

## Changing and Programming VUTEk h Series Boards

**Description:** Follow these instructions to replace and program the Print Head Ranger Board, the Tauro Light Carriage Board, and/or the Ferrari Light Video Board.

**Affected Printers:** VUTEk h3 & h5

# 1.0 Changing and Programming VUTEk h Series Boards

Follow these instructions to replace and program the Print Head Ranger Board, the Tauro Light Carriage Board, and/or the Ferrari Light Video Board.	1.5 hours	FTP-01091, Rev. I
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## 1.1 Required Tools, Materials and Documents

Part	Description	Additional Information
OMM-00047	Inkjet Solutions Safety Guide	<a href="https://inkjet.support.efi.com/doc.php?doc=683">https://inkjet.support.efi.com/doc.php?doc=683</a>
P9378-A	Static strap	<b>Important!</b> Always wear a static strap when working with printer PCBs, print heads, or electronics.
	Print Head Ranger Board	
	Identity ID Ranger Firmware File	<a href="https://inkjet.support.efi.com/doc.php?doc=6265">https://inkjet.support.efi.com/doc.php?doc=6265</a>
	Tauro Light Carriage Board	
	Ferrari Light Video Board	

## 1.2 Revision History

11/29/2018	A	First revision.
12/06/2018	B	Add Changing and Programming the Tauro Light Carriage Board and Ferrari Light Video Board.
01/11/2019	C	Updated step <a href="#">11.</a> , <a href="#">page 15.</a>
01/30/2019	D	Added step <a href="#">10.</a> , <a href="#">page 15</a> ; original step 10 is now step <a href="#">11.</a>
02/25/2019	E	Updated step <a href="#">11.</a> , <a href="#">page 15</a> ; select either file.
02/28/2019	F	Added Static Strap to Required Tools.
08/21/2019	G	Added note to top of <a href="#">page 12</a> , along with <a href="#">Figure 1-11</a> and <a href="#">Figure 1-12</a> ; DR 5872
03/17/2023	H	Removed slash (/) from end of Ranger board path on <a href="#">page 13</a>
4/23/2024	I	Added firmware update and file to Required Tools and section <a href="#">1.3</a> .

## 1.3 Changing Print Head Ranger Board

1. When you receive a Ranger board, the first step is to verify the version of the PCBA, and then deploy a new firmware file. The new identity boards only accept the new version of firmware.
2. At the same time, upgrade the entire carriage to the newest firmware, found at <https://inkjet.support.efi.com/doc.php?doc=6265>

### 1.3.1 Removing Print Head Cartridge

1. Shutdown the printer and perform a LOCKOUT/TAGOUT on the Main AC Disconnect switch.
2. Put on an ESD Static Strap.

**Important!** Always wear a Static Strap when working with printer PCBs, print heads or electronics.

3. Open the Carriage Compartment door.
4. Extend the Print Head Cartridge Maintenance Station arm and lock into position.

