Shift Instructions
for the ITS commissioning

Last Update: 8/10/2020

THESE INSTRUCTIONS ARE UPDATED REGULARLY. MAKE SURE YOU READ THEM AT THE BEGINNING OF YOUR EVERY SHIFT!

Table of Contents

IMPORTANT CONTACTS

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COMPUTING PRE-REQUISITES AND USEFUL LINKS

Please make sure you have access to **all** of the following links BEFORE you start your shift:

- Mattermost channel: https://mattermost.web.cern.ch/aliitscomm/channels/commissioning-shifts (make sure you are member, if you are not, click here http://cern.ch/go/Ll9n)
- Logbook: https://alice-logbook.cern.ch/its-run3/ **- ALWAYS CHECK THE URL - MAKE SURE YOU ARE USING ITS-RUN3 LOGBOOK AND NOT THE ALICE RUN2 LOGBOOK**
- TWiki: https://twiki.cern.ch/twiki/bin/viewauth/ALICE/ITS-IB
- This document online: https://espace.cern.ch/alice-its-commissioning/_layouts/15/WopiFrame.aspx?sourcedoc=/alice-its-commissioning/Shared%20Documents/ITS-shift-instructions.docx&action=default
- Shifter panel presentation: https://espace.cern.ch/alice-its-commissioning/_layouts/15/WopiFrame.aspx?sourcedoc=/alice-its-commissioning/Shared%20Documents/Shifter_panels.pptx&action=default

GENERAL RECOMMENDATIONS

The shifter task is to **monitor the status** of power and cooling and immediately react in case of problems. When possible, will be also asked to **execute run** for data taking. Please, be aware that the shifter is **NOT supposed to switch on/off** the detector; this is done only by an expert. Precise instructions about tasks to be executed during your shift will be provided in the next paragraph (SHIFT SCHEDULE AND TASKS).

ATTENTION! In case of not conform behavior of the detector you are asked to react as fast as possible, possibly within 10 minutes. How to react to different situations will be listed below in this guide (Sub-paragraph What if… - Instructions to be followed in case of problem).
ATTENTION! Do NOT leave the control room at the end of your shift without either handing the detector over to the next shift or getting it switched off by an expert.

<<< SPECIAL COVID19 RECCOMANDATIONS >>>
ATTENTION! In order to reduce the probability of COVID19 diffusion all the shifters and the experts have to follow the rules provided by CERN [1]. Shifters in Control Room have to:

- keep a security distance of at least 2 m
- ventilate the room with fresh air, keeping open the windows
- constantly wear a mask within the Control Room
- disinfect keyboard/mouse, desk and chair surfaces using the available disinfectant
- disinfect your hands using the available disinfectant

SHIFT SCHEDULE AND TASKS (Changing frequently)

The list of tasks the shifters have to execute is reported below. In the following paragraphs detailed instructions about how to execute these tasks and further useful instructions are reported.

Detector status

HALF-LAYER	STATUS	LIST OF POWERED STAVES	vBB (V)	READOUT	FLP
HL0-T	ON		-3	YES	flpits7
HL0-B	ON		-3	YES	flpits7
HL1-T	ON		-3	YES	flpits8
HL1-B	ON		-3	YES	flpits8
HL2-T	ON		-3	YES	flpits1
HL2-B	ON		-3	YES	flpits6
HL3-T	OFF		0	NO	flpits9
HL3-B	OFF		0	NO	flpits9
HL4-T	OFF		0	NO	flpits3
HL4-B	OFF		0	NO	flpits10
HL5-T	OFF		0	NO	flpits4
HL5-B	OFF		0	NO	flpits2
HL6-T	ON		0	NO	flpits0
HL6-B	ON		0	NO	flpits5

Actions

- For OB (only L6 for the moment):
  - Monitor that the Top Node of the FSM is in status "STANDBY" and notify presence of coming Warning/Alarm.
- For IB:
  - Monitor the status of the staves from the IB monitoring panel
  - Execute data-taking as reported below
  - Execute QC + QC EoS analysis
- If a NOT conform behavior is present in one of the parameters to be checked, call immediately the Shift-Leader. **Be aware that the safety of the detector depends on your reactiveness.**
- If a Stave switch OFF, create a logbook entry following the instructions provided below and notify on Mattermost tagging @all.
- At the end of your shift create an End-Of-Shift (EOS) Entry in the logbook, providing details about detector status, data taking and other activities.

Run schedule and remarks

Every hour run a *Threshold scan* and a *Fake-hit-Rate scan*. In between, run *ReadoutTest scan* as long as you can. Always include all the CRUs. Configuration to be set in the “Options” field in the Run Control panel is, **for all the runs** (THR/FHR/ReadoutTest), is:

```
--configure_from_file config/threshold_tuned_ib_100e_3v_run102884+run200972.json
--configure_from_file config/threshold_tuned_ib_100e_0v_run400422.json
```

General notes

These notes gives you details about how to react in case of some failure and few additional further remarks:

- If a run fails with an error:
  "...command timed out!"
  From logbook entry
  Run finished with exit code
  - code 9: CONF [STAVE, --stave, X] command timed out!
  simply wait the end of the run and start a new one straight-away.
- If a run fails with error:
  "…DECODE_ERR…"
  From logbook entry
  Run finished with exit code
  - code 8: Check RU datapath counters: {DECODE_ERR: [LX_YY, …], …}
  and/or:
  "Check GBTx LOL counters"
  From logbook entry
  Run finished with exit code
  - code 9: Check GBTx LOL counters: [LX_YY_LOCAL_CLK_CNT, LX_YY_LOCAL_CLK_C2B_CNT]
  we have the following procedure to be applied with the help of the shift leader:
  1. [shifter] Perform a "RUconfigDump" (Always "BAD" in logbook) and notify SL
  2. [shifter] Retry the run
  3. If the next run is GOOD
     - [shifter] Perform a "RUconfigDump"
     - [SL] Create a logbook entry and notify Matteo/Miko
     - [shifter] Continue with normal data-taking
  4. If the next run is BAD with same error
     - [shifter] Notify the SL
     - [SL] Ask shifter to perform a "RUconfigDump"
     - [shifter] Perform "RUconfigDump"
     - [SL] Perform a power cycle of the affected RU/Stave, create a logbook entry, notify Matteo/Miko and notify the shifters once done
     - [shifter] Continue with normal data-taking
- If a run fails with error:
  "Check RU trigger handler counters"
  From logbook entry
  Run finished with exit code
  - code 8: Check RU trigger handler counters
  - …
  - code 4: Missing data files
  the optical power of the affected stave could be too low and an intervention is needed. Contact the SL.
- If a run fails with error:
  "8b10b_OOT_ERR and 8b10b_DISP_ERR"
  From logbook entry
  Run finished with exit code
  - code 8: Check RU datapath counters: {8b10b_OOT_ERR: [LX_YY], 8b10b_DISP_ERR: [LX_YY]}
  you can move to the next run, unless it appears for more than 5 runs in a bunch of 10 runs always on the same stave (LX_YY) and sometimes in coincidence with DECODE_ERR. In the latter case, notify this on Mattermost to the SL
- If an error not mentioned in the previous lines appears, notify it to the SL on Mattermost

- If "START RUN" remains disactivated, click "CLEAR RUN ERRORS"
- Execute QC on the FakeHitRate and ThresholdScan, if requested
- At the end of each run, check that the logbook entries (one for each CRU) have been correctly added to the logbook (with the correct run number) and follow it up if needed, as instructed below

Specific notes (really volatile…)

These notes are really volatile and can change really fast, given the nature of the problem they are related to:

- L2_14 is giving often DECODE_ERR. If this happens, you can skip the suggested procedure and move to the next run.
- L2_17 is giving often BUSY and BUSY_VIOLATION warnings (still run marked as GOOD). If this happens, you can move to the next run.
- IBT1 THR is failing with errors:
  - Code 7 : Check CRU counters
  - Code 5 : Warnings in Readout.exe

  You can proceed with the following run in your list.
- IBT1 THR QC analysis has been suppressed and you will never see filled that part of the map (as a consequence of previous point).
- IBT1 FHR QC analysis could miss a stave in the occupancy maps, time-by-time; if this happens, take a note of the stave name in the EOS report.
- It could happen that a run different wrt the one you selected is executed. This is a known issue. Repeat the run you intended to run.

DETAILED INSTRUCTIONS

Access to the local PCs and to the remote DCS machines

Two (Linux) PCs are available for the shifter to control and operate the detector:

- pcaliceitscr02 - (right station, looking at the window)
- pcaliceitscr01- (left station, looking at the window)

Account details for both machines:

- User: palpidefs (Password: ask Shift Leader)

Actual detector monitoring and data taking are perform from (Window) DCS machines remotely reachable using a Remote Desktop connection. The following terminal command have to be executed to connect to the corresponding DCS machines:

- OB monitoring: xfreerdp /u:itsshif2 /d:CERN /v:aliitsdcs4.cern.ch /f +old-license
- DAQ: xfreerdp /u:itsshift /d:CERN /v:aliitsdcs2.cern.ch /f +old-license

The names of the machines are temporary, until we will have the Operator Node in operation. At the moment the monitoring of the full detector is accessible through a single project called Operator Node. This project is running on machine aliitsdcs2.

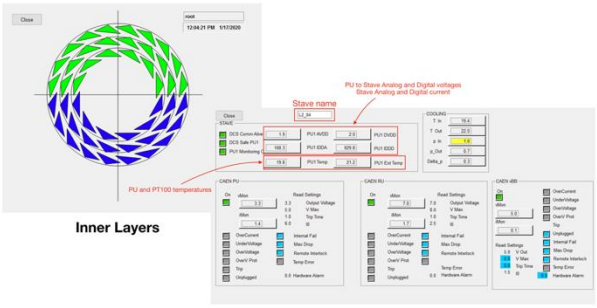
As you can see in the command line, two different accounts are used: itsshift (for DAQ) and itsshif2 (for OB monitoring); ask the passwords to the shifters. To make easier the connection to this DCS machine, in case it is needed, an icon called "Connect to DCS" is available on the desktop; one has to click on it and enter the password for the corresponding user.

Detector monitoring

ATTENTION! At the moment we are in a transient situation, given that we are going to deploy the new DCS system. Two different systems will be used to monitor IB and OB.

- **IB status monitoring (using panel "shifterPanels\ITS_IB_L0_L2.xml")**.
  This panel has to be launched from the Operator Node (aliitsdcs2.cern.ch) by user itsshift, double clicking on the desktop link "IB monitoring". This panel shows a geometrical representation of the staves within the IB layers. Each stave is represented as a colored triangle. The color of the triangle expresses the status of the stave. Meaning of the different colors are reported in the following table. Clicking on a stave, a new panel can be open. Here a lot of information are reported to monitor the status of the selected stave. Following sections can be seen in this panel:
    - STAVE: including
      - leds for CommLayer status, Monitoring status
      - RU internal temperature and PT100 temperature
      - AVDD, DVDD, IDDA and IDDA for all the channels (HICs) in the selected stave (1 HIC for IL, 8 HICs on 1 PU for ML, 14 HICs on 2 PUs for the OL)

