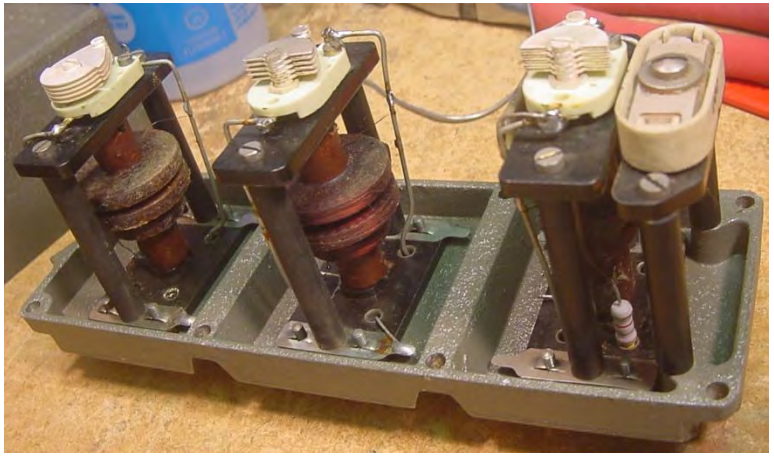
- Mullard SP210 pentode (V1)
- Osram KT2 tetrode (V2)
- Other tubes will work



S.358X

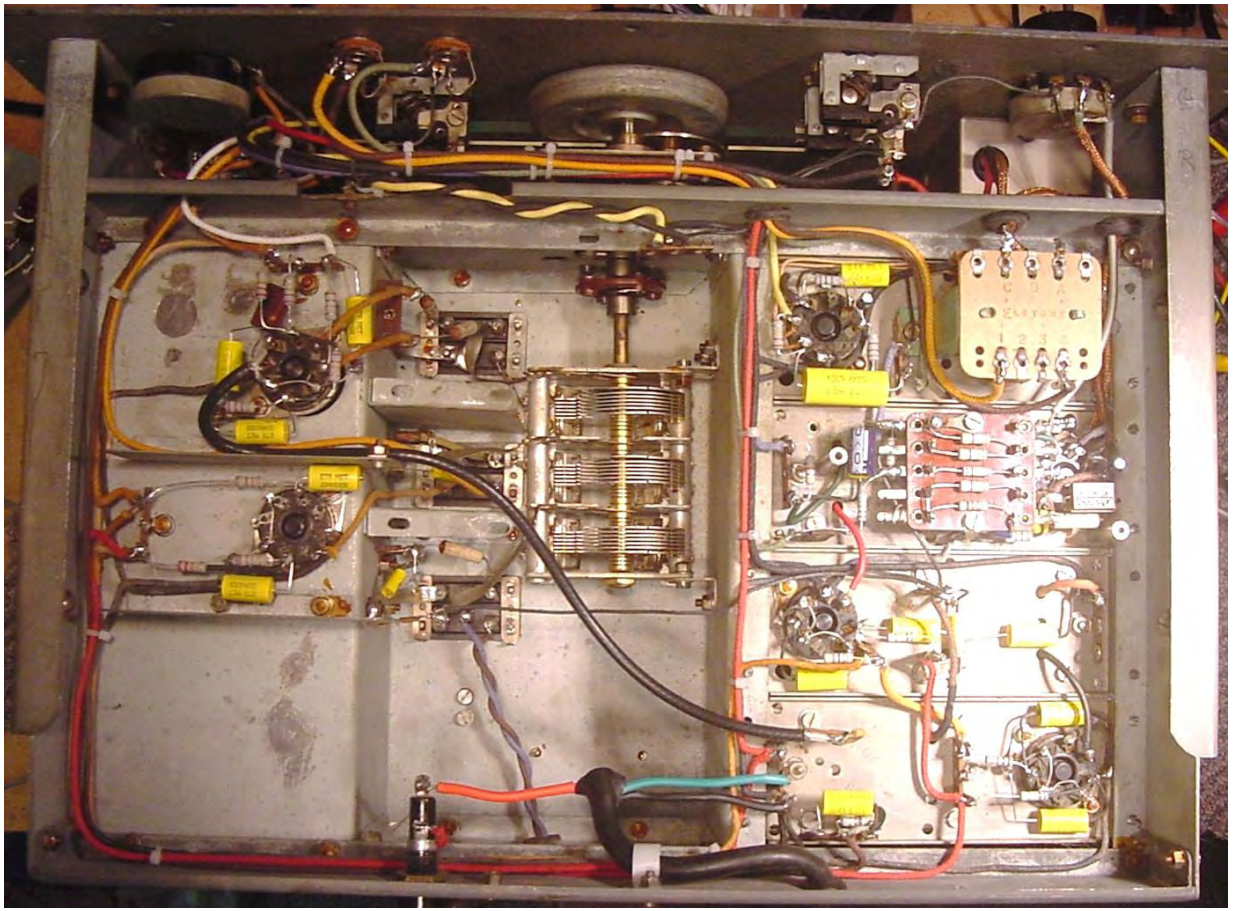
- Produced for UK Govt. and services in WWII
- Restored one owned by the SPARC radio museum in Coquitlam, BC, in 2010
- 7 tube circuit (without power supply)
- Dual crystal filter (in ‘X’ variant)
- Self-metering facility

