

Fiber Extension EHN2

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22. September 2020



Federal Ministry
of Education
and Research



Status Quo

- Old style SC connectors / low density installation / aging
→ Multiple conversions between connector types
LC-SC/SC-MTP/MTP-LC... **Multiple points of failure!**
- Lack of fibers especially at BMS/CEDARS, Target, Gallery, Trigger
→ Use of Multiplexer in experimental area to concentrate fibers
Sensitive to radiation! (Problems on Gallery and CEDARs in 2018)
- Change of classical read-out scheme to trigger-less read-out
→ Additional fibers needed to avoid multiple MUXs in area.
→ Higher speed of serial links not compatible with current fibers.
Radiation issue for future hadron runs!

Plans:

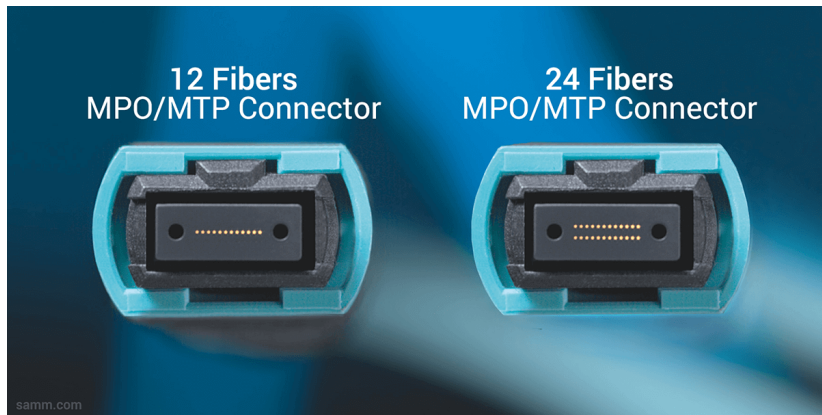
Removing all Multiplexers from the area (at least for the high radiation locations) and have direct connections to the DAQ barracks and place multiplexers there...

Requirements				Distribution along positions									
System	Channels	Ch/Card	Needed Duplex Fibers	POS8 (RMS)	POS1 (CEDAR)	POS2 (Target)	POS3 (SM2)	POS4 (Galley)	POS5 (ECAL2)	POS6 (VETO)	POS7 (Trigger)	POS8 (BD)	POS9 (RICH)
PGEM	8192	2048	4					4	7				
HCAL2	220	32	7										
CEDAR	192	16	12		12								
BMS	448	32	14	14									
HCAL1	480	32	15				15						
FMM	30720	2048	18				18						
Strip Silicon	12288	512	24				24						
MW2	1776	64	32						32				
RICH													
Hybrid/MWPC	62208	1728	36										36
GEM	30720	768	40			12	12	12	4				
ECAL1	1708	32	54				54						
W45	2800	64	55						55				
RW	4032	64	68				68						
Straw	4992	64	78					78					
ECAL2	3072	32	96						96				
Dcs	6912	64	112			48		64					
MW1	6784	64	120					120					
ScR	4200	32	138			68	27	27	16				
RICH MAPMT	9216	64	144										144
FiberTrigger	9600	64	150			150							
Pixel Silicon	10M	---	256			256							
MWPC	25600	64	405				225		180				
Total:	177544		1878	14	12	576	401	305	399	0	0	0	189
Needed 144fiber multicore:						8	6	5	6				3
Total Number of (single) Fibers:				0	0	1152	864	720	864	0	0	0	432
Length of fiber bundles:						51m	33m	30m	40m				46m
Price per Bundle:						2,000.00 €	1,500.00 €	2,000.00 €	1,400.00 €				1,830.00 €
Total Price:						17,200.00 €	9,900.00 €	10,750.00 €	9,300.00 €				53,090.00 €

Infrastructure project covers connection from patch-panel in Exp. Area to patch Panel in DAQ barracks.

MTP/MPO Technology

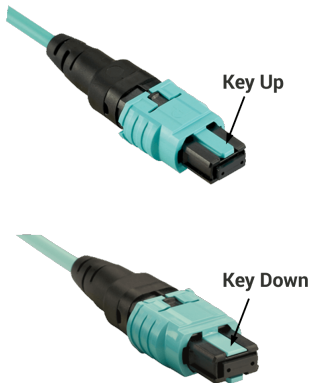
High density Fiber Connectors - used also in all new DAQ developments.



