TE-MPE-EP in 2021

“16 enthusiastic people from 11 (+4) nations!”

QDS Individual System Test & LHC Hardware Commissioning

Support to LHC HC & Beam Test
- Expert level support to OP & MP3
- Speedy QDS field team in the rare case of interventions
- 24 hours, 7 days/week on-call support during beam test (eventually not needed due to excellent system performance)

Post LS2 Magnet Training
- **641** primary MB quenches (2786 in total)
- **38** primary MQ quenches (newly installed QDS)
- + correctors, IPD, IPQ, IT
- 2 x protection triggers preventing re-powering sectors 2-3 and 7-8 …

QDS Individual Test
- Gazillion of tests in 8 (+3) sectors
- Most tests remotely but nevertheless substantial workload for the field team
- More details in the TE-TM next week

Main Dipole Threshold Change
- Request by MP3 to reduce significantly the number of fast secondary quenches
- Swapping of **2464** circuits boards
- **1540** boards to be patched**,** production, test and installation of **650** new boards to cover parallel execution of quench tests
- MP3 was right (as almost always …) → very substantial (~90%) reduction of secondary quenches

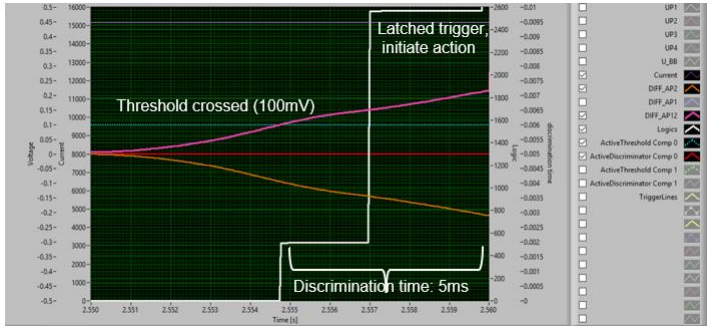
Universal Quench Detection System

- State of the art quench detection and data acquisition system
- Production of 100 units almost accomplished despite the ongoing component crisis
  - SM18, IT String, ProJoint, HEL, PSI (2 units sold!), FREIA (CCT Test), …

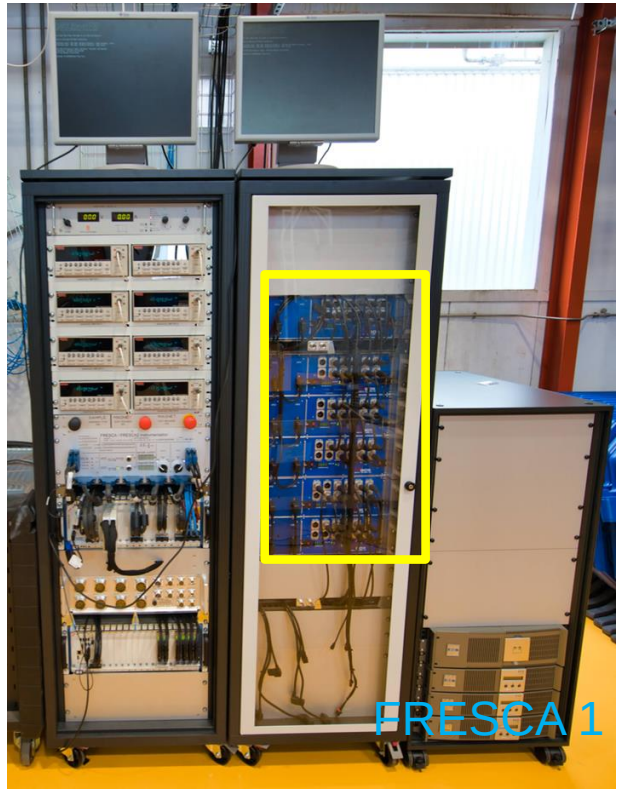
Mfr. No:	ADUM263N0BRIZ
Stock:	0
On Order:	734 Expected 25/10/2022 1 628 Expected 29/12/2022
Factory Lead Time:	79 Weeks

