EHD Design Guide: Connecting installed cabling to 400 Gbps and 800 Gbps equipment COMMSCOPE®

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Application legend

Singlemode Multimode 100G-DR 200G-DR4 2 fiber = 50/100G*-Base SR = 100G-DR/200G-DR4* applications 8 fiber = 400G-SR4.2/400G-VR4*/400G-SR4* 2 fiber = 400G-LR8/400G-FR8/800G-FR4* applications applications 16 fiber APC 8 fiber = 400G-DR4/800G-DR4* = 400G-SR8/800G-SR8*/800G-VR8* applications 16 fiber APC

applications

= 800G-DR8*/1600G-DR8*

Connecting installed cabling to 400 Gbps and 800 Gbps equipment

Data center managers are under intensifying pressure to do more with less. Data transfer speeds are accelerating—100G to 200G to 400G and beyond. Architectures are flattening and fiber densities increasing. Ultra-low-loss cabling and connectivity is fast becoming the rule, not the exception. And all of this is occurring as budgets, migration schedules and manpower continue to shrink.

In short, the rules of the game are changing in real time. CommScope keeps you two steps ahead with the Propel portfolio...

Designed for what's next, Propel is a modular, ultra-low loss, high-speed fiber platform that enables you to easily scale and adapt your infrastructure as needed, wherever it is needed. High-density fiber panels and interchangeable modules and adapters maximize design options while reducing deployment time, cost and complexity. New 16-fiber connectivity provides easier migration to more efficient 400G/800G deployments while fully supporting legacy 8-, 4- and 2-fiber applications. QR-coded components for optical performance verification make it easier to manage.

Backed by the global reach of an industry leader, the Propel fiber platform delivers the performance, support and product availability you need to thrive in a frenetic, fast-paced environment. It's everything you expect from CommScope—and then some.

About this guide

This design guide provides an at-a-glance reference for customers with installed EHD ultra-low loss data center cabling who need to efficiently support these higher speed applications. Propel transition cable assemblies, including patch cords and array cables, are referenced and shown with design graphics to simplify design choices. Propel is designed to help you customize an infrastructure platform to address your immediate needs as well as take you through multiple generations of upgrades. For more information on our SYSTIMAX portfolio and its capabilities, please contact your CommScope representative or visit https://www.commscope.com/solution-guide-systimax-ull/.



