



# Update from the CERN PH-ESE xTCA evaluation project

V. Bobillier, S. Haas, M. Joos, F. Vasey, P. Vichoudis

# PH-ESE xTCA Evaluation Project

- **μTCA evaluation project in CERN PH-ESE group launched in 2011**
  - Assess μTCA for its suitability as a platform for future modular electronics for HEP experiments
  - Technical evaluation of components for μTCA and MTCA.4 systems
  - Development of tools (H/W and S/W) for the testing of commercial components
  - Conduct market surveys
  - Report results (e.g. xTCA IG)
- **Strong interest from LHCb and ATLAS in ATCA**
  - Expand the evaluation project to also include ATCA
- **Focus PH-ESE efforts on xTCA infrastructure components**
  - Shelves and power supplies (with focus on electrical and cooling performances)
- **Keep close contact with the xTCA projects in the experiments to better understand their requirements**

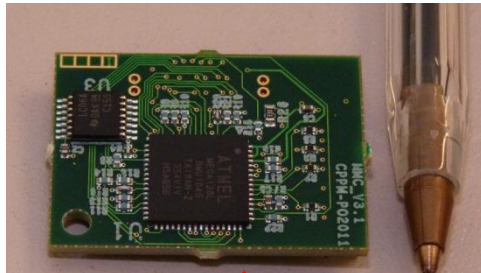
# Commercial $\mu$ TCA Equipment

- **Equipment evaluated**
  - Schroff 6 slot MTCA.4 shelf
  - Vadatech 12 slot  $\mu$ TCA shelf (VT892)
  - Vadatech 790W power module
  - Kontron MCH (with PCIe switch)
  - NAT MCH (with PCIe switch)
  - Kontron processor AMC (AM5030)
  - Concurrent Technologies processor AMC
  - ELMA AMC load module
  - ESD ADIO-24 AMC
- **Evaluation results**
  - Many (mostly minor) interoperability problems encountered (IPMI related)
  - Components providing the same function (e.g. shelf or MCH) can have very different features and user interfaces (S/W)
  - Many options (cooling, PSUs, data transfer protocols)
  - Many customizations possible (e.g. backplane routing)



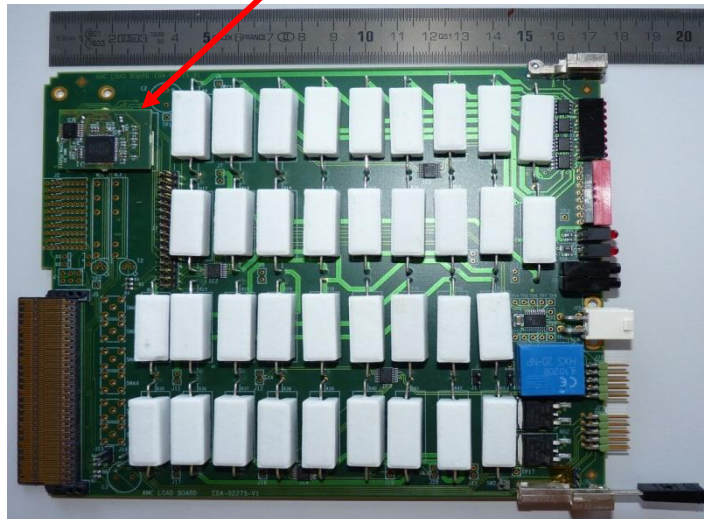
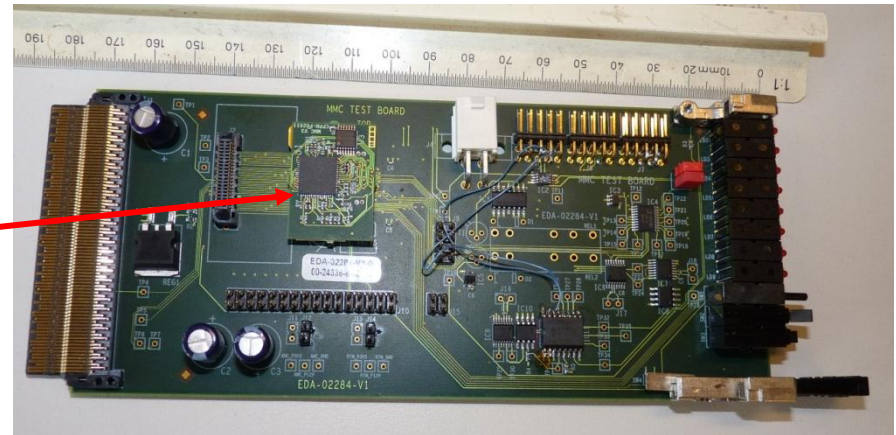
# μTCA Developments

