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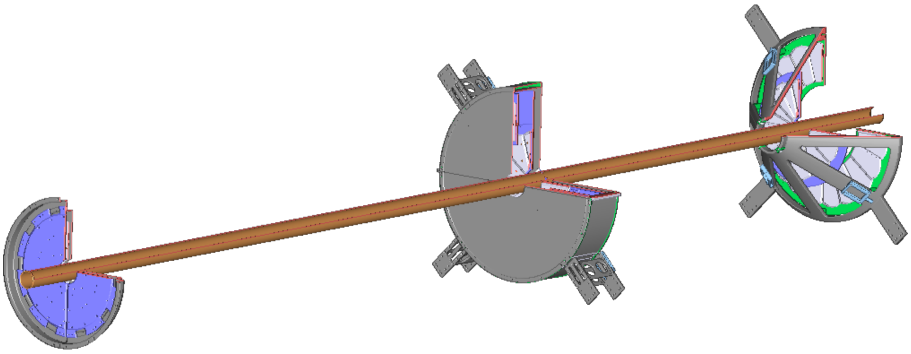
ALICE FMD Shift Guide
Version 1.4-3
29 June, 2011

Do not remove from the FMD ACR station



This page compromises the shift guide for the ALICE Forward Multiplicity Detector.

Note for Editors

This document is kept in the CERN TWiki server. It is accessible from `https://twiki.cern.ch/twiki/bin/view/ALICE/FmdShiftGuide`. Contributors must register and log-in (using CERN credentials) to edit this page.

Images are done by using the entry point **Screen Shot** in the **FMD Menu**. Images can be edited using **Gimp** (available on `alifmdwn002`).

Overview of an FMD Shift

To top

During an FMD shift you have a number of things to do. The design of the of the FMD control system is such, that it shouldn't be too hard to get these things done.

If you are not familiar with the FMD or you need a reminder, you should perhaps read the section Overview of the FMD.

The duties of an FMD shifter are roughly as follows.

- Register with the shift leader in ACR. Talk to the DAQ and DCS operators.
- Determine the LHC running conditions. Is it safe to operate the detector? I.e., is there beam? If yes, are running conditions stable? Is the expected luminosity safe for FMD operation? *If in doubt do not start the detector and call an expert.*
- Familiarise yourself with the run plan for the shift. Should stand-alone calibration runs be taken? Should stand-alone runs be taken? Should Physics runs be taken?
- Communications with the ACR and with LHC are not optimal currently. Keep yourself informed about beam and run conditions – on a continuous basis - by regularly talking to the ACR shifters and the shift leader.
- Prepare the detector for running in global runs. This essentially means bringing the detector up to the **READY** state (see Turning on the Detector).

- Monitor the detector. That is, make sure that voltages, currents, temperatures, and so on, are within the acceptable ranges. The Finite State Machine (FSM) that operates the FMD will in all cases of unacceptable values produce an error. If that happens, the current run (local or global) is aborted, and it is up to the shifter to recover the detector. At the time of writing there are no automatic recovery procedures in place and the section of this document is not available yet.
- Monitor the data recorded by the detector. You should monitor the data to see if things behave as expected. If something looks fishy to you, you investigate possible causes and perhaps contact a detector expert.
- Keep a meticulous log of what you do. To later figure out what could have gone wrong, it is important that you add entries to the log-book when you do something. Add log-book entries for all runs, noting down what you say in the data monitoring, and so on.
- Sometime during your shift, preferably in the beginning, you should perform a set of calibration runs to make sure that the data can be properly reconstructed. You should make these calibration runs when there is time to do so. A *PEDESTAL* run takes about 5 minutes to complete (including set-up/down time), while a *GAIN* run takes about 30 minutes to complete (including set-up/down time).

A Typical Shift at Point2

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Here's how a typical shift might look like.

- You get to the ACR a little before your shift starts.
  - If the previous shifter is still there, you ask him what is going on at the moment (global running, detector running, etc.), and what is planned to happen. You also ask him if he or she had any trouble during his shift — both with the detector itself and in general. You then ask for control, making sure that the previous shifter signs out of DCS and web-pages, and leave a sign-off message in the log-book.
  - If there's no previous shifter, you should log in to the ACR machine as the `fmd` user (see Log-in and start up below).
- Next, you open up the DCS interface for the FMD, and validate yourself there (see Detector Control user interface below).
- Once you have opened the detector DCS UI, you add an entry the to the log book, saying you took over, what the current situation is, and what will happen soon. This is to help debug possible problems that might occur during your shift.
- Depending on what is going on at the moment, you have various tasks to do.
  - If ALICE is currently taking data and the FMD is in a global partition, then you monitor the DCS to make sure that all voltages, currents, temperatures, etc. are in range. You will also monitor data using both the AMORE and custom monitor clients.
  - If ALICE is preparing for taking data and the FMD will be in a global partition, you will make sure that the detector is in the state **BEAM_TUNING** and configured for *PHYSICS* and once it is there, relinquish control of the DCS to the central DCS shifter. You note down in the log-book that you have done so. Note, that you may need to ask the *shift leader* to get the lock on the detector.
  - If ALICE is not taking data, and it will be a while (10 minutes to an hour) before a new run is started, you take calibration runs. If you only have a short while (10 to 20 minutes) before the next run start, you take a *Pedestal* run only. If you have more time (40 minutes to an hour) you take *both* a *Pedestal and* a *Gain* calibration run. Once you have done this, make sure that you copy over the calibrations to the quality monitoring node (use the entry in the **FMDMenu**) so that monitors have the correct data. Note, that you may need to ask the *shift leader* for the lock.

If you do not find the time to do the *Pedestal* and *Gain* evaluation runs at the beginning of your shift, do try to do it at the first possible chance you have. If you manage to take a *Pedestal* run, and then later have more time (30 to 40 minutes), you can take just a *Gain* evaluation run. Note, you need control of the DCS and DCA to be able to take this runs. If you do not already have control, please ask the *shift leader* to give it back to you.

What to do when on on-call shift

The following is a list of shift duties for the oncall shifter. The list is for the current state of the FMD. The list can be modified later, if
the state of the FMD changes (for instance, if the control system improves or more automation exists).

- Register your shift in SMS (https://alicesms.cern.ch/) well before the shift will be taken, preferable when you know it is yours. This prevents forgetting to do this later and ensures that your phone is registered and will be shown in the ACR when your shift begins.
- If your shift starts during the day (e.g. noon), modify the shift information (name, telephone number) in SMS at the time you take over.
- Cover, at CERN or remotely, the whole day of shift (normally from noon to noon next day). You are responsible for the full 24 hours of shifting. You can organize with others that they take parts of your shift, but it is your responsibility to make sure this is worked and understood by all people involved and that the re-registering of shifts (if necessary) is done to update the current oncall shift phone number in the SMS system. Except for relative short periods (a few hours) or in the case of scheduling problems, the oncall shifter (or substitute) should have immediate Internet access to CERN.
- Have a CERN phone that can be called. The ACR is not always able to call non-CERN numbers. A person must have the shift phone or their own CERN phone and register that number in the SMS system. The shifter should have the phone active during their shift and answer it (at any time).
- Deal with any problem arising with the FMD, whether you are alerted by a phone call or spot it yourself. If the problem can be handled without going to the ACR, it is fine, but the shifter must be somewhere where they can get to a computer relatively quickly to deal with the problem. The oncall shifter must be able to get to the ACR within a reasonable amount of time, if necessary. The oncall shifter must also become aware of any changes in running that have occurred since the last time they performed shifts.
- Contact experts, if necessary.
- Become aware of the current LHC plan, running plan, status of the FMD, and plans for the FMD upon starting the shift and stay aware during the shift.
- Attend the 16:30 meeting at point 2 by default. It is not necessary to always attend, but, by default, attend the meeting. Understand and ask question about the current run plan and report about the FMD status at the meeting. If the run plan changes drastically, either make a log of this or, if it imminently affects the plans for the FMD, call the FMD system run coordinator (currently Børge Svane Nielsen).
- Take calibration runs, if possible and necessary. Currently we have to calibrate the FMD (by taking *PEDESTAL* and *GAIN* runs ourselves. These must be done when no beam exists. If these conditions exist and a pedestal and/or gain run has not been taken in more than 3 days, try to find the time to get this done. It may involve asking run coordination to have you called when these conditions are possible. **Note:** these conditions must be guaranteed to exist for about 1 hour for the both runs to be fully completed. The runs stop automatically when finished. Reconfigure for *PHYSICS* when calibrating is finished.
- Run and view online monitors (event display, DQM) occasionally (during physics data taking) to ensure that proper data taking is occurring. Try to do this once a day in full physics data taking periods.
- Log any information of work done in the ALICE logbook (http://cern.ch/alice-logbook), anything that has changed, problems that occurred, or anything of interest that could be useful to other FMD shifters or the FMD experts. Log daily what what was done. If nothing occurred, a short log message saying this is preferred.

Log-in and start up

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The first thing you should do, is to log in the FMD ACR machine. It is located in the far back of the 1st side room.

The login details are as follows

Machine:	aldaqacr37
User name:	fmd
Password:	*******

If you do not know the password, contact one of the FMD contact persons.

Once you are logged in, the first thing to do, is to start up the **FMDMenu**. To do so, do one of

- click the relevant icon in the task bar,
- double click the FMDMenu desktop icon,
- or start a terminal and type

```
prompt> fmdmenu &
```

This will bring up a small window in the top-right of the screen that looks like

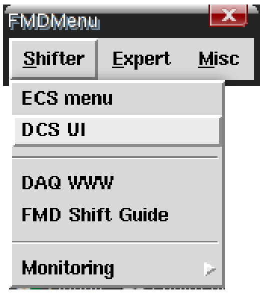
The menu consists of 3 parts:

Shifter menu.
: This is the menu used by the normal shifter. In this menu, you will find entries for all the common tasks that you may need to do during a shift.

Expert menu.
: This menu contains entries mostly used by the experts. The normal shifter should not need to execute anything in this menu, unless told to do so by the on-call expert.

Miscellaneous menu
: This contain utility entries that can be used by anyone

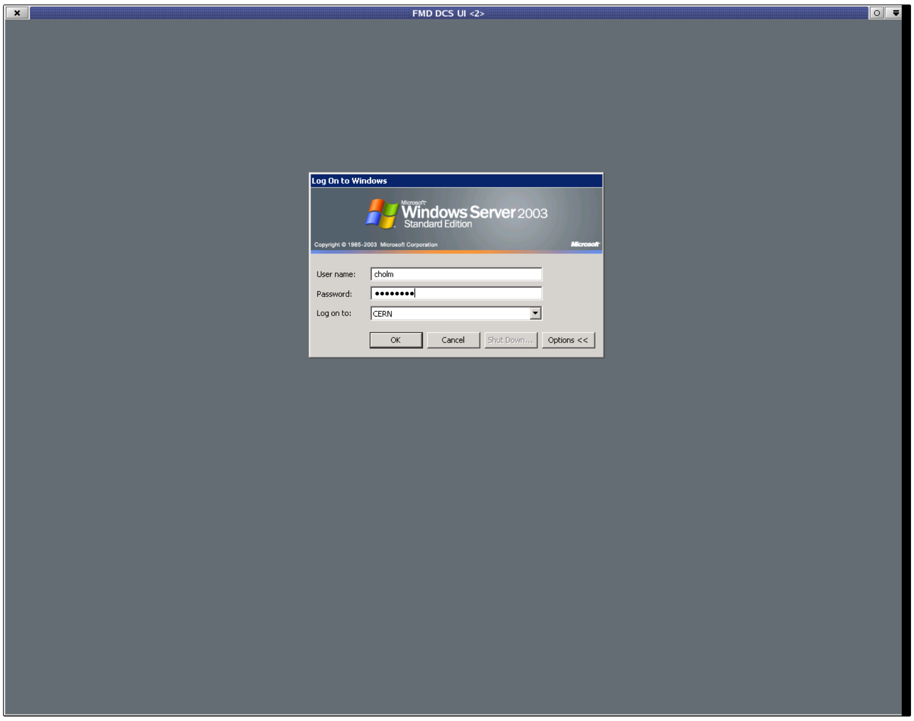
Pressing the **Shifter** menu item will bring up the shift-relevant sub-menu. It looks like



Detector Control user interface

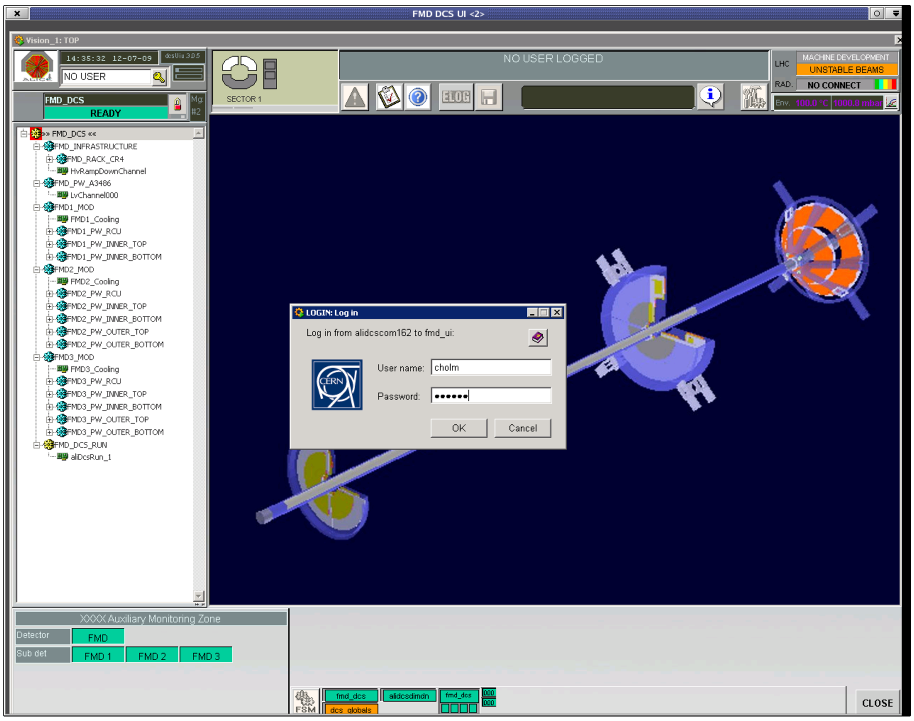
To top

Press the **Shifter** menu item on the **FMDMenu** to bring up the shifter sub-menu. Select the item **DCS UI** menu item to bring up the DCS UI. A MS Windows log-in screen will appear.



To log in specify your NICE credentials. Your NICE account *must* be registered as part of the *FMD_SHIFTER* group. If it is not, you will not be able to log in. To be added to that group contact the FMD Team.

After you logged into the MS Windows machine (the DCS operator node) you will be presented with the FMD DCS UI and an authorisation dialog:

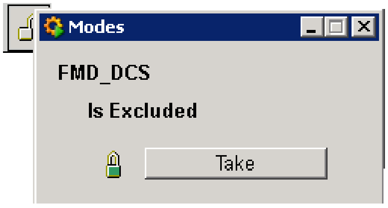


Log-in details are as follows:

User name:	*your NICE user name*
Password:	*******

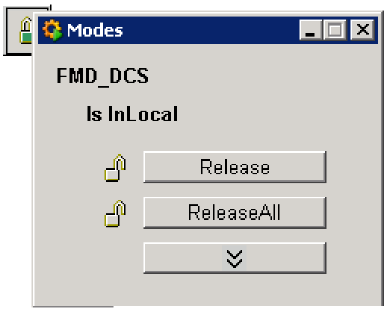
Note, that in the future, the password will be your NICE password.

If no one has ownership of the DCS FSM, the shifter *must* take ownership. The padlock symbol next to the **FMD_DCS** button (see Navigating the DCS UI) indicates whether it is owned by the shifter (green, closed —), by someone else (red, closed —), or no one (grey, open —). The shifter should click the padlock and select *Take*.



The shifter now has control of the detector, and the padlock should be closed and green.

Once done with the detector, the shifter *must* release the lock by clicking the lock symbol — on the main window, and select *Release* in the drop-down menu.



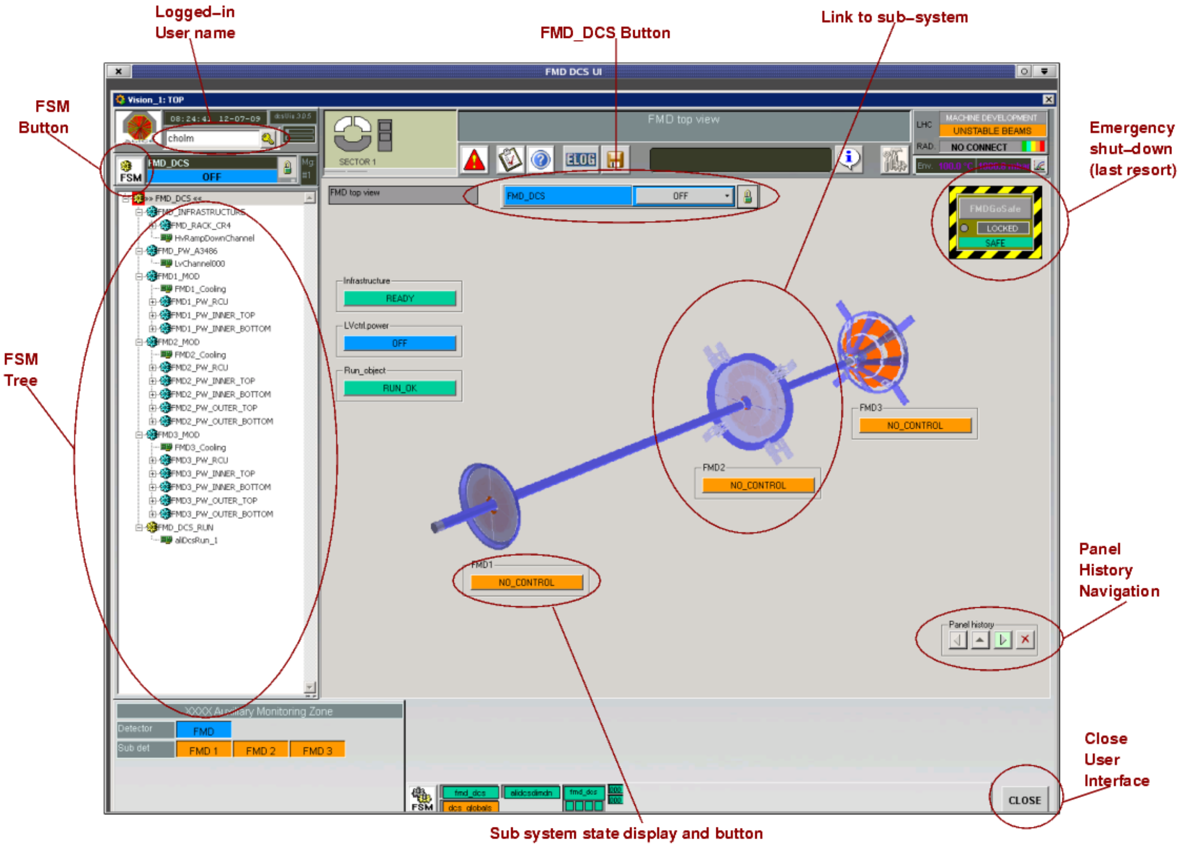
The detector is now released and the padlock should be open and grey, and free for others to pick up.

Once you have release the lock, press the large **Close** button in the bottom right corner of the main window.

Navigating the DCS UI

To top

Below is an image of the main DCS UI panel with indications of the important parts.



Static content

On the left hand-side and at the top and bottom are some static content that will never change.

Logged-in User

Shows the currently logged user of DCS. Clicking the key icon one can change user, provided one knows the password of the new user ID.

Close Button

This button will close the user interface and terminate the MS Windows session. *Be sure*, before closing the UI, that you have unlocked the **FSM** as outlined in the previous section.

FSM Button

This button will bring up the **FSM Panel**. The **FSM Panel** is the main panel for controlling the finite state machine of the FMD controls.

FSM Tree

Allows the user to navigate the hierarchy of the FSM and investigate possible problem on particular hardware devices and software services. Right-Click on any node in the tree and select **View Panel** to see the panel corresponding to that node.

Panel View

In the centre, dominating the UI, is the panel view. Selecting nodes in the **FSM Tree** will show the relevant panel for that node.

Below is a description of the main panel corresponding to the FSM node *FMD_DCS*. However, the rest of the node panels are similar.

FMD_DCS Button

Button and drop-down menu to control the FSM of this node. The drop-down menu allows the user to control the detector, and is referred to in the sections Turning on the Detector and Turning off the Detector.

The same type of button and drop-down menu is present on most other panels. Again, it allows you to see the state and control the FSM of the node (and it's daughters) for which you are viewing the panel

Emergency shut-down (Use with care!)
: This element is only present on the top-most panel. It will bring the detector to safe state (bias and some low voltages off).

