Specifications of VXD cables btw. the top of Belle II and E-hat

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version 3.2

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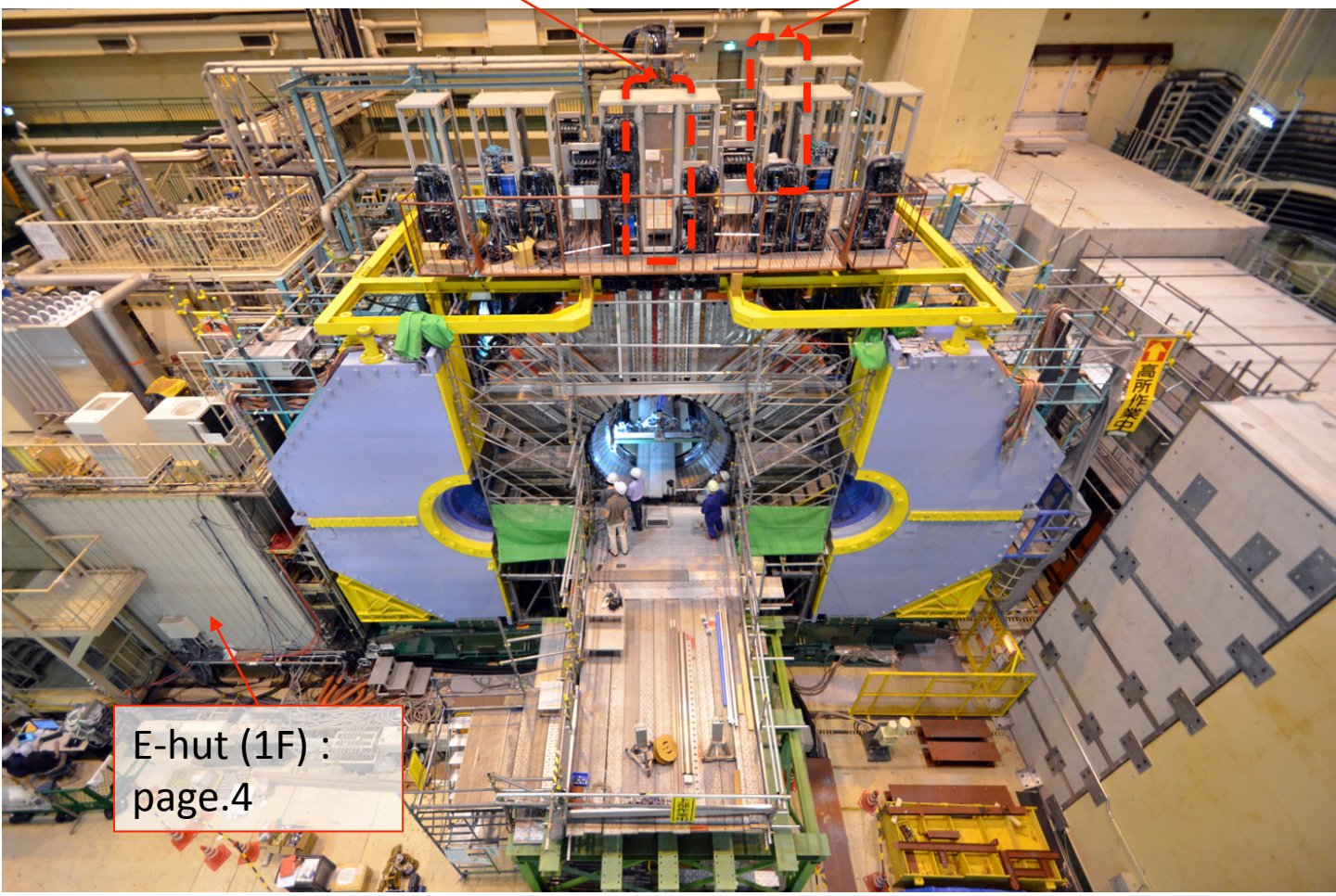
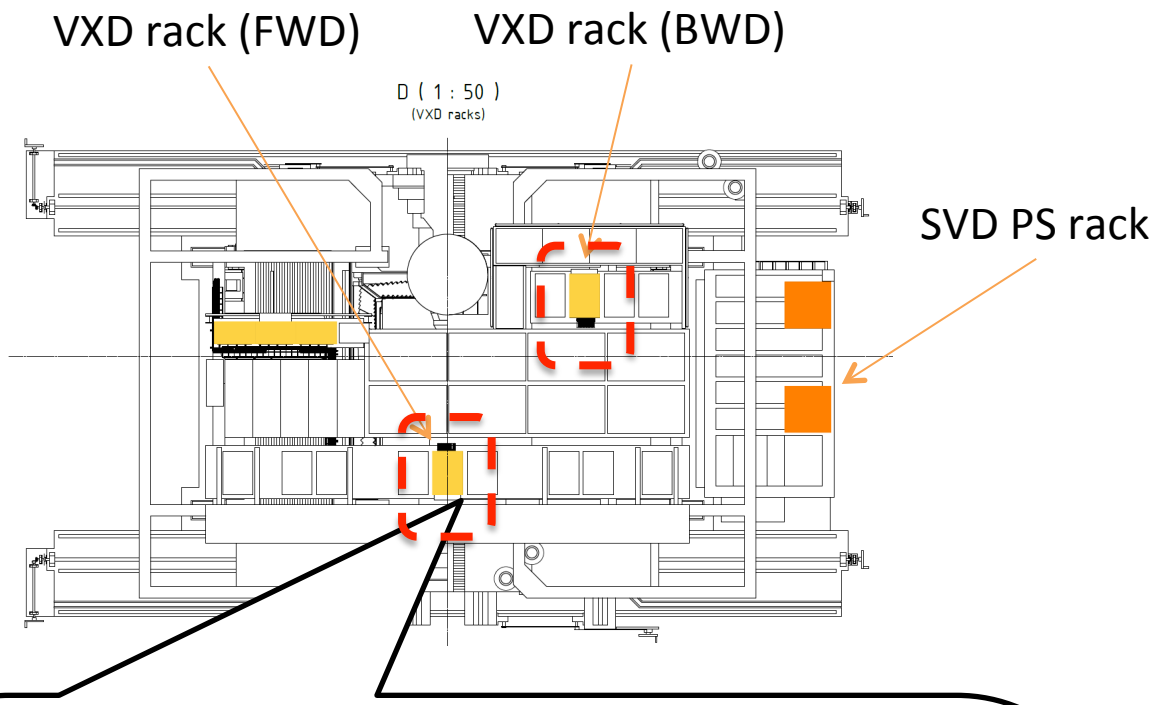
Optical cables
between the top of Belle II and E-hat

