THE EDDYSTONE 640 RADIO.

AN RF UP-CONVERTER TO RECEIVE THE MW BAND ON THE 640.

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Introduction:

The 640 is a remarkable single conversion superhet communications receiver from the 1948 to 1949 period.

Typical of Eddystone, there was use of die cast aluminium, including the entire front panel and the cental die cast RF assembly, containing the RF amplifier and converter tube along with all the band switches and coils required for the front end electronics.

But that wasn't the end of the high quality materials. The sub chassis are nickel plated brass. The IF transformer and other choke and transformer covers are also nickel plated. This is quite unlike American radio sets of the time where the construction materials were largely cadmium plated steel for the chassis. On account of the materials used by Eddystone, if their sets are stored well and looked after they maintain a beautiful finish.

Every year or less I wipe the chassis down with a WD40 soaked cloth. Corrosion is encouraged as dust & lint containing moisture is allowed to sit on metal surfaces so it is better avoided.

The photo below shows my 640:

The 640 cabinet was finished in a fine crinkle black actually very similar to the finish that Meissner used in their radio equipment in the USA.

From the electrical specification perspective, the 640 covers 1.7 to 32 MHz in three ranges. It has a 1.6MHz IF amplifier and a switch in crystal filter. It has the usual BFO (based on one EF39) and the ability to disable the AVC.

Also the usual RF gain control is provided. The band-spread is done with an independent 3 gang variable capacitor. This is beautiful and enhanced by the large knobs and the Eddystone tuning design using dial cords & drums. There is also a switchable noise limiter, based on the EB34 tube.

The tube line up is EF39 RF amplifier, 6k8(or ECH35) converter, two EF39 IF amplifiers, a 6Q7 (or EBC33) first AF amplifier, detector and AGC and the 6V6 audio output tube for 3 watt output. The HT rectifier is the 6X5.

The manufacturers boasted 50 milli-Watts output for 2*u*V input and low noise. Due to the RF amplifier the image attenuation ratio was good quoted at:

45 dB down at 30MHz

60 dB down at 10MHz

90 dB down at 2.5 MHz.

It was also claimed that the crystal filter could provide 45 dB of adjacent channel attenuation with little loss of the tuned signal. The bands were divided as follows:

Band 1: 12.6 to 32MHz

Band 2: 4.5 to 12.6 MHz

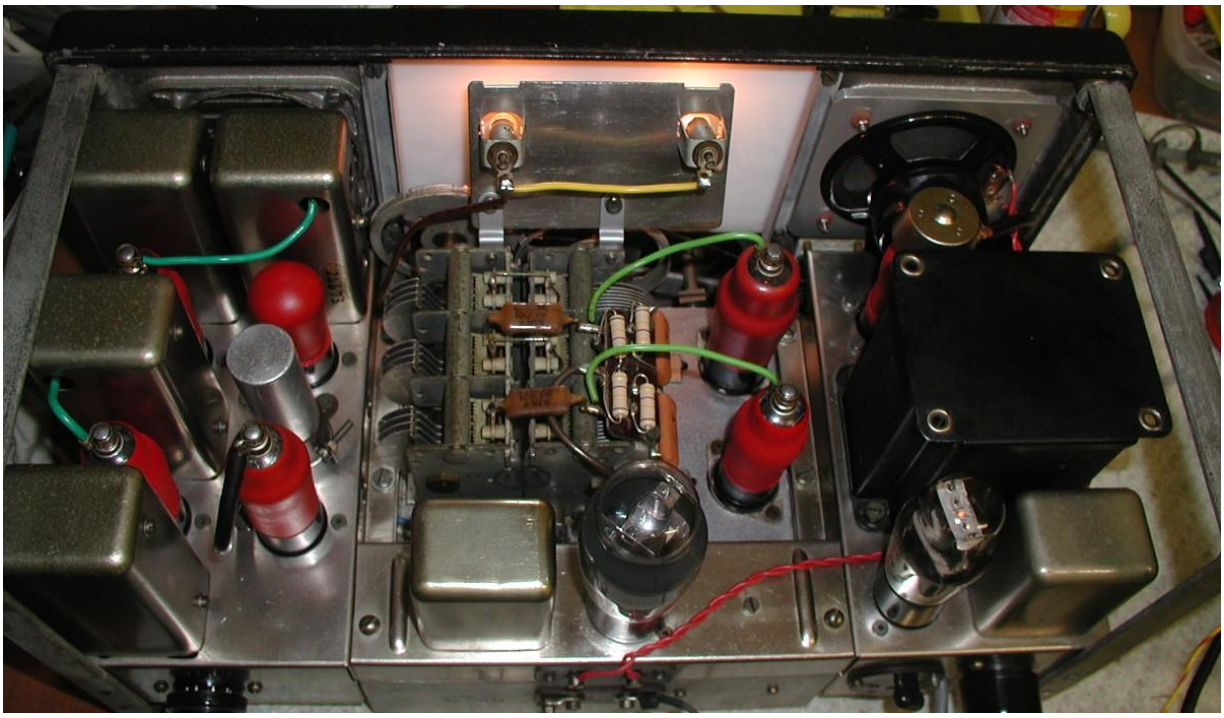
Band 3: 1.7 to 4.5 MHz

Unfortunately there no medium wave band. Later Eddystone realised they could improve their market share by adding MW bands to their communications radios. At the time though, it was primarily designed for amateur radio use. It is an interesting lesson here. Watkins-Johnson in the USA made HF receivers for restricted markets for government departments with three letter names. After the cold war ended, the only thing that saved the company was repackaging them for amateur & public use. It always pays to keep the market as wide as possible for any radio.

