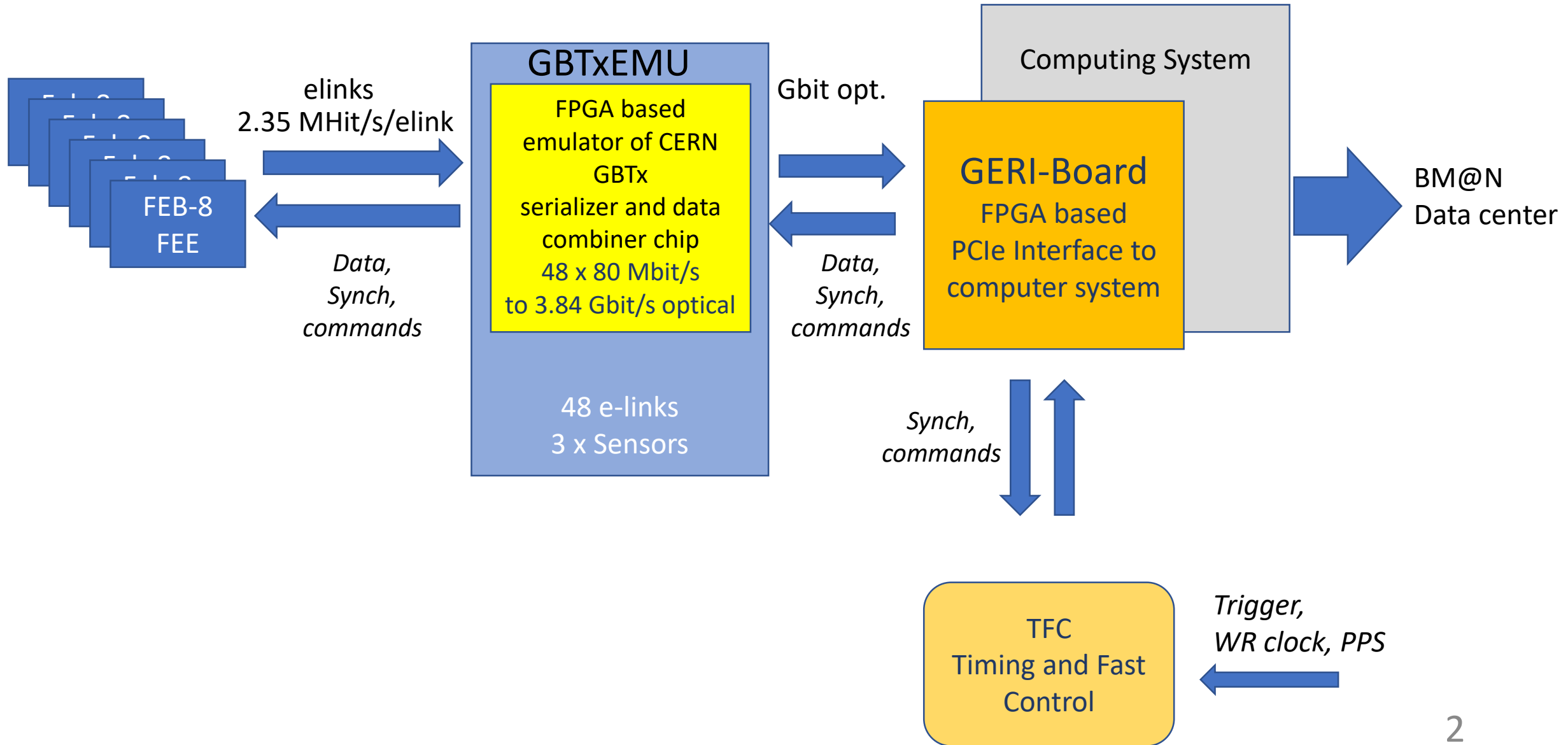


Status of electronics development and connectivity approach

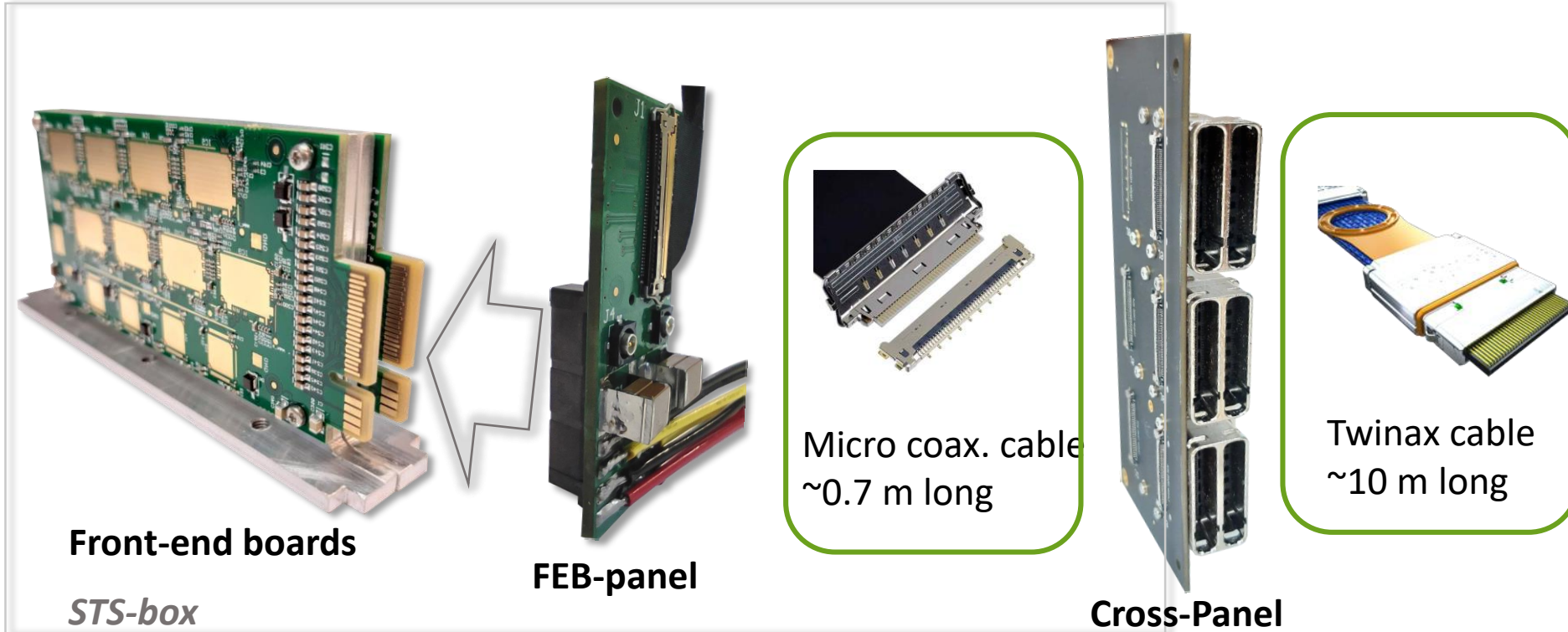
Dmitrii Dementev

Mihail Shitenkow

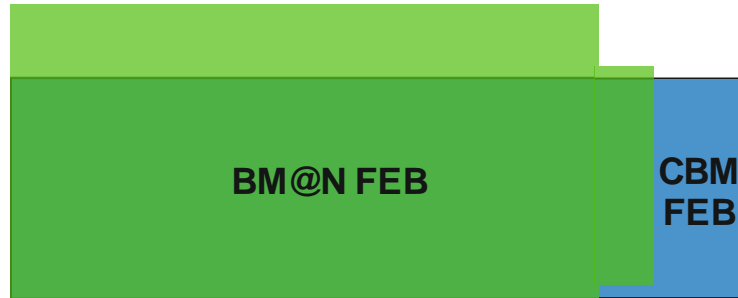