  Important: This button is a *last resort*. One *must* try to use the state machine to shut down gracefully before using this button.

  To use the button, right click to unlock it, and then left click. It will pop up a dialog asking you for confirmation. If left alone, the button will be locked after a few seconds.

Panel History
: Present on all panel, these buttons allows you to browse back and forth in the panels you have view. The button with the cross will clear the history. Note, that you can not browse back or up to the top-panel (being investigated).

Sub-system state display and button
: If the FSM node you are viewing is a parent node to other FSM nodes, these elements will show the state of the daughter nodes. Pressing the button will take you to the panel of that sub-node.

  Note that these elements may update slower than normally.

Link to Sub-system
: Various elements in the panels are links to sub-nodes of the current FSM node. Pressing these will take you to the corresponding sub-node. The cursor will change into a hand symbol if an element is a link to a sub-node.

The various panels of the control system will provide hopefully enough information for the shifter to diagnose problems before he contacts an expert. All the panels are explained in the appendix DCS UI Panels.

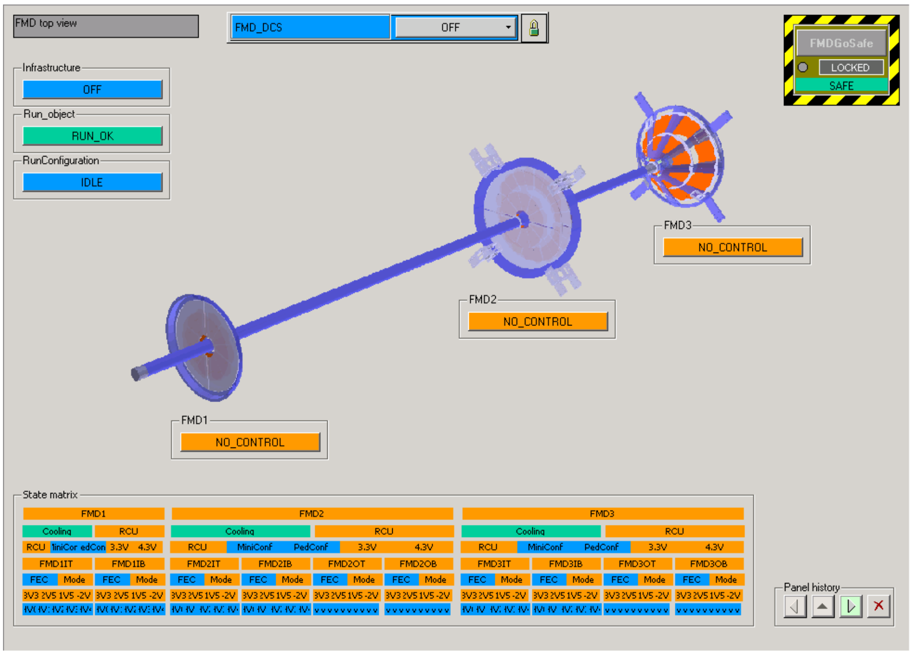
If more documentation is needed for these panels, please contact the FMD Team.

Turning on the detector

To top

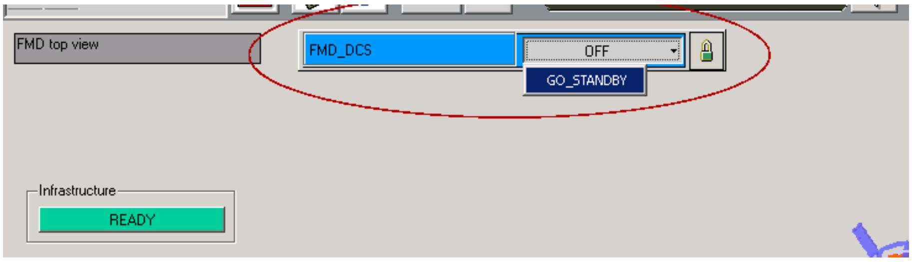
State *OFF*

If the detector is *off*, then the DCS UI will look like

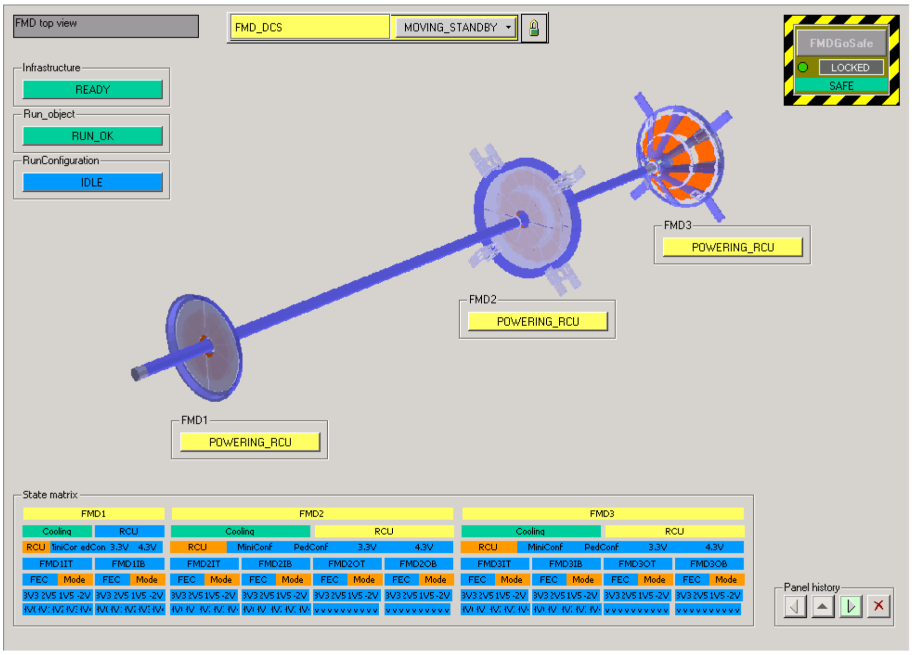


Action *GO_STANDBY*

Next, you need to bring the detector to *STANDBY*. Do this by selecting the **FMD_DCS** button in the main panel and select *GO_STANDBY*

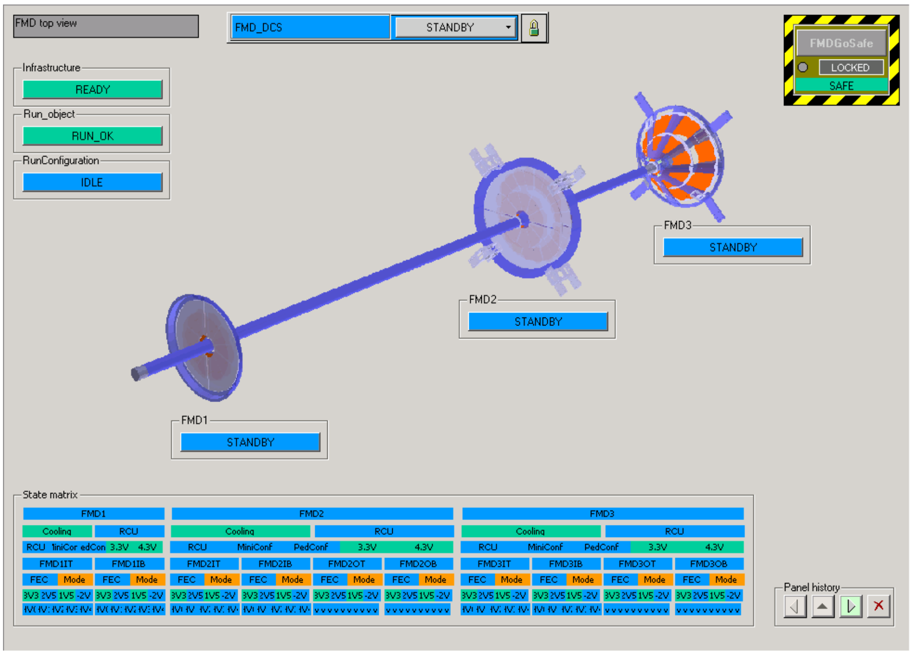


The detector will check if cooling is on, and turn on low-voltages for the RCUs. The UI will reflect this



State *STANDBY*

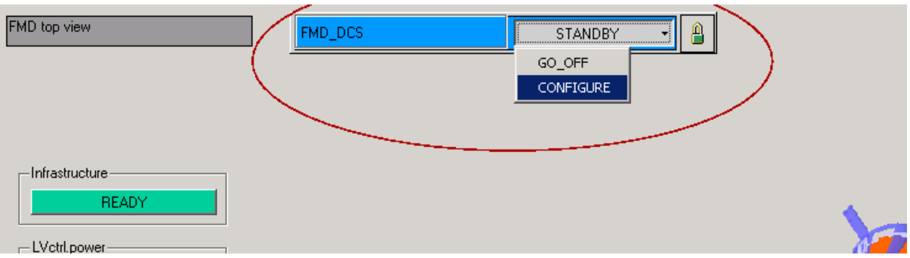
This process can take a while (a few minutes) so be patient. Once the detector has finished for *STANDBY* the UI will look like



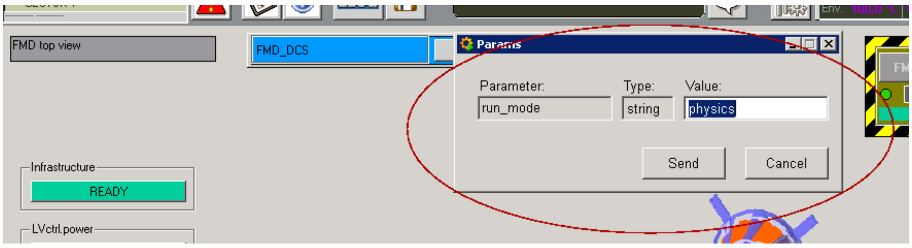
Action *CONFIGURE*

At this point, we should turn on the front-ends and configure the detector for the type of run we need. Again, press the **FMD_DCS** button, and select the item **CONFIGURE** in the drop-down menu

N.B.: The *CONFIGURE* action can be taken from *any* of the states *STANDBY*, *STBY_CONFIGURED*, or *BEAM_TUNING*, so though the starting point might be different, the steps and responses involved are always the same.



A dialog will appear and ask you for the run type *tag*.



Valid tags are

Physics

This is the configuration for when the FMD should be part of a centrally managed run and recording collisions.

Pedestal

This configuration is for doing *pedestal evaluation* runs. This runs are managed by the FMD shifter. At least 1000 events should be recorded.

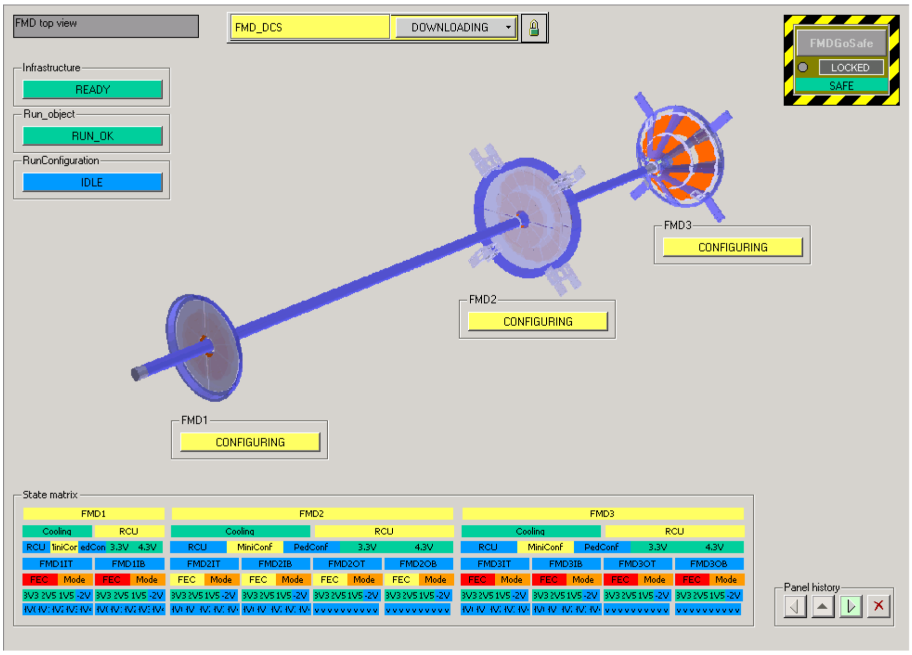
Gain

In this configuration, the FMD front-end electronics will do a scan with an injected pulser to evaluate the gain (amplification) of the pre-amplifiers on the detector. This is for *gain evaluation* runs which are managed by the FMD shifter. At least 102400 events *must* be recorded.

Stand-alone

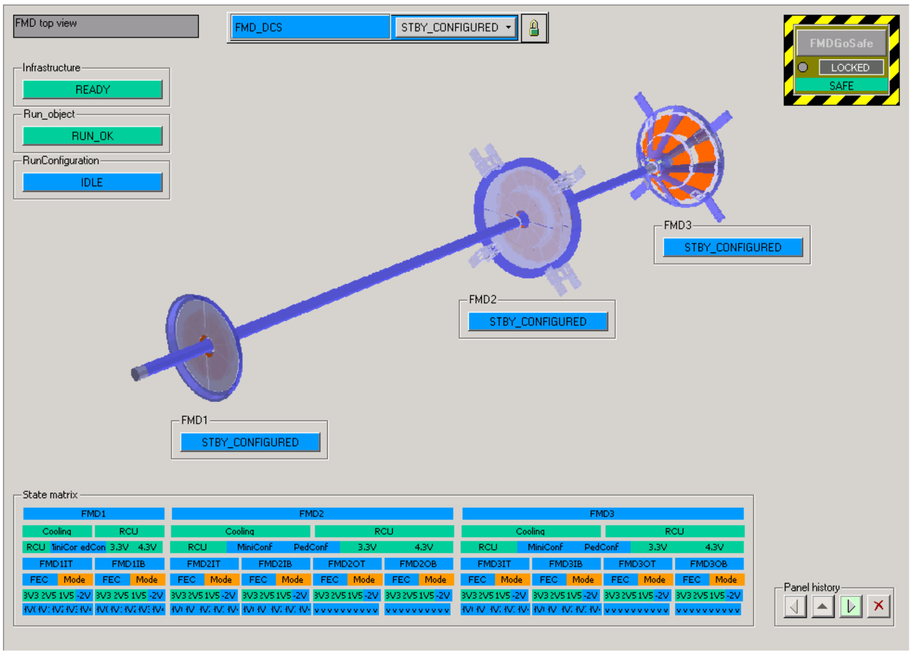
This kind of configuration is for doing normal data recording for FMD-only runs. These runs are managed by the FMD shifter.

When the detector configures the front-end electronics, it shifts to the state *DOWNLOADING*



State *STBY_CONFIGURED* (*BEAM_TUNING*)

Once the process completes, all low-voltages are turned on, and the detector is properly configured. The state will then be *STBY_CONFIGURED*.

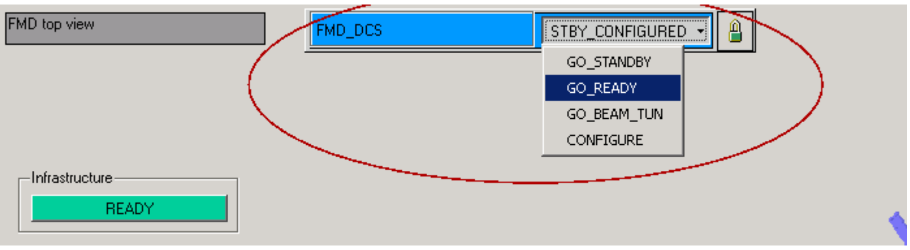


N.B.: States *STBY_CONFIGURED* (*BEAM_TUNING*) are redundant. Actions allowed in *STBY_CONFIGURED* are also available from *BEAM_TUNING*. Switching from *STBY_CONFIGURED* to *BEAM_TUNING* and back is instantaneous — it is merely a re-naming of the state.

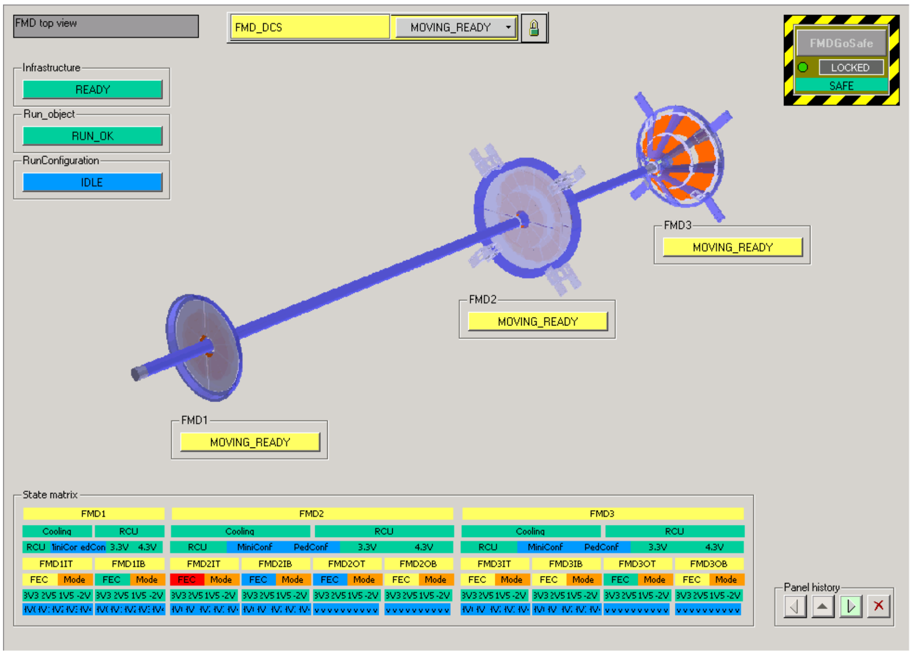
Action *GO_READY*

After this, we need to turn on the high-voltages to provide the bias voltage over the silicon bulk. We do that by going to the state *READY* Once we have done that, the detector is no longer in a *safe state* since the silicon is now sensitive to charged particles. Therefor, one should only bring the detector to *READY* when needed.

Again, press **FMD_DCS** in the main panel, and select the item **GO_READY** in the drop-down menu.

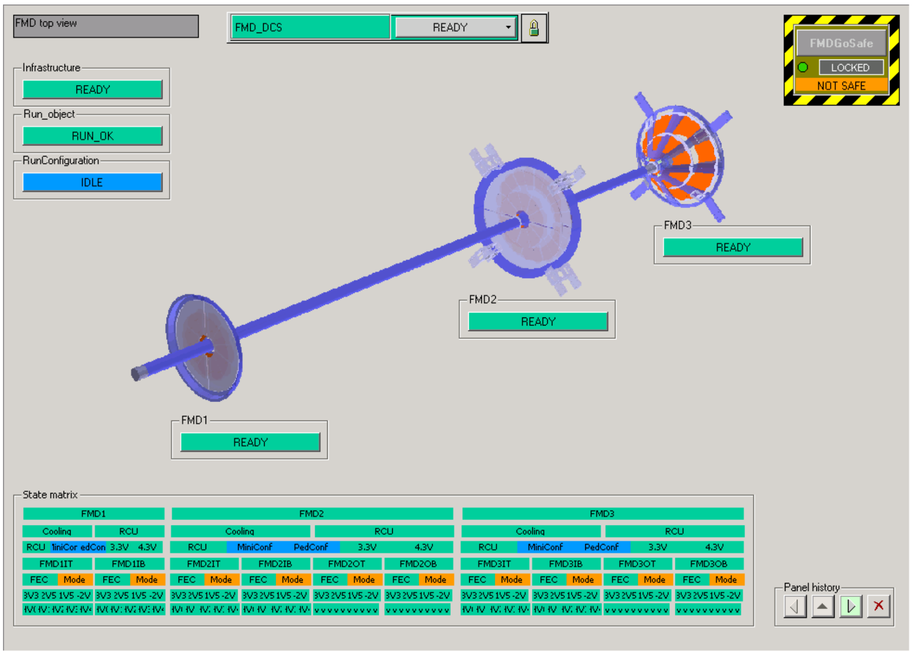


During this process, the detector switches to the state *MOVING_READY*.



