

CERN-IPMC solution

xTCA interest group meeting

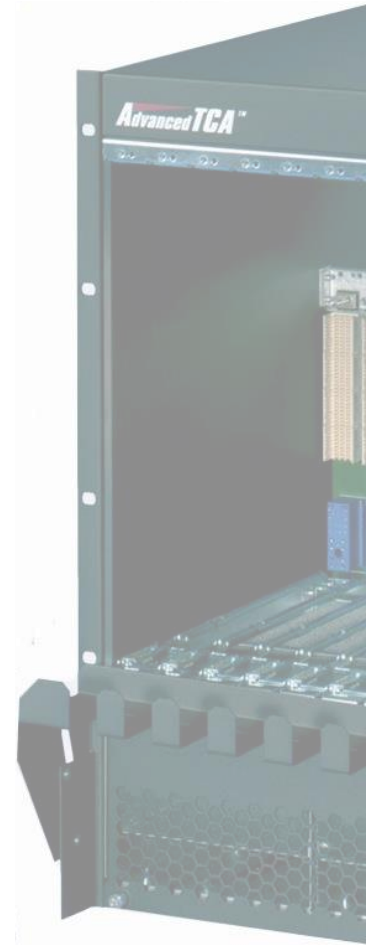
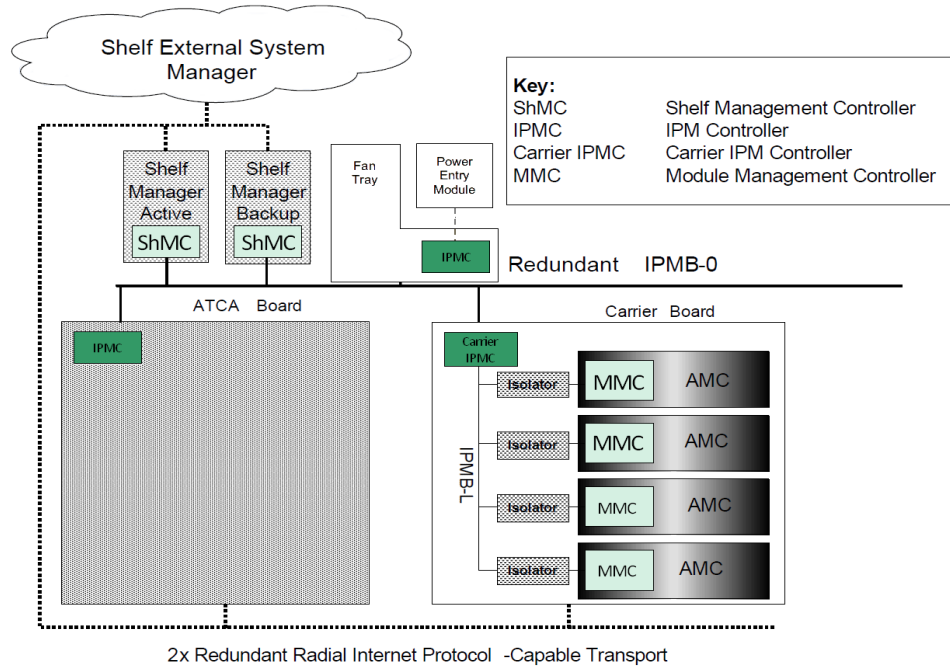
CERN EP-ESE-BE

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ATCA standard: Hardware Platform Management

