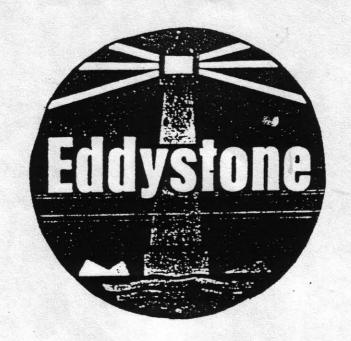


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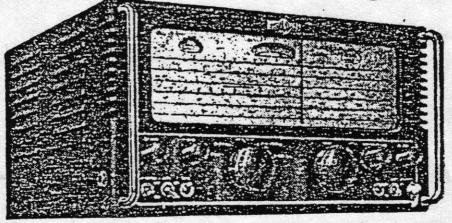


Eddystone Users Group

# EDDYSTONE

Receivers & Short
Wave Components

680x.



## ISSUE NO.5

January/February, 1991

Information quoted from Eddystone Co. manuals by kind permission of Chris. Pettit, Managing Director, Eddystone Radio Ltd.

Featured Model this issue - 680, 680X

A non-profitable newsletter for Eddystone users. Subscription on request, S.A.E. pleas Address for all enquiries:- W. E. Moore, 112 Edgeside Lane, Waterfoot, Rossendale, lancs. BB4 9TR

#### ISSUE 5

Hello to all of you. First issue of the New Year. Hope that some of you got an Eddystone for Christmas. At least Dr. Jarrett may have - he reports that his collection now numbers fifteen!

Plans to re-vamp the newsletter are being considered. I like the A4 format myself, however suggestions are welcome, so long as they do <u>not</u> involve increases in the subscription rate. The low cost membership does seem to be one reason for our success - fourteen countries now and only four issues out! Many thanks to the members who wrote over the Christmas and New Year with compliments and wishes for 1991 and to those are already enquiring about even renewing their subscriptions. Renewals are due after issue 6.

The last issue - full of queries. Well yes, some of them would have been "immediately apparent" or "just commonsense" to many of us, old hands at hollow state technology. This newsletter, the Group itself, has to cater to all, members. Many an old timer will consider just commonsense some things that will befuddle a 16 year old Eddystone owner. A query from a young S640 owner is as important as that from a 70 year old collector (Bob!) or an ex G.P.O. Engineer with 45 years experience of valves. It would help the less technically minded if they made use of their local Reference Library - many still have books on valve technology. Look out at car boot sales or rallies for old copies of the ARRL handbook or RSGB handbook. I have been trying to answer queries by post, many people do not send a S.A.E. so this became too expensive. Many queries are from non-members, not even relating to Eddystone receivers. These I refer to "Radiophile", an excellent magazine run by an excellent man. Chas. Miller knows more about valve radio than any other person I know. We are starting to get stories and articles from members - if yours is not in next issue, be patient. The number of pages is limited, for each issue. Do write in with your personal experiences of, or with Eddystones. We are looking for old adverts or company literature of interest to members - if you cannot photocopy it, we can, and let you have the original back. A good sign is that members ads are effective feedback from members, shows that they do work, they reach the right people, other Eddystone fans.

The Eddystone 40A - no such animal I am told by one member. Well not only do I have one but I also have the manufacturers operating and servicing manuals, courtesy of Chris Pettit. Some do not have any Eddystone Logo on - mine does. The 40A is one made to order of the G.P.O. for their radio interference department A semiconductor successor to the 31A. A noise measuring test receiver, an instrument grade H.F. model covering 130+32 m/cs. A.M. S.S.B. C.W. mains or battery operation with internal ferrite, loop or whip aerials, digital calibtrated decade attenuator front end, noise/ meter, internal noise generator - for those interested they make a superb D.F. receiver for N.D.B. locating. Garex are offering them at £150.00 in January Radcom. Mine actually came from Birkett's last year. It just does not look like an Eddystone, being in a buff coloured fibreglass case with carrying handle.