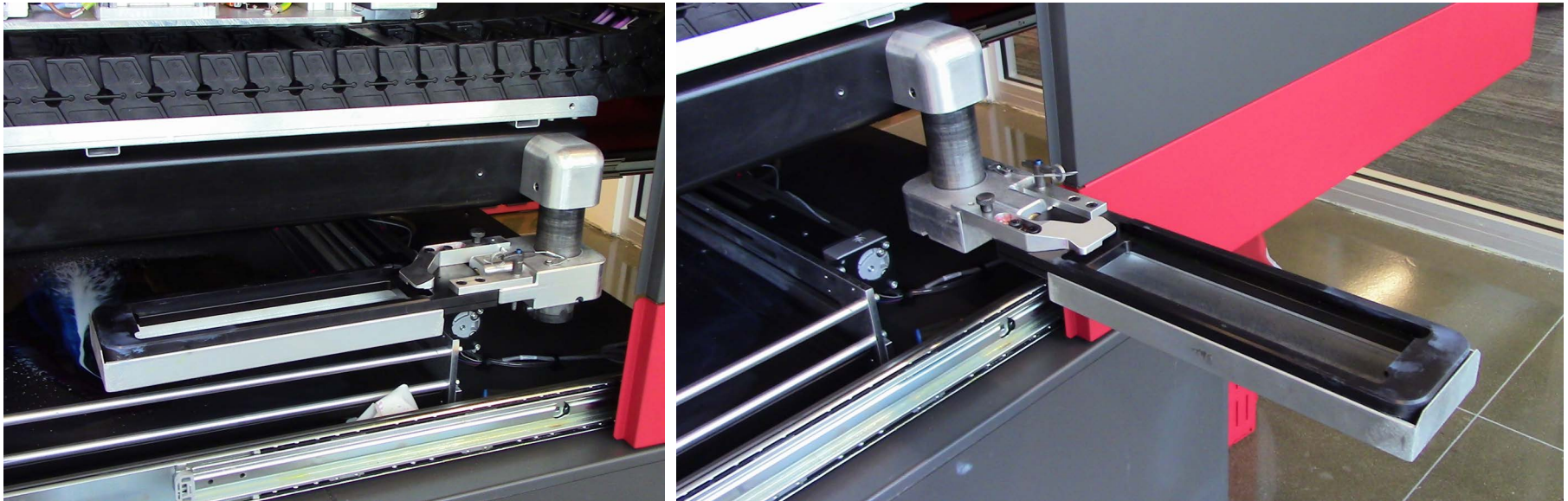
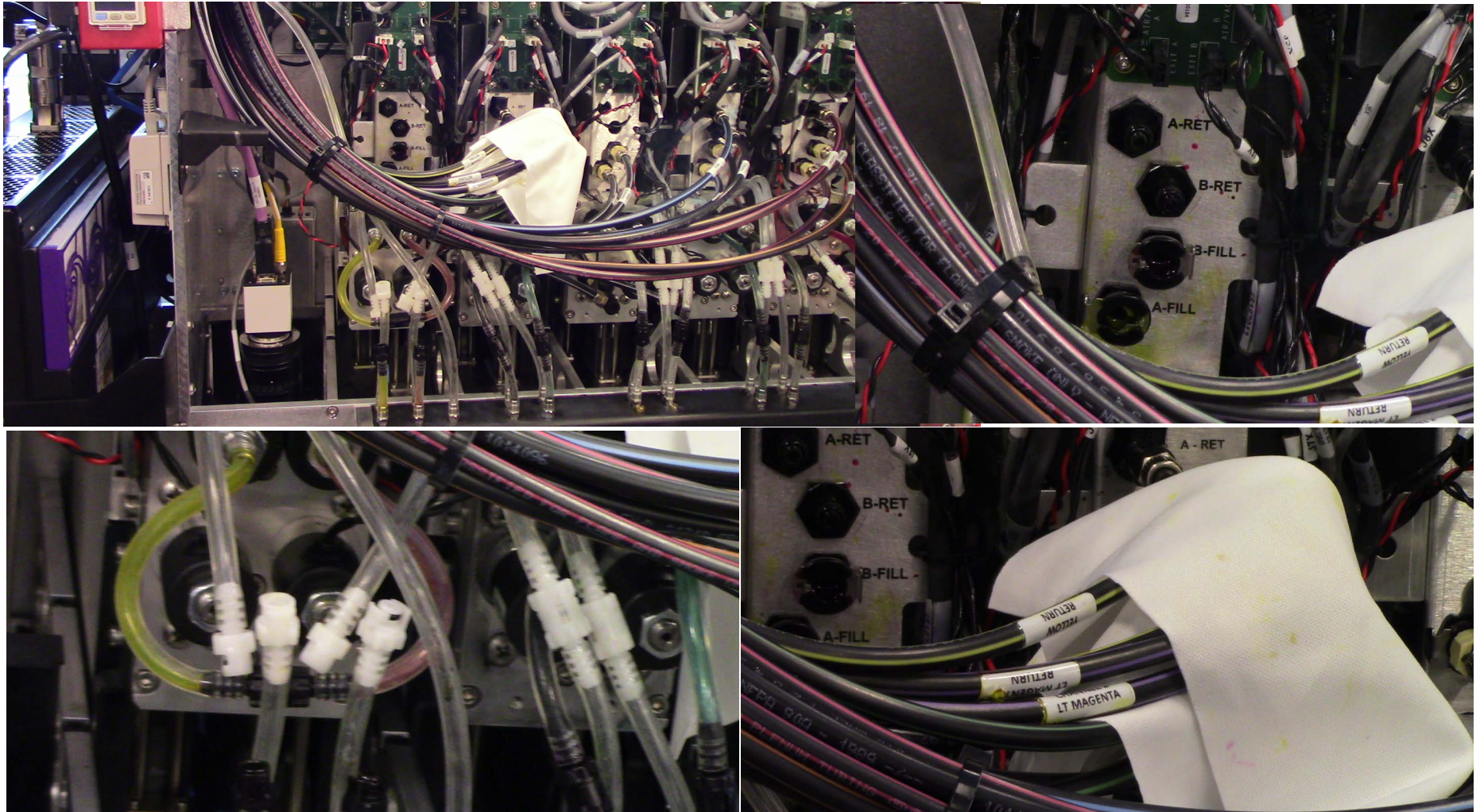


Figure 1-1: Print Head Maintenance Station, Retracted, Left, and Extended, Right

5. Disconnect the Ink Feed and Recirculation Lines and wrap in a clean room wipe. Disconnect the four connectors to the Analog Board. Disconnect the vacuum lines at the quick disconnects.



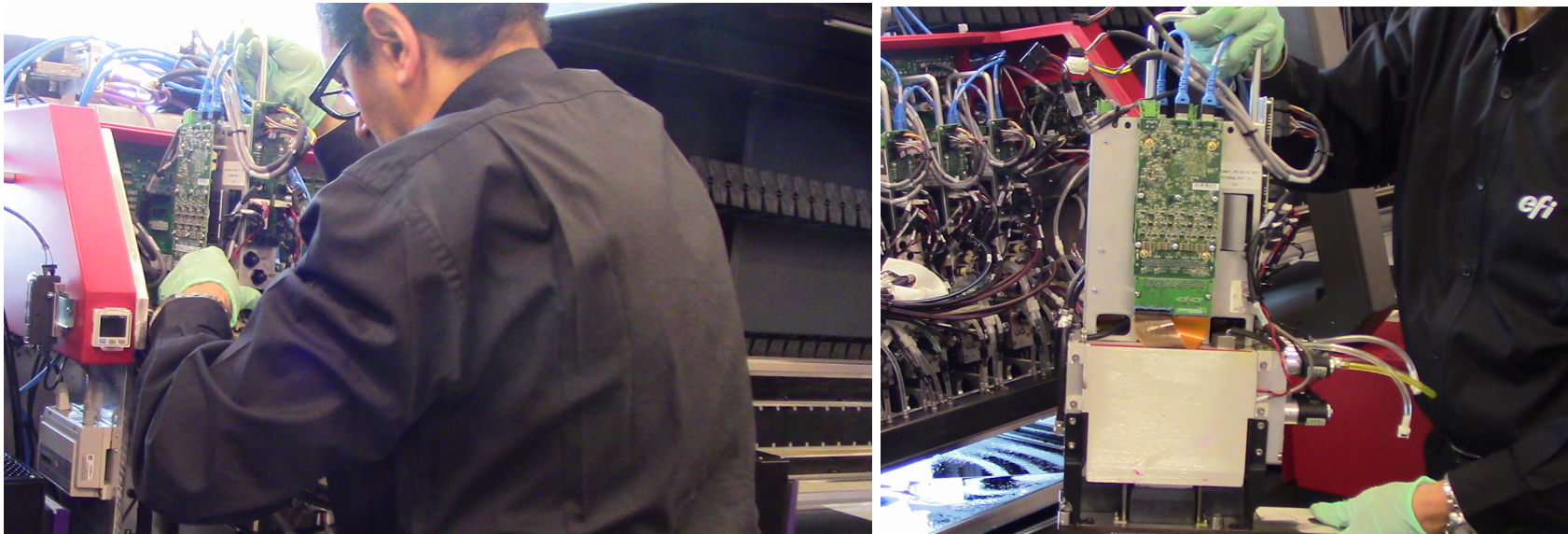
**Figure 1-2: Overview, Top Left, Fill/Return Ports, Top Right, Vacuum Lines, Bottom Left, Wipe on lines, Bottom Right**

- Loosen the six (6) Print Head Cartridge anchor screws located underneath the print head plate.