State *READY*

After this, we are in the state *READY* and we can now take data with the detector



Turning off the detector

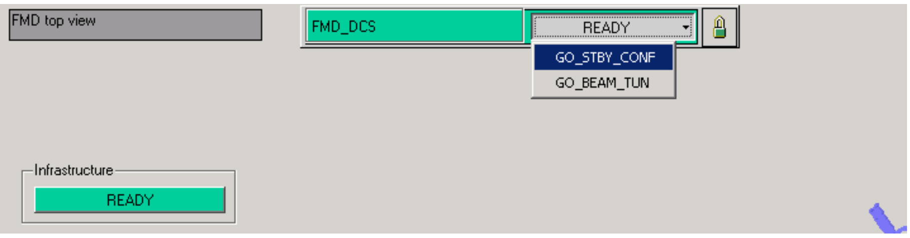
To top

State *READY*

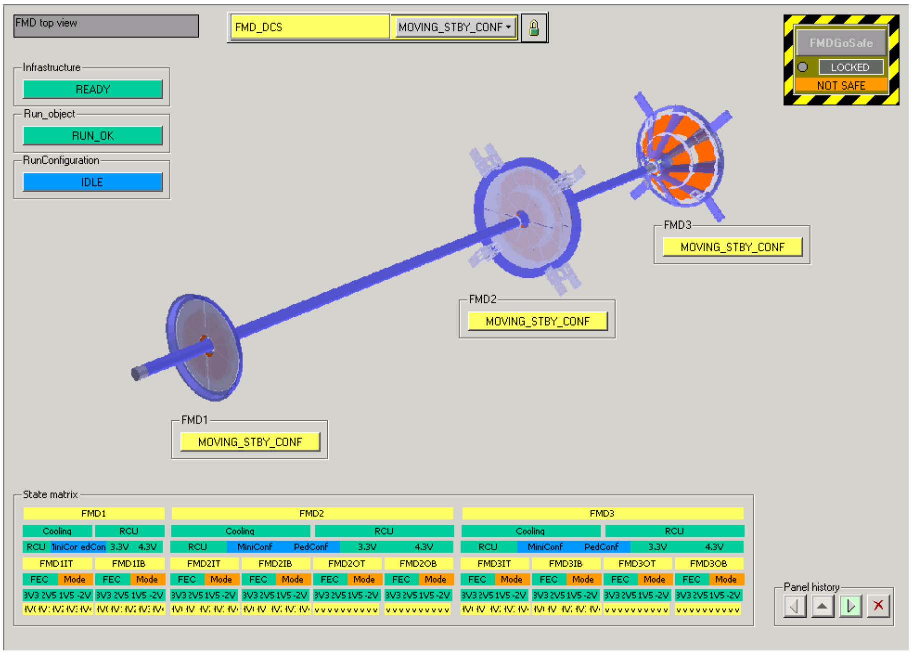
If the detector is in the state *READY*, then the main screen will look like above.

Action *GO_STBY_CONF*

You basically do the things to turn on the detector, but in reverse. First thing is to click on the **FMD_DCS** button, and select *GO_STBY_CONF* in the drop-down menu.

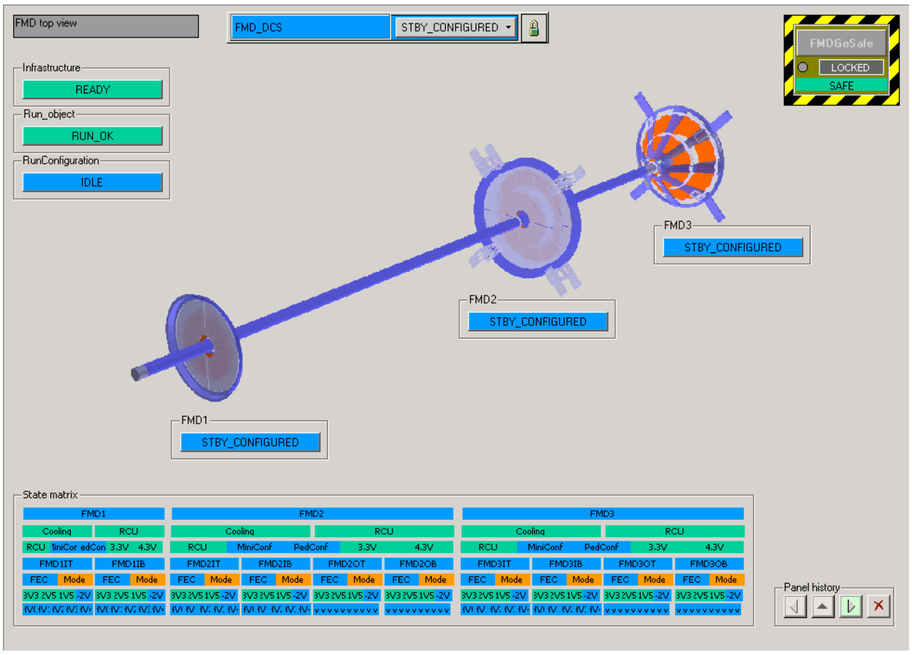


The detector will go into the state *MOVING_STBY_CONF*



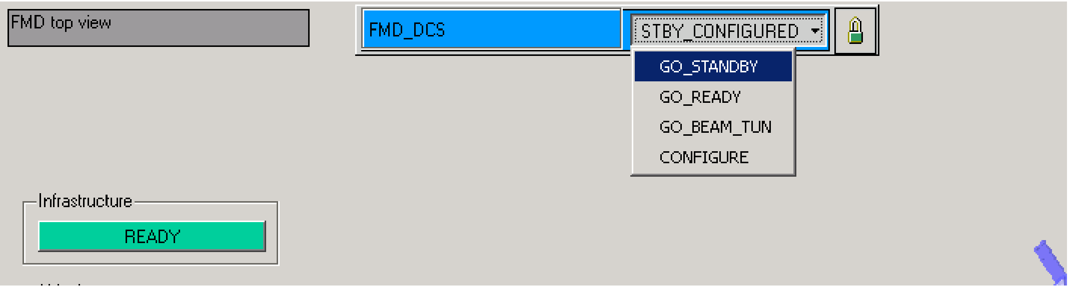
State *STBY_CONFIGURED*

When finished, no bias voltages are on, while the front-end remains configured and low voltages are on. The state is *STBY_CONFIGURED*.

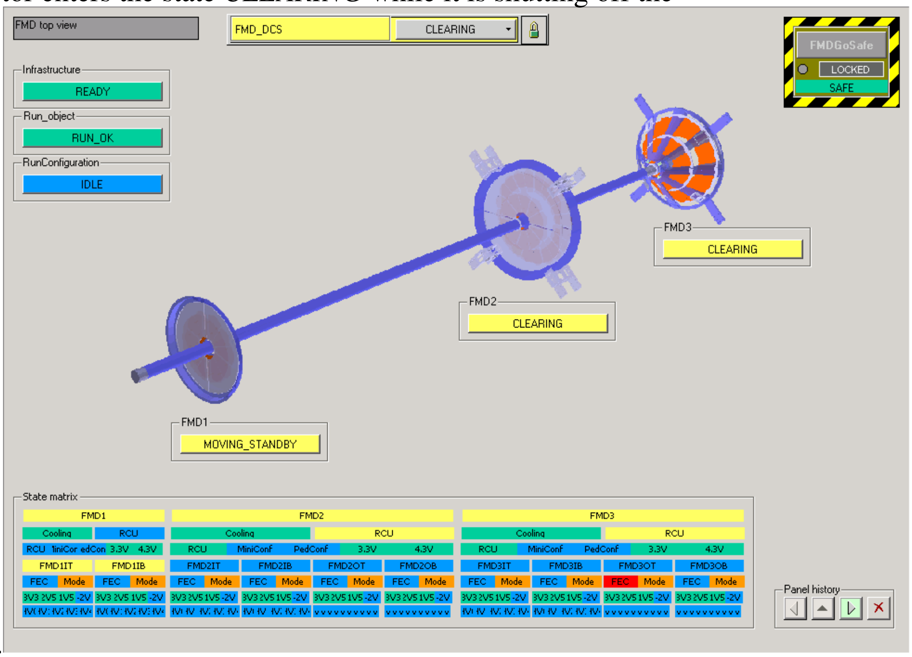


Action *GO_STANDBY*

Next step is to turn off the front end cards and low voltages to these. Click the **FMD_DCS** button and select *GO_STANDBY* from the drop-down menu.



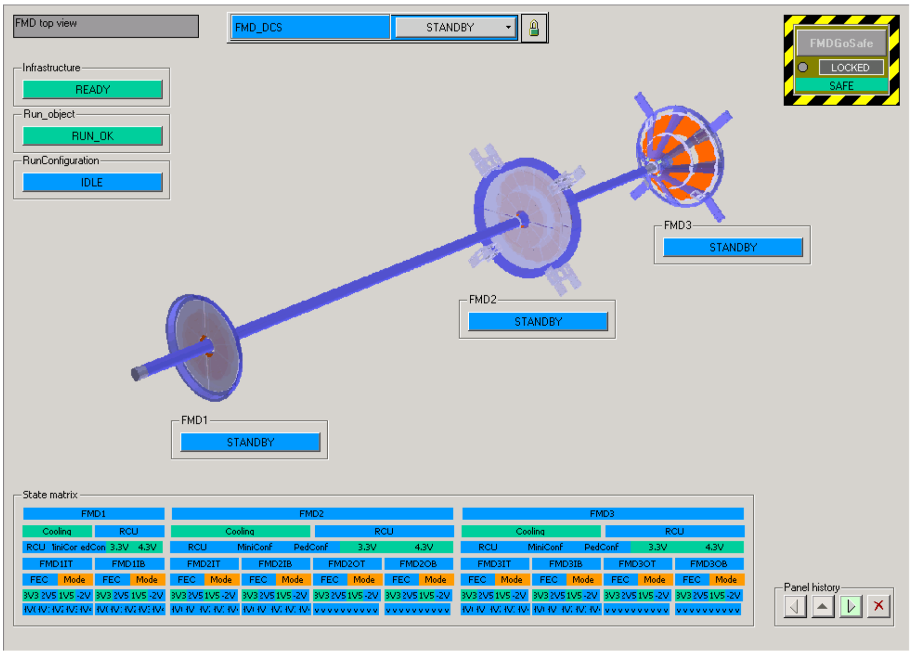
The detector enters the state *CLEARING* while it is shutting off the



front-end.

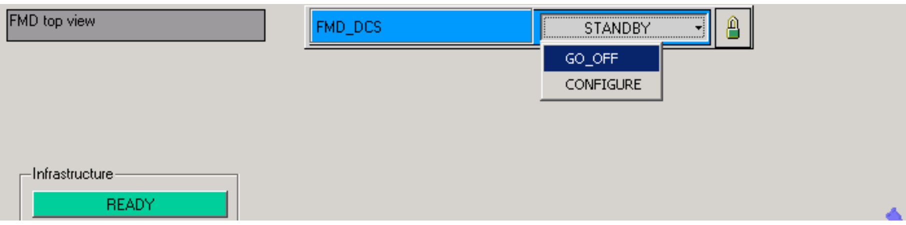
State *STANDBY*

The detector is now in the state *STANDBY*.

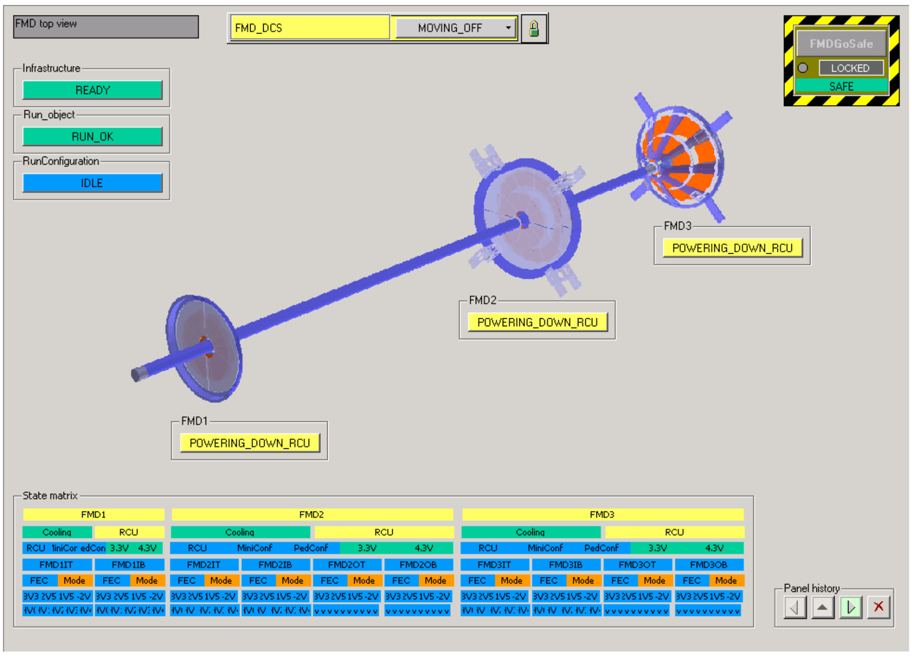


Action *GO_OFF*

At this point, only the RCU power is on. To turn completely off, we must execute the *GO_OFF* command. Click the **FMD_DCS** button and select the *GO_OFF* entry in the drop-down menu.

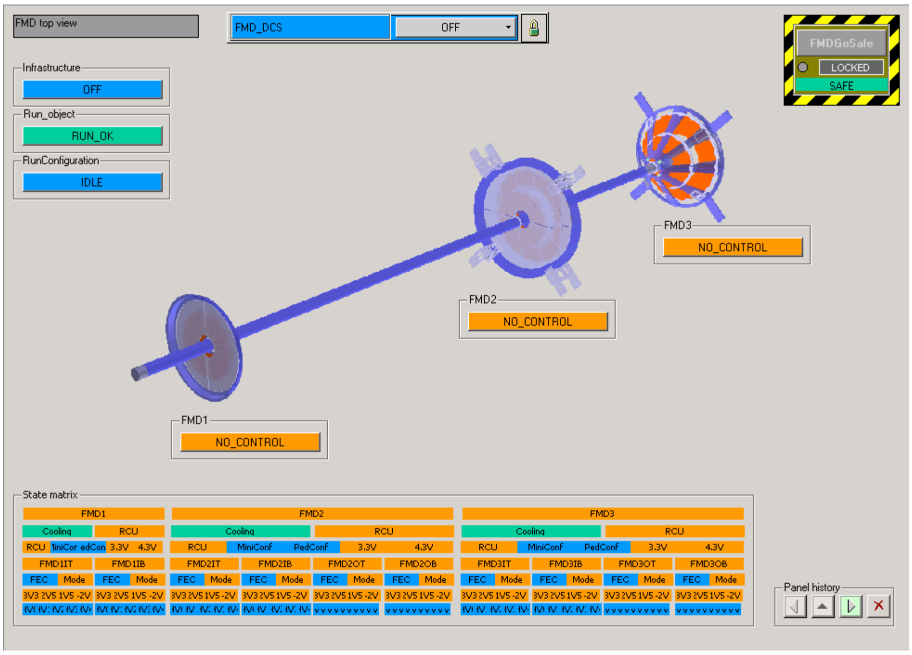


The detector is now turning everything off.



State *OFF*

Upon completion, the detector is *OFF*



The Data Acquisition and Experimental Control Systems

To top

To take data for *Standalone*, *Pedestal evaluation*, or *Gain evaluation* runs, you need to open the DCA of the FMD (other runs are managed by the central shifters and coordinated by the shift leader).

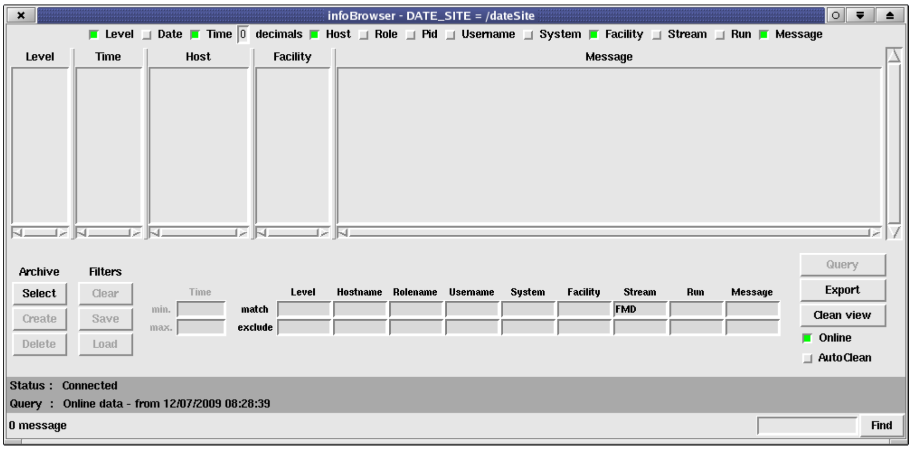
In the **Shifter** menu of the **FMDMenu** select the item **ECS Menu**.

This will open a splash window where you select the FMD

The splash will then disappear, and three new windows will appear

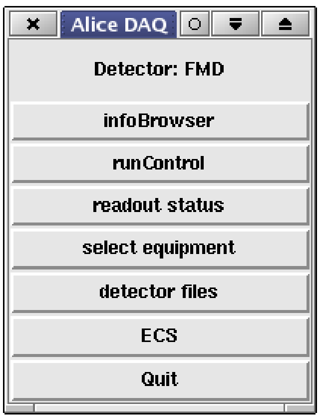
Log Viewer

Shows the AcQuisition">DAQ and ECS logs. Monitor this for errors in these systems



ECS Menu

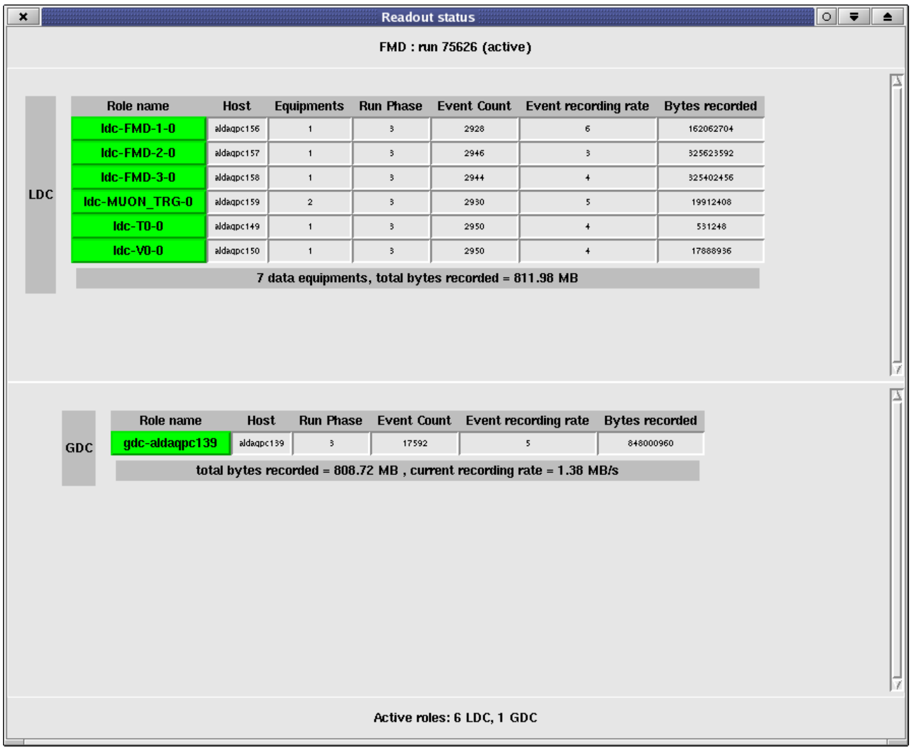
This menu allows you to launch various DAQ and ECS programs.



FMD DCA

The FMD detector control agent. In this window the shifter needs to take control of the DAQ for FMD by clicking the lock icon if single detector runs are to be taken.

It is also recommended that you open the **Read-out Status** window by clicking the *readout status* entry in the **ECS Menu**. This will show the current event rate, used GDC and LDCs and other run information.



Taking data

To top

To start a run:

- The shifter must make sure to have the lock of both the DCS UI and the DAQ. If not, clicking the padlock symbol and acquire the lock. If the central shifters have the lock, the shifter must approach the *shift leader* and explain why the lock is needed. Note, that the shift leader can refuse to give lock away.

- Next, the shifter must verify that the recording options are as they should be.
    - *Local Recording:* If this is enabled, then the data will be written to disk on the LDCs. Note, that this will create a dead-time and cause the recorded event rate to drop significantly. Normally this is left *off*
    - *GDC event building*: If this is off, no data will be recorded. One can also do local recording on the GDC, but that is not really useful. If storage of data is needed, the shifter should select *mStream recording* here.
    - *HLT:* At the moment, the FMD HLT stuff is in a poor state. The shifter must therefor un-check the HLT padlock.
- Now start the run by pressing the large button. Click the drop-down menu in the middle of the **DCA**, and select the appropriate run type. Note, that you *must* have configured the detector to the same kind of run.
- Once you have collected enough statistics, click the drop-down menu and select *STOP RUN*. Note, that the run does not stop immediately, and a DA will run after the end of recording. You should therefor wait a little before restarting a run or turning of the detector.

Stand-alone Data runs

To top

Stand-alone runs are runs in which data is only collected by a single detector and are triggered by a CTP *emulator*. The trigger frequency can be configured through the LTU client available from the **Expert** part of the *FMDMenu* or from the **DCA** menu bar.

To take a stand-alone data run, the shifter should follow the following procedure.

