

'Eddystone Inspired' S-Meter and Speaker Units – by Gerry O'Hara, G8GUH

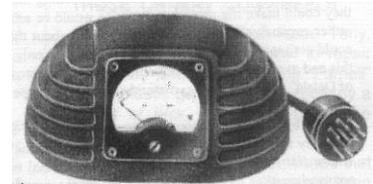
A Smart, Working, But Lonely S740

I restored an Eddystone S740 a little while ago and have been using it for general listening in the 'shack' since then. I had it connected to a Hammarlund speaker and it sounded pretty good. Then one day I was looking at the photos of the various Eddystone



sets in the 'Picture Gallery' section of the EUG website and lo and behold, there is an S740 sporting one of those 'enigmatic S-Meter' units as described by Graeme Wormald in 'Lighthouse', Issue 95, pp10 & 11. "I want one of those..." whispered my S.740 in my 'shell-like'. Unfortunately, these units are few and far between – I have only ever seen one for sale on Ebay and it raised close on \$200 as I recall.

The picture of an S740 sporting an S-Meter (EUG website)



Not wanting to disappoint my new-found friend, I wondered if I could make one? – or at least a functional S-Meter that did not look too much out of place... at least just until I found (and could afford) the real McCoy. "Ok" I said to my S740, "I will see what I can do".

Inspiration!

I stared at the rather poor photos I had of the 'real McCoy': one in the 'Ultimate Reference Guide', the one in the Photo Gallery on the EUG website and one or two in various issues of the EUG Newsletter/Lighthouse. I also stared at the



My S740 sulking without an S-Meter

classic Eddystone lines of my S740. Hmm... first, I thought about carving a case out of wood, or shaping-up some household object (but nothing sprang to mind as being a good base). Also, I had left all my old ex-RAF meters, bought many years ago from AH Supplies in Sheffield, in the UK several years ago (I now live in Vancouver, Canada) and could not find a local source. Perhaps this wasn't going to be as easy as I thought.

I poked around my shack and found a modern-looking 1mA meter movement together with the few parts needed to make it work as an S-Meter with the S740: a 47k 2W resistor, a 330 ohm, 1/2W resistor and a 600 ohm wirewound pot. I lashed these up to see if it would work – like a charm, first time. I like simple circuits...

Then, walking around a local flea market (car boot) last week I saw a pair of RCA speakers – they looked new and were meant for either computer use or to be placed on the back shelf of a car. Their shape, however, seemed 'right' for the job in hand. \$5 later, I was walking back to the car with the speakers tucked under my arm, thinking that one could perhaps become the S-Meter and the other a 'matching' speaker?

Down To It

On arriving back in the shack, I dismantle the speakers: simple - 3 screws holding a front panel, with driver mounted on it, onto the rest of the case. The front panel of each unit was nicely moulded with a circular hole covered by a grill on the outside, with a fabric covering same. The front panels also sported two rectangular recessed holes, likely acting as an enhancement to the audio quality, and an 'RCA' badge, front centre. An 8ohm driver of reasonable quality (large magnet) was fitted in each unit.

Speaker Unit

I decided to remove the grill fabric and leave the plastic mesh grill exposed – I felt this was more 'period'. I temporarily removed the driver, sanded the case, applied plastic primer and re-sprayed using black 'crackle-finish' paint. This is



The speaker cases on arrival, together with 'lash-up' S-meter circuit

obtainable from the local auto-spare suppliers (for painting hot rod engine camshaft covers apparently). I re-fitted the driver and changed the wire from modern-looking plastic to cloth covered cable recovered from an old Eddystone mains lead. I tested the unit with the S740 and it sounded good (not as good as the 3 ohm Hammarlund unit, but hey, it is minute in comparison!). The different impedance does not seem to make much difference in volume – plenty to spare.



S-Meter Unit

I removed the driver from the other speaker, cut away the plastic grill and re-sprayed the case to match the speaker unit. I decided to install a light inside the case for the meter scale to provide some ‘warmth’. Not wanting to overload the psu in the S740 or heat the plastic speaker case, I decided to use a ‘bright LED’ – I thought a yellow one would work ok – this could be fed power from the S740 heater circuit (I found that around 12mA of diode current gave a reasonable amount of light).



Next steps:

- I mounted the meter front panel onto the inside the round speaker aperture using double-sided sticky pads.
- Enlarged the cable hole on the rear of the unit to take the 600 ohm pot. Installed the pot and a ‘chicken-head’ knob.
- Wired the components in place.
- Used an old piece of multi-core cable to connect an octal plug (actually the one that Cedric supplied with the S740) to the unit – this had spare wires that could be used for the LED power.