MMC mezzanine (based on design from CPPM)

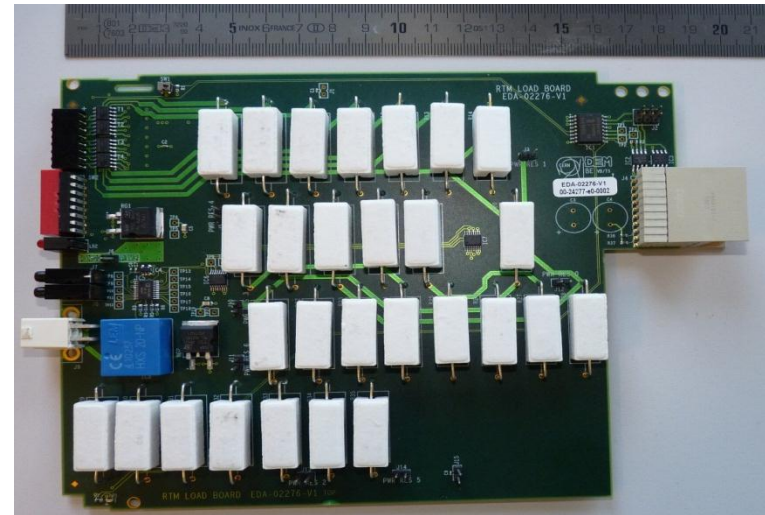


*Available to interested users*

MMC test AMC



AMC load board



RTM load board



# μTCA Evaluation Update

- **MMC software**
  - Split between generic and module specific code
  - RTM support working
    - Tested with RTM load module
  - Based on code received from DESY
  - Code available in CERN SVN repository
- **Power supply testing**
  - Production batch of load modules (AMC & RTM) received
  - Allows to fully populate and load a 12 slot μTCA shelf
  - 48V DC power modules from NAT received
    - Required to power a fully loaded shelf
  - Enables comprehensive power supply performance measurements



# Plans for ATCA Evaluation

- Extend the xTCA evaluation project to include ATCA equipment
- Focus on the infrastructure components
  - PSU performance
  - Cooling performance
    - Vertical cooling, potentially required for the racks in the LHC experiments
  - Shelf management and IPMI communication
- Equipment ordered
  - Schroff 14-slot 13U ATCA shelf with SHMM
  - Power converter unit (AC to -48V)
    - Lineage Power shelf
    - 3 x 2.7 kW power modules
  - 2 ATCA load boards + load RTMs
- Gain experience with ATCA
- Perform comprehensive load tests



# Summary & Outlook

- **xTCA evaluation project on-going in the CERN PH-ESE group**
  - Commercial  $\mu$ TCA equipment acquired and evaluated
    - Shelves, MMCs, power modules, processors AMC
  - MMC mezzanine card and software available
  - AMC and RTM load modules developed for power supply tests
  - Comprehensive  $\mu$ TCA power supply tests and measurements to be completed
  - Continue evaluation and market survey
- **Expand the evaluation project to include ATCA**
- **Focus PH-ESE efforts on xTCA infrastructure components**
  - Shelves and power supplies (electrical and cooling performance)
  - Shelf and module management
- **ATCA evaluation**
  - Shelf, power converter and load modules ordered
- **Keep close contact with the xTCA projects in the experiments to better understand their requirements**