Applications covered in this guide

Ethernet multimode modules—speed >= 100Gb/s

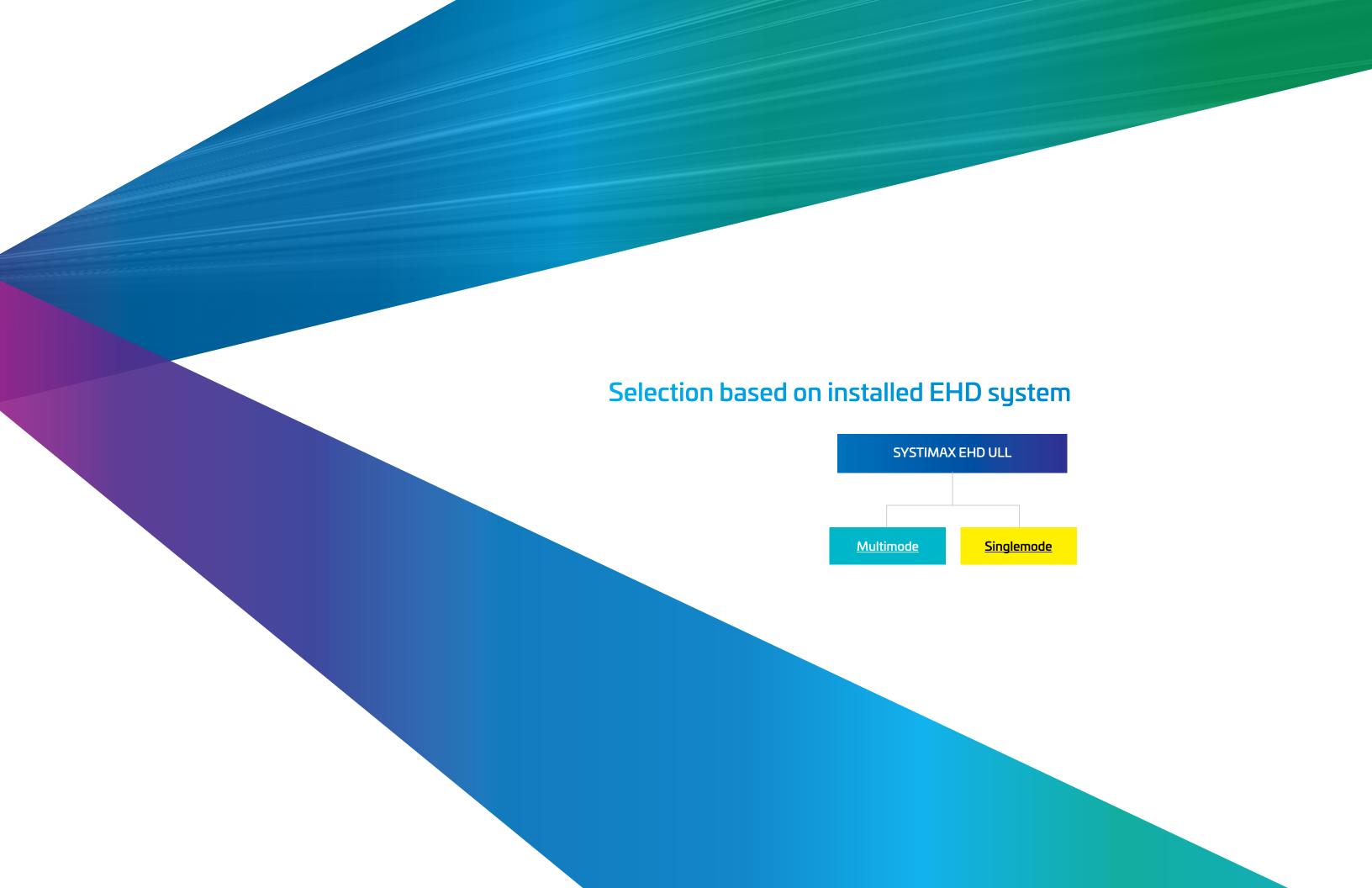
Data Rate	Ethernet standard IEEE standard Adoption # of fiber		Adoption/ tt of fiber Optic:	Optical	Reach (m)						
Gb/s	proprietary/MSA module	MSA/proprietary	introduction pairs	Ι Π λ'ς	# λ's	modulation	OM3	OM4	OM5		
100	100GBASE-SR4	IEEE 802.3bm	2015	4	1	25G NRZ	70	100	100		
100	100G-SWDM4	MSA	2017	1	4	25G NRZ	75	100	150		
100	100G-BiDi	Proprietary	2017	1	2	50G PAM4	70	100	150		
100	100GBASE-SR2	IEEE802.3cd	2018	2	1	50G PAM4	70	100	100		
100	100GBASE-VR	IEEEP802.3db Task Force	-	IEEEP802.3db Task	3db Task	1	1	100G PAM4	30	50	50
100	100GBASE-SR			2022	I	I	100G PAM4	60	100	100	
200	200GBASE-SR4	IEEE802.3cd	2018	4	1	50G PAM4	70	100	100		
200	200GBASE-VR2	IEEEP802.3db Task	2022	2	1	100G PAM4	30	50	50		
200	200GBASE-SR2	Force	2022	2	I	100G PAM4	60	100	100		
400	400GBASE-SR8	IEEE002 2	2020	8	1	FOC DANAA	70	100	100		
400	400GBASE-SR4.2	IEEE802.3cm	2020	4	2	50G PAM4	70	100	150		
400	400GBASE-VR4	IEEEP802.3db Task	2022	4	1	1006 DANA	30	50	50		
400	400GBASE-SR4	Force	2022	4	I	100G PAM4	60	100	100		
800	800GBASE-VR8	B400G Study Group	2022.24	0	1	100C DANA4	30?	50	40		
800	800GBASE-SR8		2023-24	8	I	100G PAM4	60?	100	100		