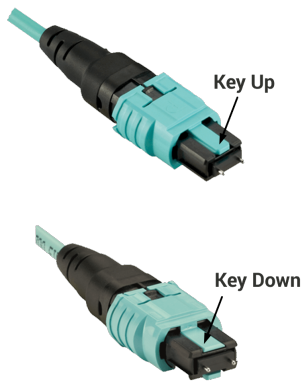
<https://www.samm.com/en/page/109/mpo-mtp-frequently-asked-questions.html>

MTP/MPO Genders

Female MPO Connector



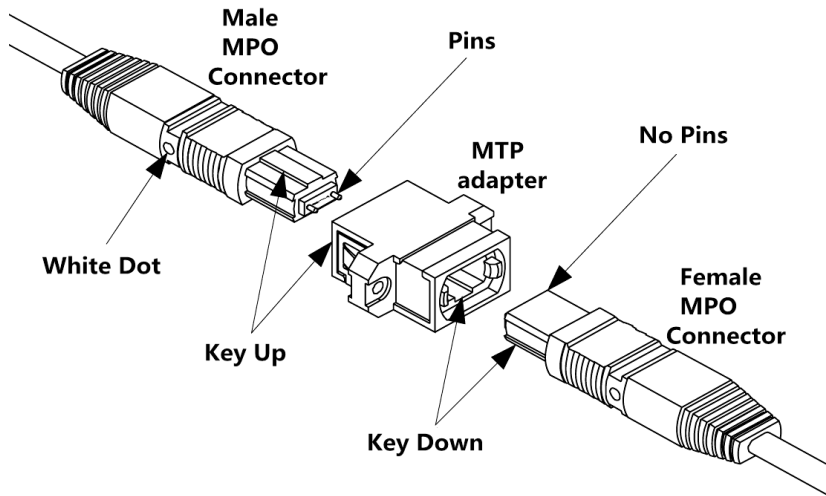
Male MPO Connector



<https://www.samm.com/en/page/109/mpo-mtp-frequently-asked-questions.html>

https://img-en.fs.com/file/white_paper/understanding-fiber-polarity.pdf

MTP/MPO Connections



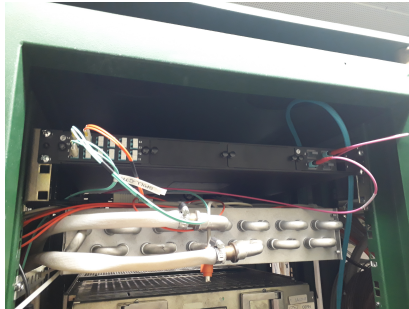
<https://www.samm.com/en/page/109/mpo-mtp-frequently-asked-questions.html>

MTP vs. MPO

MTP connectors are high performance MPO connectors designed with better mechanical and optical performance.

- MTP removable housing allow changing, re-polishing and changing the gender of the connector after assembly
- MTP connector has a floating ferrule, which improves mechanical performance (maintain physical contact while under load.)
- MPO = plastic pin clamp and round spring
- MTP = metal pin clamp and round spring → always stay centered.
- MPO \approx 50 parings.
- MTP \approx 500 pairings

Test Installation (Trigger/Veto)



Test Installation (DAQ-Barracks)



Installation Plans

Progressive installation in tubes for protection and to add additional fibers later.



Full-fills CERN requirements (provided by EN-EA-FC)

Current Situation

Order for 288 Fibers on Target / RICH / SM2 Position (each) is finally on-going (took some time to meet fire protection standard of CERN)

Each position will be equipped with an MPT patchpanel and 1MPT→LC Fan-Out.

Equipment for MWPC ifTDC tests are ordered in parallel
(see Maxims talk)

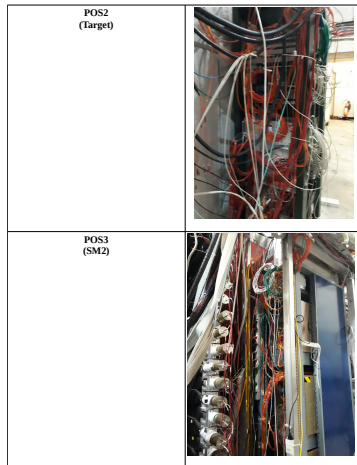
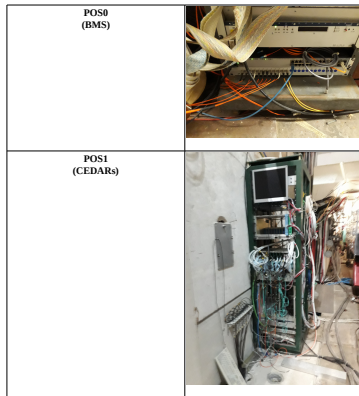
Delivery expected end of October

