

LMU München - Excellence Cluster Universe

## PS & Services

**Stefan Rummel**

**DEPFET Collaboration Meeting  
Kloster Seeon  
25.5.14-28.5.14**

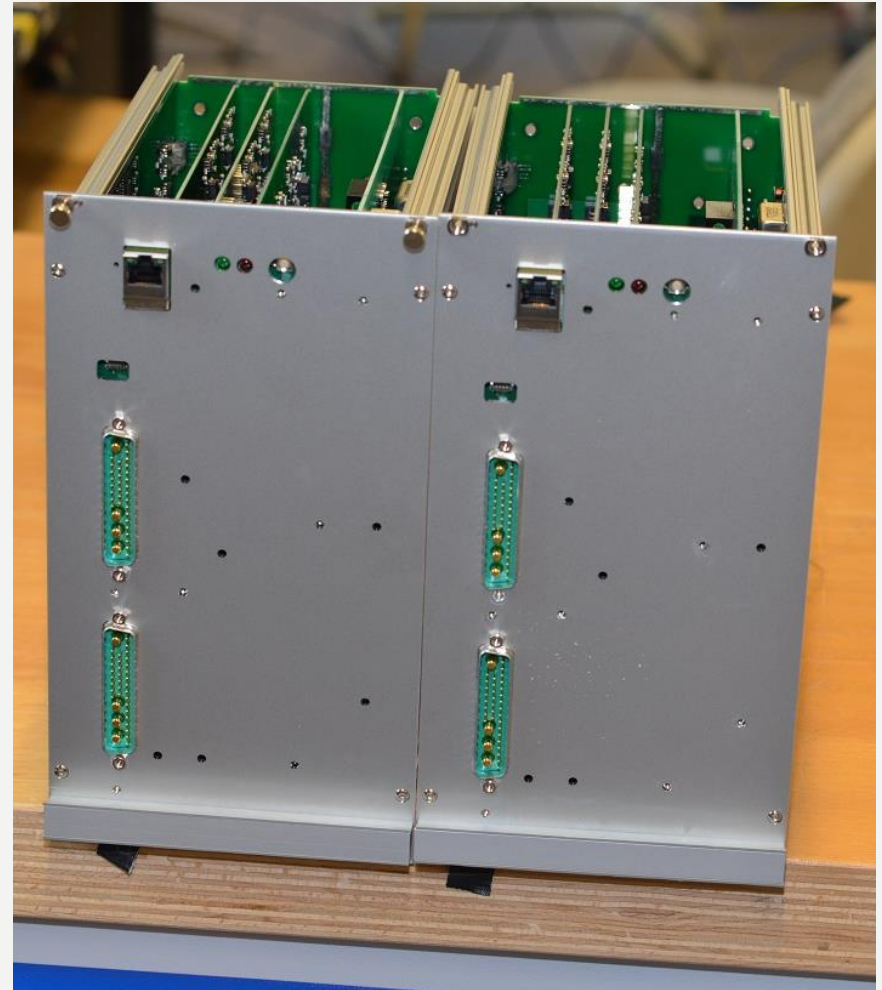




- Preproduction status
- Mechanical integration into racks
- Services:
  - Kapton development
  - Patch Pannel, Docks
- Outlook

- Goal: 10 Units, 24 Channels, full output power → Final designs specifications
- Output connectors suitable for final cables (mixed layout D-Sub)
- Final DC/DC converter cards → Full output power
- Bug fixing / optimizing
  - MCU card finalized (Interlocks)
  - Regulator cards finalized (Temperature measurement on regulators, opt. SNR of ADC's)
  - Breakout boards adapted
  - OVP substitute

- All PCB's are delivered
  - All designs have arrived from the EMS
- First units are ready for calibration



- 40 cards in 3 assembly variants
  - 10: With HV-Channel's to -100V
  - 10: Mixed with +28V and -20V range
  - 20: Bipolar with +10V - (-20V) range

→ Delivered in February

→ 10 went back for rework





- 20 cards in 2 assembly variants
  - 10: for Analog Channels
  - 10: for Digital Channels

