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Instructions for ALICE TOF shifters

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Shifter tasks

The shifter should check regularly various hardware parameters status: HV, LV, gas, cooling, temperatures. Compare them with reference values as reported below. PLEASE DO NOT TRY TO MODIFY ANYTHING UNLESS YOU ARE VERY SURE OF WHAT YOU ARE DOING.

The shifter should know what is happening in ALICE. Refer to the ALICE elog (https://alice-logbook.cern.ch, only from ALICE machines) for various informations on the activities and runs (normally you find a process running on one window of the left computer) In particular in runs--> “runs detector” you can see the actual running status. Try also to follow the activities in the control room and report them in the shift summary.

For long runs the shifter must check the data taken following the MOOD instruction in ALICE-TOF wiki (https://twiki.cern.ch/twiki/bin/view/AliceTOF/MonitoringApplications). Please report in the e-log any hole or peak in the hit rate/time/tot which is not compatible with reference values.

Report in the TOF e-log https://www.bo.infn.it/elog/Commissioning/ all useful informations on the shift:

- runs: specify start/end time, trigger, readout components, magnetic field
- errors/problems with as many details (also screen dumps).
- ----> at the end of the shift write a mini summary of what happened (also in ALICE) during the shift.
  <---- THIS IS VERY VERY IMPORTANT !!!!!!

Always ask for help from experts in case of doubts !!!!

Preliminary Instructions

The machine devoted to monitoring and shifters general operations is ALITOFON001. The machine is reachable via remote desktop from the DAQ Linux machine located in the ACR. All of you should have an active account on this machine, otherwise if you accidentally close the windows you have to call the on-call expert (not advisable especially during the night...).

On the DAQ Linux machine the TOF account is:

username: tof
password: XXXXXXX

The command for remote desktop could be for example (for a two-screen wide panel):

rdesktop -a16 -g2580x980 alitofon001

On this machine there are the following useful panels that could be opened (some of them HAVE TO BE OPENED):

- the TOF DCS_UI is the mirror of the main TOF DCS projects. If you are not granted to log into this panel please call me (Andrea). Different users may have different privileges, so each shifter must logout from this panel at the end of his shift. You should use this panel to monitor the state of the
TOF FSM and to turn OFF/ON part of the detector, i.e. LV, FEE, HV... I advise you to send commands using the FSM Controls and always from the TOP NODE. To enable the FSM Controls click with the mouse right button on the item in the tree and select "view panel". If you right-click a second time, you can select the "open fsm control" too.

- the TOF BasePanel (you can launch it from the START Menu) is the main panel for monitoring the "hardware" status of TOF. From here, you can monitor the status of the LV, HV, gas systems..., the temperatures of the FE and RO electronics, look at the status of the cooling plant and so on.

- the tofAlarms panel is a very important one. This panel is (at the moment) the only way to handle all the TOF alarms and to trigger automatic procedures to avoid big hardware damages. As an example, the automatic procedures to turn off crates when their temperatures become too high run inside this panel. VERY IMPORTANT: THIS PANEL MUST BE ALWAYS RUNNING, BUT ONLY FROM THE MACHINE IN THE ACR. DO NOT RUN THIS PANEL FROM A DIFFERENT PC IN OUR OFFICE, OR YOU CAN GENERATE UNDESIRABLE SITUATIONS. The panel is reachable from the path D:\utils\tofAlarms.bat

- From D:\utils\alarmScreen.bat you can run the panel which display in real-time all the active TOF alarms.

Reference Hardware Parameters

Clicking on the link above you will find useful reference panels to compare with the ones available during your shift. These plots are updated by the experts whenever the various parameters are changed.

