

11403A-1S/CSA404/1F Boot time selector

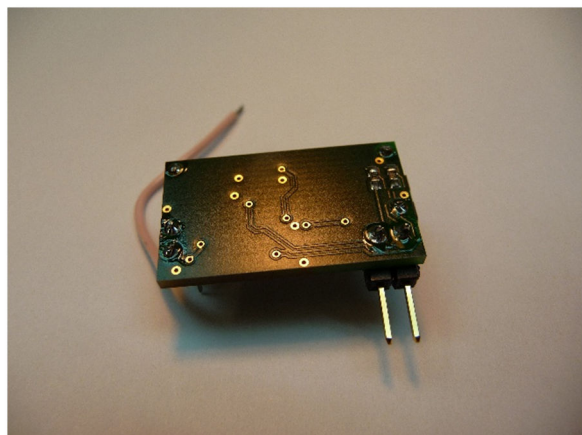
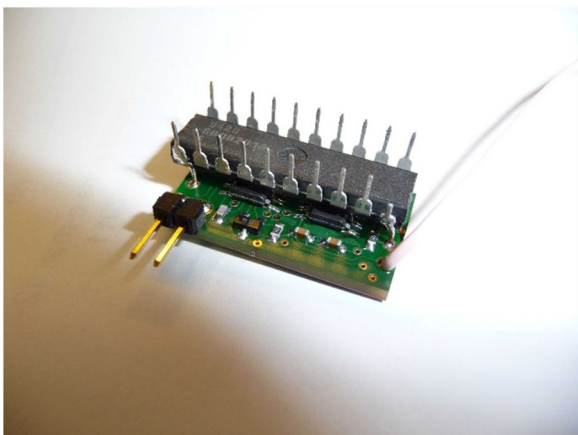
This document describes the installation procedure for a small circuit enabling upgrade of the 11403A or CSA404 to 11403A+1S or CSA404+1F level. The choice between 11403A+1S and CSA404+1F is done by activation of one of the mainframe buttons at startup. If no button is activated, the module remains in the previously selected mode.

History

Gerard Janssen owned an 11403A-1S and I owned two CSA404s. Gerard wanted to see what differences existed between the two mainframes and we compared the mainframes we had at hand. From this comparison, it became clear that the only difference that was detectable was the PAL U440 on the A18 board. We could examine the contents of this PAL and we both modified it to test how the mainframe reacted to its behavior. We came to the conclusion that under V3.6 firmware we could program a GAL to make the mainframe believe it was one of the following types: 11201A, 11203, 11402A, 11402A + 1F (FFT), 11403, 11403A, 11403A + 1S (Statistical Analysis Package), CSA404 and CSA404 + 1F (FFT). Of course, the mainframe will only work correctly if the underlying hardware is compatible with the selected upgraded level. For example, the 11403A has a very different hardware from the 11403 and an "upgrade" from 11403 to 11403A cannot provide graded color. Also, it is unclear if special hardware specifications may apply to a specific hardware. For example, the CSA404 which is oriented towards signal analysis could have a hardware specially selected for better jitter or stability vs. the 11403A. I was also interested in checking the constellation mode mentioned only for the CSA404 by Tektronix.