Readout chain of BM@N STS



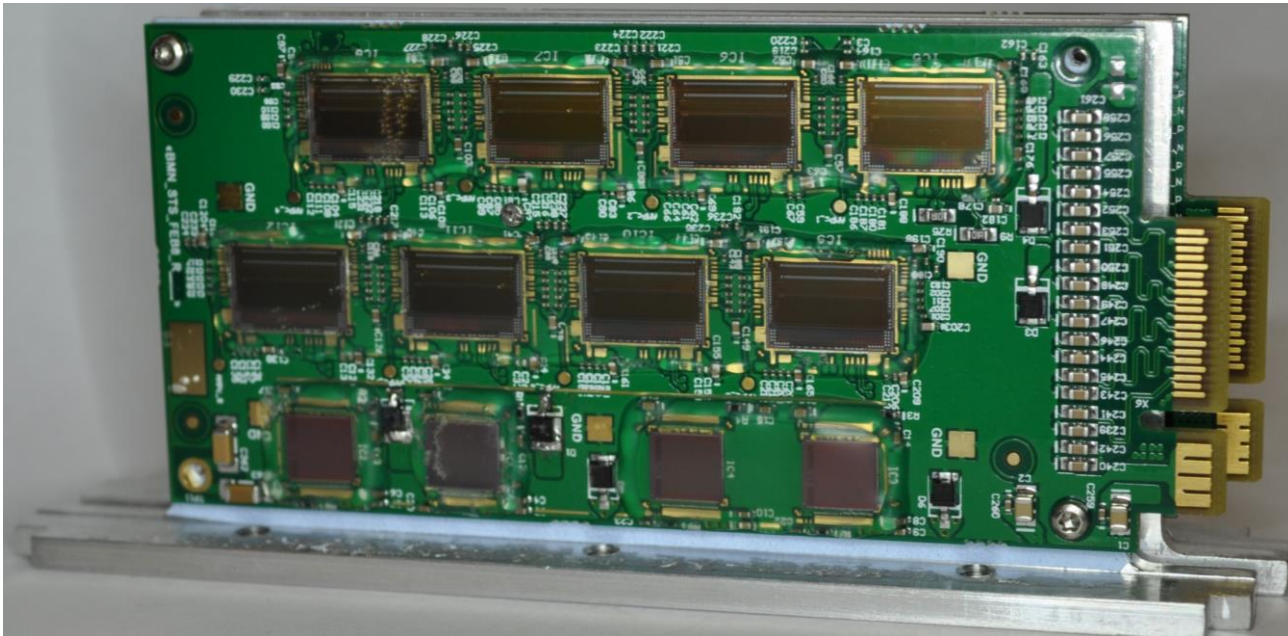
Connectivity approach



GBTxEMU



Comparison of two FEB geometries



Features:

- Size: 87*40 mm²;