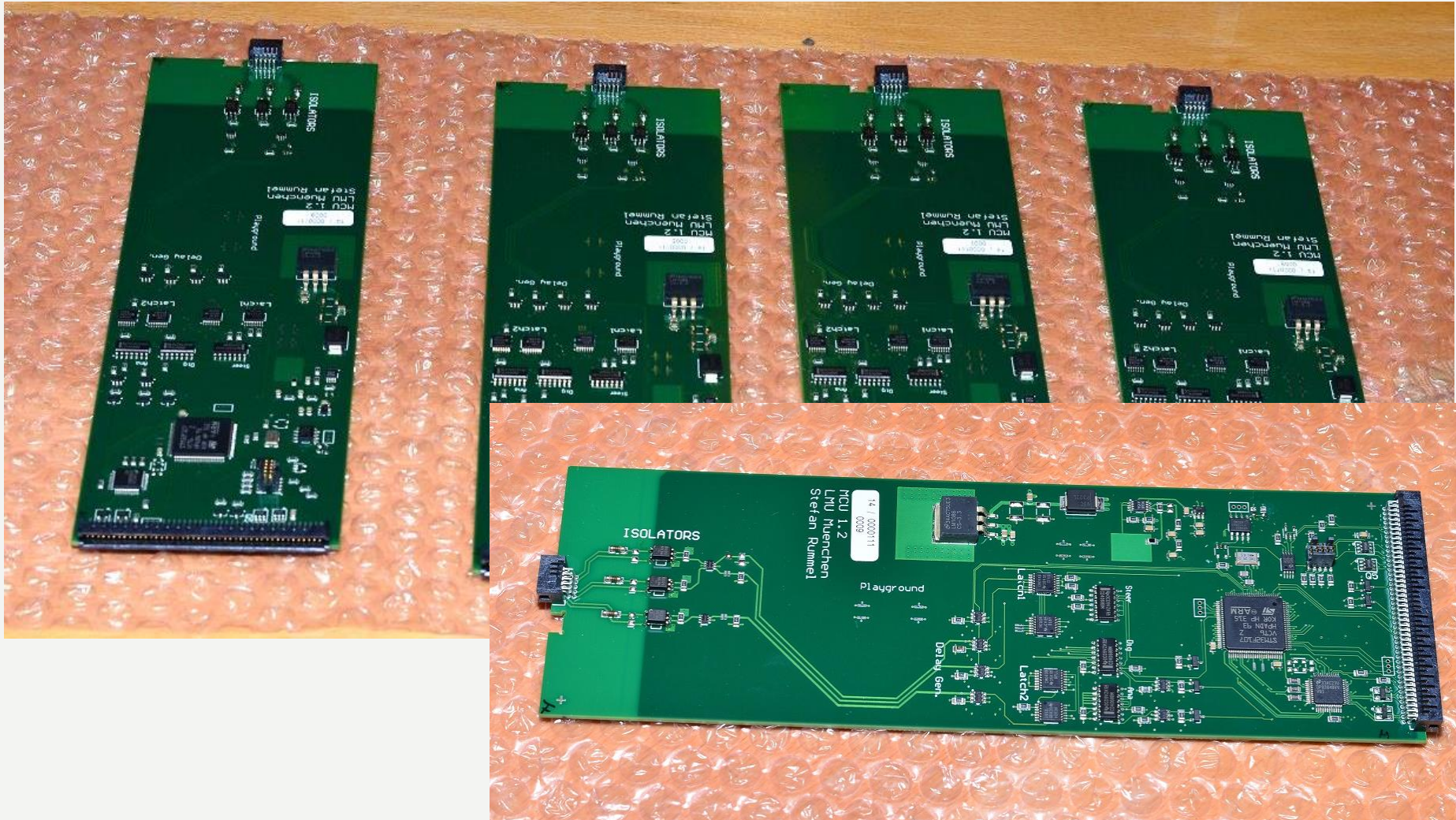
→ Delivered



# Preproduction status – Step Down Converter