Ethernet singlemode modules—speed >= 100Gb/s

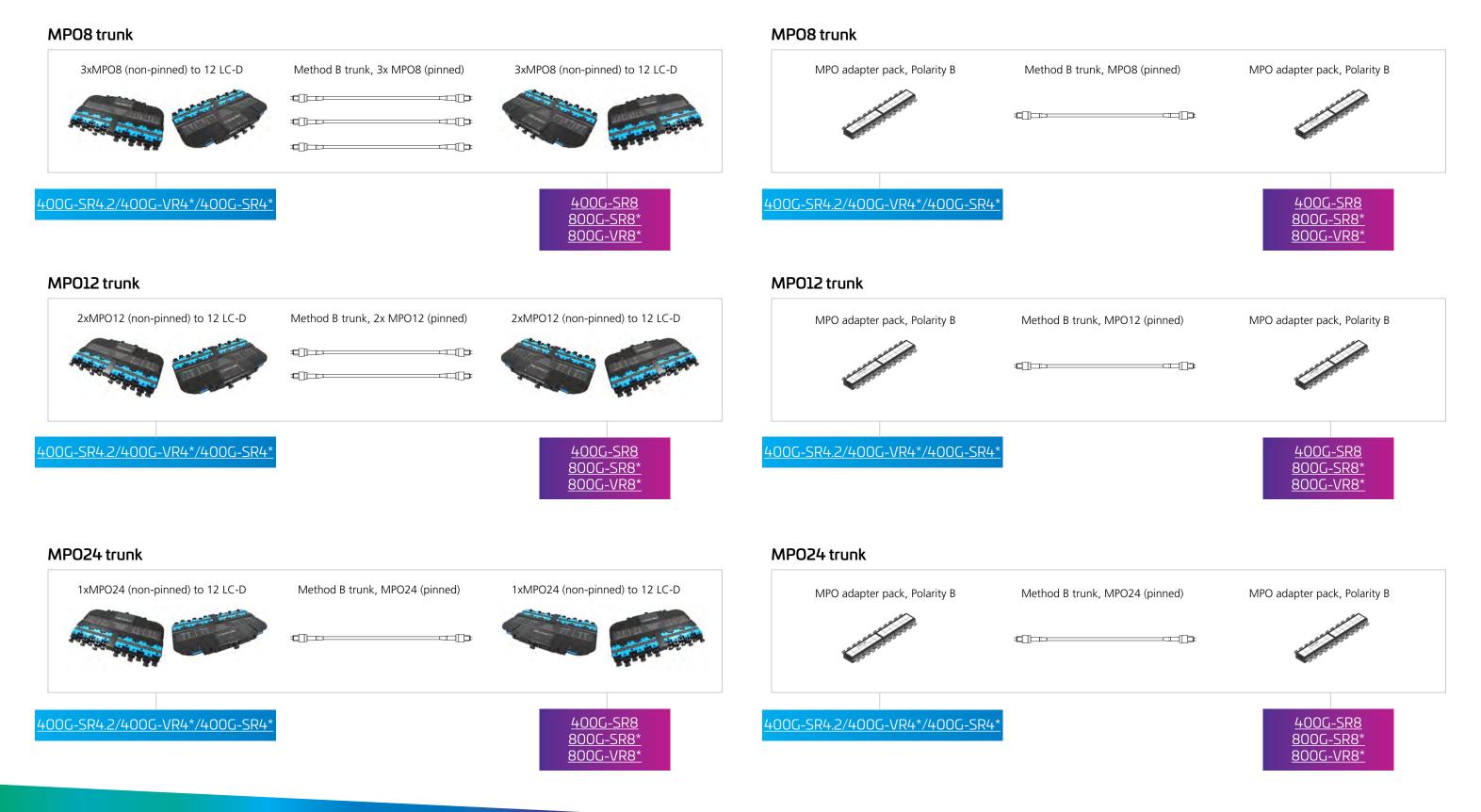
Data Rate Gb/s	Ethernet standard proprietary/MSA module	IEEE standard/ MSA/proprietary	Adoption/introduction	# of fiber pairs	# λ ′s	Optical modulation	Reach
100	100G-PSM4	MSA	2014	4	1	25G NRZ	500
100	100G-CWDM4	MSA	2014	1	4	25G NRZ	2,000
100	100GBASE-LR4	IEEE 802.3ba	2010	1	4	25G NRZ	10,000
200	200GBASE-DR4			4	1	50G PAM4	500
200	200GBASE-FR4	IEEE802.3bs	2017	1	1	FOC DANA	2,000
200	200GBASE-LR4			1	4	50G PAM4	10,000
400	400GBASE-FR8			1	8	FOC DANAA	2,000
400	400GBASE-LR8	IEEE802.3bs	2017	1	8	50G PAM4	10,000
400	400GBASE-DR4			4	1	100G PAM4	500
800	800GBASE-DR8		2022	8	1	100G PAM4	500/2,000
800	800GBASE-DR4	DAOOC Cturchy Crouse	2025?	4	1		500/2,000
800	800GBASE-FR4	B400G Study Group	2025?	1	4	200G PAM4	2,000
1600	1600GBASE-DR8		2025?	8	1		500/2,000

Distances could vary based on configuration or connector type and count. Refer to the CommScope Fiber Performance Calculator, SYSTIMAX performance specifications and other documentation at commscope.com for our Application Assurance details.

Green = defined by the IEEE Beyond 400G study group
Blue = defined by the IEEE 802.3db task force

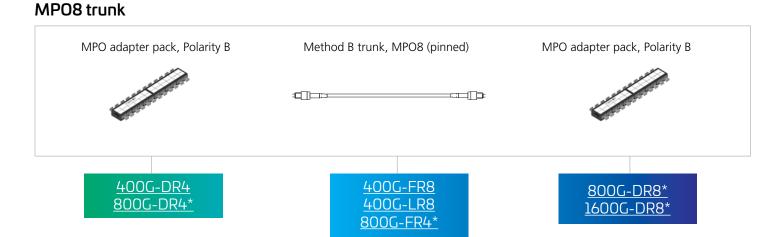


Common SYSTIMAX EHD ULL multimode transmission channels



Common SYSTIMAX EHD ULL singlemode transmission channels

MP08 trunk 3xMPO8 (non-pinned) to 12 LC-D Method B trunk, 3x MPO8 (pinned) 3xMPO8 (non-pinned) to 12 LC-D 400G-FR8 400G-DR4 800G-DR8* 800G-DR4* 400G-LR8 1600G-DR8* 800G-FR4*











400G-DR4 800G-DR4*

400G-FR8 400G-LR8 800G-FR4*

800G-DR8* 1600G-DR8*

MPO12 trunk



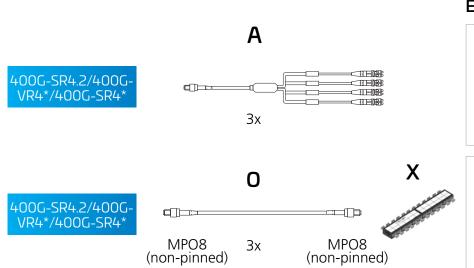


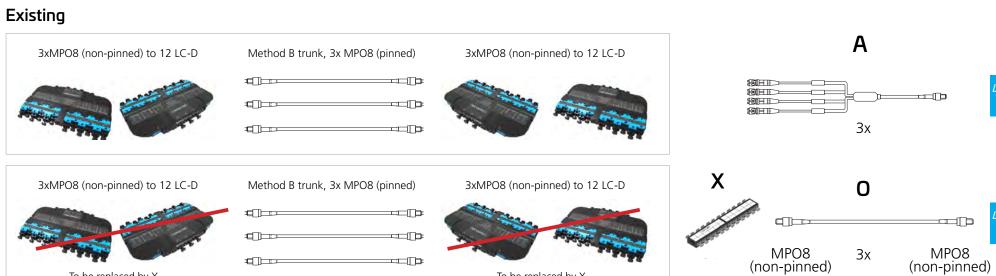
+00G-SR4.2/400G-VR4*/400G-SR4*

+00G-SR4.2/400G VR4*/400G-SR4*

Connection to 400G-SR4.2/400G-VR4*/400G-SR4*

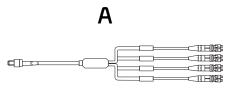
Maximum channel lengths				
OM4	100 m			
OM5	150 m			





