NEW LIFE FOR YOUR SHORT WAVE RECEIVER (USE A "Q-MULTIPLIER") By Herb S. Brier

Stolen From May 1956 Issue of POPULAR ELECTRONICS

If you use a communications receiver costing less then $150, you can probably improve its selectivity-or station separating ability-far beyond your wildest dreams. All you need is a simple device called a "Q-multiplier." As the name implies, it will multiply the Q (in the i.f. stages of the receiver) and provide that additional selectivity needed to separate stations on the crowded short-wave bands. By simply flipping a switch on the front panel, the Q-multiplier will also reject one of the interfering signals.

I have been interested inthe Q-multiplier since the orginal design was announced seven years ago. About four years after its inception, Bill Sherer, W2AEF, introduced the multiplier to the Ham ranks. Since that time, three kits-or complete units-have been available to the public. I have been experimenting with the Heath Q-multiplier which is known as the Model QF-1.

The kit is very easy to assemble and should require little more than a single evening's work. Front panel controls include all of the manual adjustments necessary to operate the Q-multiplier properly with any communications receiver in the moderate price category.

In testing the Heath QF-1 on receivers that cost from $75 to $200, an immediate improvement in selection was apparent. Phone and Ham Band C.W. signals could be copied with the QF-1 in operation that were totally unreadable before because of interference. The improvement is more noticeable in the less expensive receivers-simply because there is more room for increasing the station separating ability. The Q-multiplier can be of greatest value to the more expensive receivers through the use of the nulling out feature. This is a reversal of the Q multiplying function in that the QF-1 rejects a particular radio frequency instead of amplifying it.

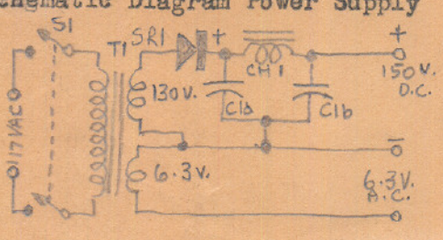
A power supply is required for the QF-1, although the Heath receiver Model AR-3 will accommodate the multiplier without modifications. In other receivers, it will be necessary to borrow power through the accessory socket on the rear skirt. A convenient point to pick up the required voltages (if the accessory socket is not supplied) is from the audio output tube socket. Check the receiver wiring diagram and instruction manual before making any connections.

Power requirements are so simple that a small supply can be constructed for a few dollars. The one diagrammed below is adequate for the job. It is built into an aluminum box with the components mounted on one piece of the box while the other acts as a shield. Wiring up this power supply is simplicity in itself and no trouble should be encountered.

The Q-multiplier will remarkably increase the phone selectivity of such receivers as the SW-54 and S-38 series. It can improve C.W. reception, but in receivers that do not have a separate b.f.o. there will be a tendency to suppress the beat note of the C.W. making it sound mushy.

When using the Q-multiplier and power supply in conjunction with an a.c./d.c. receiver, it is important to watch for accidental shock. Such shock can occur through the shielded cable connecting the Q-multiplier to the receiver. To eliminate this possibility, isolate the connector from the receiver chassis--in other words, do not ground the shielded cable to the receiver. Bypass the shielded cable to ground through a 0.01 - /µfd., 600 - volt capacitor. CHECK YOUR RECEIVER DIAGRAM F I R S T.

Schematic Diagram Power Supply



Parts List of the Power Supply for the QF-1

C1a/C1b-Dual electrolytic capacitor, 16 ufd., 150 volt
CH1--7-hy., 15-ma. choke
S1--D.p.s.t. Toggle switch
SR1--65-ma selenium rectifier(Miniature 20-ma. type may be substituted if desired)
T1--Transformer, 125 volts @ 15 ma., and 6.3 volts @ 0.6-amp.(Stancor PS-8415 or equivalent)

HOW IT WORKS

A single connection is made between the Q-multiplier and the i.f. strip in the communications receiver. The Q-multiplier will effectively "load" the i.f. strip to achieve the results described in the article. Heart of the Q-multiplier is a resonant circuit tuned to the i.f. of the receiver with which it is to be used. One half of the dual triode tube is regeneratively connected to the tuned circuit. The coupling is so arranged that signals slightly removed from the i.f. will be bypassed to ground. Signals at the i.f. are vastly amplified due to the regenerative process. Regenerative amplification is akin to improving the selectivity of the i.f. channel by increasing the Q of the tuned circuits. The other half of the dual triode is used as an inverter and the action described above is reversed. In this circuit, the Q-multiplier looks like a "Q-subtractor" at the i.f. channel. Signals slightly removed from the i.f. are passed through the receiver while a signal at the i.f. is nulled out or bypassed to ground. .