# Connecting, Programming and Testing FEC and ADC



v1.0

Notice: PRE-RELEASE for comments

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### Connection

The FEC card needs 2 jumpers to be placed on the components named "U4" and "U30" (2.5V). The ADC card needs 2 jumpers (J2 and J4) and 2 bridges (ST7 and one of 2 GND\_BRIDGE) to be placed.

See image for positions:



Use the ATX adapter output to supply power.

Connect SFP Transceiver to FEC for Ethernet connection (see below).

Connecting, Programming and Testing FEC and ADC Cards



(Ethernet SFP Copper Transceiver)

Change switch positions of all switches of ADC (8 for 8 channels) like below (The arrows show switch positions.):



## **Programming FEC Cards**



Turn the power on and wait for D2 to stop blinking (If you did not connect FEC to your computer Ethernet plug, the led will not be turned on).

Plug the Xilinx Programmer socket into card.



Run iMPACT and create an empty project. The following picture will be shown:



After successful initialization, right click on the first device and choose Assign New Configuration File.



🛞 Assign New Configuration File ✓ Documents ► Local ► SRS ► Firmware ► prom 44 Search prom **•** | Organize 🔻 New folder HE -📃 Desktop \* Name Date modified Type 🗼 Downloads fec\_firm\_v202.mcs 29/03/2011 08:46 MCS File Public on DFS fec\_firm\_v203.mcs 29/03/2011 11:20 MCS File Recent Places fec\_firm\_v204.mcs 12/05/2011 16:32 MCS File fec\_firm\_v204b.mcs 18/05/2011 17:52 MCS File 🔚 Libraries fec\_firm\_v205.mcs 14/06/2011 12:12 MCS File Ξ Documents Music Pictures 📕 Videos Normal Computer 🏭 System (C:) Removable Disk I 🚽 🧃 ш

Browse in the directory shown above and double click on a firmware you would like to program.

Right click on the first device again and click Program.



Programming will take a while.

After programming is completed, power it off and on. If you have not done yet, plug ADC card and Hybrid(s).

### **Changing IP and MAC addresses.**

Click *READ* to establish a connection using  $(1777)_{16}$  port using *srsSC2.vi* file. Enter *Expert* mode and click *B\_I2C* tab to manage advanced values. Click *READ* again to view written values in FEC.