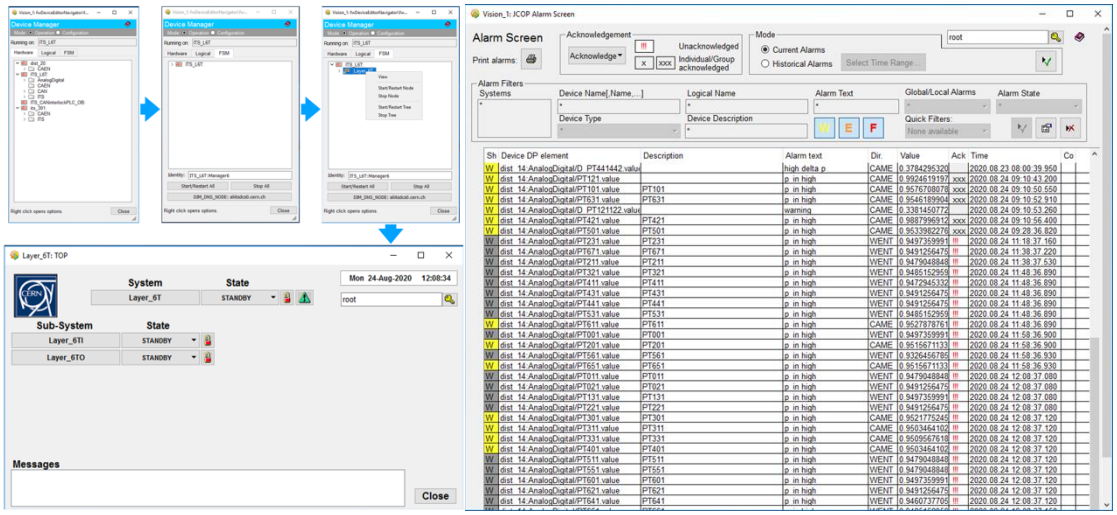
- CAEN PU/RU: including details about the status of the CAEN channels that provide power to the PUs and Rus
- CAEN vBB: including details about the status of the CAEN channels that provide power for the BB to the PUs
- COOLING: including details about input and output water temperature, input, output and delta water pressure in the cooling line for this stave



COLOR	STATUS	DESCRIPTION
GRAY	PUs/RUs OFF	CAEN modules are NOT providing voltages to RUs and PUs.
DARK BLUE	PUs/RUs ON	CAEN modules are providing voltages to RUs and PUs. PUs are not suppling voltage to the stave.
LIGHT BLUE	Monitoring ENABLED	CAEN modules are providing voltages to RUs and PUs and the monitoring process in the RUs is activate. Still PUs are not suppling voltage to the stave
DARK GREEN	Stave POWERED	PUs are providing voltage to the stave. Chips are clocked but not yet configured.
LIGHT GREEN	Chips CONFIGURED	Chips are finally configured and are ready to collect data.
ORANGE	Wrong powering	Warning situation in which a Stave, supposed to be powered, show analog and/or digital current with a wrong value.
RED	Temperature Alarm	Blinking RED color. Alarm for PT100 temperature being outside a defined range

- **OB status monitoring (using FSM)**
  This panel has to be launched from aliitsdcs4.cern.ch by user itsshif2, double clicking on the desktop link "Device Manager". As described in the below pictures, to actually open the panel, one has to: switch to tab "FSM", click on the "ITS_L6" element, right click on the element below and select "View" action. This panel gives access to the FSM of the detector and allows user to apply actions to the detector. To be able to apply a command, a lock mechanism has been implemented. Lock will always be in the hand of the shift leader (or an expert), and you will visualize it in red. At the moment we are planning to keep the stave in status STANDBY, equivalent to chip powered with clock active but not configured. Shifters have to check that the status, reported in the Top Node, is always in the desired status.
  A second panel is available to the shifters, that can be launched double clicking on the desktop link "Alarms". A screenshot of this panel is reported below. A list of warnings and errors are visible in this panel, helping the shifter to monitor the status of the full system. Presence of new warning/error has to be notified to the shift leader with a message in Mattermost (tagging @all in the Commissioning Shifts channel).
  More specifically:
  - Warning/Alarm from “dist_14” has to be notified in Mattermost tagging Hartmut Hillemanns
  - Warning/Alarm like “AnalogDigital/D PTXXXXXX refer to the difference between pressure_in and pressure_out of the corresponding cooling loop. There is an alarm when the difference exceeds 0.4, but you can ignore it.

- Warning/Alarm, in CAME status, containing a string like “LX_YY” (that represents the name of a stave) has to be notified in Mattermost tagging Serhiy Senyukov



- **Global Status Monitoring Panel**

  This panel can be launched only within the Operator Node (aliitsdcs2.cern.ch) and is an extension of the already described IB status monitoring panel. In this case, a representation of the full det **NOTE: the panel is still under development and the different components will be available while the FSM integration progresses.** At the moment, the only available part is the full L6, as for the FSM panel, described just above. Color code is really simple for the time being:

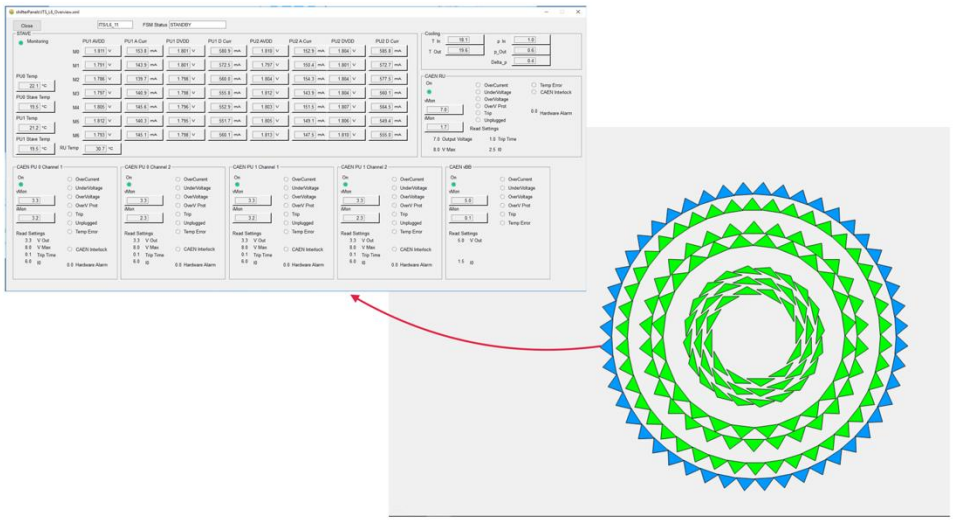
  - Gray = STAVES_OFF, NO_CLOCK
  - Blue = STANDBY
  - Green = READY (Not reachable at the moment)

  As for the IB panel, one can click on a specific stave and open the corresponding panel. Here the main news is the presence of a status box for the FSM in the top part of the panel. Trending plot for temperatures, currents and voltages, of single modules, PU, RU and cooling plant can be visualized.

  To open the panel in the Operator Node, one has to:

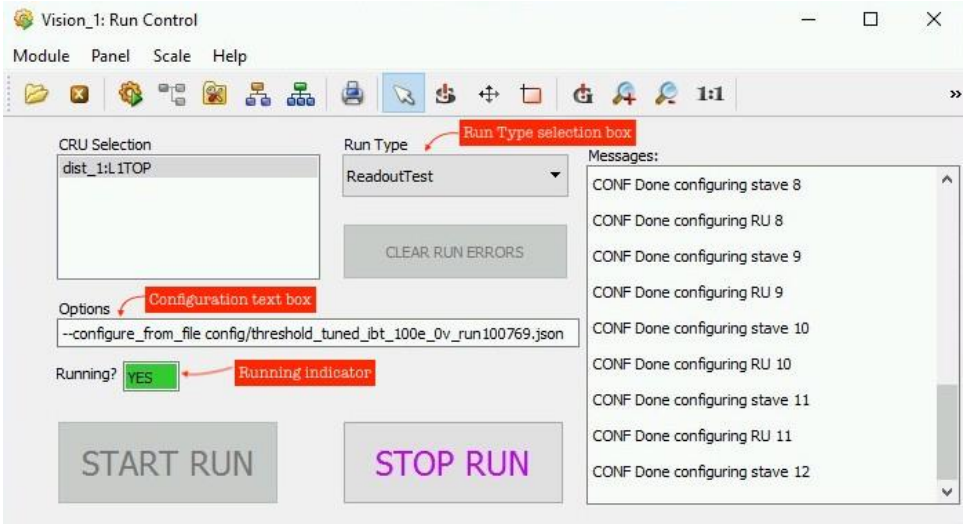
  a. Connect to the Operator Node (aliitsdcs2.cern.ch)
  b. Open the Windows PowerShell
  c. Type the following command: WCCOAui -p FullDetectorTest.xml -proj its_on

  Usage of the FSM panel is still recommended for the shifter to monitor the status of the OB staves. Soon the present panel and the FSM one will be fused in one single panel.



Run control Panel

The “Run Control” panel (shown in the picture below) must be open in the DCS machine; a desktop link has been created for the user itsshift. You have a “START RUN” button, to be pressed to actually launch the run, a “Run type selection” scroll-down menu, to select between different kind of scans (Threshold scan, Fake-Hit Rate, ReadoutTest, etc.), an “Option” field to specify the configuration for the run, a "CRU Selection list" to select the CRU to be included in the data taking, a “Running?” led that tell you if the run actually started.



The list of actions to be executed to launch a run is the following:

1. Select the scan in "Run type selection” box
2. Activate in the CRU Selection list the portion of detector to be included in the run IB staves are readout through 8 CRUs: layer 0 top (ibt0) and bottom (ibb0), layer 1 top (ibt1) and bottom (ibb1), layer 2 top (ibt2a and ibt2b) and bottom (ibb2a and ibb2b).
3. In the configuration text box write the options specified in the shift schedule and task paragraph
4. Press START RUN and wait until the run completion (Running led, just above the START RUN button, should became **GREEN** with “Yes” value)
5. If any ERROR, WARNING, CRITICAL or EXCEPTION appear in the “Messages” section, contact the Shift Leader and **DO NOT RUN ANY OTHER SCRIPT OR RUN (UNLESS SPECIFIED IN THE SHIFT SCHEDULE AND TASKS SECTION)!!!!**
6. Check the logbook entry and follow up if needed (see below); if there were errors during the run, the quality flag is BAD, otherwise GOOD

Please, verify that the logbook entries (8 for each run, corresponding to the 8 CRUs in data taking when the full IB is included) automatically created are actually present. If NOT available, create one by hand as instructed in the troubleshooting chapter.

