

## FLEXIBILIS REDUNDANT SWITCH (FRS)

### HSR Demo Quick Start Guide: Altera Cyclone IV Demo

This quick start guide for evaluation can be used if the FPGA boards have already been programmed beforehand and you already have all the needed equipment ready. This guide is for **three Altera Cyclone IV boards**, **three Terasic HSMC SFP Boards**, one **laptop** and one **web camera**. For different setups, more specific instructions, explanations and troubleshooting please refer to the complete guide “Altera Cyclone IV Demo with Terasic Interface Cards”.

Only HSR can be tested with this setup, for PRP setup please see the complete guide.

#### 1 CONNECT THE BOARDS

Connect the HSMC cards to the FPGA boards. Use HSMC connector A as in Figure 1.

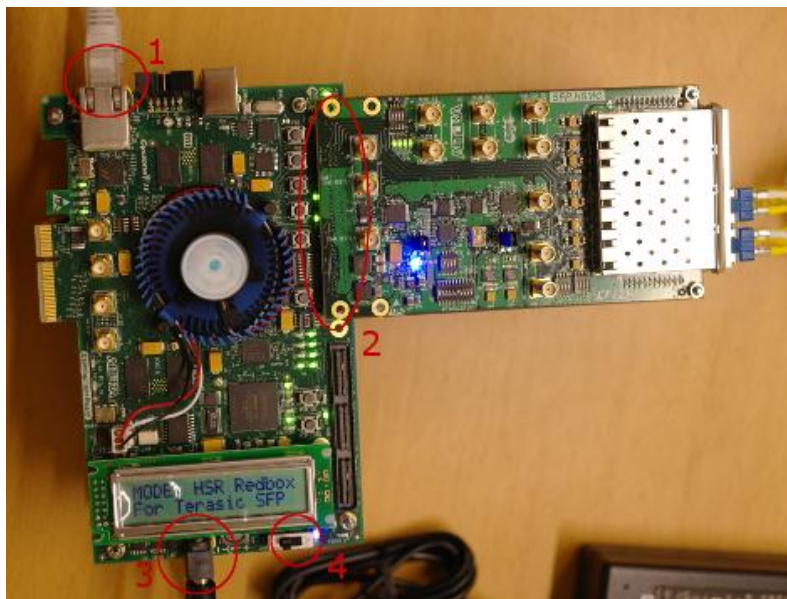
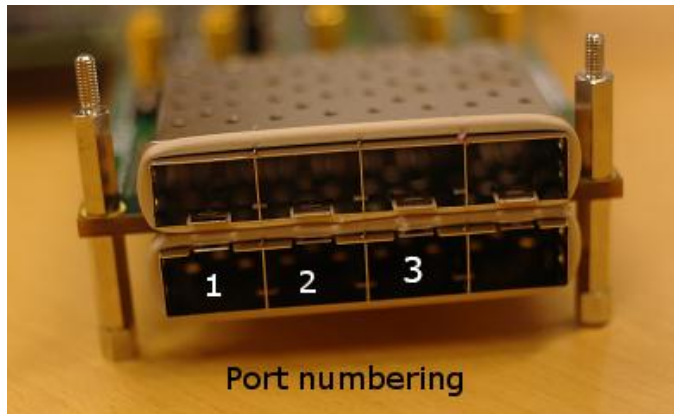


Figure 1. In the picture, 1 is the RJ45 port (Ethernet port); 2 is the HSMC connector A; 3 is the power plug and 4 is the power switch.

#### 2 CONNECT THE CABLES

Plug in the power cables to all three FPGA boards and the web camera. All the FPGA boards as well as the laptop and camera need to have their own, separate power cables and power sources. See Figure 1 where to the power cables should be plugged.

Port numbering is as shown in Figure 2.



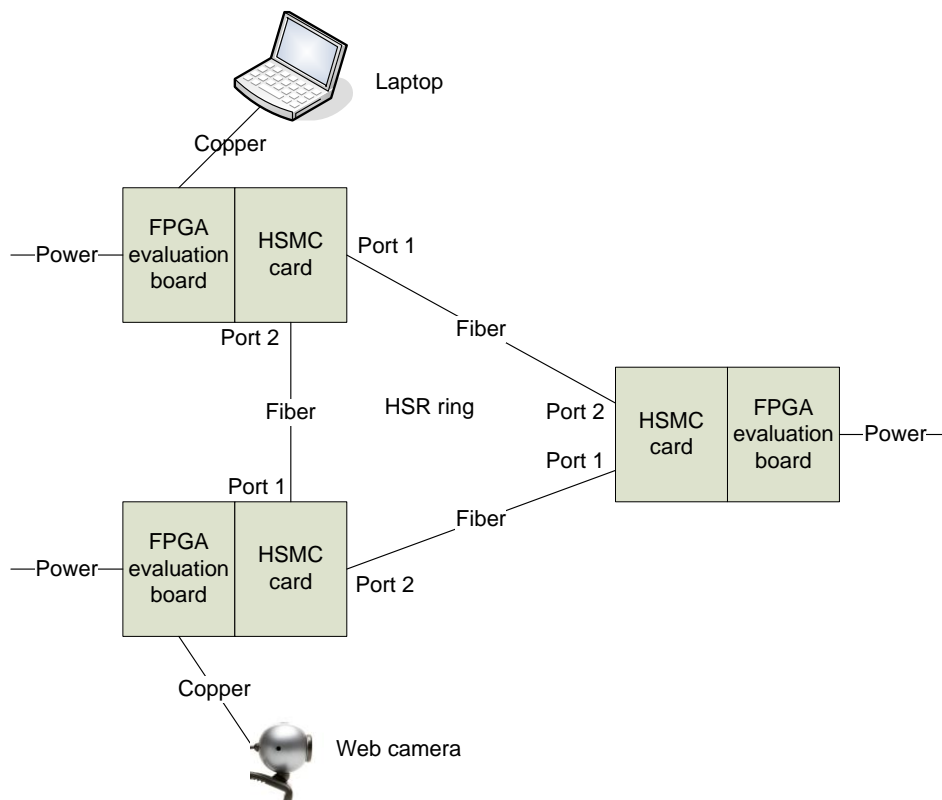
**Figure 2. Port numbering**

Connect the Ethernet cables as follows:

- HSMC Board A: port 1 <- fiber cable -> HSMC Board B: port 2
- HSMC Board B: port 1 <- fiber cable -> HSMC Board C: port 2
- HSMC Board C: port 1 <- fiber cable -> HSMC Board A: port 2
- FPGA board 1 Ethernet port <- copper cable -> laptop Ethernet port
- FPGA board 2 Ethernet port <- copper cable -> Ethernet switch
- Ethernet switch <- copper cable -> web camera Ethernet port

You will need to use SFP modules in the SFP ports (HSMC board ports 1 & 2) and fiber optic cables to connect the boards to each other's.

See Figure 3 for the complete setup.



**Figure 3. Evaluation setup**

### 3 CHOOSE THE RIGHT PROGRAM

Turn all the boards on as well as your laptop and web camera.

Now load the user configuration to the FPGA board. You can do this by first pressing PGM\_SEL button. With the button you can go through and select between three alternatives, select "USER" (the LED above text "USER" is on). Then press PGM\_LOAD once to load the user configuration. See Figure 4 for reference. Repeat this for all the three boards.



Figure 4. PGM\_SEL and PGM\_LOAD Buttons

### 4 CHECK IP SETTINGS

All the devices connected to the HSR/PRP network should be in the same IP subnetwork, so a static IP address should be defined for all of them.

The IP address of the web camera is printed on the camera, or it can be found in the manual (typically it is 192.168.0.20 for D-Link cameras). Change the IP address of the laptop to match this, to for example to 192.168.0.1 (the subnet mask should be 255.255.255.0). In Windows 7, this can be done at **Start → Control Panel → Network and Internet → Network and Sharing Center → Change adapter settings → Local Area Connection → Properties → Internet Protocol Version 4 → Use the following IP address**. Administrator rights are needed to be able to change the IP address.

For more information about IP address configuration, please check chapter 4.4 of the complete guide.

### 5 CHANGE THE LCD DISPLAY VIEW

The LCD display of the FPGA board will show the status of the board and the interfaces. There are five different views. The view can be changed with the PBO –button on the Altera board (see Figure 5). Check complete guide chapter 5.2 to see the explanations of the different views.

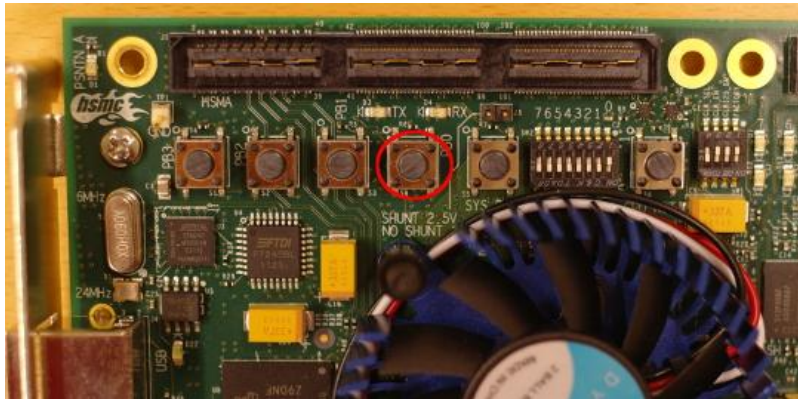


Figure 5. PB0 –button to change the screen view

## 6 CHECK IF CAMERA WORKS

Open web browser on the laptop and type the IP address of the camera to the web browser's address field (For example 192.168.0.20). You should be able to see the web page of the camera and the live video.

## 7 TROUBLESHOOTING

If the video doesn't work, please check that everything is done exactly as this guide says. If everything is done correctly, then please check the following things:

1. There is a time limit of **two and half hours** for the evaluation. If this time runs out the network will stop working. To get it to work again, just turn off the boards and then turn them on again and load the user configuration.
2. All the boards and the camera are on and the power cables are plugged in
3. All the cables are properly attached and the SFP modules are correctly plugged in
4. All the link LEDs that should be on are on (See complete guide chapter 8.2). If a link is down, there is something wrong with the cable or with the SFP module. Try a different cable.
5. The screen shows the right things (Check chapter 5.2 of the complete guide). If the screen shows something else, wrong program is selected or the program has not loaded correctly.
6. The screen also shows if some of the links is
7. The laptop and camera are in the same IP subnetwork
8. Check the firewall settings of the laptop
9. Check that all the DIP switches are in the right position (see chapter 4.1 of the complete guide)
10. Check that the copper cables are crossover type
11. SFP modules and fiber optic cables are of the same type (singlemode/multimode)
12. Check if ping works (see chapter 5.1 of the complete guide) between the laptop and the camera