- Thickness with components: 3 mm;
- Edge-type connector with two pin groups:
[HV, LV] & [DATA]
- 1 Uplink per one ASIC

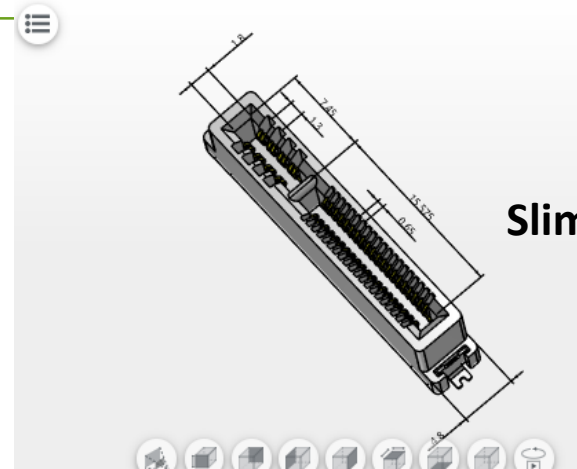
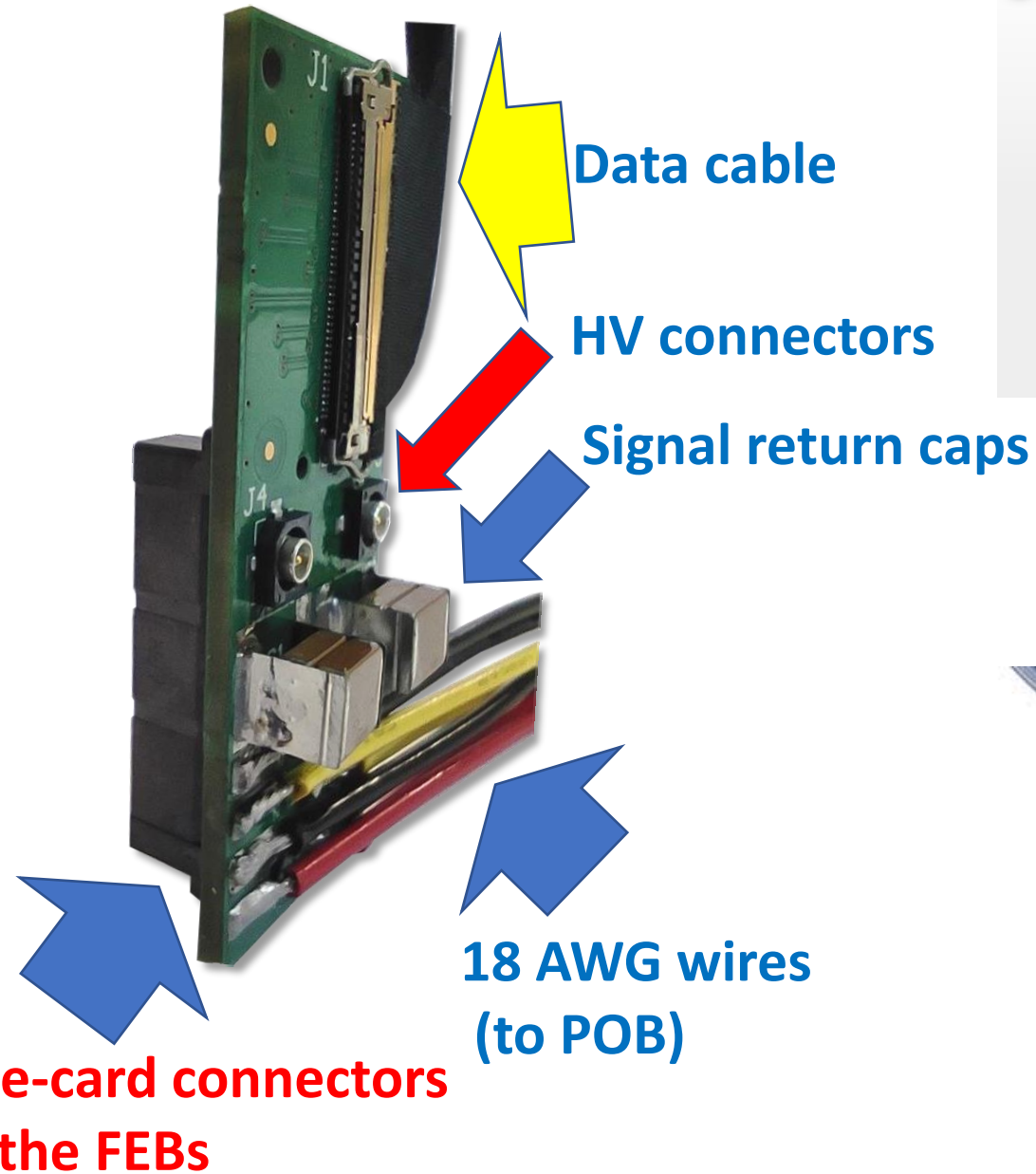
Advantages:

- Increased space for the cabling between FEB-boxes;
- 90 bending of cables is avoided;
- Easy connectivity with a FEB-panel;
- Low thickness of the board allows to increase thickness of the cooling fin for one FEB up to 3 mm.

Current status:

- Two versions of FEBs were already produced and tested
- Specification for the production of the PCBs is ready

Feb-panel



- 40 signal
- 8 Power pins: Power pin pitch at 1.30mm
- current rating of 3A per pin

MQA – 1600 pcs already ordered and tested!



Data cable connector by IpeX:

- 1.1 mm height
- 0.4 mm pitch
- 40 pins (2 FEBs)

Feb-panel open issues



Habia Cable

- Type of the connectors for the for the data cable and HV, LV cables are not yet finalized
- Grounding connection scheme should be tested with more realistic setup (half of the ladder, FEASTs)
- Thickness of the thermal interface between FEB and Fin is not known

RG Coaxials / SM & SMT

High temperature, sub-miniature coaxial and triaxial cables
Intended for use primarily as a transmission line in high frequency applications

Order reference		Core			Finished cable			Electrical				
Description (NSN - if applicable)	Article Number	Silver Plated Copper Alloy (HSA)		PTFE	SPC braid	FEP	Weight	Fixed MBR	Imp.	Cap.	Current rating In free air at 40°C	Voltage
		Stranding	Conductor	Dielectric	Shield/s	Sheath/s						
		# x mm	Nom Ø	Nom Ø	Nom Ø	Nom Ø	Nom g/m	mm	Ohms	pF/m	Amps	V AC rms
SM 50	3000005000	Solid	0.16	0.52	0.80							
SMT 50	3000005002	Solid	0.16	0.52	1st: 0.80 2nd: 1.30	1s 2s						
SM 75	3000007500	Solid	0.10	0.52	0.80							
		Silver Plated Copper (SPC)		PTFE & low noise layer	SPC braid							
Description (NSN - if applicable)	Article Number	# x mm	Nom Ø	Nom Ø	Nom Ø							
SM 95	3000009500	Solid	0.10	0.95	1.20							