To be replaced by X





MPO8 (non-pinned) to 4 x LC duplex cord				
Fiber type	Part number			
OM4	UQXQPLUJ8			
OM5	UQVQPLUJ8			



To be replaced by X

MPO8 (non-pinned) to MPO8 (non-pinned) cord				
Fiber type	Part number			
OM4	UQXQPQPJ8			
OM5	UQVQPQPJ8			

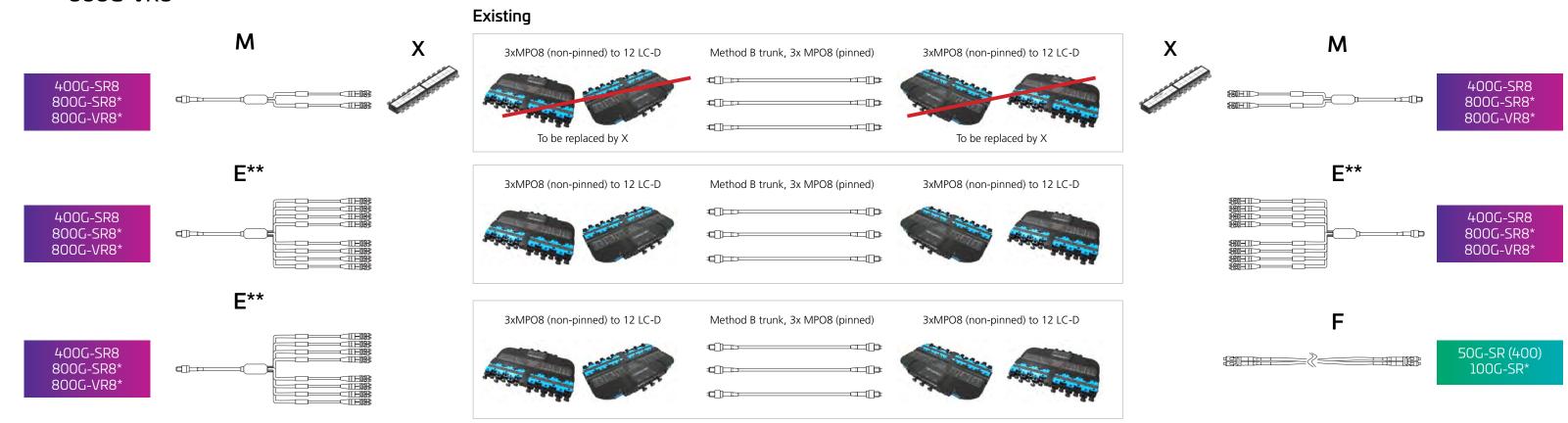
EHD adpater pack MPO, Polarity B			
# of connectors	Part number		
12	760235622 EHD-DP-12MPO-ALL-B		

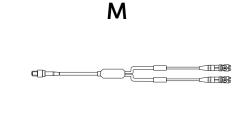
400G-SR8

800G-SR8*

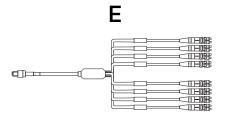
800G-VR8*

Maximum channel lengths OM4 100 m OM5 100 m





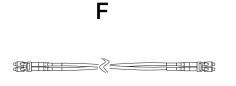
2x MPO8 (non-pinned) cord, ULL				
Fiber type	Part number			
OM4	UQXRVQP7R			
OM5	UQVRVQP7R			



	pinned) APC to ex cord, ULL
Fiber type	Part number
OM4	UQXRVLU7R
OM5	UQVRVLU7R



EHD adpater pack MPO, Polarity B			
# of connectors	Part number		
12	760235622 EHD-DP-12MPO-ALL-B		



LC-duplex cord, ULL					
Fiber type	Part number				
OM4	UDXLULU62				
OM5	UDVLULU62				

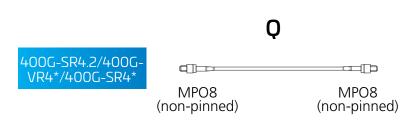
*Applications on the Ethernet roadmap

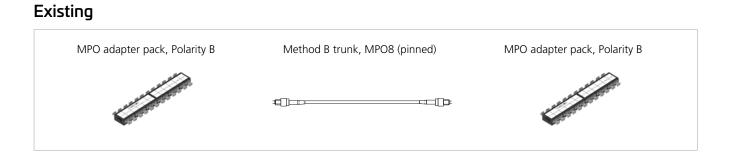
**Four LC-duplex ports will not be used by the shown port-to-port configuration. These ports can be part of another port-to-port configuration. To fully utilize the EHD modules using the "E" breakout array, 3x MPO16 to 8 LC-duplex arrays would be necessary to bridge and support 2x 24-fiber modules on a single blade.