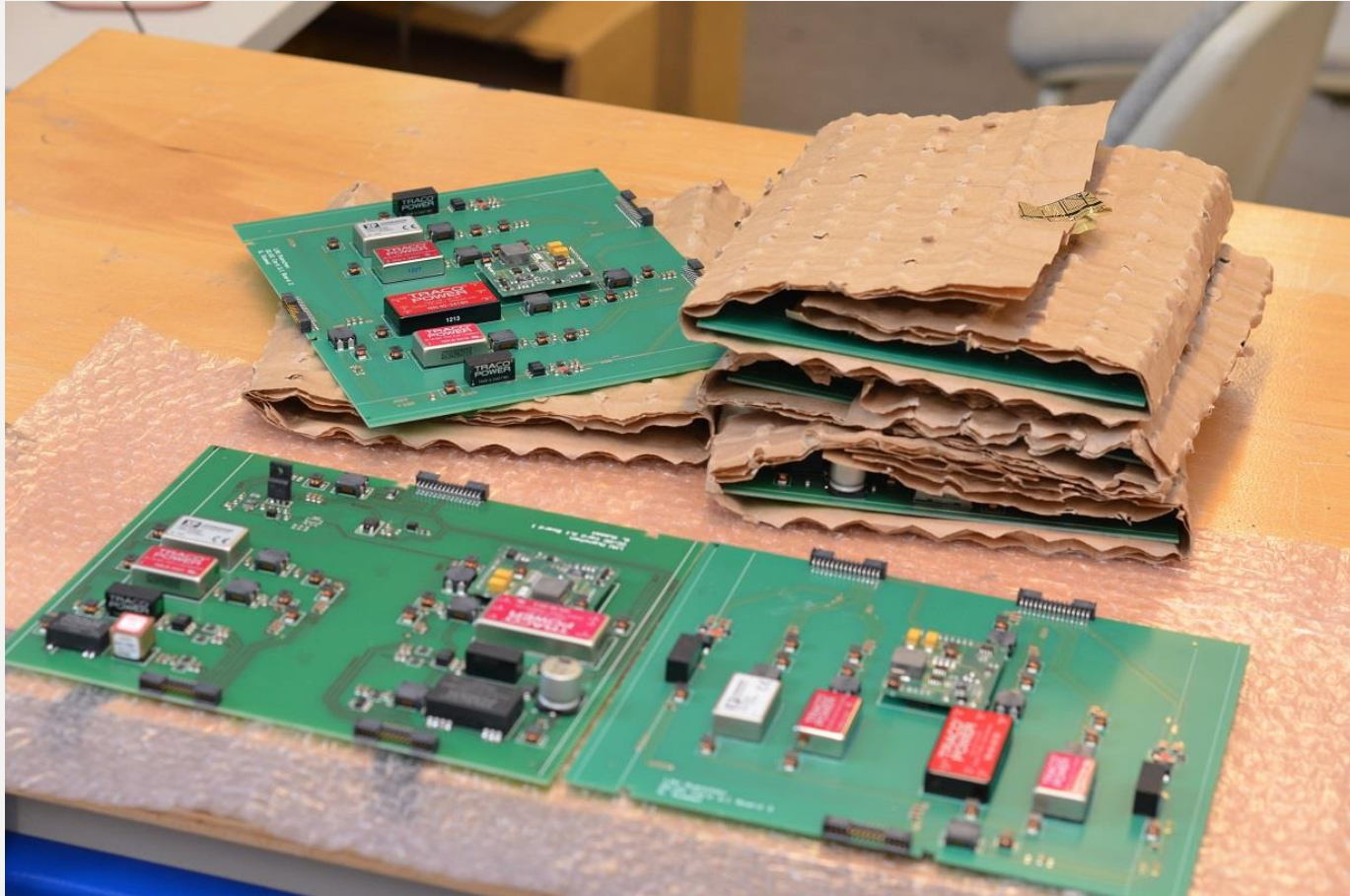




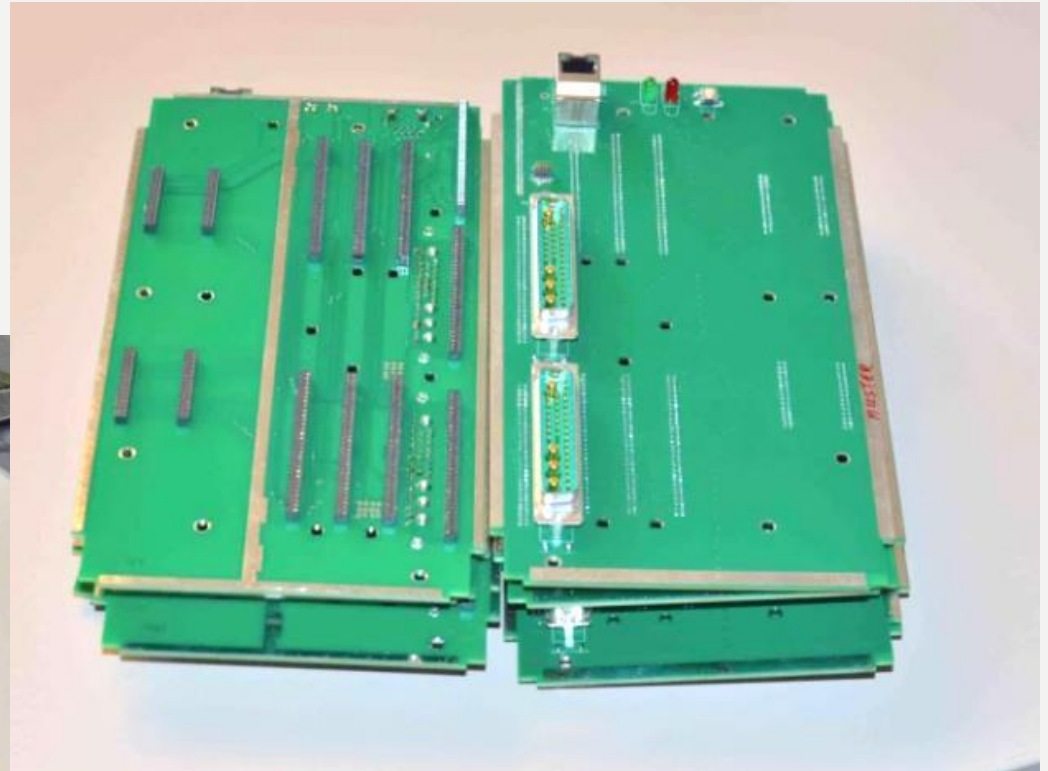
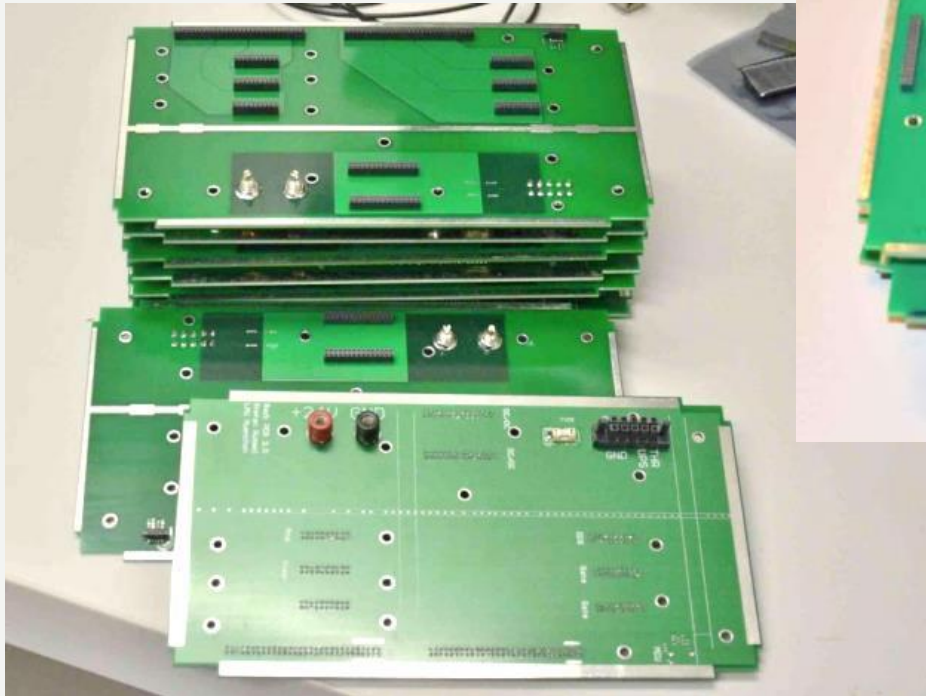