Installation location （Overview）

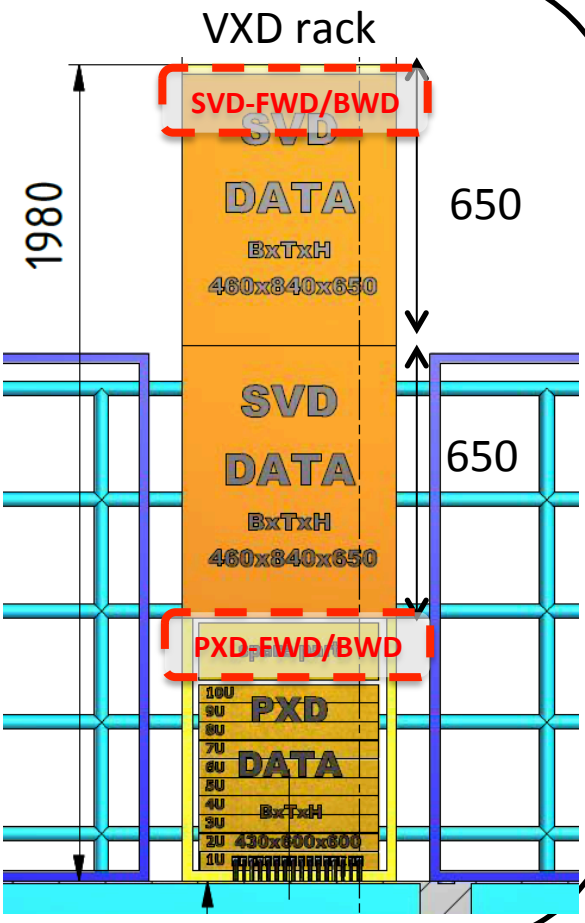


Installation location （VXD rack）

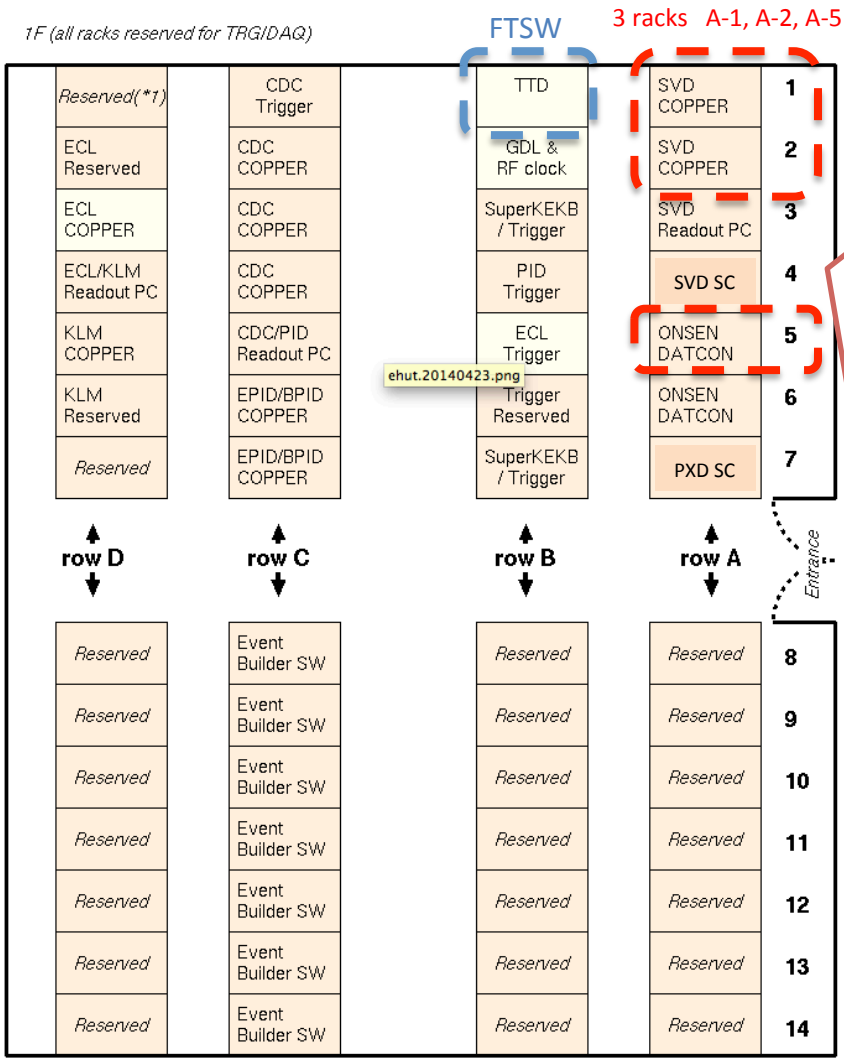


Patch-panels for optical cables
PP-SVD-F : 2U (FWD VXD rack)
PP-SVD-B: 2U (BWD VXD rack)

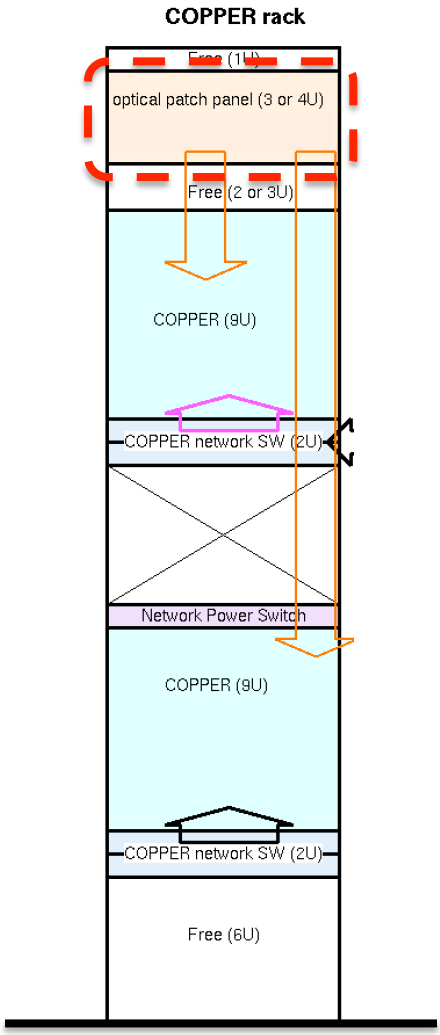
PP-PXD-F : 2U (FWD VXD rack)
PP-PXD-B: 2U (BWD VXD rack)



