

Optical links for from Dock-Box to DHE

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SeeVogh TB meeting

December 15-th 2015

Overview:

- Integration of optical interfaces

1. Glenair 050-301-0X¹

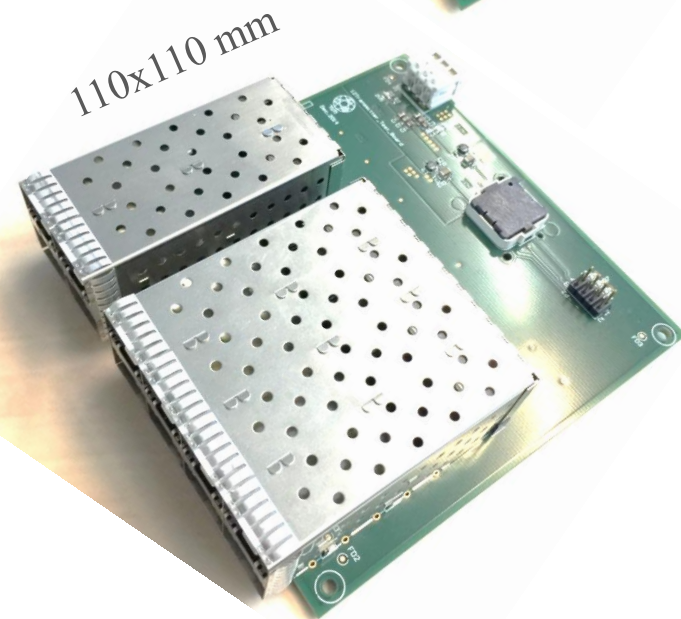
850nm, 100Mbps - 4.25Gbps
 3.3V, 300mW Power consumption
 Size 24x8x8 (mm)

TX (with blue stripe)

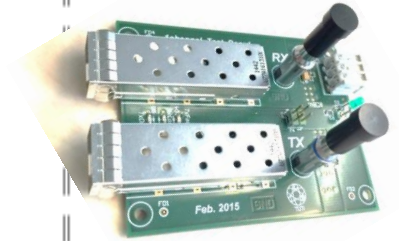
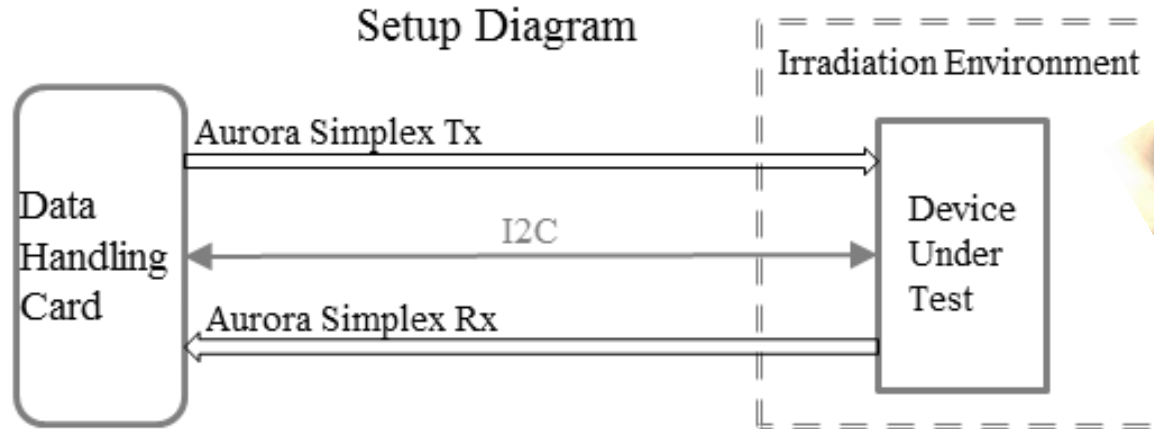


2. Avago AFBR-811FN1Z²

12 channels, 850nm, 10Gbps per channel
 3.3V, 2.5V; 100mW per channel
 Size 22x19x15 (mm)



Test setup



Signal pass :

AMC connector - PCB 10cm - SFP connector - 5 m passive SFP cable - SFP connector

Signal source :

FPGA XC6VLX130T-2 , 1.6Gbps, Default Tx settings

Neutron irradiation

During irradiation DUT powered and functionality continuously tested

Accumulated dose $2.5 \cdot 10^{12} \text{ cm}^{-2}$ or 20 years equivalent

Both devices showed no sign of degradation, one SEU observed.

Photon irradiation

Power cycling every 10 minutes, functionality continuously tested.