## Preproduction status – DC/DC Converter Cards



# Preproduction status – Front / Back PCB

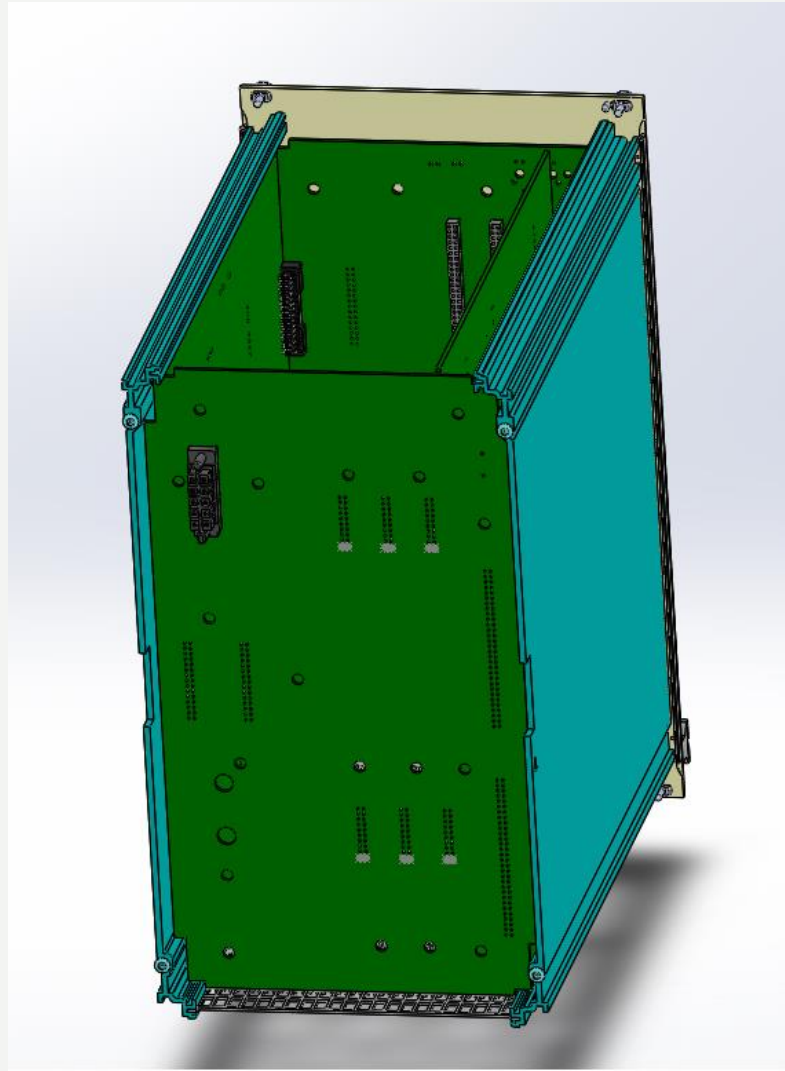


- Before unit is assembled the individual components must be tested
- DC/DC converter cards:
  - Is the hot swap controller working
  - Check dropout levels
  - Check individual DC/DC converter voltages at the card output
- Regulator cards:
  - Attach heat sink with thermal conductive rubber
  - Set solder jumpers of regulator card
  - Test card response:
    - Output level at full scale / 0 DAC → Monitoring, Regulators
    - Current limit as FS → does the current limit flag work