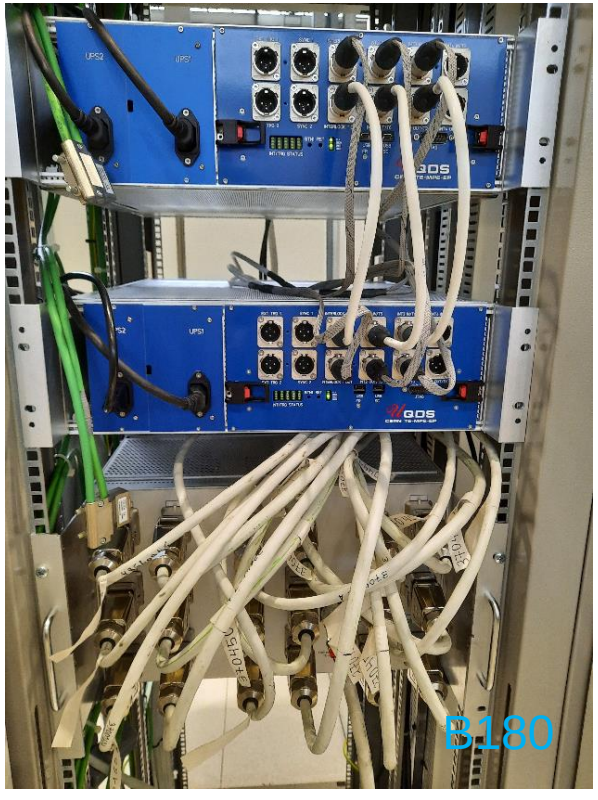
Quench Detection Systems for Magnet Test Benches

- UQDS is meanwhile established as standard solution for magnet test benches
  - SM18: clusters A, C, D, F / B180/FAIR / B163/FRESCA