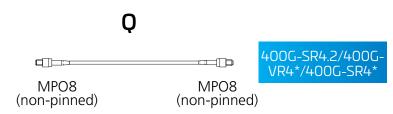


Connection to 400G-SR4.2/400G-VR4*/400G-SR4*

Maximum channel lengths				
OM4	100 m			
OM5	150 m			









(non-pinned) to MPO8 (non-pinned) (non-pinned)	
Fiber type	Part number
OM4	UQXQPQPJ8
OM5	UQVQPQPJ8

100 m

100 m

Maximum channel lengths

OM4

OM5

Connection to

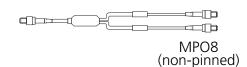
400G-SR8

800G-SR8*

800G-VR8*

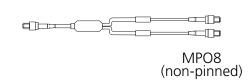
R

400G-SR8 800G-SR8* 800G-VR8*

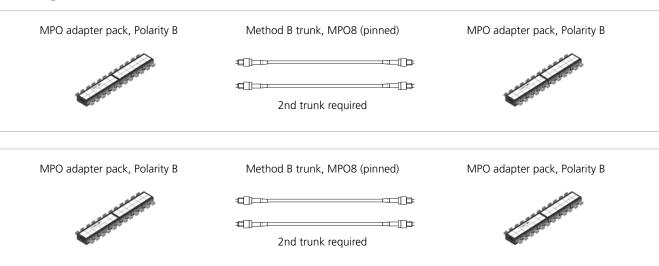


R

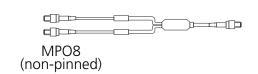
400G-SR8 800G-SR8* 800G-VR8*



Existing

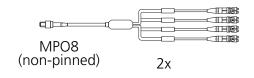


R



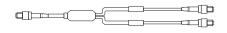


Ν



50G-SR (400) 100G-SR*

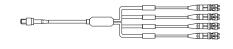
R



MPO16 (non-pinned) APC to

2x MPO8 (non-pinned) cord, ULL		
Fiber type	Part number	
OM4	UQXRVQP7R	
OM5	UQVRVQP7R	

Ν



MPO8 (non-pinned) to 4x LC-duplex cord, ULL		
Fiber type	Part number	
OM4	UQXQPLUJ8	
OM5	UQVQPLUJ8	

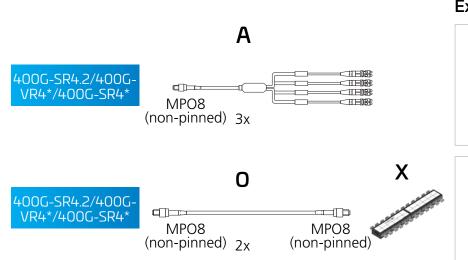


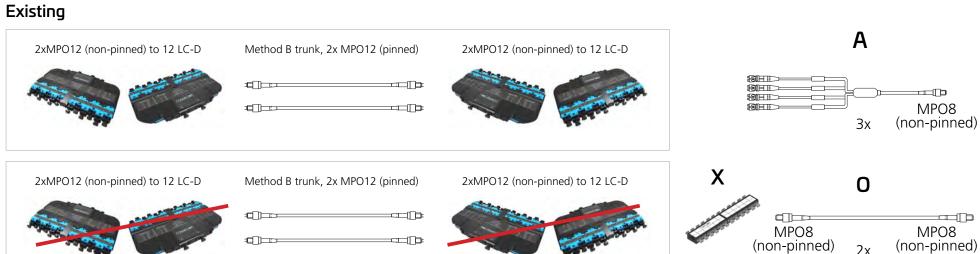
VR4*/400G-SR4^{*}

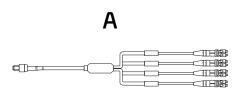
+00G-SR4.2/400G-VR4*/400G-SR4*

Connection to 400G-SR4.2/400G-VR4*/400G-SR4*

Maximum channel lengths	
OM4	100 m
OM5	150 m



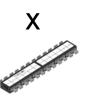




MPO8 (non-pinned) to 4 x LC duplex cord		
Fiber type	Part number	
OM4	UQXQPLUJ8	
OM5	UQVQPLUJ8	