The mod circuit

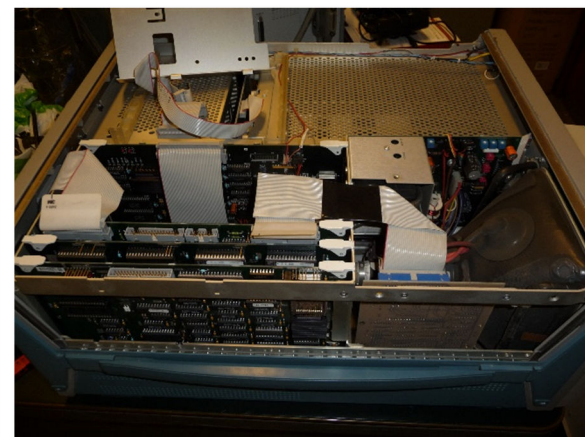
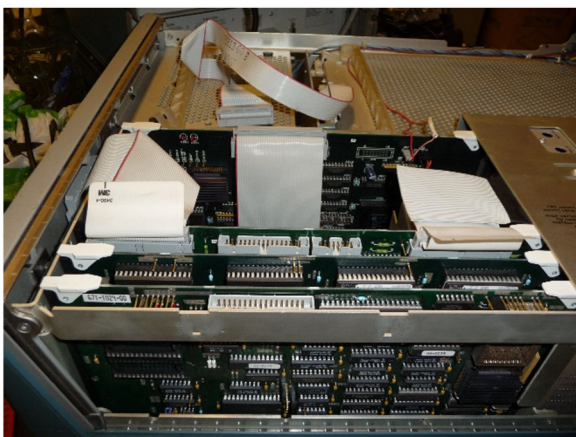
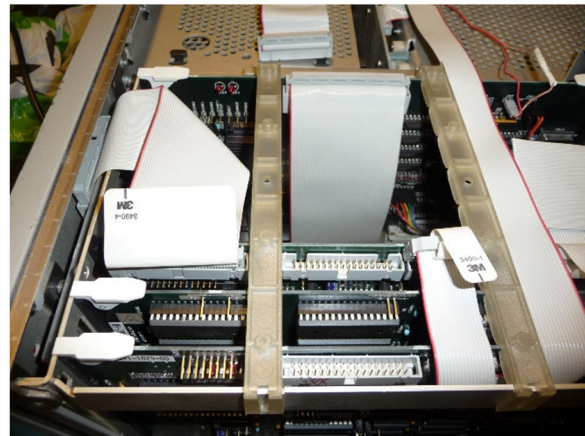
I was especially interested in checking the differences between the 11403A+1S vs. CSA404+1F. So, to enable this, I needed a mod that would easily switch the same mainframe between the two modes. My first mod used a switch that would select the mode but, like many collectors, I could not resign to install something modifying the external aspect of the mainframe and requiring drilling a hole in the front or back panels. So, I designed a second mod that is a very small PCB glued atop a GAL that plugs into the U440 socket (yes, U440 is socketed although one of my mainframes had the original socket soldered the wrong way round). The following pictures show this mod module.



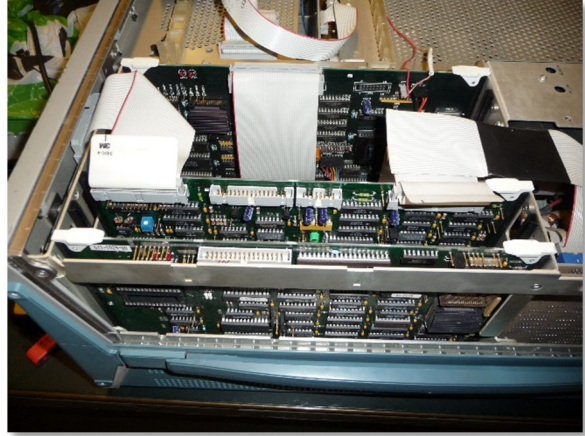
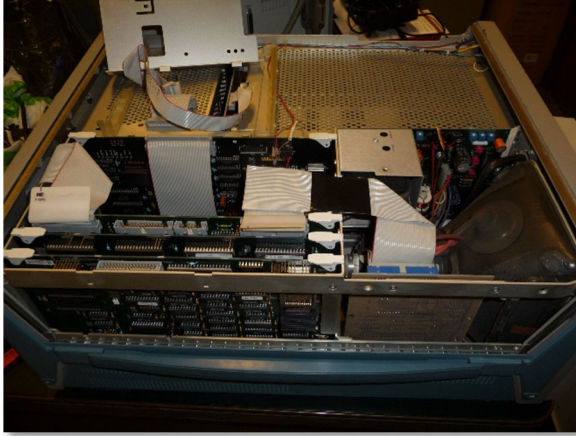
One can see the GAL with pin 11 slightly bent out so that it DOES NOT connect to the U440 socket. The short wire brings Vbat to the circuit and the pin header goes to the front panel HARDCOPY and ENHANCED ACCURACY buttons. Depressing one of these two buttons at mainframe switch on will select the 11403A+1S or CSA404+1F mode until a change is requested. Since the mainframe will start a self-check at startup, the key should not remain pressed for too long or the mainframe will report a stuck key.

