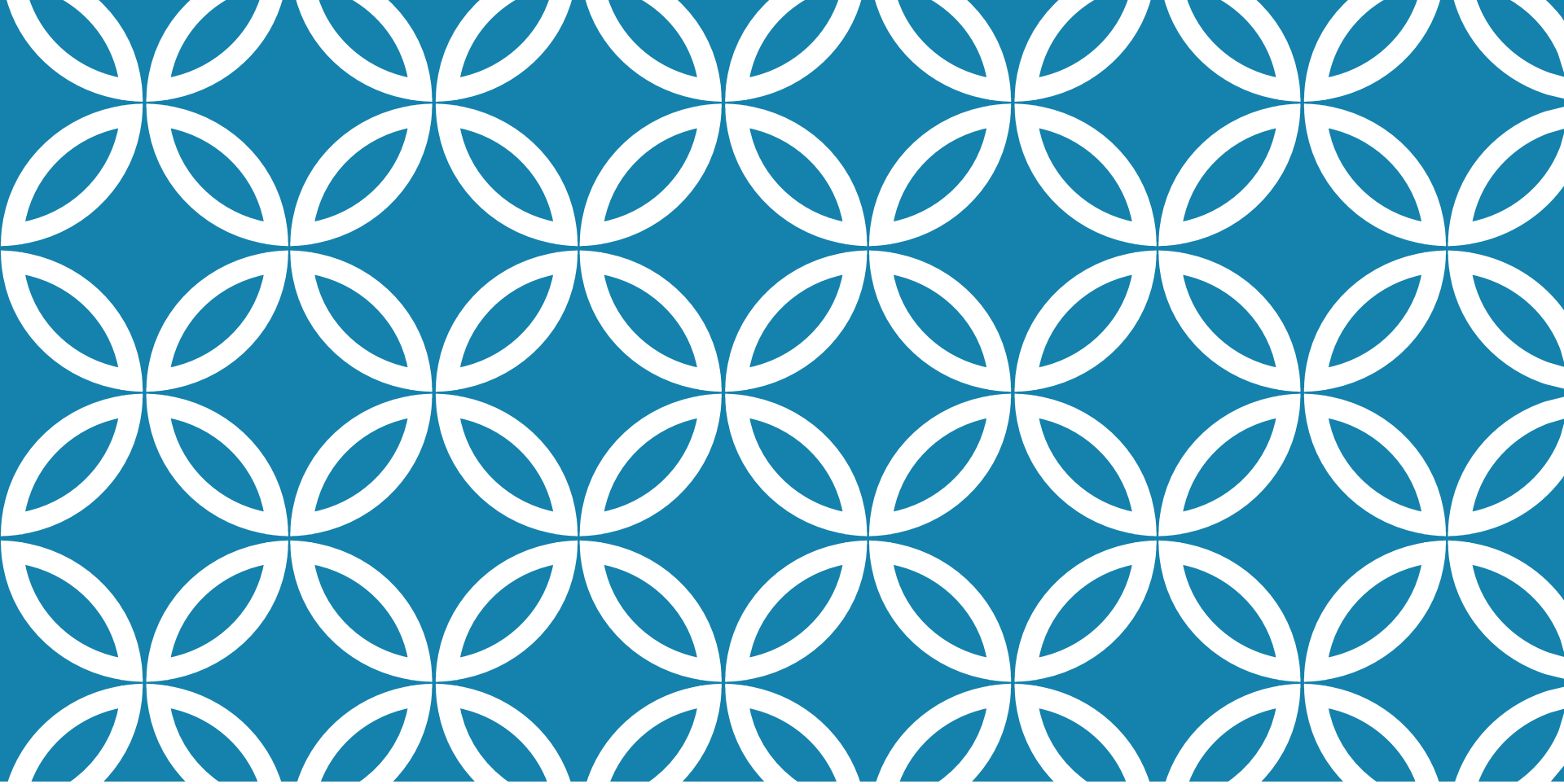
