Discussion

LS1 developments

- **Digital Quench Protection**
  - **insertion region magnets**
    - Delivery/installation
    - Pending tests
  - **600 A**
    - Status?
    - Pending tests?
- **QPS Power**
  - Pending radiation tests at Fraunhofer – Status? (LT1084, LT1930, TPS7A901, TPS7A3001)
- **IPQ & IPD protection**
  - Tested in 2012/2013 -> LS1 implementation?

LS1 – LS2:

Planning/Schedule/Strategy/Test Requirements

- **AC/DCs for RRs**
- **New NanoFIP**

>LS2:

Equipment installed in DS/RRs

- **New developments required**
- **R&D started**

Test Campaigns

2013:

Date	Equipment Owner	Test group	DUT
21-22 September	EN/STI, TE/EPC	EN/STI	Voltage reg, Amplifiers, Isolated regulator, Transceiver
(05)-06 October	TE/ EPC EN/STI	TE/ EPC EN/STI	ADC test (SEL study) - (R. Garcia Alia, S. Uznanski)
12-13 October	TE/EPC	TE/EPC	FGC lite (S. Uznanski)
19-20 October	EN/STI TE/EPC	EN/STI	RadMon, ADC, Trigger Schmitt, FG
1-3 November	TE/CRG QPS	TE/CRG QPS	Heater board (N. Trikoupis) Components for QPS (J. Steckert)
(23)-24 November	TE/EPC, EN/STI	EN/STI	Thermocouple board, RadMon, LVDT cond, Components
14-15 December	QPS PH	QPS PH	Components for QPS (depend on the previous results) (J. Steckert) ASIC test (F. Anghinolfi)

2014 ?

Budget & Man-Power / Schedule

Budget:

		2013 Exp	2014 Estimate	2015	2016	2017	2018
R2E-QPS	99612	200	190	600	700	800	500

transfer from 99692 (790kCHF)

additional requirements for QPS cards to be produced

Man-Power?

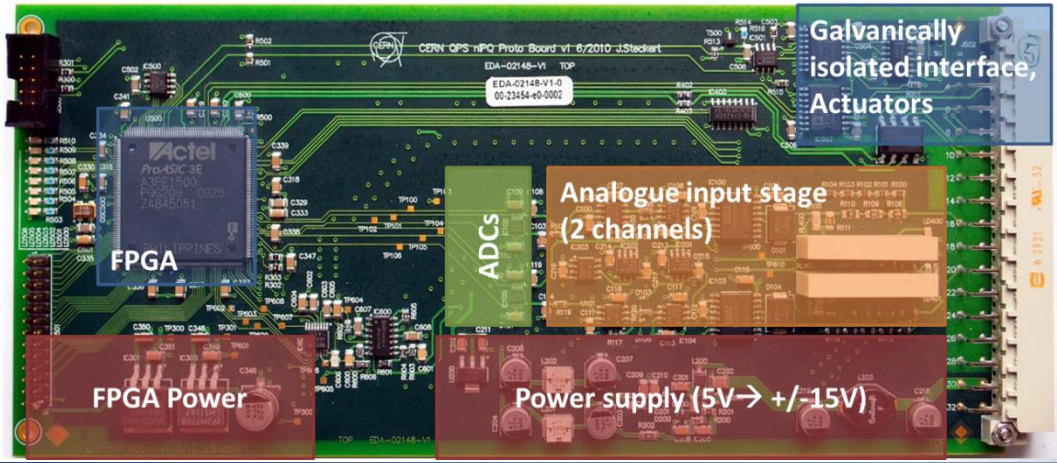
Schedule/Planning?

QPS Development

R. Denz, J. Steckert, .. (TE/MPE)

The upgrade is a staged approach (fix most urgent cases during LS1)

- **Radiation tolerant digital quench detection systems for insertion region magnets:**
  - 408 boards (450 including spares, 200 already delivered)
  - mandatory for post LS1 operation
- **Radiation tolerant digital quench detection systems for 600 A corrector magnet circuits:**
  - 208 boards (250 including spares, not yet ordered)
  - mandatory for post LS1 operation

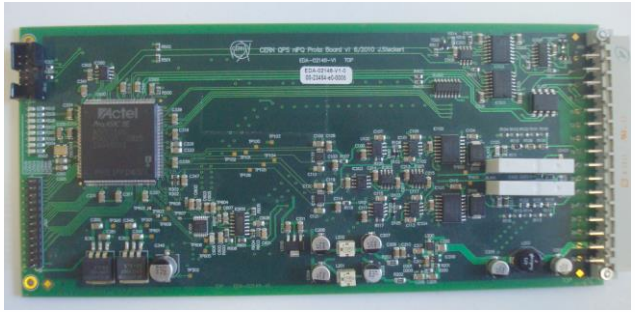


QPS Development

R. Denz, J. Steckert, .. (TE/MPE)

The upgrade is a staged approach (fix most urgent cases during LS1)

- **Radiation tolerant AC-DC converters for exposed areas (RR):**
  - 284 (300)
  - not mandatory for post LS1 operation
    (successive upgrade can be performed during LHC run 2)
- **Radiation tolerant NanoFIP based field-bus couplers:**
  - ~2500 units
  - not mandatory for post LS1 operation
    (successive upgrade can be performed during LHC run 2)
- Upgrades within the enhanced quench heater supervision project are by default radiation tolerant and not counted within R2E



QPS Developments

R. Denz, J. Steckert (TE/MPE)

The upgrade is a staged approach (fix most urgent cases during LS1)

- IPQ & IPD protection (RR13,17, 53, 57)
  - One system successfully tested in 2012/2013 (Q6.L5)
- 600 A protection (RR13,17, 53, 57, 73, 77)
  - Development to be completed upgrade is mandatory
- Enhanced power-cycle options for DAQ systems including automatic re-start of stalled field-bus couplers
  - Intermediate solution until NanoFip based DAQ systems are available
- DS areas and RR will require special consideration on the long term especially for post LS2 operation. R&D work has been started.