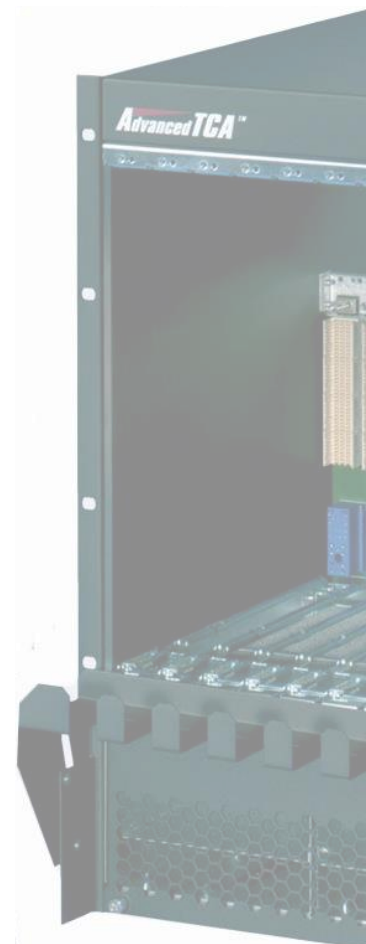
❑ Role of the Intelligent Controller for AdvancedTCA blades:



- Monitoring sensors
 - Voltages, temperatures ...
- Controlling the system
 - Power management, port/clock activation ...
- Ensuring proper operations
 - Compatibility between the different boards, hot swap, redundancy ...

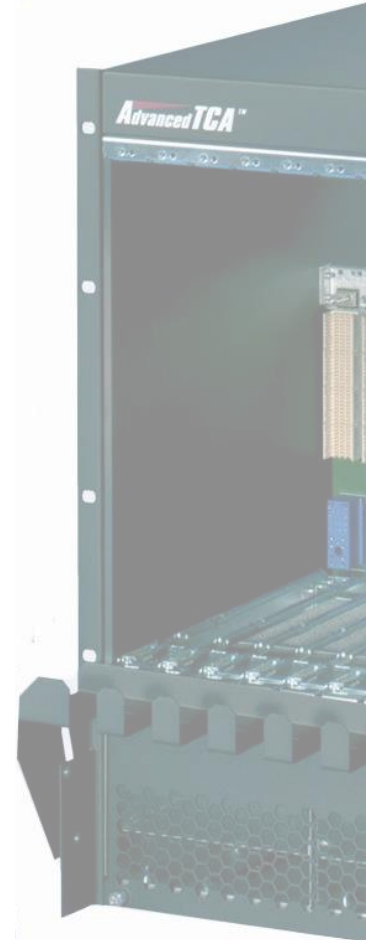
Outline

- General overview
- Customization
- Automatic tester
- Status



General overview

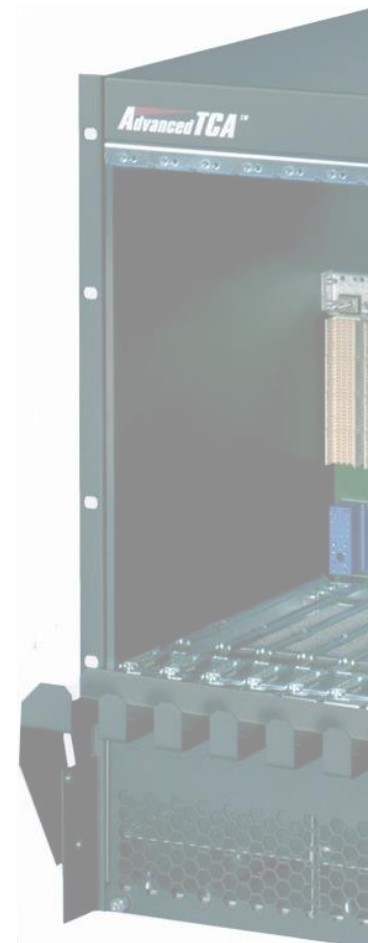
- ❑ Adaptation of the Pigeon Point IPMC solution
- ❑ Mezzanine card was designed at CERN
 - DIMM-DDR3 VLP form factor
- ❑ Compatible with already designed AdvancedTCA board
 - Follows the LAPP IPMC specification



