

LMU München - Excellence Cluster Universe

PS, Services, Grounding

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2018/01/23





- PS – Production, OVP, Firmware
- Grounding
- Dockboxes – Production, Testing
- Second set cables



- Commissioning of units completed
 - 50 units dedicated for PXD
 - OVP build in, not enabled
 - Software to test OVP is has been finished in 12/17
 - Each OVP condition is tested, shutdown levels are determined
→ First systematic tests revealed issue with one important channel
 - Condition: for $V_{ref}-V_{sub}$ only single limit applied
→ Rework towards window: $-0.4V < (V_{ref}-V_{sub}) < 2.2V$ ongoing
 - First 10 units have been adapted
 - Rate of rework ~10/WD
- 10 units can be shipped to DESY within January



- Observation: Parallel operation of 4 units showed issue while simultaneous power up
- Investigations showed that commands are distributed to all nodes instead of a point to point connection
 - Probably a horrible way to implement our specification to have broadcast commands to all units available...
- Commands transmission is organized by XME middleware
 - Black box for most developers

Possible options:

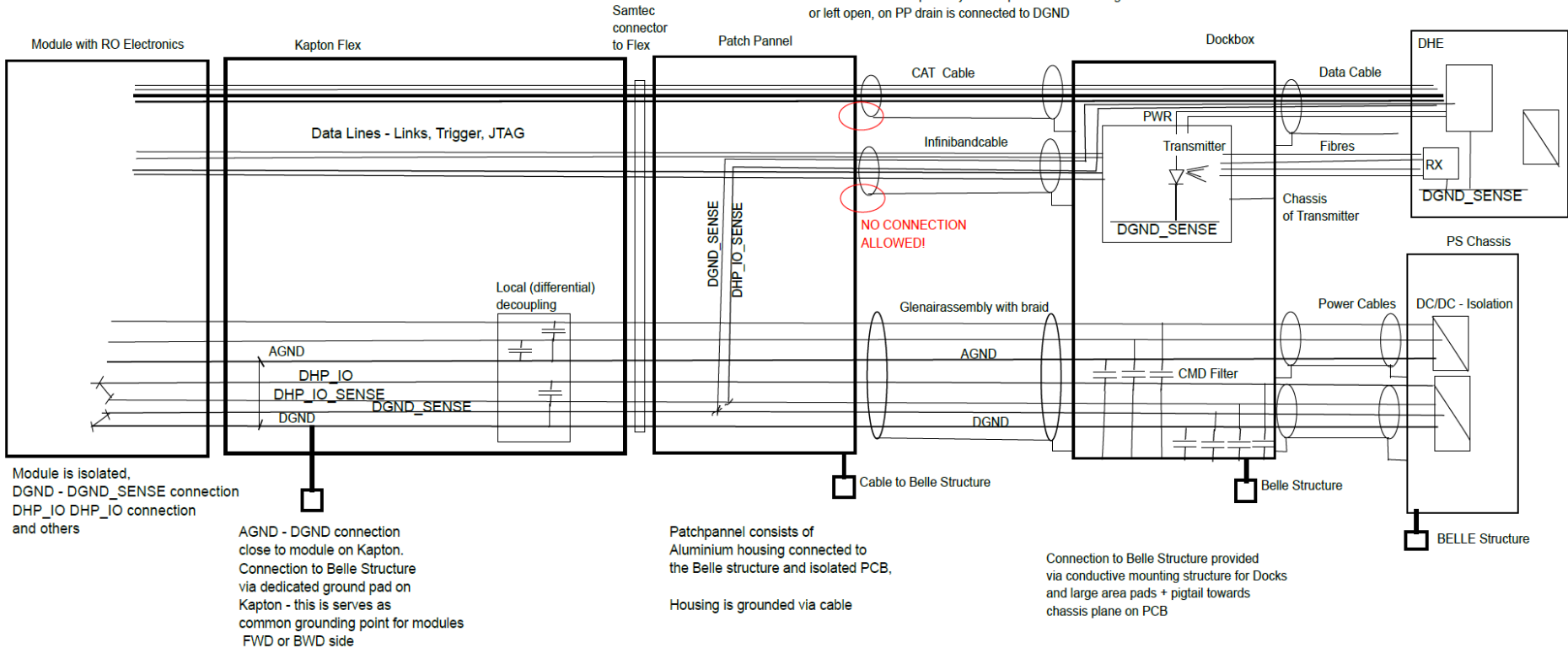
- (1) Restart firmware project with TUM/Fortiss. However most people worked on the project have left (project running 2011 to early 2013)
- (2) Remove XME from firmware