Installation of the mod

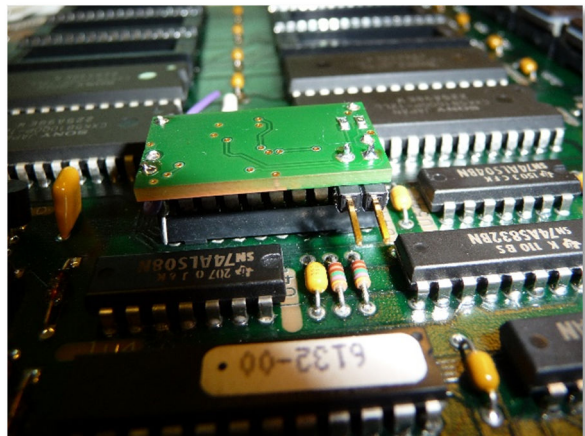
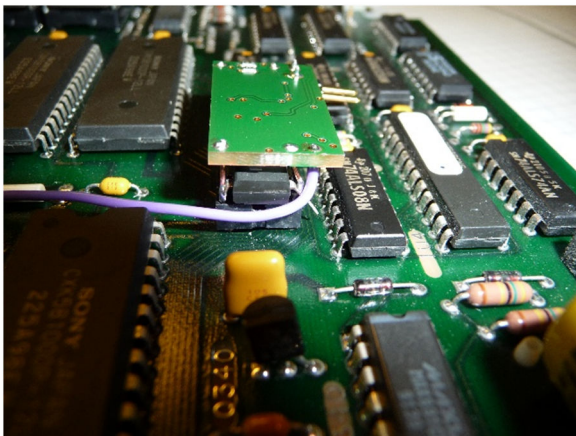
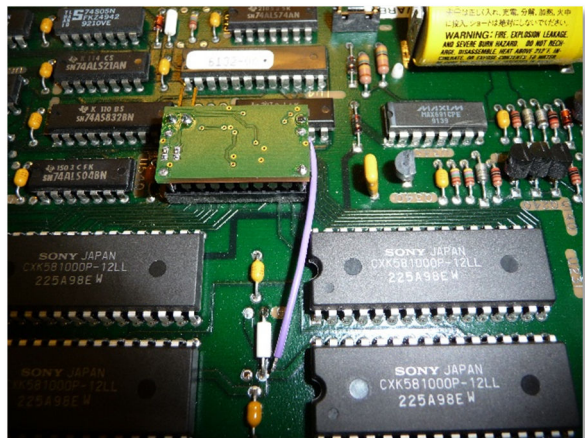
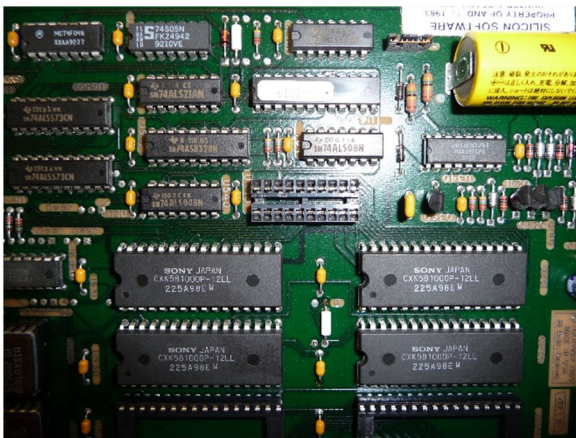
First, the mainframe should be upgraded to executive firmware V3.6. The corresponding digitizer version is V3.0, the display firmware is V3.13. A mainframe with executive V3.5 seemed to work fine with the mod but was upgraded to V3.6. This document will not explain in detail how to do it but it is clear that this should be done along with the mod installation. To access U440, open the top cover of the mainframe and remove the flat cables covering board A18. (Note that the following pictures are a mix of the modification of two mainframes, so there are minor differences like mod wire color)



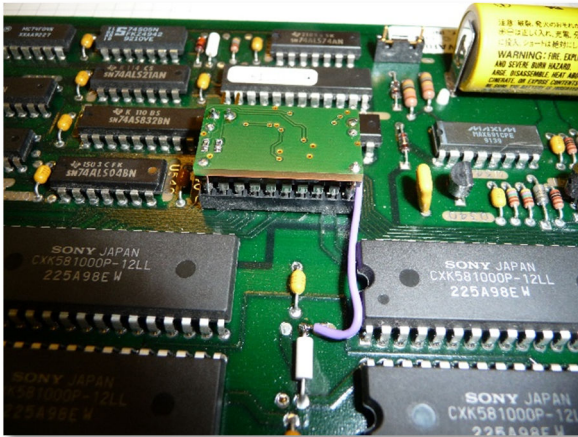
Remove the CRT cover (2 small Torx screws on the mainframe side and one larger Torx screw near the top center of the cover). A18 may then be removed for FW and mod installation.