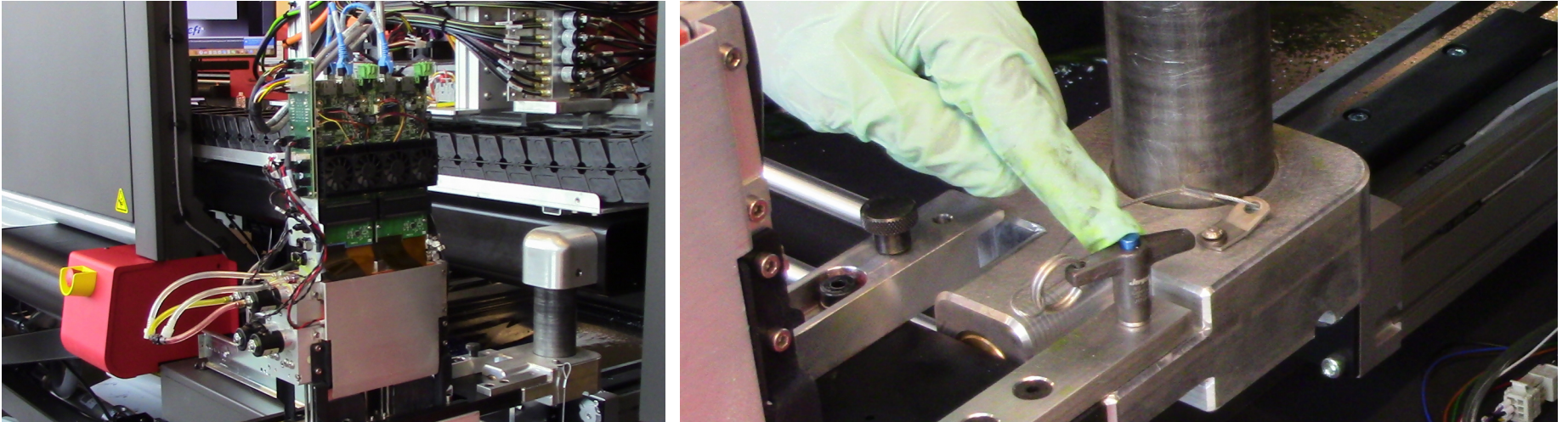
**Figure 1-3: Loosening the anchor screws**

- Grasp Print Head Cartridge by the TOP Handle and gently pull Print Head Cartridge straight UP, taking **EXTREME CARE** to not strike any other components in the carriage, particularly the Analog Board.



**Figure 1-4: Removing Print Head Cartridge assembly**

- Place cartridge in Print Head Cartridge holder and lock into position.



**Figure 1-5: Print Head assembly in holder, Left, and Locking Pin, Right**

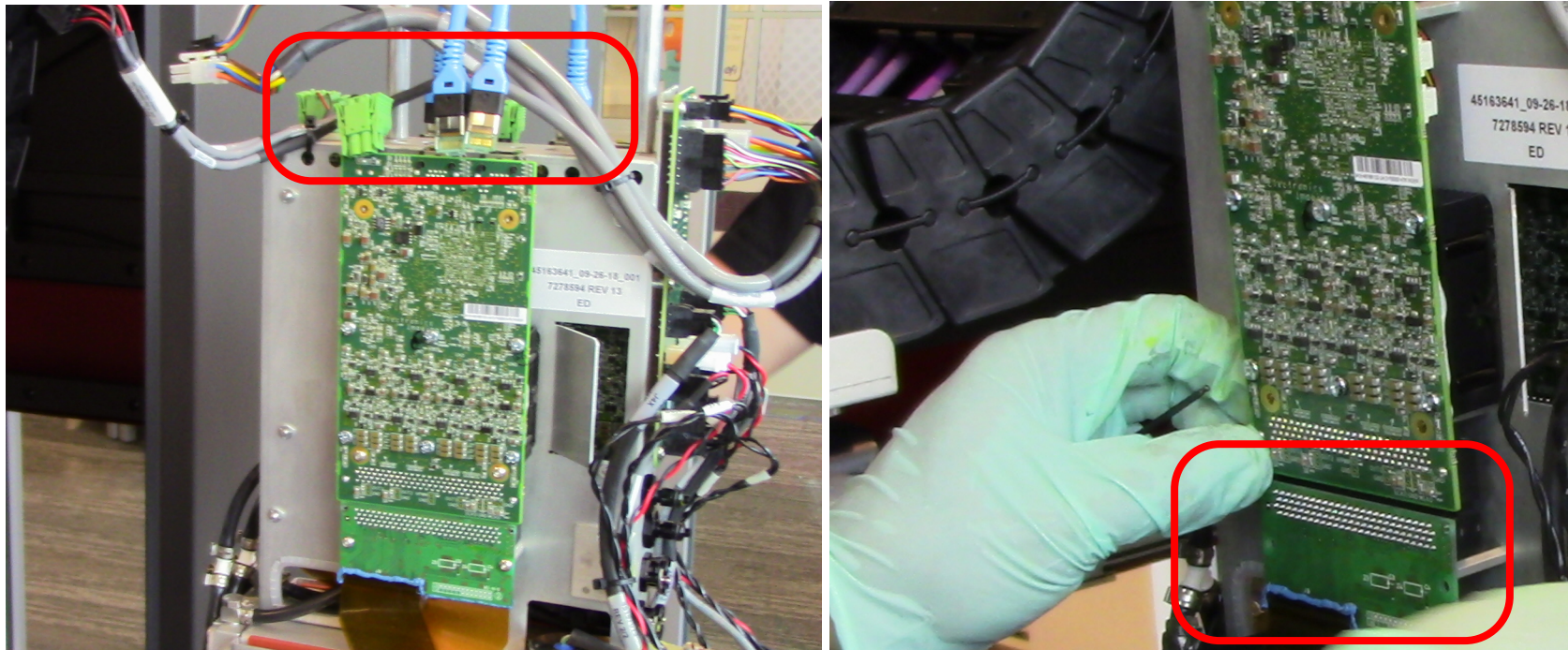
### 1.3.2 Removing and Replacing Ranger Board