- If the detector is *OFF* or not in *STANDBY* or *STBY_CONFIGURED* (or *BEAM_TUNING*) it must be brought up (or down) to in *STANDBY* or *STBY_CONFIGURED* (or *BEAM_TUNING*) as explained in Turning on the detector.
- Next, the detector must be configured for the type of run that will be executed. Execute the command *CONFIGURE* in the DCS UI (see Turning on the detector) with one of the following parameter values
    - `PHYSICS`: This is the normal mode of operation. In this mode, the baseline subtraction and zero suppression filters of the ALTROs are turned on and the bias voltage is applied over the sensors.
    - `STANDALONE`: This configuration is volatile and should be considered an *experts only* configuration. Normally, it is the same configuration as `PHYSICS` but there are no guaranties.
- Now we need to turn on high voltage — otherwise we would simply measure the geometry of the sensors. This is done by issuing the command *GO_READY* as outlined above. When this finishes, the detector will be in state *READY* which means we can take data.
- In the drop-down box of the DCA the shifter must select on of the following options
    - *STANDALONE:* In this type of run, the trigger rate is a fixed rate, as configured in the LTU. Data is collected until the operator stops the run.
    - *STANDALONE_RANDOM:* In this type of run, the trigger rate is random as configured in the LTU. Data is collected until the operator stops the run.
- When enough data has been collected for the purpose, the shifter must stop the run, by clicking the drop-down menu on the **DCA** and selecting *STOP_RUN* (or something to that effect).
- If no more runs are needed, the detector *must* be brought to *BEAM_TUNING* by selecting *GO_BEAM_TUNING* in the DCS UI, and the shift leader must be notified.

Calibration runs

To top

From time to time the shifter must take calibration runs. There are two kinds of calibration runs needed by the FMD:

Pedestal Evaluation Runs

In these runs, the detector collects 1100 events with out the base-line subtraction and zero-suppression filters turned on in the ALTROs. The data is analysed by a on-line DA and the result is uploaded to the DAQ file exchange server. Later, the off-line *SHUTTLE* will pick up these files and push the result into DataBase">OCDB. The off-line reconstruction pick up this data from OCDB.

The DA also stores a local copy of the result on the LDC which PedConf will later pick up and load into the ALTRO pedestal memory. The files are stored in the directory

```
aldaqpcL:/dateSite/ldc-FMD-D-0/work/ddlE.ddl
```

where *D* is the detector number, and

Detector	1	2	3
L	156	157	158
E	3072	3073	3074

The detector *must* be calibrated for *PEDESTAL* (see the box Valid tags). If not, the pedestal data uploaded to the ALTROs *will* be wrong, resulting in large event sizes and corrupted physics data.

Gain Evaluation Runs

When the detector is configured for *GAIN* (see the box Valid tags), the data arriving to the ALTROs are generated by a pulse send to the pre-amplifier and shaper circuits of the VA1 chips. A single input channel on the VA1 chip pulsed at a time, and the pulse is stepped up by the BC on the digitizer cards. For each of the 128 input channels and for pulse size injected, a number of events is collected before progressing to the next pulse size or input channel. Management of this procedure is done automatically by the BC, and the DAQ is configured to take enough events (currently 102700 events).

The data from the *Gain Evaluation Run* is processed and analysed by a on-line DA and the result is uploaded to the DAQ file exchange server. From there, the off-line *SHUTTLE* will later pick it up, and put the result on the DataBase">OCDB for the off-line reconstruction to pick up and use.

It is important to configure the detector for *GAIN* before starting a *Gain Evaluation Run*. If not, the gains pushed to the DataBase">OCDB *will* be corrupt, resulting in wrong reconstruction of the physics data.

For both kinds of calibrations runs, it is important that there is no beam in the LHC. If there is, the resulting pedestals and gains *will* be corrupted, again resulting in wrong reconstruction of the physics data. An appropriate time for the calibration runs is when the machine is ramping down the magnets after a fill or dump. At that time, there's no beam in the LHC and ALICE does not need to be *Safe* since beam is not imminent.

After the calibration run is finished, the result can be inspected using a custom AMORE module (see Calibration display). The shifter *must* inspect the result of calibration run and adjust the run quality appropriately. Also, if the calibration turned out bad, the shifter must take steps to rectify the situation by first retry to do the calibration, and if that fails, restore the older good calibration.

The requirements of the calibration runs are summarised below.

Calibration run type	Configuration tag	# of events*	Trigger rate	Time to complete**	Frequency	Beam conditions
Pedestal	PEDESTAL	>1000	≤100Hz	~ 5minutes	1-2/day	No beam
Gain	GAIN	>102400	≤100Hz	~ 25minutes	1/2day	No beam

*Handled automatically by ECS.
**Includes set-up time and DA post-processing.

Currently, there is no automation for calibration runs, and it is up to the shifter to properly set-up and execute the run. Hopefully this will change in the near future.

N.B.: The importance of configuring the detector for the right type of run cannot be stressed to much. If the detector is not configured probably it has a direct, highly negative, impact on the physics results.

The most efficient way to execute calibration runs, is if the shifter can get the DCS lock from the central DCS shifter. If not, the shifter will have to talk the central DCS shifter to go through the motions. Who, the shifter or central ECS shifter, executes the run is not important, as long as who ever does it selects the appropriate type of run.

N.B.: After executing a *Pedestal Evaluation Run* and/or *Gain Evaluation Run*, the detector *must* be configured for *PHYSICS*.

A Pedestal Evaluation Run

Here are the steps involved.

- Assuming the detector is in *BEAM_TUNING*, as would be the case during an LHC ramp-down. If not, bring the detector to *STBY_CONFIGURE* (or *BEAM_TUNING*) following the necessary steps outlined in Turning on the Detector.
- Next, send the *CONFIGURE* command with the parameter string `PEDESTAL` (case insensitive), as outlined above. After this has completed, the detector is now in state *STBY_CONFIGURED*.
- Now we need to turn on high voltage — otherwise we would simply measure the geometry of the sensors. This is done by issuing the command *GO_READY* as outlined above. When this finishes, the detector will be in state *READY* which means we can take data.
- Next, execute the run. If the shifter is in control of the DCA , then he or she select *PEDESTAL_EVALUATION_RUN* from the large drop-down button on the DCA. Note, that the HLT lock should be unchecked. The central ECS shifter has a similar tool to the DCA, and should also select *PEDESTAL_EVALUATION_RUN*.
- After some initial set-up, the LTU will start sending triggers. After a total of 1100 events have been received by the DAQ, the run is automatically terminated, and the DA is started. One can follow the progress of the DA in the InfoBrowser.
- Once the run is finished, you bring the detector to *BEAM_TUNING*
- From *BEAM_TUNING* re-*CONFIGURE* with the text string `PHYSICS` (case insensitive), or `GAIN` if a gain evaluation run is to be taken.
- If no more calibrations are to be done, bring the detector to *BEAM_TUNING* by issuing the command *GO_BEAM_TUNING*. The shifter *must* un-lock the DCS and DAQ and notify the central shifters (in particular the shift leader) that you are done and they can take back the lock.

A Gain Evaluation Run

Here are the steps involved.

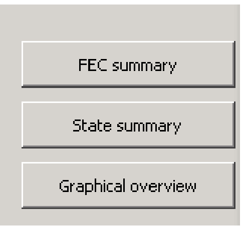
- Assuming the detector is in *BEAM_TUNING*, as would be the case during an LHC ramp-down. If not, bring the detector to *STBY_CONFIGURE* (or *BEAM_TUNING*) following the necessary steps outlined in Turning on the Detector.
- Next, send the *CONFIGURE* command with the parameter string `GAIN` (case insensitive), as outlined above. After this has completed, the detector is now in state *STBY_CONFIGURED*.
- Make the detector ready for taking data by issuing the command *GO_READY* as outlined above. When this finishes, the detector will be in state *READY*.

- Next, execute the run. If the shifter is in control of the DCA , then he or she select *GAIN_EVALUATION_RUN* from the large drop-down button on the DCA. Note, that the HLT lock should be unchecked. The central ECS shifter has a similar tool to the DCA, and should also select *GAIN_EVALUATION_RUN*.
- After some initial set-up, the LTU will start sending triggers. After a total of 102700 events have been received by the DAQ, the run is automatically terminated, and the DA is started. One can follow the progress of the DA in the InfoBrowser.
- Once the run is finished, you bring the detector to *BEAM_TUNING*
- From *BEAM_TUNING* re-*CONFIGURE* with the text string `PHYSICS` (case insensitive), or `PEDESTAL` if a pedestal evaluation run is to be taken.
- If no more calibrations are to be done, bring the detector to *BEAM_TUNING* by issuing the command *GO_BEAM_TUNING*. The shifter *must* un-lock the DCS and DAQ and notify the central shifters (in particular the shift leader) that you are done and they can take back the lock.

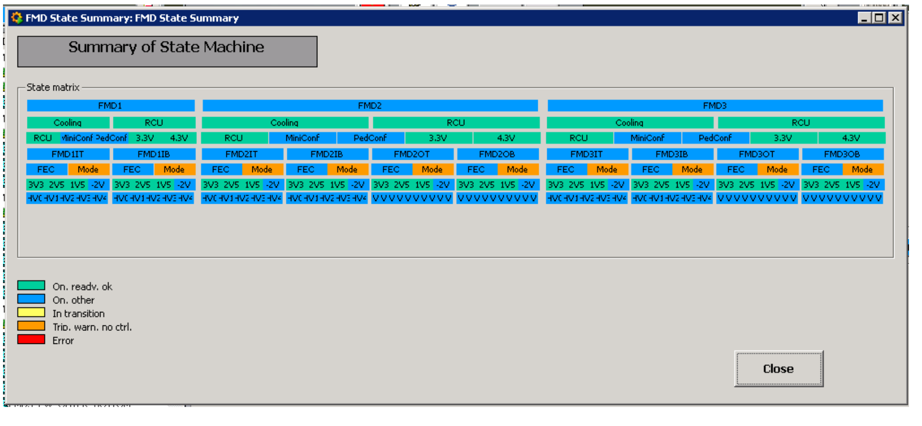
Monitoring the Detector

To top

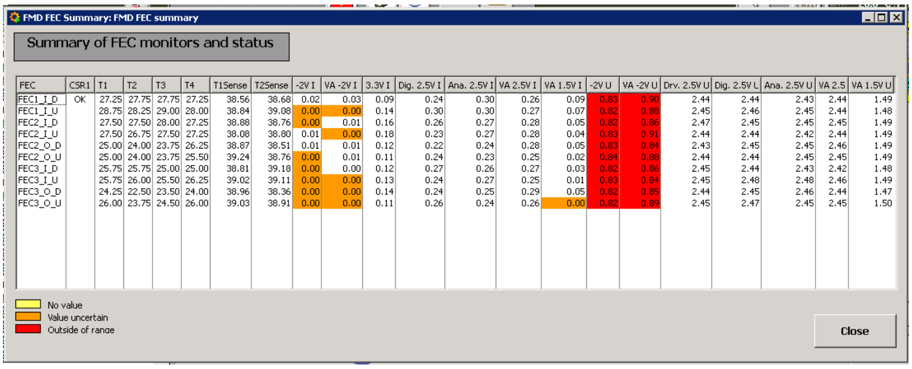
The main tool for monitoring the detector is the DCS UI. On the front panel, there are three buttons *State Summary*, *Fec Summary*, and *Graphical Summary*. Each will bring up an overview of all the detector that helps the shifter monitor the detector in a convenient way.



Clicking the *State Summary* button will bring up a window with the state matrix in it. This panel can be kept open while navigating the DCS UI.



Clicking the *Fec Summary* button will bring up a window with a large table that shows the values of the monitored temperatures, voltages, and currents. This panel allows the shifter to look one place only for this information.



FMD FEC Summary: FMD FEC summary

Summary of FEC monitors and status

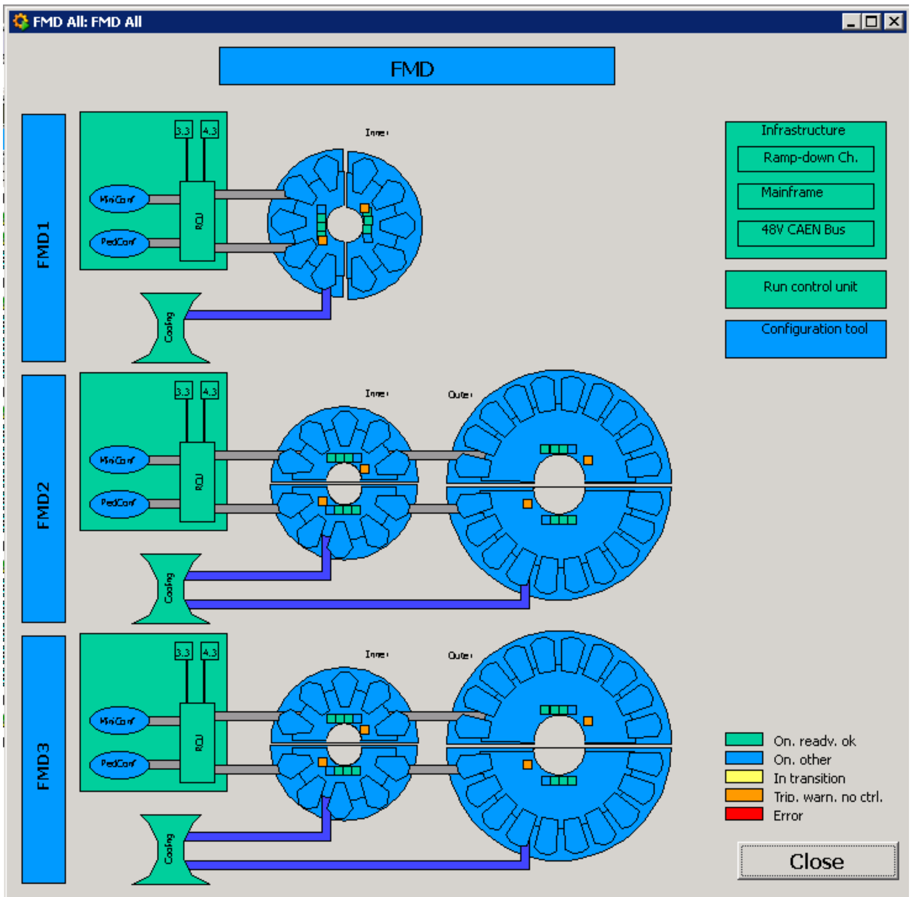
FEC	CSR1	T1	T2	T3	T4	T1Sense	T2Sense	-2V I	VA -2V I	3.3V I	Dig. 2.5V I	Ana. 2.5V I	VA 2.5V I	VA 1.5V I	-2V U	VA -2V U	Drv. 2.5V U	Dig. 2.5V L	Ana. 2.5V U	VA 2.5	VA 1.5V U
FEC1_I_D	OK	27.25	27.75	27.75	27.25	38.56	38.68	0.02	0.03	0.09	0.24	0.30	0.26	0.09	0.83	0.90	2.44	2.44	2.43	2.44	1.49
FEC1_I_U		28.75	28.25	29.00	28.00	38.84	39.08	0.00	0.00	0.14	0.30	0.30	0.27	0.07	0.82	0.88	2.45	2.46	2.45	2.44	1.48
FEC2_I_D		27.50	27.50	28.00	27.25	38.88	38.76	0.00	0.01	0.16	0.26	0.27	0.28	0.05	0.82	0.86	2.47	2.45	2.45	2.45	1.49
FEC2_I_U		27.50	26.75	27.50	27.25	38.08	38.80	0.01	0.00	0.18	0.23	0.27	0.28	0.04	0.83	0.91	2.44	2.44	2.42	2.44	1.49
FEC2_O_D		25.00	24.00	23.75	26.25	38.87	38.51	0.01	0.01	0.12	0.22	0.24	0.28	0.05	0.83	0.84	2.43	2.45	2.45	2.46	1.49
FEC2_O_U		25.00	24.00	23.75	25.50	39.24	38.76	0.00	0.01	0.11	0.24	0.23	0.25	0.02	0.84	0.88	2.44	2.44	2.45	2.45	1.49
FEC3_I_D		25.75	25.75	25.00	25.00	38.81	39.18	0.00	0.00	0.12	0.27	0.26	0.27	0.03	0.82	0.86	2.45	2.44	2.43	2.42	1.48
FEC3_I_U		25.75	26.00	25.50	26.25	39.02	39.11	0.00	0.00	0.13	0.24	0.27	0.25	0.01	0.83	0.84	2.45	2.48	2.48	2.46	1.49
FEC3_O_D		24.25	22.50	23.50	24.00	38.96	38.36	0.00	0.00	0.14	0.24	0.25	0.29	0.05	0.82	0.85	2.44	2.45	2.46	2.44	1.47
FEC3_O_U		26.00	23.75	24.50	26.00	39.03	38.91	0.00	0.00	0.11	0.26	0.24	0.26	0.00	0.82	0.89	2.45	2.47	2.45	2.45	1.50

No value
Value uncertain
Outside of range
Close

Clicking any FEC name will bring up the panel for that FEC.

N.B.: When *not* in the state *READY*, the negative power supplies are not on, so one should not be alarmed that the columns *IM2V*, *IM2VVA*, *M2V*, and *M2VVA* are out of bounds. Furthermore, since the *T1SENS* and *T2SENS* depends on the negative power supply, they should not be consider either when not in the state *READY*. The image above shows the situation in *STBY_CONFIGURED*.

Finally, the button *Graphical Overview* brings up the window seen below.



Monitoring data

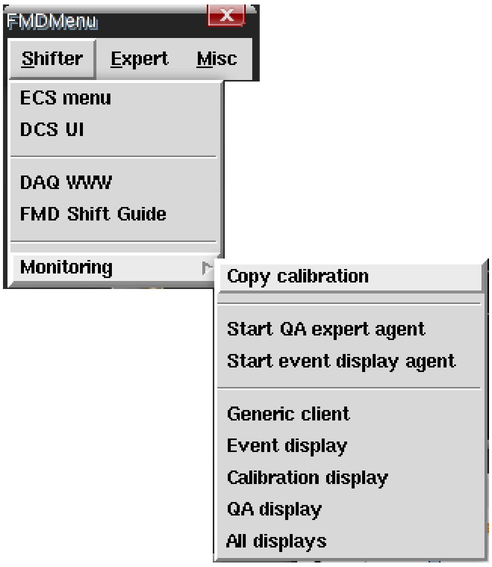
To top

Event display

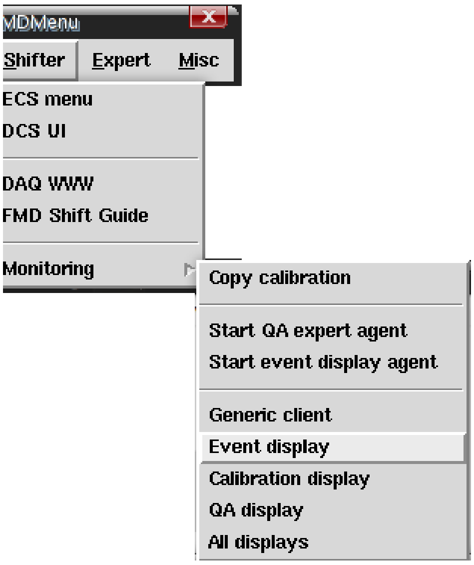
To top

The main application for monitoring the data on-line on an event-by-event basis is the AMORE **Pattern** display. It uses the current calibrations to do a first-shot reconstruction and displays the distribution of hits on the FMD rings.

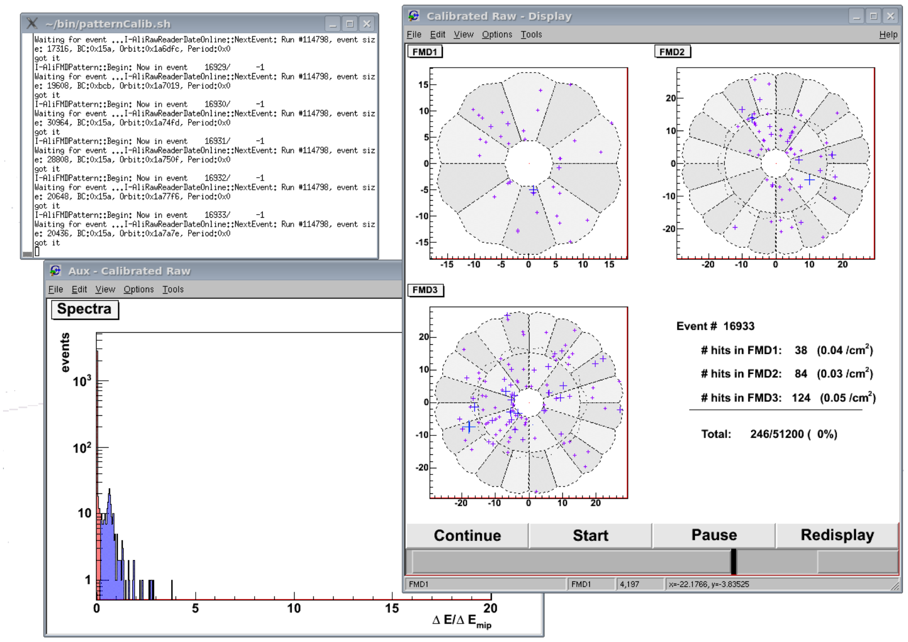
First, one should copy the calibrations from the various LDCs to the DQM machine. Every time the calibrations are updated, i.e., a *Pedestal evaluation* or *Gain evaluation* run was taken, the new calibrations have to be copied over. To do so, select the *Shifter* menu in the **FMDMenu** and under the heading *Monitoring* select *Copy Calibrations*. Note, that there's no visual feed-back except that the **FMDMenu** is unresponsive.