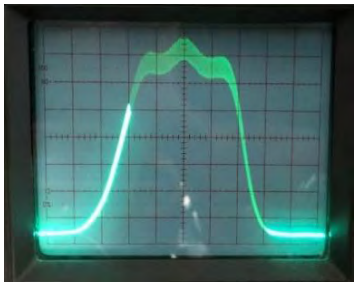


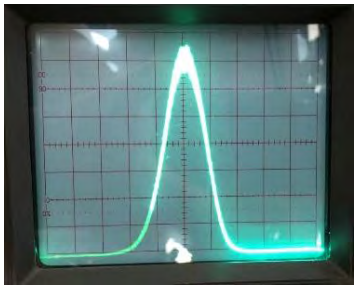


S.358X

- Plug-in coil packs
- 40KHz – 31MHz
- ‘Unit’ construction
- External power supply

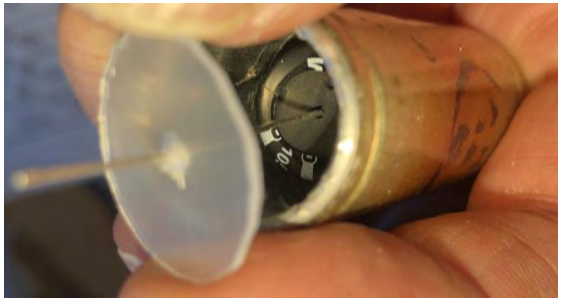




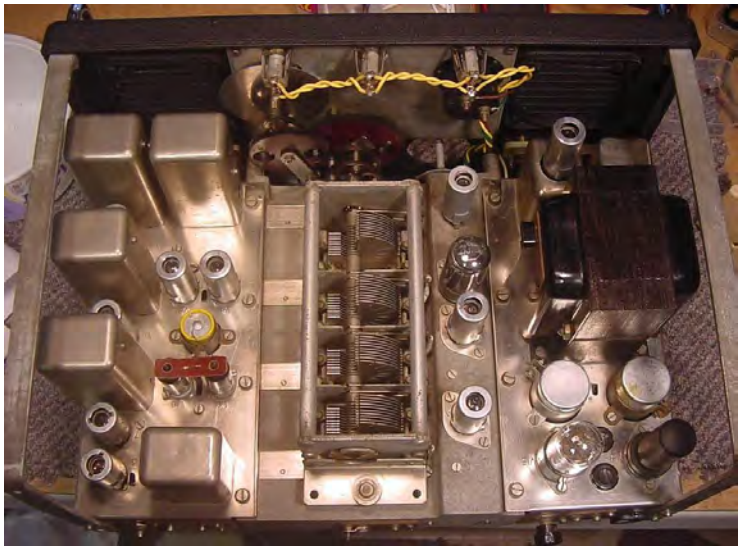


S.680/2

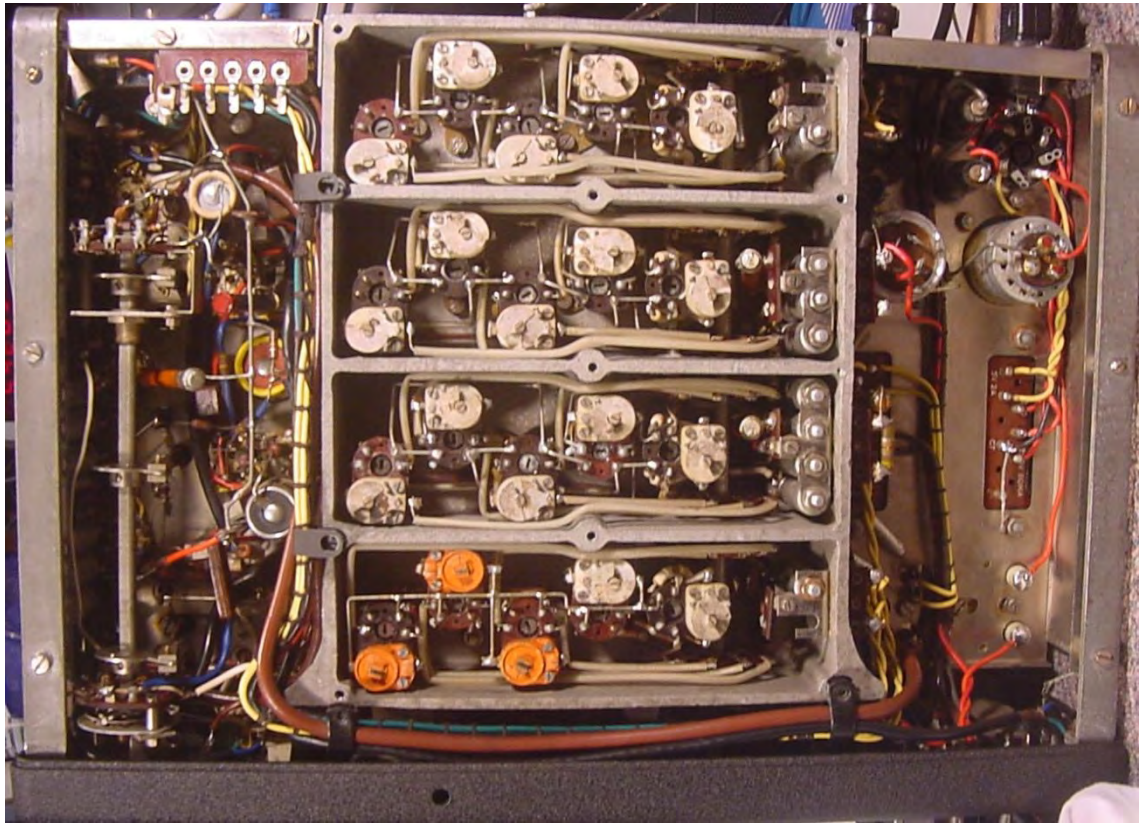
- Rare post-WWII model with ‘half moon’ dial – replaced by much more common S.680X with sliderule dial
- 15 tubes (one Loktal)
- Single conversion
- 480KHz – 30MHz in 5 bands
- Crystal filter/phasing control
- S-Meter
- Inset logging scale
- I still own this set! (love it!!)