→ Michael will report on option 2



DHE circuitry is floating with respect to Belle Structure. Referencing is done towards Module DGND using DGND_SENSE

Outer cable shield must be opened on PP side!
Drainwires can be optionally AC coupled to Transmitter ground or left open, on PP drain is connected to DGND



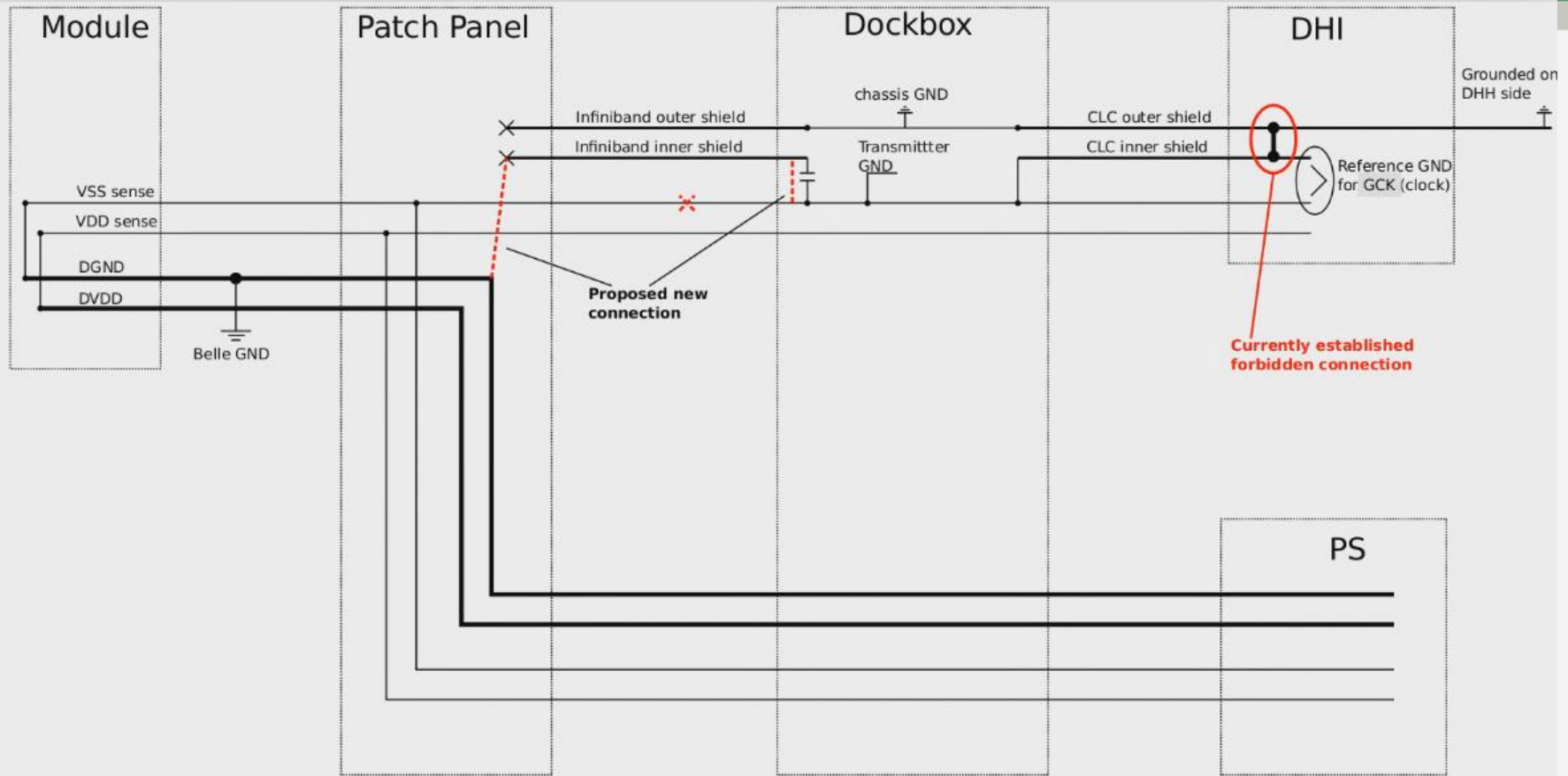
- Based on the recommendations from ITA/Fernando
- Details like referencing the transmitter / DHI not covered