This brings me to the following - How many people are using Eddystone products without even knowing it? Seeing an ad recently for a "Marconi HR101 receiver" I hesitated, alarm bells ringing, fainly at first. Getting home and checking my records I was sure of my facts, an hour of peak traffic driving and my "thoughts" had left me "sweating". A quick phone call to check it was not sold and then a persuasive chat to my wife to explain that a quick 120 mile dash to Doncaster was a good way to spend Saturday afternoon. Anyway we came home with a M.I.M.C.O. badged Eddystone 910/1. This covers 375K/cs to 30 M/cs in 7 bands, and is the only 910 I have ever seen. I do not believe any were sold with an Eddystone logo, although company files do list a 910. The "company" did, and still do, manufacture a lot of equipment to be badged by other companies. Present day

production badged "B.B.C." for use at local radio sites for instance, including stereo F.M. broadcast transmittors and control racks. In the past receivers for others have included:-

```
Eddystone 670/1 - MIMCO type 2232B

" 830/11 - STC model
" 850/5 - "
" 880/3 - Marconi H2301
" 958/H - Hagenuk Model
" 958/D - Debeg "
" EC10 MK2-MIMCO Type 6689
" EM34 - " " 3873A "Elettra"
" 1004 - " " "Sentinel"
" 1004 - Redifon Model
" 1004 - I.T.T. Model
" 1004 - Hagenuk Moden E92
```

Information from members re other models is wanted, so do help us fill in our model list. I do know of '830' models in Greece and South Africa but believe they have "lighthouse" logos, any Eddystone literature for the more elusive models is welcome for inclusion here. We will photocopy and if required refund your postage. The newsletter is not subsidised and all costs are met by subscriptions and sale of receiver data. The vast amount of work is shared now by my wife, Kathy, as yet not very knowledgeable about Eddystones. My worry is that if she learns too much I will be sacked! Information is needed on these models - 688, 720, 739, 820, 909, 930, 964, EB31, EY11, EB36A. We will refund all costs.

Now for a "Horror Story". A member who bought an externally nice looking 830/9 at rally from a regular rally trader, paid £160.00 At home on powering up his prize, results were nil. Frank tells me all valves were in the wrong sockets, all I.F. and R.F. slugs were butchered, apparently a cowboy armed with a steel screw-driver. Some non-spec mods had been attempted, some components missing. When the trader was contacted at a later rally, he was less than helpful despite having claimed at the time of sale that the 830 was"a worker". It took almost thr months to get the receiver up to spec. Component cost from rallies was about £25.00 but labour cost, if counted, would have been phenominal. So - buyer bewere and if you are going to D.I.Y. it, please use the correct trim tools and make you have the necessary knowledge. Beware too much enthusiasm and not enough circuit information. A few tips are included here:-

- Dial glass, soapy water, do not <u>rub</u> scales as printing will be erased. Read manual for particular model as to glass removal.
- 2. Trimming cores or trim condensers with a steel tool is out. Professional trimtools in plastic or nylon are sold by RS, Cirkit or Maplin. If necessary, old knitting needles can be filed to fit.
- 3. As a general rule unless showing signs of previous abuse, do not touch dust cores in I.F. R.F. stages. They rarely go off.
- 4. If it is necessary dust cores are set at the L.F. end of the band and trimmers at the H.F. end.
- Burnt resistors, or just O/C, usually indicate an excessive current, most likely due to leaky paper condensers in anode or screen circuits.
- 6. Audio distortion is usually caused by incorrect voltages in the A.F. or output stage. Faulty valves possibly but more likely dried out electrolytics, leaky paper condensers, resistors gone high. If receiver has abuilt in speaker do no overlook a sticking coil due to rust! (840A)

7. Remember "valve" receivers use high voltages, it is not enough to switch off mains on front panel, 240 volt A.C. will still be present under chassis. Always unplug the mains lead.

## s.o.s ...--... s.o.s. ...--... s.o.s. ...--...

- 770R V. nice condition with manual, must sell as unemployed. £150. Mike Evans, 120 Loughton Way, Buckhurst Hill, Essex. IC9 6AR
- 1830/1 manual wanted by Lamiere Guy, Rozenlaan 26, 9800 Deinze, Oost Vlaanderen,
  Belgiu
- M.W. Box loop with or without preamp for direct connection to receiver. Special price to E.U.G. members £30.50. Mike Evans at above address.
- I.F./A.F. chassis for 840C or just 2 xI.F. transormers wanted, good price paid, Dr. Jarrett on 021-705-7626 evenings, 021-706-1360 days.
- sell AR88LF G.W.O. £55.00 including matching speaker and manual. Ring Ian on 0267-232421
- wanted EA12 Good condition. Good price paid. Ring Charlie on 0734-477482
- wanted 770R and 770U. Must be in very good condition. Have Racal Ral7 for sale in good working order. D. Butler, 2 Rossendale, Chelmsford, Essex. CMl 2UA
- SWAP Eddystone speaker. S688A for national HRO speaker. Wanted 940 receiver. Phone W. Gibson 041649 4345

#### A CAUTIONARY TALE

all were normal.