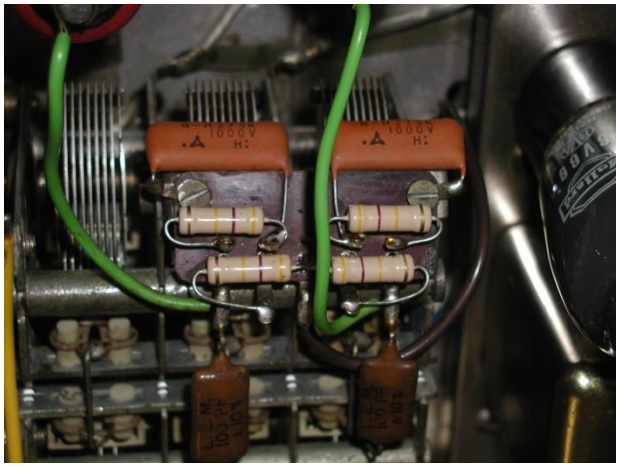
Other features of the 640 included multi country mains input voltages which was helpful.

Another and clever feature is that the cabinet has a top lid. This makes it possible to change any tube without taking the chassis out of its cabinet.

The 640 came with an optional S meter shown in the photo above. It also came with an extension speaker which I do not have. However I found a compact 3W speaker with a shielded magnet which would fit to the front panel behind the grill. This speaker was painted black and an aluminium plate machined to hold it in:

