

Citizens Band Q-Multiplier

- ... gives any superhet razor-sharp selectivity
- ... cuts down on noise and static pickup

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CITIZENS BANDERS, hams, or SWL's plagued by interference on the crowded bands can pep up their receivers with an easy-to-build Q-Multiplier.* The unit improves a set's selectivity by narrowing its i.f. bandpass, thus eliminating interfering stations and reducing static and noise pickup.

Since the Q-Multiplier operates on the receiver's i.f. frequency, it can be used with any superhet receiver, including CB, ham, or SWL sets, regardless of its tuning range. However, the receiver must have an i.f. near 455 kc. or between 1300 and 1800 kc.

Completely self-contained, the Q-Multiplier has its own a.c. power supply and requires only a two-wire connection to the receiver. Operation is simple, too; using only two controls, you select the desired station and reject the ones you don't want.

As for construction, there are no expensive parts; with all parts purchased

new, you can build the unit in an evening or so for around \$10.00. The wiring is not critical.

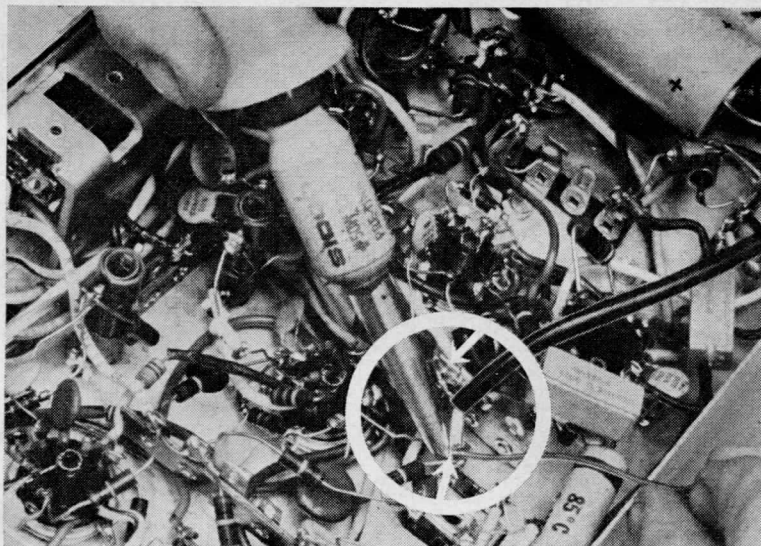
Construction. Build the unit following the layout shown in the pictorial diagram. The tube socket, tuning coil $L1$, and potentiometer $R4$ are fastened to the front panel of the box; however, each requires soldering or modification before mounting.

Bend out the solder lugs on the tube socket before fastening it to the front panel. Then solder a bare wire jumper through the socket's ground sleeve, pin 4, and the socket's mounting flange. Mount the socket so that pins 1 and 7 are pointing to the left when viewed from the front of the box. The socket is fastened to the box by soldering its ground sleeve to a machine screw mounted on the front panel with a nut and lock washer.

If the Q-Multiplier is to be used with a receiver having a 1300- to 1800-kc. i.f., remove 100 turns of wire from the winding of tuning coil $L1$, which is a Miller 2007 ferrite loopstick. For sets with 455-

*Developed by O. G. Villard, Jr., the original Q-Multiplier was first described in the engineering monthly "Electronics" in April, 1952.

Hot lead of Q-Multiplier's output cable can be connected to plate of first i.f. tube at i.f. transformer (lower arrow in photo). Cable's shield should be soldered to ground lug nearby (upper arrow).



kc. i.f.'s, do not modify $L1$, but change capacitors $C2$ and $C3$ to 680 $\mu\mu\text{f.}$ and .0025 $\mu\text{f.}$, respectively.

Ground one lug of potentiometer $R4$ to the shell of the control with a short bare-wire jumper, as shown in the pictorial diagram. Then mount the control.

The remaining wiring is straightforward. However, take care to watch polarities on diode $D1$ and filter capacitor $C5$. Note that the output cable shown on the schematic is a 2' length of RG-58/U coaxial cable.

Connection and Adjustment. If you build the Q-Multiplier to operate on 455 kc., it should be adjusted when you connect it to the receiver. The 1300- to 1800-kc. model requires a preliminary adjustment before being connected. To make the preliminary adjustment, tune the receiver or any broadcast-band set to approximately 1600 kc., and place the hot lead of the Q-Multiplier's output cable near the receiver's antenna. Set selectivity control $R4$ to its minimum resistance position and adjust tuning coil $L1$ until you hear a whistle in the receiver's speaker.

Before hooking up either model to your set, turn off both the receiver and the Q-Multiplier. Then connect the hot lead of the output cable to the plate of the first i.f. tube in the receiver, and solder the output cable's shield to the nearest ground point. If you use the Q-Multiplier with a dual conversion superhet, you must connect the hot lead to the plate

of the i.f. tube which operates in the frequency range of the Q-Multiplier.

Now power the receiver and Q-Multiplier, and set selectivity control $R4$ to its maximum resistance position; this is the point where the Q-Multiplier does not oscillate. When you tune in a station on the receiver in the normal manner, you should notice a considerable reduction in the volume of the received station.

To adjust the 455-kc. Q-Multiplier and to touch up the tuning on the 1300- to 1800-kc. model, set $R4$ to its minimum resistance position. Adjust $L1$ until a strong whistle is heard from the speaker. Now reset $R4$ to maximum resistance. For maximum output, you can repeat the plate tuning adjustment on the first i.f. transformer; a quarter turn in either direction is all that is needed.

Operation. Starting with $R4$ at maximum resistance, slowly decrease the resistance; you will find that the volume of the received station starts to increase as you do so. Soon the volume will increase noticeably, and voice signals will begin to sound rather bassy. Any further decrease in $R4$'s resistance will cause the Q-Multiplier to oscillate and the received station will be blotted out.

Back off $R4$ until the oscillation just stops; this is the most selective point in $R4$'s range. Now adjust both $L1$ and $R4$ slightly, for best results. Whenever you tune in a new station, both of these controls should be readjusted.

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