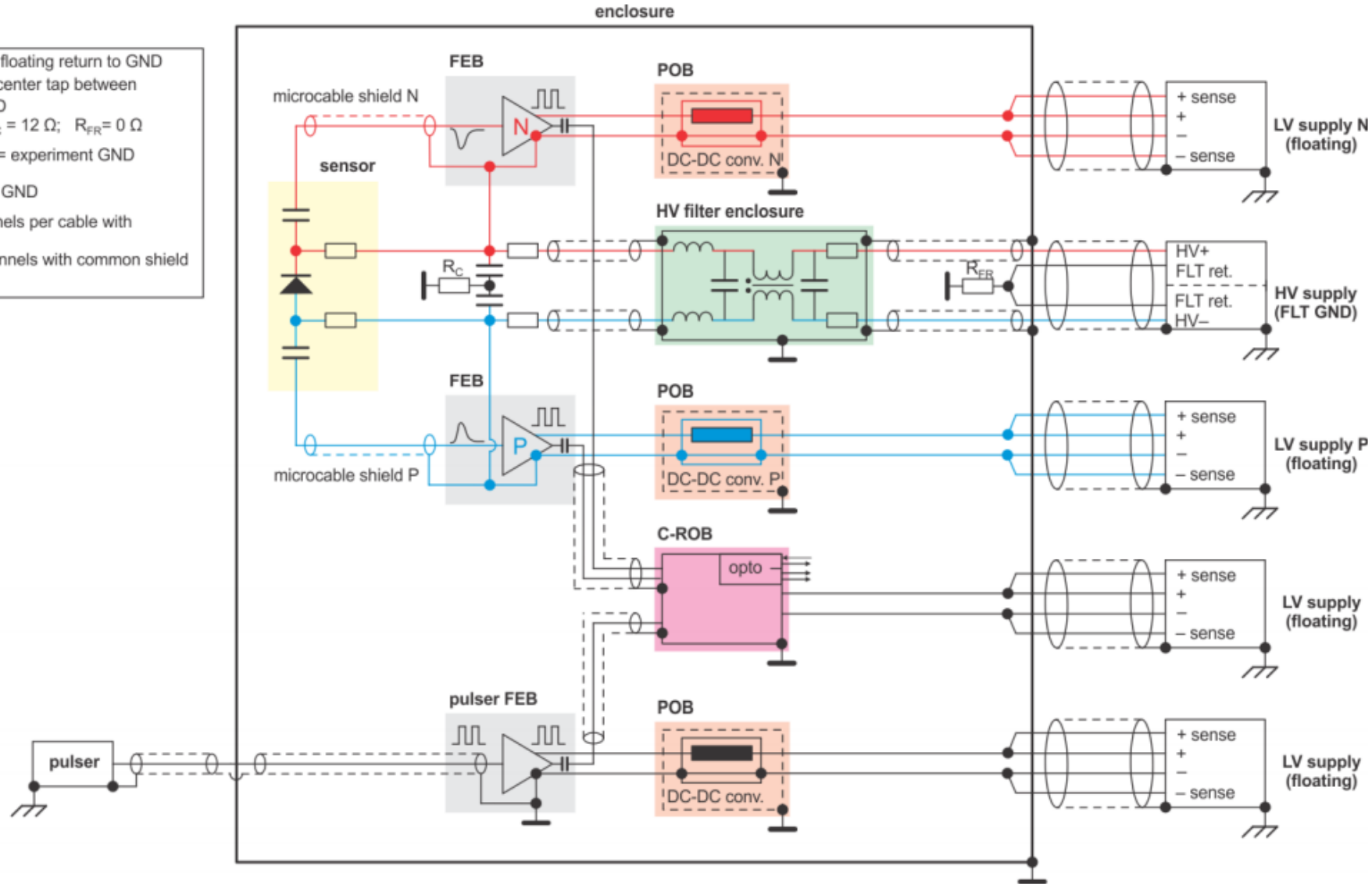
Alternative candidate for HV cable



Alternative candidate for LV cable

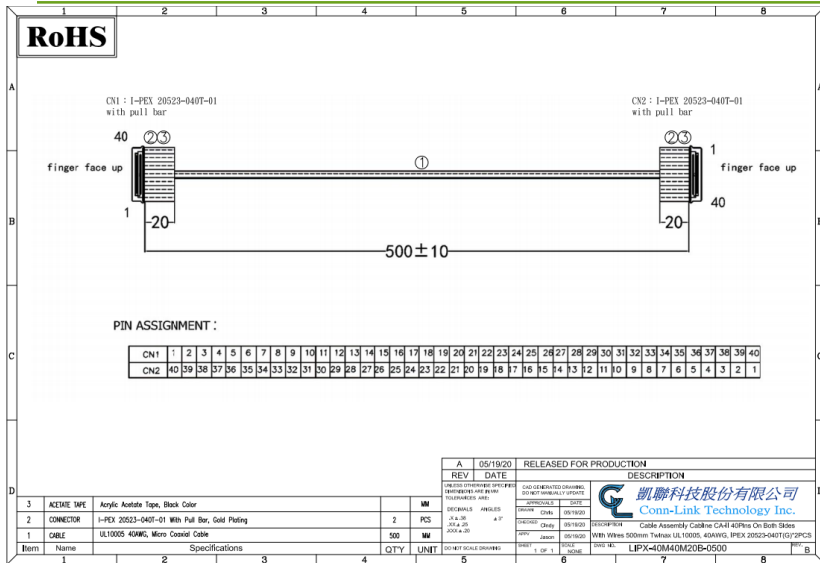
STS powering scheme

- R_{FR} resistance of floating return to GND
- R_C resistance of center tap between capacitors to GND
- Current setup: $R_C = 12 \Omega$; $R_{FR} = 0 \Omega$
- Enclosure = experiment GND
- Power grid GND
- LV cable: 4 channels per cable with common shield
- HV cable: 16 channels with common shield (8 pos. + 8 neg.)