General Overview

The core of the DCS is based on Finite State Machine (FSM). A FSM is an intuitive, generic mechanism to model the functionality of a piece of equipment or a sub-system. The entity to be modelled is thought of as having a set of stable ‘states’. It can move between these states by executing ‘actions’ that are triggered either by commands from an operator or another component or by other events such as state changes of other components. The control system is build as a tree-like structure. Communication between the different nodes in the tree (the control and device units) is performed via a well defined, so called, state/command interface. Commands will propagate from the highest levels through the control units to end in the device units where action on the real hardware is performed. In each control unit appropriate behaviour can be programmed with the FSM upon the reception of a command. This allows the use of ‘generic’ commands (commands that are independent of the actual sub-detector or sub-system such as ‘prepare for physics’) on the higher levels of the control hierarchy. The control unit will then send the appropriate commands to its children. States will propagate from the lower levels to the higher levels. Upon receiving or reading a change in one or more parameters of a device, the device unit can change its state to reflect this. The parent control unit can react on this state change and, depending on the behaviour programmed in the control unit with the FSM, change its state to propagate the information. In parallel the control unit can also act on this and/or other children. This mechanism allows the propagation of state changes up to the highest level, while at each level states can be correlated with the states of other sub-trees. The set of all disposable states for TOF DCS is (and the shifters and anyone else MUST STRICLY follow the exact sequence powering ON and OFF the detector) is:

**OFF --> STANDBY --> STBY_CONFIGURED --> BEAM_TUNING (optional) --> READY**

OFF means that the whole detector is switched OFF.

In the **STANDBY** state all the LV channels and the VME slots are powered ON.

In the **STBY_CONFIGURED** important checks and configurations on all the VME boards are performed.
**BEAM_TUNING** means essentially electronics ready but HV OFF (safe condition for beam injection).

In the **READY** state the detector is finally ready for taking data. During beam periods this state is associated with a SAFE state for TOF, i.e. with HV < 1000 V. Full HV will be applied manually when appropriate.

A set of command is defined as well: **GO_OFF**, **GO_STANDBY**, **GO_STBY_CONF**, **GO_BEAM_TUNING** and **GO_READY**.

During a state transition the will assume one of the following transient state: **MOVING_OFF**, **MOVING_STANDBY**, **MOVING_STBY_CONF**, **MOVING_BEAM_TUNING**, **MOVING_READY**

For remote control and monitoring of all equipments a set of operator interface panels have been created. The panels that have to be always opened and running are: the DCS UI panel, the BasePanel and the TofAlarms (they are launchable from the Windows Start Menù).

**General Operations**

Let us suppose that such is the case: the TOF is in OFF state and you are asked to set it to READY. The panel you need to send the correct commands is (I repeat it over and over again) the DCS UI panel. Well, this is what you will be asked to do:

1. (1) open the TOP NODE panel in the DCS UI from the FSM Hierarchy Tree Browser then open the FSM control panel (right button on >> TOF DCS << then OPEN FSM CONTROL)
2. (2) be sure to have the control of the TOF DCS. If the general lock is red painted, it means that the TOF is owned by someone else (DCS, ECS or DAQ). Ask them to release the control and take it!
3. (3) send the command **GO_STANDBY** from the TOP NODE. The LV channels and in succession the VME slots are switched ON. You can use the TOF BasePanel to monitor the execution of the command. For example, looking at the LV you can see all the selected LV channels switching ON. In the same way from the FEE panel you can check if all the VME slots are turned ON correctly.
4. (4) if all it's ok, the status TOF DCS will become STANDBY, otherwise it will be different (tipically MIXED). Use the BasePanel to find what's wrong.
5. (5) now, in the same way as before you can apply a **GO_STBY_CONF** and a **GO_READY** commands.

**More details on Panels**

**DSC UI**

DCS UI documentation (ver. 3.0.2):


This panel allows to monitor the state of the TOF FSM and to send commands from the highest level of the hierarchy (TOP NODE) to all sub-nodes and devices.

On the top left part the actual status is displayed, as well as if the panel is locked (red) or not by the central DCS: this is the status that allows ALICE to use TOF in the runs. If unlocked then the TOF DCS is under our control.
• **User Login**

Pressing the key button the standard Access Control Login panel opens. It allows for the User Name changing.

• **FSM node control**

This push button opens the standard “FSM Control Window” corresponding to the selected node in the tree browser.