- ITA / Fernando worked out grounding scheme
→ Baseline for PXD

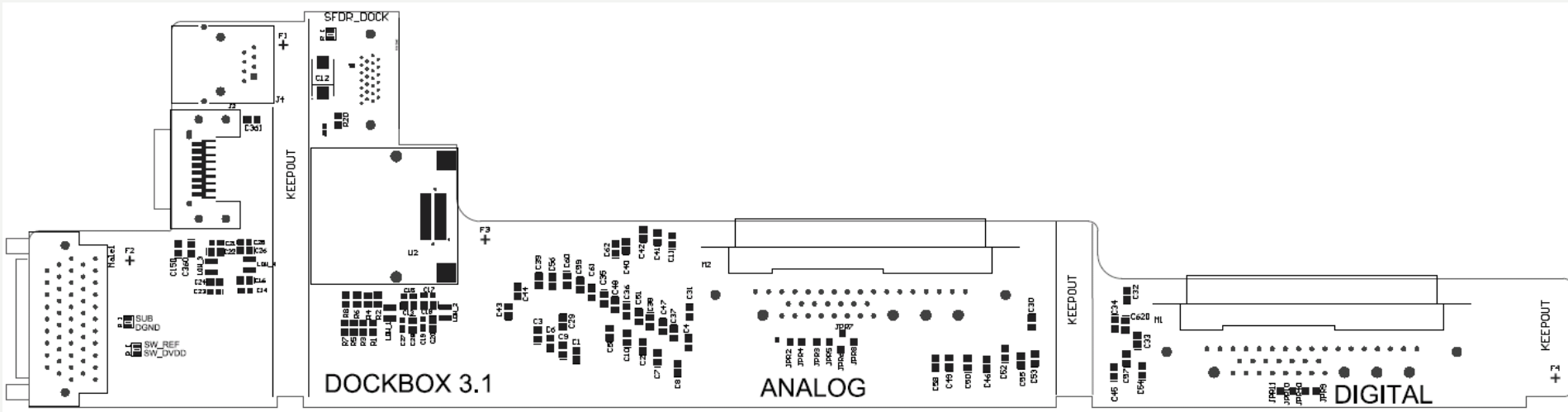
Phase 2 commission revealed a set of issues in the grounding scheme:

- Transmitter housing internally connected to gnd
 - Dockbox connected transmitter housing to chassis gnd
→ Short of chassis gnd to transmitter gnd
→ Fixed using tape, pads towards screws opened
- Accidental connection of inner shield of Infiniband cable and PP housing
→ Should be fixed by detailed production documentation by ACK
- Intentional connection on DHI between inner shield of CLC and chassis gnd
→ Loss of ground sense wire(!) as ground sense is used as transmitter ground
- Link stability was only achieved by shorting transmitter ground to chassis
→ Sense wire has high resistance
- DCD_MON cable pair carries DGND_SENSE, too
→ Need to be adapted while PP production



- Use Inf.B. cable drain wires /inner shield to define potential of transmitter and DHI, remove connection between CLC shields on DHI
- Restore DGND sensing

- Dockboxes:
 - First batch of 12 production boxes has been produced
 - EMS via MPI electronics workshop
 - Setting jumper, testing of power at LMU
 - Ongoing mounting and testing of transmitters at TUM
 - Flexibility to adapt grounding by exchanging R/C
 - Aiming for final batch once green light from collaboration



Dockbox

Changes 3.0 to 3.1



- Topoverlay (Names of components, strings for documentation) is switched on
 - All capacitors are marked, the power connectors with names, similar to the PS - "analog" and "digital"
 - Jumpers (where required) are named with the possibilities they offer (eg. sw_sub / sw_dvdd)
 - SW_SUB jumper has been replaced with a net tie, therefore no manual soldering is required anymore
 - Version of box now mentioned
 - Connections to the mounting holes of the transmitter are disconnected from the chassis-ground as the transmitter housing is internally connected to TGND
 - Pads of the transmitters have been changed from chassis-ground to TGND
 - Passives around the keepout areas have been moved from the keepout
- Jig for safe mounting developed by ACK



- Camera link cables available at DESY
- Power cables available, one batch of 11 is still at LMU
- Fibers/transmitter available at LMU

Second Set:

- Application for funding has been granted in December
- Most pressing item the power cables have been ordered – lead time ~5 month
- Dockboxes dummies will be prepared by DESY
- Orders for Fibers, Connectors, Cameralink-cables will be ordered soon