**Important!** There is one Ranger Board per print head.

1. Put on an ESD Static Strap.

**Important!** Always wear a Static Strap when working with printer PCBs, print heads or electronics.

2. Remove the data cables and connectors for the Ranger board for the matching print head.
3. For Print Head 1 only, first remove the lower ribbon cable assembly.



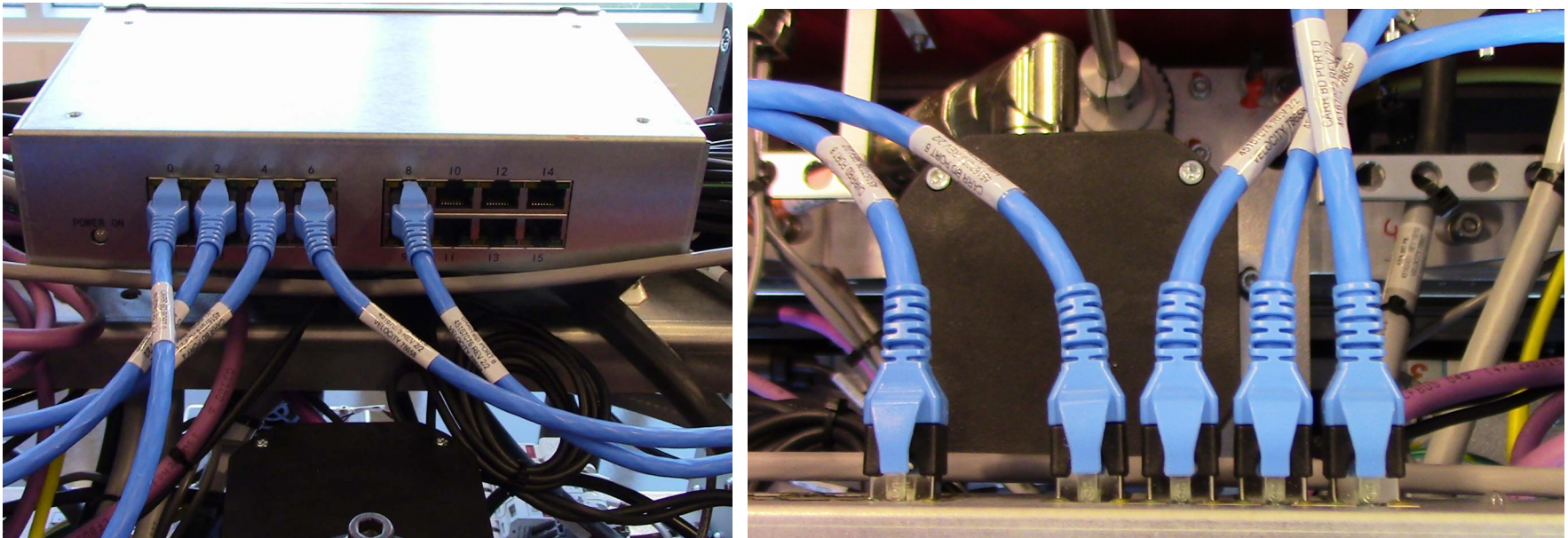
**Figure 1-6: Ranger Board assembly, Print Head 1, Data Cables illustrated, Left, and Ribbon Cable, Right**

4. Remove Ranger Board.
5. Connect new board to existing ribbon cable and secure new board with screws.
6. Re-connect data cables and connectors.
7. Install Print Head Cartridge into carriage in the reverse order from removing.
8. Proceed to [Programming the Ranger Board](#).

## 1.4 Removing and Replacing the Tauro Board

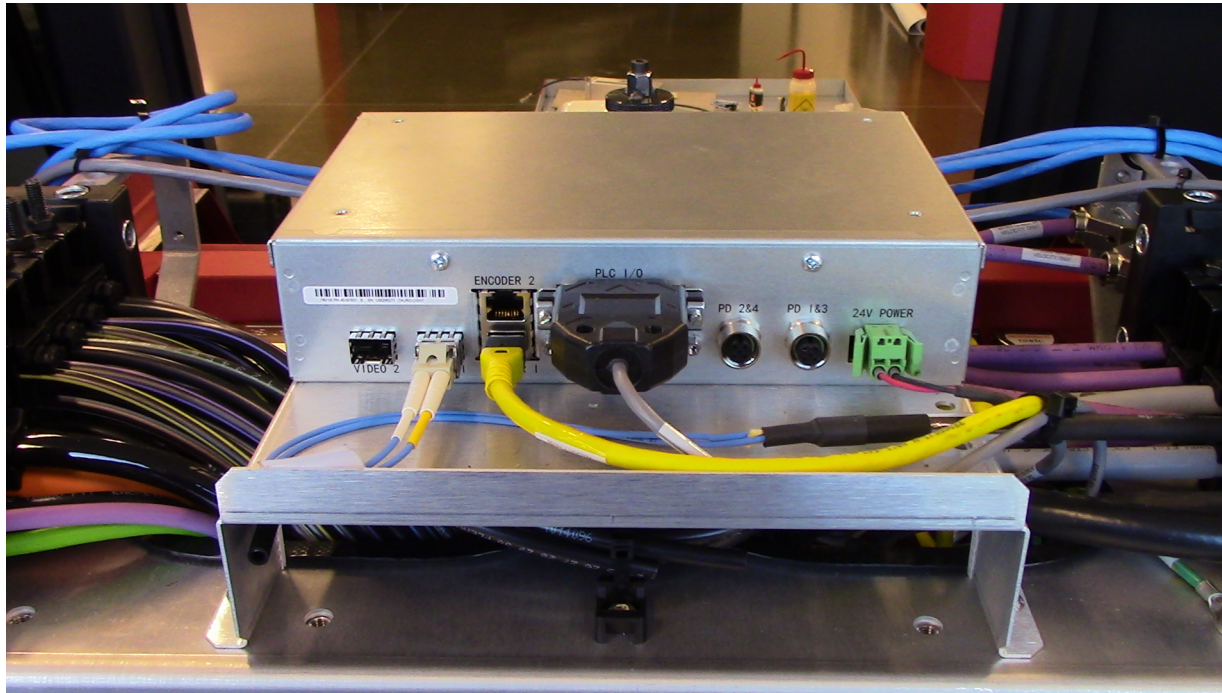
1. Shutdown the printer and perform a LOCKOUT/TAGOUT on the Main AC Disconnect switch.
2. Open the Carriage Compartment door.
3. Verify the blue Data Cables are labeled; label cables if required.
4. Disconnect the blue Data Cables connected to the Tauro Board front.