QC (Quality Control) and Post-process trending

There are four ***QC related tasks that has to be executed for each IB run (FakeHitRate of ThresholdScan)***:

- Start the analysis of the new run
- Check the processing status
- After processing, check the errors and add a screenshot of the histograms to the logbook entry (as follow-up of existing automatically created entry for the analyzed run)
- Check the post-processing plots every ~hour

All four steps are explained in detail below:

1. Analyzing a new run:

From one of the two station PC connect to **flpits6** (full list at the beginning of this document) [DON NOT USE –X or -Y]. A ssh key has been created in this station to connect to these two FLP machines, so you do not need to know the password.
In case of FakeHitRate:

- cd /home/its/QC_Online/workdir
- ./shift_run_QC_replay.sh runXXXXXX

In case of ThresholdScan:

- cd /home/its/QC/workdir
- ./shift_run_QC_threshold.sh runXXXXXX

The two scripts can be launched in parallel from two terminals!
But the gap between submitting/re-injecting two runs (e.g. THR+FHR, FHR + FHR) should be larger than 5 mins even running in different terminals.

2. Check the status of the processing from the GUI:

To check the current status of QC, go to the links:

- FHR for IB: https://qcg-test.cern.ch/?page=layoutShow&layoutId=5f3fc798af8b6db8a8889389&layoutName=ITS_FHR_IB_Online
- THR for IB: https://qcg-test.cern.ch/?page=layoutShow&layoutId=5e3c6ae923836bd5a7b01cb9&layoutName=ITS_THR_IB

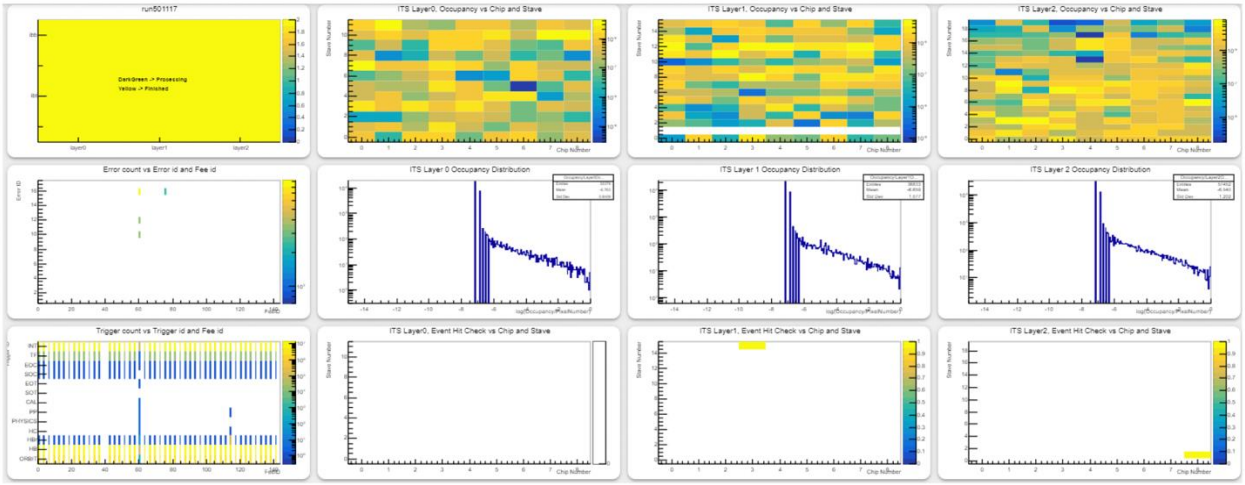
(these links are also available in the header of the Mattermost "Commissioning shifters" channel).

FAKE-HIT-RATE

You have to refresh the page to update the status. The current QC publishing period is 1 min. But the first result would come up after 5 mins (to start the online QC workflow) when executing ./shift_run_QC_replay.sh.
The QC layout for FHR is shown in below screenshot. The general status, decoding errors and trigger statistics can be found in the first column 3 plots. The other 3 columns show the chip-wise occupancy and the occupancy distribution for the noisy pixels and the event counts when the fired pixels/event/chip > 100 for the Inner Barrel L0, L1 and L2 respectively.
The bins in the top-left general status plot would be reset to white after injecting a new run, then change to green (processing) and then to yellow (processed and ready to take

screenshot).
In case of problem:

1. **For both good and bad FHR runs**, if not all the bins changing to green (after 5 mins) and then finally to yellow (after 35 minutes), please re-run the script **once** and take a note in logbook. If still not working, please inform QC experts (tag Jian Liu in the Mattermost channel) and shifter leader.
2. If errors presenting in the decoding error plot, please also take a note in the logbook (e.g. write down the error IDs and FeeIDs)
3. If a missing stave is present in the occupancy maps, take a note in the EOS report



Error meaning

ERROR ID	Description
1	Page data not start with expected RDH
2	New HB/trigger page started w/o stopping previous one
3	Page with RDH.stop is not empty
4	RDH page counters for the same RU/trigger are not continuous
5	RDH and GBT header page counters are not consistent
6	GBT trigger word was expected but not found
7	GBT payload header was expected but not found
8	GBT payload trailer was expected but not found
9	All lanes were stopped but the page counter in not 0
10	End of FEE data reached while not all lanes received stop
11	Data was received for stopped lane
12	No data was seen for lane (which was not in timeout)
13	ChipID (on module) was different from the lane ID on the IB stave
14	Cable data does not start with chip header or empty chip
15	Active lanes pattern conflicts with expected for given RU type
16	Jump in RDH_packetCounter
17	Packet done is missing in the trailer while CRU page is not over

TRIGGER	Description
ORBIT	Orbit
HB	Heartbeat
HBr	Heartbeat reject (if 0: HB accept, if 1 HB reject)
HC	Health check
PHYSICS	Physics Trigger
PP	Prepulse
CAL	Calibration
SOT	Start of triggered data
EOR	End of triggered data
SOC	Start of Continuous Data
EOC	End of Continuous Data
TF	Time Frame delimiter
INT	Internally generated trigger in RU continuous mode

THRESHOLD SCAN

You have to refresh the page to update the status. The current QC publishing period is also 1 min. The first result would come up after 4 mins when executing ./shift_run_QC_replay.sh.