Then select the *Shifter* Menu in **FMDMenu** and under the heading *Monitoring* select *Event display*.



After a while a window will pop up.



The main part of the user interface shows the 3 FMD sub-detectors, and the pattern of hits seen. The size and colour of the markers are proportional to the signal strength in each strip.

In the lower right panel is shown some numeric summaries of the event displayed: The number of signals over threshold in each detector, the approximate hit density in cm^{-2}, the total number of strips fired and the approximate relative hit density.

Selecting the tab *Spectrum* will show you the summed spectrum of the displayed events. Two histograms are shown: In blue is the total summed spectrum of signals, and superimposed in red is the spectrum of the signals that survived the threshold cut.

To be implemented: At the bottom are two sliders.

- Adjust the noise factor *f*. A signal is only counted if

  $$c_i > p_i + f \times n_i$$

  where c_i is the number of ADC counts in strip i, p_i and n_i are the pedestal and noise value of that strip, and f is the selected noise factor.
- Adjust the lower and upper cut off in the scaled energy signal (values displayed). The scaled energy signal is given by

  $$E_i = (c_i - p_i) \times g_i / E_{MIP}$$

  where c_i is the number of ADC counts in strip i, p_i, n_i, g_i, are the pedestal, noise, and gain values of that strip, and E_{MIP} is the average energy loss of a minimum ionising particle.

Note: If the event display agent is not running, one need to start that by selecting *Shifter->Monitoring->Start event display agent* in the **FMDMenu**.

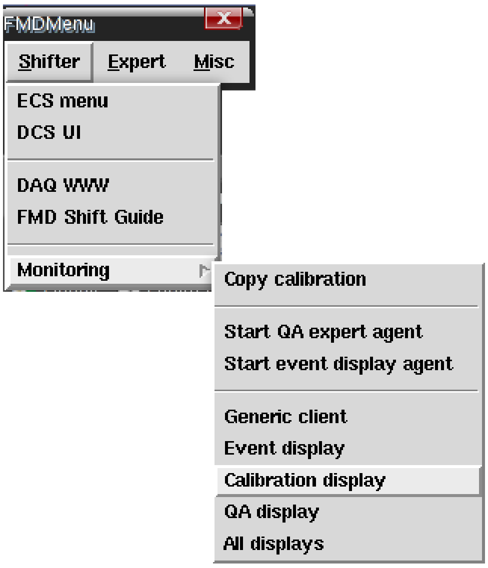
The three buttons at the bottom of the window are the standard AMORE buttons to start and stop monitoring, and to force update the display. The input box selects how often the display should be updated.

Calibrations display

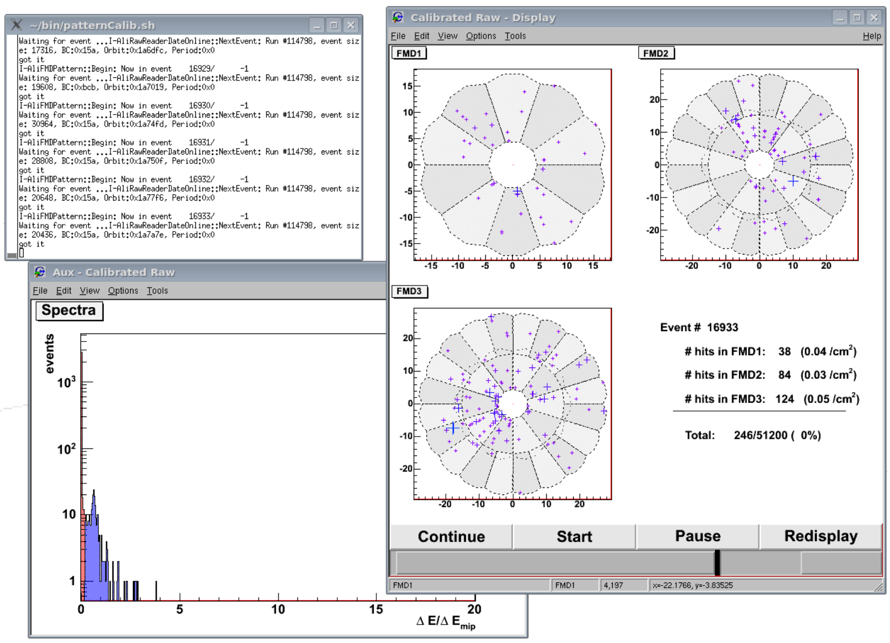
To top

This display allows the shifter to inspect the last done pedestal and gain calibrations.

Select the *Shifter* Menu in **FMDMenu** and under the heading *Monitoring* select *Calibration display*.



After a while a window will pop up.



On the left is a fold-out tree that allows selection of sub-detector (FMD1, 2, and 3), and for each sub-detector the ring (inner or outer), and finally the sectors of each ring (sector 0-19 for inners, and 0-39 for outers).

By selecting an element in the tree, the corresponding summary data is displayed. Note, there's no summary data defined for the sub-detectors at moment.

Selecting a ring will show 4 2D histograms on the right. The axis are strip (horizontal) and sector (vertical). The colour indicates the value in each bin.

Selecting a sector will show 4 1D histograms on the right. on the horizontal axis is the strip number (0-511 for inner sectors, and 0-255 for outer sectors). Vertical dashed lines indicate the VA1 pre-amp boundaries.

For both rings and sectors, the 4 displayed histograms show

- The pedestal value in ADC counts
- The noise value in ADC counts
- The gain value in DAC-to-ADC counts
- The ^{2}/NDF for the gain fits

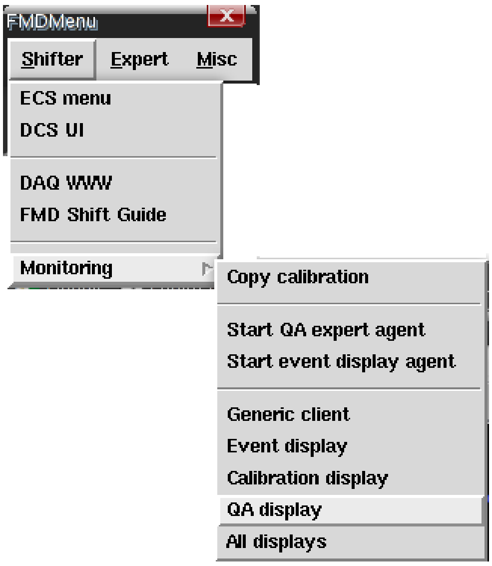
The three buttons at the bottom of the window are the standard AMORE buttons to start and stop monitoring, and to force update the display. The input box selects how often the display should be updated.

Quality Assurance display

To top

This display allows the shifter to inspect the accumulated ADC spectra of the detector.

Select the *Shifter* Menu in **FMDMenu** and under the heading *Monitoring* select *QA display*.



After a while a window will pop up.

Two tabs are available: *Shifter* and *Expert*.

In the *Shifter* tab, 5 histograms corresponding to the 5 rings (FMD1i, FMD2i, FMD2o, FMD3i, and FMD3o) are shown.

In the *Expert* tab, 10 histograms corresponding to the 10 front-end cards (upper-FMD1i, lower-FMD1i, upper-FMD2i, lower-FMD2i, upper-FMD2o, lower-FMD2o, upper-FMD3i, lower-FMD3i, upper-FMD3o, and lower-FMD3o). This tab is organised like this to allow the shifter to figure out if there's a problem with a particular front-end card.

Note: If the expert QA agent is not running, one need to start that by selecting *Shifter->Monitoring->Start QA expert agent* in the **FMDMenu**.

The three buttons at the bottom of the window are the standard AMORE buttons to start and stop monitoring, and to force update the display. The input box selects how often the display should be updated.

All FMD displays

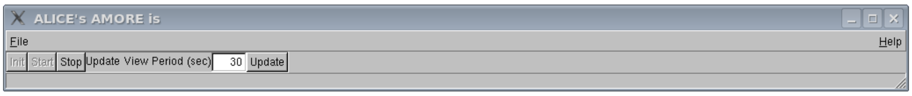
To top

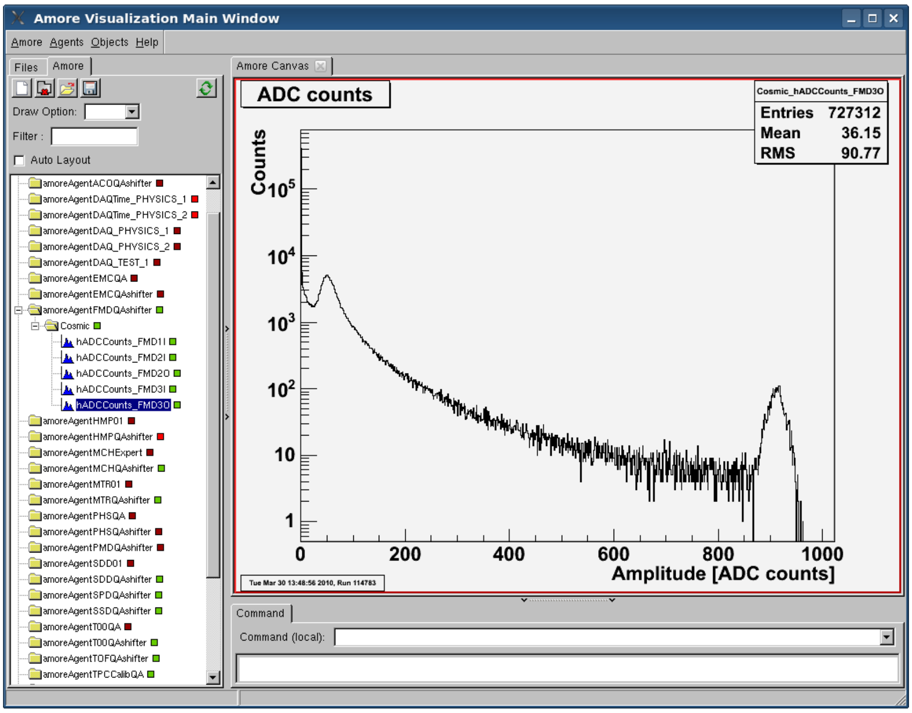
Select the *Shifter* Menu in **FMDMenu** and under the heading *Monitoring* select *All displays* will show a window that embeds all the three displays listed above (*Event*, *Calibrations*, and *Quality assurance* displays).

Generic GUI

To top

One can also use the AMORE generic graphical user interface to display published monitoring data. Select *Shifter->Monitoring->Generic client* in the **FMDMenu**. Two windows will appear: A tool-bar like window and a display with a selection tree.





Select any of the FMD histograms (1 for each ring) to monitor the ADC distribution.

Error Recovery

To top

If a trip occurs - whether it is on a high or low voltage - the shifter needs to select the *INFRASTRUCTURE* in the **DCS UI** and select the action *RESET*.

This section needs to be filled in.

Information about clearing trips (infrastructure)

How to restore half-rings to a valid state

What to do in case of configuration problems.

Bad pedestal runs.

and so on ...

Contact the FMD team

To top

Person	Title	E-mail	Phone	Contact for
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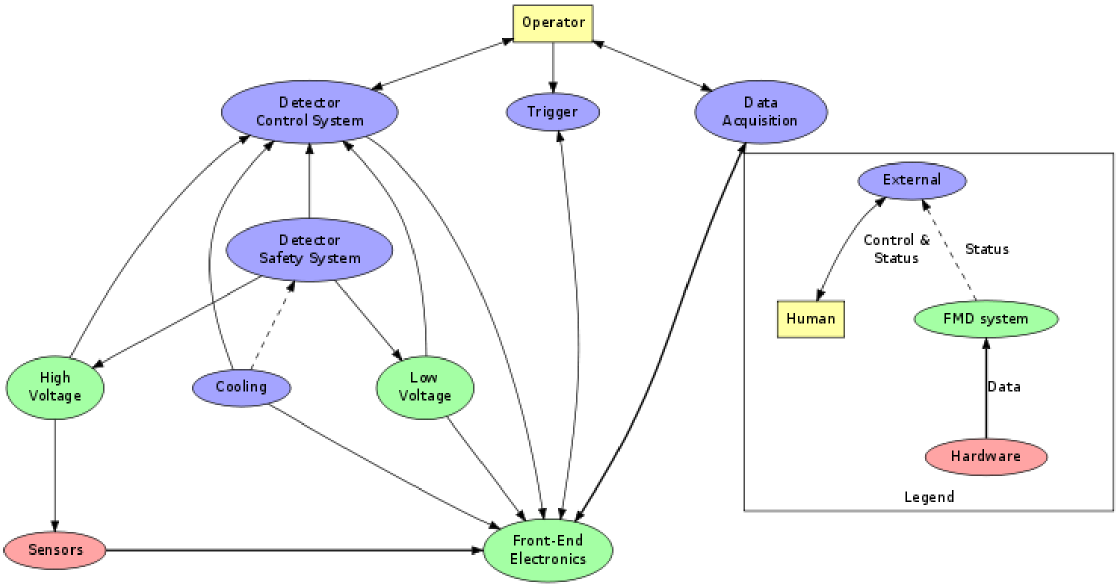
Overview of the FMD System

To top

The FMD system is consists of a number of components as outlined in the figure below.

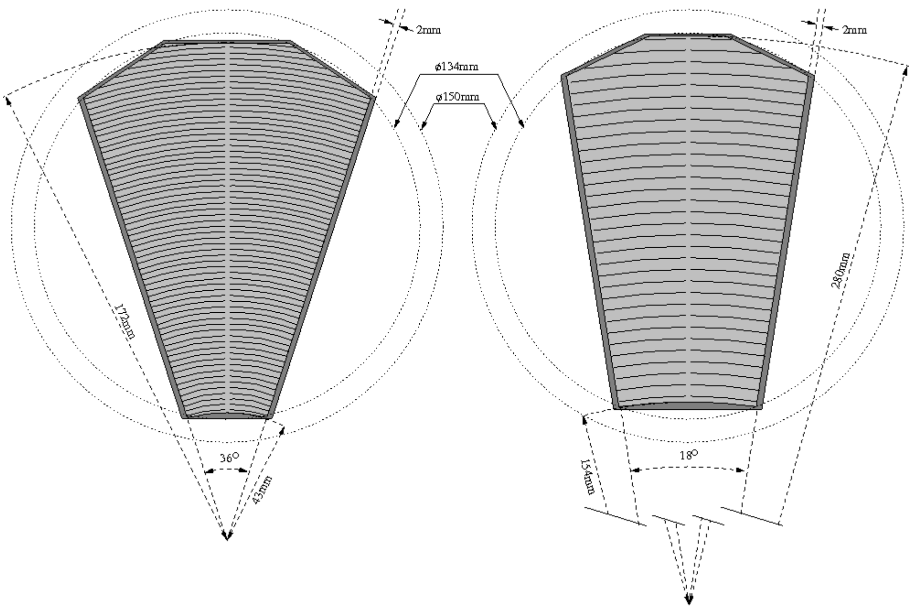


Sensors

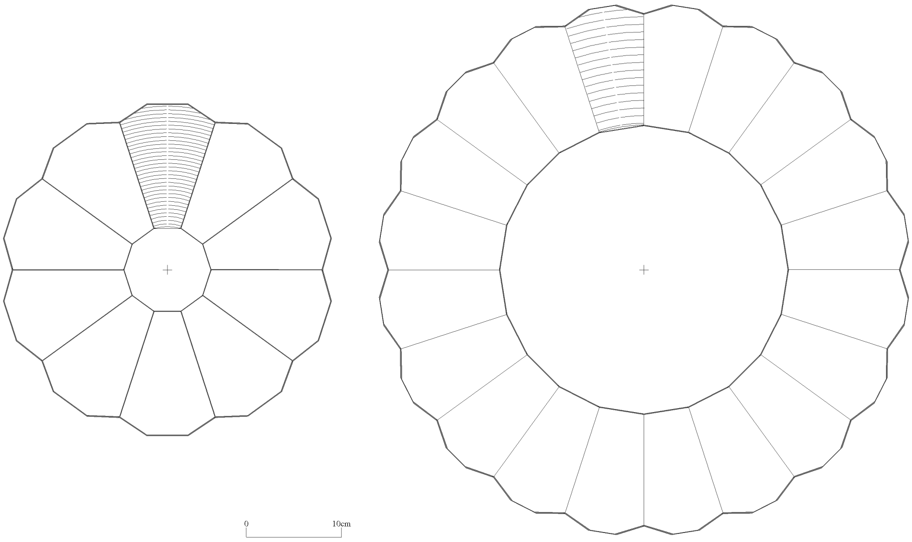
To top

The sensors are the active elements of the FMD. When a charge particle traverses the volume, it creates electron-hole pairs that induce a current on the out-put pads of the sensor. For this to happen, a reverse bias voltage must be applied to the sensors (see High Voltage).

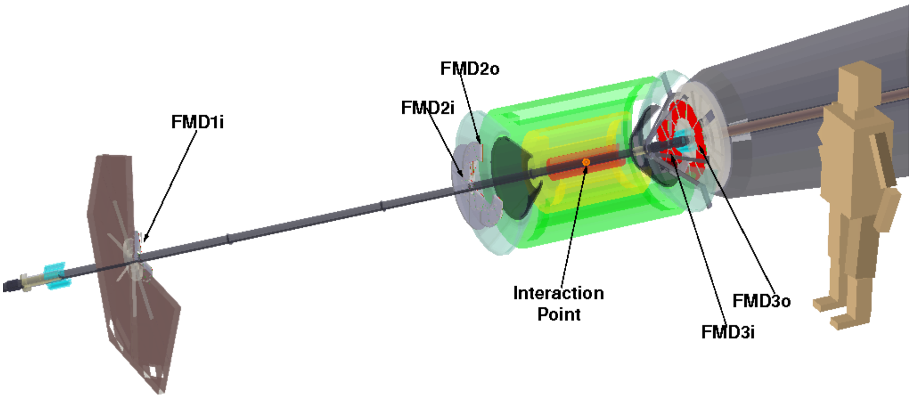
The sensors are 320μm thick silicon, produced by Hamamatsu in Japan. There are two kinds of sensors: inner type sensors and outer type sensors. Both kinds of sensors are divided into two azimuthal *sectors*. Furthermore, each sector is divided into a number of radial strips: 512 for inner type sensors and 255 for outer type sensors.



The sensors are arranged into *rings*. An inner type ring consist of 10 sensors, and this has 20 segments in the azimuthal direction and 512 segments in the radial direction, giving a total of 10240 read-out elements. An outer type ring consist of 20 sensors, giving 40 segments in the azimuthal direction and 256 segments in the radial direction, which also comes to a total of 10240 read-out elements.



The three sub-detectors of the FMD, are built up of these kinds of rings. FMD1 (at z=320cm from the interaction point) has only 1 inner type ring. FMD2 (at z=83.4cm from the interaction point) has both an inner and outer ring. The last, FMD3 (at z=-62.8cm from the interaction point) consists of both and inner and outer type ring. Thus in total there are 5 rings, named FMD1i, FMD2i, FMD2o, FMD3i, and FMD3o.