- PS commissioning done, OVP testing ongoing
- 10 units for DESY within January
- Major improvement in firmware stability, scalability expected
- First set of cables available
- Procurement of the second set started in December
- Final batch of Dockboxes can be started after decision of collaboration

Backup



- Components for PP available
 - Infinibandcables
 - Glenair 165cm, 185cm and some 200cm
 - 30 housings for PP production available
- Issue: Final length of cables not decided
- Issue: Availability of slots for manufacturing at HighQ EMS
 - Glenair assembly by E-Workshop @ LMU
 - First PP assemblies (10) done by E-Workshop @ MPI

- PP production has been documented in detail by ACK, incorporating all our experience

Ansicht ohne Sicherungsplatte (2 : 1)

Ansicht von unten, Typ. L1 (2 : 1)

Ansicht von unten, Typ. L2 (2 : 1)

N (5 : 1)

Verschraubung umgeschlagen damit es jederzeit leicht zu öffnen ist

30	1 Krimpöse RC Pro (CATY-Kabel)	06-05913.gpt	Kupfer-Glanszinn	Art. 513-2663, blau, 6AWG	Fa. RS (geprüft)
30	1 Krimpöse E50-35-BLUE (Infini-Kabel)	06-05913.gpt	Kupfer-Glanszinn	Art. 311-1896, blau	Fa. RS (geprüft)
31	1 Kaptonfolie (Innen/Äußen)	Verschul.-Folien.gpt	Kaptonfolie		Fa. Conrad
32	1 Isolationsfolie 2x0,50 mm (Vias auf PCB Oberseite)	06-05912.gpt	Kaptonfolie	Art. 542004	Fa. Conrad
33	1 Isolationsfolie 0,5 mm (PCB in PP Unter- und Oberseite)	06-05912.gpt	Kaptonfolie	Art. 542004	Fa. Conrad
34	1 Isolationsfolie 2x0,50 mm (Vias auf PCB-Unterseite)	06-05912.gpt	Kaptonfolie	Art. 542004	Fa. Conrad
2	1 Zyl.-Schr. m. Innensechsk.	ISO 4762-M6x0,5 A2-70.gpt	A2-70	M6x0,5	ISO 4762 (DN 92)
3	1 Gew.-Schiff. m. Innensechsk.	ISO 4762-M6x0,5 A2-70.gpt	A2-70	M6x0,5	ISO 4762 (DN 92)
1	1 Locking plate Layer 1	06-05915.gpt	L4301 xSChwms-0	Art.Nr.: 554-50-3-00-L-0-w-1R	Fa. Saamec
1	1 Saamec-PPG-Femle	ISO 554-50-3-00-L-0-w-1R.gpt	Saamec	Art.Nr.: 554-50-3-00-L-0-w-1R	Fa. Saamec
1	1 Unterstreifen ohne Fuge (A)	ISO 7099-L6.Hs.gpt	Hs	ISO 7099	(DN 125-1)
1	1 Mutter, akt. lineare Nibbel	K50432-M6x.Hs.gpt	Hs	M6	ISO 4332 (ähnl. DN 134)