I had been asked to look at, and possibly repair an 840A. The owner had not used the receiver since 1958, it had been stored in the loft for some years after a 20 year stretch in a garage. First impressions were of rust, cobwebs, broken dial glass and greenish mould around chassis corners. Amazingly, after two days "drying out" in a warm room, a test on the speaker from an external source showed it to be okay. Use of a vacuum cleaner to remove as much loose "muck" as possible helped by a clean paint brush and then some turps, this allowed much more to be seen and identified. The valves were removed and tested on an AVO valve tester, all came up as good - in the green sector, The valve bases were next and a !" brush with Ervisol soon cleaned these. Having replaced all valves in the correct sockets, the chassis was turned up for a visual check, all appeared normal, untouched since new as the owner assured me. The mains lead was two wire to an old 5 amp plug. Removing this plug I connected the lead to my "safeblok" and powered up the 840A. Touching the chassis I felt a distinct A.C. tingle so the power was removed and a check was made with an AVO on resistance, Several minutes later, several resistance checks later, it was found that one pole on the on/off switch was open circuit, the neutral pole, this was replaced by a new toggle switch. At the same time conductive green mould around the top of the dropper resistance was removed. This time before switching on I connected an earth lead to the "E" socket (not to chassis!) Powering up again and after some seconds, a loud hum was heard from the speaker, almost immediately a fizzing was heard from below chassis and a smell of burning. A quick power down and upon turning over the chassis it was apparent the electrolytics were about to pop. As a replacement was in stock the repair took 15 minutes, it was time for another try. This time all seemed normal valves and dial lampslit, since both original bulbs were "silvered" internally I had replaced them with new. After several minutes, no surprises, I connected an aerial and going to range 4 - the M.W. - I checked up and down the band, some faint signals were heard but gain was way down, full volume and 909 K/CS was only just available. Voltage checks were done starting back from V7 to V1 and

During the next two hours I became not just puzzled but annoyed having checked wit a signal generator back to Vl, I found signals to be okay on the secondary of the aerial input coils but very weak from the primary, so it had to be here somewhere. Dabbing each soldered joint with the tip, of a nylon trim tool I finally found that the live end of a paper .01 MFD condenser when tapped hard gave out clicks. Checks on the circuit wiring showed this to be between the chassis and the commoned earthy end of all four aerial input coils. A look at the circuit diagram showed no paper condenser here. It definitely looked like an original component even to original soldering. On the diagram however was a ceramic 1800 PF condenser the same as Cl on the top end of the coils. It was removed and found to be open circuit, finding an A.C. 450 wolt ceramic replacement and fitting it cured the low gain problem. The wrong component must have been fitt during production, a check on my 840A did prove that a ceramic was fitted on other sets. It must be emphasised that Cl and C2 must be ceramic types of at least 450 volt A.C. rating.

Query - Two members are asking about removal of white deposits from tuning condenser vanes. These are salts of aluminium caused by damp storage. I imagine the correct way would be removal of the complete condenser and dismantling followed by cleaning. This would necessitate a full re-alignment after re-assembly On a 670A with this problem I decided to try another method. Using a 4" x 2" strip of crocus paper, folded lengthwise to make it double sided, I opened out the condenser to minimum capacity by tuning to the! H.F. end of the scale, carefully sliding the crocus paper up and down between each pair of plates on both rotor and stator. I checked with a torch to be sure all was cleared. The powder now lying on the chassis was removed with a vacuum cleaner and dry brush. Servisol was then brushed on to all plates to remove any remaining powder. After a 20 minute warm up alignment was spec'at all points except for a minute error at 30 M/cs. A slight touch on the oscillator trimmer was enough to correct this.

