

Fluke HC700013PK Clone Assembly Instructions

Thank you for purchasing this kit form of our HC700013P custom quad analog switch replacement. In order to successfully complete the kit assembly and install the device, you will need desoldering equipment (a vacuum solder extractor & solder wick), a soldering microscope, micro-fine soldering iron, PCB vise or holder, water-soluble liquid or gel flux, water-soluble flux solder 20mil diameter, fine tweezers and a steady hand.

With Fluke using 5-700013 custom IC switches and rather cryptic diagnostics, it may be difficult to determine exactly which, if any, 700013 is defective. You may want to consider removing all three U301, U302 & U303 devices and socket the device positions. You will then have the flexibility to swap devices in the debugging process. Always put extracted 700013 ICs into machined-pin sockets for safe handling, insertion & removal.

If you have never soldered 0602 devices or 50mil SOIC packages, you should practice on scrap material until you are comfortable. Remember that solder flux is your friend. Flux will control and limit temperature rise and protect the pads and leads. Read all of the instructions first! ***It is very important the sequence is followed or you will make subsequent steps hidden and inaccessible!***

Bill of Materials

1. Vishay DG212B 16-pin SOIC quad analog switch IC
2. Custom 20-pin SOIC CMOS control logic IC
3. HC700013P2 PCB
4. Strip of machined mezzanine pins (20)
5. Machined pin socket (20-pin)
6. 3 – 0.1uF 0602 MLCC SMD chip capacitors
7. 1 – 4.7uF or 10uF 0602 MLCC SMD chip capacitor

Assembly Instructions

1. Attach the 3-0.1uF (C2, C3, C4) & 1-4.7uF or 10uF (C1) 0602 chip capacitors to the PCB in the positions indicated. Tin one pad of each capacitor and then solder the chip to the tinned pad. Flux both pads and solder the remaining pad. Touch up the first pad. We suggest doing C1 first so as to not mix up identical-looking capacitors. ***Do not place the 4.7/10uF cap in the wrong location. These high-capacitance chips are on the 5V supply with a max of 6.3 to 8V. The DG212 analog supplies will exceed this!***
2. Split the pin strip in half (10 pins each) and insert the ***straight pin*** side into machined socket to act as a holder. (Shoulder pin is out). Put the socket in small vise with shoulder pins up.
3. Place PCB onto pins. Pins 1-10 ***will be under the SOIC packages*** and need to be trimmed flush with the PCB. Solder pins 11-20 first. (These can protrude above the PCB). Next use a good flush diagonal cutter to trim pins 1-10 flush with the top of the PCB before soldering. Solder pins 1-10 insuring that they do not protrude above the surface.
4. Flux the DG212B quad-switch pads and place the device on to the pads. Pay close attention and locate pin #1 onto the rectangular pin. (Pin #1 is readily identified by the top-side dimple). Solder pins 1-16. Check for bridging and floating pins.
5. Flux the CMOS logic device pads and place the device on the pads. Pay attention that pin #1 is on the square pad. (Pin #1 is always on the sloping side of the package). Solder the device with the above precautions.

6. If you have used water soluble flux and solder, wash the PCB in hot water and dish soap. Dry in an oven at 50deg C for 20-30 minutes to remove moisture. Inspect all joints for good soldering. If you used rosin flux, clean in acetone or rosin flux remover first, then do step 6 above.
7. Remove PCB from 20 pin socket. It is important to keep the part clean, dry and free of contaminants.

If you have not yet removed the defective 700013 DIP device, now is the time to prepare the Fluke motherboard for IC removal. Following the service manual instructions, remove the bottom protective shield to expose the underside of the main PCB. This is a critical stage of the repair. You need to use solder removal techniques that are quick and do not overheat the PCB. It is very easy to damage solder pads or surrounding guard rings.

In order to remove an IC, you need to get all of the solder out of the through-hole quickly and with minimum heat. Use a vacuum extractor and solder wick as needed. Use plenty of flux. Once the holes look clear, gently wedge the IC from the topside to release the pins. If it is stubborn, do more solder removal from the bottom.

Once the IC is removed, you must clean the top and bottom of the PCB to a spotless condition with water, alcohol & acetone. Solder in the machined pin socket paying close attention to the location of pin #1. Re-clean the top and bottom of the PCB as done above.

Re-assemble the meter to a point that you can test the clone HC700013P, respecting static discharge control. Insert the clone HC700013P device and power on the meter. You should have a reasonably normal display. Pressing the SRQ button for a few seconds will initiate the 21-step self-test. Hopefully your meter now passes all tests. But if not, recheck your repair and note the failing tests. It is always possible that you have either multiple 700013 failures or defects in other parts of the meter.

Further fault tracking is beyond the scope of these instructions, but the manual is very detailed in diagnostic procedures. You may want to consider socketing all U301, U302, U303 devices in order to exchange them.

If you suspect U402 and U403 in the *ohms current source*, you must follow the same procedures as outlined above. Note that if the ohms current source is defective, it will likely impact many other tests, and should be corrected or verified first.

Please refer to the following photos as guidance.

HCI



