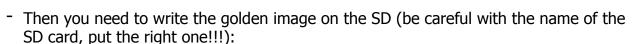# Setting up the FC7 (Tested on CentOS7)

Load the golden image on the SD card:
- Put a micro SD card in a dongle like this one

- Check the name of the SD on your system:
    - sudo /sbin/fdisk -l

- Expected output for a 8GB SD micro SD:

    Disk /dev/sdb: 7744 MB, 7744782336 bytes, 15126528 sectors
    Units = sectors of 1 * 512 = 512 bytes
    Sector size (logical/physical): 512 bytes / 512 bytes
    I/O size (minimum/optimal): 512 bytes / 512 bytes

- Then you need to write the golden image on the SD (be careful with the name of the SD card, put the right one!!!):
    - sudo dd if=sdgoldenimage.img of=/dev/sd_card_name bs=512

If this finished successfully you can plug your micro SD in the FC7. Then either slide the FC7 in your nano-crate or uTCA crate and power it. When the SD card has the golden image on it, and it is not corrupted, you will see the blue LED of the FC7 blinking.

Now you need to setup your second ethernet card with the IP address of the local network that your FC7 is going to be inside of (usually 192.168.X.X).

- Check the name of your second ethernet card:
    - Ifconfig -a

- Once you have the name, you can edit the following file:
    - sudo vim /etc/sysconfig/network-scripts/ethernet_card_name
    - Add a line to this file that says for instance:
        - IPADDR=198.162.4.1

- Save the file and restart the network:
    - sudo service network restart

And now if you check with "ifconfig -a" you should see that your second ethernet card has the IP address that you just gave it.

Now physically connect the (nano)crate to your second ethernet card in the computer.

Then you need to figure out the MAC address of the FC7. To do this you need to "listen" on the ethernet card that your FC7 is connected to, with wireshark (it's also printed on the FC7).

- First install the program (if it is not already installed):
    - sudo yum install wireshark
- Then listen on that network card for the MAC address:
    - sudo tshark -i ethernet_card_name

- The expected output of this command is something like this:

[daqschool@teledaq002 ~]$ sudo tshark -i ens6
Running as user "root" and group "root". This could be dangerous.
Capturing on 'ens6'
  1 0.000000000 NetworkR_00:29:14 -> Broadcast   RARP 60 Who is 08:00:30:00:29:14? Tell 08:00:30:00:29:14
  2 6.039787918 NetworkR_00:29:14 -> Broadcast   RARP 60 Who is 08:00:30:00:29:14? Tell 08:00:30:00:29:14

You will get a response like: Who is XX:XX:XX:XX:XX:XX ? Tell XX:XX:XX:XX:XX:XX
The XX:XX… is the MAC address of your card. You need to add this address and the name that you want to give your FC7 in the /etc/ethers file:

- sudo vim /etc/ethers
- And add the following (example) line in the file
    - 08:00:30:00:29:14   daqschool1

Now you need to give the card an IP address in that is in your subnet, add it to /etc/hosts:

- sudo vim /etc/hosts
- And add the following (example) line in the file
    - 198.162.4.11 daqschool1

The you need restart your rarp deamon to make sure you can ping the FC7. You probably have to install it first. Download this RPM: http://download-ib01.fedoraproject.org/pub/epel/6/x86_64/Packages/r/rarpd-ss981107-42.el6.x86_64.rpm
And install it with yum.

- sudo wget http://download-ib01.fedoraproject.org/pub/epel/6/x86_64/Packages/r/rarpd-ss981107-42.el6.x86_64.rpm
- sudo yum install rarpd-ss981107-42.el6.x86_64.rpm

Now you need to create a script to configure the daemon properly:

- sudo vim /etc/systemd/system/rarpd.service
- Add the following lines to the file and save it:

```
[Unit]
Description=Reverse Address Resolution Protocol Requests Server
Documentation=man.rarpd(8)
Requires=network.target
After=network.target

[Service]
Type=forking
User=root
#EnvironmentFile=/etc/sysconfig/rarpd
ExecStart=/usr/sbin/rarpd -a -e -v

[Install]
WantedBy=multi-user.target
```

Then restart the daemons and the rarpdaemon with systemctl (CENTOS7!!!):

- sudo systemctl daemon-reload
- sudo systemctl restart rarpd

- sudo systemctl status roared

Now you should see that you rarpdaemon is active. You should be able to ping the FC7 on the IP address or the name that you gave it in the hosts file.

Then you should be able to upload firmware on the FC7 with the fpgaconfig tool in the Ph2_ACF middleware.

- Clone and install the middleware
    - https://gitlab.cern.ch/fravera/Ph2_ACF#setup-on-cc7-scroll-down-for-instructions-on-setting-up-on-slc6

- and after you do:
    - ./setup.sh
    - fpgaconfig -h

This shows the options that this tool has. Then you can load the new firmware like so:

- fpgaconfig -c settings/D19CHWDescription.xml -f firmware/d19c/firmware_that_i_want.bin -i name_that_i_want_to_give_the_firmware

Then check if it was successful by listing the images on the card:

- fpgaconfig -c settings/D19CHWDescription.xml -l