The QC layout for THR is shown in below screenshot. The general status, chip-wise avg. threshold and dead pixels for L0, L1, L2T and L2B are shown from left to right. Please keep looking at the four QC process information plots in the top row. The bulbs will change to green/yellow in 3 mins after injecting a new Threshold run. Waiting for all bulbs changing to red, which means the run is processed.

For **good THR runs**, if the bulbs not changing to green or yellow in 5 mins after running ./shift_QC_threshold.sh, or if the bulbs cannot change to red after 45 mins, please execute:

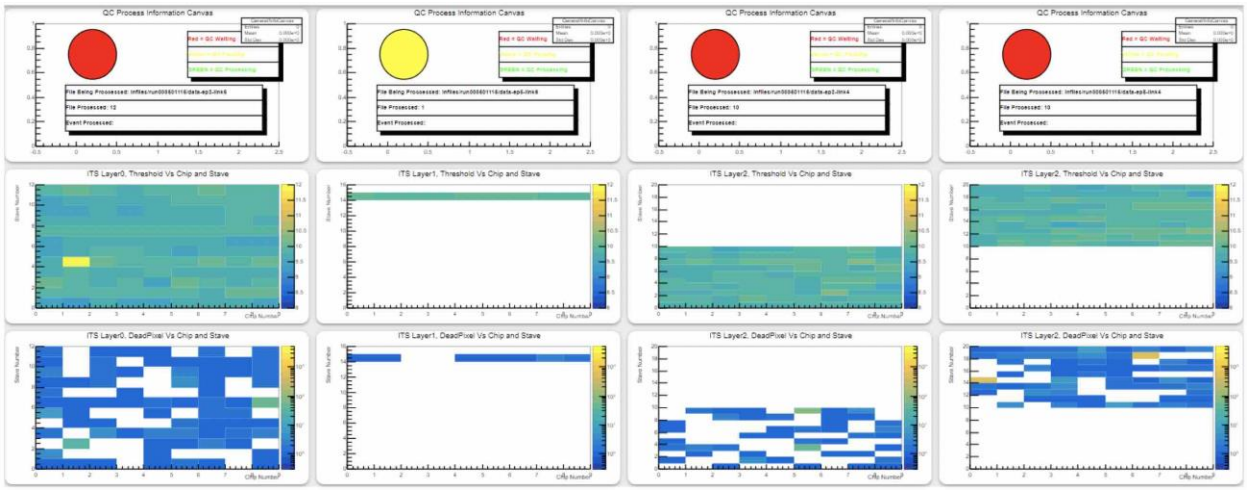
- ./shift_restart_QC_threshold.sh

then re-inject the run by executing:

- ./shift_QC_threshold.sh runXXXXXX

If still not working, inform QC experts (tag Jian Liu in Mattermost channel) and shifter leader. Then skip this run and move to next one.

For **bad THR runs**, if QC fails to process (above mentioned cases), skip the run and take a note in the logbook (as follow-up of existing automatically created entry for the analyzed run).



3. Adding QC information to the logbook:

Once the analysis of the run has finished, the all bins in yellow for the general status plot of FHR and all bulbs in red for the status plots of THR, which means that QC is waiting for a new file. At this point, check the other plots on the same page.

Refresh (reload) the page and take screenshot of the plots, and then add it to the logbook entry (as follow-up of existing automatically created entry for the analyzed run).

If errors presenting in the decoding error plot for FHR runs, please also take a note in the logbook (as follow-up of existing automatically created entry for the analyzed run).

If there are any problems (e.g. web page not accessible) *call* the QC expert and WRITE A LOGBOOK ENTRY with type DQM/QA. If the QC hasn't started processing the run before the shift_check_data.py has finished, omit the QC for that run, and write in the logbook entry "QC unavailable".

4.Check of post-processing plots (NOT TO BE DONE FOR NOW)

When running threshold and fake-hit rate runs, you can monitor the trends of different pararameters at this link:
https://qcg-test.cern.ch/?page=layoutShow&layoutId=5ed22421001a31b55d7df715&layoutName=PostProcessingGUI
(this link is also available in the header of the Mattermost "Commissioning shifters" channel).
In the web page there are two tabs: THR and FHR. In each tab, the main parameters of the two type of runs are plotted for layers 0, 1 and 2 (Inner Barrel). From the plot titles and y-axis titles is possible to clearly distinguish the different layers and parameters plotted, respectively. On the x-axis of every plot, the run number is plotted. **It can happen that a given run is plotted twice (or even more times). Refresh the browser to see the plot updating.**
Important: the plots update automatically every 30'
Shifters activity:

1. monitor the trends of all the parameters as a function of the run number. If you see large fluctuations, report this on the shift channel on mattermost tagging the shift leader and Ivan Ravasenga.
2. If the plots do not update every 30' (remember to refresh the browser!), write on the same mattermost channel tagging Ivan Ravasenga (iravasen).

5. Execute the data checker (in case requested by shifter leader)

This python script is available at:

```
/home/its/production/CRU_ITS/software/py/decode.py
```

It can be executed on all the output files for a given run, through the following command:

```
lz4 -d -f /data/shifts/runs/run${i}/data-ep4-link0.lz4 |
/home/its/production/CRU_ITS/software/py/decode.py
```

The bash script, /shareFS/its/dcolella/decoder/decode_execute.sh can be used to launch the python script.