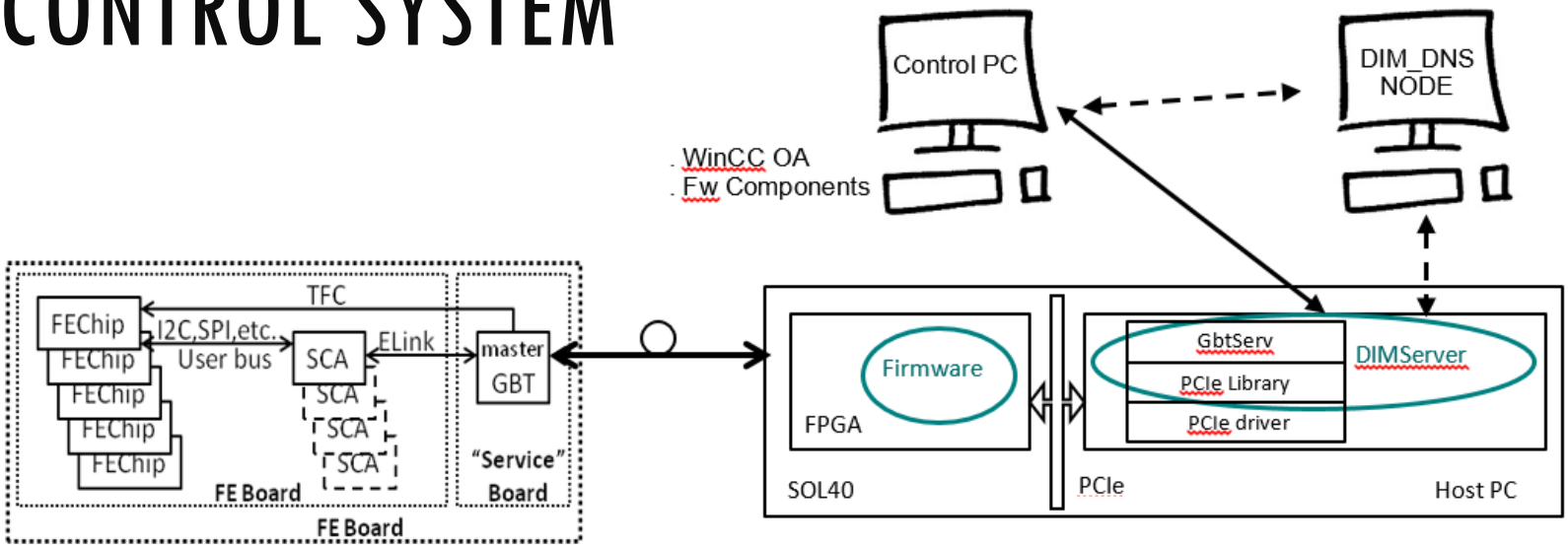