### ONE MAN AND HIS S640

The call came from a former workmate, they were clearing the garage prior to moving house. "Did I want the old valve wireless?" Not realising at this point, I said Yes, and set off prepared to collect some ancient domestic model in a polished wood, or shiny plastic cabinet.

Surprise and elation combined, and some eager thoughts of my teen years in the forties, it was a tatty but recognisable S640. One of Eddystone's first post-war models and one designed and built with the amateur or SWL in mind.

Tatty, yes! Black crackle chipped from all corners, rust on the rear cabinet and chassis. The dial glass broken, but still in place and luckily protecting the scale. All valves were missing but that was not the worst part, that came when I removed the rear cabinet. Both main and bandspread drive cords were missing completely, anybody who has looked into an S640 will realise it is a nightmare to try and puzzle out these two separate systems.

Under-chassis it became apparent that some components had been chopped out, quite literally "chopped" as evidenced by the tinned copper wire "ends" going nowhere. A first step had to be a copy of the S640 manual from "Eddystone User Group". After ordering this, I set to on the cabinet and front panel.

Rust inhibitor, as sold for car use, was used on the bare metal of the steel cabinet, this was later cleaned up inside and out, getting rid of the ex-inhabitants, spiders and the like. A full coat of 'Hammerite' was put on and the cabinet left in the loft to dry.

Taking out the 3. pieces of dial glass, I sellotaped them together and paid a visit to out local glass "Emporium". For eighty-five pence I had a replacement dial glass and they even smoothed off the rough edges. After re-fitting the dial glass covering it with cling film and sellotape. Next stage was removal of all control knobs, this was an easy enough job since several days earlier I had put several drops of 3-in-l oil into the grub screw hole toggle of each knob. Toggle switches were unscrewed and pushed through temporarily to the other side of the front panel. The fingerplate was carefully removed by sliding the blade of a kitchen knife along and under so as to loosen the adhesive blobs holding it in place.

The front casting was now given a full coating of "Hammerite" taking care to protect top and bottom of the chassis with taped on sheets of newspaper. This was left to dry, a second coat was later given both to this front casting and to the rear cabinet.

Whilst waiting for these to dry thoroughly a matter of two days, I studied the manual which had now arrived, first was a list of the valves required for a 640. Several phone calls later I had a quote for £12.00 plus postage for the 9 valves, ordered them and whilst waiting made myself familiar with both the circuit diagram and the parts list. A blown-up photocopy of the underchassis view was made so as to locate those components I knew to be missing.

When next I got to look at the chassis things were much more clear, cleaning up the chassis and coil cans came next, the rust was removed and a long bristled new paintbrush enabled me to clean the three-gang variable condensers, both main and bandspread. Underchassis too got the same treatment, Servisol was used on the value bases and on the band switch wafers. Once the accumulated 'gung' was removed, it became much easier to identify and locate components. Each value base was marked by laundry marker pen, both on top and below chassis i.e.  $V_1$ ,  $V_2$ ,  $V_3$ etc.

The dreaded cord drives were tackled next, after much study of the diagrams contained in the manual and the actual chassis layout, it was decided that of the two main drives the bandset would be most difficult, whilst the two portions of the bandspread looked straightforward. It is first necessary to remove and push away the dial lamps and reflector plate. I used fine, braided kite string but it is still possible to purchase "RS" dial cord, several attempts were necessary for each cord, a dummy run to estimate the actual cord length required followed by the almost inevitable failed attempt. Finally, they were done, working well and no apparent backlash - I had allowed a drop of 3-in-l oil to soak down the concentric pointer spindles since this had looked to be a possible problem earlier on.

My parcel of valves had arrived by now, I had ordered an ECH35, I got a 6K8, since this is an exact replacement - no problem. In fact, I afterwards found that one circuit specified a 6K8 not an ECH35.

Next step was to upend the chassis and compare the underchassis view with blown up photocopy of the photograph in the manual. It was immediately discovered that 7 resistors were missing - chopped out - plust one electrolytic in the 6V6 output stage. (This stage is mounted on a sub-chassis at the rear of, and above, the main chassis, great care is needed when replacing this sub-chassis as it is very easy to trap the H.T. lead or heater leads). The headphone socket was missing also. For safety I also decided to replace C72-C73 the mains smoothing electrolytics (chicken!) A list was made up and these components were purchased at the Granby Halls rally which "Just happened" to occur as needed.