General overview

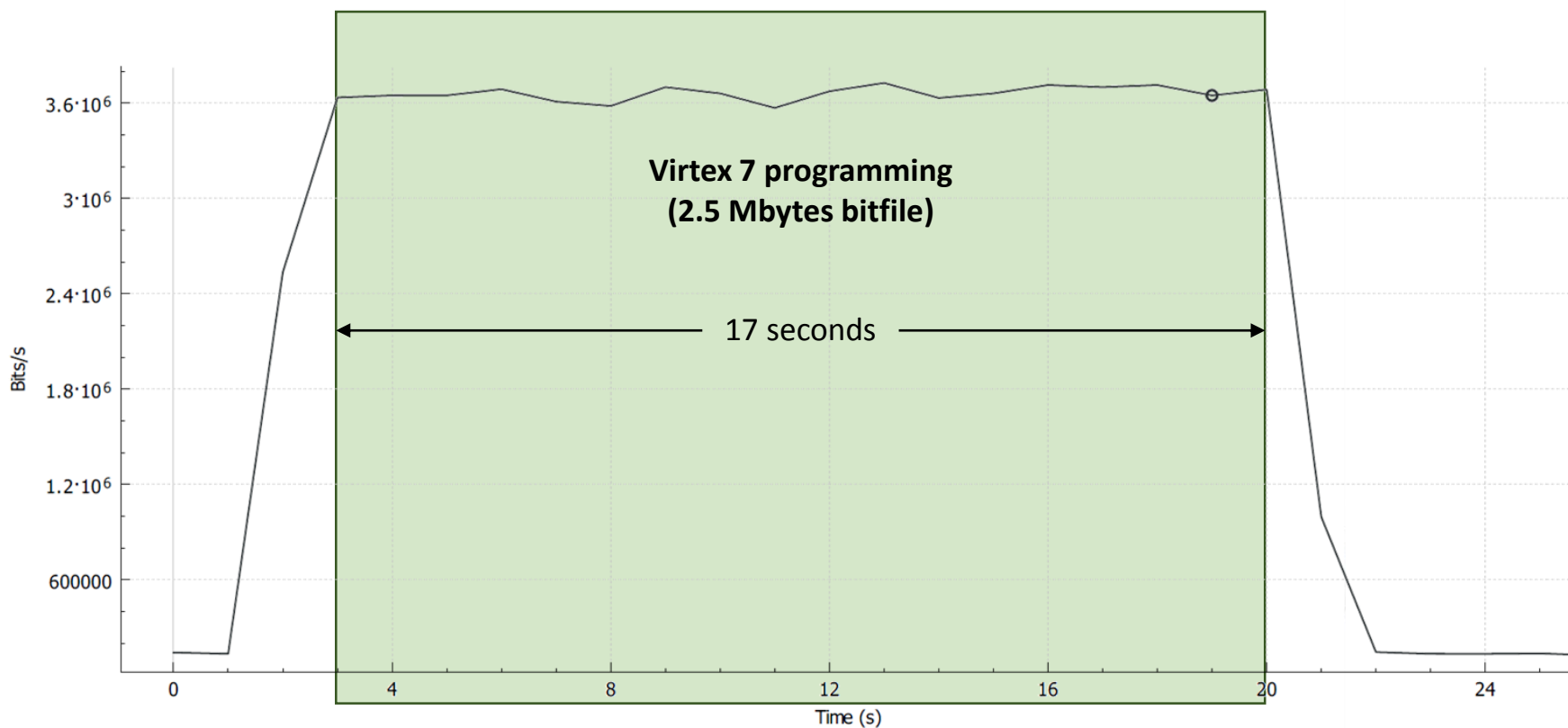
❑ Supported features [**fully tested**]:

- AdvancedTCA Rev.3.0 standard
 - Hot swap (FRU info., handle switch, LEDs, Hardware address, etc.)
 - Sensor monitoring (SDR, measurement, events, etc.)
 - Rear Transition Module (intelligent and non-intelligent RTM)
- AMC standard (up to 9 AMCs)
- Ethernet interface (RMCP/RMCP+, TPC/IP, UDP, Telnet)
- Serial interface (SoL or debug interface)
- User I/Os (35 User I/Os + 16 IPM I/Os)
- JTAG Master (Xilinx Virtual Cable daemon)



