

N1996A-03

S E R V I C E N O T E

Supersedes:
NONE

N1996A Agilent CSA Spectrum Analyzer

Serial Numbers: US00000000/US46490000
MY00000000/MY46490000
SG00000000/SG46490000

DIF FPGA Upgrade Failure While Upgrading to >= A.02.00 Firmware

To Be Performed By: Agilent-Qualified Personnel

Parts Required:

P/N	Description	Qty.
1253-6145	Right-Angle Connector Header, 14 position	1
0699-3921	Resistor, Fixed, 75 Ohms (A4R315)	1
Xilinx HW-PC4	Parallel Cable IV	1

ADMINISTRATIVE INFORMATION

SERVICE NOTE CLASSIFICATION:			
MODIFICATION RECOMMENDED			
ACTION CATEGORY:	<input type="checkbox"/> IMMEDIATELY X ON SPECIFIED FAILURE <input type="checkbox"/> AGREEABLE TIME	STANDARDS:	LABOR: 2.0 Hours
LOCATION CATEGORY:	<input type="checkbox"/> CUSTOMER INSTALLABLE <input type="checkbox"/> ON-SITE X SERVICE CENTER	SERVICE INVENTORY:	<input type="checkbox"/> RETURN <input type="checkbox"/> SCRAP <input type="checkbox"/> SEE TEXT
AVAILABILITY:	PRODUCT'S SUPPORT LIFE	USED PARTS:	<input type="checkbox"/> RETURN X SCRAP <input type="checkbox"/> SEE TEXT
AUTHOR: BDT	PRODUCT LINE: 12	AGILENT RESPONSIBLE UNTIL: 1 MARCH 2012	
ADDITIONAL INFORMATION:			

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Situation:

When performing a firmware upgrade on older N1996A spectrum analyzers to \geq A.02.00, one of the last steps of the upgrade process is to upgrade the FPGA code on the A4 Digital IF (“DIF”) board. This upgrade process is very susceptible to glitches on the data and clock lines. If a glitch occurs at the wrong time during the DIF FPGA upgrade process, the upgrade will fail, leaving the N1996A in an inoperable state.

N1996A spectrum analyzers with serial numbers US/MY/SG46490000 and above have a newer A4 DIF board, p/n N1996-60033, which have a lower value for R315 which prevents the glitches from occurring.

Solution/Action:

The procedure below describes how to reprogram the DIF FPGA using a PC and a programming cable which connects to the PC’s parallel port. The software and FPGA code can be downloaded from the following website:

<http://mktwww.soco.agilent.com/field/service/signal/csa/http://mktwww.soco.agilent.com/field/service/signal/csa/>

Also, by changing the value of R315 on the A4 DIF board to 75 Ohms, this problem will be avoided in the future. The resistor part number is 0699-3921.

The programming cable requires the A4 DIF board to have diagnostic connector J4 loaded. Early A4 DIF boards have this connector loaded but later boards do not. Therefore, it may be necessary to also load J4 with p/n 1253-6145.

Procedure:**Part 1 - Modification of A4 Digital IF Assembly**

1. Remove the analyzer’s outer case as described in the Instrument Outer Case, Removal procedure in the N1996A Service Guide.

2. Remove the analyzer's board cover as described in the Board Cover, Removal procedure in the N1996A Service Guide.
3. Remove A4 DIF assembly as described in the A4 IF Board, Removal procedure in the N1996A Service Guide.
4. Refer to Figure 1 below to locate A4R315. Remove A4R315 and replace it with a 75 Ohm resistor, p/n 0699-3921.
5. Refer to Figure 1 below. If J4 is not loaded, install a 14-position, right-angle connector header, p/n 1253-6145, in the space provided for J4.