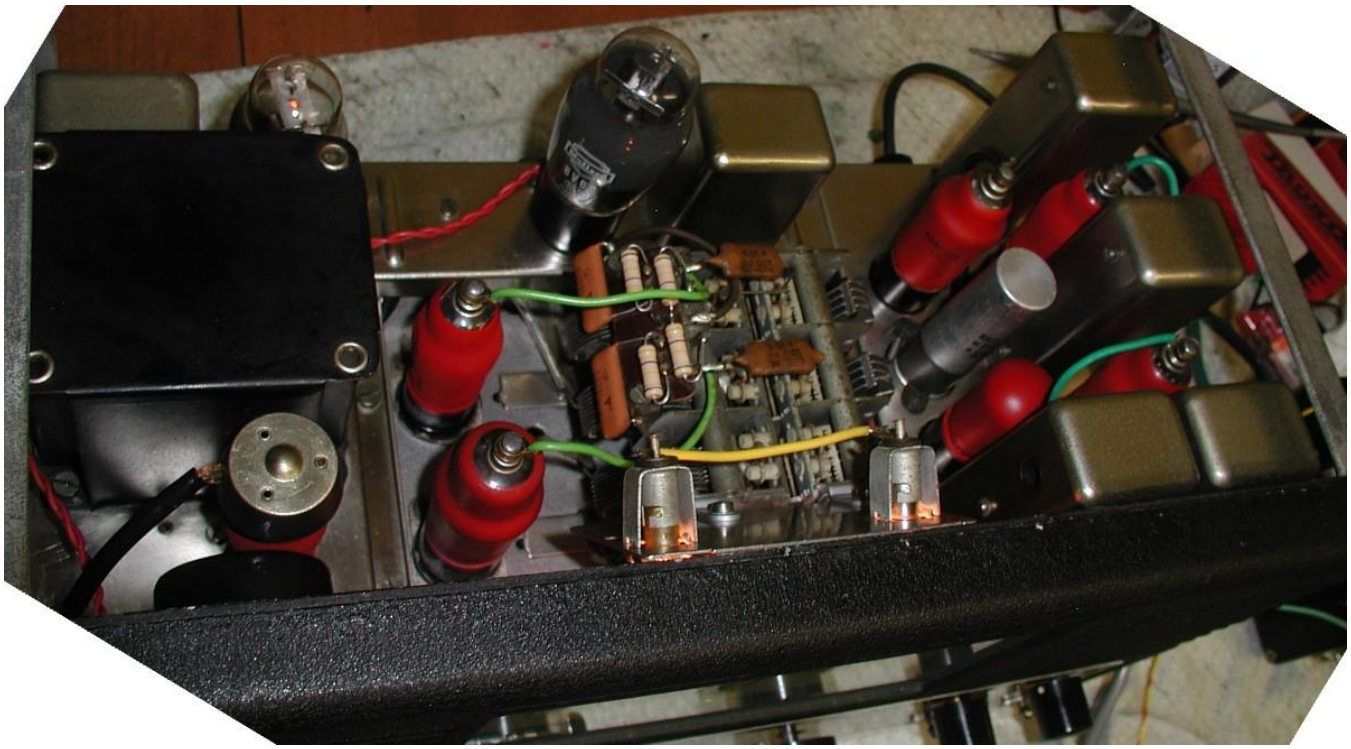


When I restored this set back in the 1980's it was fitted with new capacitors, many new resistors. 1kv rated Mitubishi brand capacitors were used as they have an old fashioned look (see below). The replacement resistors were Philips as were the electrolytic "can" capacitors, such as the one between the EBC33 and EB34 on the chassis on the left in the photo above. It is always better to find electrolytic capacitors of the same diameter, that way the original riveted chassis clamps can be retained. The set was also fitted with NOS tubes then, including a Mullard branded 6V6G which only cost a few dollars in the 1980's and a military 6X5G.



As noted on the photo of the front panel of the unit, the front panel and writing looks a lot better than most 640's. This is because it was screen printed with new writing. I contracted a screen printing company to screen the original metal panel with the original artwork. The writing (or coating) rubs off the original panels and they get a terrible look to them.

Another photo below shows the interior of the receiver:



A Medium Wave Up-Converter for the 640:

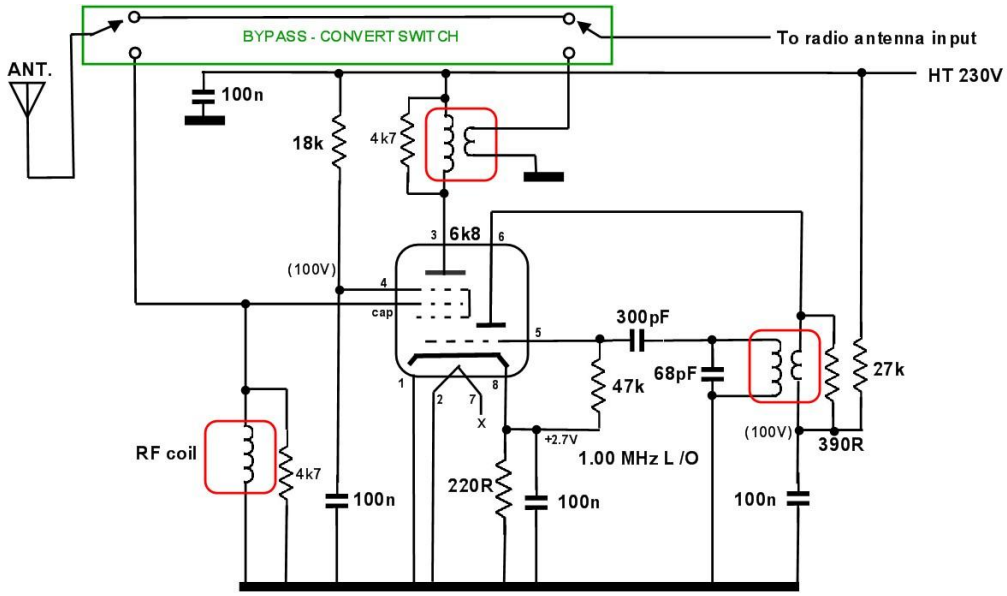
As noted the 640 has no MW band. I have short range AM transmitters too and it is useful to be able to tune to those as well as local MW stations. So back in the 1980's I made a broad band up converter to reflect most of the MW band onto the 640's band 3. All of the parts were fitted in a die cast Eddystone box, seemed apt. The box is shown

below. Notice the Emerald Green lens on the pilot lamp. Even back in the ‘80’s pilot lamps had **real glass** lenses, now they are nearly always plastic fakes.

The photo below shows the inside of the converter. The Local oscillator runs at 1MHz:

The construction quality is a little untidy compared to my projects these days. The input RF coil is a standard part the other two coils are MW oscillator types, but one is used as a coupling coil. Due to the fact that to receive all MW stations there is no coil tuning (except the oscillator) and the coils have damping resistors to broaden the bandwidth.

The circuit is shown below. It might be helpful if others wanted to make a tube based converter. The 390R resistor is required across the primary of the oscillator coil because it was a coil type designed for the 6A8 and when a 6k8 is used the oscillator gets over excited and produces harmonics.



CONVERTER TO RECEIVE MEDIUM WAVE STATIONS ON EDDYSTONE 640 BAND 3

The converter plugs onto the S meter socket on the 640 and gets its power that way.

With the L/O in the converter set at 1MHz, the radio with the converter can in practice receive from just below 700kHz upwards on the whole MW band. 700kHz appears at 1700 kHz or 1000kHz appears as 2MHz etc. If the local oscillator in the converter is reset to 1.2MHz then it can receive 500kHz on the Mw band. I found though it was best to keep the L/O in the converter well away from the 640's 1.6kHz IF frequency, so I settled on a 1MHz L/O as a nice round number.

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