CERN-IPMC solution

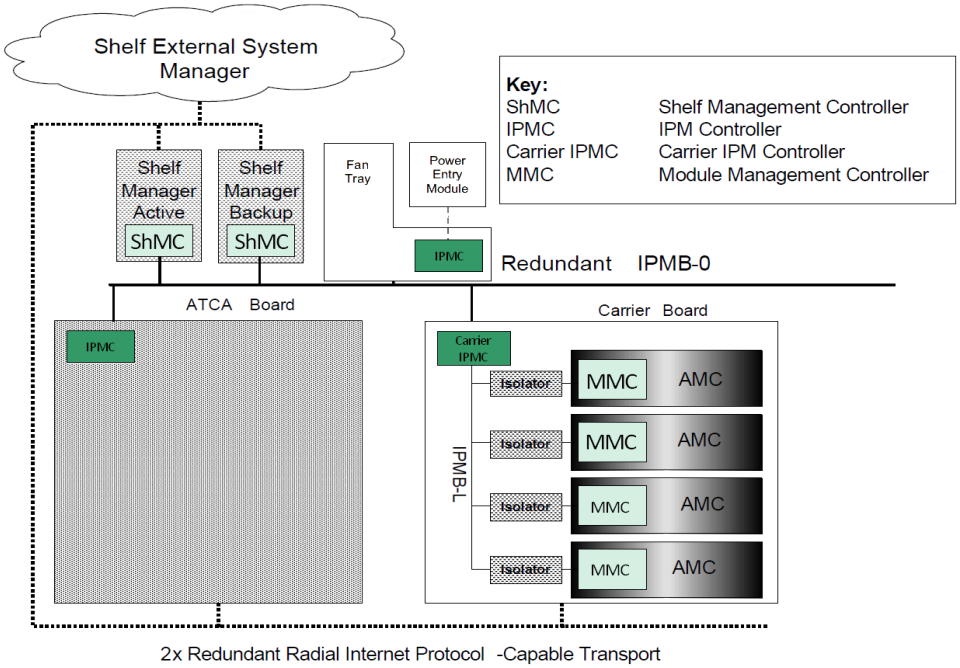
xTCA interest group meeting

CERN EP-ESE-BE

Vincent Bobillier, Stefan Haas, Markus Joos,
Julian Mendez, Sylvain Mico and Francois Vasey

ATCA standard: Hardware Platform Management

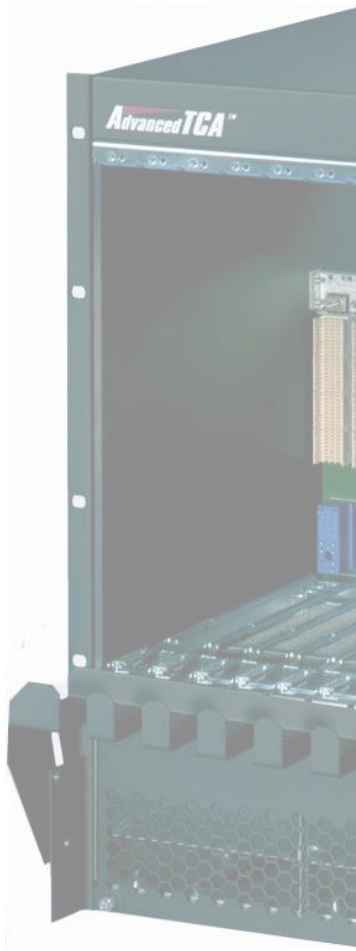
❑ Role of the Intelligent Controller for AdvancedTCA blades:



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

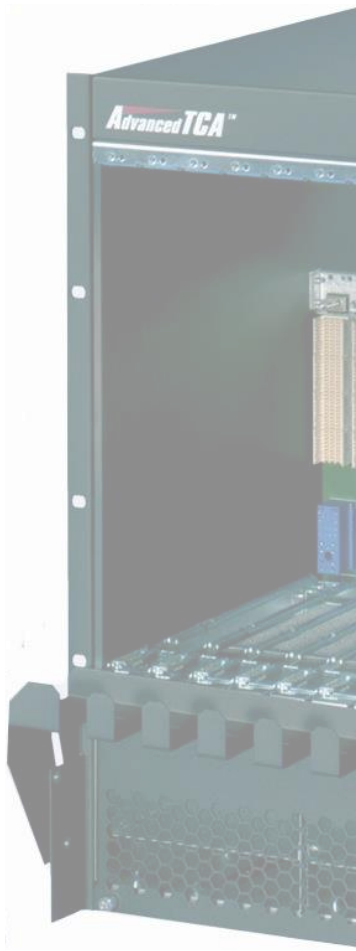
Outline

- ❑ General overview
- ❑ Customization
- ❑ Automatic tester
- ❑ Status



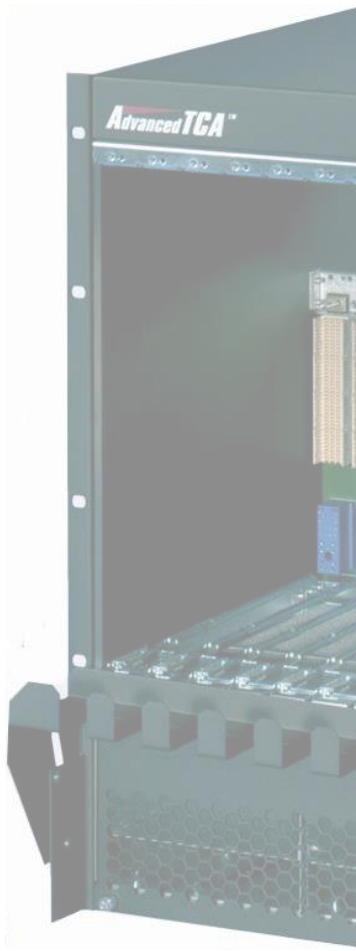