MINIDAQ2 WORKSHOP

01.08.2017

Control System

CONTROL SYSTEM



Requirements:

- SCADA (WinCC OA)
- DIM
- JCOP Core Components:
  - FwCore
  - FwDim
  - FwConfigurationDB (for usage of recipes)
- Gbt Server
- Gbt Client (FwGbt)
- Hardware Tool (FwHw)
- MiniDAQ Component (FwMiniDAQ)

CONTROL NODE CONFIGURATION

First steps:

- Have a CC7 machine
- Configure the daq40 repository (http://lbyum.cern.ch/daq40/)
- Install WinCC OA 3.15 (https://readthedocs.web.cern.ch/display/ICKB/PVSS+Service+Download)
- Install required RPMs
  - dim
  - dim-programs
- Start the DNS server
  - Note: it might be a good idea to set it to start on boot ("sudo systemctl enable dnsd")
- Install the GBT Server (https://gitlab.cern.ch/lhcb-amc40firmware-mng/lhcb-amc40software)

WINCC OA PROJECT CONFIGURATION

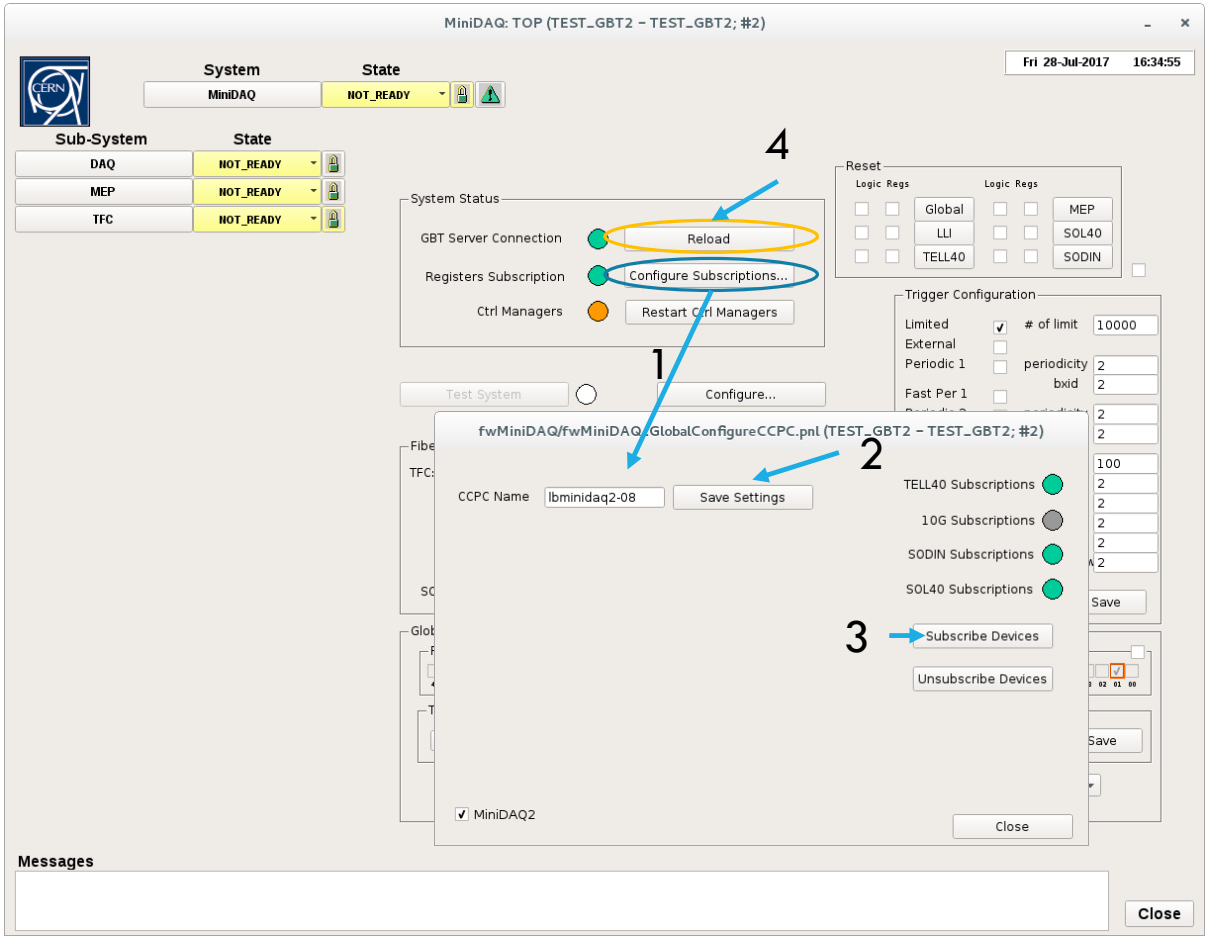
1. Create a new project
2. Get the fwInstallation Tool to be able to install the components (http://jcop.web.cern.ch/jcop-framework-component-installation-tool)
3. Install the core JCOP components (https://jcop.web.cern.ch/jcop-framework-0) → JCOP Framework (https://cernbox.cern.ch/index.php/s/UlbgqHTFE0wOZiU/download) → (LbHwFw v2r0) JCOP Framework + LHCb components
   - fwCore
   - fwDIM
4. Install the LHCb Hw components (https://gitlab.cern.ch/lhcb-amc40firmware-mng/lhcb-amc40software)
5. Install the fwMiniDAQ component (https://gitlab.cern.ch/lhcb-amc40firmware-mng/lhcb-amc40software)
   - Note: due to the amount of datapoint data to import, this installation takes quite a bit (~15min), please be patient