General overview

□ JTAG Master (XVCd):



Measured using Wireshark: network transactions

Customization

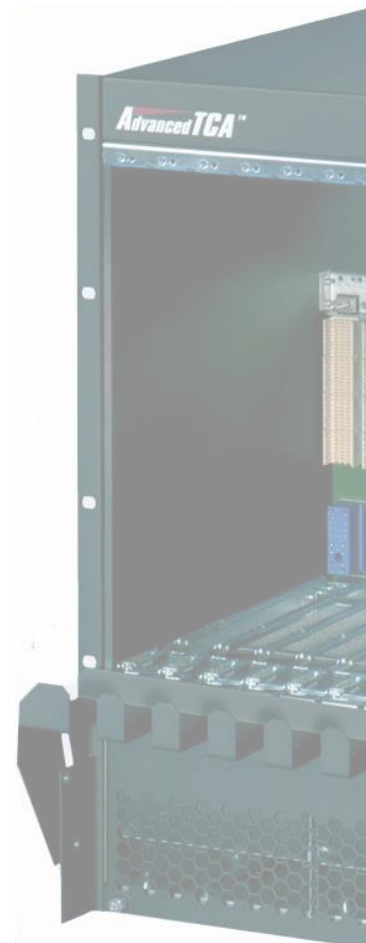
- ❑ Firmware runs on an ARM Cortex M3 SOC processor (A2F200 Microsemi chip)
 - IDE used: SoftConsole v3.4

- ❑ Source code has been divided into the following parts:
 - IPMC-Core: Core source code
 - IPMC-Config: Firmware configuration (AMC slots, Sensors instantiation, etc.)
 - IPMC-Sensors: Sensor drivers
 - IPMC-User: User's custom feature (e.g.: OEM commands, GPIO control)

- ❑ Additional tools to simplify the firmware configuration
 - Generate the content of the IPMC-Config directory using an XML file

- ❑ Examples are included

- ❑ Available on GIT: <https://gitlab.cern.ch/ep-ese-be-xtca/ipmc-dev>
 - Access on request
 - Documentation present on the Gitlab webpage (readme.md file)

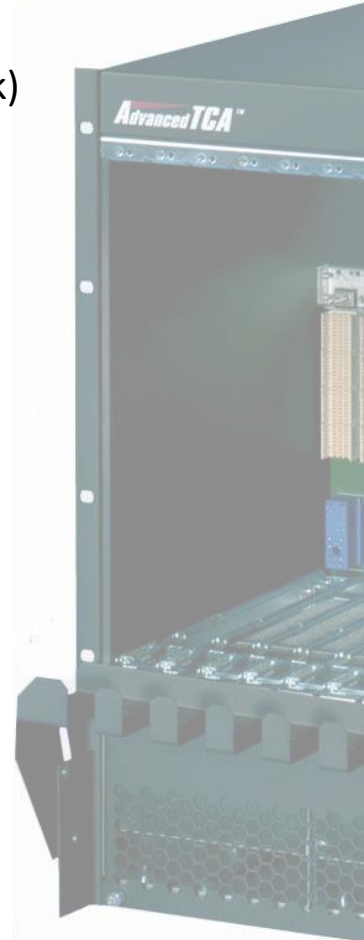


Customization

- ❑ XML configuration file:
 - FRU information (Device ID, Manufacturer info., Product info.)
 - LAN configuration (MAC address, Default IP, slot specific IP, Gateway, Netmask)
 - AMCs (AMC Sites, Physical port, Maximum current)
 - iRTM (Physical port, I2C address, Maximum current)
 - Sensors (Name, Thresholds, Custom fields)
 - *Non-intelligent RTM* } **Foreseen**
 - *E-Keying* }

