

# IPMI Updates and Plans

10<sup>th</sup> VXD Workshop  
Santander, 14.9.2016

- All hardware (MMC and IPMC) production was finished before last TB
  - a few boards were fixed afterwards
- Firmware v1 on MMC and IPMC was used in DESY Test in Apr 2016 without observing any problems (and used since then...)
- EPICS / Slow control was used
  - Sensor reading by IOC based on ipmitool (M. Ritzert)
  - CSS OPIs were ready for AMC, carrier and Shelf/PSU/Fans
  - Monitored data was archived continuously.
- Setup TB Apr 2016:
  - ATCA Shelf (2 slot) with Kontron Shm500
  - 2 Carrier with 2 AMCs (→ 2 IPMC, 2 MMC)

- Implemented CRC check for bootloader and IPMI firmware
- Bridge to MMC is now fully working (IPMC).
- SDR is loaded from EEPROM, no need to recompile firmware if sensor properties (thresholds) change.
- IPMB lock detection, IPMB sensor for IPMC
- New user functions for CRC check, firmware version, board id, uptime
- Remote upgrade works, but there is no rollback functionality
  - Failed/interrupted upgrade is not remotely recoverable ☠
- One big problem left:
  - IPMB two wire bus locks if two boards send at the very same time
  - Was not an issue for last test (only few boards, only one IOC)
  - Turned up if several IOCs serve several boards at once.
  - If not correctly handled, it might lock the whole shelf.

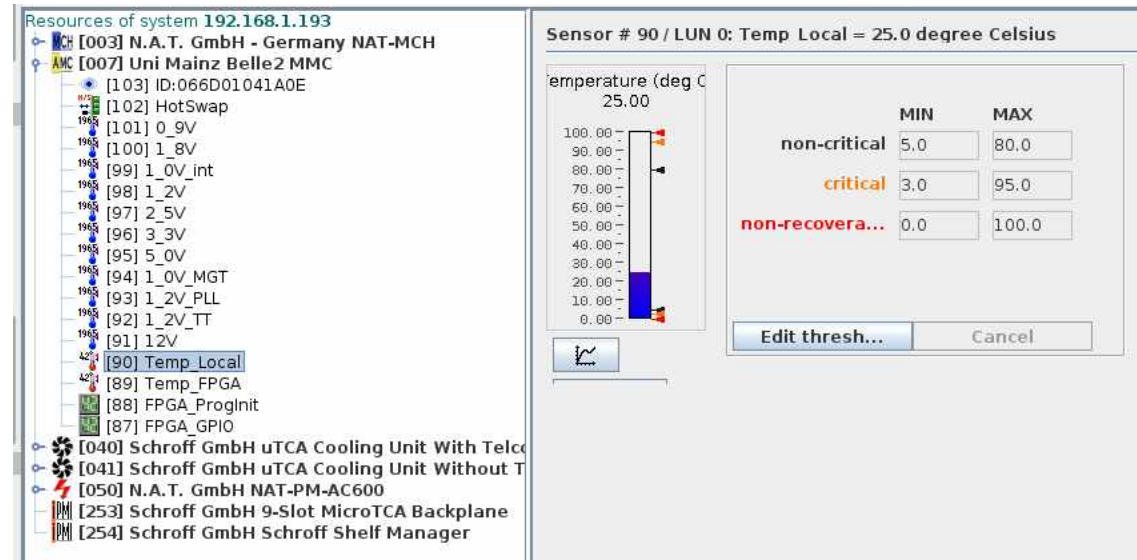
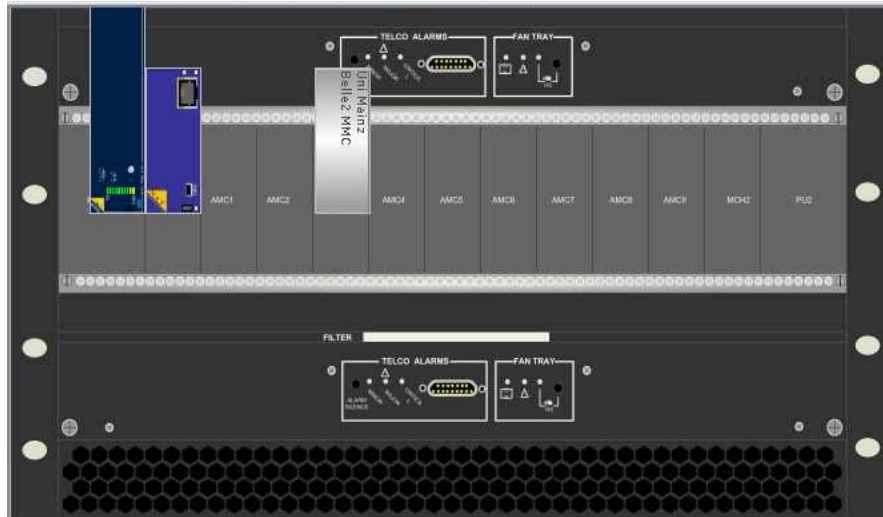
- New IPMI EPICS IOC
  - Command based
    - Send arbitrary command to IPMI board. Parameters can be taken from PV and/or result is written into PV
  - (de)activate, reprogram and other user defined functions
  - Differs strongly from “sensor” based version used until now.
  - Not a replacement but really a second IOC
  - Read and Write PV supported
    - mbbidirect, mbbodirect, bo (for simple trigger) and waveform (read and write)
- Several (small) improvements on both IOCs
  - No overall device scan needed anymore