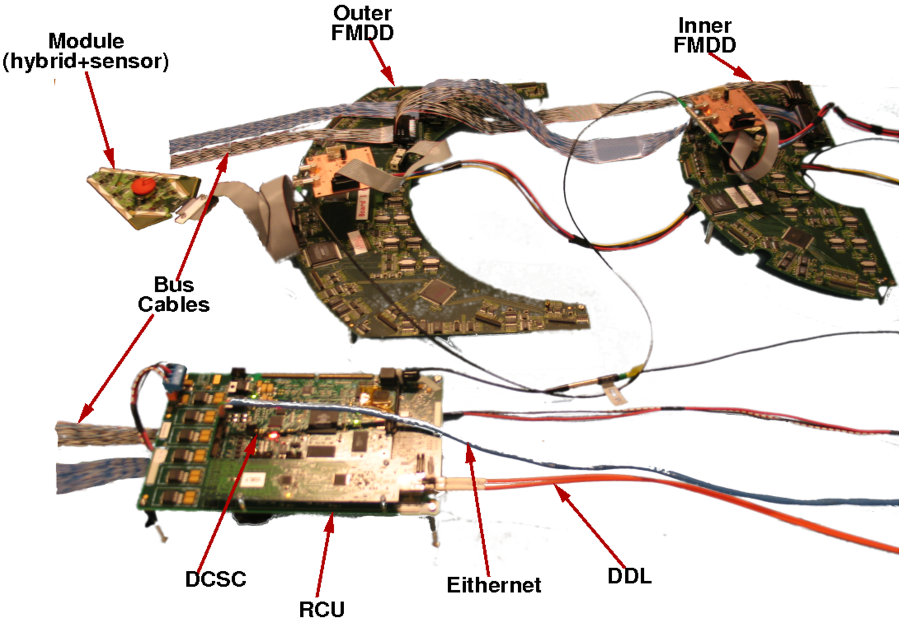
Detector	Ring	segmentation	segmentation
FMD1	I	512	20
FMD2	I	512	20
	O	256	40
FMD3	I	512	20
	O	256	40

The current signals from the sensors are very small and need to be amplified. A front-end electronics card, called the "hybrid", mounted directly on the sensors, take care of that (see Front-End Electronics).

Front-End Electronics

To top

The front-end electronics is composed of three parts: the hybrid cards, the digitizer cards, and the read-out controller unit.



The Hybrid cards

These cards are mounted directly on the sensor, and hold a number of VA1 pre-amplifier and shaper ICs. There are two kinds of hybrid cards: The inner type that has 8 VA1s, and the outer kind that has 4 VA1s. Each VA1 is connected to 128 strips on the sensors, and the amplified signal from these strips are multiplexed into a single output line. The conglomerate of a sensor and a hybrid card is called a *module*.

The Digitizer Cards (FMDD)

Each ring — whether it is an inner or outer type is split into two half-rings. Each of these half-rings have one digitizer card mounted on the back of the honeycomb support plate that holds the modules. The main purpose of the FMDD cards is to digitize the analogue signals from the VA1s. The FMDD has 2 major components:

ALTRO ADCs
: The ALTRO is a 16-channel parallel ADC with a resolution of 10bits in 1024 timebins. Upon reception of a trigger it converts the analogue input to a digital signal. After a number of filters (pedestal subtraction, zero suppression, etc.) the digitized signal is stored in a multi-event buffer. Upon a read command, this data is sent out as 40bit words to the RCU. Each output line of the VA1s is connected to a single channel on the ALTROs. There's a total of 3 ALTROs per channel.

Board Controller
: The BC on the FMDDs takes care of the communication between the RCU and the FMDD components. Furthermore, it processes triggers and raises a *busy* signal to the CTP when needed. It also monitors the running conditions (voltages, currents, and temperatures) of the FMDD through 4 separate ADC ICs.

Read-out Controller Unit

Each sub-detector has one associated RCU, which is connected the FMDDs of the sub-detectors half-rings. The main responsibility of the RCUs is to receive triggers from the CTP and to collect the data from the ALTROs on the FMDDs. It also facilitates communication with the ALTROs and BC of the connected FMDDs. The RCUs are situated just outside of the TPC, and are connected to the FMDDs via 3m long bus cables, to keep the irradiation down.

In the other end the RCU is connected the data acquisition farm via an optical fibre (known as the DDL) and through a daughter card (the DCSC) to the network of the DCS. The DDL is used to transfer data from the RCU to the acquisition system, while the Ethernet connection is used to control and monitor the RCU and associated FMDDs.

On the DCSC is an embedded core with Linux installed. A *FmdFeeServer* is running on that machine. This server provides monitoring information to the DCS, as well as control for configuring all of the front-end electronics.

Data Acquisition

To top

The data collected by the RCU is sent over the DDL to an LDC. For the FMD there are three such LDCs: `aldaqpc156` connected to FMD1, `aldaqpc157` connected to FMD2, and `aldaqpc158` connected to FMD3.

The LDC can recorded the data locally on disk, but more often is the data sent to a Global for event building. The GDC can then write the full events to PDS. The number and specific GDC is never fixed and can vary from run to run.

To upload pedestals for the pedestal subtraction filter in the ALTROs each of the LDCs run a *PedConf* daemon. This daemon reads the last processed pedestal data from a *Pedestal Evaluation* run and put that into the pedestal memory of each ALTRO channel. Note, that the *PedConf* daemons are controlled by the DCS — not the DAQ system.

On each LDC is also an optical link to the HLT cluster. The data received by the LDCs can be mirrored on this interface to allow the HLT to process the data.

The DAQ system also provided monitoring channels for on-line monitoring of the data, as well as quasi-automated data quality monitoring.

The FMD cannot control the DAQ in case of global runs. But for stand-alone runs, the FMD will control the DAQ.

High Voltage

To top

As mentioned earlier, each sensor of the FMD needs a bias voltage to work as a detector. This bias voltage is supplied by a number of high-voltage cards situated in CR4 in the ALICE shaft. The cards are protected by interlocks from the DSS in case that the cooling plant fails.

The bias voltage supplied to the sensors depends on the type of the sensors. For inner type sensors it is 70V, while for the outer type it is 130V.

Detector Control System

To top

The detector control system is a conglomerate of many specific subsystems, ranging from the *FmdFeeServer* to cooling, from low-voltage to alarms. To easily control all these various subsystems a Finite State Machine (FSM) runs in DCS project of the FMD.

The FSM is coded to take care of all the steps involved in turning the detector on, preparing for data taking, monitoring the system, and of course turning the detector off again. The FSM is built up in hierarchal manner: At the bottom one finds state machines that control particular hard-ware devices, and as one moves up the hierarchy these are collected into logical units. A hardware device could be a low voltage channel, or an FMDD. A logical unit could corresponding to a half-ring with low/high-voltage, and FMDD daughters. The user interface of the DCS reflects this structure.

The DCS of the FMD is built upon the SCADA system PVSS. PVSS provides distributed project management, archiving (or logging), and so on.

Trigger System

To top

The trigger system of ALICE is hierarchical. At the low level one finds the LTUs which distribute triggers to the detectors, and receives busy signals from the detectors. At the higher level one finds the CTP which processes trigger signals from detectors or other sources and makes decisions about what to do with these: distribute them or ignore them.

The CTP is under the control of the central shifters. But the LTUs can be controlled by the FMD shifter for stand-alone runs. One can configure the trigger rate, the trigger types, and so on.

Note, that each FMDD has its own *busy* output, which is fanned-in through an *or* gate to provide the busy seen by the LTU. The fan-in is under the control of the FMD and should always be configured appropriately.

Low Voltage

To top

All of the front-end electronics requires low-voltage power supplies to operate. The FMDD needs 3.3V, 2.5V, 1.5V, and -2V, while the RCU needs 4.3V and 3.3V (the FMDD distribute power to the hybrid cards and therefor they do not have separate power lines).

The low-voltage modules are situated in the pit on the upper gallery on the O-side. They are controlled via the mainframe in CR4 by DCS.

Cooling

To top

The FMD does not have its own cooling plant. Instead we leech of the TPC cooling plant. We can therefor not control the cooling of the detector. We have, however, installed flow-monitors on our lines and these are available and reacted upon in the DCS.

Detector Safety System

To top

The DSS is a service provided by the LHC and ALICE. It has system for fire and smoke detection, power fall-outs, and cooling plant failures.

Other sources for information on the FMD

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The ALICE Forward Detector Technical Design Report `https://edms.cern.ch/document/498253/1`

The ALICE FMD Web-pages

`http://fmd.nbi.dk/fmd`

C.H.Christensen Ph.D. Thesis

The ALICE Forward Multiplicity Detector — From Design to Installation:

`http://fmd.nbi.dk/fmd/thesi/cholm_phd.pdf`

H.H.Dalsgaard Master Thesis

The Forward Multiplicity Detector:

`http://www.nbi.dk/hehi/publications/canute_master.pdf.gz`

C.Søgaard Master Thesis

The ALICE Forward Multiplicity Detector — Test Beam Results:

`http://www.nbi.dk/hehi/publications/soegaard_master.pdf.gz`

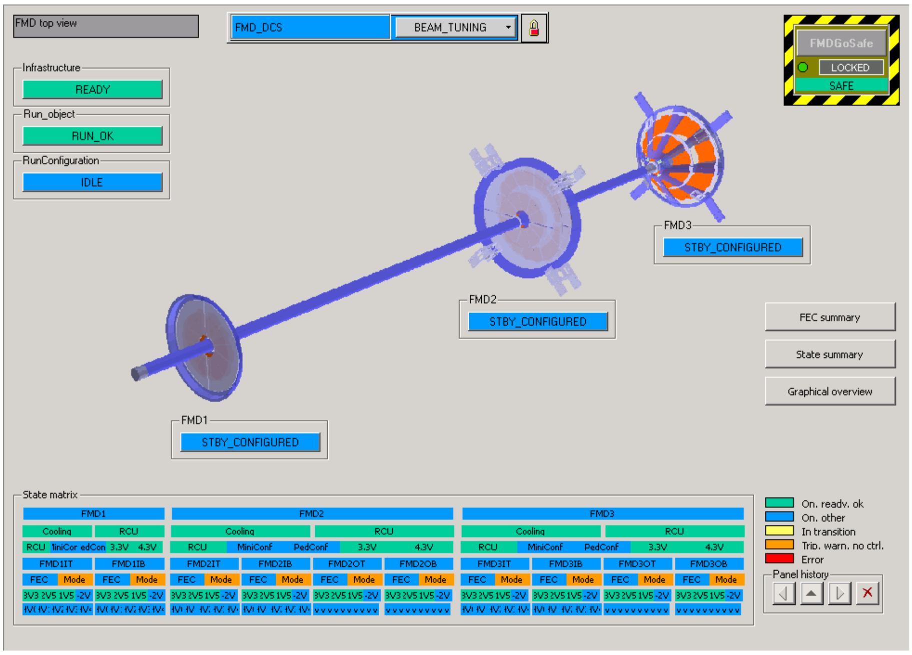
DCS UI Panels

To top

Below, we'll briefly look over a the panels of the FMD DCS UI.

Top panel

To top



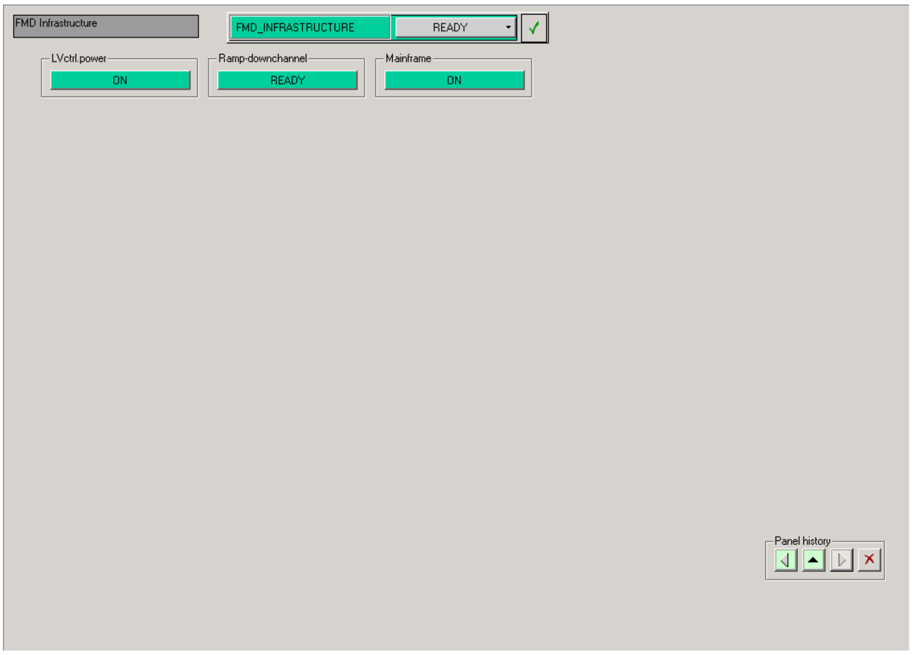
This is the top-level panel that the shifter will mainly see. At the top is the **FSM** button and drop-down menu. On the top-left are 3 buttons corresponding to the global systems: *Infrastructure*, *Run Object*, and *Run Configuration*. At the far right is the *Emergency Shut-down*

In the centre is a graphical representation of the FMD. Placed close to each sub-detector are **FSM** buttons that shows the state of the sub-detectors.

At the bottom is a tabulated overview of the FMD state machine. States of all objects in the state machine is shown, and allows the shifter to quickly identify where a possible problem occurred. One can click any element in this table to open the corresponding panel. The legend on the right shows how to interpret the colours in the table. If you hover the cursor over an element, you will see a tool-tip text that tells you the name and state of the object.

Infrastructure panel

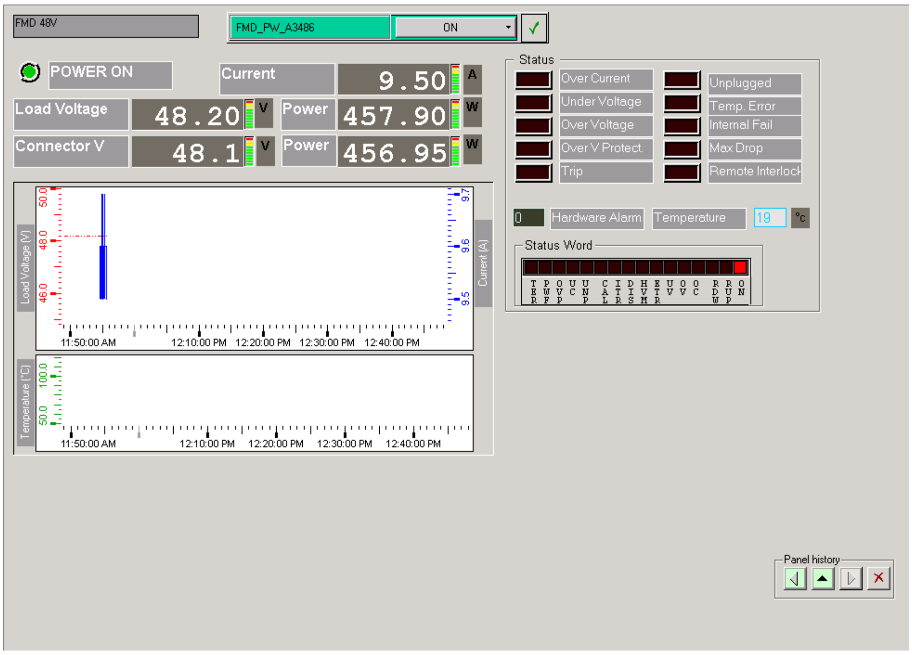
To top



This panel shows the overall state of the global infrastructure. There are three buttons: *The low voltage control power supply*, *The high voltage interlock channel*, and *the power supply mainframe*.

Low voltage control panel

To top

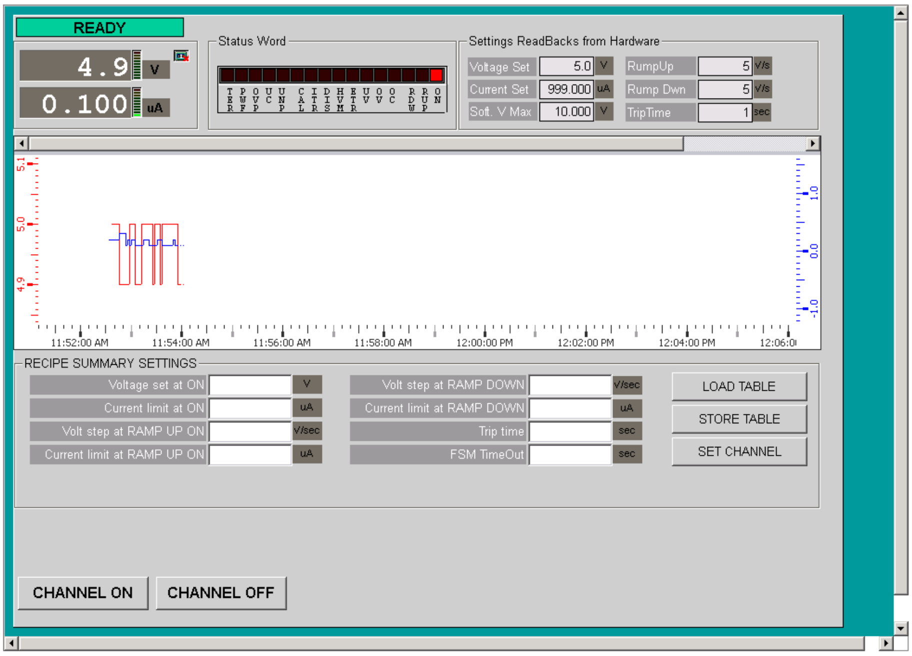


The 48V power supply powers the low-voltage crate in the pit. If this is not on, the one cannot control the low voltages supplied to the detector electronics. The power supply it self is situated in rack O24 on the upper left gallery in the pit.

The panel shows the load and connector voltages, currents, and power dissipation, status flags, and a *trend* of the output voltage and current, and temperature as a function of time.

High voltage ramp-down channel

To top

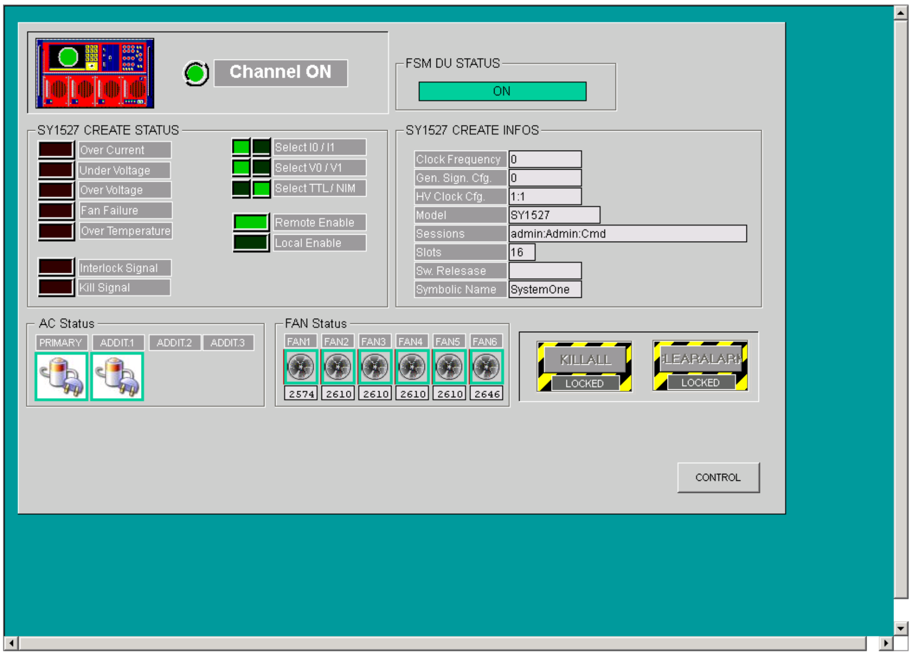


This high-voltage channels output is in fact not connected to anything. It exists solely to ensure proper ramp down of the other high voltage channels. A hardware interlock from the cooling plant is connected to this channel. If the cooling plant trips, the interlock will disappear, and this channel will then ramp down the other high voltage channels. The channel is physically located in the CAEN crate in CR4.

The panel show the voltage and current, status words and a trend of the voltage and current. The most interesting thing here, is whether the channel is *Tripped* or not

Power supply mainframe

To top

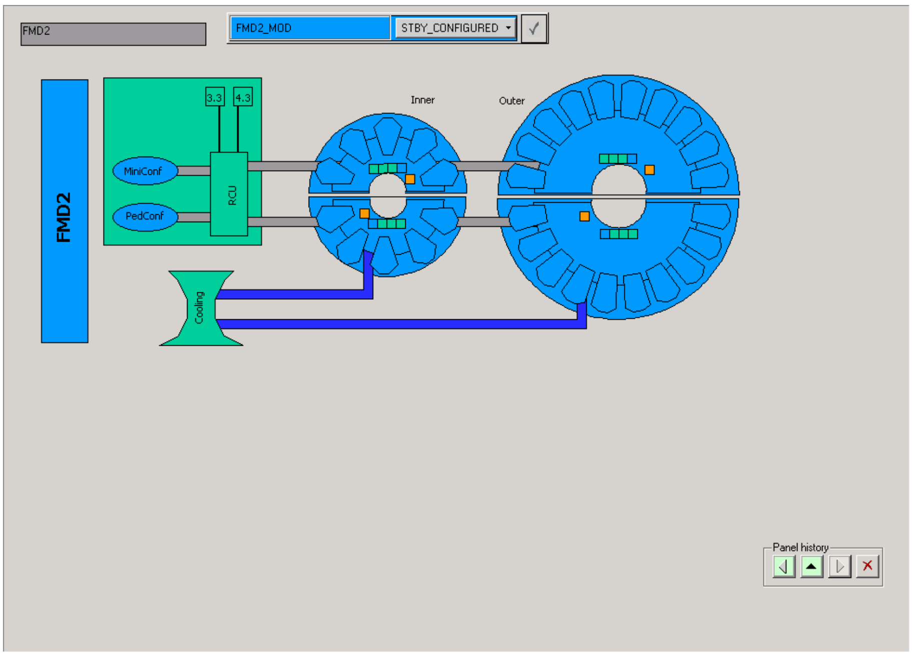


The mainframe sits in CR4. It contains all the high voltage cards and a branch controller that communicates with low voltage power supplies in the pit.