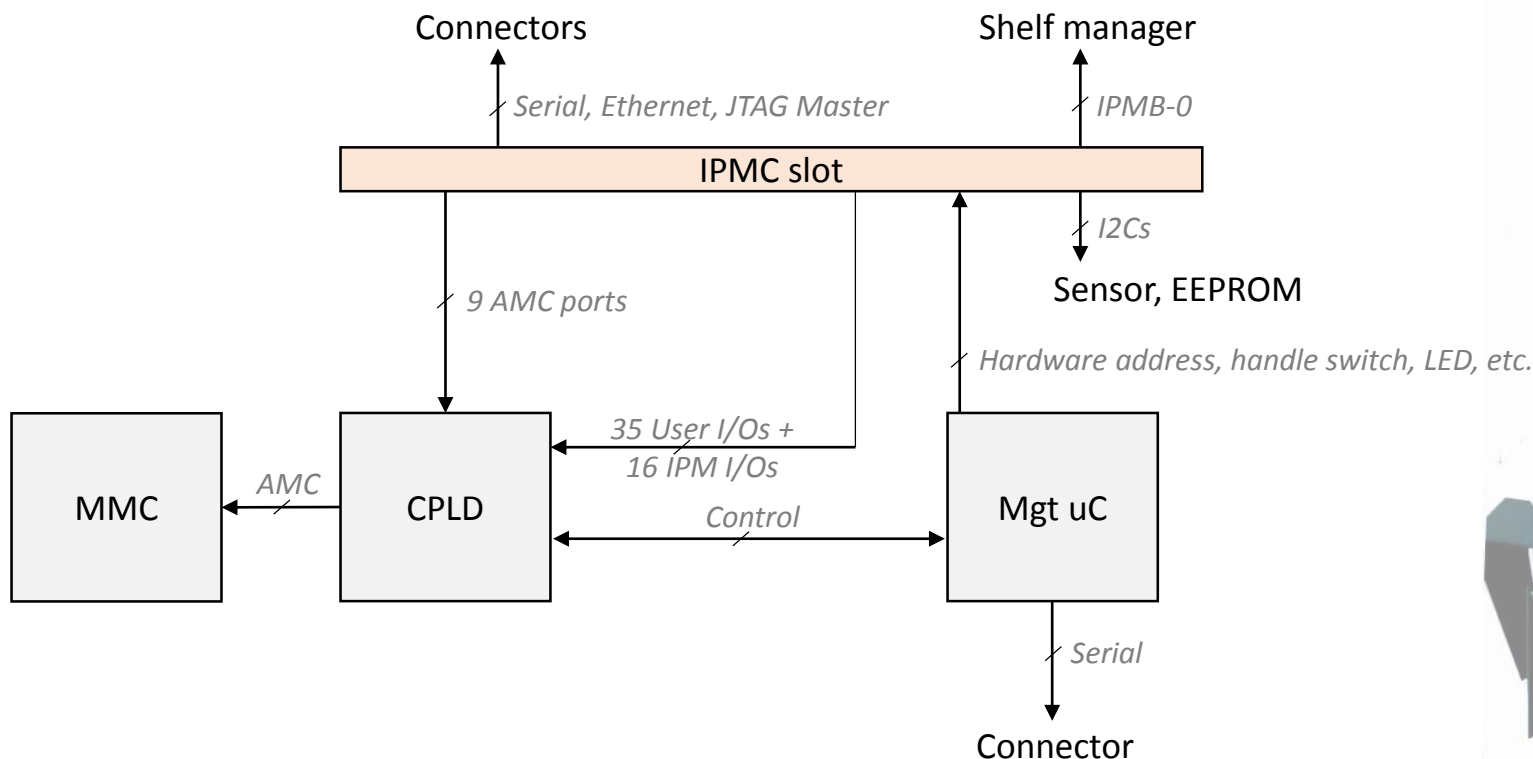
- ❑ Additional user features:
 - TCP/IP server
 - Callbacks: called every *nms*, at init time or every main loop iteration
 - OEM commands

