

Repair of Icom IC-28A, -28H squelch pot plus battery replacement

by Richard L. Carey, W6RLC, April 19, 2014, revised Dec. 4, 2015 (See note at the end)

The Icom IC-28A is an older 144MHz FM Transceiver which has been discontinued some years ago. I purchased my unit in 1986 and used it in my truck for some years. I traded trucks and used a different radio for some years. Then when that truck would no longer pass a smog test I sold it and bought a new used truck. Space was very limited in the 2004 Toyota Tacoma and I wanted to use the IC-28A again.

The Problem: Upon turning it on I found that the memory channels were still intact and the receiver worked OK, but the squelch didn't work. Turning the squelch knob all around produced nothing but continuous noise. The rig's transmitter was good and it pegged my 25W scale on the Bird 43 Wattmeter. So the rig was worth trying to fix. A call to Icom repair in Kirkland, WA revealed that they could not repair this radio anymore. Icom told me that a nearby Ham, Kuni, W7JV, did repair some older Icom radios. In a note from him he indicated that the squelch pot was no longer available. This got me to thinking that maybe it was just a bad pot and not other parts like the MC3357 IF chip. After taking the radio apart I found the wiper on the pot was open. I found a substitute part and the following notes and photos show how to replace it.

Taking the radio apart: On the rear of the case are two black screws holding the top cover and two holding the bottom cover. Take these out and set aside the covers. Note: The bottom cover has the small speaker and you need to unplug the small connector on the board to put the cover aside.

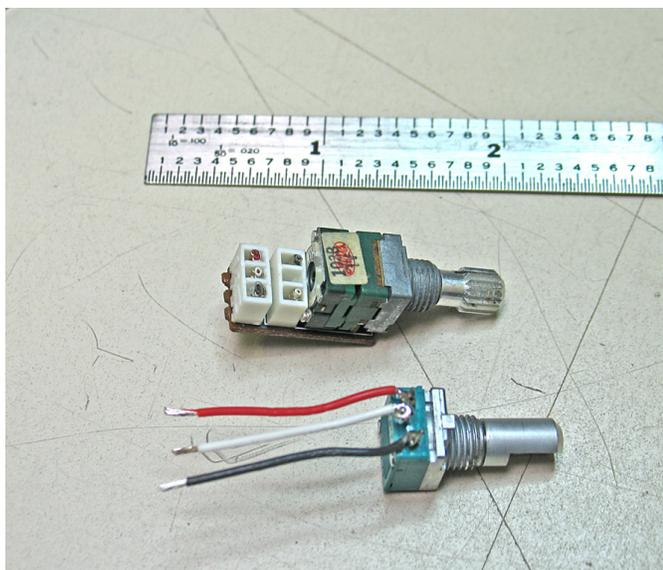
Then pull off the three knobs on the front. There is a large one for changing channels and two small knobs for volume and squelch. Also disconnect the microphone too.

Use a small Philips screwdriver to take out two silver flat-head screws on the top and two more on the bottom of the front panel. The panel can then be pulled forward off the chassis.

Replacing squelch pot: The pot is held at the front by a circular nut with two indents. You can't take this off with a normal wrench and using pliers might chew it up. I found a pliers used for circular retaining rings worked well. The tool is called a "Waldes Truarc Plier No.3". If you do a Google search on these you can find several sources. With the pot pulled out you can use an ohmmeter to check the wiper which is the center pin on a very small connector on the rear of the pot. I found mine to have an open circuit. The pot is 9mm square with a push button switch. The three leads at the rear are the pot and the two next to the body are the switch. I clipped these wires at the connector. Since the replacement pot did not have a switch I covered the switch ends with shrink tubing so they wouldn't touch the chassis.

The replacement part is No. RK097111080J by Alps which is available from Mouser for \$1.74. I didn't worry about the taper. The pot has a 7 mm mounting bushing and a 15 mm shaft which works out well with no cutting of the shaft required. The photo shows the Icom part and its replacement.