1	1 Isolationswulst PP fixieren bridge	06-05918.gpt	PEEK	16-148 HV	ISO 7099 (DN 125-1)
1	1 Schrägflansch, halogenfrei, Serie GPT	Schrägflansch.Hs.gpt	Polyethen	Ø14, Schr. 2,1, Art.: 170-6606	RC, YE Connectivity
1	1 Zyl.-Schr. m. Innensechsk.	ISO 4762-M6x0,5 A2-70.gpt	A2-70	M6x0,5	ISO 4762 (DN 92)
1	1 Flanschenische	ISO 4762-M6x0,5 A2-70.gpt	A2-70	M6x0,5	ISO 4762 (DN 92)
1	1 Zylinderstift, ungehärtet	ISO 2338-M6x0,5 A2.gpt	A2	Ø6x0,5	ISO 2338 (DN 7)
1	1 Zylinderstift, ungehärtet	ISO 2338-M6x0,5 A2.gpt	A2	Ø6x0,5	ISO 2338 (DN 7)
1	1 Zyl.-Schr. m. Schlitz	ISO 2009-M6x0,5 Hs.gpt	Hs	M6x0,5	ISO 2009 (ähnl. DN 94)
1	2 Gew.-Schiff. m. Schlitz	ISO 2009-M6x0,5 Hs.gpt	Hs	M6x0,5	ISO 2009 (ähnl. DN 94)
1	1 Gew.-Schiff. m. Schlitz, Kegelkuppe	ISO 2009-M6x0,5 Hs.gpt	Hs	M6x0,5	ISO 2009 (ähnl. DN 94)
1	1 PP-Box mit Schaum-Innen-SS	ISO 2009-M6x0,5 Hs.gpt	Hs	M6x0,5	ISO 2009 (ähnl. DN 94)
1	2 Gew.-Schiff. m. Schlitz, Kegelkuppe	ISO 2009-M6x0,5 Hs.gpt	Hs	M6x0,5	ISO 2009 (ähnl. DN 94)
1	1 PP-Board ohne Viers. (S)	06-05905.gpt	ALSi0mg (30-Druck)		
1	1 PP-Flexion bridge (Viers. (S))	06-05905.gpt	Trialav (30-Druck)		
1	2 Kaptonzwischen-MCS Typ 8 / i.u.	06-05912.gpt	ALSi0mg (30-Druck)		
1	1 Power cable fixation (Viers. (S))	06-05902.gpt	ALSi0mg (30-Druck)		
1	1 PP-PCB-Board (Viers. (S))	06-05902.gpt	ALSi0mg (30-Druck)		
1	1 PP-Board ohne Viers. (S)	06-05905.gpt	ALSi0mg (30-Druck)		
1	1 Stabilisationsfeder	Feder Ø3.gpt	1.4310 xSChwms-0	Best. Nr.: VH-605	Fa. Gekutsun
1	2 Gew.-Schiff. m. Schlitz	ISO 2009-M6x0,5 Hs.gpt	Hs	M6x0,5	ISO 2009 (ähnl. DN 94)
1	2 Schrägflansch, halogenfrei, Serie JH-100	Schrägflansch.Hs.gpt	Polyethen	Ø14, Schr. 2,1, Art.: 304-4394	RC, YE Connectivity
1	2 Gew.-Schiff. m. Schlitz	ISO 2009-M6x0,5 Hs.gpt	Hs	M6x0,5	ISO 2009 (ähnl. DN 94)
1	2 Zyl.-Schr. m. Schlitz	ISO 2009-M6x0,5 Hs.gpt	Hs	M6x0,5	ISO 2009 (ähnl. DN 94)
1	1 PP cap (Bettungswinkel-A, Viers. (S))	06-05904.gpt	ALSi0mg (30-Druck)		
1	1 PP cap (Bettungswinkel-A, Viers. (S))	06-05904.gpt	ALSi0mg (30-Druck)		