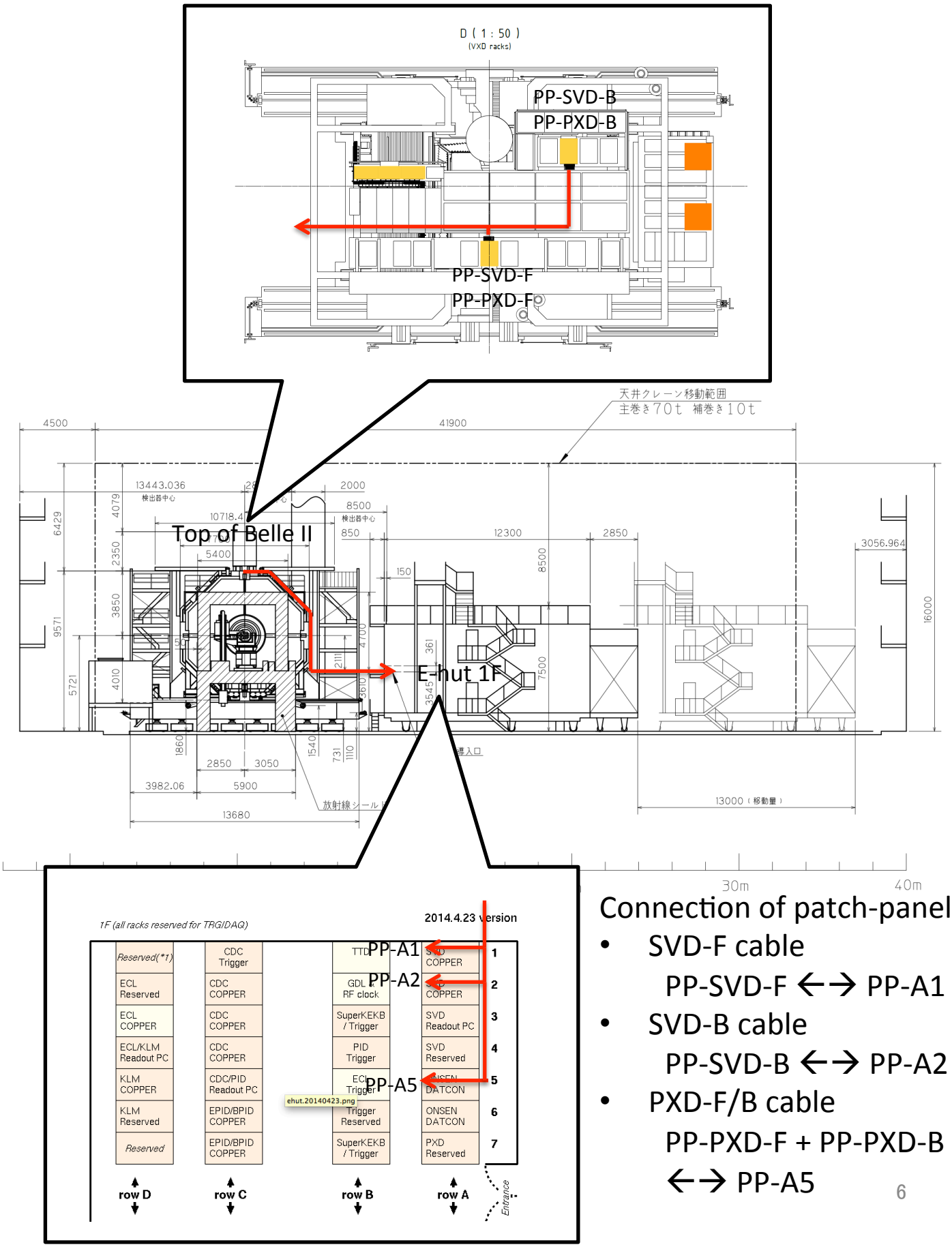
Installation location
（E-hut 1F rack）



Patch-panels for optical cables
PP-A1 : 2U (A-1 rack)
PP-A2 : 2U (A-2 rack)
PP-A5: 4U (A-5 rack)