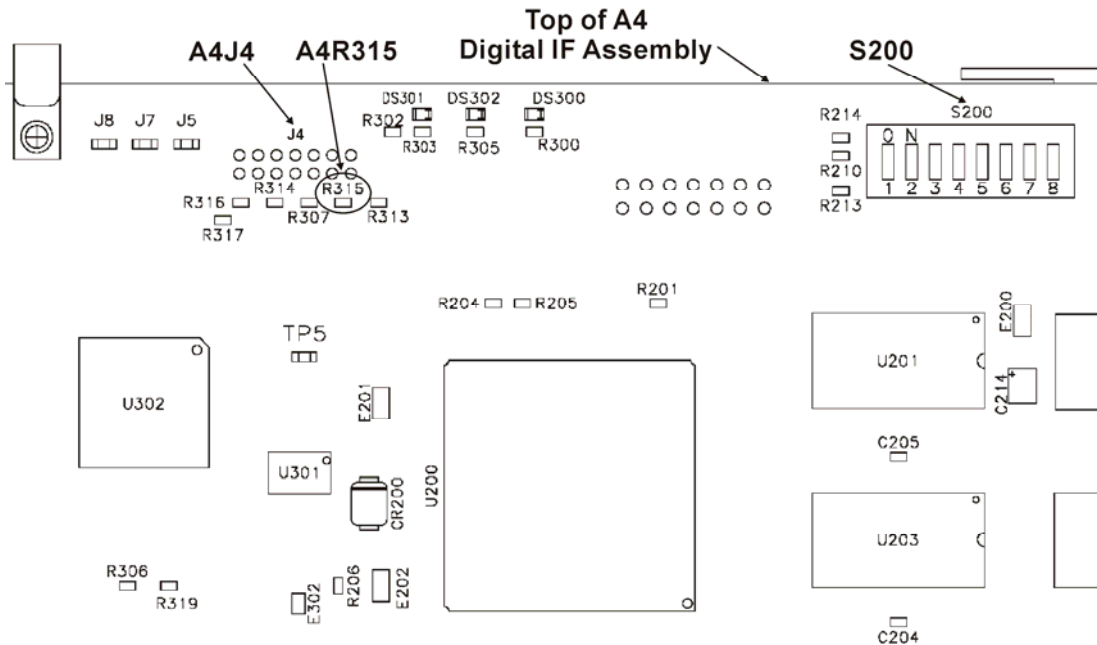


Figure 1. A4 Digital IF Assembly – Location of A4J4 JTAG connector and A4R315.

6. Re-install A4 DIF assembly as described in the A4 IF Board, Replacement procedure in the N1996A Service Guide.
7. The modifications to the A4 DIF board are complete.

Part 2 - Reprogram DIF FPGA

1. Connect the Xilinx Parallel Cable IV to your PC as described in the cable's manual.
2. Go to the website listed below and follow the link to "[Download software to reprogram Digital IF \(DIF\) board FPGA](http://mktwww.soco.agilent.com/field/service/signal/csa/)". Download the iMPACT 6.x software, Service Pack, and FPGA programming files.

<http://mktwww.soco.agilent.com/field/service/signal/csa/>

NOTE: It may be possible to download a newer version of iMPACT directly from Xilinx. However, the download will be much larger since iMPACT is only a small part of a larger development toolkit and is not available from Xilinx separately. Also, newer versions of iMPACT have a slightly different user interface, so the instructions below will not necessarily apply.

3. Install the iMPACT 6.x software and Service Pack.
4. Press the power switch on the N1996A. As the N1996A is booting up, make note of the firmware revision. This firmware revision is needed to select the appropriate DIF FPGA code to download.

5. Connect the ribbon cable from the Parallel Cable's pod to the JTAG connector, A4J4, on the A4 DIF assembly.

CAUTION: Do not connect the Parallel Cable to the JTAG connector on the A3 Power Supply board.

6. Launch iMPACT.
7. In the Operation Mode Selection dialog box, select Configure Devices. Press Next.
8. In the Configure Devices dialog box, select Boundary Scan Mode. Press Next.
9. In the Boundary Scan Mode Selection dialog box, select "Automatically connect to cable and identify Boundary Scan chain". Press Finish.
10. iMPACT will now search the hardware for programmable devices. When the search is completed, a Boundary Scan Chain Contents Summary dialog box will appear. It should report that it found two devices. Press OK.
11. On the iMPACT screen, two blocks should be displayed. One box will be labeled "xcf02s" and the other labeled "xc3s400". The block labeled "Xcf02s" should be highlighted and an "Assign New Configuration File" dialog box displayed.
12. In the Assign New Configuration File dialog box, browse to select the appropriate FPGA download file based upon the firmware revision noted in step 4. For example, 1_11_03.mcs for firmware revision A.01.xx. Click Open.
13. The block labeled "xc3s400" should now be highlighted and another "Assign New Configuration File" dialog box displayed. This device does not need to be programmed. Click Bypass.
14. In the iMPACT screen, click on the box labeled "xcf02s". Right click and select Program.
15. In the Program Options dialog box, ensure that "Erase Before Programming" and "Verify" are checked. All other boxes should be un-checked. Click OK.
16. The Programming Status dialog box should now appear showing the programming progress. When the programming is done (this takes approximately 20 seconds), the Programming Status dialog box should go away and "Programming Succeeded" will appear for a few seconds on the iMPACT screen.
17. Disconnect the ribbon cable from the JTAG connector on the A4 DIF assembly.
18. Cycle power on the N1996A. It should now boot up normally.

Part 3 – Reassembly and Performance Verification

1. Replace the board cover as described in the Board Cover, Replacement procedure in the N1996A Service Guide.
2. Replace the outer case as described in the Instrument Outer Case, Replacement procedure in the N1996A Service Guide.
3. Connect the output of the ac adapter to the analyzer.
4. Turn N1996A on and wait for analyzer to boot up.
5. Run the performance verification test plan using the N7813A Calibration Software.
6. Procedure is complete.