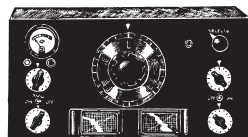


THE COMMUNICATIONS RECEIVER



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The Eddystone 750 Communications Receiver

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Once again our guest contributor, Dr. Jim Hanlon, graces our pages with an unusual receiver, one not often seen on our side of the "pond." This is the Eddystone Model 750, a British-manufactured double-conversion receiver bearing a famous name. A prominent feature of this receiver is the high-quality Eddystone Type 898 slide rule dial, with its 110:1 tuning ratio and its anti-backlash gears, considered by many builders to be the best ever made for communications receivers. In Jim's hands this garage-sale find came to life, and it is an interesting story. His repair of the broken tuning gears may be helpful to other restorers with similar problems. —W2DGB

The subject of this column, an Eddystone 750, is the only receiver in my collection of some 40 boatanchors that was built outside of the United States. According to a 1962 letter that accompanied it, from K. R. Wilkins of Stratton & Company Limited, the Eddystone Works, Birmingham, England to Mr. Harvey G. Van Erem, Chief Engineer of KSJB radio in Jamestown, North Dakota, the 750 was built in England around 1951 and sold through Eddystone's Canadian distributors "who are now Conway Electronic Enterprises Ltd, Toronto, Ontario."

Mr. Wilkins also included a schematic diagram and a set of alignment instructions that fortunately stayed with the receiver when it came to me. Another letter that came with the set, from Marconi Instruments Division of English Electric Corporation, Englewood, New Jersey, recommended American equivalents or replacements for the British tubes—or valves—several of which Mr. Van

Eram had evidently made use of.

I have no idea how this radio got from North Dakota to the US southwest, but by the spring of 1998 the Eddystone 750 was sitting out in a yard sale in Albuquerque, New Mexico. It appeared to be pretty much intact, although the dial cord—actually a piece of thin steel piano wire—was sprung out all over the inside of the cabinet and the tuning condenser did not respond when I turned its knob. I took it home and filed it away in my queue of projects to be gotten to "one of these days."

A couple of years later, the set finally arrived on my repair bench and we began to become acquainted. In comparison to its American contemporaries, for example, the Hammarlund HQ-129X reviewed in the May 2003 *OTB*, this radio is quite compact for its 11-tube circuit, measuring only $8\frac{3}{4} \times 16\frac{1}{4} \times 9\frac{1}{4}$ inches. But despite its small size, it weighs in at a hefty 42 pounds thanks to a



Front panel of the Eddystone 750.

substantial cast-aluminum front panel and the three cast sub-chassis inside.

The schematic shows that what had initially appeared to be just a 1951 era short-wave listener receiver was actually a rather interesting design. The circuit is a dual-conversion superhet with its first IF at 1620 kHz and its second IF at

85 kHz. The two 85 kHz IF transformers have variable coupling between their primary and secondary windings, controlled by a "Selectivity" knob on the front panel. Whoever designed this radio may have taken a leaf from the American BC-453 "Q-5er" popular in those days, and decided to incorporate its 85 kHz IF in this nice little set.

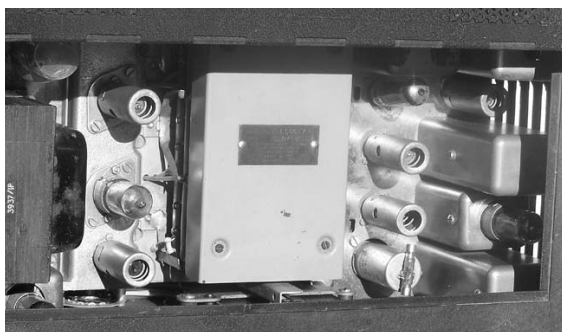
The Eddystone's tube lineup is a 6BA6 RF amplifier, 8D3 (6AM6) high-frequency tuned local oscillator, an ECH42 (6CU7) first mixer and triode cathode follower driver to a 1620 kHz IF transformer, followed by a ECH42 second converter (both mixer and oscillator) to an 85 kHz IF, 6BA6 85 kHz IF amplifier, DH77 (6AT6) detector, AVC, and first AF Amplifier, N78 (changed to a 6AQ5) audio output. Other tubes included a D77 (6AL5) noise limiter, the 6BA6 BFO, a VR150 voltage regulator, and a 5Z4 rectifier.