- Glued the LED onto the top of the meter 'glass' (plastic really) and secured its leads with a cable tie onto a protruding case screw socket. I decided to mount the dropper resistor for the LED and cap inside the S740 for ease (sacrilege! - but reversible in about 10 seconds... so I thought Ted would be ok with that). A 120 ohm 1/2W

resistor and a 0.01 muf cap did the trick (the cap is needed to stop voltage spikes generated by the rectifying action of the LED from causing RF interference and/or popping the valve heaters).

- Checked out the meter and it worked as well as the lash-up had.
- The meter scale did not look the part however, so I decided to make a 'bespoke' scale. I downloaded a 'free to try' piece of software from the James Tonne website (<http://www.tonnesoftware.com/meter.html>) and drafted a suitable scale based on the poor photos in my possession and the description in Graeme's article in Lighthouse. I also added a photo of the Eddystone badge 'logo' from the S740, tinted red to add a bit of 'glamour'.



- Removed the old scale and fitted the new one (printed in colour on stiff glossy photo paper).
- Assembled the case and tested the meter.
- The LED gave just the right amount of light and the yellow tinge makes the scale look 'mellow and cozy'.
- As per the article, I found it best to adjust the meter 'zero' (using the mechanical adjuster on the meter movement) to below zero on the scale with the set switched off. Then switch on the set and adjust the pot to give zero on the scale. Using a 1mA movement negated the need for the 200 ohm shunt mentioned in the article: the meter gives fsd when a strong broadcast signal is received - ok for my purposes.

- I copied the Eddystone badge logo onto the RCA badges and fitted to the front of each unit.
- I decided that the square holes on either side of the front panel looked a bit odd, so I glued some 'louvers' in place to mimic those on Eddystone sets of this period (used wooden 'swizzle sticks coloured black with a marker pen).



- Hey – presto!, that’s it.

The units work well and don’t look too out of place with the S740 (better than the Hammarlund speaker anyway).

Meter legend with the log-scale divisions and unusual ‘calibration’ - LED glowing nicely.

Postscript

Chris Pettit asked me to take a few photos of the S740 ‘posing’ in a better location than my shack workbench. So I set up the S740 and its newly-acquired accessories for the shot in another room (my ‘radio museum’ as my XYL calls it) – sitting atop a high-quality Canadian 1960’s radiogram I acquired for another \$5, fully functional!). I switched the S740 on and ‘crackle, psst’, the sensitivity of the set dropped way down as I was setting up the camera. For expediency, I admit that I faked that shot of the S-Meter, showing a reasonable deflection, by injecting a really strong signal into the aerial from my signal generator(!)... I found that the set had full sensitivity when the BFO was switched in (AGC line shorted to earth). The AGC line was found to have a positive bias



present on all but the strongest signals – strange: the effect was a very quiet receiver until a very strong signal was tuned in and then it blasted out really loud. The fault was later traced to an intermittent grid 1 ‘short’ to cathode (actually around 300k ohms) in the EAF42 valve in the RF stage (strange fault that) – not having a spare valve I swapped the EAF42

from the BFO for it and the set sprang to life again with the AGC working properly (though the BFO is now intermittent until I obtain another EAF42!). I also changed-out the AGC cap at the same time as this was found to be a bit leaky (round 500k ohms).



Well that's it folks – I hope you (and Eddystone) can forgive me for using the Eddystone name in vein on these units – all meant as good fun and I promise to ditch them once I manage to obtain the 'Real McCoy'... of course, I blame Graeme

for writing the 'Stratton's Enigmatic S-meter' article in the first place.

73's

Gerry O'Hara, G8GUH (gerryohara@telus.net), Vancouver, BC, Canada, July, 2006.



S740 playing with its new pals – 'Happy at last...'

Stratton's Enigmatic S-meter

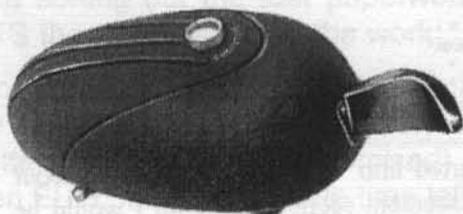
by Graeme Wormald G3GGL

In 1947 Stratton's introduced a novel 'economy' product by making the S-meter an optional extra for their new 'budget' model, the S.640. It cost a 'modest' £5 15s 6d (£5.77), which was a week's pay for a junior army officer. But the surprising thing is that on e-bay today they fetch almost as much as the sets they were made to go with! About £60-70.

In fact, the modern-day purchasers (as well as the original buyers) are really only buying a rather swish aluminium diecast box. Or to be precise half a diecast box because it has no bottom or back on it.