**Note:** Data Cable colors may vary.



**Figure 1-7: Tauro Board Data Cables, Carriage TOP**

5. Disconnect the **Video 1**, **Encoder 1**, **PLC I/O**, and **24V Power** connectors from the Tauro Board REAR.



**Figure 1-8: Tauro Board Connectors**

6. Remove the four (4) anchor screws securing the Tauro Board.
7. Install the new Tauro Board.
8. Reconnect the **Video 1**, **Encoder 1**, **PLC I/O**, and **24V Power** cables.
9. Reconnect the Data Cables.
10. Proceed to [Programming the Tauro Light Board](#).

### 1.4.1 Removing and Replacing the Ferrari Light Board

1. Shutdown the printer and perform a LOCKOUT/TAGOUT on the Main AC Disconnect switch.
2. Put on an ESD Static Strap.

**Important!** Always wear a Static Strap when working with printer PCBs, print heads or electronics.

3. Open the Printer Computer Compartment doors.
4. Remove the Printer Computer Cover.
5. Disconnect the 45165487 fiber optic cable from the top of the Ferrari Light Board.



**Figure 1-9: Ferrari Fiber Optic Cable, Left, and Ferrari Light Board, Right**

6. Remove the Ferrari board and replace with new board.
7. Reconnect the fiber optic cable.
8. Proceed to [Programming the Ferrari Light Board](#).

## 1.5 Programming Boards

### 1.5.1 Programming the Ranger Board

1. Power on printer.
2. Identify incorrect firmware in software, [Figure 1-10](#).

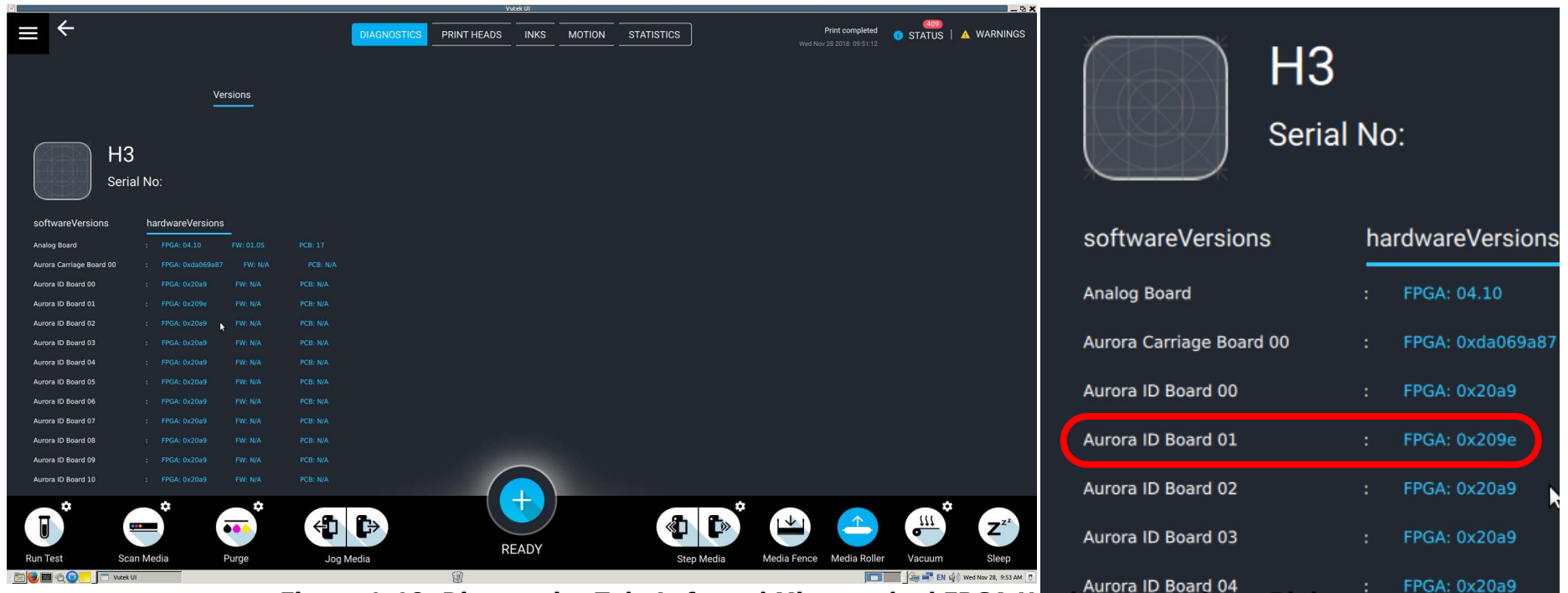
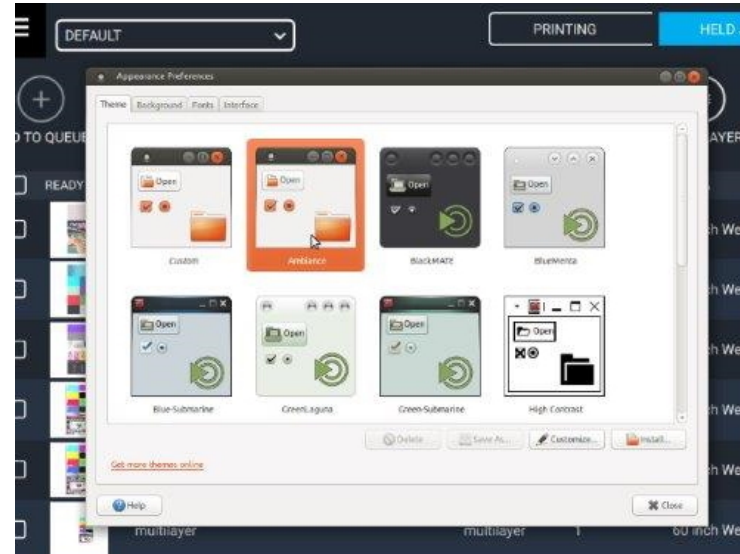