I was able to test all but the ECH42s on my Hickock testers. The only dud was the 5Z4, and there was a replacement in my parts box. So I was making progress. The power supply filter choke was out of commission, being both open, shorted to ground, and also the source of a fair amount of boiled-out wax.

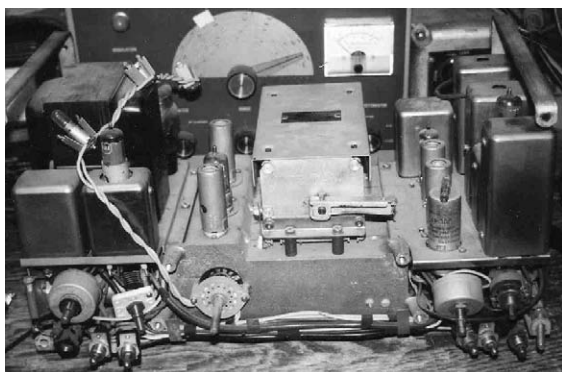
I was fortunate to find a Thordarson choke in my junkie that was a snug fit in the space occupied by the original Eddystone part. I cut off one of its mounting tabs so that it would fit and glued it in place with some J-B Weld. I sure hope it never has to come out! Now the power supply was ready to go.

The potential showstopper was that sprung dial cord. When it had come off the spools, the wire had apparently gotten caught in the two plastic gears in the tuning mechanism and broken off quite a few of their teeth! A post for help to the Boatanchors Reflector was answered by Joe LeKostak, K9LY.

Joe sent an article from the April 2000 Eddystone User Group newsletter, "Chewed-Up Plastic Tuning Cogs—A Solution," that solved the problem. Its author, Anthony Richards, had acquired a length of Delran plastic "toothed bar" with the proper diameter and number of teeth, and he had cut replacement cogwheels from it. He had cut the original damaged cogs off the gear shafts, glued his new ones on in their place,



Looking down through the top lid. "Mains Transformer" on the left, RF, mixer and local oscillator tubes next, covered tuning capacitor in the center, IF and audio sections on the right.



The "Naked Eddystone" on my workbench sans its front panel.

and then drilled out the centers of the new cogs to fit the original shafts.

I was about to order replacement cogs from Mr. Richards when a model-railroading friend suggested that I check the local hobby shop to see what they might have in the way of gears. Luckily, I found two model automobile gears with the proper diameter and number of teeth, (Robinson Racing Products RPR 1324 24 Tooth, 48 Pitch, Aluminum Pro Pinion gears.) They were in hand and affordable, so I took them home and started my repair.

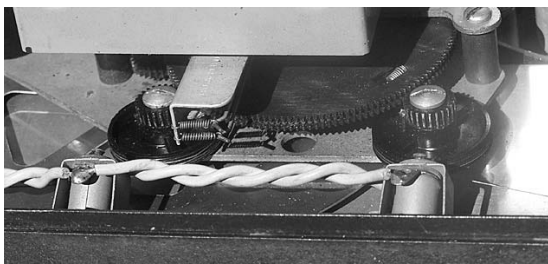
Following Mr. Richards directions, I cut off the damaged cogs, fastened the new ones in place with Super Glue and carefully enlarged the center hole in the aluminum gears up to the needed $\frac{1}{4}$ ". The repaired gears fit perfectly into the dial mechanism. It remained only to restring the dial wire, adjust the gear positions so that the pointer had the correct travel across the dial and so that the wire had the proper tension, and I was back in business. A little fine machine oil completed the process, and the dial has been working

smoothly ever since, as you would expect of this beautiful Eddystone product.