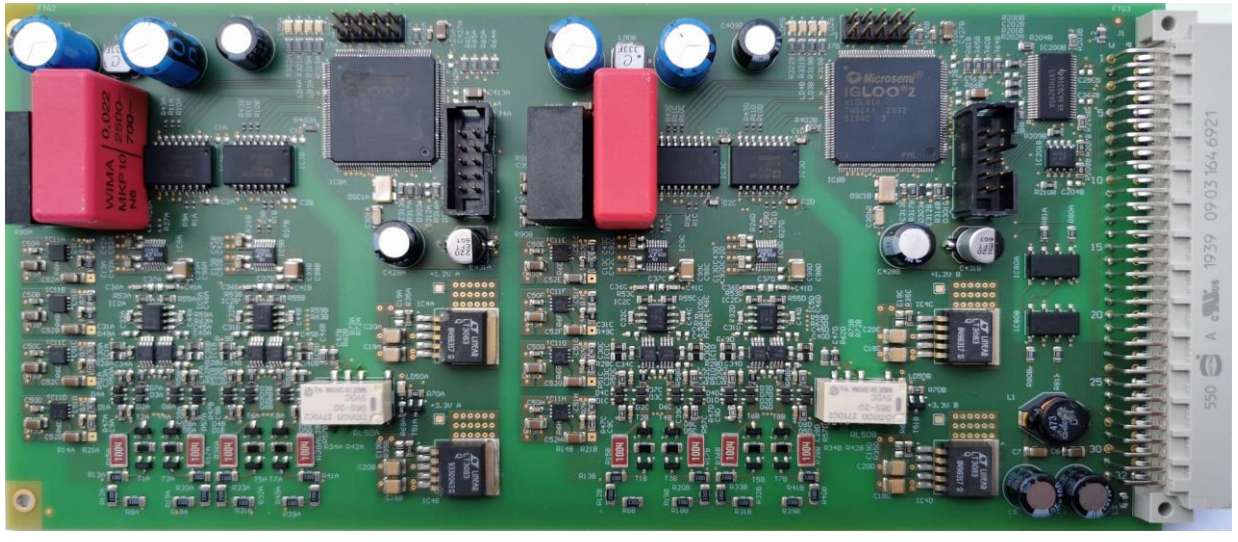
MQXF training quench @ 15.1 kA plateau



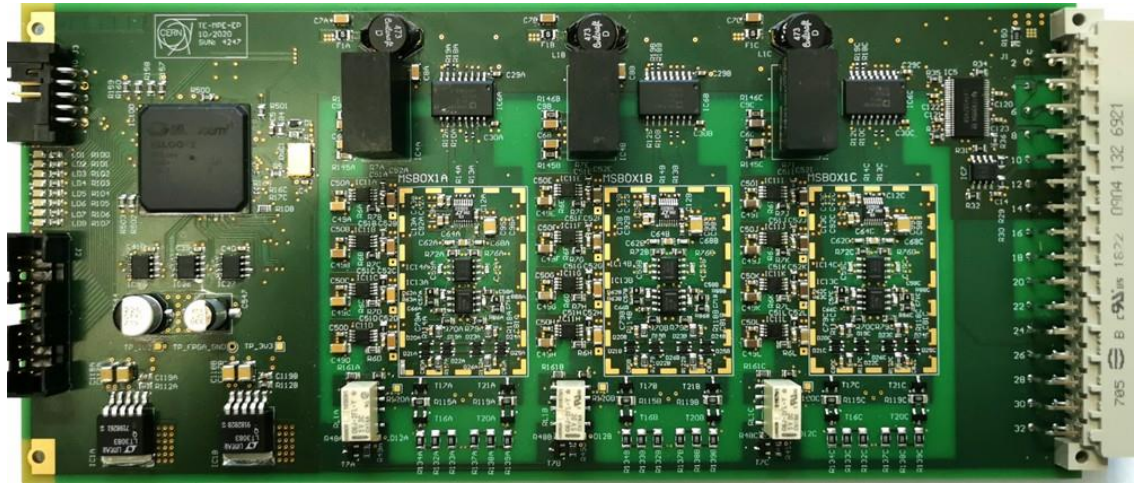


R2E Developments for the HL-LHC Era

- TE-MPE-EP is among the teams with the most experience in R2E developments in the AT sector
- Current challenge – getting ready for HL-LHC
  - Focus on hot areas DS around IP1, 5, 8, RR13, 17, 53, 57

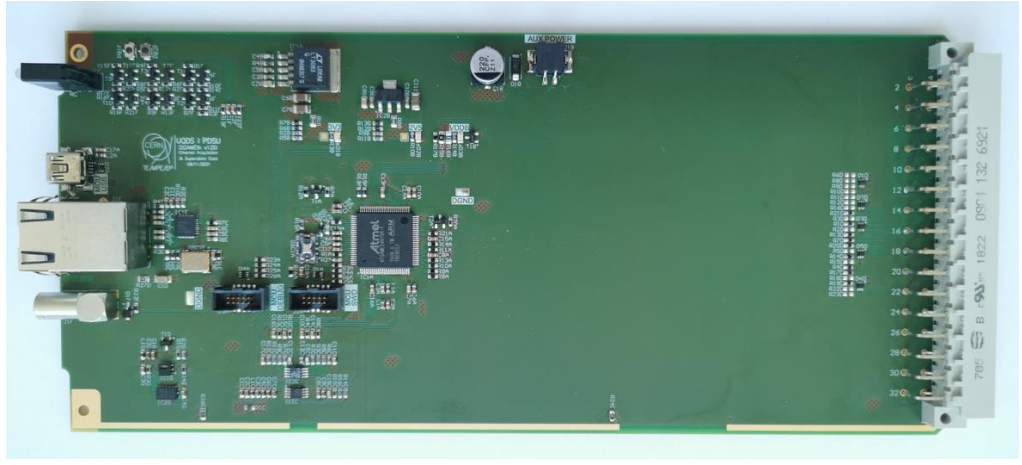


Radiation tolerant busbar splice protection system (fully redundant 2 in 1 design)