- ❑ *FPGA firmware available on request (limited access)*

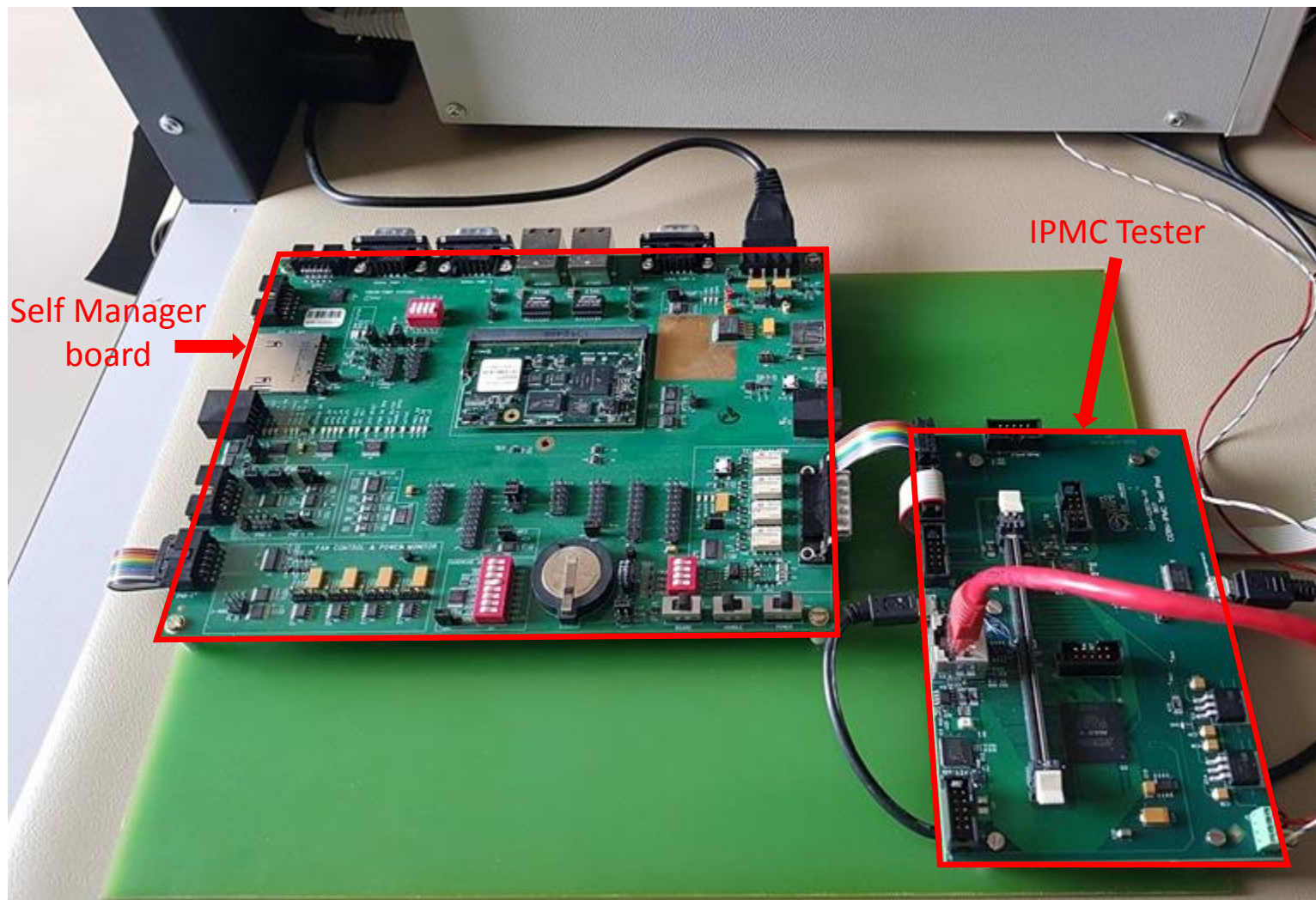


Automatic tester

- ❑ Used to verify the IPMC functionality after production
- ❑ All of the interfaces are tested