Replacement of these components in, as near as possible, the positions indicated on the photograph was a nervewracking job since to make a good mechanical and soldered joint meant first removing excess solder and the tag end of wire left from the chopping out of the original component. Having finished replacement I checked from the resistor list in the manual that all resistors, new and old, were within 10% of the specified value.

Refitting the fingerplate and all control knobs - taking care that the white indicator spots were correctly set - I removed the cling film protector the dial glass, fitted the new valves in place and re-located the dial lamp assembly. I had taken the precaution of sanding off a quarter inch circle of metallising from the top centre of V8, the EB34 to enable a check of the heater. After final visual and electrical checks, with an ohmeter, I risked connecting the mains and with my AVO 7 on the H.T. positive line I switched on, and watched the needle rise and stop at 247 volts, well within spec. all heaters were glowing red and noise was coming from the speaker. A twenty foot length of hook-up wire was connected, it worked! Signals on all bands! My BC221 had now been on for more than an hour - so I checked L.F. and H.F. limits on all three bands, no problems except at 30 M/CS, which was just outside the makers 0.5% tolerance. A burn-in period of 5 hours:brought no problems and in fact 30 M/CS was now within specification so no twiddling was necessary. Several weeks later I am wondering how I ever managed without my 640. I am thinking of selling my R1000 trio to purchase a 940 or 830.

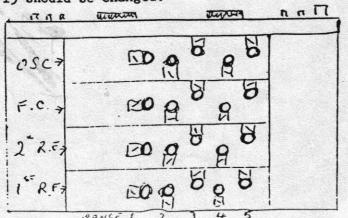
Please - we would like more restoration stories like this - typed or handwritten.

# FEATURED MODEL 680, 680X

From 1949 onwards this was the top line receiver from Eddystone, being a fifteen valve, including stabiliser and rectifier, five waveband professional receiver with two R.F. and two I.F. stages. A single pole crystal filter and buil in "S" meter are fitted. The earlier 680 differed from the 680X in that V3 the frequency-changer was a 7S7, this being difficult to obtain at times the later version used a 6BE6. Similarly V8 and v9 prior to 1952 were 6AU6, later versions 680X - used 6BR7 or 8D5.

AC mains is from 110 to 250 volts and a stated consumption of 80 watts, although other factory literature claimed 65 watts.

Coverage in 5 bands was from 480 KC/S to 30 M/CS, with an I.F. of 450 KC/S. A.F. stages used two phase splitter valves feeding a push-pull output stage, headphone output is from V8 the driver stage which disconnects the push-pull stage. The phones socket is placed on the lower left hand side of the cabinet, an unfortunate necessity dictated by lack of space on the front panel. lighting pot; and "S" meter pot; are on the rear chassis panel. The four position selectivity switch incorporates gain compensation acting on the A.V.C. circuit. Both local oscillator and B.F.O. are fed from the 150 volts stablised supply. Aerial input is approx. 400 OHMS with provision for longwire, balanced doublet input or unbalanced dipole. The two low noise R.F. stages provide adequate sensitivity and selectivity. Figures of 37db down at 5KC/S off are quoted without the use of the crystal filter, with the filter, figures of 45 db down at 1.2 K/CS off are given. All heater circuits are balanced to earth and as added security the N.L. heater has its own supply. A point to watch is that V13 the N.L. valve has a history of blowing heaters, on several versions I have serviced, the supply at switch on can be up to 7.1 volts and even after heater warm up is rarely below 6.5 volts. Non-function of the N.L. or S.meter are indications of a blown valve. Files here at E.U.G. suggest brimar are more prone to fail than mullard type. Hum in the N.L. stage (when switched "in") can be caused by an open circuit resistor R66 in the V15 stabiliser circuit. This is a 100 Kilohm and for some reason it is frequently found to have gone high, up to 400 Kilohm on one receiver. Drift can be caused by an aged VR150/30 - Yes, they can go lowemission and give excessive local oscillator volts and poor regulation. On ` standby H.T. is removed from all except local oscillator and BFO, apparently on a few models delivered to one Government Department a reduced gain, listen through, facility was provided by shunting the standby with a fixed resistor giving a lowered H.T. supply, no mention of this is found in any manual. However, two of this modified type were found on sale in 1984. Front panel controls are - R.F. and A.F. gain, main tuning, bandswitch, BFO tune, crystal phasing, BFO on-off, N.L. on-off, AVC on-off, mains on-off, standby, and selectivity 4 positionsincluding crystal narrow, as is normal with a crystal filter any I.F. circuit alignment should be done with the filter "in" and I.F. transformers should be peaked to the crystal frequency. Normally - unless the I.F. cores have been tampered with - they should be left alone. Dial lamp life is showened if they are run at full intensity, 3/4 strength will give much longer life and yet adequate brightness. Any more than 150 volts on the HT2 line is an indication that V15 should be changed.