• **FSM Hierarchy Tree Browser**

This part of the panel display the tree browser for the TOF FSM hierarchy. The navigation with the tree browser is quite similar to the one of the standard Windows. Clicking on the mouse right button, a FSM node is selected and is possible to display the corresponding user panel in the dedicated area of the UI. **This panels allow to monitor and (if the user is granted) to change settings and parameter bypassing the FSM Commands. To be used with care.** Sometimes could happens that parts of panels look wrong or incomplete; usually is just a matter of system memory overload. Try to close other windows to fix it (and to reopen if needed).

If commands have to be issued push the FSM Node Control button.

• **Alarm Panel**

Pushing this button the standard Alarm panel (the JCOP one) opens.

• **InfoBrowser**
Pushing this button the InfoBrowser panel opens.

**FSM Expert Controls**

Pushing this button the FSM expert control panel opens. This panel may be useful if you need to stop/restart FSM nodes or the whole FSM.
Panel

To get this panel go on the Windows START and look for the tofAlarms.bat process.
Standard Alarm Panel

You can run this panel from the specific button in the DCS UI panel.
In this panel you can find informations that could help you in fixing the problems. More in details:

- The 3th column display the logical name of the object falled in an error state;
- The 4th column display a short description of what kind of error is (connection, temperature, LV...)

By default, the panel display all the alarms coming from all the ALICE DCS sub-systems, i.e. also from dcs_ui, dcs_magnet, dcs_gas...
To display only the TOF alarms one have to use the appropriate filter.
• Click on the Modify Filter button (1);
• Click on the Open folder button (2);
• Select the tof filter and load it (3);
• Apply the filter (4).

**PVSS Alarm Panel**

You can run this panel from D:\utils\alarmScreen.bat
(1) select the filter called tof;
(2) run the panel;
(3) here you can check if all the three TOF system (DCS, HV and VME) are running;
(4) from here you can acknowledge all the visible alarms, or
(5) click with the mouse right button here you can acknowledge just one particular alarm;
(6) if you click on this column a panel with explanation on this particular alarm opens, as for example...

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**The RDB Archive Manager is not running!!**

Please, restart the manager using a web browser

For tof_dcs system the address is:  
http://alitofvn001.cern.ch:4999

For tof_hv system the address is:  
http://alitofvn002.cern.ch:4999

For tof_vme system the address is:  
http://alitofvn003.cern.ch:4999

For more detailed info see the TOF wiki page  
https://twiki.cern.ch/twiki/bin/view/TOF/InstructionsForShifters/Alarm_List
Here you can find a list of alarm and some instruction to how to fix it!

## Alarm List

- **Connections**
  - DIM server crate#
  - VME server crate #
  - Status RDB Manager (Oracle DB)
  - Status Distribution Managers
  - Status Linux PCs
  - Status PVSS DIM Managers

- **HV System**
  - Alarm on current values
  - Over Current
  - Trip
  - Under Voltage

- **LV System**
  - Over Current
  - Trip
  - Under Voltage
  - A1396 Temperature (with action on LV channel)
  - DRM, LTM and TRM Temperature (No Standard Alarm but action on VME boards)

- **Cooling System**
  - Cooling Water Temperature
  - Loops Status (with action on CANE Power Supplies)

- **Gas System**

## Alarm Description

- **Under Voltage**
  
  It means that some LV or HV channel went in a UNV status. **How to fix it:** find which channel is in error reading the logical name of the object. Using the FSM Hierarchy Tree Browser find the relevant node and open the operational panel. Try to switch OFF and ON again the channel, or get a Clear Alarm. If the error persists, you have to exclude the object from the TOF DCS Project.

- **Over Current**

  It means that some LV or HV channel went in a OVC status. **How to fix it:** find which channel is in error reading the logical name of the object. Using the FSM Hierarchy Tree Browser find the relevant node and open the operational panel. Try to switch OFF and ON again the channel, or get a Clear Alarm. If the error persists, you have to exclude the object from the TOF DCS Project.