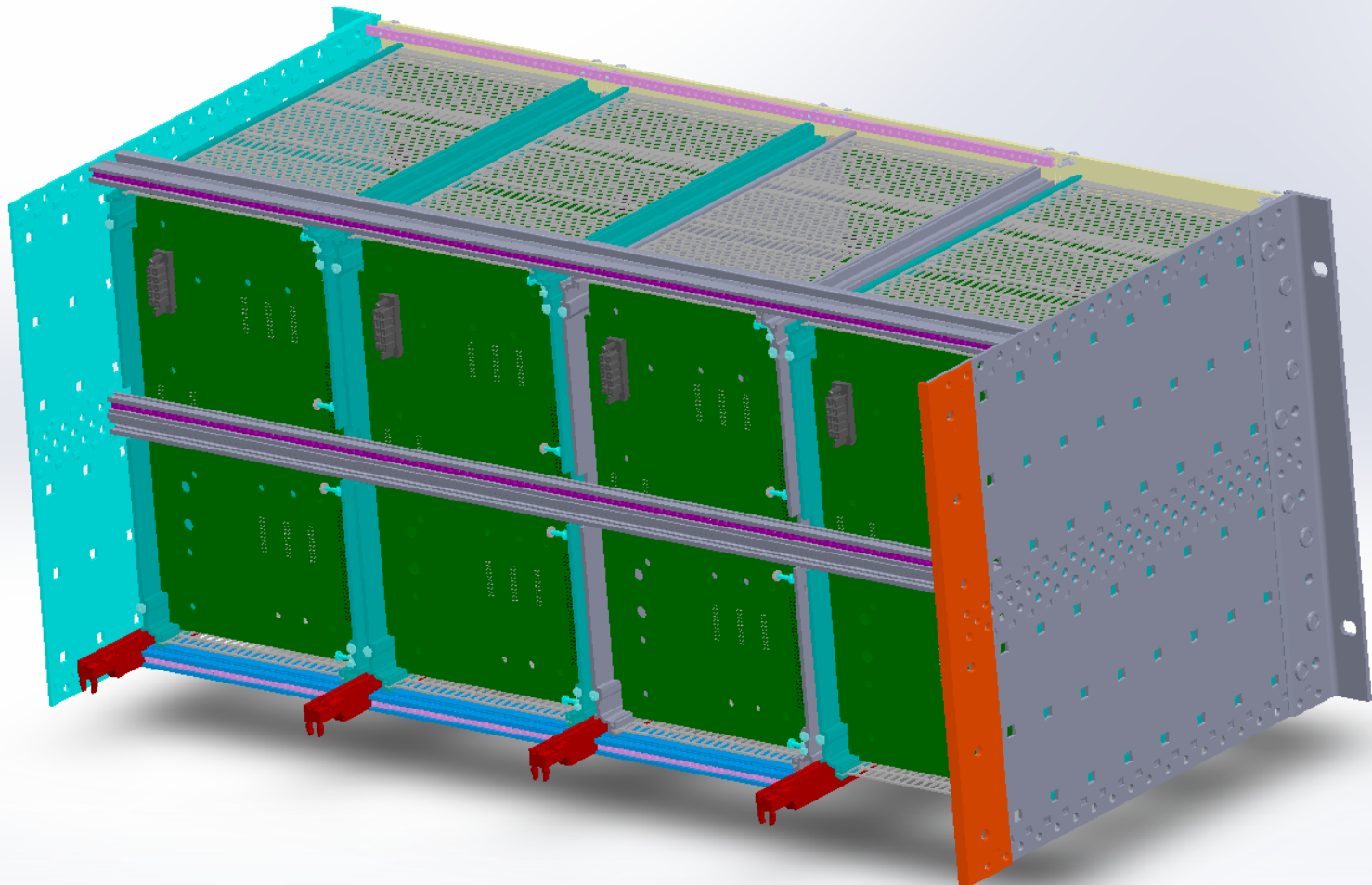


- Step down cards:
    - Set I2C address
    - Check responsiveness of I2C bus
    - Check stability at 0 / full output current at max. / mini. output voltage
  - MCU Card:
    - Upload firmware
    - Check responsiveness of Ethernet interface
    - Check external interlock
- After each component is working the unit can be assembled and calibrated

