

Unusual Squelch Troubles

By ARNOLD W. WIEGERT

THE BENDIX 28 SERIES OF FM TWO-WAY radios uses the model 16-RS-1 receiver chassis. It has two tubes. One is an rf amplifier, the other a multiplier for the local oscillator and first mixer. The rest of the circuit is transistorized and divided into printed-circuit boards—local oscillator, first i.f. amplifiers, second i.f. amplifier, and the squelch and audio driver. All are easily accessible for servicing. An 8-watt class-B transistor amplifier is the final audio stage.

We had five of these sets in operation for over a year and a half as fixed base stations. During all this time, the only thing to give us trouble in the receiver was the squelch circuit, or at least that's what it seemed to be from the symptoms.

On two sets the complaint was very slow squelch action. It took about 10-15 seconds after receiving a signal before the squelch would cut off. On the first one, all voltages in the squelch circuit checked good and the trouble seemed to be low input to the noise amplifier. Instead of 0.65 volt, the meter showed only 0.4 volt at the discriminator output. After about 5 seconds the voltage started to rise slowly until it reached 0.65 volt and the squelch cut off. Voltage checks in the second i.f. board seemed to indicate poor power supply regulation. With the squelch open, supply voltage to the second i.f. was about 10.5 volts and jumped to 12.5 volts as soon as the squelch cut off. At those voltages this is quite a drop, but a different set worked just perfectly with the same change. (This drop is due to the heavy drain of the class-B output stage when amplifying the noise.)

Several hours later we noticed that the voltage at Q204's emitter (Fig. 1) changed slowly as the noise at the discriminator came up. Checking the transistor showed its leakage was a bit too high. Replacing it with a good one cleared up all our troubles. The second set showed the same symptoms, but this time it was Q205. Again a new transistor cured the set. So watch those jumping voltages and don't let them fool you into a wild goose chase.

The third set came into the shop with erratic squelch action. Sometimes the squelch cut off right after receiving

a signal, sometimes it would stay on for minutes or hours and nothing would help. Everything worked fine up to the noise amplifier. Voltage checks around Q251 (Fig. 2) showed that the bias had changed enough to cut the transistor off completely. Remembering the article on Ultra-Kaps in the January 1961 issue of RADIO-ELECTRONICS, C254 (1- μ f 3-volt Ultra-Kap) was not even suspected. But after every other part was found to be good, we finally tested C254 and found it was practically shorted. Replacing it with a 10- μ f electrolytic, because we had no exact replacement at the time, cleared all problems and the set has been working fine ever since.

You will have to watch out for one thing when working on the second i.f. board in these sets. If you have to get at the back side while the set is operating, make sure that the two lugs under the bottom mounting screws as well as the ground strip on the back are grounded. The best and easiest way is to take two nuts and thread them over the

mounting screws. Then run a short jumper from there to ground. After you are finished, make sure the mounting screws are good and tight again. Otherwise you are heading for more trouble, again with the squelch. It will be very erratic. Sometimes the squelch will cut off, sometimes it won't until you bang the radio or somebody walks around the room. The reason is simply that the wires attached to the two lugs are actually short ground connections for the ground system in the printed-circuit board and, unless they are securely grounded, all kinds of troubles develop. One of them is low noise output from the discriminator and intermittent squelch due to a drop in gain in the sound i.f. amplifiers.

All these troubles appeared in the summer and we suspect that high temperatures had something to do with it. They kept us busy for many an hour and we hope that these tips will help to make life easier for some readers with similar problems. END

Lugs under two lower printed-board mounting screws (arrows) must be grounded securely.

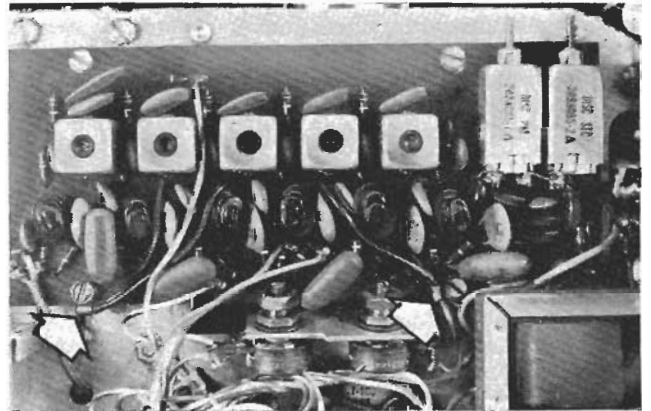


Fig. 1—Circuit of second i.f. amplifier board. Trouble here was leaky transistors.

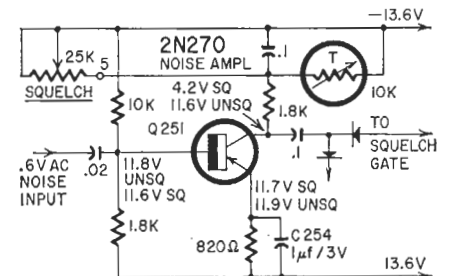
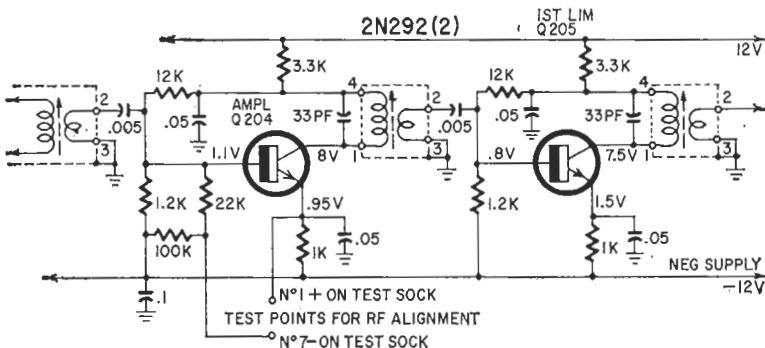


Fig. 2—Noise amplifier circuit in the Bendix 16RS-1.