Figure 1-10: Diagnostics Tab, Left, and Mis-matched FPGA Hardware versions, Right

**Note:** If, when browsing, the software only displays the board FW versions or the \*.rpd file, make sure that the operating system's theme is set to "Ambiance, as shown in [Figure 1-11](#) and [Figure 1-12](#).

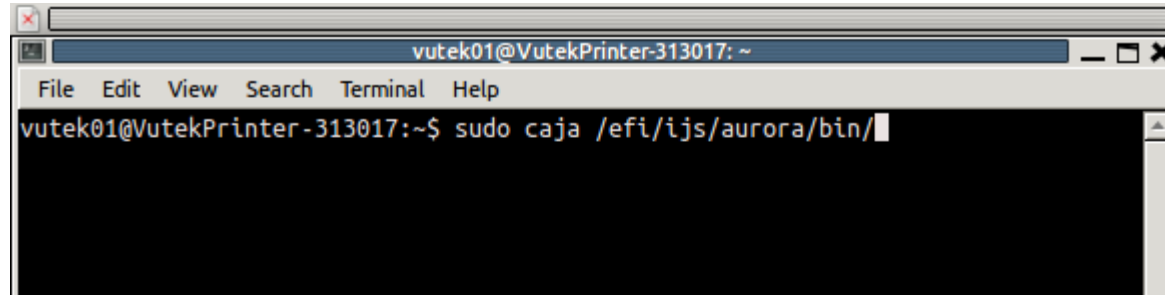


**Figure 1-11: Navigate to Theme Selection**



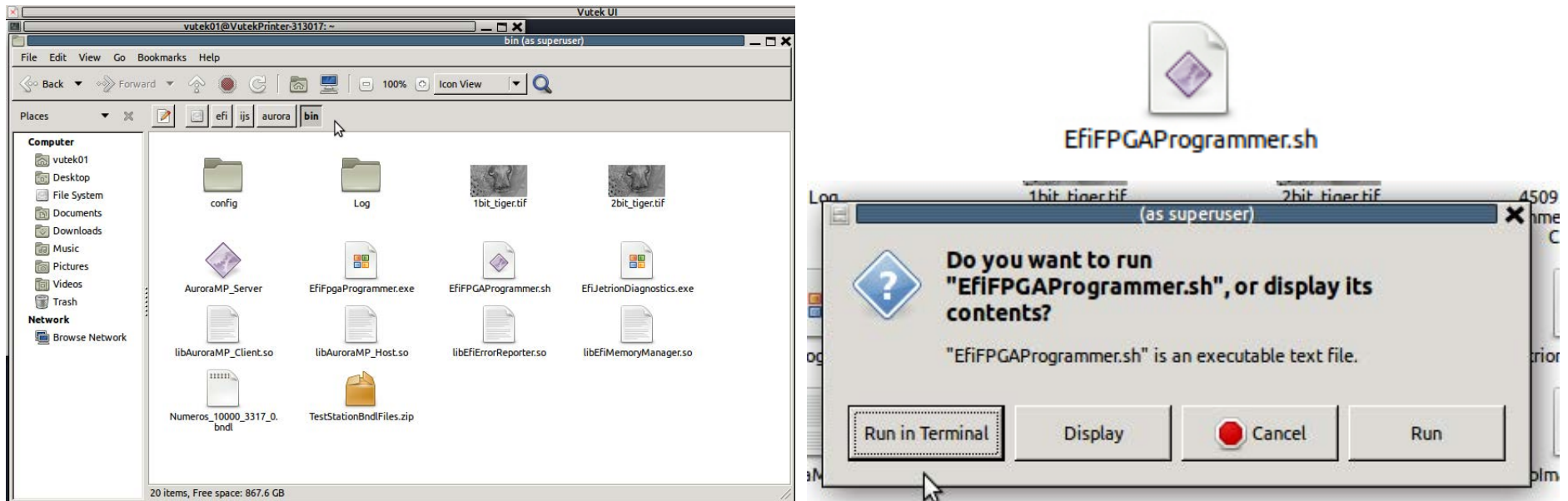
**Figure 1-12: Select Theme in Dialog Box**

3. Open a Terminal window, [Figure 1-13](#).
4. Type the following command and press **Enter**.
  - `sudo caja /efi/ijs/aurora/bin`