- Performance issues
  - Sensor Reads/Command are send one after the other, each waiting for reply
  - → Will timeout for large number of sensors
  - Parallelize several IOCs (one per carrier) might be a solution → interferences?
    - → large IPMB bus traffic → higher chances for a lock
- Sensor read errors (timeouts) are not correctly transferred to epics PV
- Timeout issue
  - SC should take timed out sensor as error
    - prevent false alarms!
  - Scan rates vs timeouts, (scan rate < time out is useless.)
  - Two ideas for improvements are tested now

- Bonn (DATCON) has new shelf and shelf controller (MCH)
  - NAT (MCH-Base12-GbE)
  - Tested with MMC on ONSSEN/DATCON boards.
  - Board is recognized and gets switched on by MCH, sensors are monitored
  - Database files and GUIs for MCH prepared.
  - Minor issues: NAT MCH behaves a bit different than Kontron MCH/ShMM; configuration issues?

(NAT view screen shots from Bruno)

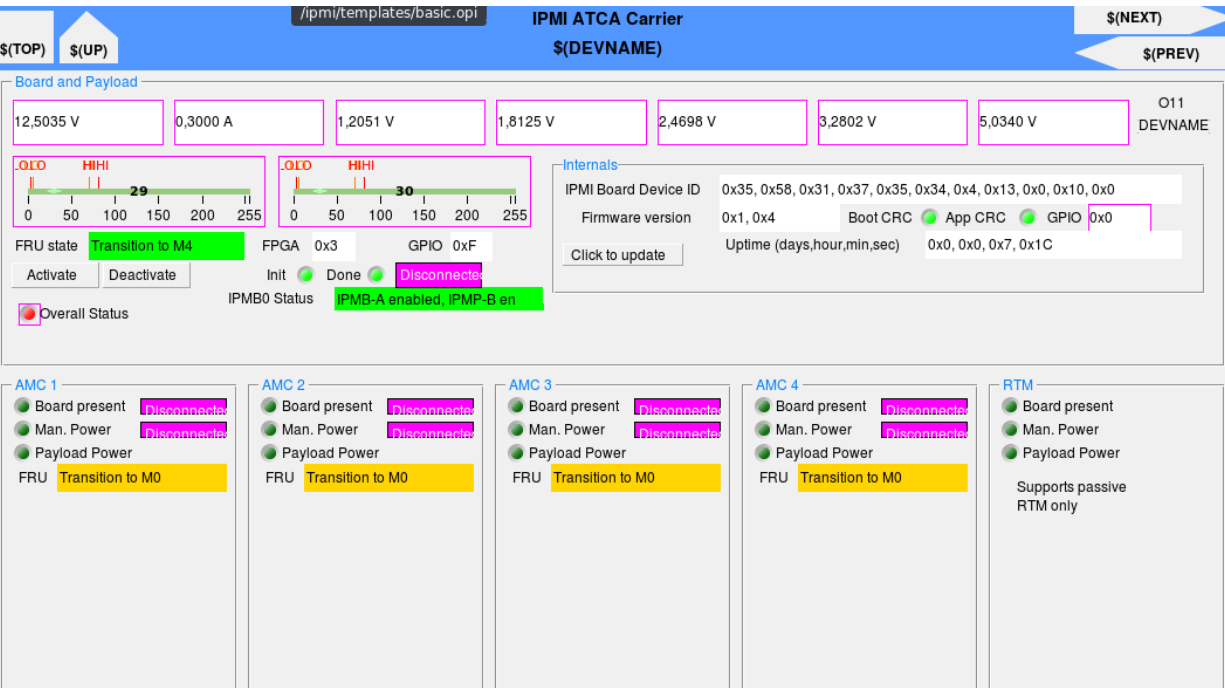


**(copy n' paste from ONSEN)**

The image shows a CSS GUI editor interface. The top window, titled "DATCON IPMI Shelf TOP \$(DEVNAME)", displays a rack layout with components like POWER, MCH, CON C 1-9, TRACK, SFP, and FAN Tray. Below it is "DATCON Shelf 2". The bottom window, titled "DATCON AMC IPMI \$(DEVNAME)", shows a detailed monitoring dashboard with various gauges for voltages (1.8V, 2.5V, 3.3V, 5.0V, Core 1.0V, MGT 1.0V, 1.2V, PLL 1.2V, TT 1.2V), temperatures (Die Temp., Board Temp.), and other metrics. A third window, titled "ONSEN", is shown in the background, with arrows indicating that elements from its dashboard are being copied into the DATCON AMC IPMI window.

**Properties Panel:**

Property	Value
Arrived	false
Editable	true
Last modified	March 14, 2016 at 8:20:09 AM
Locked	false
Location	/home/bruno/Documents/sc_da
Name	ipmi_shelf_datcon.opi
Path	/ipmi/opi/ipmi_shelf_datcon.opi
Size	115,094 bytes



- Hardware – done
- Firmware
  - v1 used in DESY Test in Apr 2016 (and used since then...)
  - now working on v2 with additional features (f.e. crc, send msg bridging)
- EPICS / Slow control
  - IOCs based on ipmitool (M. Ritzert)
    - Already used in DESY Test in Apr 2015. But: sensor monitoring only
  - New IOC (command based)
    - Implemented and tested. still need some work.
  - Updated database files and CSS OPIs for shelves and boards
- Tested and currently used setups
  - ATCA Shelf (2 slot and 14 slot) with Kontron Shm500
    - 2 slot used @DESY TB Apr 2016
  - MTCA 4-slot Shelf with Kontron AM4901 MCH (lab use only)
  - MTCA Shelf with NAT MCH (MCH-Base12-GbE) – DATCON