CONFIGURE THE SYSTEM

- Once the project is installed, you'll need to configure it and subscribe your devices.
  - Note: Make sure the checkbox is ticked if you're subscribing for MiniDAQ2
- The subscription will configure all the registers for the TELL40, SOL40 and SODIN, as well as configure the correct Writer subscriptions

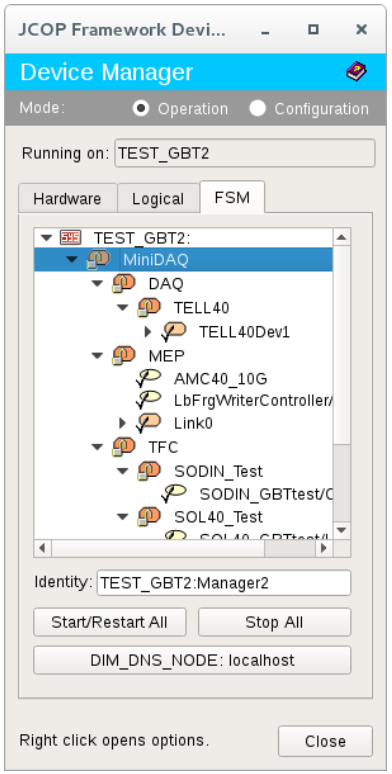
- The Reload button is very useful as it performs the following actions:
  - Reloads the pcie driver
  - Recalibrates the fPLLs
  - Relaunches the Gbt Server
  - Restarts the ctrl managers

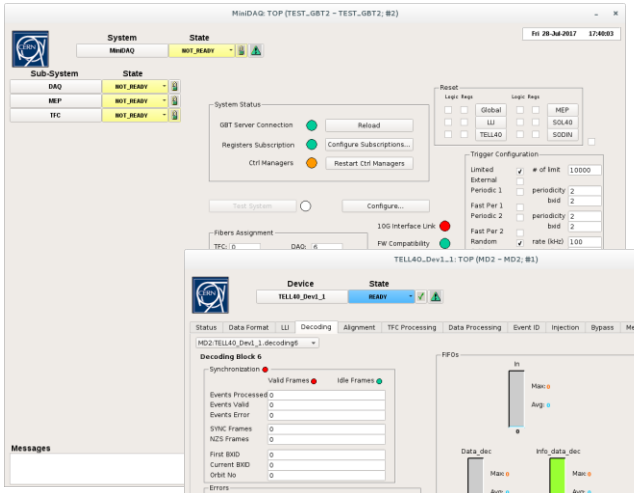
In the development phase, when trying out new firmwares it should come in handy