I soldered on some 24Ga wires before installation. The colors match those Icom uses.



CHK Function: This function allowed the user to see the transmit frequency when in Duplex or repeater mode. Since I could not find a pot with a push button switch this function is lost. Much of my operation is mobile in simplex mode so I don't need this function anyway.

Install new pot: With the short pigtail leads soldered onto the pot I fastened it onto the front panel using the Truarc plier. The pot has a small alignment tab which fits perfectly into a small hole in the front panel preventing rotation of the pot. I then put 1/16 inch shrink tubing on the red and white wires and 1/8 inch on the black which connects to the shield. Solder these leads to the leads in the radio. I was afraid to use the heat gun on these leads so I just slipped them over the joints and used some lacing cord to hold them in place.



The above photo shows the new pot in place, but the leads have not yet been connected to those in the radio. With the pot wired in you can replace the front panel. The volume and squelch knobs had a small amount of adhesive tape on them. There was some still inside the squelch knob which should be removed. The pot shaft is 0.236 inch diameter so I used a number "A" drill which is 0.234 inch. I twisted it inside the knob by hand to clean it out and remove the glue. The Icom knob fit on snug and looks like it will stay without any glue.

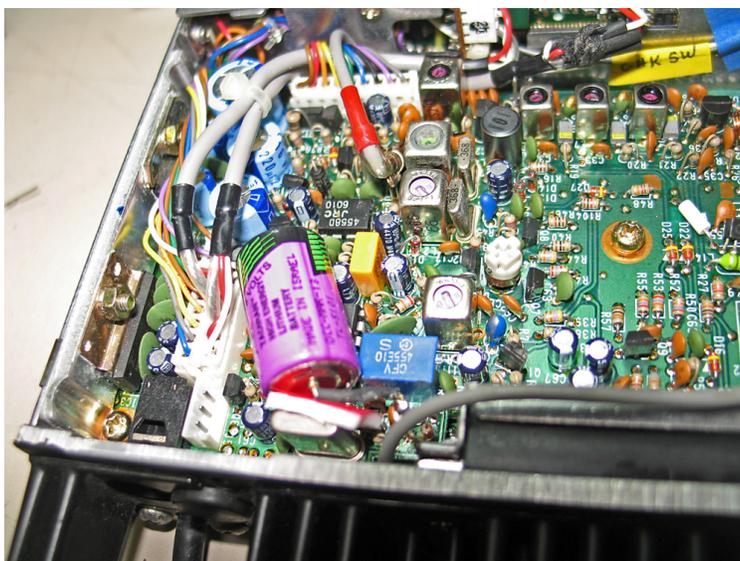
Battery Replacement: Since the battery was more than 20 years old I decided to replace it even though it still measured 3.6V. The exact battery can be found at Mouser for \$19.07, but I found a lithium cell by Tadrian at a local store here in San Diego that was about \$7.00. It is called Ultralast No. TL-5101/P.

It has solder leads which are necessary for connection to wires in the radio. Its capacity is 950 mAh which is more than the 750 mAh battery it replaces.

The new Tadrian battery is cylindrical and thicker so to make it fit I removed a piece of foam that was underneath the battery. It fits in OK then setting on top of the MC3357 chip. See the photos.



Icom IC-28A bottom circuit board showing the lithium battery wrapped in shrink tubing. The red and white wires at the top coming out of the front panel are the wires to the new pot.



The new battery in place.



Tadrian battery on top and original Icom battery below.

New Information, December 2015.

I received a note from Mike Foerster, WØIH, who did these repairs on his IC-28H. He found a potentiometer, also by Alps, which has the push-type switch so that the repeater check function is still operable. The pot is number RK0971114D0B and is available from Mouser Electronics. When ordering from Mouser the full part number is: 688-RK0971114D0B. The shaft diameter and length are the same so my descriptions above are OK. Mike found that the leads on the pot with a little bending will fit directly into the circuit board so that pigtail leads are not needed.

Many thanks to Mike for these suggestions.