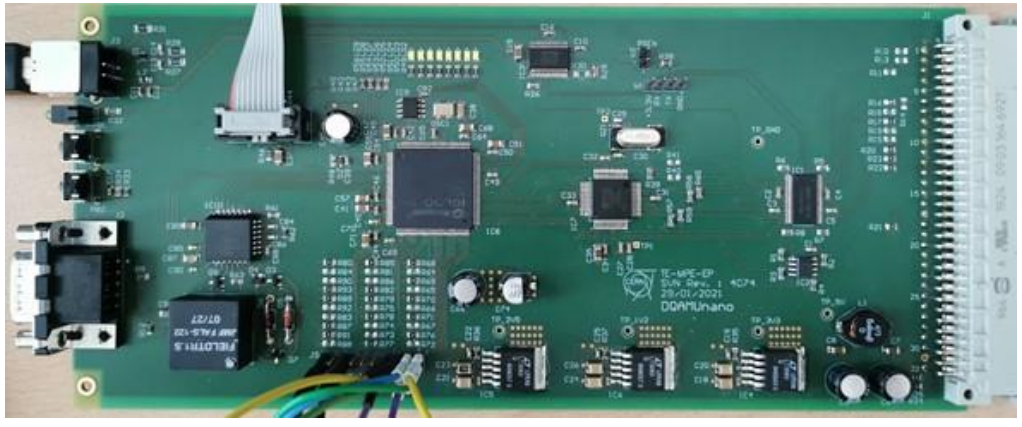


Radiation tolerant QDS with thee fully isolated analog input channels

Next generation of communication boards for QPS

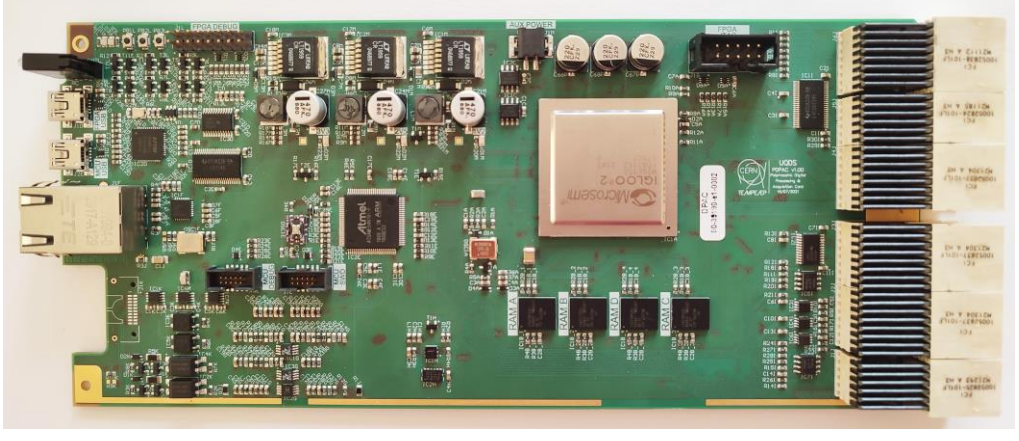


UQDS v2 / PDSU version (Ethernet)



Radiation tolerant DQAMx for iQPS/nQPS in “hot” areas (using NanoFIP IP core)

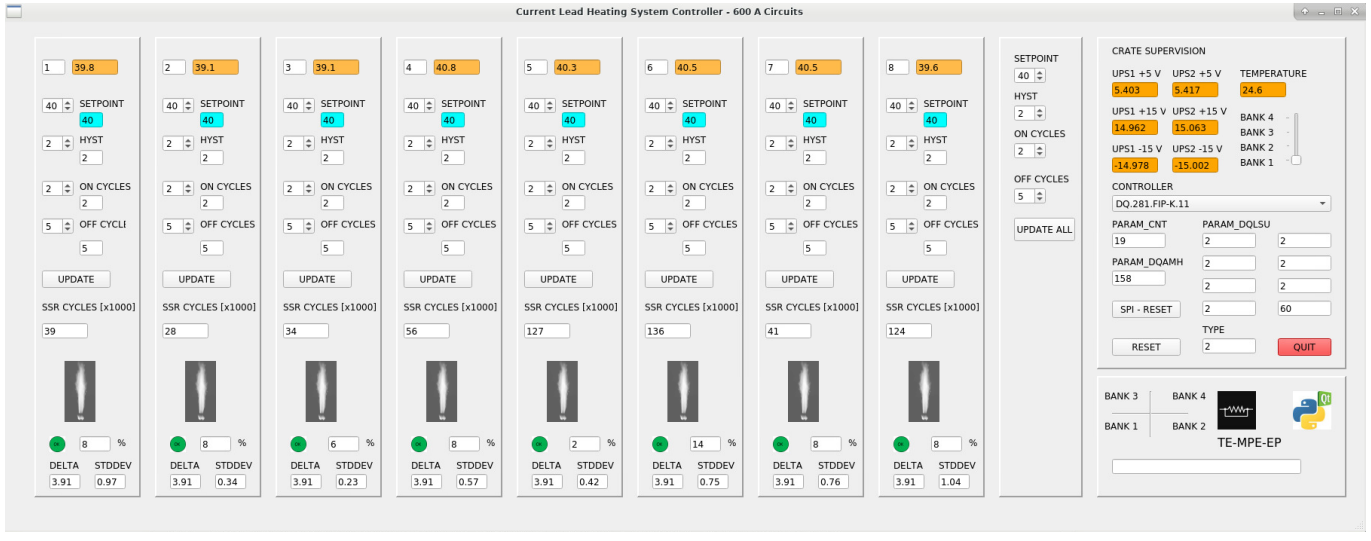
- Next generation of communication boards using Ethernet
  - Data transmission rate10 Mbps
  - Absolute time stamping precision < 10 µs