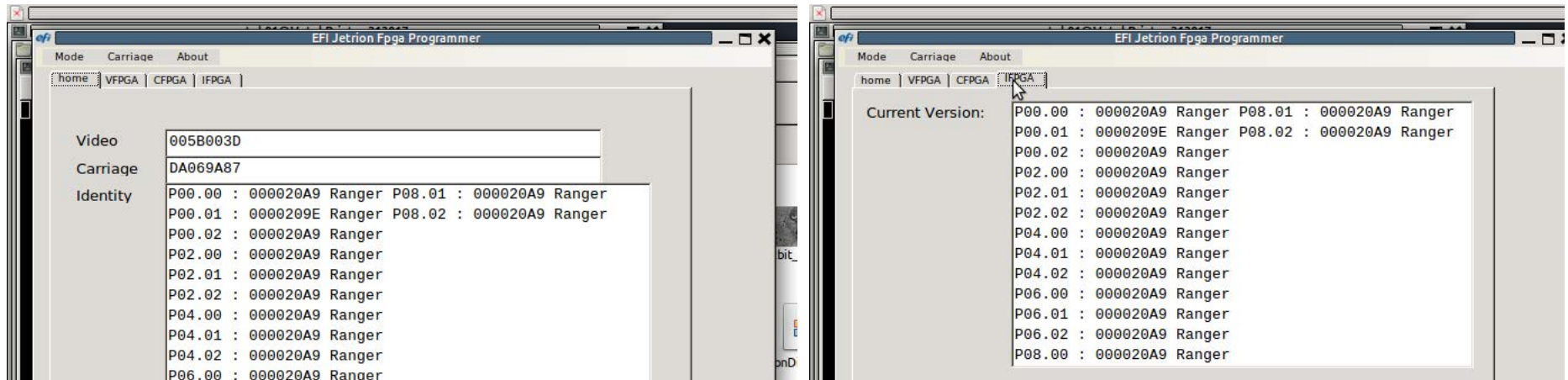
**Figure 1-13: Terminal window**

5. The Target folder opens in a File Browser, [Figure 1-13](#).
6. Double click the **EfiFPGAProgrammer.sh** file to launch the programmer.
7. Select **Run in Terminal** from the confirmation dialog box.



**Figure 1-14: File Browser, Left, Launcher Shortcut, Right, Top, and Confirmation dialog box, Bottom Right**

8. The **EFI Jetrion Fpga Programmer** dialog box displays, [Figure 1-14](#). Select the **IFPGA** tab.



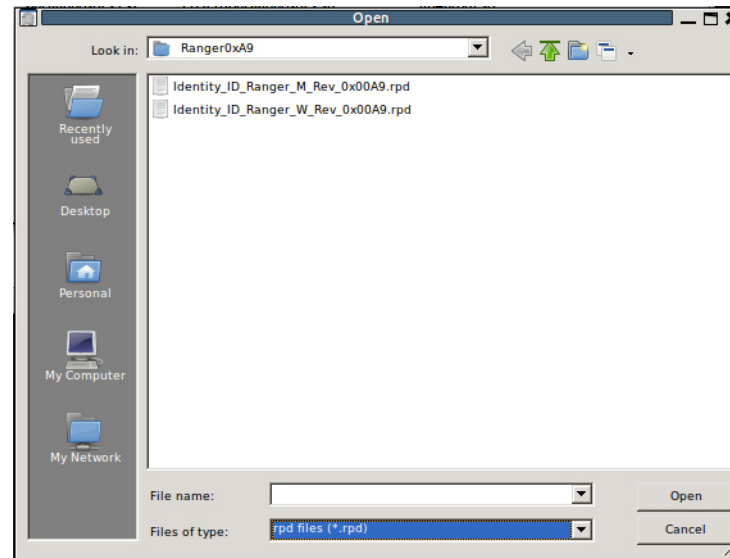
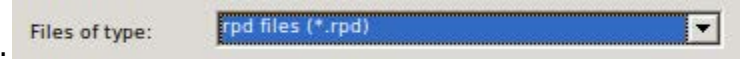
**Figure 1-15: EFI Jetrion Fpga Programmer dialog box, Left, and IFPGA Tab, Right**

9. Click the **Browse** button. The **Open** dialog box opens, [Figure 1-16](#).

10. Click the **Files of Type** drop-down and select **rpd files (\*.rpd)**.

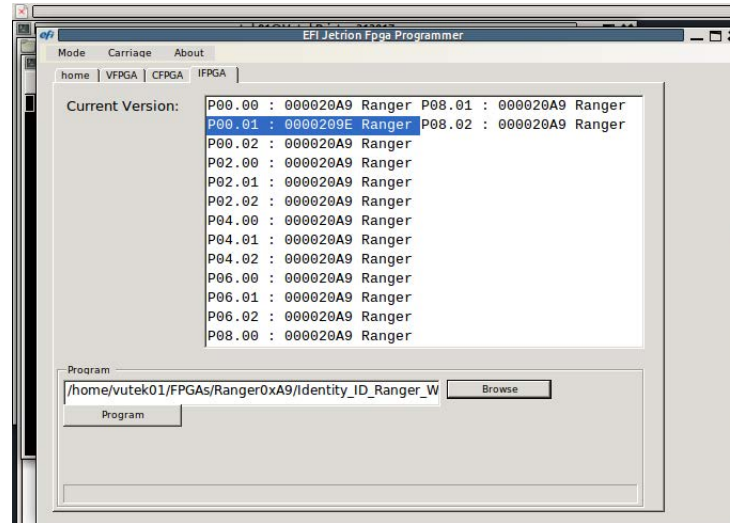
11. Select **either file name** and click **Open** or double click **either file name**, [Figure 1-16](#).

**Note:** By selecting either file name, you set the desired Directory Path to use; the Ranger board programmer then selects the appropriate one for each board depending on the flash part detected.