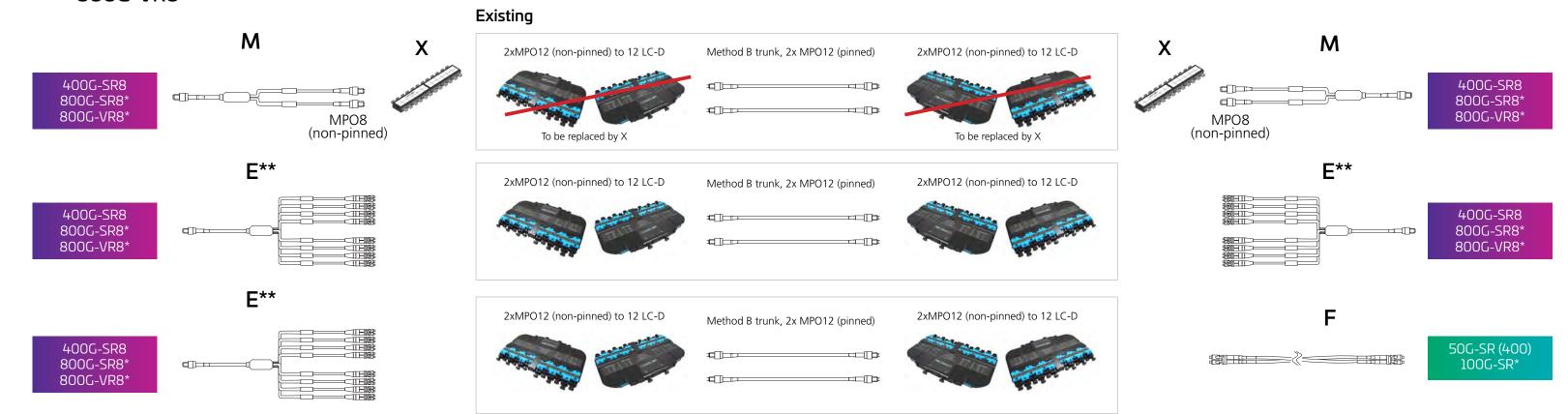
MPO8 (non-pinned) to MPO8 (non-pinned) cord, ULL		
Fiber type	Part number	
OM4	UQXQPQPJ8	
OM5	UQVQPQPJ8	

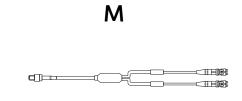


EHD adpater pack MPO, Polarity B	
# of connectors	Part number
12 760235622 EHD-DP-12MPO-ALL-B	

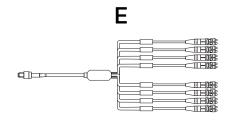
400G-SR8

800G-SR8* 800G-VR8* Maximum channel lengths OM4 100 m OM5 100 m





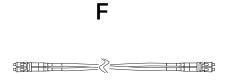
2x MPO16 (non-pinned) APC to 2x MPO8 (non-pinned) cord, ULL	
Fiber type	Part number
OM4	UQXRVQP7R
OM5	UQVRVQP7R



oinned) APC to ex cord, ULL
Part number
UQXRVLU7R
UQVRVLU7R



EHD adpater pack MPO, Polarity B	
# of connectors	Part number
12	760235622 EHD-DP-12MPO-ALL-B



LC-duplex	LC-duplex cord, ULL	
Fiber type	Part number	
OM4	UDXLULU62	
OM5	UDVLULU62	

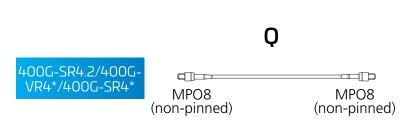
*Applications on the Ethernet roadmap

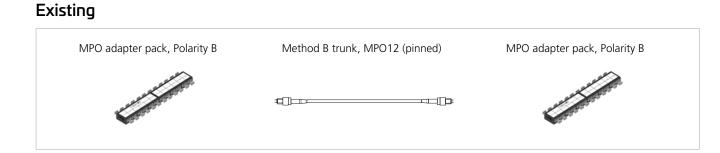
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Connection to 400G-SR4.2/400G-VR4*/400G-SR4*

Maximum channel lengths	
OM4	100 m
OM5	150 m









	nned) to MPO8 d) cord, ULL
Fiber type	Part number
OM4	UQXQPQPJ8
OM5	UQVQPQPJ8

100 m

100 m

Maximum channel lengths

OM4

OM5

Connection to

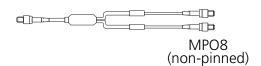
400G-SR8

800G-SR8*

800G-VR8*

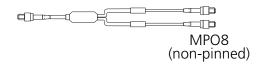
R

400G-SR8 800G-SR8* 800G-VR8*

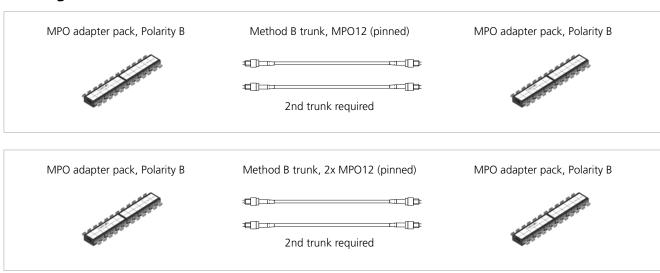


R

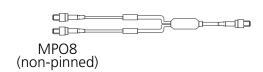
400G-SR8 800G-SR8* 800G-VR8*



Existing

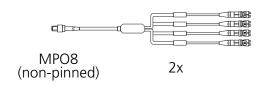


R



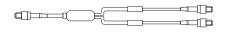
400G-SR8 800G-SR8* 800G-VR8*

Ν



50G-SR (400) 100G-SR*

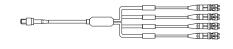
R



MPO16 (non-pinned) APC to

2x MPO8 (non-pinned) cord, ULL		
Fiber type	Part number	
OM4	UQXRVQP7R	
OM5	UQVRVQP7R	