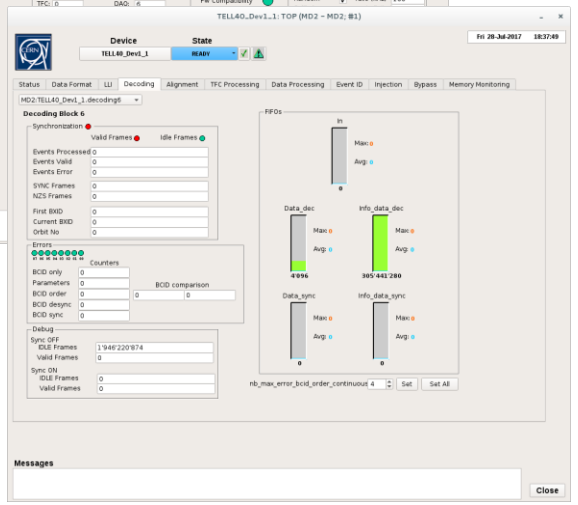


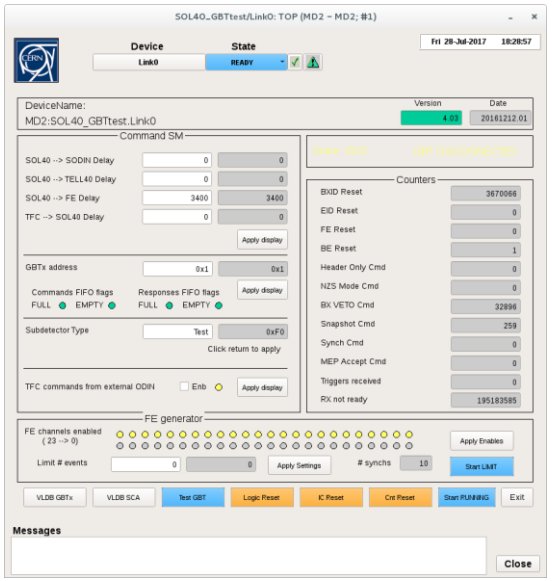
FSM

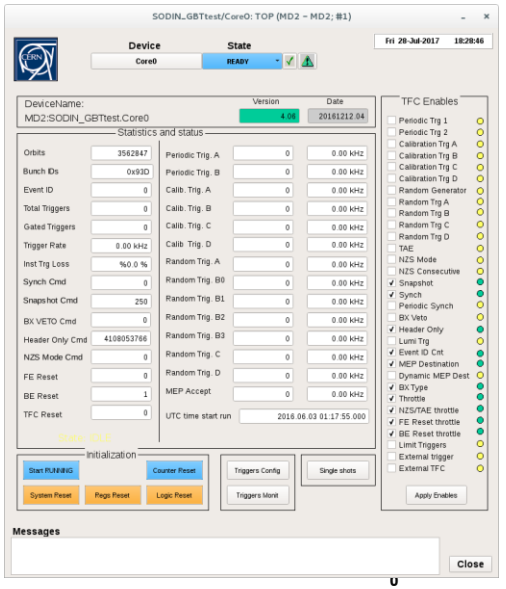
- The FSM can be opened from the Device Editor Navigator
- Expanding the Tree you can see all of the nodes of the FSM
  - Some of the nodes do not appear on the FSM panels as they are only visible/not visible depending on the MiniDAQ configured (e.g. no 10G device on MiniDAQ2)
  - This will change in the future and MiniDAQ1 related devices will be removed