Automatic tester



Automatic tester

☐ LabVIEW interface

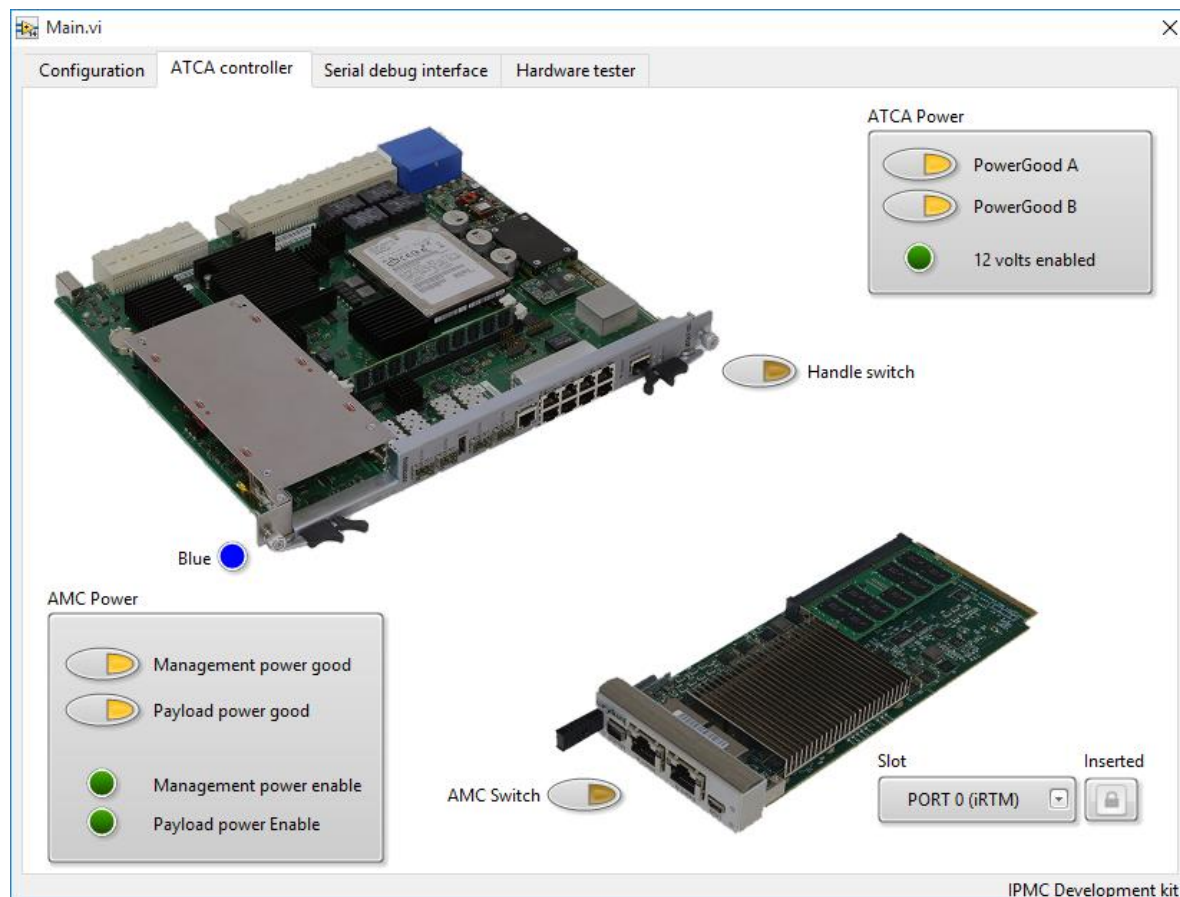
The LabVIEW interface is divided into several sections:

