

# diysquared

Tuesday, April 13, 2021

## Fixing an HP 3314A function generator - Part 2.

Continuing with the repair of the HP 3314A function generator that was "repaired" by a previous owner. I left off at the decision of checking everything that was done to it.

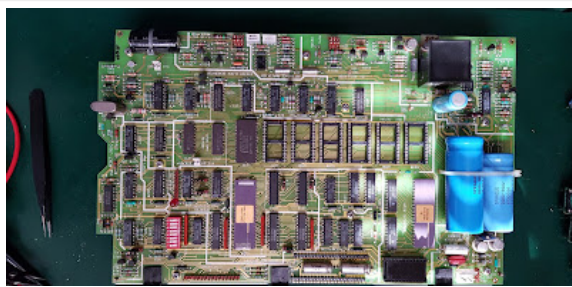
First I had to clean up. 5 of the 6 EPROM adapter boards were soldered into the instrument and for some unknown reason 1 was in a socket. I started beeping out the connection between the EPROMs for the data and address lines, and sure enough, found several where there were no connection. Not very surprising, given what I have seen with the 74S74 IC in the clock generator circuit. Also, some of the adapter boards were bad, there was no connection between some of the pins, there were cold solder joints there.



Very carefully I started removing the adapters. Even though HP made quite sturdy PCBs, I didn't want to risk any more damage, so I snipped the pins of the adapters and removed them one by one. I also removed the two 74ls373, they are the ones with the two jumpers next to them. You can see the solder blobs at their ends near to the EPROMs. That is where their pins were snipped and soldered from above, presumably to fit after the adapter boards were already put in.

Once everything was removed, I was already able to see four broken traces under U209, the one in the socket. Those were fixed with scraping off the solder mask and soldering twin wires there.

Then I checked for continuity for every pad related to the ROMs and installed high quality sockets and replaced the 2 74ls373. All this took quite some time, but was well worth the effort as at the end I had a nice board.



I again double checked continuity to the sockets and proceeded with getting the EPROMs fixed.

Next, I turned my attention to the adapter boards. My initial idea was to scrap the 6 EPROMs and just use one with a 74ls148 priority encoder figuring out the additional address lines from the 6 chip select signals. But to make it nice it needed some PCB, and work, and then I also realized I actually had 3 of the same (well, nearly same, they were blue, and a bit different layout) adapter boards from an earlier project, so I actually only had to clean up three of the old ones. So I went with tidying up those boards, as the previous owner even got those wrong, instead of using the

### Blog Archive

▼ 2021 (10)

▶ October (1)

▶ May (1)

▼ April (3)

[Fixing an HP 3314A function generator - repair com...](#)

[Fixing an HP 3314A function generator - Part 2.](#)

[Fixing an HP 3314A function generator - Part 1](#)

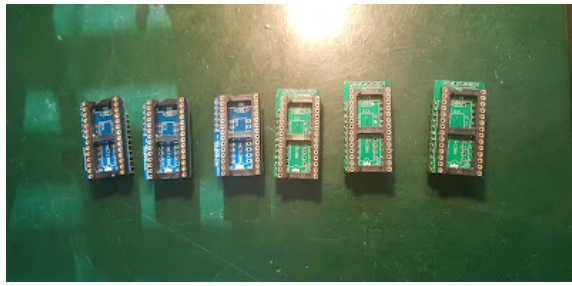
▶ March (1)

▶ February (3)

▶ January (1)

▶ 2020 (7)

proper jumper places he used bodge wires to configure it. After some tedious work with the solder sucker and the iron, I got all six EPROMs ready for action.



Plugged them in and did again a quick check that everything is in place and turned the instrument on. It started the countdown and then did the calibration sequence without problem. Honestly I wasn't expecting that, I was prepared to see a bunch of calibration errors at best.



Halleluja! But does it **play Halleluja**? No! There is no output. There is output from the sync, but nothing from the signal.

Ok, don't panic, just think. If the calibration sequence is successful, then there must be a signal with proper amplitude and frequency where the calibration signal is picked off. Looking at the schematics, this is done nearly at the very end, after the output amplifier, but before the output attenuator. I quickly verified this with a scope. Looks like the signal is lost somewhere at the reed relays. So the main suspect now is the relays themselves or the drivers of the relay coils.

The relays are controlled by a latch which in turn controls a CA3082 transistor array. The latch seems to be good, but the voltages on some of the outputs of the array were strange. As a quick test I piggybacked some random NPN transistor on one of these outputs, and surprise surprise, the corresponding relay came to life.



So the CA3082 seems to be a fault. This is an obsolete part, not too easy to get. Of course I made a purchase on eBay for some cheap solution, I'm pretty much certain that it will be fake, but let's take some chances. As plan B I also designed a small PCB with surface mount transistors as a pin compatible replacement.

So right now I'm waiting for either a working replacement or the PCB. This will take a couple of weeks probably. Hopefully this will fix the instrument. I'll write a **Part 3**. of this post once this


happens.

Bejegyzte: [The Happy Engineer](#) dátum: [7:00 PM](#)

Címkék: [EPROM](#), [function generator](#), [Hewlett-Packard](#), [HP 3314A](#), [PCB](#), [repair](#), [signature analysis](#)

No comments:

### Post a Comment

 Comment as:    
   **Notify me**

[Newer Post](#)

[Home](#)

[Older Post](#)

Subscribe to: [Post Comments \(Atom\)](#)

Simple theme. Powered by [Blogger](#).