| 📴 srsSC2.vi  |   |              |                  |                 |               |  |              |           |                           |         |             |      |                                       |
|--------------|---|--------------|------------------|-----------------|---------------|--|--------------|-----------|---------------------------|---------|-------------|------|---------------------------------------|
| <u>F</u> ile | <u>E</u> dit  | <u>V</u> iew | <u>P</u> roject  | <u>O</u> perate | <u>T</u> ools | <u>W</u> indow                                 | <u>H</u> elp |           |                           |         |             |      |                                       |
|              | "   | · & (        |                  |                 |               |  |              |           |                           |         |             |      |                                       |
| Γ            | REA   |              | WRIT             | F               | FXIT          | Dest IP  |              | SC        | port time                 | out(ms) | Progress Ba | r    | Land Langest                          |
| L            |   |              |                  |                 | EAT           | 10.0.0.2                                       |              | <u>×1</u> | .777 5000                 |         |             |      | V Expert                              |
| ļ            | Initial   | zation       | APV H            | /brid CO        | CARD Co       | ontrol Sy                                      | stem 🏻 🖊     | Applicati | on B_I2C                  | Gen     | eral        |      | _                                     |
|              | 0   |              | use sub          | address         |               |  |              |           |                           |         | Expert use  | only | RI                                    |
|              | sub   | address      | ; byte3          | subad           | dress by      | te2  |              |           |                           |         |             |      |                                       |
|              | ×A  | 0            |                  | × FF            |               |  |              | (         | Command T                 | уре     |             |      |                                       |
|              |   |              |                  |                 |               |  |              |           | Pairs/Lis                 | st      |             |      |                                       |
|              |   |              |                  |                 |               | December of a                                  |              |           | <ul> <li>Burst</li> </ul> |         |             |      | 4                                     |
|              |   |              |                  |                 |               | A0F100   | ress<br>00   |           |                           |         |             |      |                                       |
|              |   |              |                  |                 |               |  |              |           |                           |         |             |      |                                       |
|              | Pairs   | Array        |                  |                 | _             | Burst Arra                                     | y            | _         | Replay                    | _       |             | -    |                                       |
|              | v x   | \0F1007      | 8 🔶 ×            | 205             |               | $\left \frac{\lambda}{\nabla}\right  \times 1$ |              | ^         | ×1                        | ×       | FFFF        |      | Re                                    |
|              | T X   | \0F2007      | A 🖒 🛛            | A35             |               | $\left(\frac{\lambda}{\tau}\right) \times 2$   |              |           | ×1                        | ×       | FFFFF       |      |                                       |
|              | v x   | \0F2007      | D (X)            | 703             |               | $\left(\frac{\lambda}{\tau}\right) \times 3$   |              |           | ×1                        | ×       | FFFFF       |      |                                       |
|              | x (T  | \0F3000      | 0 ( <u>^</u> ) × | A000302         |               | $\frac{\lambda}{\nabla} \times 4$              |              |           | ×1                        | ×       | FFFFFFF     |      | RE                                    |
|              | $\left(\frac{\lambda}{\tau}\right) \times \frac{1}{\tau}$ | \0F1000      | 4 🙆 x:           | 1776            |               | € ×5   |              |           | ×1                        | ×       | FFFF        |      |                                       |
|              | A X   | 0F1000       | 6 🗍 x:           | 1777            |               | A xo   |              |           | ×1                        | ×       | FFFF        |      | 9                                     |
|              | A X   | 0F1000       | 8 Å.             | 0               |               |  | _            |           | ×1                        |         | FFFF        |      |                                       |
|              | A.  | 0F1000       | A                | 0               |               | 1.50m  |              | •         | ×1                        |         | FFFF        |      |                                       |
|              | Ă.  | 0E1000       | c Å.             | FFFF            |               |  |              |           | ×1                        | ×       | FFFF        | 1    |                                       |
|              |   | 051000       |                  |                 |               |  |              |           | ×1                        |         | FFFF        | 1    | a a a a a a a a a a a a a a a a a a a |
|              |   | 1000         |                  | 0               |               |  |              |           | ×O                        |         | 0           | -    | e                                     |
|              | JUN   |              |                  | 0               |               |  |              |           |                           |         |             |      |                                       |
|              |   |              |                  |                 |               |  |              |           |                           |         |             |      |                                       |

On the picture above, orange box shows the values that are ready to be written into memory. The yellow box shows values of the same parameters that are in the memory. For the picture above, the card is using default values for remote connection (e.g. IP: 10.0.0.2).

The descriptions of the first four parameters are below:



The whole MAC address becomes: 00-0A-35-00-07-03

To change IP, you will need to modify the part shown in red text above. To make

To save changes click *WRITE* on the toolbar.

After writing process, you can see the written values on the right side of the window.

Please note that the "Dest IP" field should be changed into your new written IP after rebooting the card to establish connection.

Please see the following picture:

| Pairs Array                              | Burst Array | Replay      |   |
|--|-------------|-------------|---|
| λ         A0F10078         λ         205 |             | ×1 ×205     | * |
| λ x A0F2007A  x A35                      | ×2          | x1 xA35     |   |
| A0F2007D                                 | A 3         | x1 x703     |   |
| A0F30000                                 | A           | x1 xA000302 |   |
| A0F10004                                 | A           | ×1 ×1776    |   |
| A0F10006                                 | A x0        | ×1 ×1777    |   |
| A0F10008                                 | A ×0        | ×1 ×0       |   |
| A0F1000A                                 |             | ×1 ×0       |   |
| A0F1000C                                 |             | ×1 ×FFFF    |   |
| AOF1000E                                 |             | ×1 ×FFFF    |   |
|  |             | ×0 ×0       | - |

Click on *READ* again to verify changes.

#### Testing

Open LabView and browse the following folder:



Select srsSC2.vi file.

Browser for file again and choose *srsReadUdp.vi* in the following folder:



On the *srsSC2.vi* file, run the file using right arrow button on the toolbar and click **INIT** to begin initialization.

If you encounter any errors (e.g. ReqId error), try changing the IP 10.0.0.3, 10.0.0.4 ... etc. The SC port  $(1777)_{16}$  (6007 in decimals) here is for System registers. Dynamic control of IP address, MAC addresses, and GbE parameters...

