

# DHH

**Stefan Huber**

Institute for Hadronic Structure and Fundamental Symmetries (E18)

TUM Department of Physics


Technical University of Munich


PXD workshop, 16th May 2022




# Recent issues

## [PLL lock lost on 1052, heartbeat lost](#)



**pxd\_bot** Owner able to create personal access token 2:38  
 Log message – **DHH RC** : H1052 RC: Entered state RECOVERY. (heartbeat lost)


**pxd\_bot** Owner able to create personal access token 2:38  
 Alarm triggered – PV: **PXD:H1052:dhp\_pll\_not\_locked:ALRM:cur**, State: **MAJOR** (STATE\_ALARM) [here](#)

path	description
/DHH/H1052/PXD:H1052:dhp_pll_not_locked:ALRM:cur	


**pxd\_bot** Owner able to create personal access token 2:38  
 Alarm triggered – PV: **PXD:H1052:pvsConfig\_status:S:cur**, State: **MAJOR** (LOW\_ALARM) [here](#)

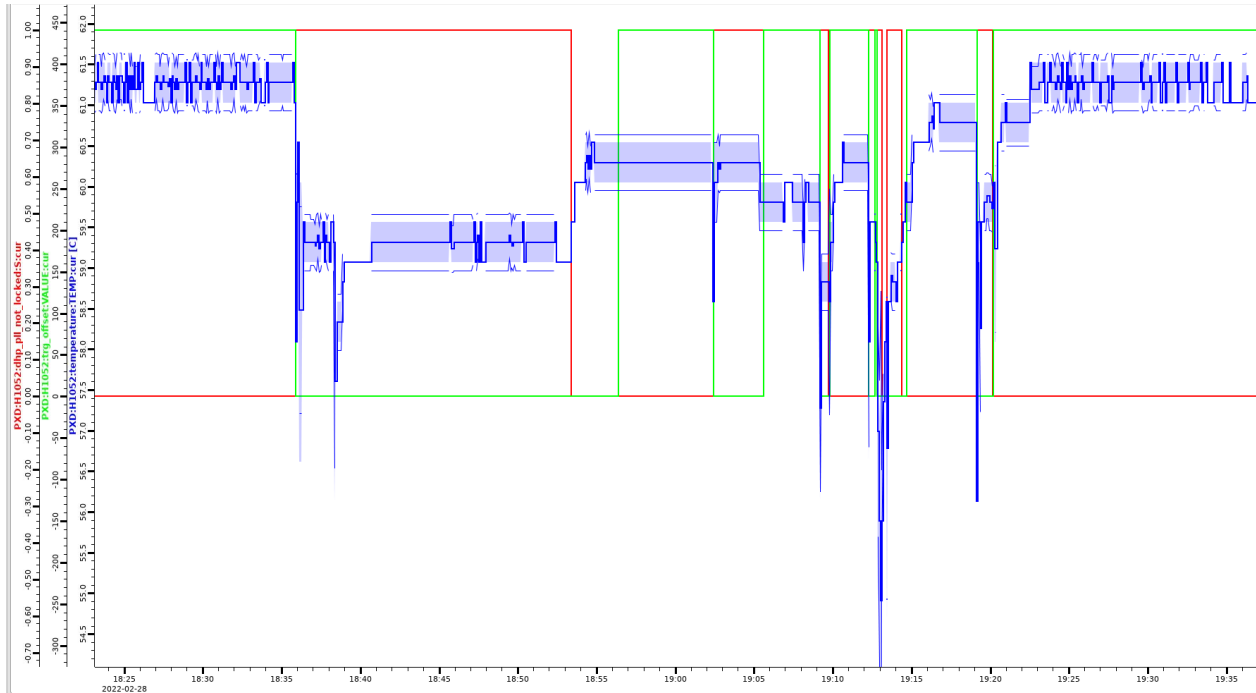
path	description
/DHH/H1052/PXD:H1052:pvsConfig_status:S:cur	


**pxd\_bot** Owner able to create personal access token 2:38  
 Log message – **DHH RC** : H1052 RC: PVs not reconnected in time. Going to ERROR state

- Errors observed on 14.02.2022

# Recent issues

## PLL lock lost on 1052, heartbeat lost



- Errors observed on 14.02.2022
- FPGA temperature drop at times of link loss
- Indication of FPGA rebooting at these occasion
  - ⇒ Suspect broken DC/DC converter
  - ⇒ Card exchanged

# Recent issues

## DHC 40 firmware crash

During run 24/371 <https://rundb.belle2.org/webview/run/24/371/> DHC 40 firmware crashed.

Programming of DHC clock failed. No respond.

DHC flashing failed. Following message was produced:

INFO:iMPACT - iMPACT quit the Identify Chain because it detects there are at least 30 'UNKNOWN' type devices on the chain.

Please check the hardware settings and retry!

Power cycle of DHH 40 did not resolve the problem.

Power cycle of the complete shelf did not resolve the problem.

Other DHCs and their DHE/DHI seem to work again after program their clock in order.

DHC 40 still unavailable.

The DHH-RC seems to be stuck in a loop producing log messages periodically.

- Errors observed on 24.02.2022
- JTAG errors don't point to individual DHH
  - One card in the chain creates troubles
- Power LED was discovered off
  - ⇒ Suspect broken DC/DC converter
  - ⇒ Card exchanged

# Recent issues

## ATCA power supply issue

- During intervention on DHC 40
- One broken power supply of the ATCA shelf
  - Redundancy hid issue from user
  - System still operational

=> PSU exchanged
  
- Three failures during powering up of the system
- Common cause of troubles?

# Plan for new throttling mechanism in DHH

- Main idea: Stop triggers to DHP in case occupancy gets close to limits
- For continuous monitoring: Continuous trigger from DHI to DHP => All latency settings = 0
- DHE monitors occupancy on all inputs
  1. On basis of frame integral → Veto to DHI
  2. On basis of integral over few consecutive gates → Veto to DHI
- DHE sends veto signal to DHC -> DHI
  1. DHI checks to which frame the veto corresponds
  2. DHI vetoes the rest of the frame
  3. In case the veto occurs close to the end of a frame veto also for the next frame

# Plan for new throttling mechanism in DHH

- Requirement:
  - Latency: DHI->DHP->DHI->DHE->DHC->DHI not to big
  - Depending on occupancy thresholds
  - Assumed to be only few microseconds
- Plans
  - Measure latency in the lab -> measure latency at KEK (no beam needed)
  - Decide detailed veto conditions
    - Tune integral ranges
    - Tune thresholds
    - When to veto second frame

# New carrier card

- Necessary for 5Gb/s links
- Optical links directly attached from the back(no RTM)
- Schematic ready
- Layout to be done
- Plan to test it in autumn