Glenair 050-301

no problem up to 230kRad , small change of current. It may sustain even higher dose.

Light power after irradiation unchanged: -5dBm

Avago AFBR-811FN1Z

worked up to 80kRad, After power cycle I2C stopped working and current dropped.

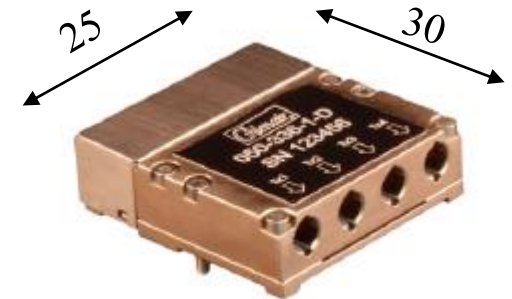
Meeting with Glenair in July.

Proposal for more compact 4 channel package

Type 050-363-2 , 2Gbps

Optical power -5dBm

Input CML, 100 Ohm



050-363-2

Tscharlie has verified that transmitter fits in Dock box

First offer in July: 980 Euro/pc for 50 pcs order

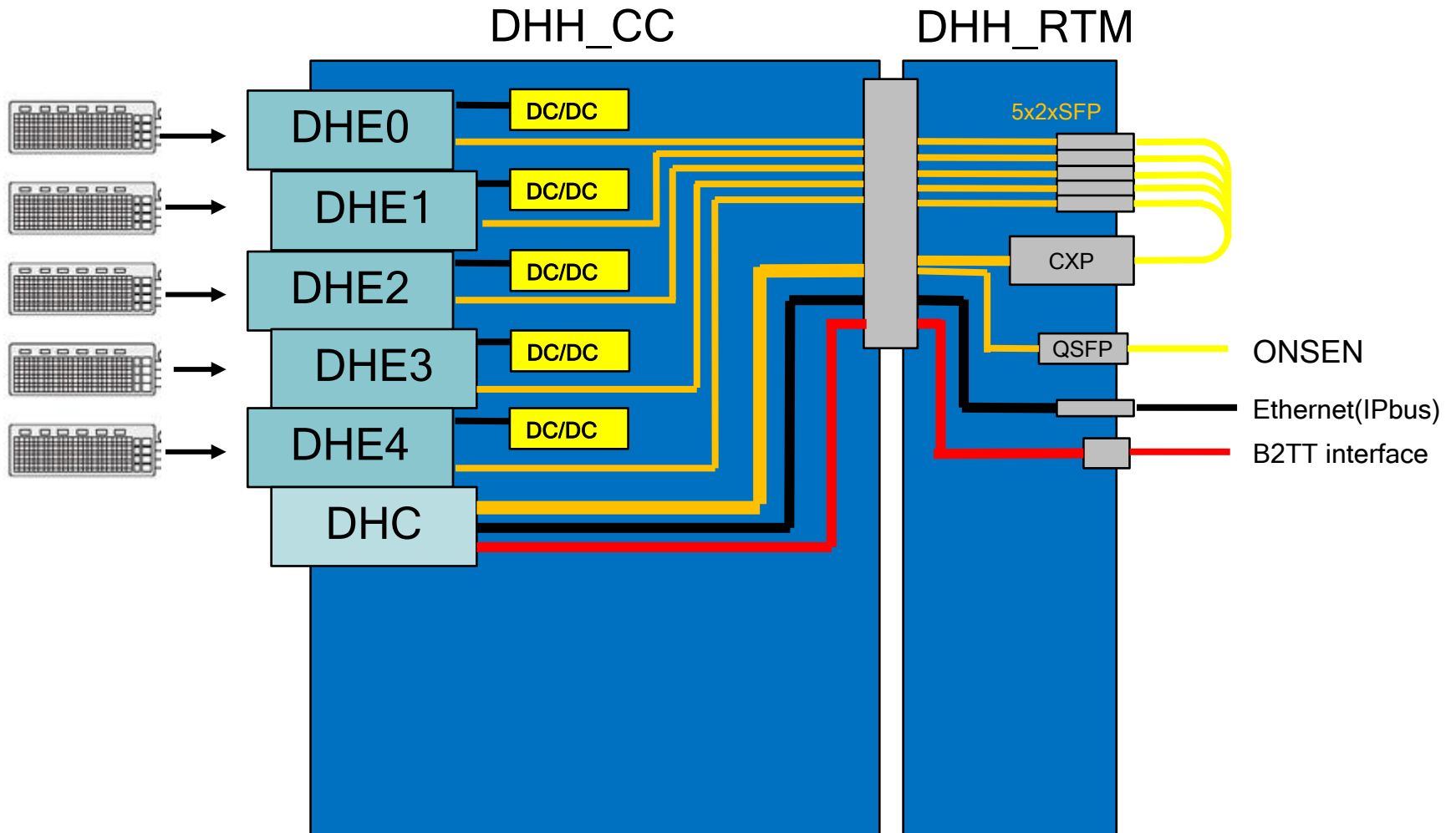
Long mail exchange

Final offer in October 29-th:

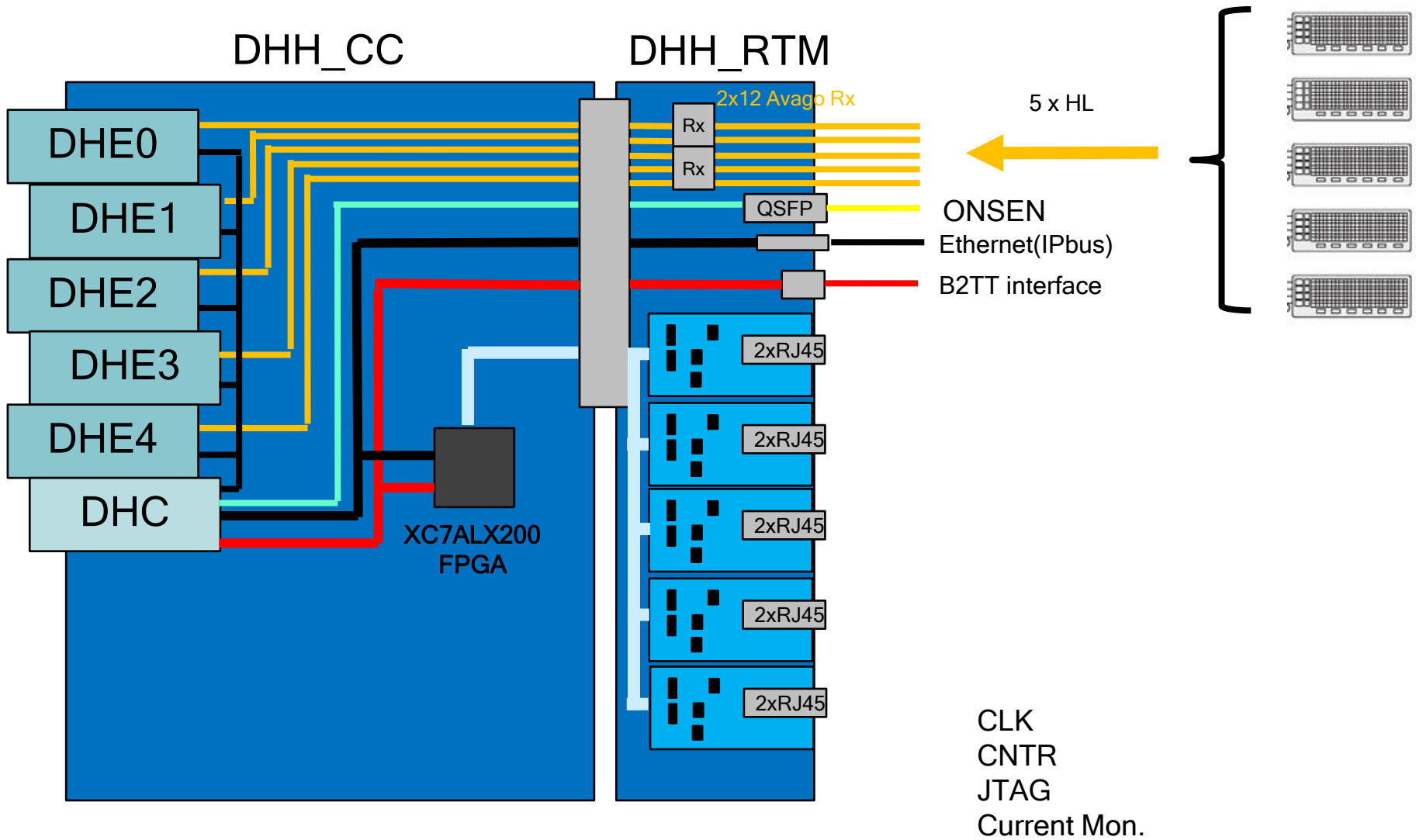
21.5 kEuro	45 transmitters , 14 weeks delivery time, samples 6 weeks delivery
18kEuro	28 optical fiber cables of 20m (two per Dock box)