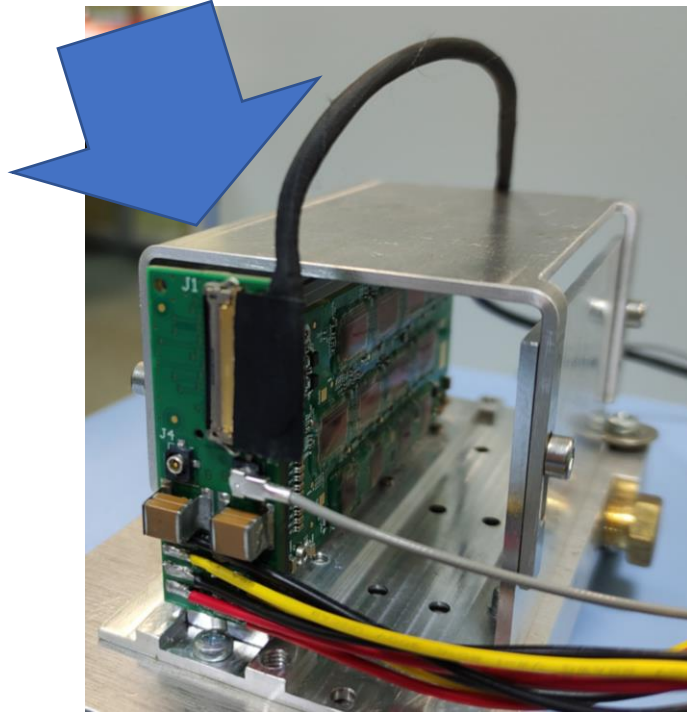


From the presentation of Anton Lymānets

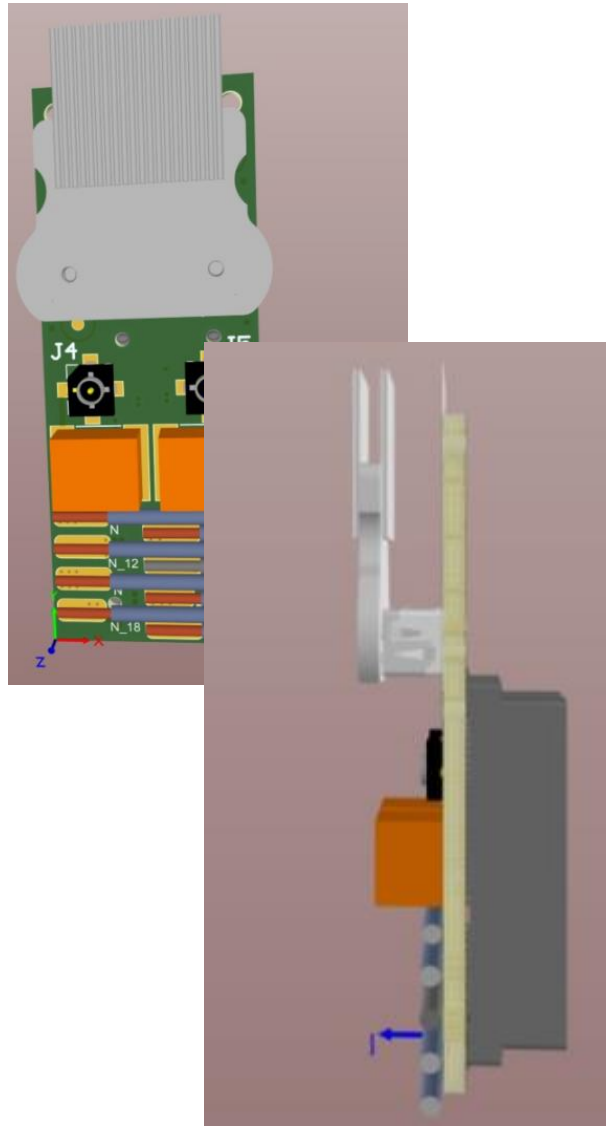
Inner data cables



- Cable assembly is produced by Taiwan company, which has a service in Moscow
- IpeX Cabline CA-II connectors with AWG 40 microcoax wires (50 Ohm)
- Length of the cables: 800 mm