Installation path



Connection of patch-panels

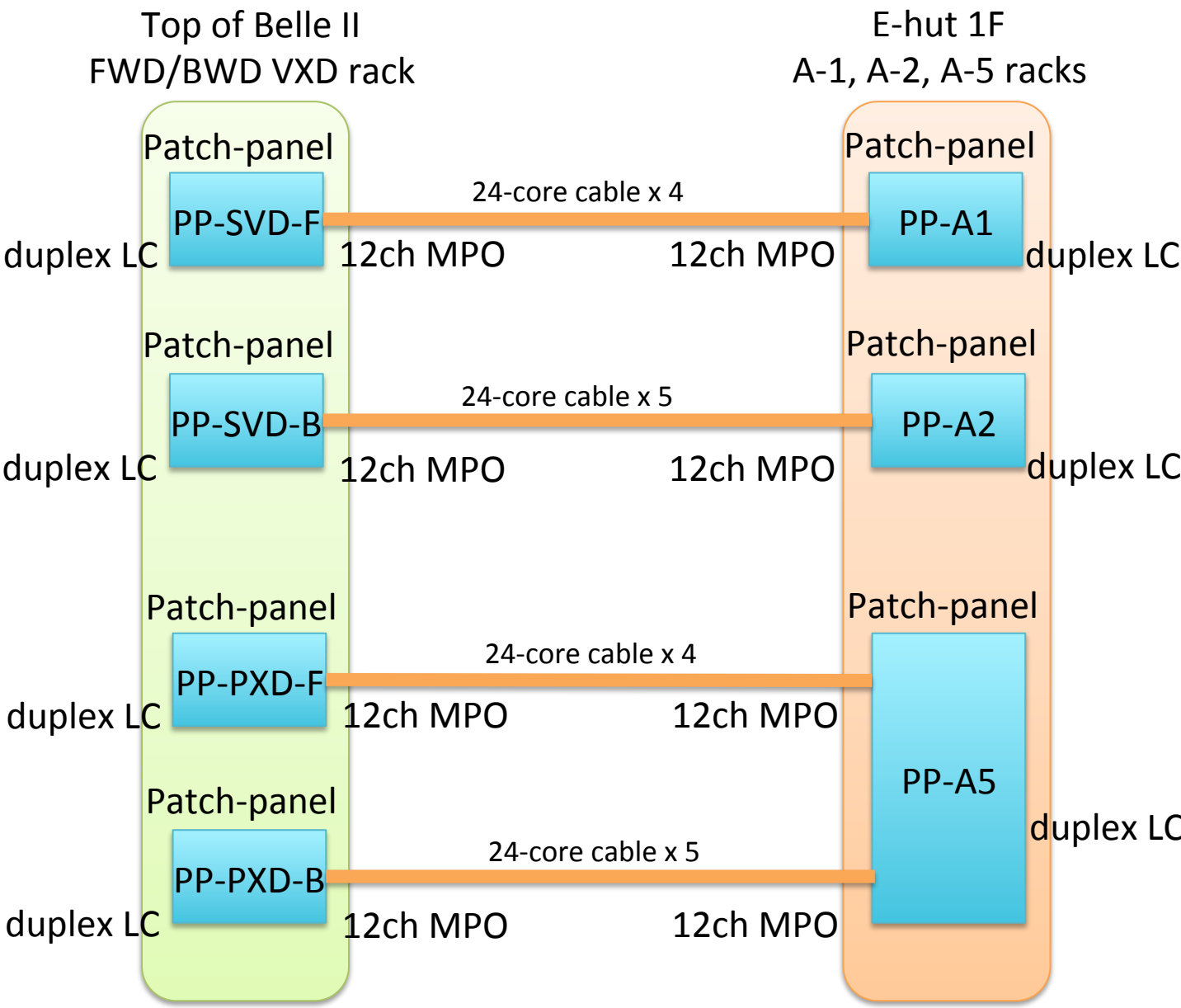
- SVD-F cable
  PP-SVD-F ←→ PP-A1
- SVD-B cable
  PP-SVD-B ←→ PP-A2
- PXD-F/B cable
  PP-PXD-F + PP-PXD-B
  ←→ PP-A5