S.680/2

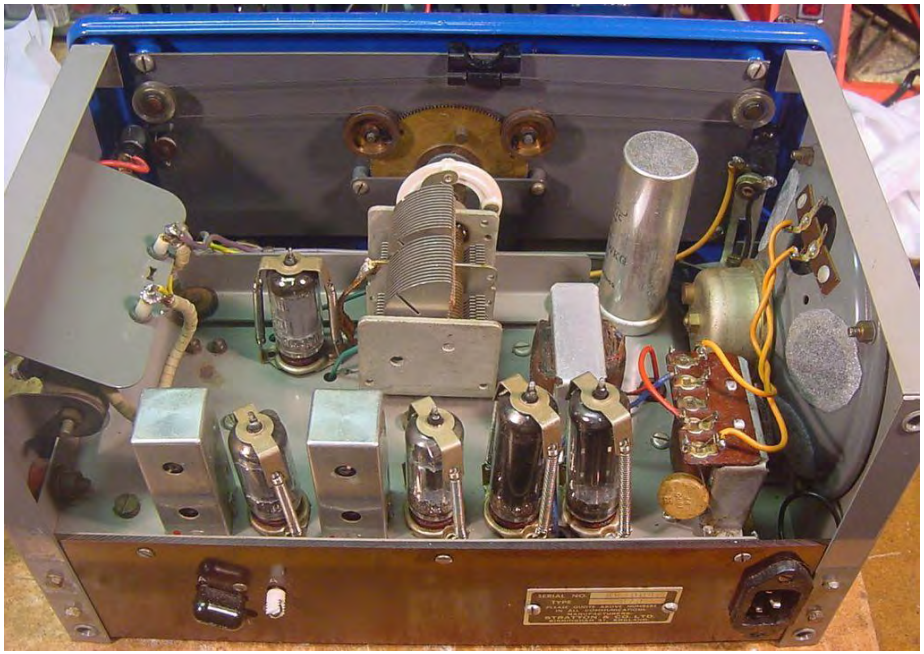


- Re-stuffed capacitors
- Repro resistors (where visible)
- Matching speaker

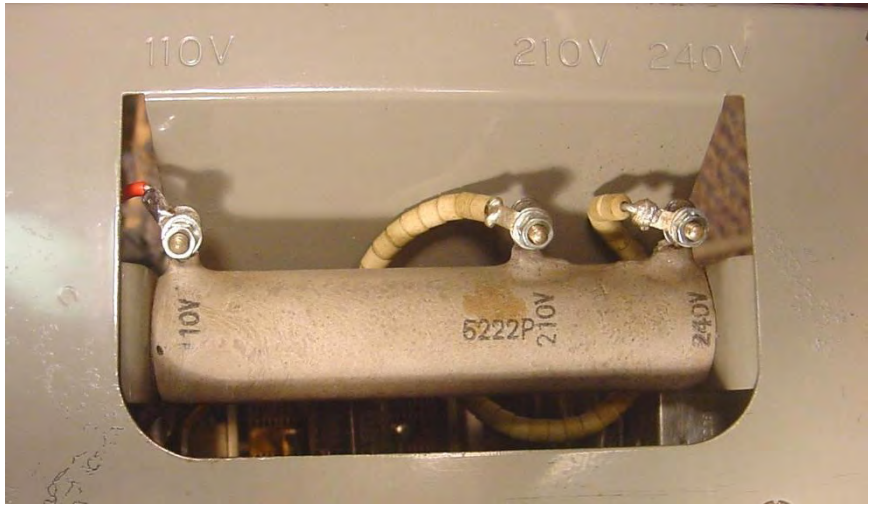


S.870, S.870A

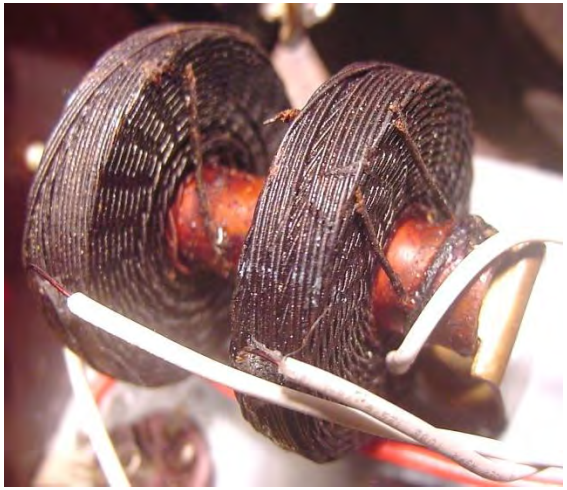
- Owned and restored both models
- 5 tube circuit
- S.870 covers 150KHz – 380KHz, 540KHz – 18MHz in 4 bands
- S.870A covers 150KHz – 380KHz, 510KHz – 24MHz in 5 bands
- Decided to tweak my ‘basket’ case S.870:
  - ‘Little Boy Blue’ was born! (and I still own it)
  - Powder coat