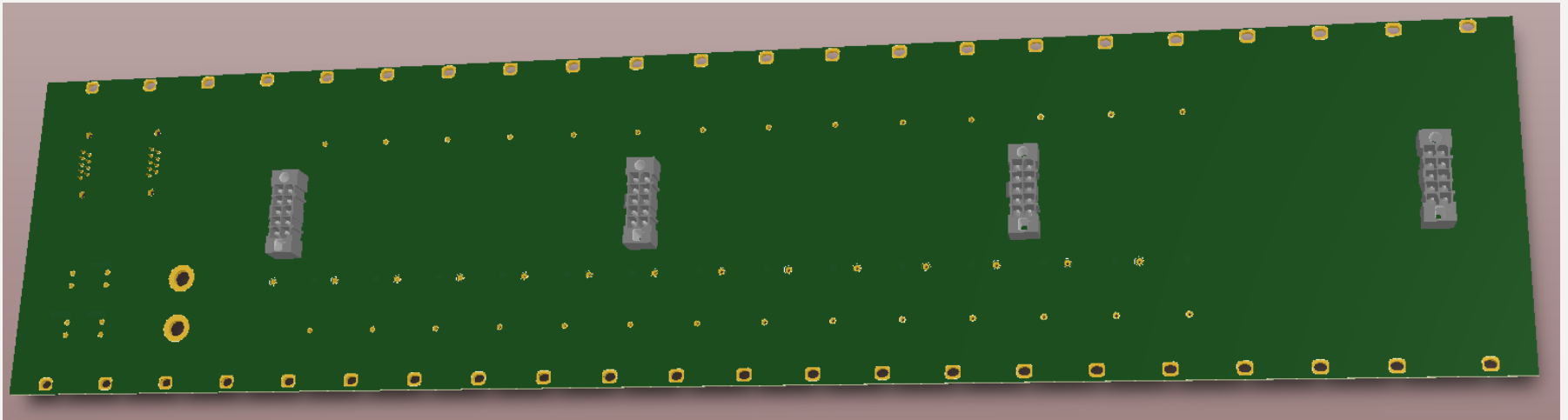
# Integration into racks







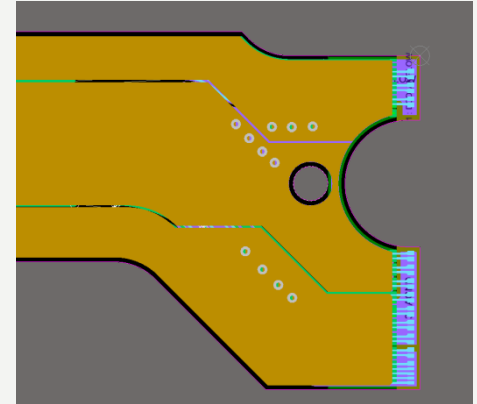
- Form factor PS: Cassette 28TE (5.04mm) wide
- Rack 112TE wide
- Backplane to distribute power and interlocks



# Services



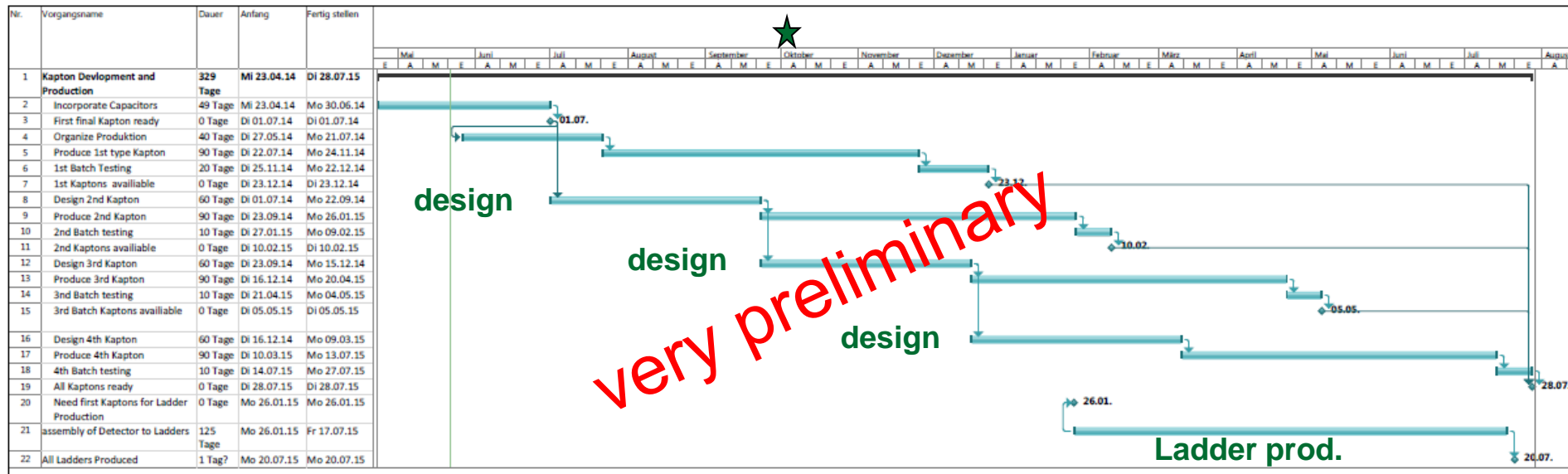
- Received prototypes from Taiyo
- Specs:
  - ~50cm long
  - 4 layer Kapton, Vias in the EOM area
  - 6 layer around the connectors
  - No capacitors incorporated
- In addition a German vendor has been qualified (“Kaupke”) after a second trial some Kaptons will be delivered in beginning June
- For final production 4 designs are needed ( inner, outer, fb, bw), space for capacitors varies for each type, rerouting of connectors necessary to preserve compatibility with PP





- Kapton (L2bwd) – latest information from MPI (Miriam & Markus)
  - Capacitors are placed – this area is routable inc. TML's and power traces  
→ Very promising!
  - Partially routed from EOM to strain relief
  - Waiting for input from mechanics to finalize outline around strain relief
  - ~ 4 weeks work
- Next important Step: finish this design
  - Important information for planning
  - Go for discussion with Taiyo for production