**Figure 1-16: Open dialog box**

12. The path for the waveform populates in the **Program** field.



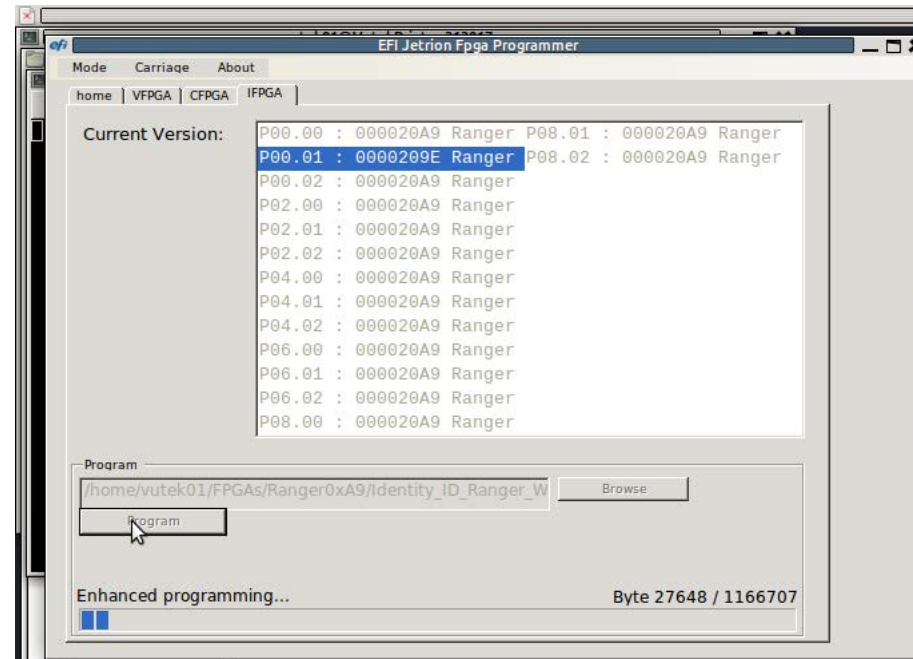
**Figure 1-17: Populated Program link**

13. Click the Target Ranger Board (Firmware version) that is out of date, in this example, Position 1, **P00.01**.

- Old Firmware - 0000209E
- New Firmware - 000020A9

**Important!** For two or more Ranger Board replacements, each one will have to be programmed independently. All ranger boards can be programmed in series, without requiring a power cycle between board programs.

14. Click the **Program** button, [Figure 1-18](#). Programming begins.



**Figure 1-18: Programming FPGA**

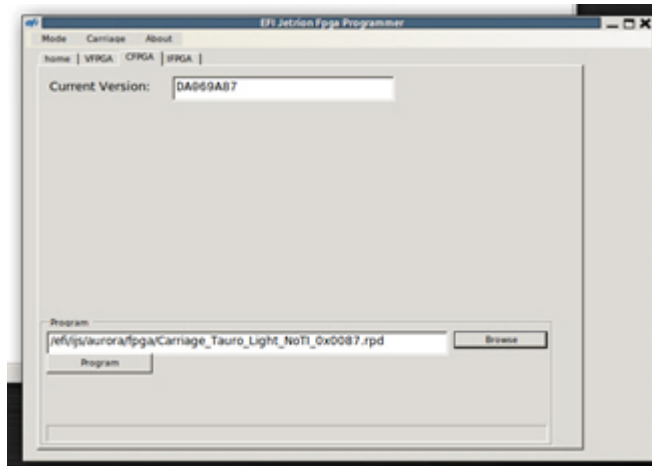
15. An **Updated/Done** confirmation dialog box opens after programming is complete.
16. Repeat the programming procedure for any additional Ranger Boards.
17. Proceed to [1.6 Completing Programming](#).

## 1.5.2 Programming the Tauro Light Board

1. Click the **CFPGA** tab.
2. Click **Browse** and navigate to `/efi/ijs/aurora/fpga`

**Note:** If this path does not exist, instead navigate to `/home/vutek01/FPGAs/Carriage_Tauro_Light_NoTI_0x0087`

3. Select **Carriage\_Tauro\_Light\_NoTI\_0x0087.rpd** and click **Open**.
4. Click **Program**.



**Figure 1-19: CFPGA Tab**

5. Wait for the **Erase** and **Program** operations.
6. When complete, a **Done** message displays.
7. Proceed to [1.6 Completing Programming](#).

### 1.5.3 Programming the Ferrari Light Board

1. Click the **VFPGA** tab.
2. Click **Browse** and navigate to `/efi/ijs/aurora/fpga`  
**Note:** If this path does not exist, instead navigate to `/home/vutek01/FPGAs/Ferrari0x3D`
3. Select **Video\_Ferrari\_Rev0x3D\_Compressed\_LightNoTi.rpd** and click **Open**.

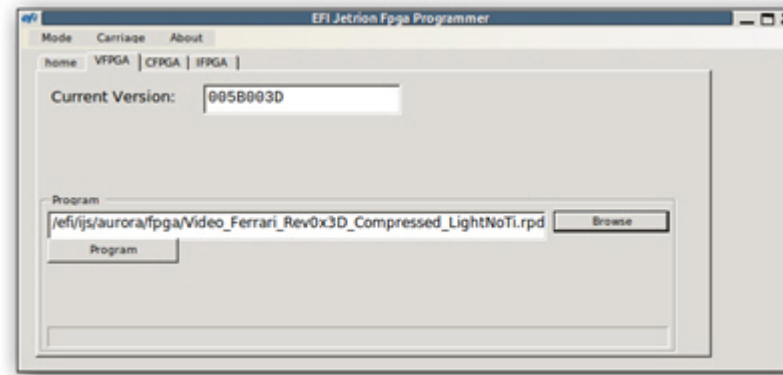


Figure 1-20: VFPGA Tab

4. Click **Program**.
5. Wait for the **Erase** and **Program** operations.
6. When complete, a **Done** message displays. Proceed to [1.6 Completing Programming](#).

### 1.6 Completing Programming

1. Shutdown the printer.
2. Wait for the PLC LED lights to turn off.
3. Turn the Main AC Disconnect switch to OFF for 30 seconds.
4. Turn the Main AC Disconnect switch to ON.
5. Power **ON** the printer.
6. Check the firmware versions in the software.  
**Important!** If the correct firmware versions are not listed, repeat the procedure.
7. Print a **Check Jets** test to verify print head functionality.