General overview

- 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



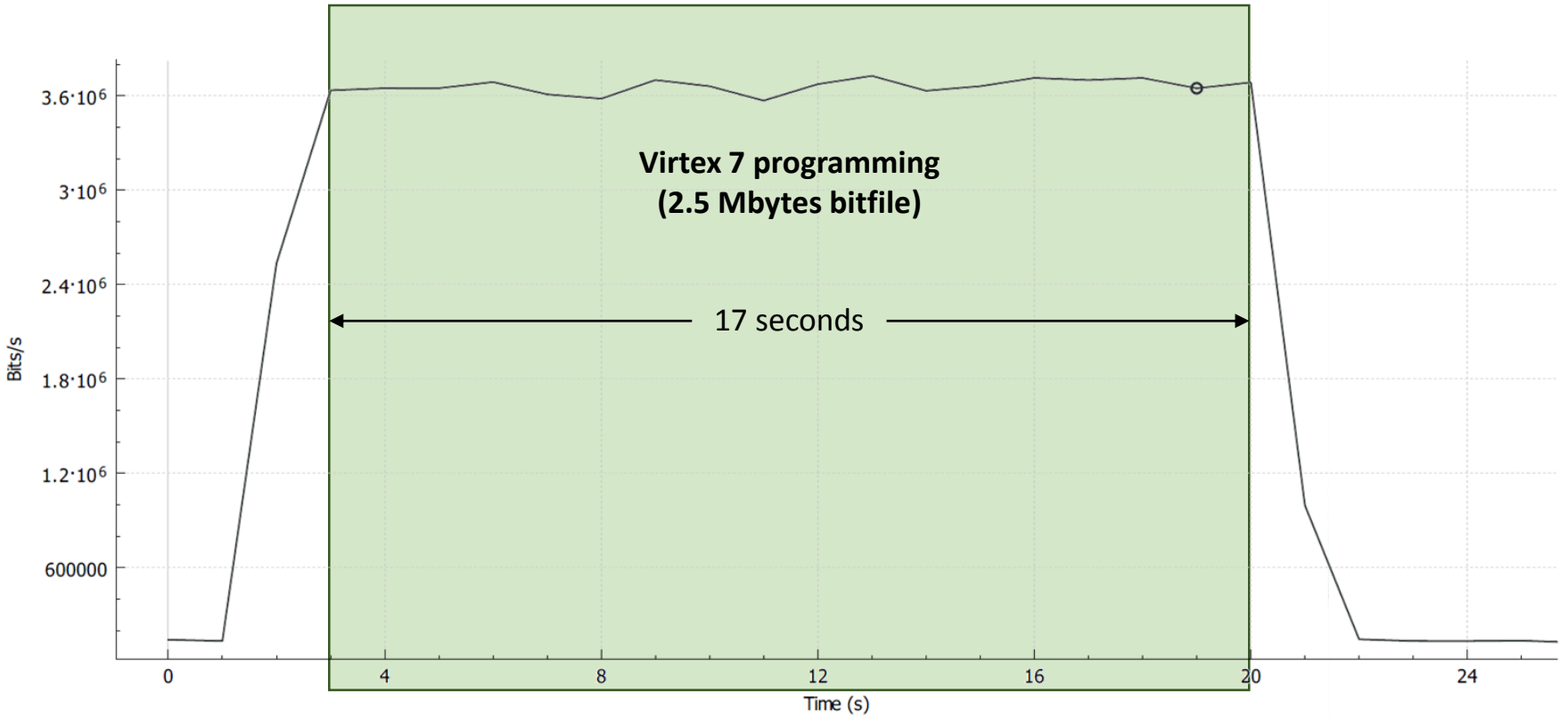
General overview

- 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*
  - *E-Keying*