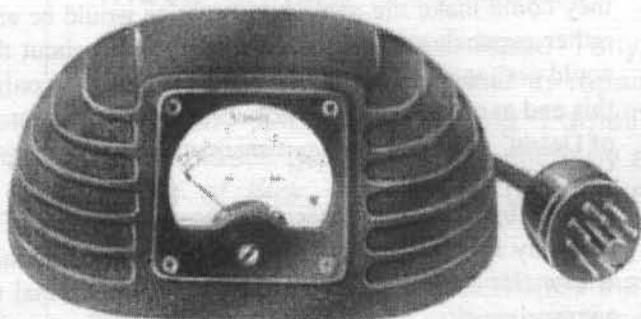
It was produced in two finishes; the standard model in wrinkle black to match the finish of the 640, 740, and 750, all of which have octal sockets on the rear panel pre-wired to take the meter. The special version was in oyster hammer finish to match the 888 and 888A hambanders which were similarly equipped.

For style it ranks with the once-despised Eddystone semi-automatic Speed Key (bug). That really does look like a bug and fetches extremely good prices these days, (£100+). (I should have kept mine!)



Actually you're also buying a calibrated scale on a very standard ex-RAF 2½" 200 µA (500 Ω) moving coil meter. I'm sure any vintage ham radio buff will recognise it at once.

One of its oddest features, not clear on our catalogue photograph, is that it carries the legend "1 DIVISION = 4dB".



It is calibrated in rather non-linear S-points up to "9" then it has two more marks, "+4" and "+8".

This compares with the conventional S-meter of 6dB per division up to S9 and then +20; +40; and sometimes +60. The result, of course, is that the Eddystone S-meter is end-stopping most of the time when a band is more than half-open.

I once spoke to Bill Cooke, GWØION, who became chief Engineer of Eddystone radio shortly after this meter was introduced. "Why?" I asked him. "It was one of Harold Cox's bright ideas," he replied. Harold Cox had been the Technical Director at Stratton's since the late 1920's and was known as a bit of a martinet.

"He thought it would make the set look more sensitive than it really was." It certainly did! In spite of Eddystone's association with the world of amateur radio Harold Cox was very sceptical of hams and their approach to his chosen profession. He could be very sarcastic when it took him that way.



HAROLD COX

Technical Director

The circuit of this plug-in gem is slightly anonymous. I don't know of any of the above set handbooks which carry the circuit. But it **IS** carried in the well-known "Radio and Television Servicing" by Molloy and Poole, in the corner of the 640 circuit.

Actually, the features in R & TV S for all the early post-war Eddystone sets were written by Jerry Walker, G2JS, at that time an engineer at Stratton's, and edited by Pat Hawker, G3VA, of "Technical Topics" fame.

It's a slightly odd little drawing and first of all I must ask you to ignore the extension of the line from the left-hand side of the meter to the rim of the octal plug between pins 6 and 7!

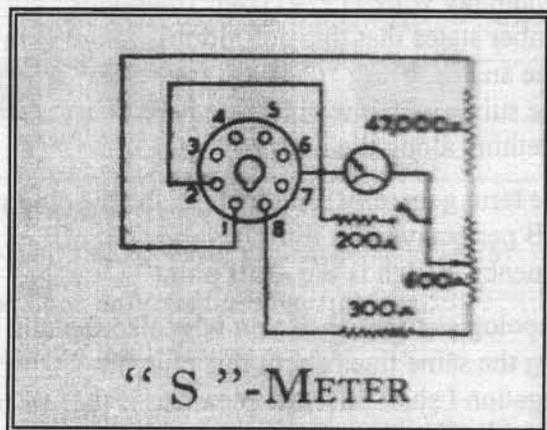
The fixed 47 k resistor at the top right is a chunky 2 watts. The 600 ohm potentiometer is a two watt Colvern wire-wound. Any rating will do so long as it's wire wound and any value from 500 to 1000 ohms would be OK. It is for zeroing the meter when the set has warmed up.

Don't forget that Eddystone practice is to adjust the meter movement to minus zero when switched off. It should then

be reading zero when the set is on and the aerial shorted and RF/IF gains at maximum. This means that the meter starts to move at once when a signal is detected.

The bottom line 300 ohm resistor is anything from ¼ watt upwards.

Now we are left with the 200 ohm switchable shunt below the meter. And there's the enigma. It doesn't exist in the actual unit! But if it did it would make the meter into one of conventional sensitivity. Well, there's a thing!



I have two of these meters; one for my 888A and one for my 750. In both of them I have wired a 200 ohm 1/10th watt resistor across the metre movement to reduce the end-stopping.

Now any of you can replicate this meter in a 2" x 3" x 4" Eddystone diecast box (still made) with any movement up to one milliamp that you can locate. I would suggest you make the 200 ohm mystery resistor a variable one (or leave it out if you are using a 0-1 mA meter) and you can then set the whole device up to suit your meter, juggling the zero and sensitivity shunt until you're happy with what you think is S9.

Yes, I know, S-metre calibrations are a figment of most people's imaginations but they're very useful for comparing aerials and setting up ATUs! ♠