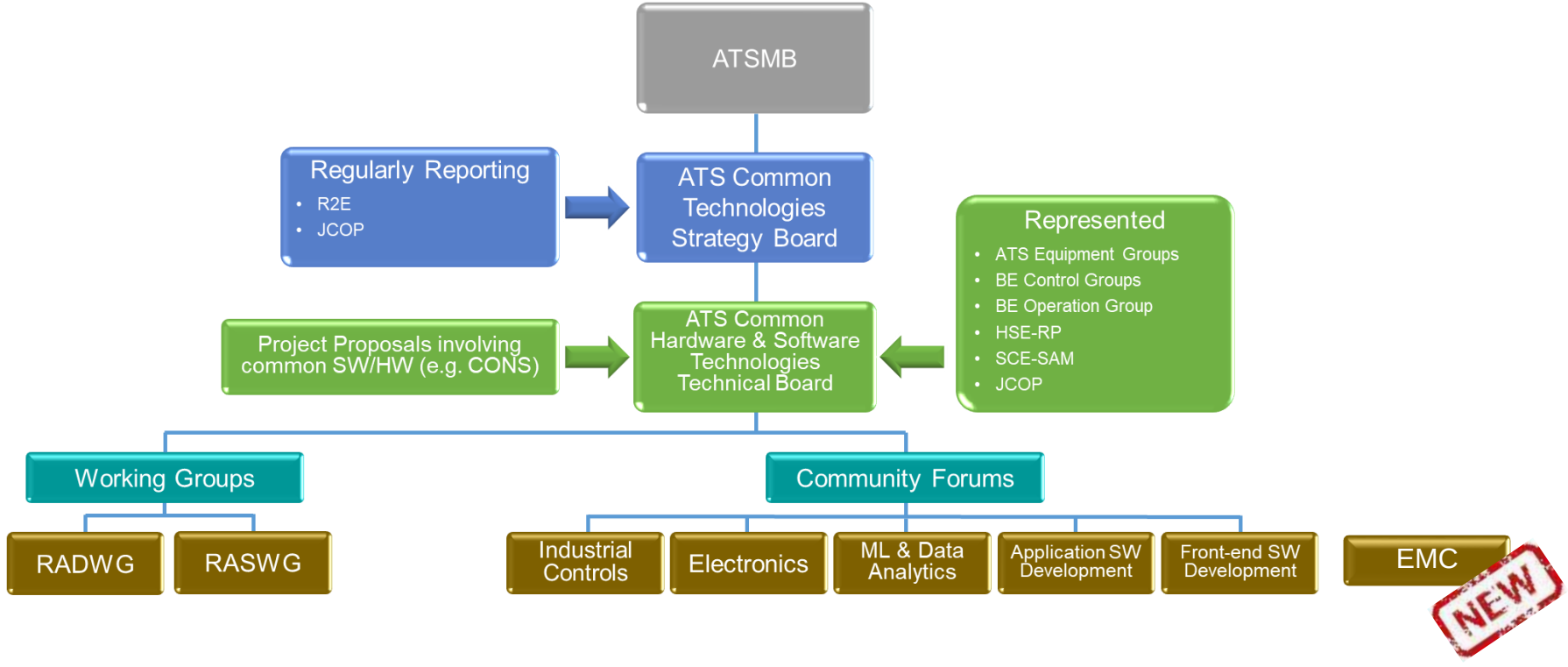
CLIQ / UQDS v3 version (Ethernet / DI/OT compatible)

Current Lead Heating System Controller Upgrade

- Radiation tolerant and enhanced featured replacement for obsolete commercial system
  - Type testing campaign in 281 ongoing; LHC tests in 2022
  - Design of HL-LHC version in preparation



MPE contribution to the ATS Common Hardware & Software Technologies Technical Board (CTTB)



- TE-MPE representation in CTTB:
  - A. Appollonio (co-chair RASWG)
  - R. Denz (co-chair CTTB)
  - Jean-Christophe Garnier (co-convener Control Application Software Development)
  - J. Steckert (co-convener Electro Magnetic Compatibility)
  - D. Wollmann (TE-MPE representative to CTTB)


STAY SAFE


HAPPY
NEW
YEAR