- **TRIPPED**
It means that some LV or HV channel went in a TRIPPED status. **How to fix it:** find which channel is in error reading the logical name of the object. Using the FSM Hierarchy Tree Browser find the relevant node and open the operational panel. Try to switch OFF and ON again the channel, or get a Clear Alarm. If the error persists, you have to exclude the object from the TOF DCS Project.

- **VME Server Down**

It means that the communication between a ddl and the corresponding Linux machine is lost. **How to fix it:** find to which crate the ddl belong and open the corresponding operational panel (there is also a link from the tofAlarms panel, see picture below). Click on the **VME server restart**. **If the problem persist you have to switch OFF the whole crate because the board temperature are not monitored so far!**

- **DIM Server Down**

It means that the communication between a ddl and the corresponding Linux machine is lost. **How to fix it:** find to which crate the ddl belong and open the corresponding operational panel (there is also a link from the tofAlarms panel, see picture below). Click on the **DIM restart**. **If the problem persist you have to switch OFF the whole crate because the board temperature are not monitored so far!**

- **ACM Server Down**

It means that the communication with the ACM is lost. **How to fix it:** open the ACM operational panel (there is also a link from the tofAlarms panel, see picture below) and click on the **ACM restart**.

- **INTERCOM Server Down**

It means that the communication with the INTERCOM server is lost. **How to fix it:** open one of the crate operational panel no matter which (there is also a link from the Base Panel panel in the CONNECTION section, see picture below) and click on the **INTERCOM restart**.
Base Panel

Knowing the TOF hardware construction, most of the panels are self-explaining.

Please note that for LV and HV clicking on a channel the history will be available (if the option "OPEN panel" on the right is selected).

Miscellaneous

Get an error starting a panel

Sometimes an error occurs trying to open a panel and the following message appears:
I don't know why it happens, but it's just a temporary problem. Usually trying several times or after few minutes it desappears...

**How to exclude some objects**

If the TOF DCS fall in an error state you may be forced to exclude part of the project. In order to do that you have to:

- ask the DCS, DAQ or ECS people to release the control of the detector to you;
- go on the TOP NODE of the DCS UI and open the FSM controls;
- take the control of the FSM by clicking on the lock icon (look at (3) in the picture below);
- exclude the node by clicking on the corresponding icon (look at (4) in the picture below);
**How to exclude HV channels from the FSM**

Since the HV system FSM elements are imported from a different project it is not possible to include/exclude HV channel from the FSM in the usual way. Instead of the FSM control we have to use the operational panel and the button enable/disable show in the picture below.
How to restart the FSM

If the TOF DCS become DEAD you have to restart the FSM. Click on the button "FSM expert controls" in the DCS UI panel and select "Start/Restart All". The process could take times; be patient.

How to apply a recipe

In the TOF DCS there are 2 Configurator: the INFRA/TOF_HVSYSTEM_ConfDB for the HV system and the TOF_DCS_ConfDB for the LV system. The standard recipe for LV setup is applied automatically before to switch ON the crates. For the HV setup you can do it manually from the FSM control; give the command LOAD and select the recipe you want to apply. The DB panel (see below) may help you; selecting the name of the recipe, a small description is given in the Recipe description field. Just type the name of the recipe in the popup window and go.
How to monitor PVSS managers

If you would like to monitor or manage the status of the PVSS managers or to restart the whole project, you can connect directly to the PMON using a web browser and select the address:

- http://alitofwn001.cern.ch:4999 for TOF_DCS
- http://alitofwn002.cern.ch:4999 for TOF_HV
- http://alitofwn003.cern.ch:4999 for TOF_VME

How to extract errors from the DAQ_SITE infoBrowser

It is likely in your shift report you want to report error messages from the infoBrowser (both the ALICE DAQ or the TOF one). To select a portion of messages and save it in a file follow this procedure:

- decide which messages you want to extract
• deselect the online bottom
• typically use the following keys to get only the messages you want: min Time, Level, Facility, then push Query
Once you have the entries you want to save, push "export" and save them in a file. The file with the error is pure text and it can be usefully sent as an attach in log entry.

-- AndreaAlici - 15 Jun 2008

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