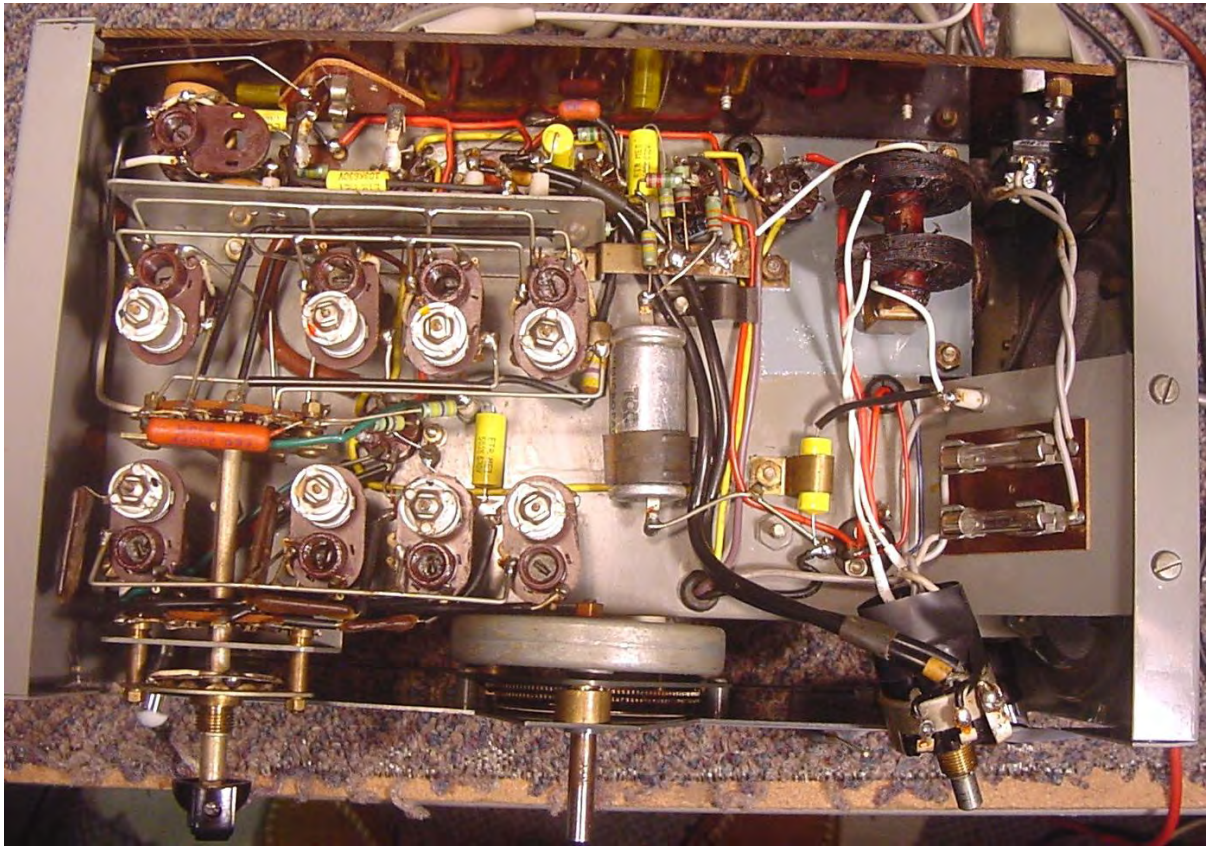


S.870, S.870A



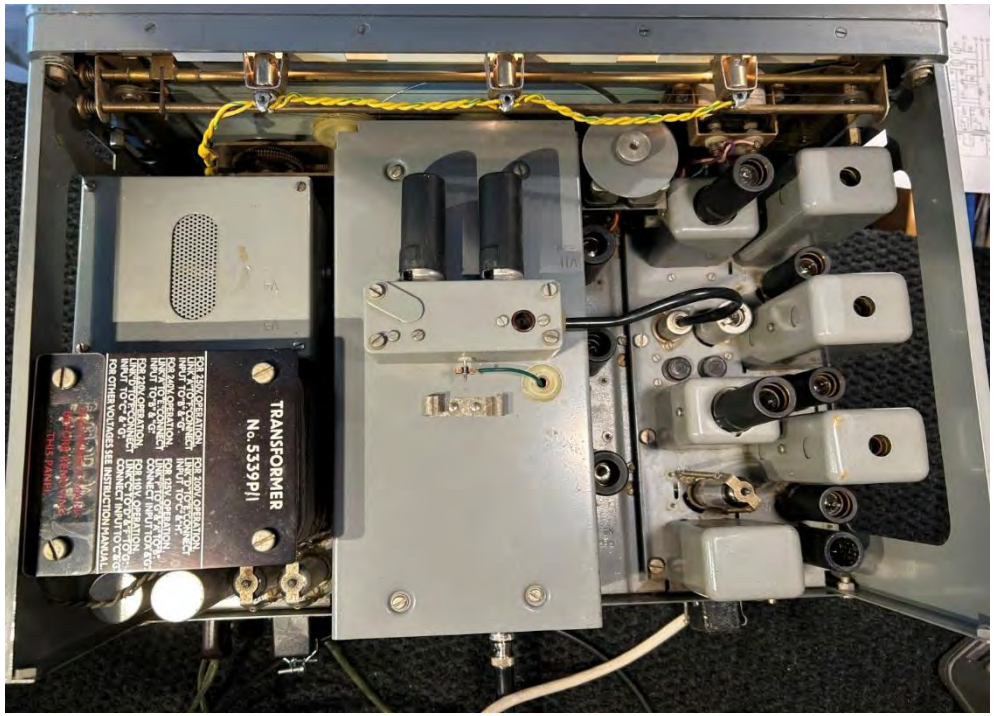
- Uses large ‘dropper’ resistor for 210/240v operation
- ‘Brute force’ filtering