The panel shows the status of the mainframe.

Sub-detector panel

To top



The image above shows the FMD2 sub-detector panel. The other two sub-detector panels are the same, except that FMD1 only has an inner ring.

At the top, is the familiar **FSM** button and drop-down menu. Below are two buttons showing the state of the cooling for that particular detector and the state of the RCU of that sub-detector.

Clicking on either of these two buttons will take you to the panel of the cooling and RCU respectively.

Below the two buttons are graphical displays of the state of the half-rings of the sub-detector. Again, clicking on these will take you to the relevant half-ring.

Read-out Controller Unit panel

To top

Again, there's the **FSM** button and drop-down menu of this RCU. Below are 5 buttons

RCU
: State of the RCU hardware as reported by the `FeeServer`

MiniConf
: State of `MiniConf` — the software daemon responsible for the set-up of the front-end electronics.

PedConf
: State of `PedConf` — the software daemon responsible for uploading pedestals the the front-end electronics.

3.3V
: State of the 3.3V power supply unit of the RCU

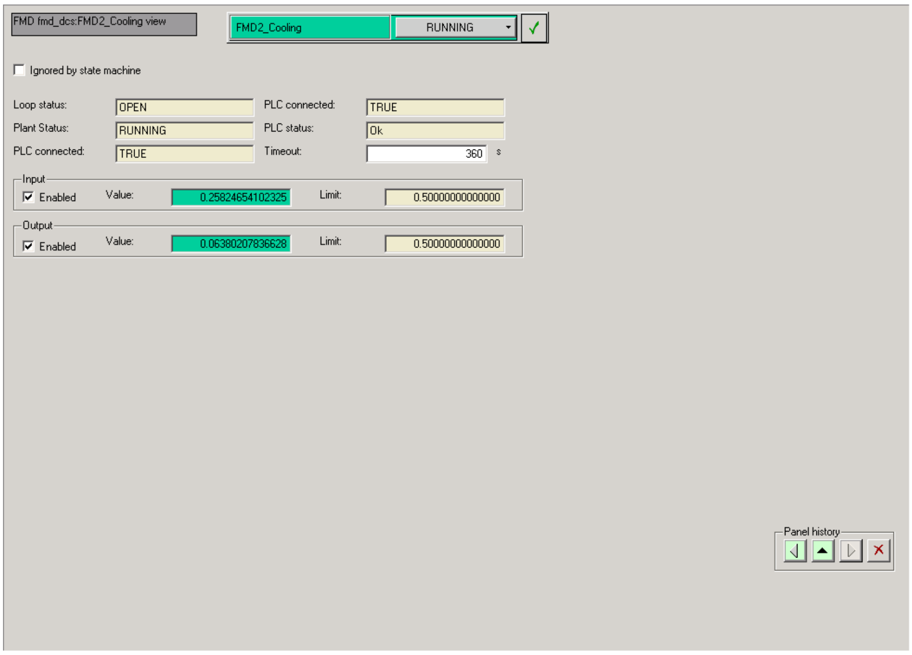
4.3V
: State of the 4.3V power supply unit of the RCU

Below this, are a number of tabs. The show various pieces of information about the front-end cards attached to the RCU. The information includes temperatures, voltages, and currents monitored by the front-end cards.

At the very bottom are 2 boxes showing where you can find more information about what's going on with the `FeeServer` and `PedConf` — the pedestal uploader.

Sub-detector cooling

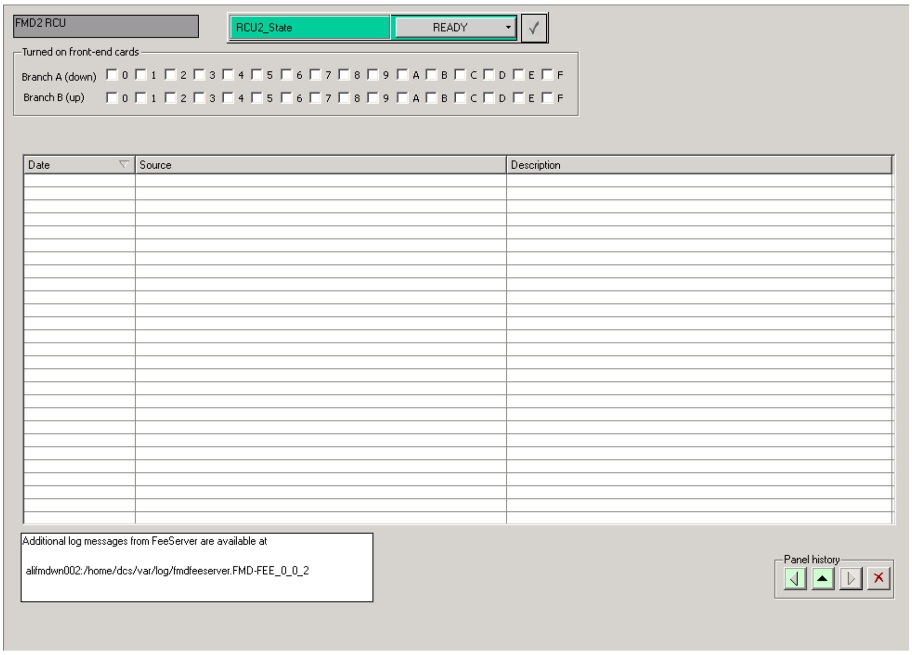
To top



This panel shows the state of the cooling of a sub-detector.

RCU state panel

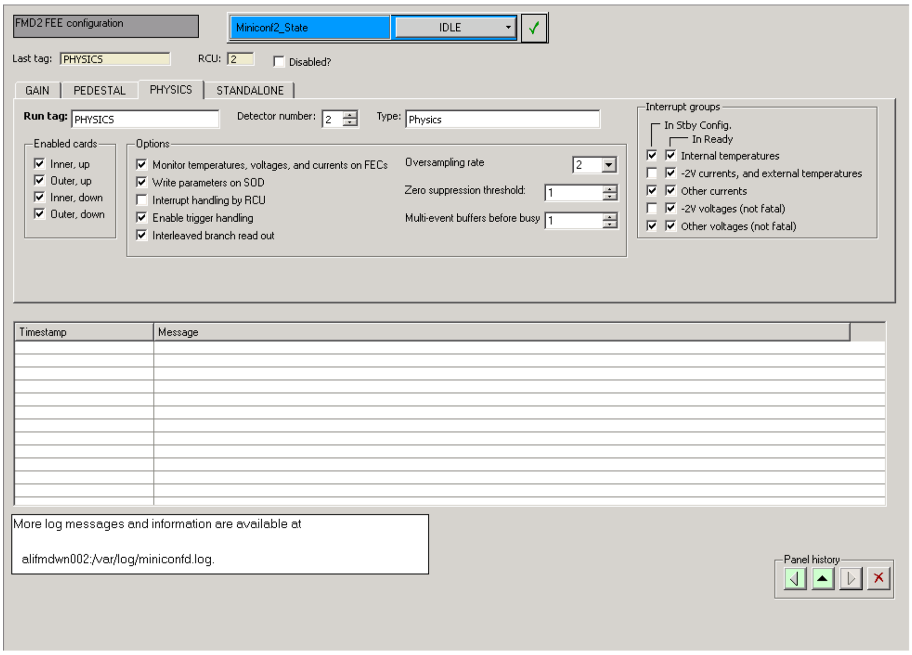
To top



This panel shows the state of the RCU, the front-end cards that have been turned on, and a log from the FmdFeeServer running on the daughter DCSC board.

!MiniConf panel

To top



MiniConf is a daemon running on the Linux worker node (`alifmdwn002`). Upon request it configures the front-end electronics for data taking, pedestal extraction, or gain calibrations.

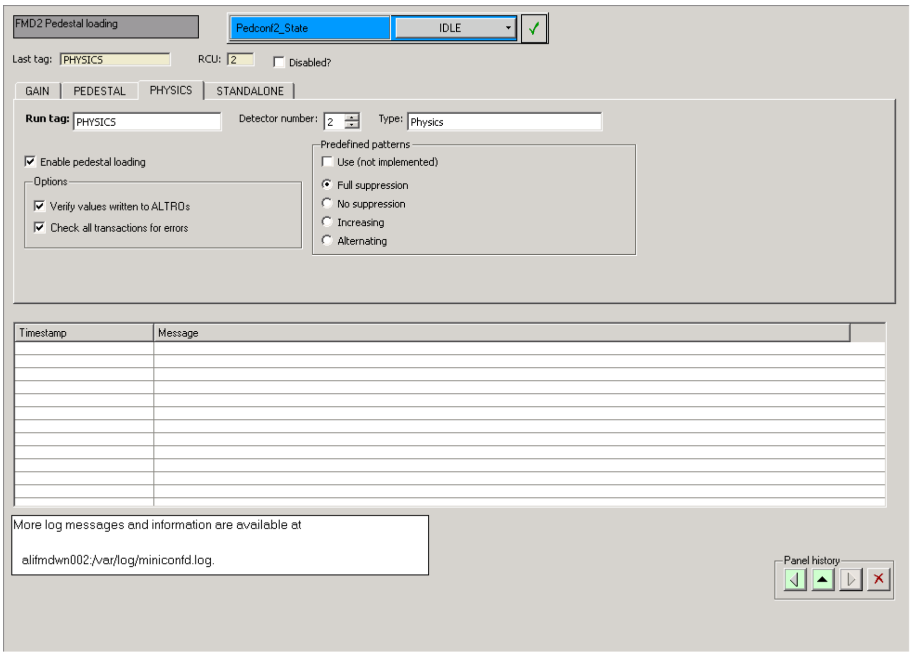
Below the **FSM** button and drop-down is shown the last configuration command executed by MiniConf.

Below that, are a number of tabs — one tab for each defined kind of configuration that MiniConf can do. Each tab contains a number of GUI elements that allow the experts to control how MiniConf will configure the front-end electronics. These elements are grayed out since the normal shifter is not allowed to change anything here.

The large table in the middle shows the log of the MiniConf execution. Problems will show up as read or yellow messages.

!PedConf panel

To top



Pedconf are 3 daemons running on the LDCs in the DAQ network. Upon request they upload the latest pedestal data to the front-end for use in the baseline suppression filter.

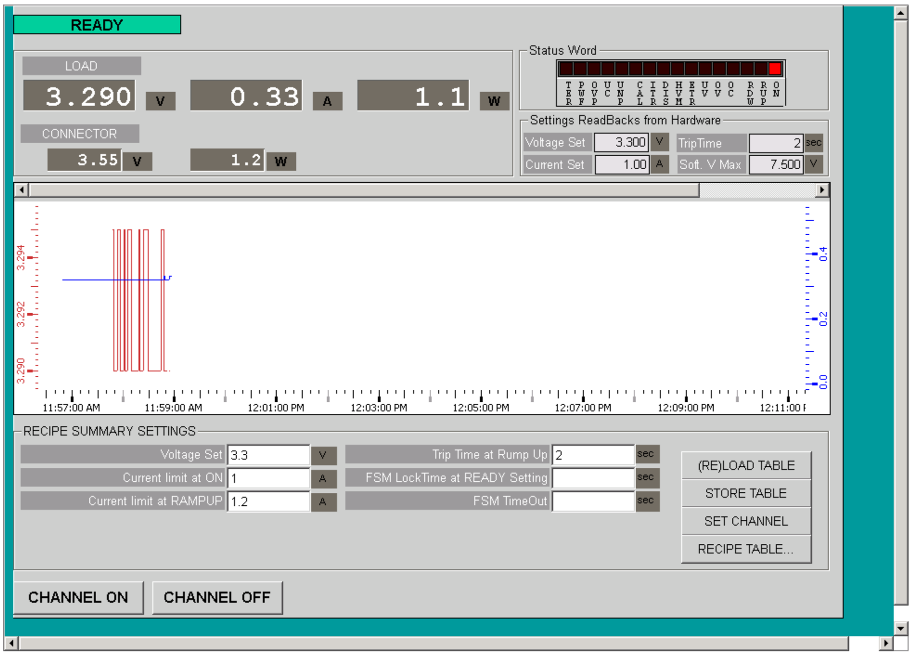
Below the **FSM** button and drop-down is shown the last configuration command executed by Pedconf.

Below that, are a number of tabs — one tab for each defined kind of configuration that Pedconf can do. Each tab contains a number of GUI elements that allow the experts to control how Pedconf will configure the front-end electronics. These elements are grayed out since the normal shifter is not allowed to change anything here.

The large table in the middle shows the log of the Pedconf execution. Problems will show up as read or yellow messages.

RCU 3.3V panel

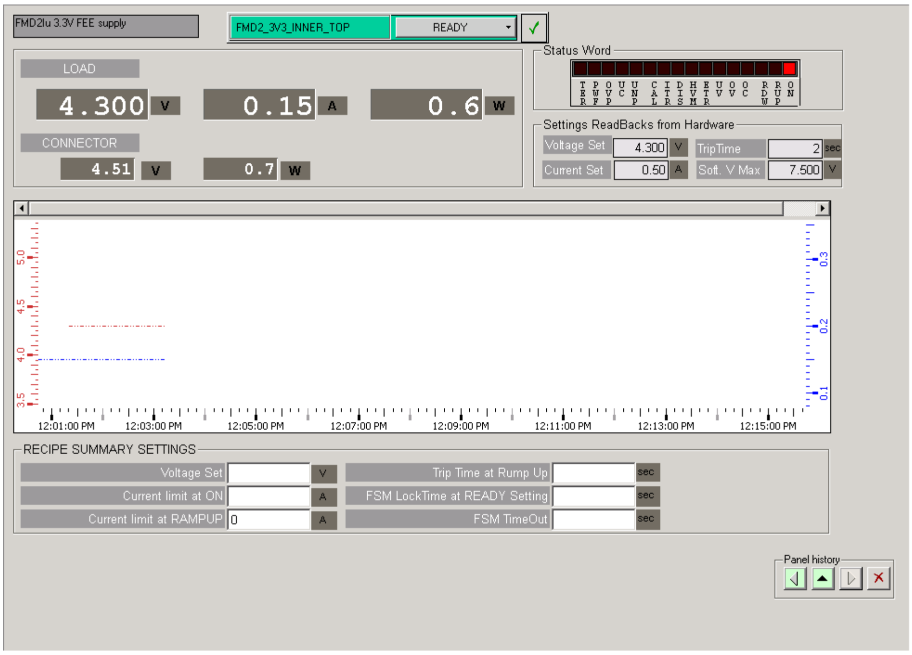
To top



This shows the load and connector voltages, currents, and power of the 3.3V power supply for the RCU. Also shown are status bits and a trends of the voltages and currents.

RCU 4.3V panel

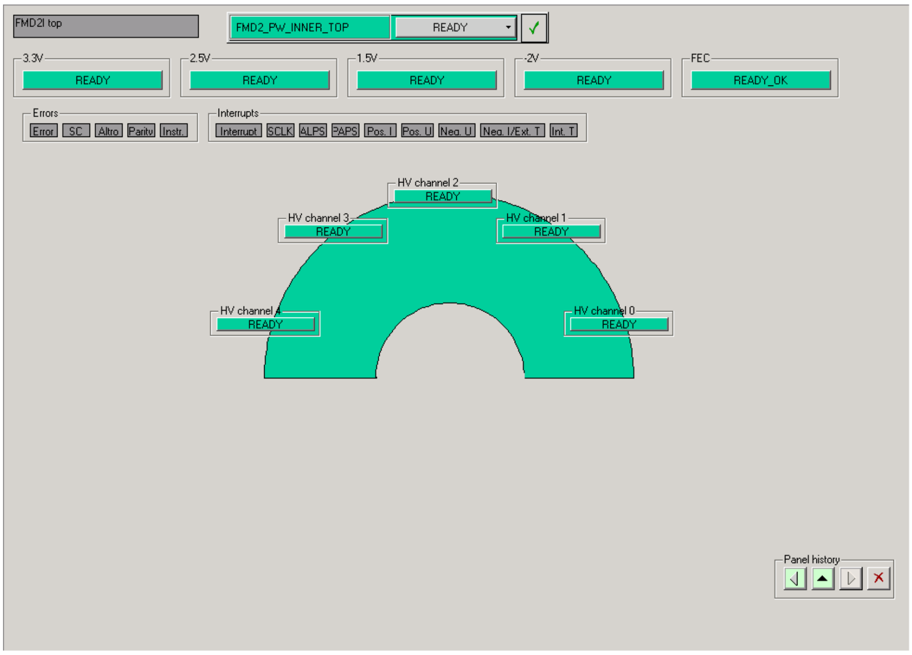
To top



This shows the load and connector voltages, currents, and power of the 4.3V power supply for the RCU. Also shown are status bits and a trends of the voltages and currents.

Half-ring panel

To top

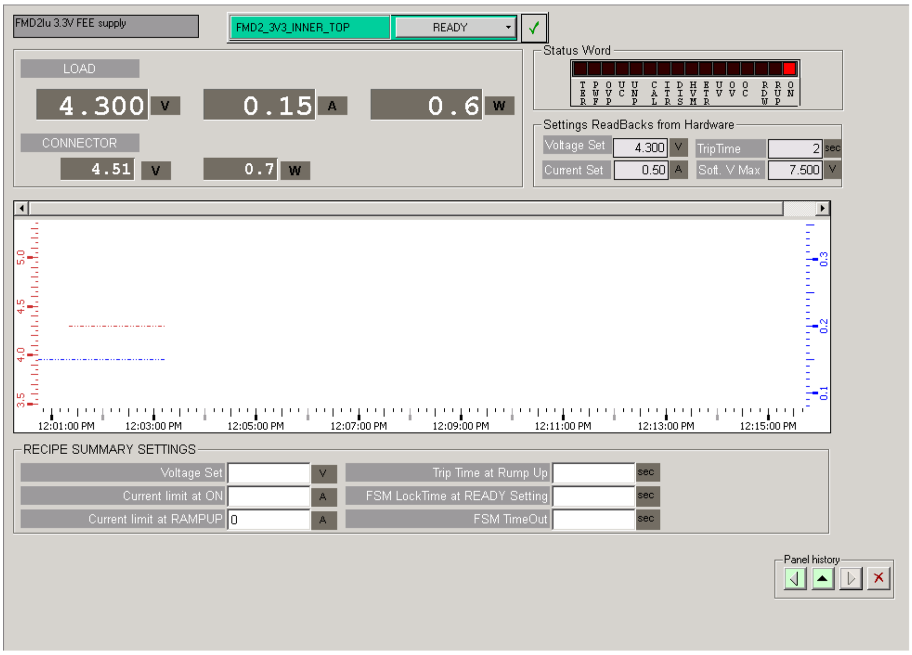


On top is the familiar **FSM** button and drop-down menu. Below are 5 buttons — 4 for the power supplies and one for front-end card state.

Below is a graphical display of the bias voltage state, and the front-end card state.

Digitizer 3.3V power supply panel

To top

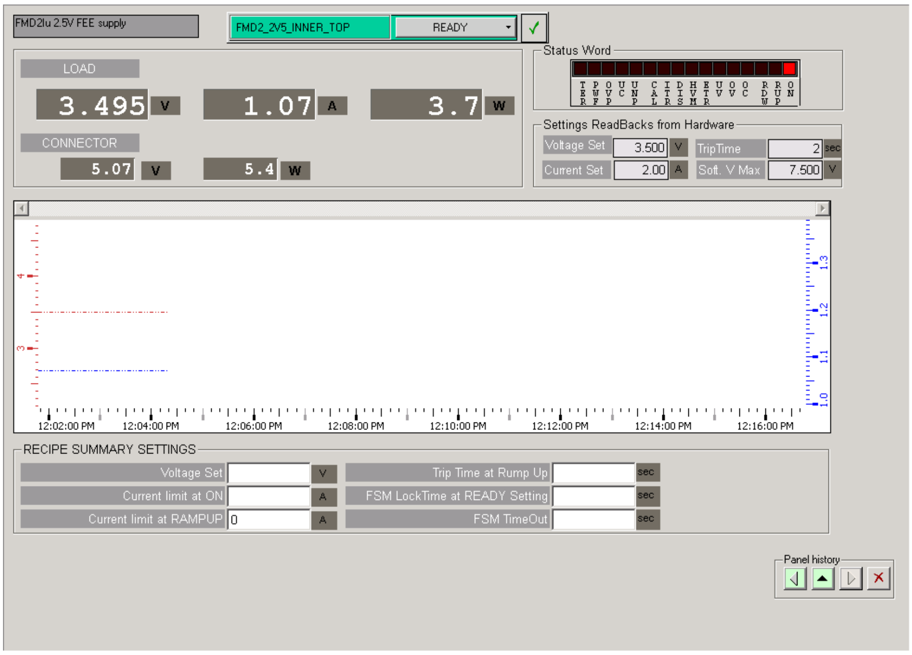


The status of the 3.3V power supply for a digitizer card. It shows the voltage, current, and power at the target as well as at the connector. Also shown are status bits and a trend of the output voltage and current.