→ **Goal Installation before Dry-Run 2020.**



BACKUP

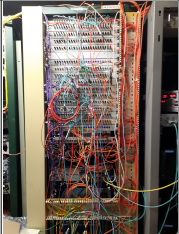
Spare: Positons I

Pictures of Positions:



Spare: Positons II

POS4 (Gallery)	
POS5 (ECAL2)	

POS6 (VETO Barracks)	
POS7 (Trigger Barracks)	
POS8 (Test Platform / Beam Dump) DAQ	

Old Material Price

DAQ ROOM			
3	1He 19" Rack case for 4x Casette	59	177
12	LWL-Adapter-Patchpanel der FHD-Serie (8 MTP Ports; Key Up to Key Up)	56	672
	Total:		849

POS0 – BMS			
1	1He 19" Rack case for 4x Casette	59	59
2	MPO/MPT – LC Fan Out	97	194
1	48Fiber – 2x MPT 24Fiber Bunch 125m	1162	1162
	Total:		1415

POS1 – CEDAR			
1	1He 19" Rack case for 4x Casette	59	59
4	MPO/MPT – LC Fan Out	97	388
1	96Fiber – 4x MPT 24Fiber Bunch 100m	1861	1861
	Total:		2308

POS2 – Target			
1	1He 19" Rack case for 4x Casette	59	59
4	MPO/MPT – LC Fan Out	97	388
1	96Fiber – 4x MPT 24Fiber Bunch 50m	1070	1070
	Total:		1517

POS3 – SM2			
1	1He 19" Rack case for 4x Casette	59	59
4	MPO/MPT – LC Fan Out	97	388
1	96Fiber – 4x MPT 24Fiber Bunch 50m	1070	1070
	Total:		1517

POS4 – Gallery			
1	1He 19" Rack case for 4x Casette	59	59
4	MPO/MPT – LC Fan Out	97	388
1	96Fiber – 4x MPT 24Fiber Bunch 50m	1070	1070
	Total:		1517

POS5 – ECAL2			
1	1He 19" Rack case for 4x Casette	59	59
4	MPO/MPT – LC Fan Out	97	388
1	96Fiber – 4x MPT 24Fiber Bunch 50m	674	674
	Total:		1121

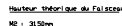
POS6 – VETO			
1	1He 19" Rack case for 4x Casette	59	59
2	MPO/MPT – LC Fan Out	97	194
1	48Fiber – 4x MPT 24Fiber Bunch 25m	346	346
	Total:		599

POS7 – Trigger			
1	1He 19" Rack case for 4x Casette	59	59
2	MPO/MPT – LC Fan Out	97	194
1	48Fiber – 2x MPT 24Fiber Bunch 25m	346	346
	Total:		599

POS8 – Testplattform			
1	1He 19" Rack case for 4x Casette	59	59
4	MPO/MPT – LC Fan Out	97	388
1	96Fiber – 4x MPT 24Fiber Bunch 50m	1070	1070
	Total:		1517

**Grand Total: 12959
9134**

Approx. prices - Only rough planning and calculation until now!



FS.COM reaction

Hello Benjamin,

Wish you a nice day.

This is Della, Sales dept manager at [FS.COM](#).

Susie feedback an after-sales issue to management for high attention. I got all the info and hope to talk directly with you.

We feel sorry for the misleading about our website picture, Product dept is improving, we will let you know once all right. However, our standard one is really the one you received. This standard one was designed after many times consideration and test.

Firstly, for cost-saving:

If the middle trunk part adopts 96-core cable. Due to the large cores, the loss during the production will also be large, so the general cost is higher and require a certain MOQ (1 km).

And during the using time, once one of the connectors has a loss problem, the entire root cable must be replaced, or the 4 * 24 core MTP connector, the cost is very high.

With current design, if any problem with one branch, it will not affect the other branches. You can replace only one of them, which is a better for customers' subsequent maintenance costs and convenience.

Secondly, for product quality:

This design has low loss and work more stable.

Thirdly, Security issues

This design has been loved and affirmed by many customers, and there have never been any accidents in terms of safety. I have client called Medical Research Council (United Kingdom) purchased many times for 144 fibers which is the same design and work very well. If you are really unsure, you can also use it separately.

Meanwhile, if you still cannot accept this product after using it, we also provide RMA processing. Based on your subsequent demand for 96-core products, here wanna know whether you can reach the MOQ standard of 1KM, we will find ways to help you get further discount to make up for this unpleasant shopping experience.

what do you think?

Best regards,

Della.Duan | Sales Manager