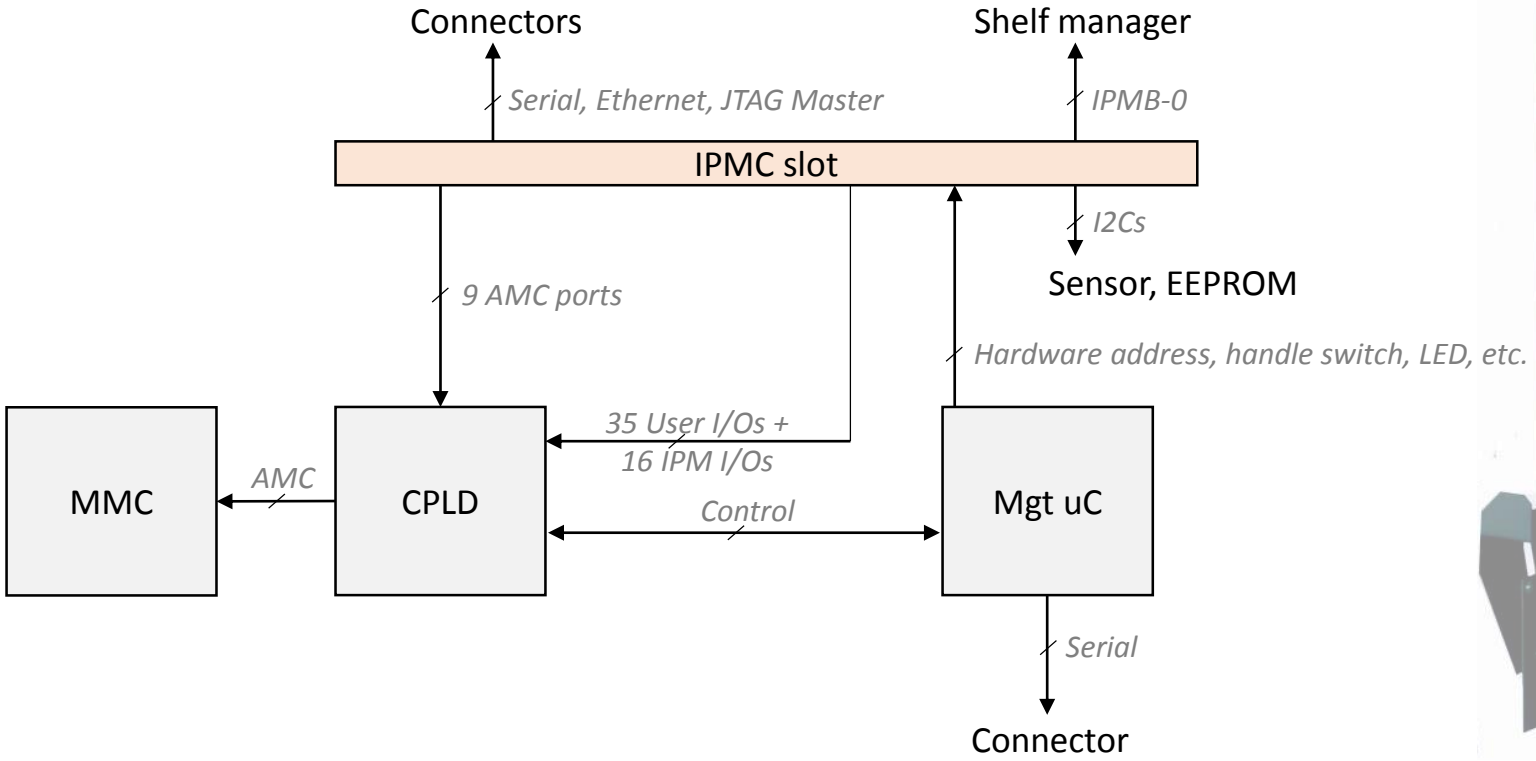
  } ***Foreseen***

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

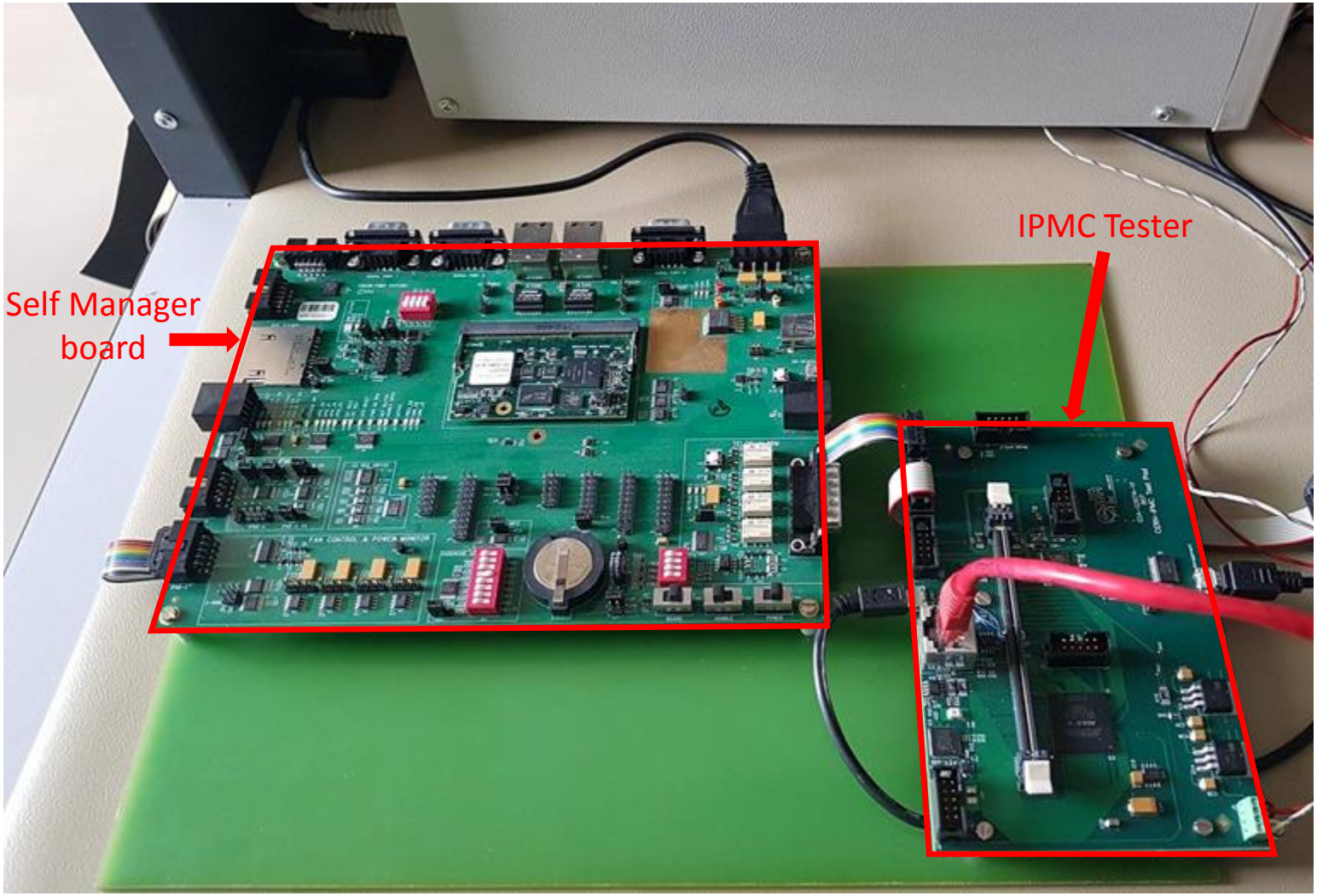
- *FPGA firmware available on request (limited access)*