Ν

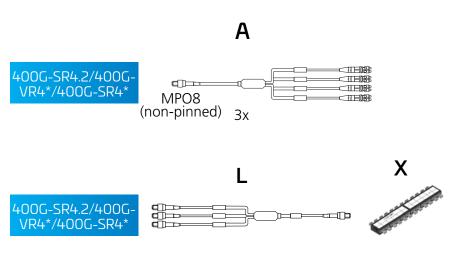


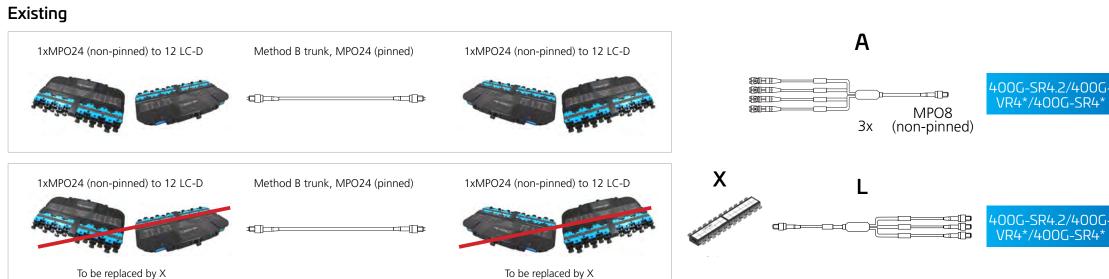
MPO8 (non-pinned) to 4x LC-duplex cord, ULL	
Fiber type	Part number
OM4	UQXQPLUJ8
OM5	UQVQPLUJ8

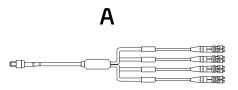


Connection to 400G-SR4.2/400G-VR4*/400G-SR4*

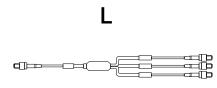
Maximum channel lengths	
OM4	100 m
OM5	150 m











MPO24 (non-pinned) to 3x MPO8 (non-pinned) cord, ULI	
Fiber type	Part number
OM4	UQX2PQPPHF
OM5	UQV2PQPHF

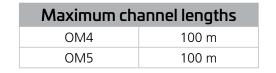


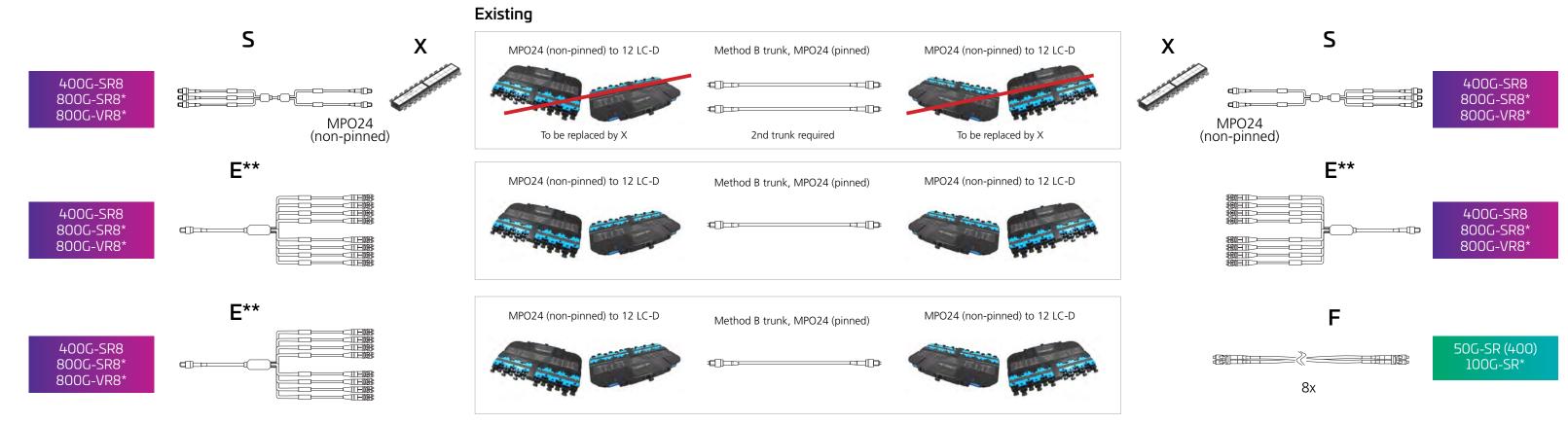
EHD adpater pack MPO, Polarity B	
# of connectors	Part number
12 760235622 EHD-DP-12MPO-ALL-B	

400G-SR8

800G-SR8*

800G-VR8*





S

3xMP016 (non-pinned) APC to 2x MP024 (non-pinned) cord, ULL	
Fiber type	Part number
OM4	UQX2PRVBH-MAxxxx
OM5	UQV2PRPBH-NAxxxx

E

8x LC-dup	ex cord, ULL
Fiber type	Part number
OM4	UQXRVLU7R
OM5	UQVRVLU7R

MPO16 (non-pinned) APC to

EHD adpater pack MPO, Polarity B	
# of connectors	Part number
12	760235622 EHD-DP-12MPO-ALL-B

F

LC-duplex cord, ULL	
Fiber type	Part number
OM4	UDXLULU62
OM5	UDVLULU62

*Applications on the Ethernet roadmap

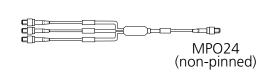
**Four LC-duplex ports will not be used by the shown port-to-port configuration. These ports can be part of another port-to-port configuration. To fully utilize the EHD modules using the "E" breakout array, 3x MPO16 to 8 LC-duplex arrays would be necessary to bridge and support 2x 24-fiber modules on a single blade.