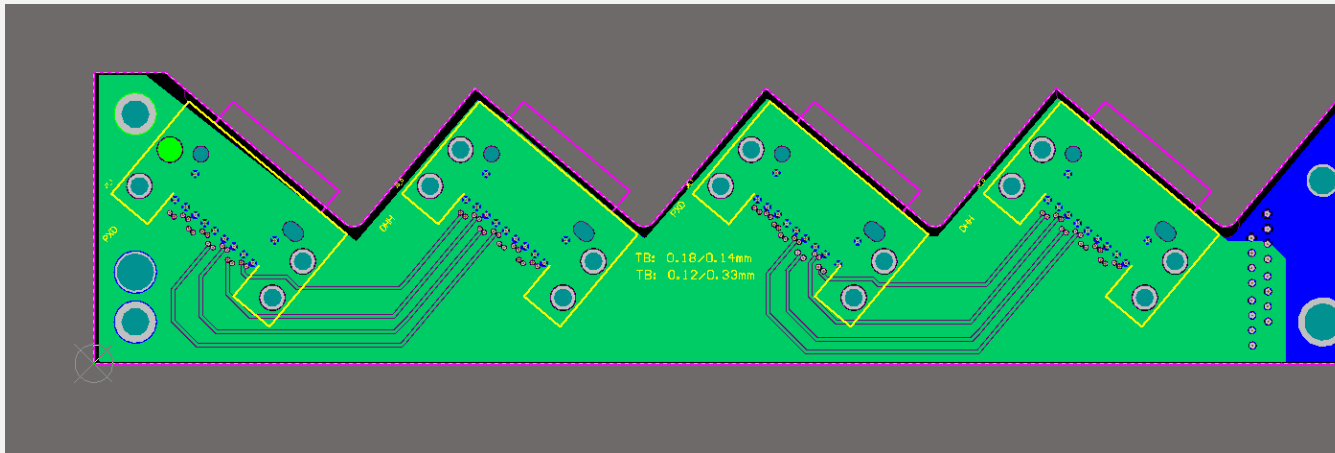
- Requirements from our schedule:
  - First final Kapton should be delivered till October
  - One set of Kaptons (e.g. Innerlayer FW and BW) must arrive in time with module production
- Production time ~90 days
- Time for a design 60 days (worst case: each type is a new design, no learning effect)
- Design is done in a serial way



- The current design-effort is crucial to get a realistic understanding of time required
- Designing in parallel would allow a significant speed up

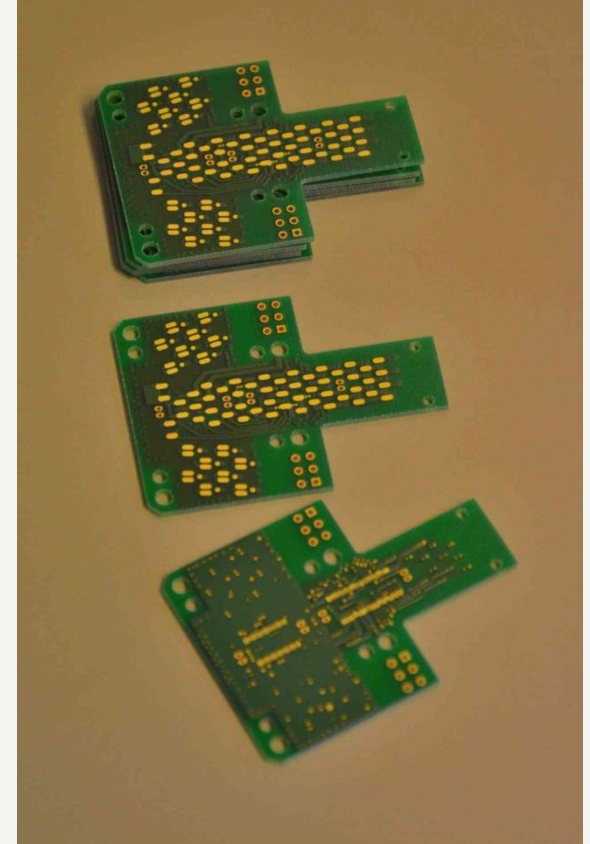


- Layout finished by MPI last September
- Design review has revealed several issues regarding routing



- Design was reworked at LMU
- Option to go back to 8 layers (1.6mm thickness) has been restored

- Design of PP for Taiyo Flex prototype
- Features:
  - Incorporates latest mechanical requirements
  - Solder pads for ALL cables
  - Samtec SS4/ST4 towards Kapton
- Design finished (8 Layers, Blind Vias)
- Mechanical Dummy for solder tests has been produced
- Expected lead time 12WD for full production