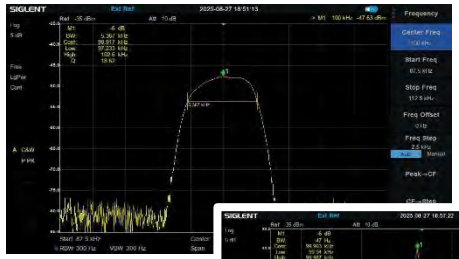


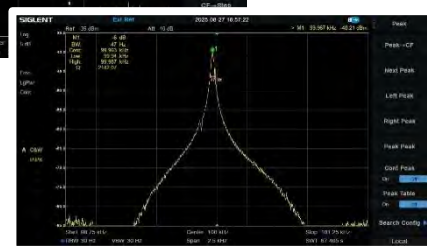


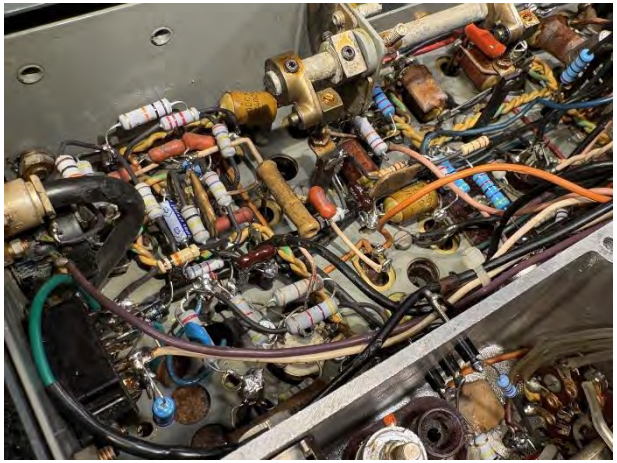
S.830/2,/4,/7

- The first model I bought after several decades of 'Eddystone Absence' – an S.830/4 – a superb set!!
- Dual conversion superhet with 1KHz dial resolution (incremental tuning on HF bands)
- S.830 was the last tube-based set <u>marketed</u> by Eddystone to 1973 (S.950 'Atom Proof' prototype was the last tube-based set <u>made</u> - 1974)
- 13 known S.830 variants: the S.830/4 variant was produced for the Canadian Govt.
  - No 'Broadcast band coverage below 1.5MHz
  - Has additional LF band