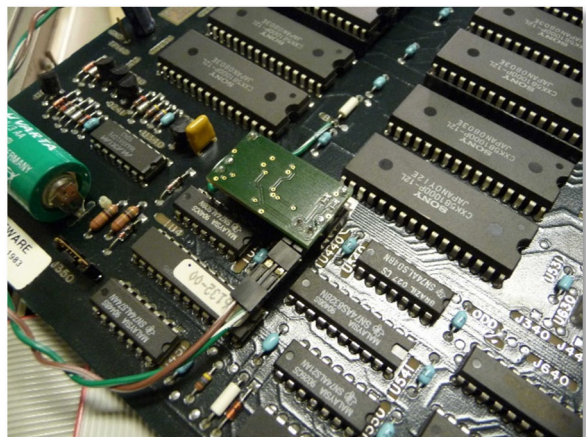
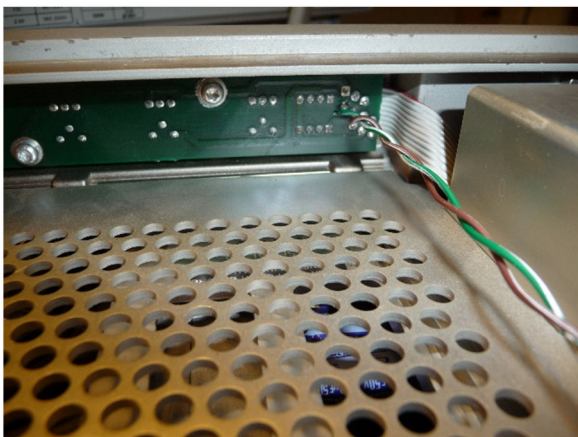
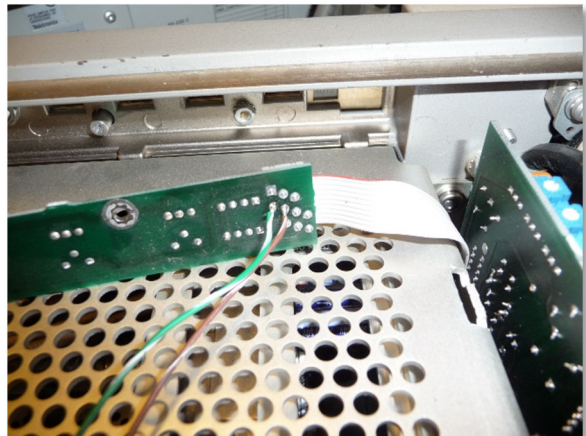
Remove U440 from its socket. Check its orientation is correct like in the picture here.

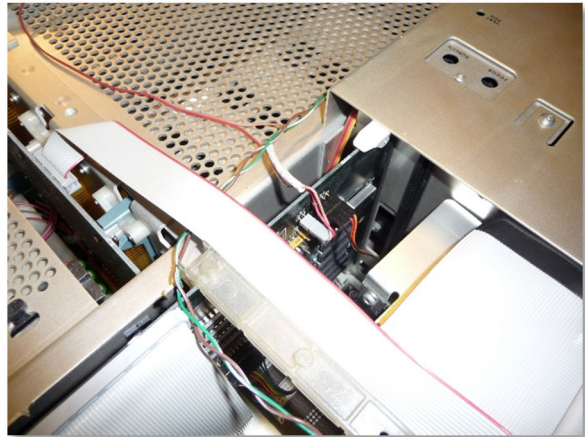
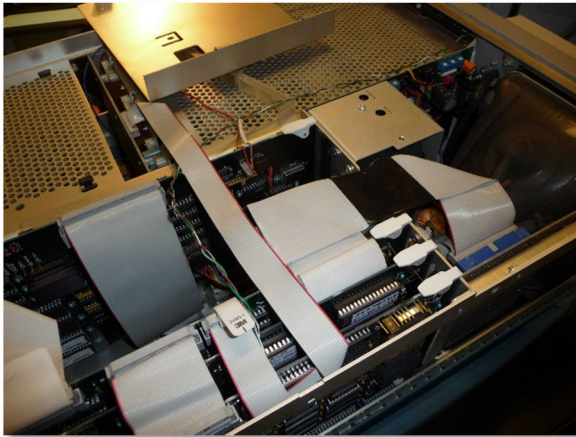


Replace U440 with the module. Make sure all the pins are correctly inserted in the socket except pin 11 which should stay unconnected (see the above pictures). Connect the small wire to Vbat. The easiest available point is the closest end of a white plastic jumper (or OR resistor). Make sure you will not short circuit Vbat to ground with the tip of your soldering iron. If it is grounded, then make sure the board is floating. If you are very concerned about static electricity, connect the board GND to earth with a 1M resistor. It will enable Vbat to remain working.