Alternative solution for the inner cables



RAZOR™
BEAM
SYSTEM

HIGH-SPEED HERMAPHRODITIC CABLE

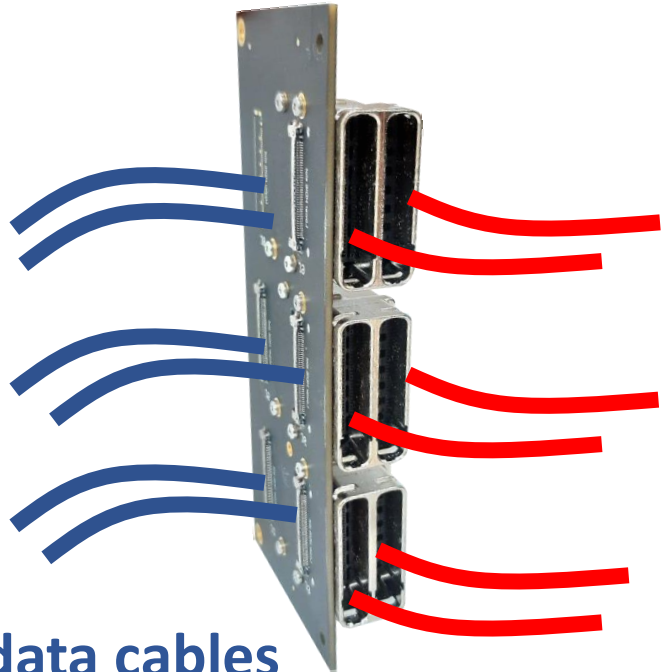
(0.50 mm) .0197" PITCH • HLCD SERIES



Benefits:

- 2-row connector (more compact);
- 38 AWG instead of 40 AWG;
- Mechanical connectivity is more reliable;

Cross panel



6 data cables
inside STS box
0.8 m length,
40 AWG coax

6 data cables
Outside STS box
10 m length 32 AWG twinax

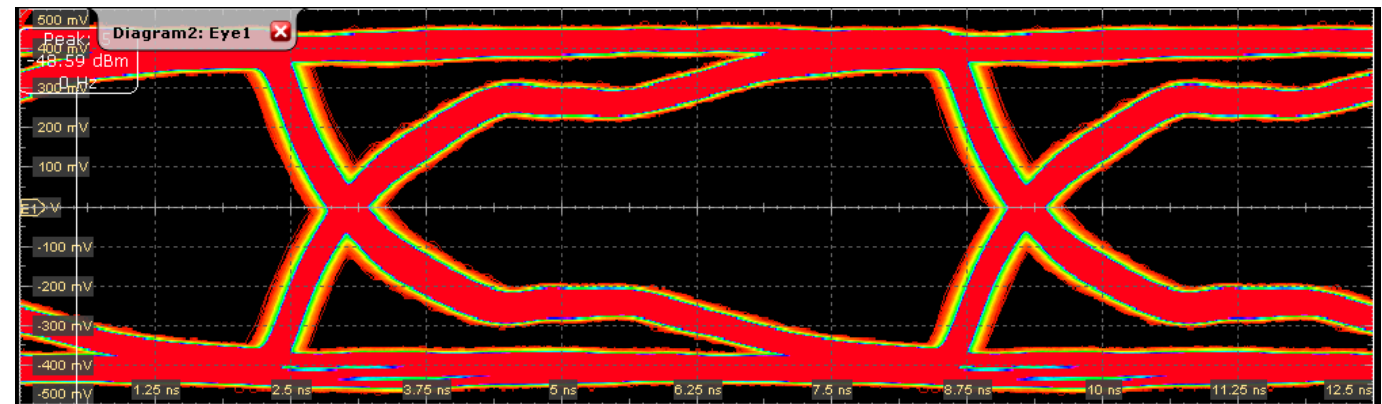
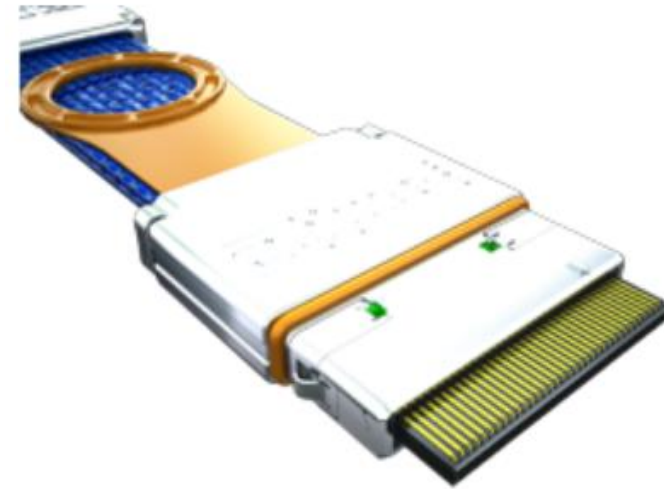
- Is mounted on the side wall of the STS box
- Provides a feed-through interface for data cables for up to six modules

Current status:

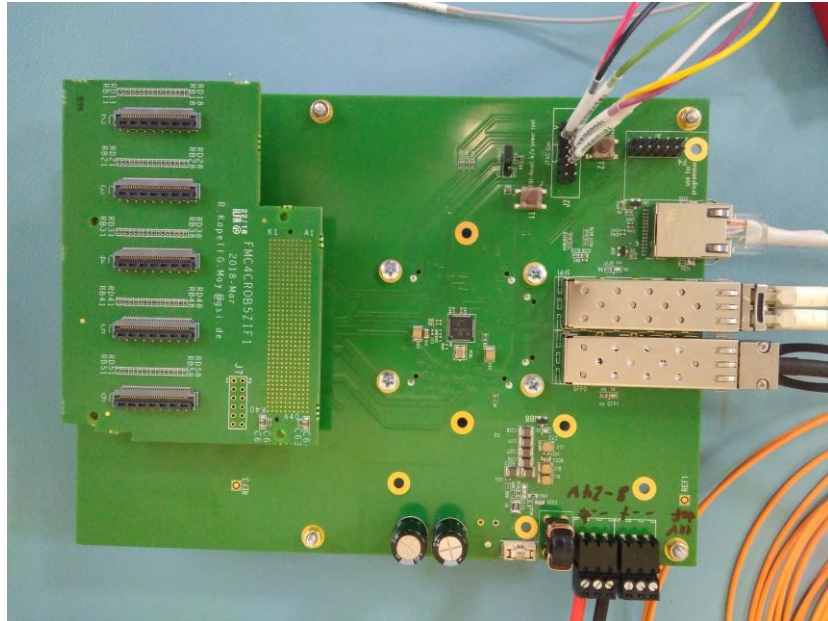
- Prototype was produced and tested,
- Connector type for the inner cable should be finalized
- Connector thermal insulation

Outer data cables

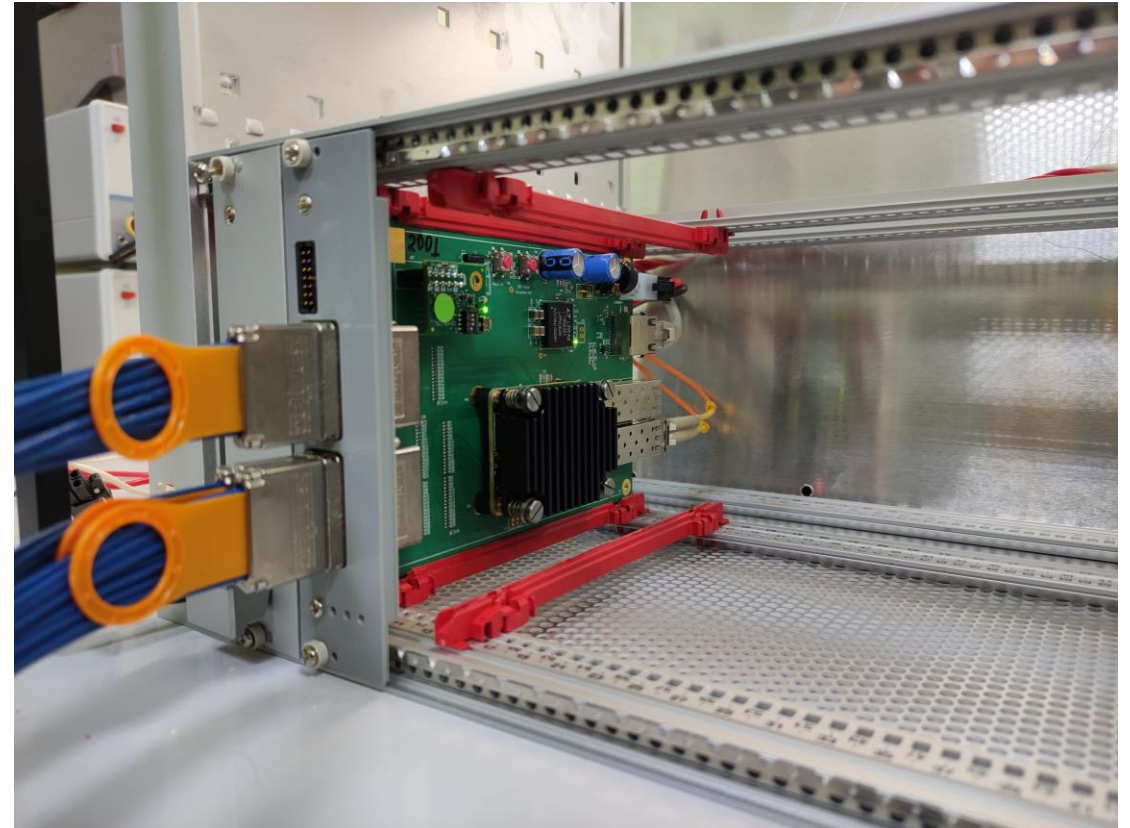
- PN: HDLSP-035-9999 *by Samtec*;
- 32 AWG twinax cable
- 24 pairs
- Available length up to 10 m



Eye diagram of the Up-link signal at 80 MHz Clock



First version of GBTxEmu board produced at GSI



New version of the board with HDI6 connectors in crate

Status of the board:

- First two boards are now used for the module tests
- Specification is prepared for the production of PCBs

Thank you for your attention!