Number of necessary fibers

LC-d = LC duplex
= 2 fibers

- PP-SVD-F, PP-A1
  - total: 48 LC-d (96 fibers)
    - FTB-COOER: 18 LC-d
    - FADC VME controller: 2 LC-d
    - FTSW (SVD FWD): 3 LC-d
    - SVD SC: 8 LC-d
    - +spares (17 LC-d) (L3 FADC extension plan: 2 LC-d)
- PP-SVD-B, PP-A2
  - total : 60 LC-d (120 fibers)
    - FTB-COPPER: 30 LC-d
    - FADC VME controller: 2 LC-d
    - FTSW (SVD BWD): 4 LC-d
    - SVD SC: 8 LC-d
    - +spares (16 LC-d) (L3 FADC extension plan: 2 LC-d)
- PP-PXD-F
  - total : 48 LC-d (96 fibers)
    - DHH-ONSEN: 16 LC-d
    - FTB-DATCON: 18 LC-d
    - FTSW (PXD FWD): 1 LC-d
    - PXD SC MAIN: 2 LC-d (used at PXD PS racks)
    - +spares (11 LC-d) (L3 FADC extension plan: 2 LC-d)
- PP-PXD-B
  - total : 60 LC-d (120 fibers)
    - DHH-ONSEN: 16 LC-d
    - FTB-DATCON: 30 LC-d
    - FTSW (PXD BWD): 1 LC-d
    - + spares (11 LC-d) (L3 FADC extension plan: 2 LC-d)

Configuration

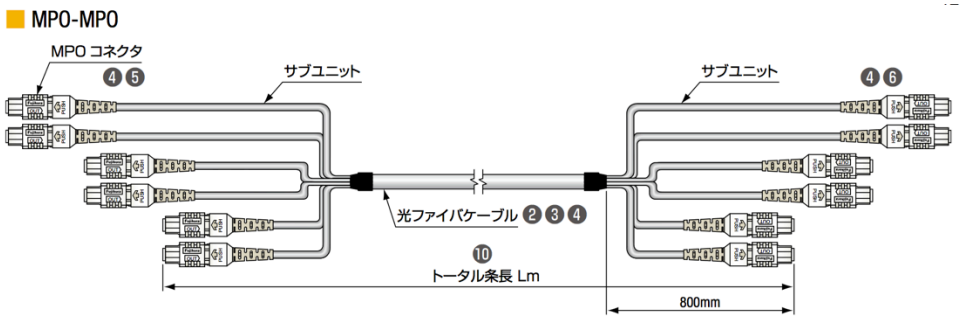


※ We don't matter to use 12-core cables or 48-core cables for above 24-core cables as long as the number of the total fibers is same.

※ LC cables from the patch-panels to your modules must be prepared by each group. 3m cables would be sufficient.

Patch-panel, Cable

- MPO(12ch)-MPO(12ch) cable:
  - FJ-B-KLADMPFMPF-AABM028C
  - 50um, multi-mode
  - OM3 class
  - flammability grade: Plenum
  - length：28m（all the same must have exactly same length）
  - polarity： cross
- MPO-LC connector module (installed in patch-panel chassis):
  - FBC514M-24LC-MM
- Patch-panel chassis:
  - FBC514P-2U