Automatic tester

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

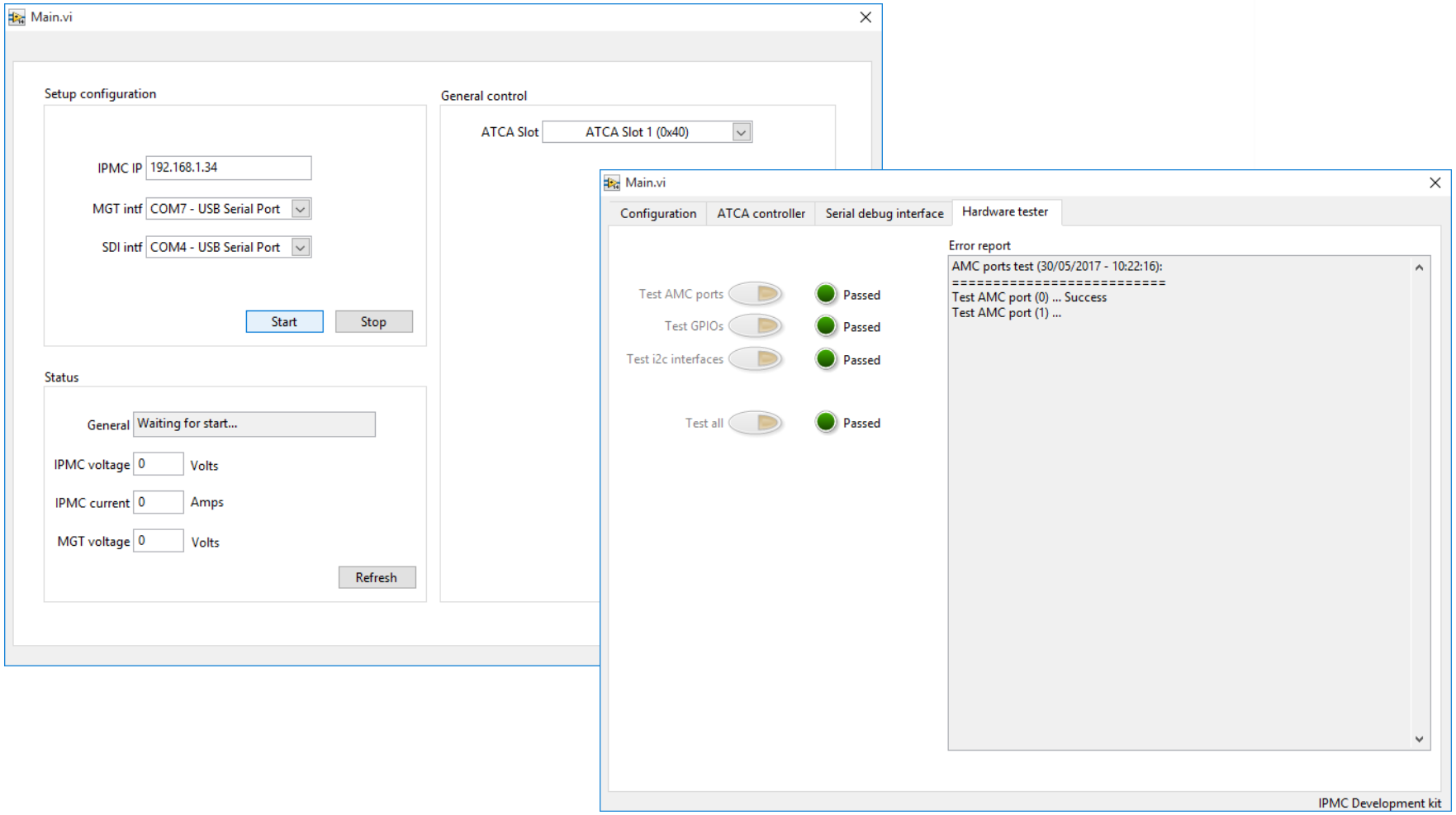


Automatic tester



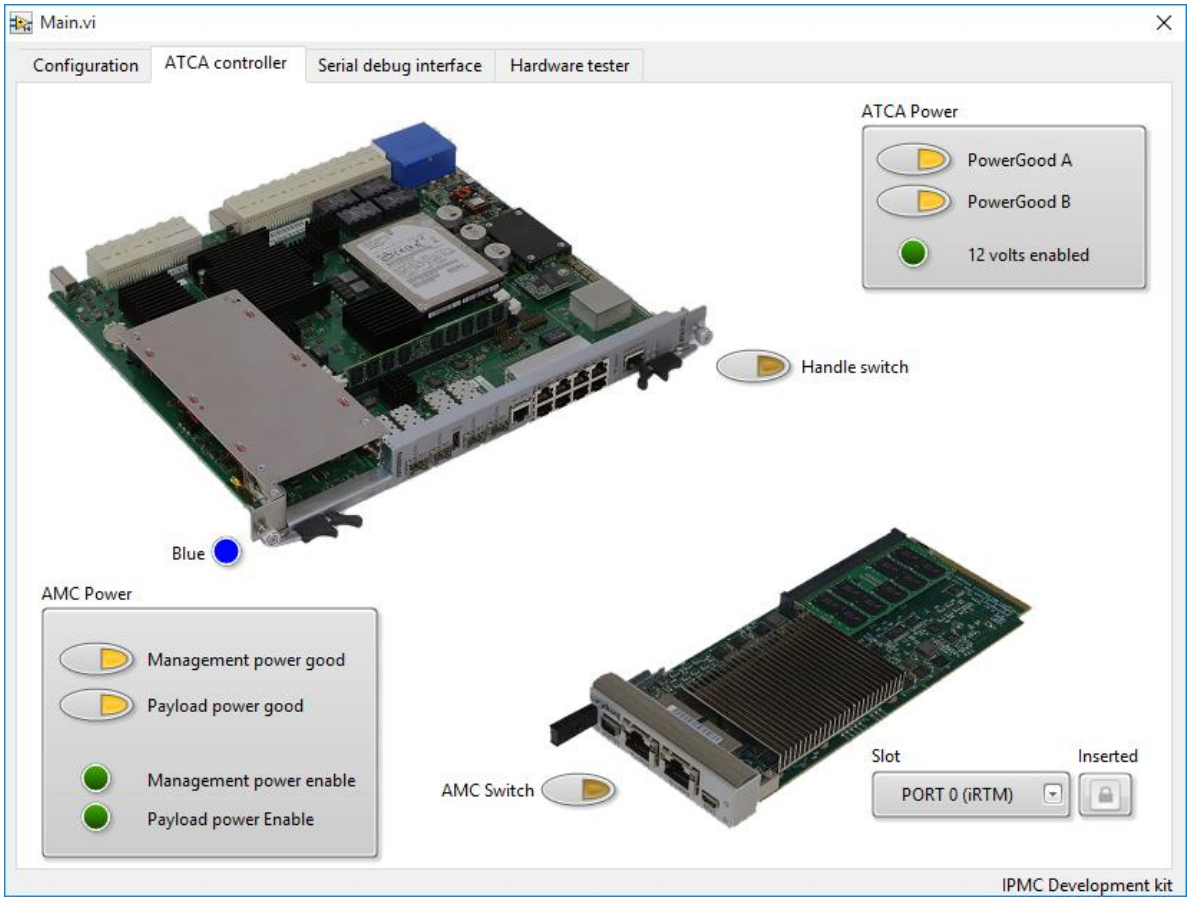
Automatic tester

- LabVIEW interface



Automatic tester

- LabVIEW interface

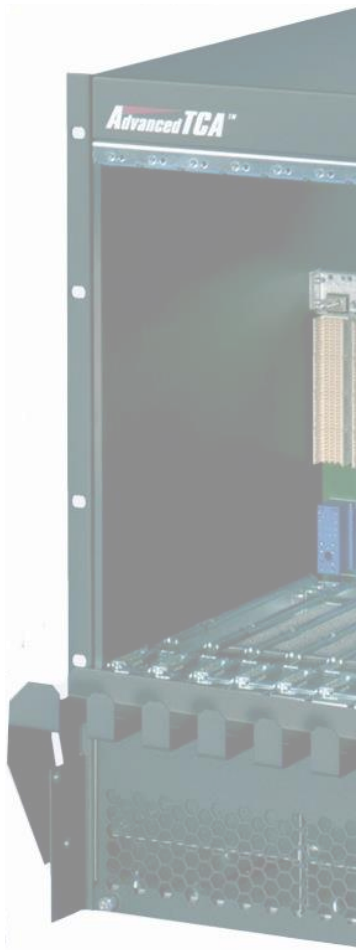


Status

- 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

julian.mendez@cern.ch



Functional bloc diagram