



EM section activities for MPE group

YELLOW RACKS

- New projects
 - DQLIM: chassis, motherboard, side board, cables (EDA-02644, 02645, 02646)
 - DQLPR: 2 boards, 1 box (EDA-02606, 2607, 02648)
 - DQLPU: chassis, motherboard (EDA-02658, 02534)
 - New boards into DQLPU: DQIPF (EDA-02697), DQHSU (EDA-02660), DQCSU (EDA-02661), nDQQDL (EDA-02380)
 - Fuse Holder Adapter (EDA-02930)
- Upgrades
 - DQQDL (EDA-00060)
 - DQAMC (EDA-00115)

OTHERS

- New projects
 - 600A Switch tester macrolon box (EDA-03037)
 - 600A Switch tester crate (EDA-03038)
 - mDQQBS (EDA-03017)
 - nDQQDG (EDA-03039)
 - DQQDE (EDA-2129)
 - nDQQDI (EDA-02148)
 - HV Crate upgrade (EDA-02681)
 - Thermostar connector Board (EDA-02652)
 - Low Noise Measurements 600A EE (EDA-02552)
- Upgrades
 - Switch Driver (EDA-00894)
 - FPA Open Close (EDA-00467)
 - Mains board (EDA-01839)
 - Braker Board (EDA-01861)

Description of work and quantities produced

29 projects during the period **October 2012** to **February 2015**

- **22** designs (PCB layout, front panels, crate, BOM and assembly)
- **4'400** sets of mechanical parts outsourced through EN-MME
- **12'260** PCB made (at CERN or subcontracted)
- **12'240** PCB mounted (at CERN or subcontracted)
- **2'900** PCB reworked or modified
- Purchasing of components

Design office

1'145 hours (DQLIM 365h, DQLPR 290h, DQLPU 140h), most of them in the period October 2012 to March 2013.

Purchasing and logistics

2-3 collaborators during 6 months

- Follow-up of the planning, answers to technical problems at contractors
- **120** DAI and **50** MAG issued for
 - Manufacturing of mechanical parts
 - Components purchasing
 - PCB manufacturing
 - PCB assembly
 - Crate assembly
 - PCB rework/modification



All this represents **only part of** the global workload of the section (15-25%)

What worked well?

Weekly reviews at group level

- Gives a global view of the projects
- Helps to define priorities between the projects in the group
- Increases the level of understanding of each other's concerns

Collaboration with subcontractors

- Assembly projects were spread over several suppliers to balance load and capacity
- New suppliers were found for mechanics (Laser Galicia, Elekmerk, MARS), cable manufacturing (HTC) and for assembly (ADTP)
- The motivation of contractors helped to meet deadlines

Support from EE and EP section

- The procurement of the material for DQLPU and long leadtimes parts were done by these sections
- Cadenced deliveries for DQLIM were organized together with the final Yellow-racks assembly

Support from EN-MME and FI-FP

- MME: 3 new suppliers, good results in terms of quality, cost, planning
- FP: all DO and orders placed without delays

What went wrong?

High workload in the design office for DQLIM and DQLPR

- The project was not enough prepared before starting drawing, leading to several iterations
- Interactions between DQLIM-DQLPR-DQLCT were not enough anticipated
- This led to jeopardize the planning for other projects inside and outside MPE

Availability of recuperated parts

- The poor quality of cables has been detected only when reassembled in the crates
- This led to re-order some parts late
- A test should have been done at dismanteling

What needs to be improved?

Review designs

- DQLIM design: there was no clear view from the EE-engineer before starting drawing, interactions with DQLCT and DQLPR were not enough taken into account

Specify the work to be done before starting

- HV test of cables was not specified when ordering
- Need for traçability of DQLIM boards and crates was not transmitted

Qualify suppliers

- Choose the right supplier: Connect group was too big, Prima was not familiar with IPC standards
- Process and the preseries must be validated: DQLIM assembly at ADTP, DQLPR at Prima.

Follow-up the planning

- This follow-up should be done since the very beginning, not when delays will be only hardly recovered
- Workload for the design office should be announced earlier, even if moves. This would give the possibility to anticipate the size of the FSU or to decide subcontracting this activity

What should be done next time?

- We succeeded in providing all projects without creating delays. However, with some more anticipation and planification life would have been easier and crisis limited to really unexpected matters.
- The mission of EM is to provide PCB design together with the manufacturing and assembly of electronics modules. This can be seen as an opportunity for other sections to reduce their overload.

Thank you!