With the dial repaired and the front panel of the receiver put back in position, the set began to work right away. I did not have to replace a single one of those 1951 bypass capacitors. They are all sealed in metal cans, and not a one of them showed any leakage problems.

The only additional repair needed was to the BFO pitch capacitor. It had lost a spacer, and the variable plates were being pushed back against the fixed plates causing a short. When I saw what was wrong, I cut a "C" clip out of a standard, round washer and replaced the missing spacer. With the short removed, the BFO worked properly over the entire range of the pitch control.

Alignment went smoothly. I peaked the IFs at 85 and 1620 kHz and set the BFO for the center of the passband. The local oscillator, mixer, and RF amplifier coils all have adjustable cores to set



A look behind the dial at the gear repair. The two smaller gears are aluminum replacements for the original plastic ones that were destroyed when the dial wire came off its spools.

for the low-frequency end of each band and trimmer capacitors for the high end, so the front end tuned up easily as well. The resulting dial calibration was right on despite my gear repair and fooling with the position of the dial cord and pointer.

As you have figured out by now, I am sure, my primary interest is in amateur radio receivers, so I was pleasantly surprised to find that the Eddystone did a good job on the ham bands as well as on general short-wave. It covers from 480 kHz to 32 MHz with just a small skip around its 1650-kHz first IF frequency.

There is no electrical bandspread, but that legendary Eddystone dial covers its range in 85 turns of its flywheel-weighted knob so there is no problem with too-fast tuning. It takes, for example, 14 1/4 turns to cover the 80-meter band. In addition to its frequency calibration, the dial has a horizontal scale that runs from 0 to 2500 and a small, circular dial that runs from 1 to 100 for each 100-unit division of the horizontal scale, making for very good reset accuracy anywhere on the dial.

Above the dial is an Eddystone nameplate with their lighthouse trademark. The dial also proudly proclaims this receiver to be a "Model 750" and to be "Made in England."

The knobs on the panel are, from left to right, RF Gain, BFO pitch, Bandswitch, Tuning, IF Gain, and AF Gain. Under the knobs are the Phone jack, the Mains Switch (British for "power switch"), the Send (B+) switch, on the left side, and the Noise Limiter switch, BFO switch and Selectivity bandwidth control on the right.

On the rear apron there are terminals for "LS, 2.5" (Loud Speaker, 2.5 ohms), "PU" (Phonograph Pick Up, not something that smells bad), and A and AE (Aerial and Aerial/Earth). There are two octal sockets, one labeled "A Vibrator, S-Meter for External H.T." ("High Tension" or B+ for Americans), and the other labeled "B Vibrator for External L.T." ("Low Tension" or filament voltage). It's a good thing one of my EE professors was British. There is also a sticker on the back that says this is an Approved CSA (Canadian Standards Association) Power Operated Radio, and a metal tag saying that it is wired for 110 volts, 25/60 cycles, 0.56 amps.

On the air the Eddystone performs well. Its selectivity is about 6 kHz at 6 dB down in its broad position and about 2.2 kHz in its narrow position. It is a very good short-wave broadcast receiver, with plenty of sensitivity, no noticeable drift after warm-up, and no images due to its 1650-kHz first IF. I used it on 20-meter CW in a recent amateur Classic Exchange and it did a very credible job. On CW I ran with the AVC off and the RF and AF gain controls full open for best sensitivity. I controlled the volume with the IF gain.

In response to a further inquiry, Joe LeKostaj, who solved the dial problem, found out that the 750 sold for 68 pounds in 1951 when the pound was the equivalent of 2.8 dollars. So that made it a \$190 radio, comparable to the Hammarlund HQ-129X or the Hallicrafters SX-71, which were both selling for \$199.50 here in the States at the same time. If I were a short-wave listener, especially in some far-off part of the British Empire in 1951, I just might have preferred this Eddystone. If I were a ham, I would definitely have chosen the Hallicrafters or Hammarlund alternatives with their ham-radio specific features. But being a yard sale and hamfest scrounger in the 21st century, I am very happy that the Eddystone found its way to New Mexico and ended up as a functioning member of my collection. ☐