PXD PatchPanel Overview

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PatchPanels



- very complex cable, three cables (Infiniband, Glenair and Ethernet) mapped to one 100 pin connector
- long development time
- many people involved for development, documentation, commissioning and testing Stefan Rummel, Tscharlie Ackermann, Ronald Maier, Christian Kiesling, Stefan Horn, Carina Schlammer, Christoph Knust, Felix B. Müller, Enrico Töpper, David Kittlinger, Philipp Leitl, Hua Ye, Felix J. Müller, Varghese Babu, Maiko Takahashi



• Assembly on three different sights.



Production



12x L1-bwd, 12x L1-fwd, 18x L2-fwd



18x L2-bwd

Prototyps from MPI workshop



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not final cable length: 7x L1-bwd, 7x L1-fwd



- Right after delivery the cable is labeled.
- The cover is opened.
- The soldering is documented with a picture.





- The cables are sent to Stefan for testing the connections and assignment of lines with a cable tester.
- Several line swaps and shielding issues were already detected in this state.
- This lead to improvements of the isolation to the housing.

PatchPanel Production - Isolation of Cover





2 layers of Araldit inside the cover



Kapton tape at the wire bending



- The PatchPanels are tested with a test module before connecting to a hot module.
- Procedure:
 - Power up of module and checking for the voltages and currents.
 - Configuration of the module to check SC connections.
 - Taking pedestal data to check the HS connections.
 - Test module does not have to be grade A. Known shorts in the matrix are still ok.
- The functional test can be done in labs or even at KEK.

PatchPanel Production - Potting (at KEK)







Oven available at KEK

Small table in B1

PatchPanel Production - Final Test

- The potted PatchPanels are tested with a test module again before connecting to a hot module.
- Same procedure:
 - Power up of module and checking for the voltages and currents.
 - Configuration of the module to check SC connections.
 - Taking pedestal data to check the HS connections.
 - Additional step: check the pins of the Samtec connector with a microscope.
 - Test module does not have to be grade A. Known shorts in the matrix are still ok.
- The final test can be done in labs or even at KEK.



- Finally the PatchPanels were mounted t
- Finally the PatchPanels were mounted to the PXD.
- For experience reports ask David Kittlinger, Enrico Töpper or Felix B. Müller.
- Critical issue: Samtec connector can be damaged during connecting! This happened already several times during testing and also once at KEK only the last days (L1-fwd-08).
- Not clear if rework of Samtec connector is possible.

Connection to Kaptons





PatchPanel to Module Mapping

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PatchPanel	Ladder	Module
L1-bwd-15	L1_019	W43_IB
L1-bwd-18	L1_020	W45_IB
L1-bwd-14	$L1_014$	W01_IB
L1-bwd-09	L1_028	W03_IB
L1-bwd-19	L1_036	W13_IB
L1-bwd-12	L1_017	W44_IB
L1-bwd-08	L1_018	W41_IB
L1-bwd-11	L1_015	W02_IB
L1-fwd-12	L1_036	W13_IF
L1-fwd-14	L1_017	W32_IF
L1-fwd-15	L1_018	$W41_IF$
L1-fwd-18	L1_015	W47_IF
L1-fwd-11	L1_019	W03_IF
L1-fwd-09	L1_020	W42_IF
L1-fwd-16	$L1_014$	W45_IF
L1-fwd-13	L1_028	W02_IF
L2-bwd-15	L2_029	W09_OB2
L2-bwd-13	L2_034	W12_OB2
L2-fwd-18	L2_034	W41_OF1
L2-fwd-14	L2_029	W32_OF1

- Cabling documentation for Phase3 on Confluence: https://confluence.desy.de/display/BI/Cabling+overview+-+commissioning
- PatchPanels in the HephyDB: HephyDB
- PatchPanel "Fertigungsverlauf": Spreadsheet

Production yield



PCS

• L1-bwd: 12 ou	it of 12 OK	100%
• L1-fwd: 11 out	t of 12 OK	92%
(4 could be rew	vorked for swapped lines)	
• L2-fwd: 13 out	t of 18 OK	72%
(3 could be rew	vorked for swapped lines,	
3 still to be dor	ne,	
2 damaged San	ntec connectors)	
HighQ		
• L2-bwd: 11 ou	it of 18 OK	61%
(5 could be rew	vorked for swapped lines, 1 failed,	
4 still to be dor	ne,	
1 damaged San	ntec connectors,	
1 failed function	nal test at DESY)	



- All Phase3 modules are equipped with a working PatchPanel at the moment.
- More problems with the outer layer, but no obvious reason for this.
- With repair of remaining cables it might still be possible to achieve a complete set of working cables.
- At each connection process a PatchPanel can be damaged and possibility of repair of Samtec connector is not clear.



• L1-fwd:

L1-fwd-12 exchanged with L1-fwd-08 L1-fwd-10 reworked, no functional test yet L1-fwd-19 reworked, no functional test yet

• L1-bwd:

L1-bwd-10 reworked, no functional test yet L1-bwd-17

L2-fwd:

L2-fwd-12 functional test status not clear

• L2-bwd:

L2-bwd-17 functional test status not clear L2-bwd-18 functional test status not clear