Fertigungslose ab 2018						
Los	L1	L2	Stanz	gesamt	fertig	verf.
1	2	2	4	4	4	4
2	5	5	10	10	10	10
3	12	12	24	24	24	24
4	18	18	36	36	36	36
5	24	24	48	48	48	48

Wichtig: unter Teil 2 (PP-PCB) muss eine 0,1mm Isolationsfolie von EP-Gruppe untergelegt werden

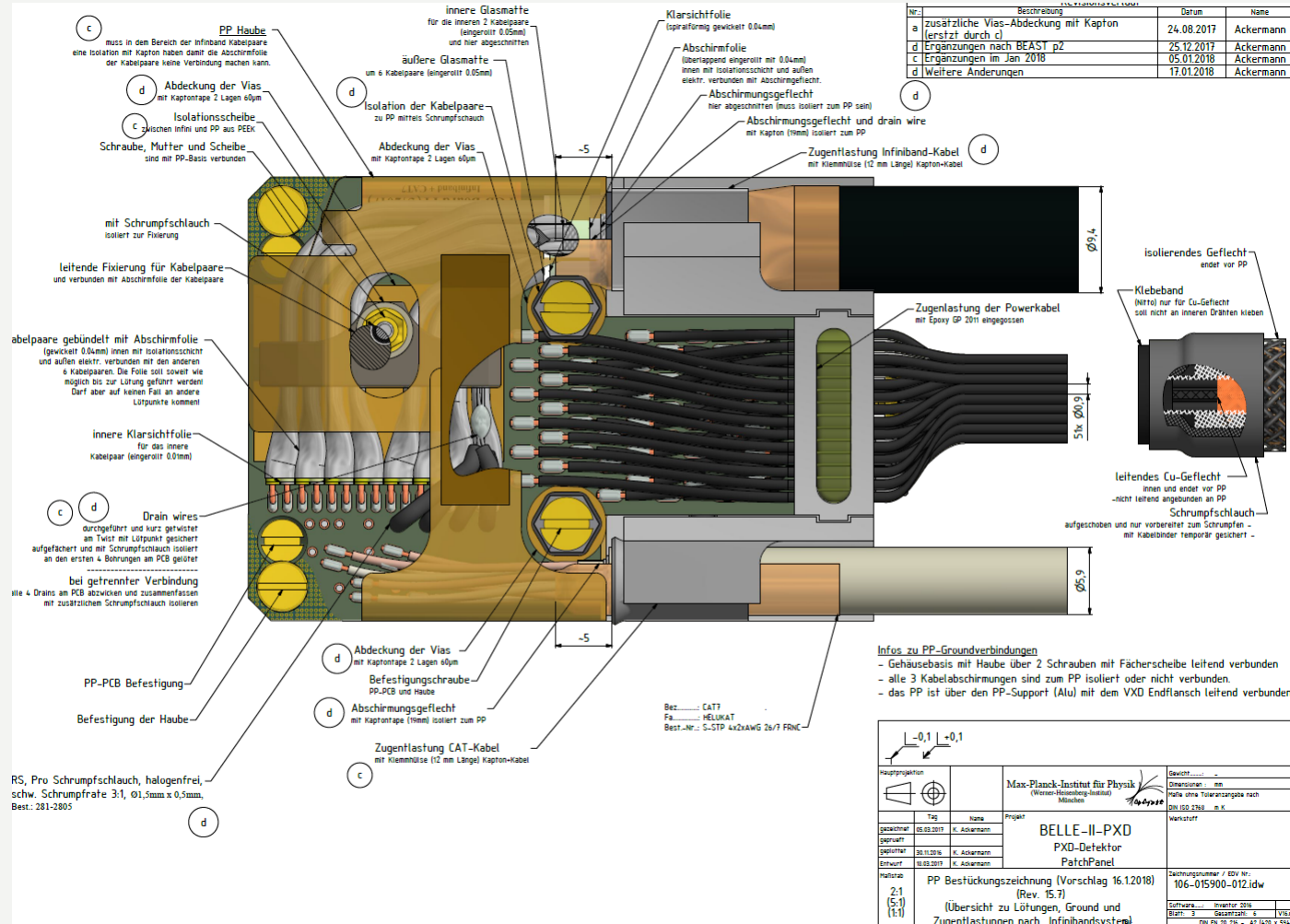
Maßstab: 1:1

Material: Mass-Plausch-Testteil für Physik (Werkstoff: Polyethen)

Hersteller: BELLE-IL-PPXD PVD-Detektor

PP Design (Dehnungswinkel-A, Viers. (S))

Stand: 4/2017



Nr.	Beschreibung	Datum	Name
a	zusätzliche Vias-Abdeckung mit Kapton (ersetzt durch c)	24.08.2017	Ackermann
d	Ergänzungen nach BEAST p2	25.12.2017	Ackermann
c	Ergänzungen im Jan 2018	05.01.2018	Ackermann
d	Weitere Änderungen	17.01.2018	Ackermann

Infos zu PP-Groundverbindungen

- Gehäusebasis mit Haube über 2 Schrauben mit Fächerscheibe leitend verbunden
- alle 3 Kabelabschirmungen sind zum PP isoliert oder nicht verbunden.
- das PP ist über den PP-Support (Alu) mit dem VXD Endflansch leitend verbunden

		Max-Planck-Institut für Physik (Werner-Heisenberg-Institut) München		Gewicht: ... Dimensionen: mm Maße ohne Toleranzangaben nach DIN ISO 2768 - m K
Hauptprojektion		Tag: ... Name: ... Projekt: ...	BELLE-II-PXD PXD-Detektor PatchPanel	
gezeichnet	05.08.2017	K. Ackermann	Zeichnungsnummer / IDV Nr.: 106-015900-012.idw	
geprüft	...	K. Ackermann	Software: ... Inventor 2016	
gezeichnet	18.08.2017	K. Ackermann	Blatt: 3 Gesamtzahl: 6 DIN EN ISO 216 - A2 (420 x 594)	
Maßstab	2:1 (5:1) (1:1)	PP Bestückungszeichnung (Vorschlag 16.1.2018) (Rev. 15.7) Übersicht zu Lötungen, Ground und Zugenlastungen nach Infinibandsystem!		