Following instructions have to be executed by shifter:

- connect to the flp machine where the data are collected: ssh its@flpitsX.cern.ch, where X depends on the machine
- create a tmux session with name decoder
  - check if the session already exist: tmux ls
  - if it does exist: tmux attach -t decoder
  - if it does not exist: tmux new -s decoder
- to launch the bash script: ./decode_execute
- the list of the available data for the Fake Hit Rate in folder /data/shifts/runs/ will be displayed
- two options will be presented
  - Analyse run: to execute the decode.py script; more than one run can be analysed simply listing all the run names separated by empty space
  - Create a logbook entry with results: to create a logbbok entry containing the summary of the checker results; in this case only one run can processed per time.
- verify that the actions have been executed
  - in case of option A, a file has to created in folder /shareFS/its/dcolella/decoder/ with name decode_runXXXXXX.log
  - b. in case of option B, a logbook entry has to be created with title "Data checker run XXXXXX" and content like: "Feeid 4098: Run was executed in continuous mode: 14052728 blocks trigger_counted: {ORBIT: 456, HB: 14052728, HBr: 14052386, HC: 0, PHYSICS: 0, PP: 0, CAL: 0, SOT: 0, EOT: 0, SOC: 1, EOC: 0, TF: 2, INT: 14052272} Identified feeids: [4098] Identified links: [0]"

QC End of Shift analysis

15 minutes before the end of the shift, **if you took fake-hit rate runs during your shift**, run the script that analyses the FakeHitRate runs in the last 24h. To do so:

1. In FLP6 (where you are running already QC scripts) go into: /home/its/QC/workdir/QCanalysis
2. Run the script startanalysis.sh: ./startanalysis.sh
3. Follow the instructions on the terminal
    a. Select option 1: Shifter Mode
    b. Select option 1: FakeHitRate runs
    c. Enter layer number: put -1 to select all IB layers
    d. Put B or T for selecting IB Bottom or IB Top, respectively
    e. The analysis starts automatically.
    f. When the script is finished run the command: **ls -lrt Plots**
    g. **Verity that the report is in the folder "Plots"**. Its name is ShifterReport24h_FHR_<date>_<time>_from_runXXXXXX_to_runYYYYYY.pdf where <date> and <time> are the date and time related to when you run the script, XXXXXX is the first run in the list and YYYYYY is the last run in the list.

Repeat from b selecting option 2: Threshold Runs. This can be done <u>in parallel</u> on another terminal!

End of shift report (EOS)

At the end of every shift, please write a summary according to the template below:

Crew:
Detector Status: on/off + who switched it off before you stop the shifts
Run list: *(see example lines below)*
ThresholdScan run000406 VCASN 52 ITHR 51 GOOD
FakeHitRate run000407 VCASN 52 ITHR 51 GOOD
QC good
ThresholdScan run000408 HL0_threshold_tuned_100e GOOD
FakeHitRate run000409 HL0_threshold_tuned_100e GOOD
QC good

Every run should contain its run number, settings and the result or potential errors as well as the status of the QC.

General remarks on writing logbook entries

- For any issue not covered in this Shift Instructions write a detailed logbook entry with a clear description of the problem and solution (AFTER contacting the expert)
- Use the following convention for the title of the logbook entry:
  HLx PP1-<O|I>-<0-7> <stave id, if necessary><intervention>
  e.g. "HL5 PP1-O-6 L5_19 RU reset" or "IBT PP1-I-4 L2_00 PB went off"
  The list of the rack to which a stave is connected is reported in the troubleshooting.
- If you have contacted an expert because of any issue, specify in the corresponding logbook entry that you contacted an expert and which expert it was
- Take note of the time of the different actions e.g. if there is a cooling interlock write cooling interlock at 12:53, contacted expert at 12:54, expert solved the problem and released the control of detector at 13:12

- Try to attach useful information to do log entries, e.g. in case of a cooling interlock attach screenshot of the cooling panel.

SHIFT IN REMOTE CONNECTION

Connection to DCS machines

Data taking and monitoring of the status of the detector is done through DCS machine hosted within the CERN network.
Here few instructions to access to them.

1. Install a remote desktop software
   —> Microsoft Remote Desktop on Mac/Windowsr
   —> FreeRDP on Linux (CENTOS7 useful command: xfreerdp +clipboard /smart-sizing /u:NICEaccount /d:CERN /v:cernts.cern.ch /size:1500x800, where you have to specify your NICEaccount)
2. Create a connection to PC cernts.cern.ch using your NICE account (put CERN\ in front of the account name)
   —> This is a Windows machine that acts as a Gateway to machines within CERN network
3. From the gateway open Remote Desktop and create a connection to the DCS machine:
   —> For DAQ activities: **aliitsdcs2.cern.ch** using user **itsshift** (ask password to the shift leader)
   —> For OB monitoring: **aliitsdcs4.cern.ch** using user **itsshif2** (ask password to the shift leader)
   Here you have the usual panels already open to operate.

Connection to QC machine

QC is execute on FLP machines hosted within the CERN network.
Here few instructions to access to them.

1. Open a terminal and connect to lxplus using you NICE account
   >> **ssh NICEaccount@lxplus.cern.ch**
2. From this gateway, connect to the Linux machine in Control Room
   >> **ssh palpidefs@pcaliceitscr02.cern.ch** (ask password to the shift leader)
3. Here two tmux sessions dedicated to QC activities are open
   >> **tmux ls**
   Two sessions are “QC_FHR” and “QC_THR”
   >> **tmux new -s QC_FHR or tmux new -s QC_THR** (if not existing)
   >> **tmux a -t QC_FHR or tmux a -t QC_THR** (if already existing)
   Open these two sessions in two different terminals, repeating the steps until now.
4. From each of these two windows connection to the flp machine, where the QC is executed, if not already connected:
   >> **flp6** (no password needed))
5. From each of these two window, already connected to flp6 machine, open the local tmux session for THR (“qc_thr”) and for FHR (“qc_fhr”).
   In one window:
   >> **tmux ls**
   >> **tmux new -s qc_thr** (if not existing)
   >> **tmux a -t qc_thr** (if already existing)
   In the second window:

>> **tmux ls**
>> **tmux new -s qc_fhr** (if not existing)
>> **tmux a -t qc_fhr** (if already existing)
From these two session you can operate as described in the QC paragraph.