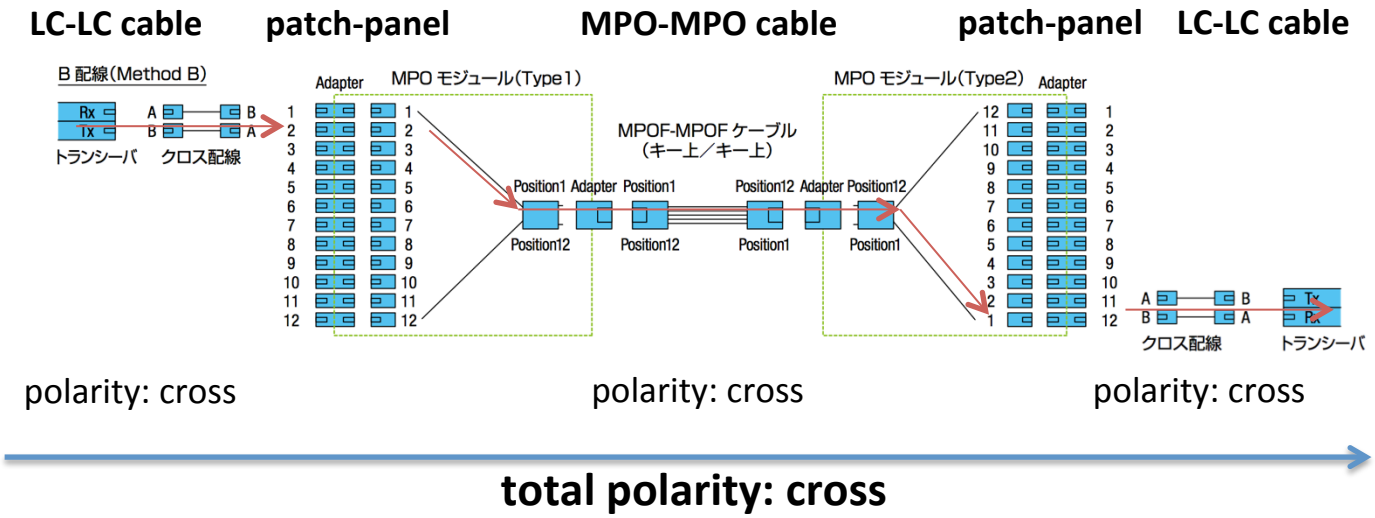


MPO-MPO cable

patch panel chassis

MPO-LC connector module

Polarity: cross



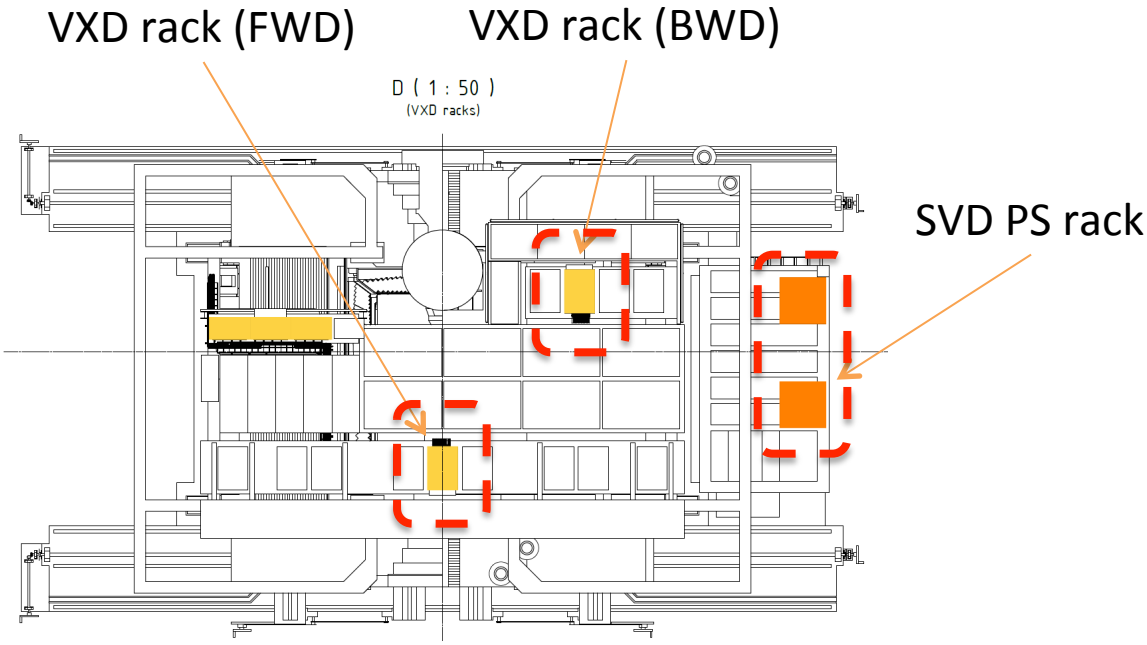
- Since we don't want to mix up cables with different polarities (cross and straight), we will make the polarities of all the cables cross.
  - Since the default polarity of LC duplex cables is cross, you don't need to change it by yourself.
- Due to the cross polarity in MPO-MPO cable, channel numbers in both patch-panels are swapped.
  - ch.1/2 (left) --- ch. 12/11 (right)
  - ch.3/4 (left) --- ch. 10/9 (right)
  - ch.5/6 (left) --- ch. 8/7 (right)
  - and so on.