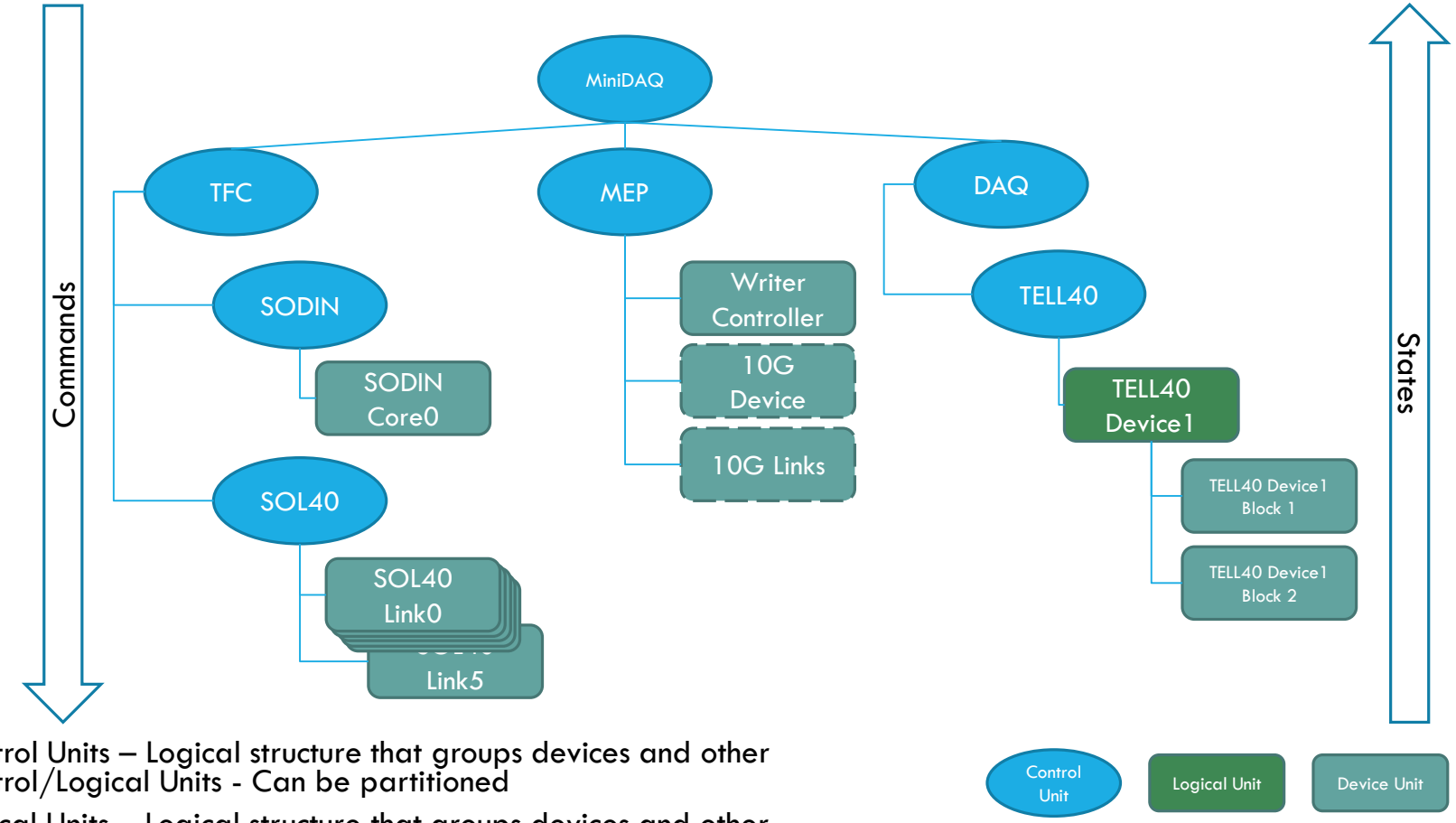








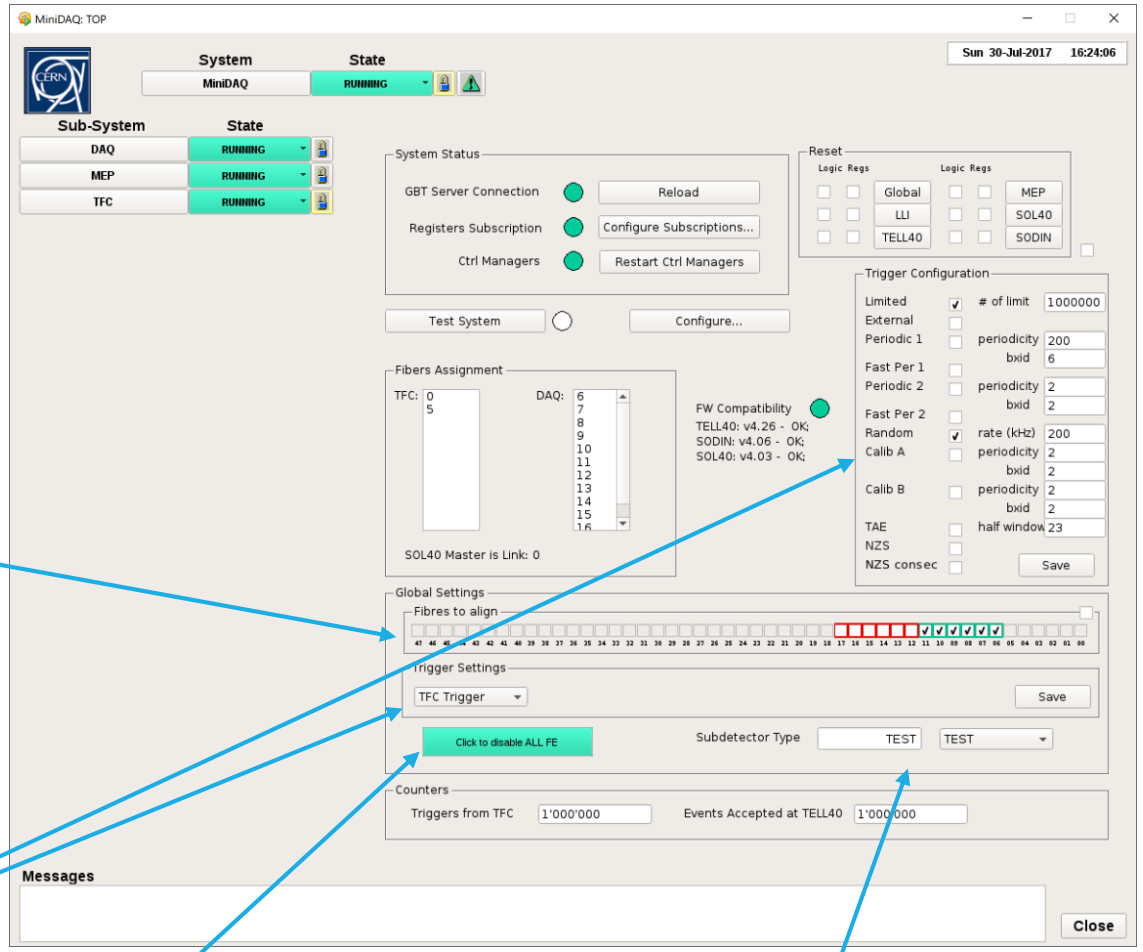
FSM TREE



- Control Units – Logical structure that groups devices and other Control/Logical Units - Can be partitioned
- Logical Units – Logical structure that groups devices and other Control/Logical Units - Can not be partitioned
- Device Unit – Corresponds to a real device (hw or software) that performs a given action

FSM TOP PANEL

- Main face of the whole system
- Allows for the quick configuration of the most relevant run parameters



- Selection of DAQ Fibers
  - MiniDAQ2 has up to 48 links of Data Acquisition
    - This means 2 blocks of the TELL40, each with 24 links
  - Green means fiber active and enabled
  - Red means fiber active and not enabled
  - Orange means fiber not active but selected on the current configuration → If you try to configure the TELL40 like this it will go to ERROR, you'll have to disable the non active fibers