Samples have been ordered to be able to test in April at DESY

 Data links



DHH_CC design Optical interfaces



- 5 identical submodules
- Submodule design
 - Submodule has galvanic isolation, ground common with detector ground
 - DC/DC converters
 - 2xRJ45 connectors
 - Dif.JTAG(unchanged),
 - GCLK+TRG_CNTR+CurrentSource + DHPT Voltage sensors(new cable type)
 - Digital IC with isolation from Analog Device
 - ADN4651 Differential 600MHz for GCLK and CNTR_TRG
 - ADUM141D for JTAG and Current source, 150Mbit

Pros

- Reliable interface particular important for big system
- No limits on distance from detector

Cons

- More expensive
- Changes in DHH design

Comment

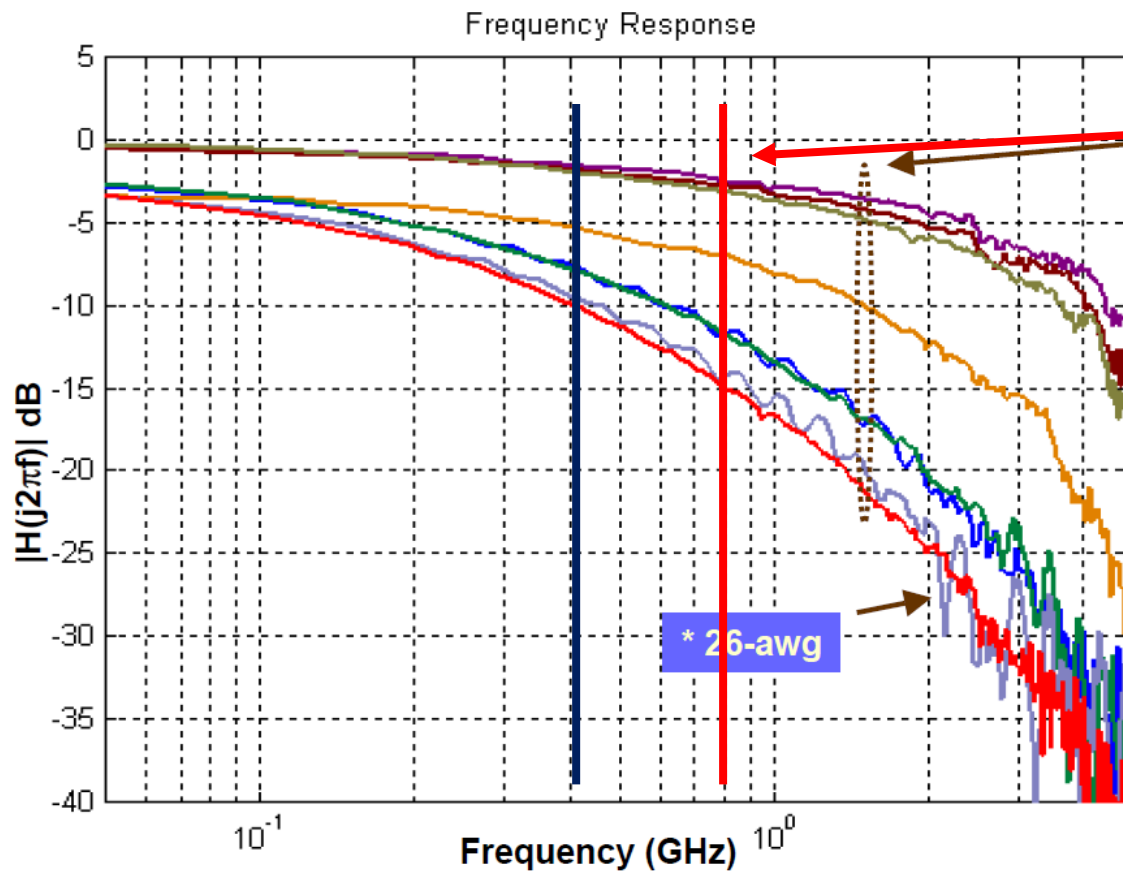
- No changes in Slow Control software
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- DHH_CC
 - layout frozen for final decision
 - Assembly in January
 - Still time for second iteration before April tests
- DHH_RTM
 - Schematic finished
 - Production in January

Comment:

- DHH_CC can also be used for PXD with copper interface

THANK YOU



15dB@800 MHz =>
To provide 125mV at destination
requires 700mV at source

10dB@400 MHz =>
To provide 125mV at destination
requires 400mV at source

- Cross talk between cable pairs (NEXT)
- Connectors with additional losses due fretting(wear) contacts

DHH_CC design Optical interfaces I