See the picture below for the result of mentioned procedures above:

| s 🔝  | rsSC2.v    |                   |                |                  |   |              |            |       |                      |   |
|------|------------|-------------------|----------------|------------------|---|--------------|------------|-------|----------------------|---|
| File | Edit       | View Project      | <u>O</u> perat | te <u>l</u> ools | Window                                      | <u>H</u> elp |            |       |                      |   |
|      |            | · ॡ 🔵 Ⅲ           |                |                  |   |              |            |       |                      |   |
| Г    |            |                   |                |                  | Dest IP                                     |              | SC port    | timed | out(ms) Progress Bar |   |
|      | REA        | D WRIT            | re 🛛           | EXIT             | 10.0.0.2                                    |              | ×1777      | 5000  |                      |   |
| L    |            |                   |                |                  | <u>ــــــــــــــــــــــــــــــــــــ</u> |              |            |       |                      |   |
|      | Initiali   | zation APV H      | lybrid         | CCARD Con        | trol S                                      | ystem Ap     | oplication |       |                      |   |
|      |            | -                 |                |                  |   |              |            |       |                      |   |
|      | <b>- -</b> |                   | t              |                  |   |              |            |       |                      |   |
|      |            | INIT              | 4              |                  |   |              |            |       |                      |   |
|      |            |                   | -              |                  |   |              |            |       |                      |   |
|      | S          | vstem ADC C       | ard Al         | PV Hybrid        | APV Ap                                      | o )          |            |       |                      |   |
|      |            |                   |                | í                |   | - 1          |            |       |                      | 1 |
|      |            | The it was to see | - 1- 1 -       |                  |   |              |            |       |                      |   |
|      |            | V init_apvn_en    | able           |                  |   |              |            |       |                      |   |
|      |            | APV Register      | rs             |                  |   |              |            |       |                      |   |
|      |            | Register          | Addr           | WrValue          | radix                                       | RplError     | RdValue    |       |                      |   |
|      |            | IPRE              | 10             | 100              | dec   | 0            | 100        |       |                      |   |
|      |            | IPCAS             | 11             | 60               | dec   | 0            | 60         |       |                      |   |
|      |            | IPSF              | 12             | 34               | dec   | 0            | 34         |       |                      |   |
|      |            | ISHA              | 13             | 34               | dec   | 0            | 34         |       |                      |   |
|      |            | ISSF              | 14             | 34               | dec   | 0            | 34         |       |                      |   |
|      |            | IPSP              | 15             | 55               | dec   | 0            | 55         |       |                      |   |
|      |            | IMUXIN            | 16             | 10               | dec   | 0            | 10         |       |                      |   |
|      |            | ISPARE            | 17             | 00               | dec   | 0            | 0          |       |                      |   |
|      |            | ICAL              | 18             | 100              | dec   | 0            | 100        |       |                      |   |
|      |            | VFP               | 19             | 30               | dec   | 0            | 30         |       |                      |   |
|      |            | VES               | 1A             | 60               | dec   | 0            | 60         |       |                      |   |
|      |            | VPSP              | 1B             | 40               | dec   | 0            | 40         | -     |                      |   |
|      |            | CDRV              | 10             | 11101111         | bin   | 0            | 239        |       |                      |   |
|      |            | CSEL              | 1D             | 11111110         | bin   | 0            | 254        |       |                      |   |
|      |            | MODE              | 01             | 00011001         | bin   | 0            | 25         |       |                      |   |
|      |            | LATENCY           | 02             | 132              | dec   | 0            | 132        |       |                      |   |
|      |            | MUXGAIN           | 03             | 00000100         | bin   | 0            | 4          |       |                      |   |
|      |            | monorun           |                |                  | 2   | -            | -          |       |                      |   |
|      |            | FRROR             | 00             |                  |   | 0            | 0          | 100   |                      |   |

| <u>F</u> ile | <u>E</u> dit | <u>V</u> iew | <u>P</u> rojec | ct |
|--------------|--------------|--------------|----------------|----|
|              | ¢            | · &          |                | 15 |
|              | Ru           | n            |                |    |
|              |              |              | apture         |    |
|              |              | 3.           |                |    |
|              |              |              |                |    |

The other file will help observe the card status.

Run the file using right arrow button.

Choose a channel which you plugged one of the HDMI cables in (In the program, channel numbers start from 0). Even numbers are masters, odd numbers are slaves.

SINGLE

Click RUN if it is not running.



If the graph seems like the picture above, the card works properly. Otherwise, check for cables and channel.

Go to *Pedestial* tab and reset baselines and noise. Then check for noise mean value.

If you receive *ReqId* Error, make sure that device is turned on, Ethernet cable is connected and Destination IP address field is the same as device IP.