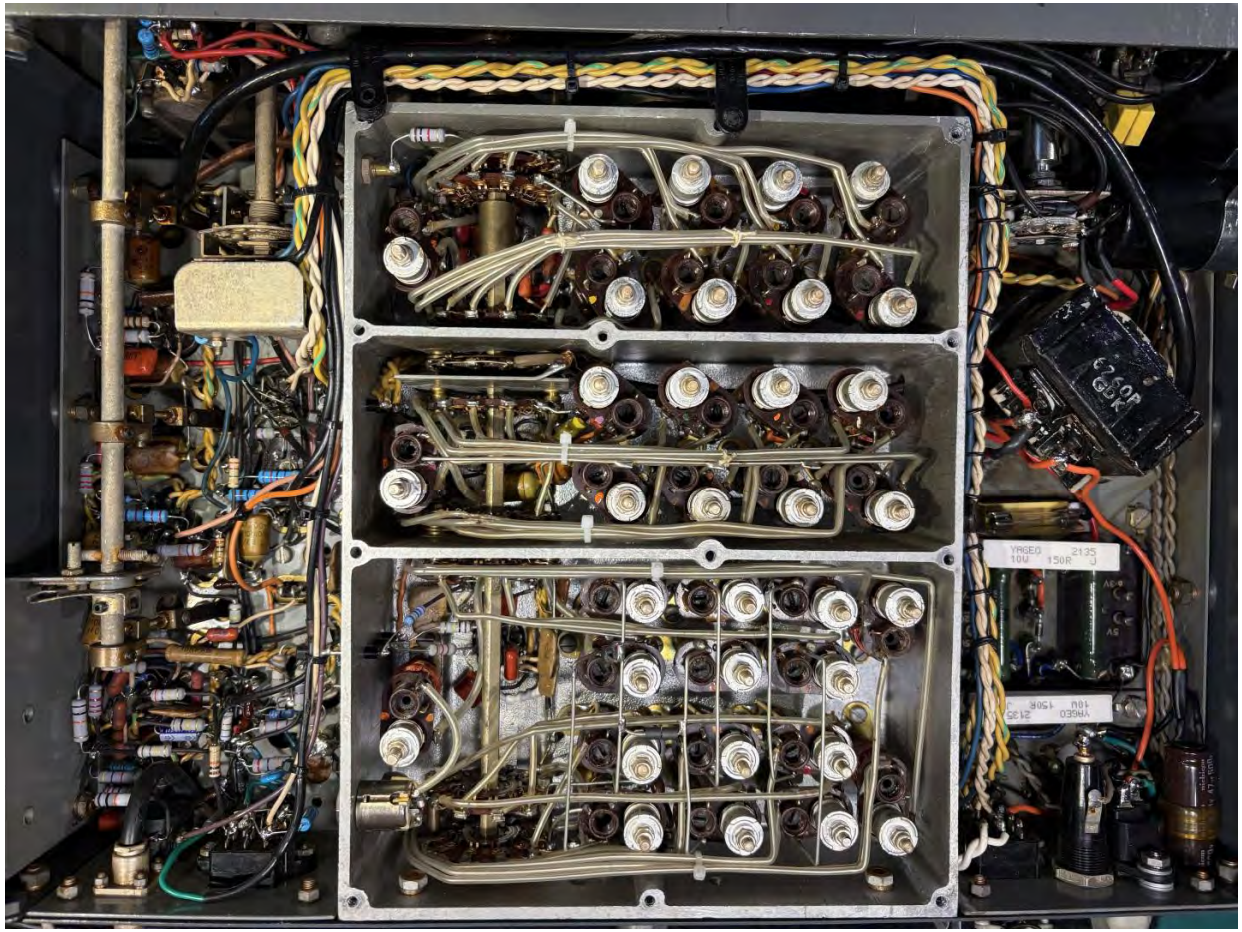






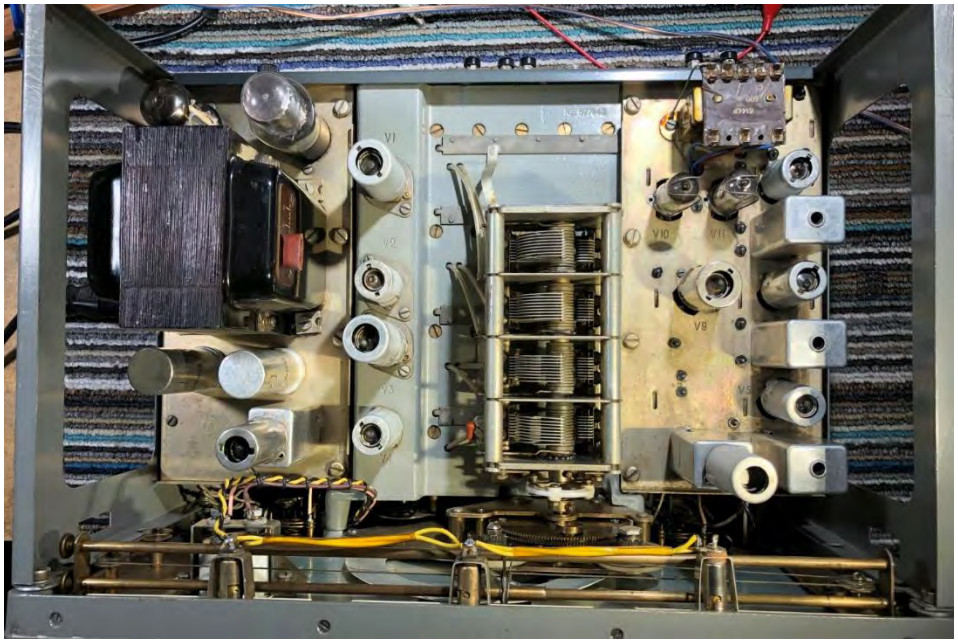
S.830/4

- 15 tubes plus 5 silicon diodes
- Varicap BFO
- Product detector
- 120KHz – 560KHz and 1.5 - 30MHz in 9 bands