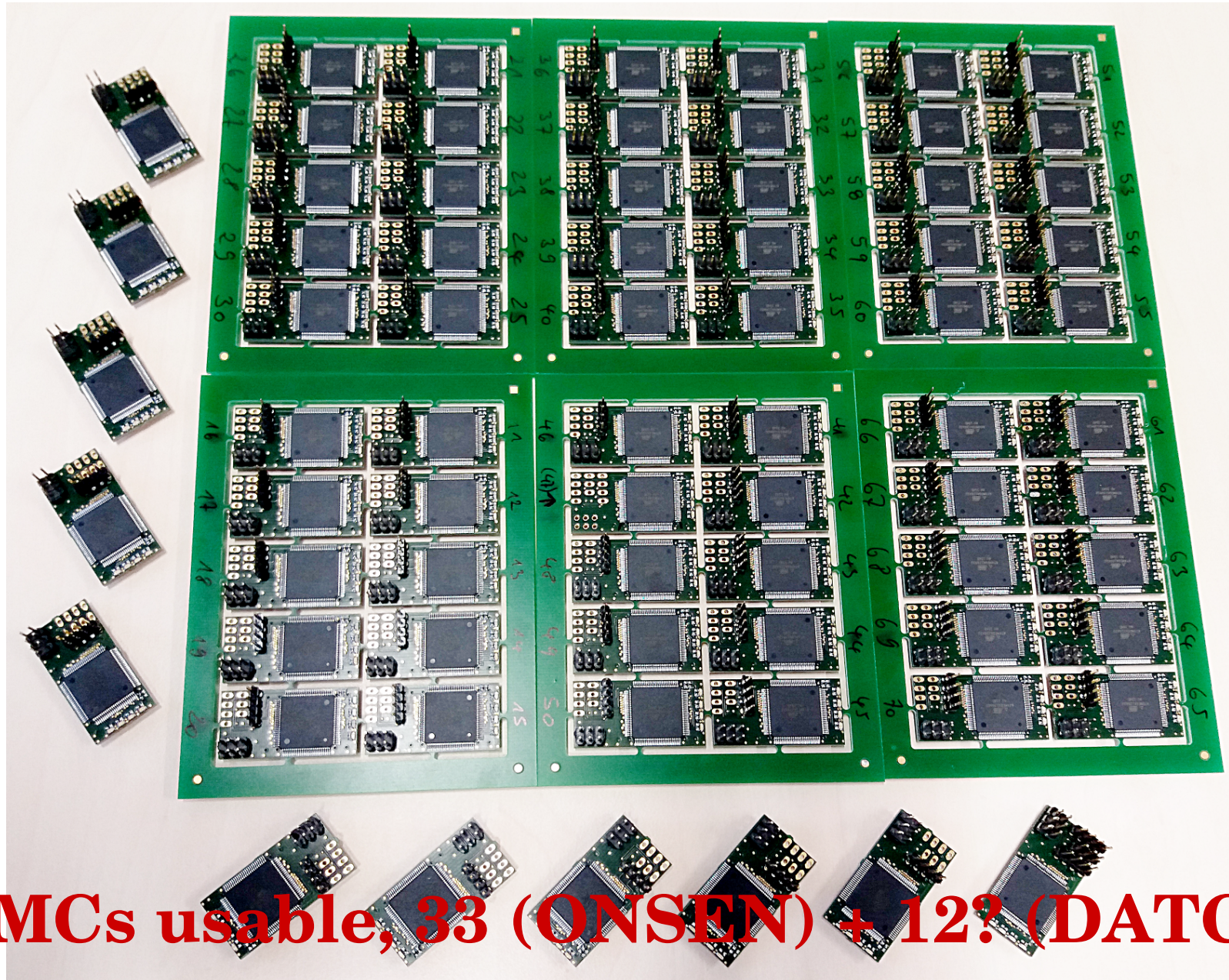
- Before beam we would like to do
  - Stress test – for problem do not show up in “normal” operation
    - many boards, action, read/write
  - Error “injection”, unusual conditions
    - Report errors from MMC, IPMC and see if we (or ShM) react on them
    - e.g. remove fan unit, remove filter, hot swap, etc
- Learn about IOC (and ShM) performance bottlenecks
- Exercise alarm conditions
  
- No plan to include IPMI for DHH in the upcoming TB



- Kontron (AM4901)
  - slot/IPMB: 0x10/0x20
  - PICMG ext. 2.2
  - FRU Deactivation works
  - FRU Activation does not work
    - ... without clearing lock bit (not so clear what the PICMG standard requests?)
  - Tunnel messages to MMC works
- no problem → will not be used for experiments
- NAT (MCH-Base12-GbE)
  - slot/IPMB: 0x1/0x10
  - PICMG ext. 5.0
  - FRU Deactivation works
  - FRU Activation works
  - Tunnel messages to MMC does not work
  - suspect ipmitool problem (one problem already found and solved)
  - No serious problem, as this only affects direct commands to the MMC