Notes

1. Use the Vidyo Virtual Room for Shifters and Experts (https://vidyoportal.cern.ch/join/jVKVQhUhjy, link also available in the header of Mattermost Commissioning shifters channel) to be in contact with the second shifter:
   —> The shifter in CR has to ping the other one about his status every hour
   —> We actually do expect higher rate interactions between the two shifters given the correlated activities of DAQ and QC done by the two shifters
2. Keep using the Mattermost channel to communicate with SL and experts
3. In case of problem call the SL to the phone number

Emergency

1. Firebrigade number: 74444
2. Fast powering OFF of the full detector (only if agreed with SL/Felix)
   a. turn the key of the Main Frame
   b. activate circuit breaker close to the door

TROUBLESHOOTING

Taking screenshots

Following aliases are available to make screenshots:

1. scw (for the full desktop)
2. scwa (to select a specif area)

Alternative instructions are:

1. Open "Screenshot" application: Applications -> Utilities -> Screenshot
2. Select "Select area to grab" option
3. Press "Take a screenshot" button
4. Choose area for screenshot (Temperature trends)
5. Set correct name (THRESHOLD_run123456 / FAKEHITRATE_run123456 / QC_hitmaps_run123456) and folder name where the file is located on the local PC.

Logging the runs

After ***each run*** a logbook entry is created automatically; but you should check it has been correctly created. To be able to view automatically generated log entries, make sure you have ***disabled*** Log Entries “Class” filter:

Class filter "enabled"

Class filter "disabled"

If the log entry is present, add a follow-up entry (icon) with the additional information (if applicable):

- If a run has finished with errors because of some other issue (e.g. detector went off)
- If you have run QC, make a screenshot of the plots and attach it to the follow-up log entry, for precise instructions what to screenshot see below. Write if the QC detected any errors.

If the log entry is not present, add a log entry as following and inform Shift Leader.
Type: GENERAL
Subsystem: Inner Barrel
Title: [ThresholdScan/FakeHitRate/ReadoutTest] run123456 [VCASN XY ITHR YX/configuration_file_name] [BAD if errors]
Log entry:

[ThresholdScan/FakeHitRate/ReadoutTest]
[VCASN XY ITHR YX or configuration file name]
Run number: run123456
Quality flag: [GOOD/BAD] + comment if any (see executing runs section for details)
if there are errors, paste here the output for run123456, at least last 20 lines

Files:

- If you have run QC, make a screenshot of the plots and attach it to the log entry, for precise instructions what to screenshot see below

N.B. Always use full run number in the form run000976, pay attention to the number of digits (6)

-->An **example** is shown here: https://alice-logbook.cern.ch/its-run3/date_online.php?p_cont=comd&p_cid=34050

Preparing the tmux windows

1. If not already, ssh to flpitsX machine with command:
   ssh its@flpitsX
2. try:
   tmux a -t shifters
3. if this doesn't work check whether the *shifters* session is not there:
   tmux ls
4. and then create a new one:
   tmux new -s shifters
5. go to the scripts folder:
   cd ~/shifts/ib-commissioning-tools/
6. Create a new tab with CTRL + b followed by c.
7. Create another tab with CTRL + b followed by c.

To switch between the tabs, use CTRL+b followed by 0 for tab 0 or 1 for tab 1, 2 for 2. Tab 1 is to be used for the temperature text file and the tab 0 for the execution of scripts. Tab 2 is to be used for QC and data checking. To scroll in tmux window type use CTRL+b followed by [. To exit scrolling mode type q.

List of staves and sub-racks connections

In the following list you can find to which subrack each stave is connected. This information is needed to create a useful logbook entry.

Half-Layer	Staves	Subrack	Half-Layer	Staves	Subrack
HIB-T HL0	L0_00 to L0_05	PP1-I-3	**HIB-B HL0**	L0_06 to L0_11	PP1-O-4
HIB-T HL1	L1_00 to L1_07	PP1-I-3	**HIB-B HL1**	L1_08 to L1_15	PP1-O-4
HIB-T HL2	L2_00 to L2_09	PP1-I-4	**HIB-B HL2**	L2_10 to L2_19	PP1-O-3
HOB-T HL3	L3_00 to L3_05	PP1-O-5	**HOB-B HL3**	L3_12 to L3_17	PP1-I-2
	L3_06 to L3_11	PP1-O-2		L3_18 to L3_23	PP1-I-5
HOB-T HL4	L4_00 to L4_07	PP1-O-5	**HOB-B HL4**	L4_15 to L4_22	PP1-I-2
	L4_08 to L4_14	PP1-O-2		L4_23 to L4_29	PP1-I-5
HOB-T HL5	L5_00 to L5_09	PP1-I-1	**HOB-B HL5**	L5_21 to L5_31	PP1-I-6
	L5_10 to L5_20	PP1-O-1		L5_32 to L5_41	PP1-O-6
HOB-T HL6	L6_00 to L6_11	PP1-I-0	**HOB-B HL6**	L6_24 to L6_35	PP1-I-7
	L6_12 to L6_23	PP1-O-7		L6_36 to L6_47	PP1-O-0

BACKUP