- Setup configuration:** Includes fields for IPMC IP (192.168.1.34), MGT intf (COM7 - USB Serial Port), and SDI intf (COM4 - USB Serial Port). It features 'Start' and 'Stop' buttons.
- General control:** Features a dropdown menu for 'ATCA Slot' set to 'ATCA Slot 1 (0x40)'.
- Status:** Shows 'General' status as 'Waiting for start...'. It includes numerical displays for IPMC voltage (0 Volts), IPMC current (0 Amps), and MGT voltage (0 Volts), with a 'Refresh' button.
- Hardware tester (pop-up window):** Contains a 'Configuration' tab and a 'Hardware tester' sub-tab. It displays test results for:
 - Test AMC ports: Passed
 - Test GPIOs: Passed
 - Test i2c interfaces: Passed
 - Test all: Passed
- Error report (pop-up window):** Shows a log of test results:

```
AMC ports test (30/05/2017 - 10:22:16):
=====
Test AMC port (0) ... Success
Test AMC port (1) ...
```

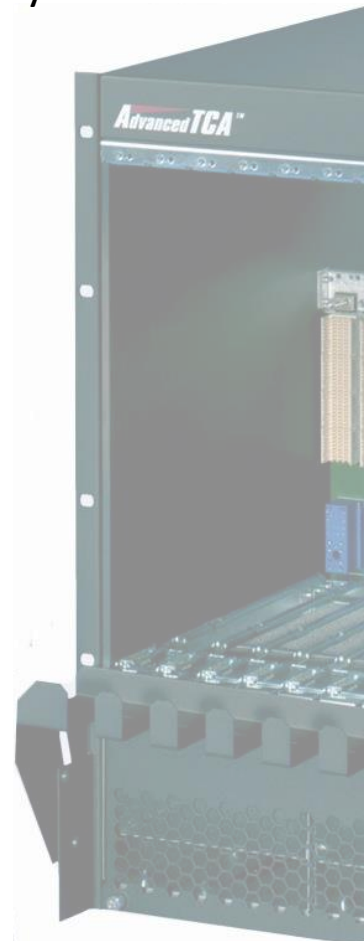
Automatic tester

- ❑ LabVIEW interface



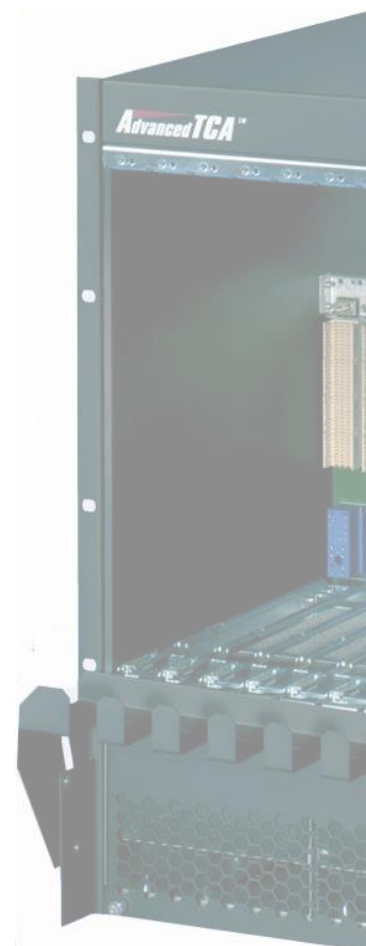
Status

- ❑ All of the presented features and the Firmware architecture have been fully tested and ready to be used.
- ❑ First batch of 52 IPMCs has been produced and are being tested
- ❑ CERN-IPMC kit includes:
 - Mezzanine card
 - Pigeon Point licence fees
 - Access to the Git repository
 - Support
- ❑ Price: 200.- Chf
- ❑ Purchase contact: epesebe-xtca-support@cern.ch



Thank you

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Functional bloc diagram