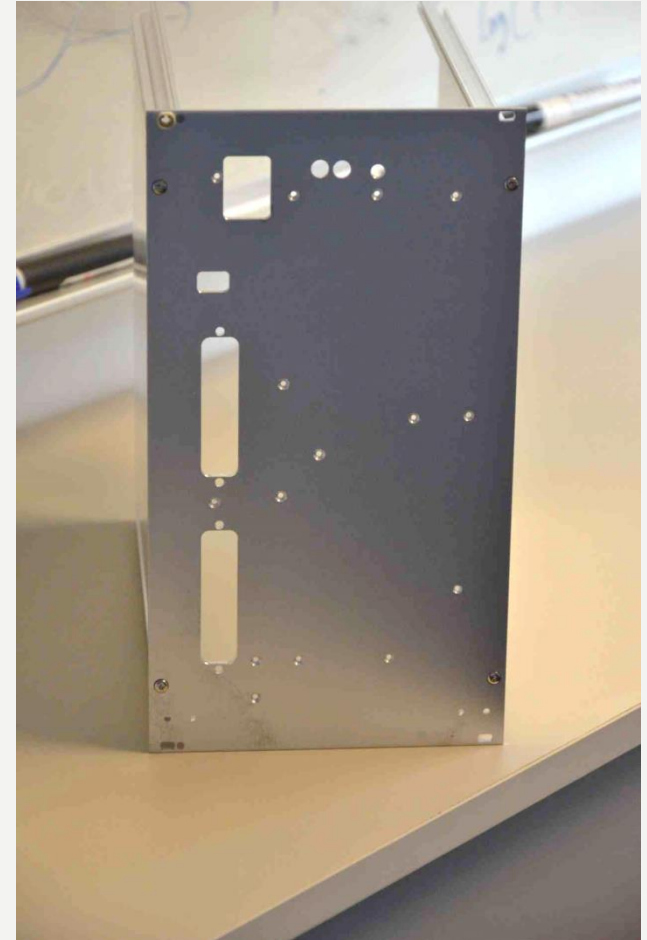


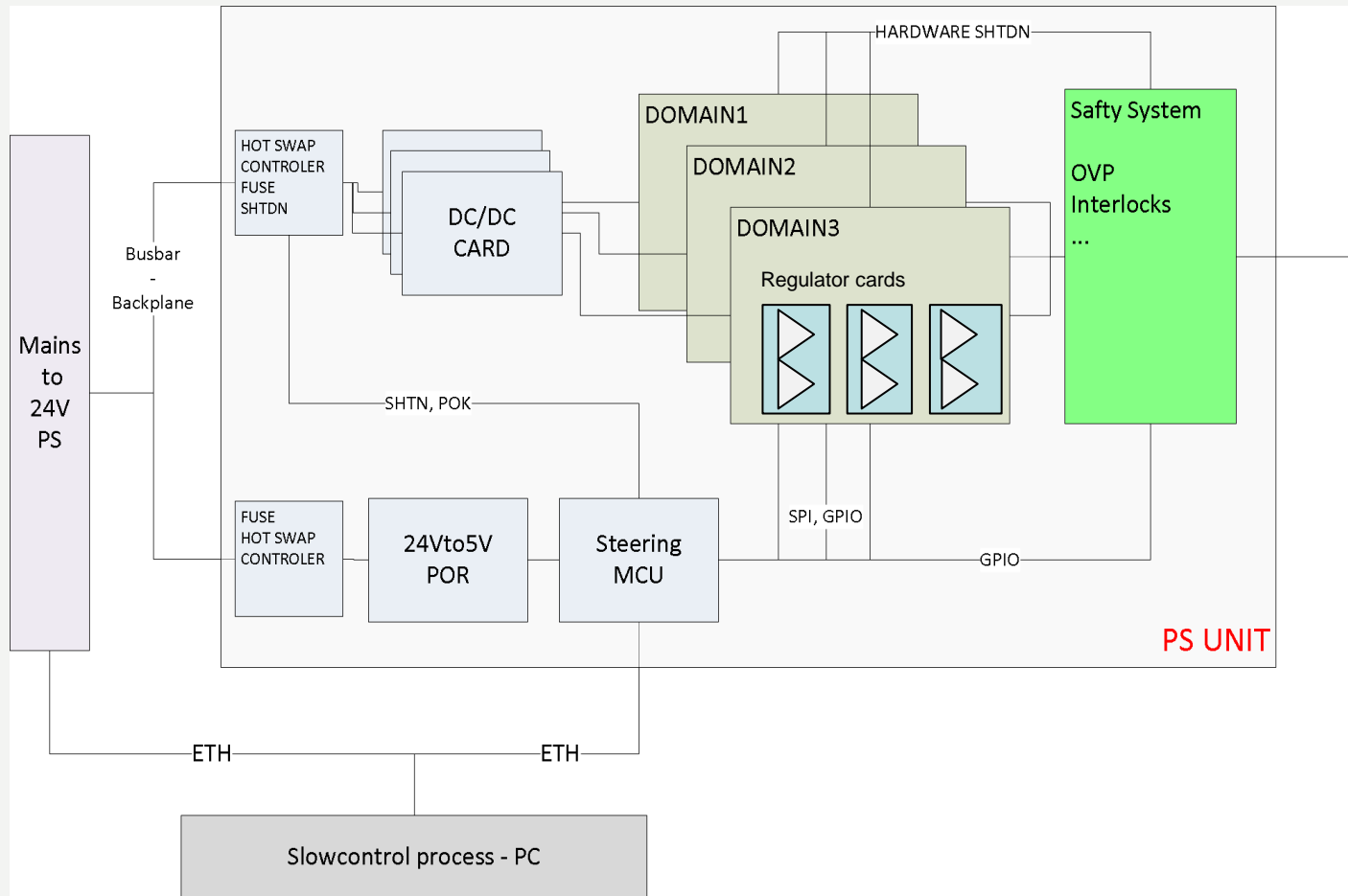
- Preproduction is finished, first 2 units are ready for calibration, rest will be finished soon
- Mechanical integration into rack has made progress
- Kapton development is ongoing, the next weeks of development are crucial for getting the Kaptons in time

# Backup



- Box designed and first sample produced
- Extra wide crate received





|                    | <b>Demonstrator</b>     | <b>Preproduction PS</b>         |
|--------------------|-------------------------|---------------------------------|
| # Channels         | 16 (up to 24)           | 24                              |
| Mechanics          | 21TE                    | 28TE                            |
| Power distribution | 37 pin D-SUB            | Mixed Layout D-Sub, final cable |
| Output Power       | DEPFET + 1 pair DCD/DHP | DEPFET + 4 pairs DCD/DHP        |
| Slow control       | Chromosome + EPICS      | Chromosome + EPICS              |