FINAL ADJUSTMENT OF TRIMMER CONDENSERS MUST BE DOWE WITH THE SCREENING RATE IN SITU.

# XMAS CROSSWORD

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SFERICS - A number of readers ask about the Air Ministry numbering for S770 models. This can be on an engraved plate on the front panel, below and between the tuning and range knobs. On some it may be stencilled along the top of the die-cast front panel. Most of the number/letter groups are stores reference numbers i. e. ZA2432 or 10AX/3241. Ignore this and look for the group beginning with an "R". Those encountered so far have been R213, R213/2 etc. The Eddystone Equivalents are -

S770R/3 = R213 - Min. Civil Av. S770R/4 = R213/1 S770R/5 = R213/2 S770R/6 = R213/3

Main differences are, different Co-ax sockets or different F.M. Bandwidth.

I gues that is it for this issue. Hope it is as well received as previous issues.

Letters so far indicate that content is as you want it to be. If not, write and say so, better still contribute to your Newletter about your Eddystone, what you use it for, what do you listen to? For instance, has anybody got an 850? (10 K/CS - 600 K/CS only). What do you use it for, N.D.B.s, time signals or what?

C.U.

73

Kathy and Ted

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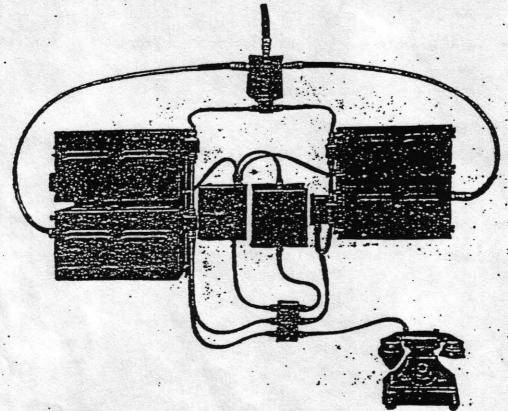
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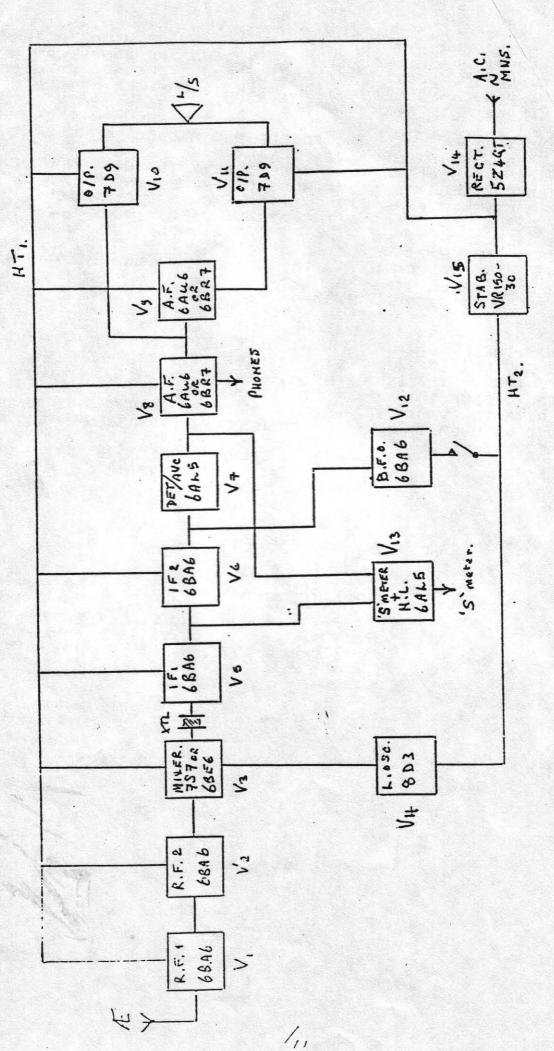
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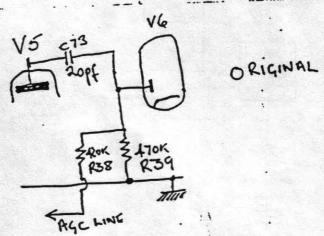
COMMS. REOVR. 5 VALUE ×089/089 EDDYSTONE

