Purpose of Faraday Cage and Requirements

Front-End Electronics Overview

Inside the Faraday Cage
  Electronics - mechanical details (several views)
  On-Chamber Gas Distribution

Faraday Cage Itself
  Barrel Faraday Cage
  Faraday Cage Penetrations

Outside the Faraday Cage
  Electrical Services

Summary and Open Issues
MDT Faraday Cage
Purpose and Requirements

EMI shielding for front-end electronics

**IDEAL:**
- completely sealed enclosure of entire chamber
- no openings
- all seams, joints covered with 100% conductive material

**REALITY:**
- complete enclosure is too expensive
- gas, electrical, signal, support connections required
- perfect sealing of joints is impossible
- many openings required

**DESIGN:**
- compromise-- two enclosures at opposite ends
- close joints as tightly as possible
- minimise number of openings
MDT Faraday Cage

Front-End Electronics Overview

Faraday Cage

24 MDTs

Readout Boards (24 ch)

Octal ASD

24-ch TDC

Control ASIC

DC V Reg

TDC-Links (LVDS)

Service Chamber Module

Optical Fiber to USA

24 MDTs

Readout Boards (24 ch)

Up to 9 boards per superlayer (18 per chamber)

TDC Links (LVDS)

JTAG (LVDS)

DC Power

ATLAS MDT PRR - 18.06.1999 - E. Hazen

MDT Faraday Cage

Front-End Electronics Overview

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MDT Faraday Cage
Hedgehog PCB Mounting

NOT TO SCALE

- Mill-Max socket
- 1.9 mm machined Pin (gold plated)
- Brass Cap
- Ground Stand-Off
- Screw
- Faraday Cage
- Bottom Plate
- Ground Ring
- Insulator
- Aluminium Tube
# MDT Faraday Cage

## Electrical Penetrations

<table>
<thead>
<tr>
<th>Function</th>
<th>External Cable</th>
<th>Connector</th>
<th>Internal Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>LVDC</td>
<td>Shielded</td>
<td>D-type, Shielded</td>
<td>Unshielded</td>
</tr>
<tr>
<td></td>
<td>~8 AWG</td>
<td>shield to F-cage</td>
<td></td>
</tr>
<tr>
<td>JTAG (LVDS)</td>
<td>CAT-5 STP</td>
<td>RJ-45, Shielded</td>
<td>CAT-5 UTP</td>
</tr>
<tr>
<td>TDC-Links (LVDS)</td>
<td>Shielded Ribbon</td>
<td>Micro-pitch Header</td>
<td>CAT-5 UTP</td>
</tr>
</tbody>
</table>
Patch Panel and CSM are Centrally Located on most chambers:

Specific Cases Studied (end views):

- **BOL, BML, BOS**
  - 317mm spacer

- **BIL, BMS, BOG, BOH**
  - **BMF, BIR**
  - 170mm spacer

- **BIS, BEE**

- **Endcap Chambers (all)**
MDT Faraday Cage
Summary

Design Status

Hedgehog PC Boards  
Production scheduled to meet requirements for module zero and series production

Faraday Cage Itself  
Minor open design issues - tests continue

Wiring inside Faraday Cage  
Final design due before 1st module zero

Patch Panel

Chamber Service Module  
Installed after chamber production

Wiring outside Faraday Cage

Open Issues

Faraday Cage - how to seal joints?
Ground Connections - tube to Faraday Cage
Alignment of Ground Pins