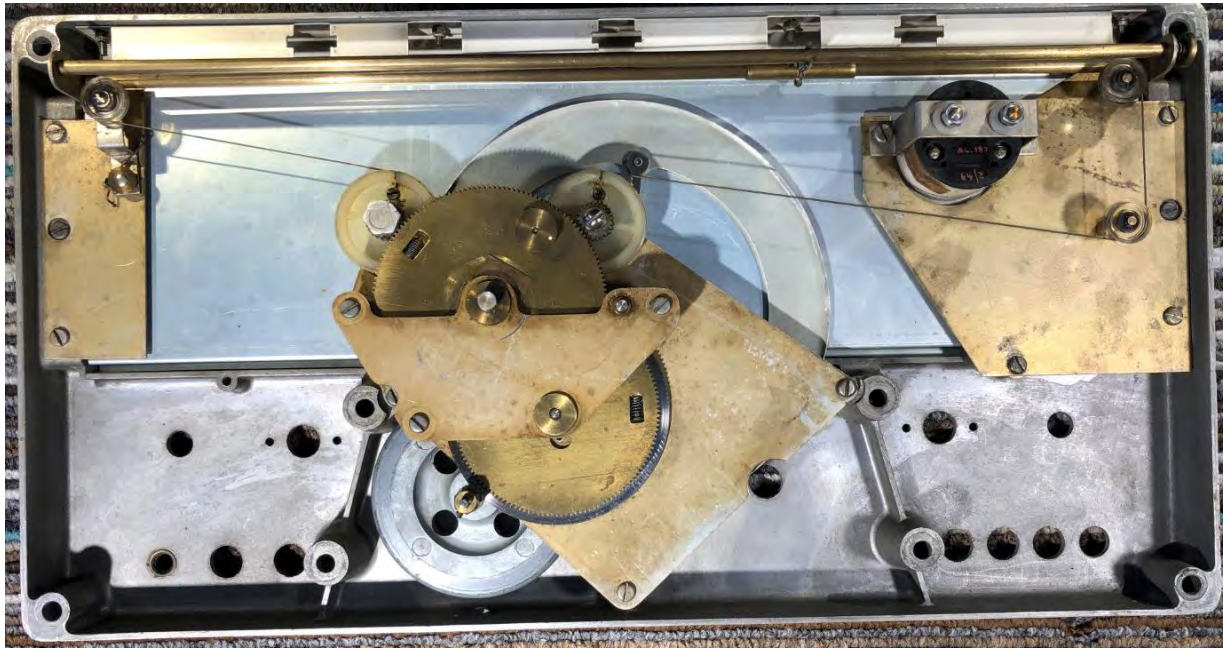


S.940

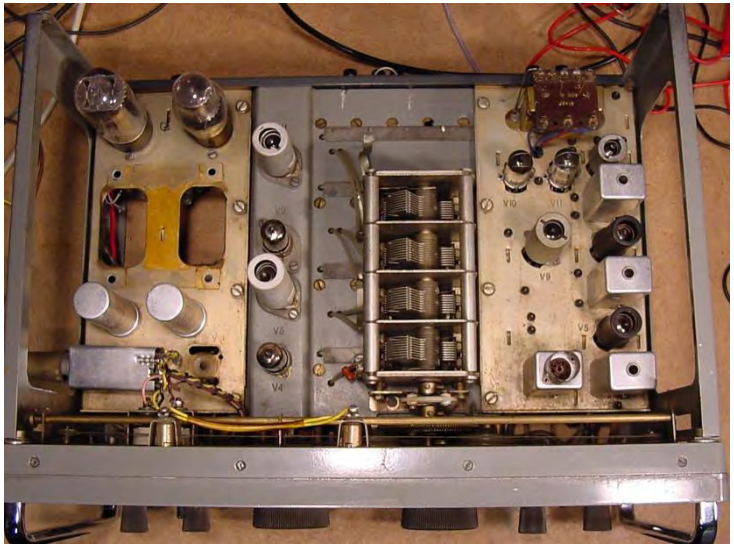
- Built as a good-performing shortwave listeners receiver
- Used mainly ‘off the shelf’ components
- Pentode and cascode preselector stages
- Restored from a ‘parts set’ – many parts missing
- Obtained parts from scrap Eddystone sets and EUG

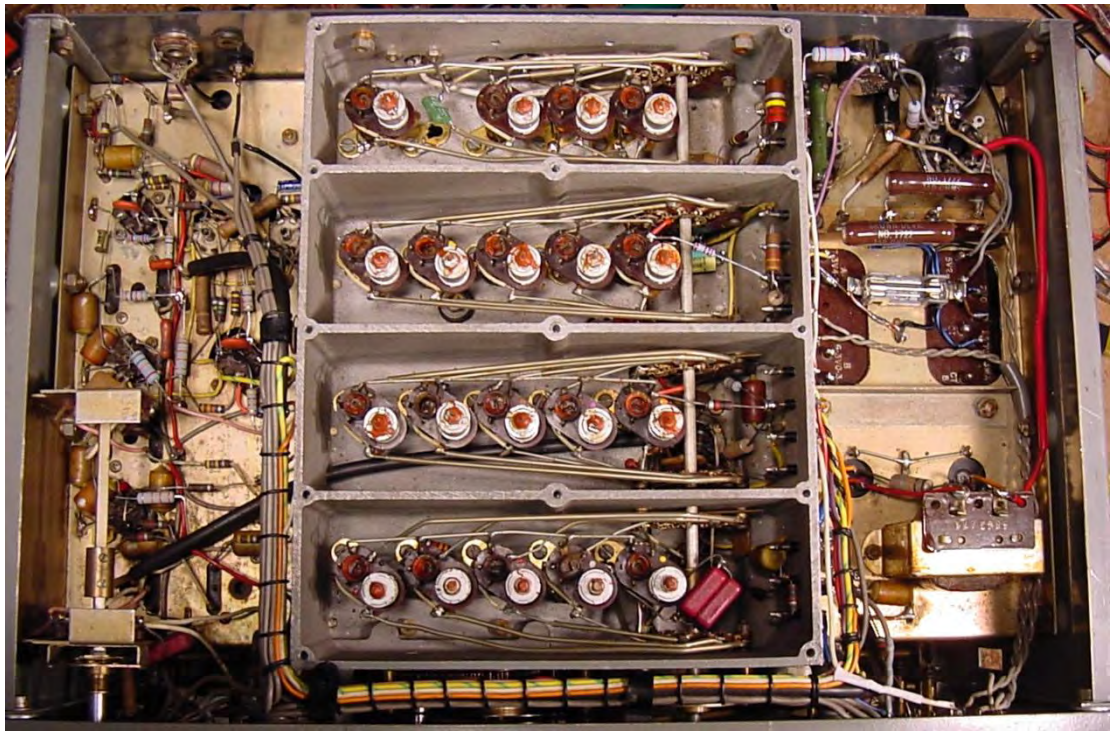


S.940



- 13 tubes
- 480KHz – 30MHz in 5 bands





Other Sets

- Eddystone sets I have restored/refurbished include:
- All World Two
- S.358X
- S.640
- S.670A
- S.680/2
- S.680X
- S.740
- S.750
- S.770/R

- S.770/U
- S.820
- S.830/2, /4, /7
- S.840
- S.870
- S.870A
- S.888
- S.940
- S.990/R
- S.958/3
- 669 (S-Meter)
- 688 (Speaker)
- 696 (Absorption Wavemeter)
- 902 MkII (Edometer – 'GDO')
- 1570/1
- 1830/1
- EB35
- EB36
- EC10 MkI