SEVERAL MONTHS AGO I PURCHASED A 888 IN EXCELLENT CONDITION. IT HAD BEEN RE VALVED AND HAD PLENTY OF "ZIP". HOWEVER HAVING USED A TRID830 FOR MANY YEARS IT TOOK SOME TIME TO GET USED TO THE FREQ DRIFT AND AN EVEN WORSE PROBLEM WHEN TUNING THE BANDS, AN AGC WHICH WAS NOT VERY EFFECTIVE ON SSB. I FOUND THE AGC USELESS IN THIS MODE AND FOUND MYSELF GETTING BACK TO THE OLD METHOD OF TURNING THE AF GAIN TO MAX WHILST ADJUSTING THE RF GAIN WITH THE AGC OFF.

DAY AND FOUND THAT AT THE JUNCTION OF R38 AND R39 SOME SVOITS WAS BEING DEVELOPED ON A STRONG SSB SIGNAL (BOTH IF & RF GAINS AT BEING DEVELOPED ON A STRONG SSB SIGNAL (BOTH IF & RF GAINS AT BEING DEVELOPED AT METHODS OF INCREASING THE AGC DISTORTED AUDIO. I LOOKED AT METHODS OF INCREASING THE AGC TOUT AGE FOR A GIVEN SIGNAL WITHOUT TOO MUCH MODIFICATION. I FIRST CUT OUT R39 WHICH WAS LOADING THE AGC LINE DOWN SOMEWHAT. IF YOU LOOK AT THE AGC CIRCUIT YOU WILL FIND THAT NEGATIVE VOLTAGE IS DERIVED FROM A SIMPLE DIODE DETECTOR IN V6.

INSTEAD OF USING THIS SIMPLE METHOD I INTRODUCED A VOLTAGE DOUBLER CIRCUIT, THIS MENT THAT 10 volts was now derived for the same strong signal. This, was sufficient to "Back" off the IF & RF STAGES GIVING LESS SIGNAL TO THE PRODUCT DETECTOR AND GOOD RESOLUTION OF 6SB. I NOW FIND THAT I CAN SET THE IF & RF GAINS TO MAX, THE AF GAIN TO A SUITABLE LEVEL AND TUNE THROUGH THE BAND RESOLVING DIFFERENT STRENGTH SSB SIGNAL WITH NO ADJUSTMENTS. I HAVE INCLUDED THE MODIFICATION, THE 47 UF CAPACITOR IS TO GIVE THE AGC A LITTLE "HANG" TIME YOU MAY LIKE TO EXPERIMENT WITH THE VALUE OF THIS. I HAVE NO DOUBT THAT THIS CIRCUIT COULD BE USED ON MANY OTHER MODELS, I WOULD BE PLEASED TO KNOW YOUR RESULTS.

AS FOR THE DRIFT I HAVE NOT LOOKED INTO THIS AS YET . I AM TOLD THAT THERE IS A DIFFERENCE BETWEEN THE 888 AND THE 888A AND THAT THE LATTER DID NOT SUFFER WITH DRIFT. CAN ANY ONE ADVISE?



N.B. - MAMIAL AT

E.U.C. FOR 888A

STATES ONLY DIFFER- ENCE 888 IE THAT

"STANDARD WITCHATUMAL

VALUES ARE USED TO

FACILITATE REPAREMED

DRIFT IN THIS MODEL

IS NEARLY ALWAYS A

LOW EMISSION VRISO/30

CRUSING VARYING OSCIU-ATER VOLTS.