Others

- Inspection after installation :
  - Propagation/connection loss test in optical fibers
- Labels in 12-core cables
  - SVD-F<#> (#=1...6)
  - SVD-B<#> (#=1…8)
  - PXD-F<#> (#=1…8)
  - PXD-B<#> (#=1…10)

LAN cables / LEMO cables
between the top of Belle II
and E-hat

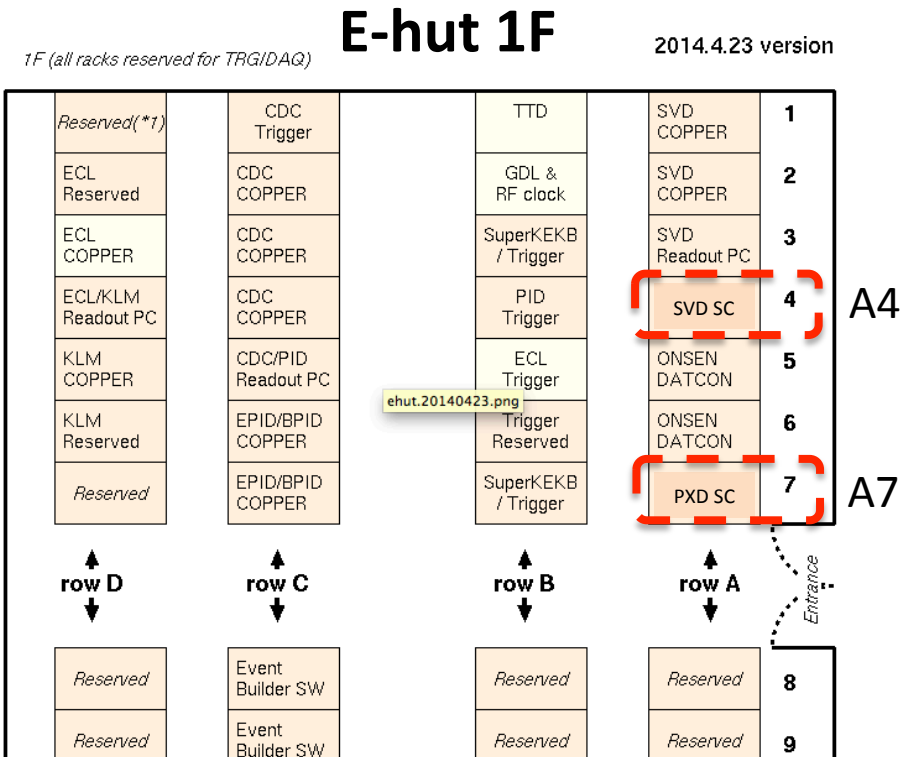
Installation location （VXD rack）



Some of racks are not same as one for optical cable installation. However main path of cables is same as optical cables.

Switches for DAQ network (daqnet) are already implemented on the top of Belle II by ECL group. We can use some ports of them.

Installation location （E-hut 1F/2F rack）



Number of necessary LAN cables

- **SVD FADC (FWD)**: VXD rack (FWD) – E-hut A4 rack
  - total: 6 x CAT6 cables
    - FADC VME crate control: 2 (from 2 crate)
    - FADC switch: 2 (from 1 switch)
    - + spare: 2
  - length: 30 m
- **SVD FADC (BWD)**: VXD rack (BWD) – E-hut A4 rack
  - total: 6 x CAT6 cables
    - FADC VME crate control: 2 (from 2 crate)
    - FADC switch: 2 (from 1 switch)
    - + spare: 2
  - length: 30 m
- **SVD PS**: SVD PS rack – E-hut A4 rack
  - total: 9 x CAT6 cables
    - CAEN PS crate: 3
    - Patch panel: 3
    - + spare: 3
  - length: 40 m

- **PXD (FWD)**: VXD rack (FWD) – E-hut A7 rack
  - total: 6 x CAT6 cables
    - BonnDAQDATA: 4
    - + spares: 2
  - length: 30 m
- **PXD (BWD)**: VXD rack (BWD) – E-hut A7 rack
  - total: 6 x CAT6 cables
    - BonnDAQDATA: 4
    - + spares: 2
  - length: 30 m

Specification

- CAT6 (or higher) STP cables
- polarity: straight
- Flammability grade: equal to or higher than UL VW-1
- Halogen contamination: no halogen cable is preferable, but might be difficult due to the cost

Number of necessary LEMO cables

- **SVD PS**: SVD PS rack – E-hut A4 rack (?)
  - total: ? x CAT6 cables
    - CAEN PS crate: ?
    - + spare: ?
  - length: 40 m