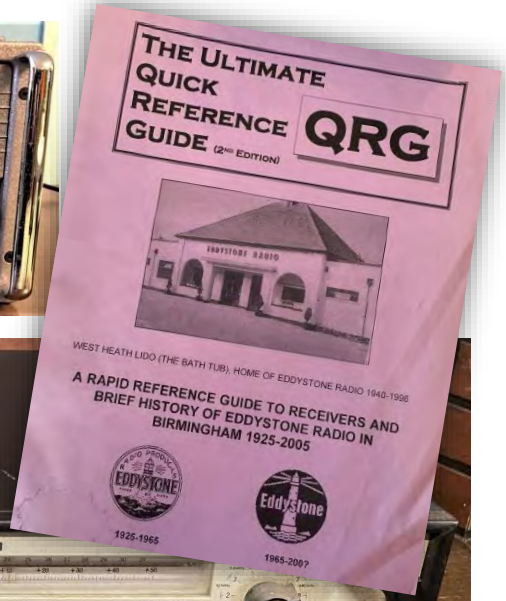
Resources

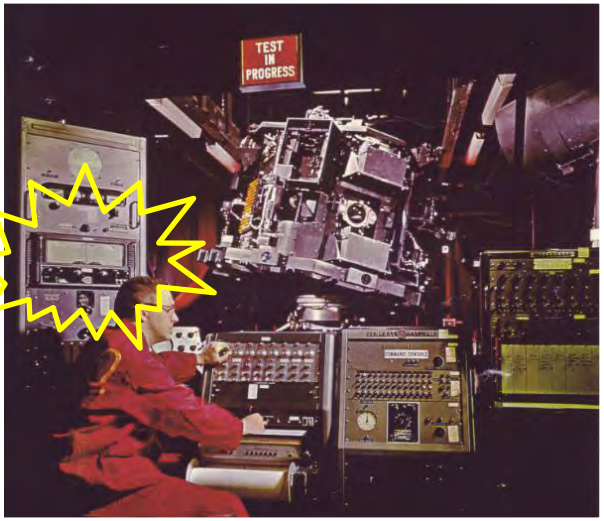
- Eddystone User Group (EUG)
- Eddystone Radio Owners Facebook page
- SPARC Radio Museum

Part of Ben Nock's Eddystone Collection

Eddystone User Group

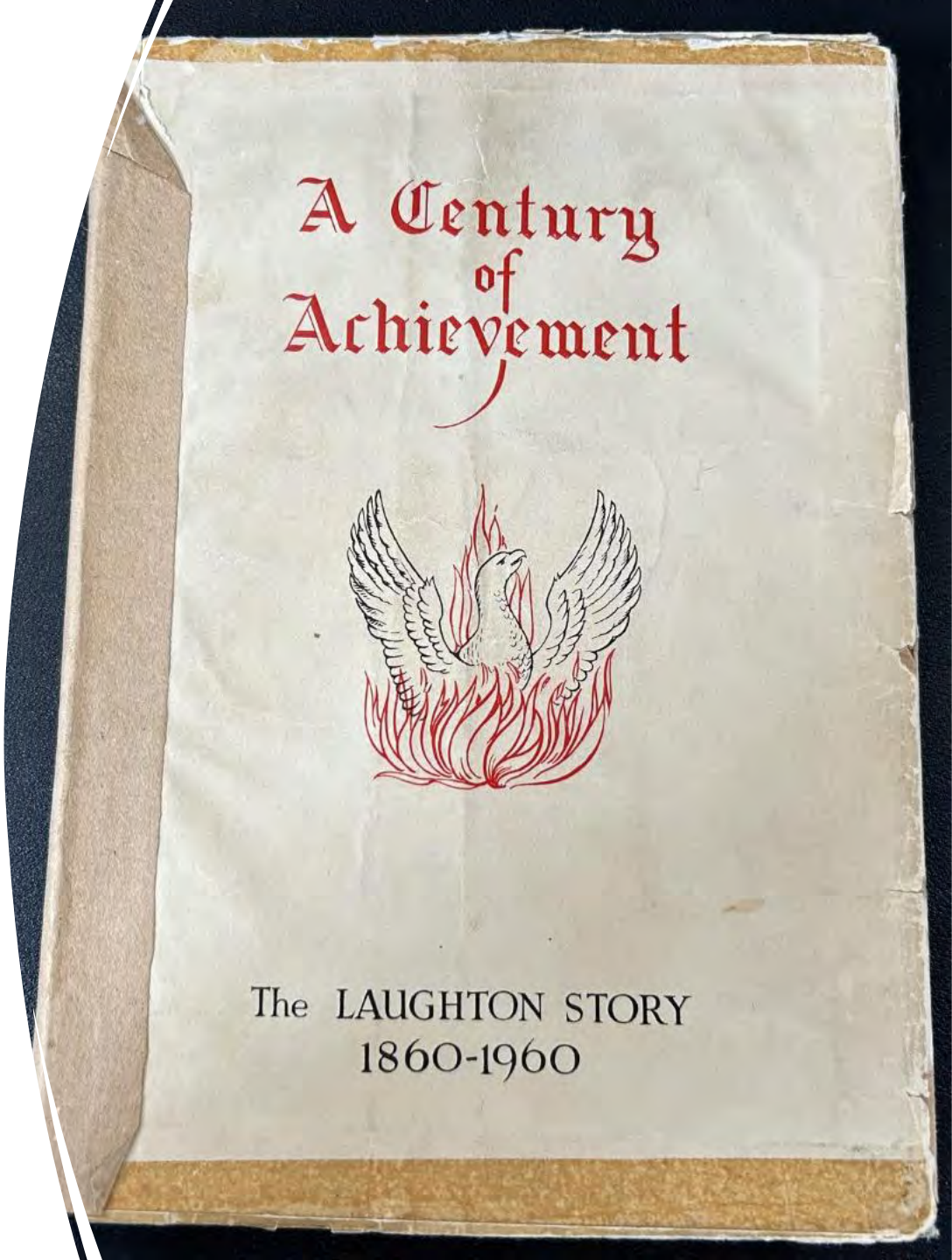
- History
- People and personalities
- Collections
- Adverts
- Manuals
- Restoration articles
- Spare parts
- Ultimate Quick Reference Guide
- Newsletter/Lighthouse Magazine (96 issues!)
- Eddystones in famous places (eg. ‘The Crown’, NASA)
- Lots more!!





Closure

- Eddystone: a great UK radio company
- Produced radios for over 80 years
- Strong loyal brand ‘following’, with many sets still in everyday use in the UK and overseas (post-WWII UK economy needed the export market income!)



Q&A

EDDYSTONE RADIO
Working in improvised surroundings at 'The Bath Tub,' 1941

ASSEMBLING EDDYSTONE RECEIVERS IN FORMER LADIES' DRESSING ROOMS
Plate 67

RADIO ASSEMBLY IN THE OLD BALL ROOM
Plate 68