Monitor Spectrometer Integration

ASSEMBLY AND HOLDING STRUCTURE
Reminder of 47 and 166 Channel Design

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<th>47 Channel</th>
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- **47 Channel**
  - 1 ASIC Board
  - 2 Ribbon Cables

- **166 Channel**
  - 2 ASIC Boards
  - 4 Ribbon Cables

- **Sensors**
  - Thermal Sensor

- **Diagram**
  - SDD Bonds
  - C-Shape Flex
  - ASIC Board
  - Ribbon connectors
  - 47 Channel
  - 166 Channel
Assembly Procedure in Moni-Spec

Idea: Assembly everything outside and then slide inwards
Assembly of the Module Top

- Top of Module assembly @ HLL clean room
- 4 steps cleaning procedure
  - Acetone, Propanol, distilled H20, N2
- Epotec 920 glue cured at 60°C for 5.5 h
- Bond connections made and tested on probing station
- Difficult to clean after assembly

Tested and Cleaned
Assembly of ASIC Board

- ASIC Board Assembled at Polimi
  - Soldering ASIC board
  - Cleaning in ultrasonic path
  - Bonding Ettore ASIC
  - N2 flushed sealed transportation bag

- Test functionality
- Shipped to MPP/KIT
- Difficult to clean after assembly

Tested and Cleaned
First Assembly and Calibration

• Assemble Module itself
• Connect C-Shape and ASIC board
• Testing and Calibration
  • Detector Response
  • Noise Curve
  • Stability over time/temperature
  • …
• Performed at MPP (KIT)

Tested and Calibrated
Attaching Vacuum Shield

- Vacuum shield
  - Reduce conductance between outgassing parts and spectrometer vessel

- Adjustable with screws
  - Finding the right spacing challenging
    -> Dummy test assembly

- Z variation ≈ 40 mm at vacuum seal
1. Preparation

- Support bellow tube
- Additional/removable mount for cooling structure
- Counter weight for stability
2. Installing Cables

- Connect vacuum connectors/cables to flange
- Temporary fix cables at heat exchange (guiding mount on holding structure possible)
3. Installing Module

- Installing module at heat exchange block
- Tried already and worked
4. Slide Insight

- Installing module at heat exchange block
- Remove additional flange mount
5. Outside Electronics

- Installing Bias board, DAQ etc.
Open Points

Holes or threads inside?
Slow control Sensors

• No thermal sensor currently for 47 Channel
• External Sensors possible?
• What could be useful?
  • Thermal (where?)
  • Magnetic
  • Calibration Source
  • Vibration
• Where to connect to?
Which tests should be performed?

- Vacuum shield spacing
- Characterization of Module
Backup
Holding Structure Design Modification

- Heat exchange out of OHFC
- Reduction piece out of stainless steel or aluminum
- Remove Swagelok Connectors
- Stainless steel Brackets instead of GFK ones
- Ventilation holes for Copper heat exchange screw
47 Channel Design Proposal

- Silicon **L-shape frame** with traces for **back-voltages**
- **Ring X pad** is in **top corner**
- **No thermal sensor** (No connection possible)
- **Assembly procedure stays the same** (only change baseplate)
1. Installing Holding Structure

- Install holding structure on movable desk
- Removed bellow tube
2. Installing Vacuum Cables

- Connect vacuum connectors/cables to flange
- Temporary fix cables at heat exchange
  (guiding mount on holding structure possible)
3. Installing Bellow Tube

➢ Slide the bellow tube over the holding structure
➢ Probably stabilization required
  (pull back and compensate gravity)
4. Installing Bellow Tube

➢ Mount module (vacuum shield mounted)
➢ Connect Cables
5. Installing Bellow Tube

➢ Probably: slightly move module inside cross
➢ Slide Bellow tube over Module and fix at cross
Position of Detector

• Current Design:
  • Distance to solenoid edge: \( \approx 230 \, mm \)
  • Flux Tube: \( \approx \varnothing 40 \, mm \)