NB: Note that the voltage should be 4.3V (one volt over) than what the title says.

Digitizer 2.5V power supply panel

To top

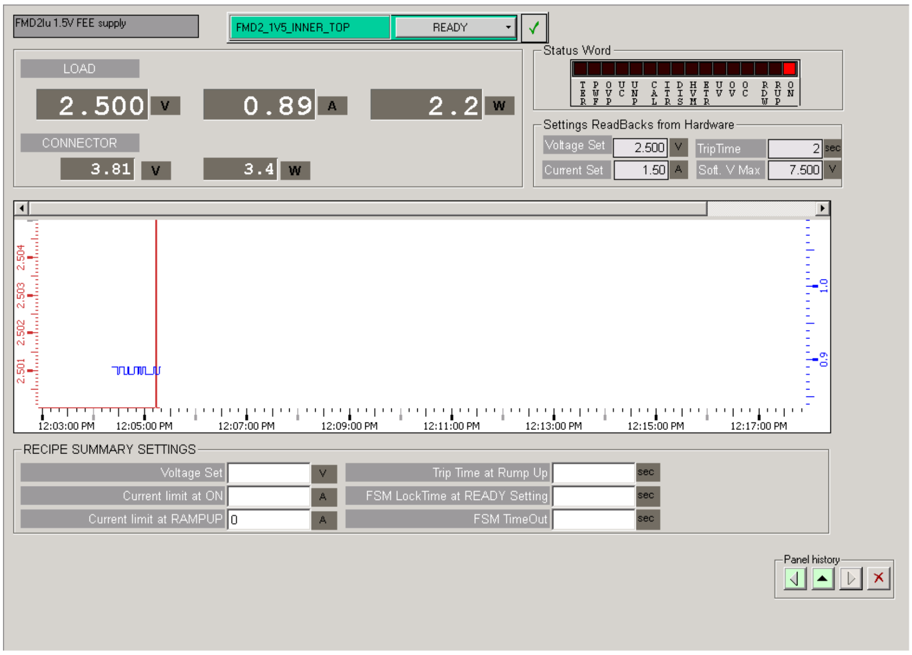


The status of the 2.5V power supply for a digitizer card. It shows the voltage, current, and power at the target as well as at the connector. Also shown are status bits and a trend of the output voltage and current.

NB: Note that the voltage should be 3.5V (one volt over) than what the title says.

Digitizer 1.5V power supply panel

To top

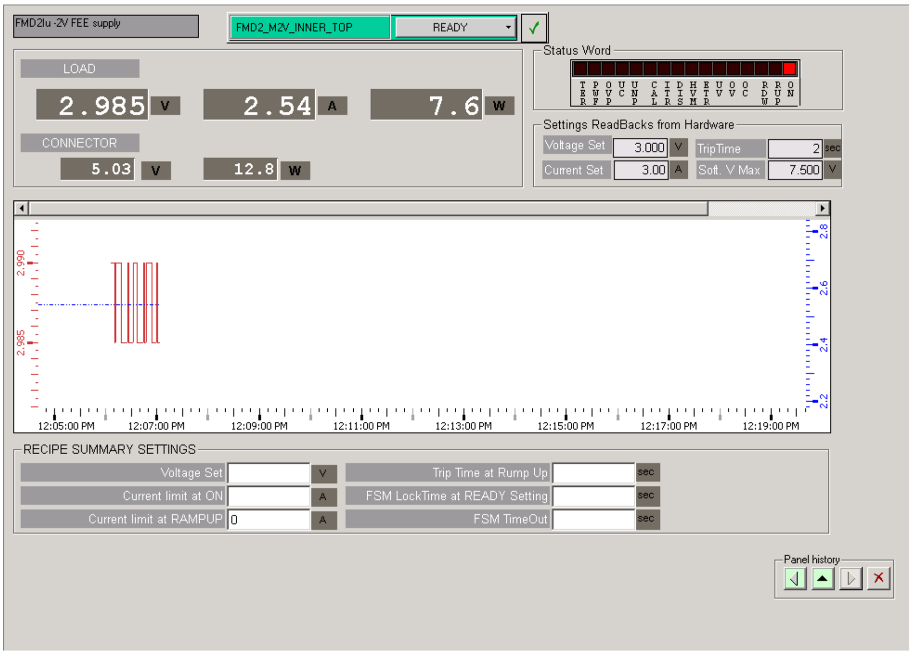


The status of the 1.5V power supply for a digitizer card. It shows the voltage, current, and power at the target as well as at the connector. Also shown are status bits and a trend of the output voltage and current.

NB: Note that the voltage should be 2.5V (one volt over) than what the title says.

Digitizer -2.0V power supply panel

To top



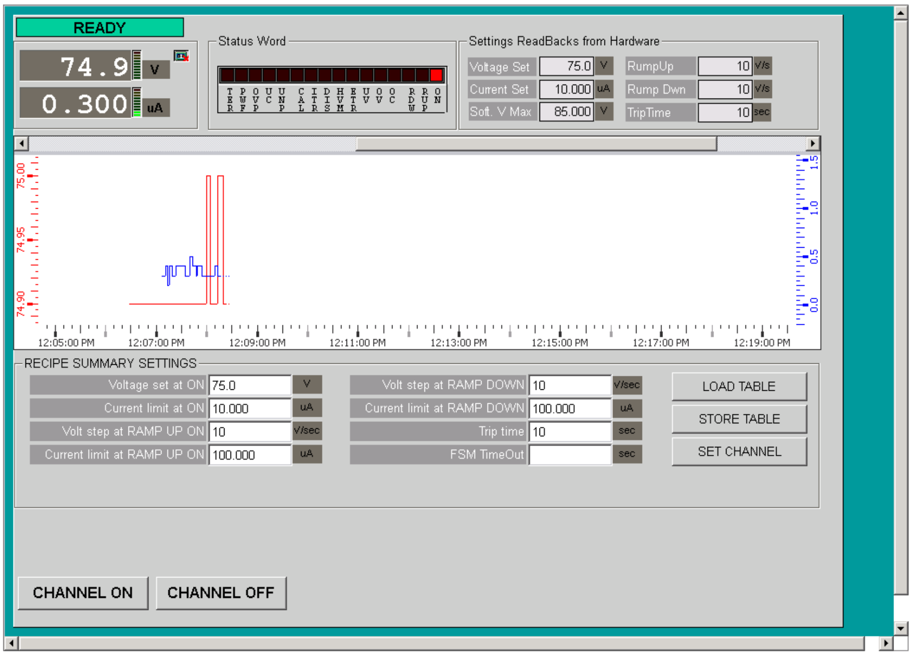
The status of the -2.0V power supply for a digitizer card. It shows the voltage, current, and power at the target as well as at the connector. Also shown are status bits and a trend of the output voltage and current.

NB: Note that the voltage should be 3.0V (one volt over) than what the title says.

NB: The scale of the trend, and the values displayed are positive. This should be interpreted as negative voltages, as the wires are connected with opposite polarity.

Sensor high voltage panel

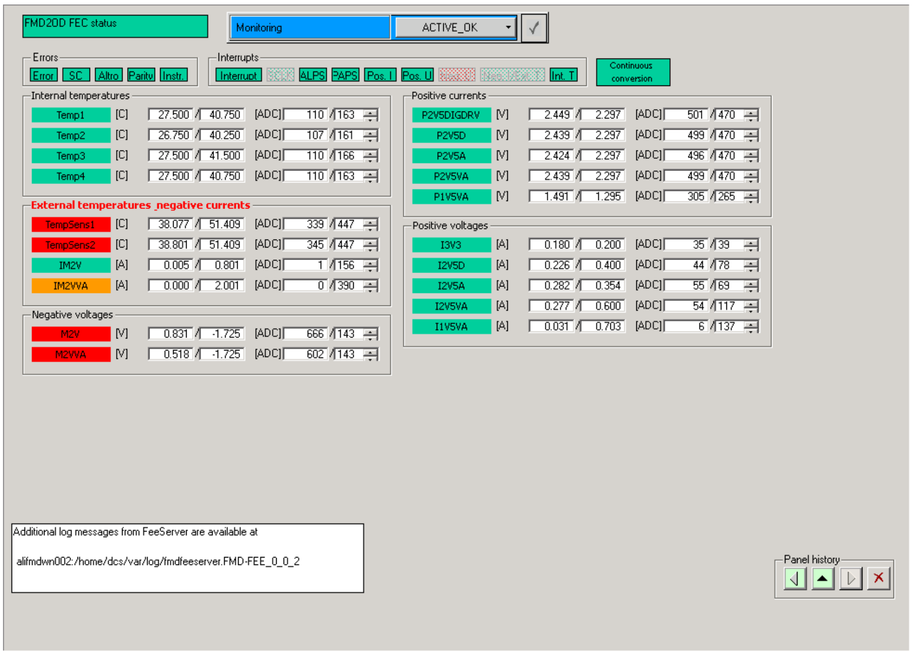
To top



This panel shows the status of a high voltage channel.

Front-end Card panel

To top



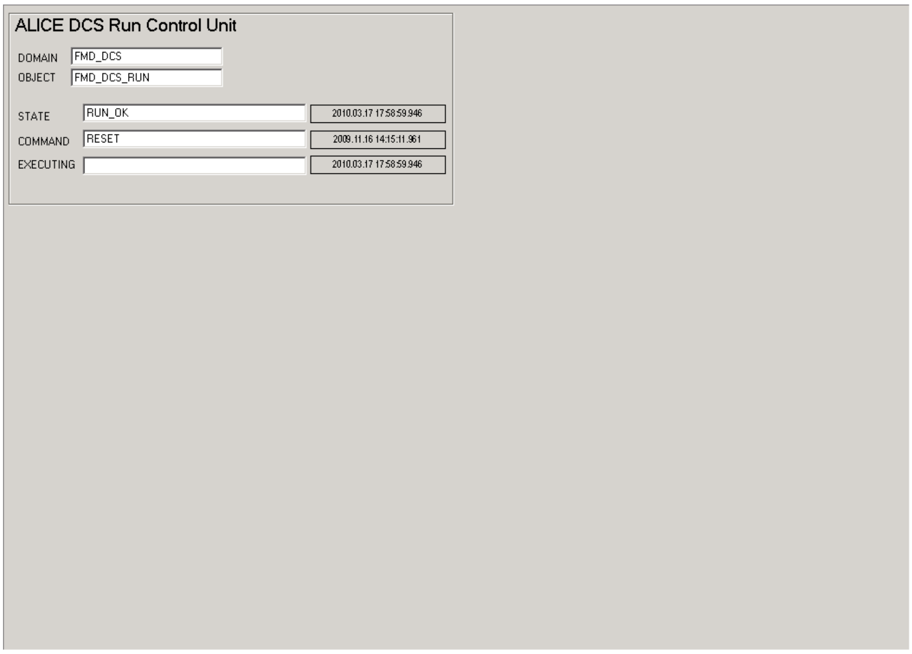
Digitizer -2.0V power supply panel

Apart from the **FSM** button and drop-down menu this panel shows the current values and limits of the various monitored currents, voltages, and temperatures, as well as the error and interrupt state of the FEC.

The display is grouped to correspond with the interrupt bit mask shown near the top. Note, that if a bit is grayed out, it is not part of the active interrupt mask.

The screen-shot above shows the case for the expert user, who can change the limits. For normal shifters, the entries are grayed out and cannot be edited.

Run object panel



The run control unit is an object used by the central DCS operator to make sure the detectors are ready for taking data. This panel shows the state machine object that encapsulates the run control unit.

Run control unit panel

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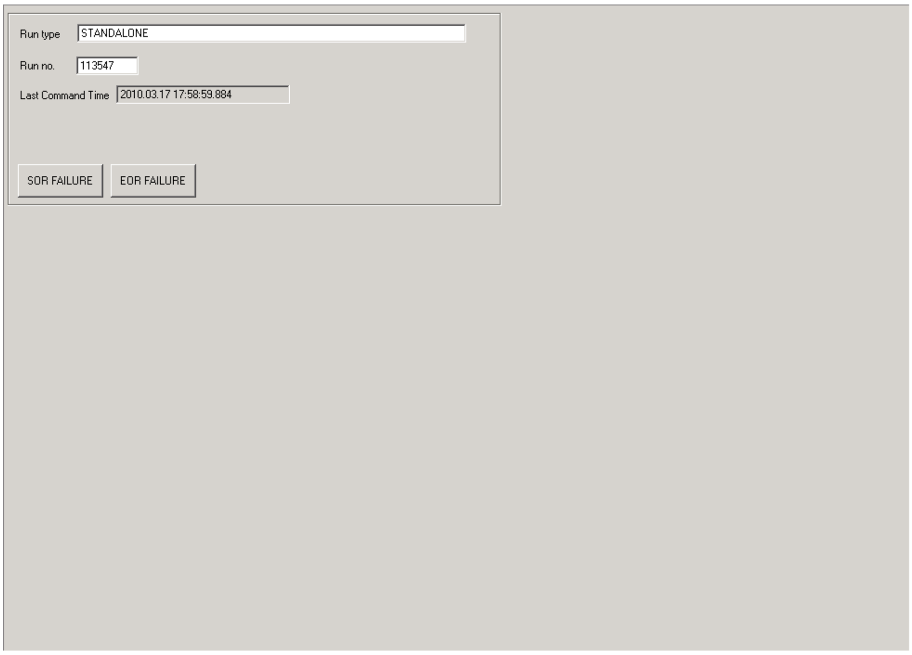

The run control unit is an object used by the central DCS operator to make sure the detectors are ready for taking data.

Run configuration tool panel

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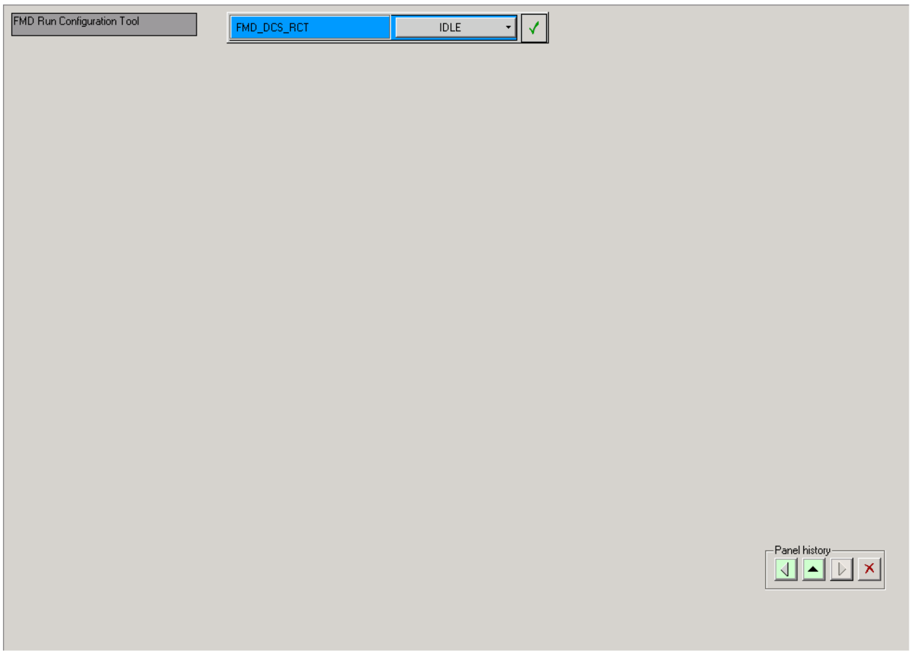

The run configuration tool allows the central DCS to configure all detectors for a particular kind of run. This shows the state machine object that encapsulate the run configuration tool

Other panels

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There are panels for most nodes of the **FSM** tree. Most of these are hardware panels, and they are of little use to the normal shifter.

What every shifter *must* know

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General things

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1. Whom to call in case of emergency or trouble during a shift
2. What training, authorisations, access rights and passwords are necessary before a shift.
3. Where relevant equipment is located and what the shifter is allowed to operate.
4. What you imperatively must monitor and control to ensure detector safety.
5. How to bring the system to a safe "OFF" state.
6. Read and understand the fmd shift guide

How to register for a shift

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Go to the page:

https://alicesms.cern.ch/

How to turn off the detectors manually

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Physically turn off the crate (last resort).
: Go to CR4 (the lowest level of the electronics rooms accessible by separate elevator).
: **NB:** This requires that you are authorised to open the CR4 door via your card/token.
: Turn off the fmd lv+hv crate with the key.

Turn off the voltages via telnet to CAEN crate.
: In the FMD MENU on the FMD console in ACR select: *Expert*, then *DCS*, then *CAEN CRATE*. Log in with:

User name:	`admin`
Password:	*

: In the column 1, turn voltages from ON to OFF by pressing the space bar.
: **NB:** Use the TAB key to switch between commands and channel control

How to find the FMD hardware

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ALICE cavern:	FMD1, FMD2, FMD3:	Detectors are inaccessible inside ALICE
	RCU1, RCU2, RCU3:	Accessible from miniframe (RCU1/2) or inside L3 magnet (RCU3) during LHC stops
	Top rack gallery:	(On left seen from A side to C side) Low voltage supplies in rack O13 and Ethernet switch in rack O12

CR4:	CAEN crate with High voltage cards and Low voltage branch driver (rack near entrance door on left).
CR3:	JTAG board and engineering node. No access without DCS specialist
CR1:	BusyBox and FMD-LDCs. No access without DAQ specialist.
ALICE CONTROL ROOM (ACR):	FMD Console is at the far end in the second detector room
TPC clean room:	Various tools and spare parts in cupboards on top-level.

Other people to contact

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HEHI		
Office 1-R-0034 @ CERN:	+41 22 76 74 603	74603
Shift phone @ CERN:	+41 76 487 5991	16-5991
Remote oncall phone 1	+41 76 487 0610	16-0610
Remote oncall phone 2	+41 76 487 8959	16-8959
ACR		
Near FMD station:	+41 22 76 76 452	76452
Near TPC station:	+41 22 76 76 795	76795
Shift leader:	+41 22 76 77 702	77702
DCS shifter:	+41 22 76 76 676	76676
DAQ shifter:	+41 22 76 76 678	76678
DAQ		
Pierre Vande Vyvre	+41 22 76 78 336	78336
DCS		
Lennart Jirden:	+41 22 76 75 125	16-4459
Andre Augustinus:	+41 22 76 76 294	16-3534
Trigger		
Anton Jusko	+41 22 76 75 977	16-2090
Off-line		
Federico Carminati	+41 22 76 74 959	16-4843
Latchezar Betev		
RCU		
Luciano Musa:	+41 22 76 76 261	16-3119
Run coordinator:		
Paolo Martinengo	+41 22 76 78 434	16-3757
Technical coordinator:		
Werner Riegler:	+41 22 76 77 585	16-2986
Arturo Tauro:	+41 22 76 73 252	16-2529
Spokesperson:		
Paolo Giubellino:	+41 22 76 75 173	16-0587
Miscellaneous		
LHC Main control room:	+41 22 76 76 922	76922
Emergency:	+41 22 76 74 444	112
Taxi - Switzerland	+41 22 32 02 202	
Taxi - France		
CERN Main switchboard	+41 22 76 76 111	76111

CERN internal telephone numbers

These are of the form 7*xxxx* when called from inside CERN (from fixed phones or other CERN mobiles). Example: to call internal number 7*xxxx* from a telephone in Denmark, dial 00 (to get out of Denmark) then 41 (country code for Switzerland) then 22 (area code for Geneva) then 76 (the first two digits of all CERN telephones) and finally 7*xxxx*. Note that not all countries use 00 to dial internationally. The ACR for example is +41 22 76 77702. You can dial CERN phones from NBI phones directly by dialing 1642 *xxxx* where *xxxx* are the last 4 digits of the phone number.

CERN GSM numbers (mobile phones)

These are of the form 16*xxxx* when called from inside CERN (from fixed phones or other CERN mobiles). To call a CERN GSM from outside CERN, dial as if you were calling the Swiss number (76) 487 + 4 digits of the GSM number. For example, to call GSM 161234 from the DK, dial +41 76 487 1234. You can dial CERN mobile phones from NBI phones directly by dialing 1643 *xxxx* where *xxxx* are the last 4 digits of the mobile phone number.

This topic: ALICE > FmdShiftGuide
Topic revision: r13 - 13-Jul-2011 - 10:05:37 - BorgeNielsen