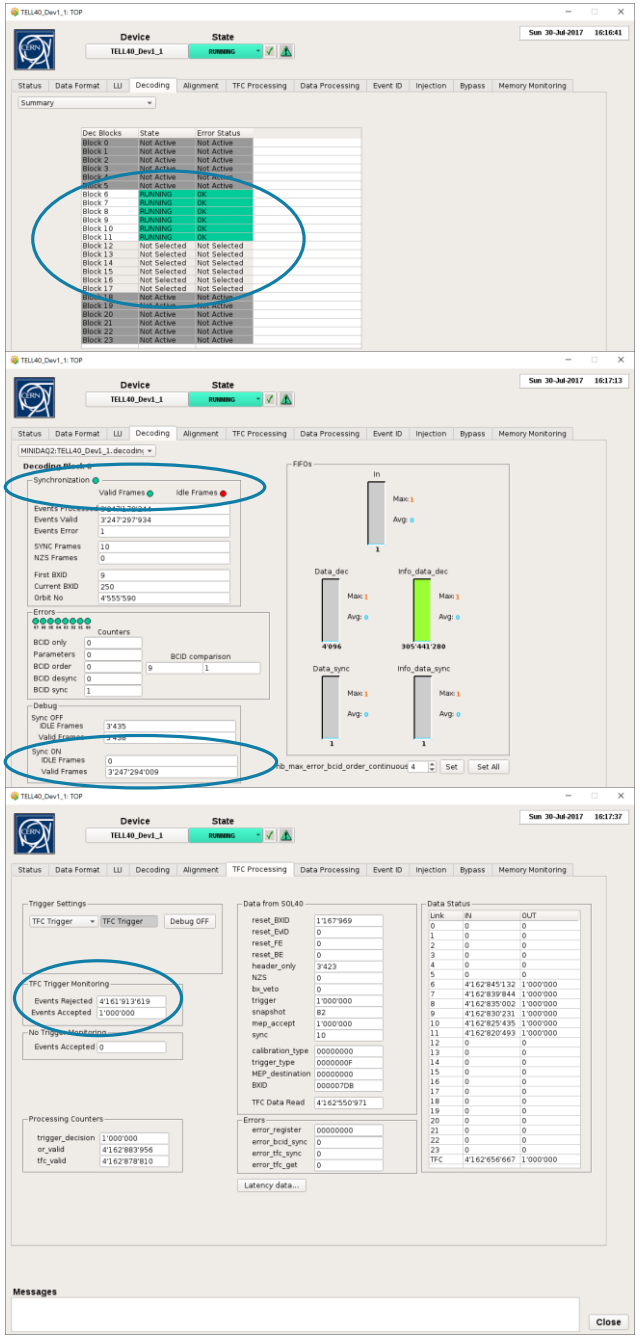
- Trigger Configuration

- FE Generator switch
  - When the system is in the correct state it will be yellow when FEs generator not enabled and green when enabled
  - If you don't have any FE connected it might be useful to test the system

- Sub-detector type setting
  - Should no longer be reset when resetting from the FSM

TRYiNg ThInGs OuT

- To make sure everything is working as expected
  - Push the “Test System” button
    - This will read the current value from a test register, increase it by 1, write it and read it back again
    - If everything went OK, the LED should go green
  - Send the commands from the top MiniDAQ node and see if you can get it to running
    - You can use the fibers in loopback and FE generators to help you
    - All the selected fibers should go to state RUNNING
    - On each of the decoding blocks
      - You should see the “Synchronization” and “Valid Frames” green
      - The “Sync ON” Valid Frames counter should be going up
    - On the “TFC processing” tab, you should see the same number of TFC events accepted going up to same number of triggers set as limit on the top panel (if set) and after this you should see the events rejected going up



TROUBLESHOOTING

- The values on the panels are not updating
  - Check if the Gbt Server is running (LED on Top panel)
  - Restart the Ctrl Managers (to restart the monitoring of the registers)
- The “Test system” comes back red
  - Try again (sometimes it takes a little while for the system to become stable)
  - Restart the Gbt Server, wait a couple of seconds and restart the ctrl managers
  - Sometimes, the firmwares are not ok and the control system becomes confused
    - Try to read some register from the terminal (‘pcie40_ecs -b 0 -a 0x700004 -r’)
    - Try a known good firmware to check if the control system reacts appropriately.
- Lots of “Unknown Service ID” errors on the log viewer
  - Probably the Gbt Server was just started
  - The Ctrl Managers issued a start monitoring to registers that the Gbt Server still doesn’t know
  - Wait a bit and try restart Ctrl managers again
- Check the log viewer often
  - Some times, errors happen which have not visible on the panels, but the log message can provide useful information
- We are always glad to check things out as sometimes things happen that we haven’t seen before
  - The possibility to connect remotely to your system is really helpful
  - A vidyo connection can be setup so we can debug together