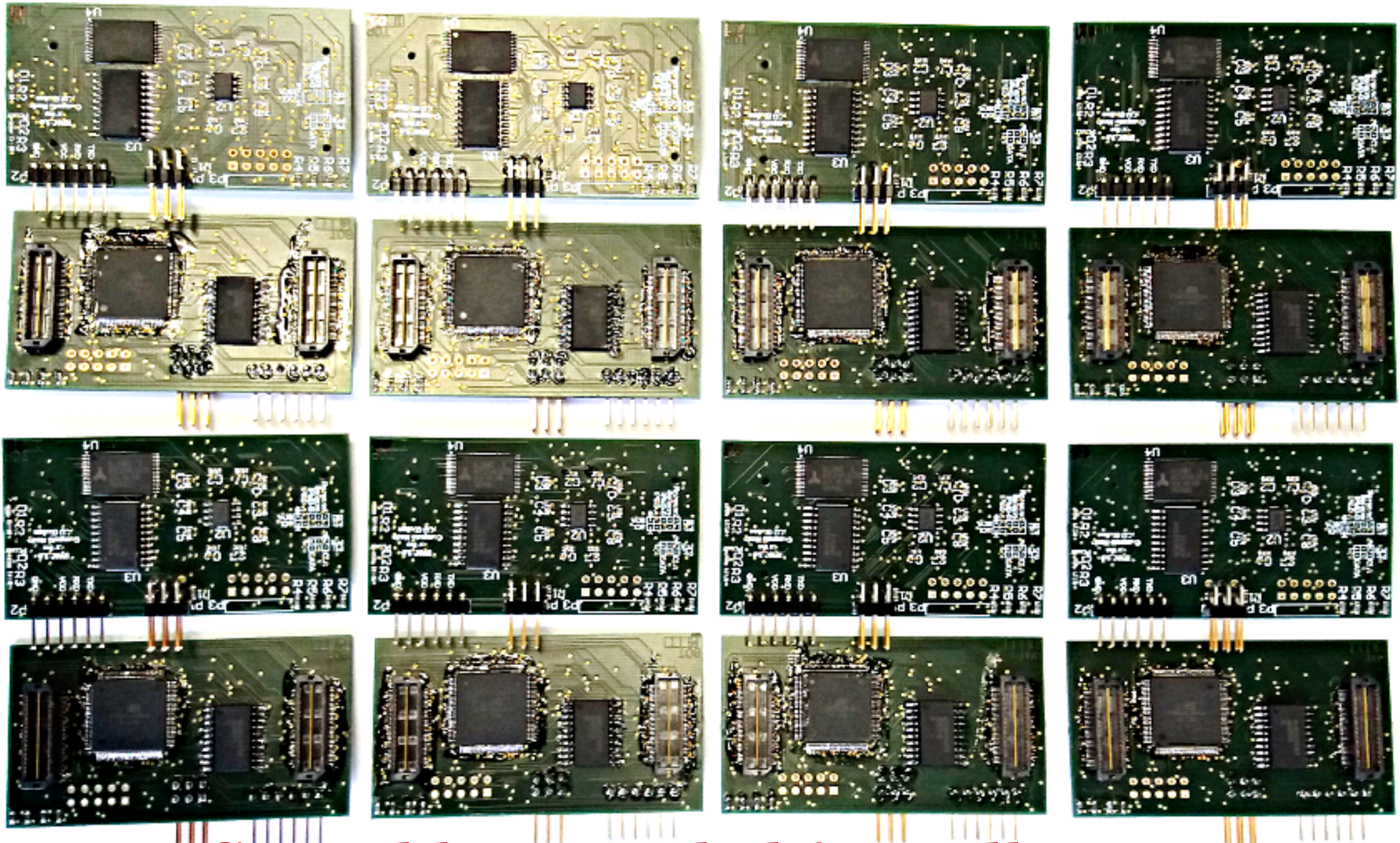


# MMCs – IPMI Controller for AMC Daughter Board



**69 MMCs usable, 33 (ONSEN) + 12? (DATCON)  
needed for Belle2 setup**





**20 IPMCs usable, 9 needed for Belle2 setup**



- All sensors added to GUI
- Labels and design is missing

The screenshot displays the DATCON MCH GUI interface. At the top, there's a navigation bar with 'DATCON' and '\$(UP)' on the left, and '\$(NEXT)' and '\$(PREV)' on the right. The main content area is divided into several panels:

- Cooling, Fans 1:** A table with three columns of numerical data: 12.5950, 12.7050, 3.3033; 1260, 1260, (blank); 22, 21, (blank). Below the table are status indicators: 'Module Handle Closed', 'Device Present', and 'IPMB-A enabled, IPMP-B e 0'.
- Cooling, Fans 2:** A similar table with data: 12.6500, 12.6500, 3.3176; 1320, 1260, (blank); 24, 23, (blank). Status indicators include 'Module Handle Closed', 'Device Present', and 'IPMB-A enabled, IPMP-B e'.
- MCH:** A large table with five columns. The first two columns contain numerical values (11.6400, 1.1900, 3.3280, 0.8300). The remaining three columns contain status text: 'Device Absent', 'Transition to M4', and 'Transition to M0'. The table is repeated for multiple rows.
- Shelf, PM:** A table with five columns. The first two columns contain numerical values (12.4000, 3.4000). The remaining three columns contain status text: 'Device Absent', 'Upper Non-critical', and 'Upper Non-critical'. The table is repeated for multiple rows.

- Both IOCs based on ipmitool (open source)
- SDR and FRU created/checked with free software tools
- Bug fixes and improvements:
  - Fixes for ipmitool have been send to maintainer, partly included already
  - Fixes for sdr tool have been included in OpenIPMI already
  - fru tool fixes have been included, too