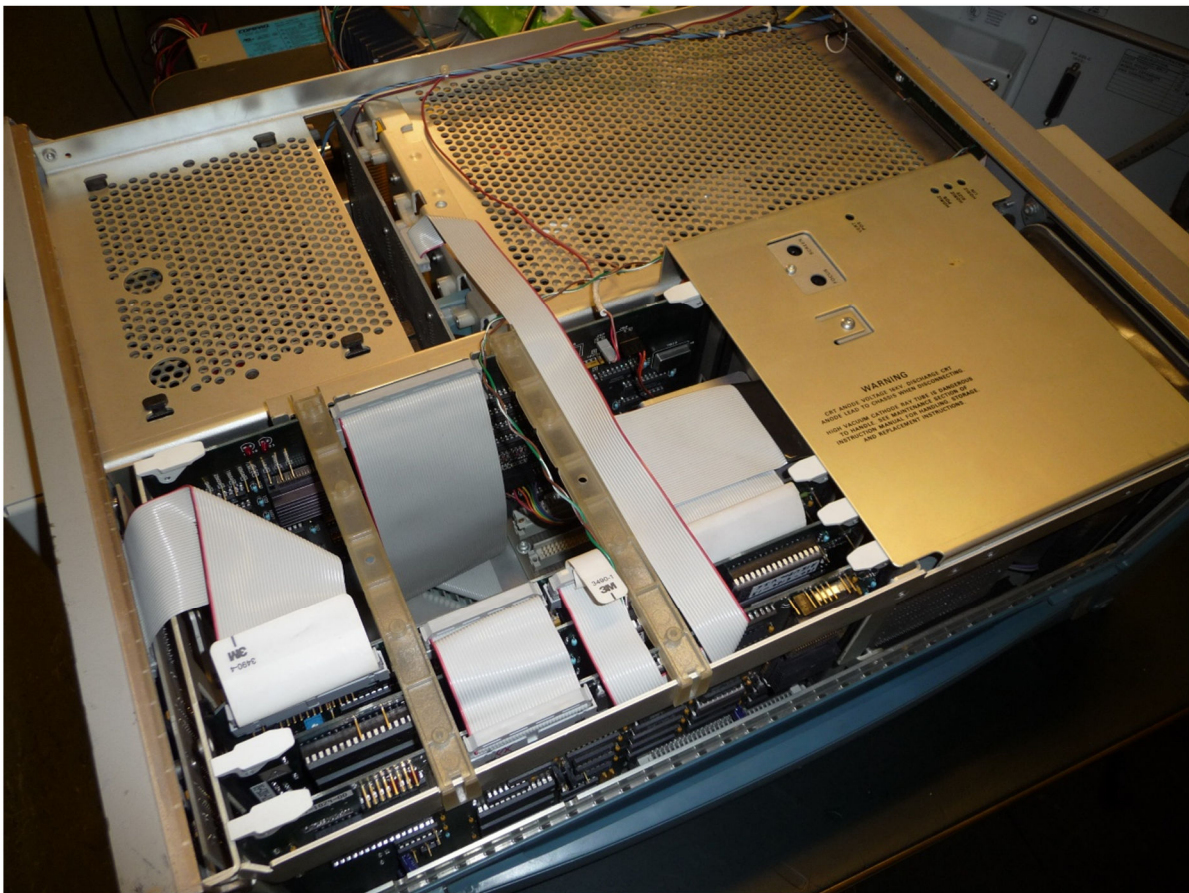


Prepare a 66cm long (from memory, I may be wrong) twin wire with a 2-pin 100mil-pitch connector end. Prepare the other end with 2-mm long tinned tips. Unscrew the A11 front panel board and solder the two wires to the pictured solder pads of the flat wire connector. Put the panel back and route the wires as displayed. Attach the connector to the module and sit the A18 board back in place.





Put the CRT shield and flat cables back in place. To try the mod, depress the ENHANCED ACCURACY or HARDCOPY button before power on and release it about two seconds after.



A higher resolution version of these photos has been stored in the 11403A-CSA404 folder of the pictures area of the Tekscopes yahoo group.

Firmware version 3.6 can be downloaded from:

<ftp://ftp.bluefeathertech.com/electronics/testgear/Tektronix/firmware/11403A/>

Have fun.