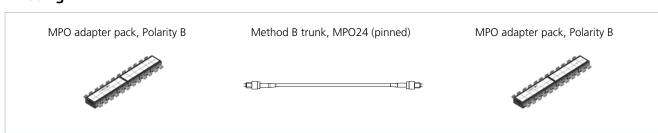
Connection to 400G-SR4.2/400G-VR4*/400G-SR4*

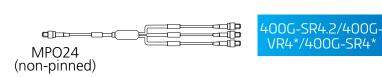
Maximum channel lengths	
OM4	100 m
OM5	150 m

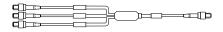
400G-SR4.2/400G-VR4*/400G-SR4*



Existing







MPO24 (non MPO8 (non-pir	
Fiber type	Part number
OM4	UQX2PQPPHF
OM5	UQV2PQPHF

100 m

100 m

Maximum channel lengths

OM4

OM5

Connection to

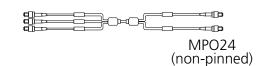
400G-SR8

800G-SR8*

800G-VR8*

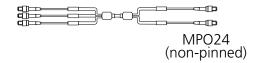
S

400G-SR8 800G-SR8* 800G-VR8*

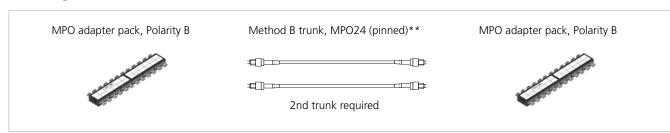


S



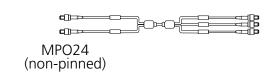


Existing



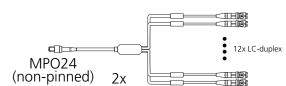


S





U

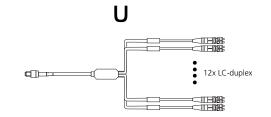


50G-SR (400) 100G-SR*

S



3xMP016 (non-pinned) APC to 2x MP024 (non-pinned)cord, ULL		
Fiber type	Part number	
OM4	UQX2PRVBH-MAxxxx	
OM5	UQV2PRPBH-NAxxxx	



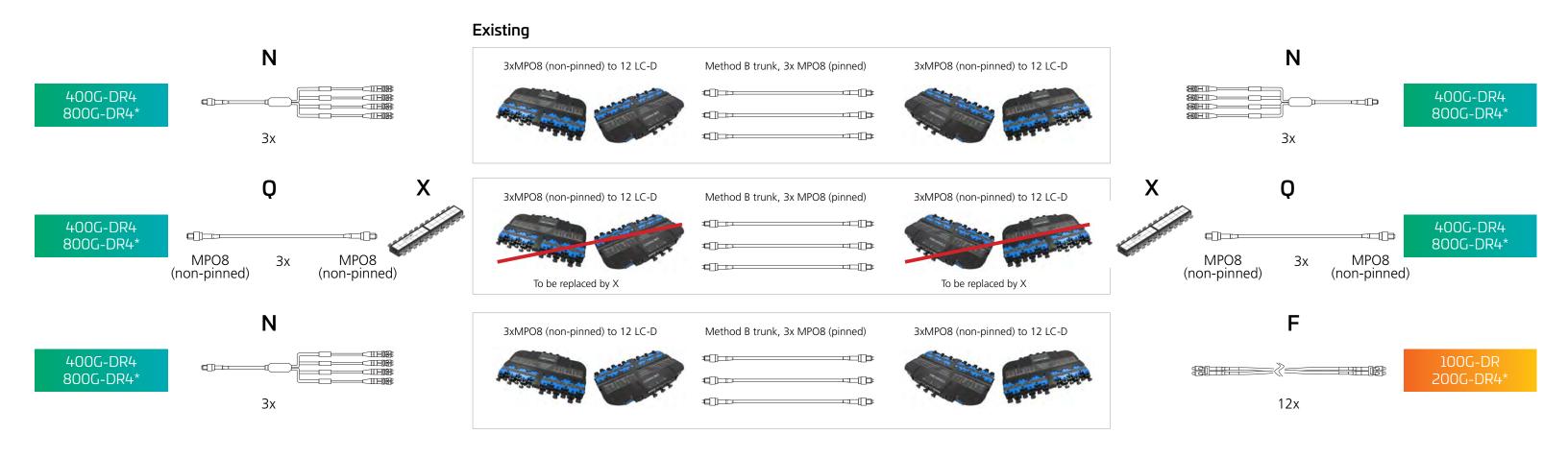
MPO24 (non-pinned) to 12x LC-duplex cord, ULL	
Fiber type	Part number
OM4	UQX2PLUHF
OM5	UQV2PLUHF

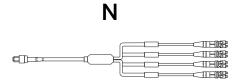
*Applications on the Ethernet roadmap ** Trunks have to be under the same sheath

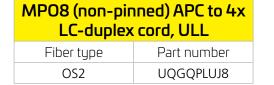


Connection to 400G-DR4 800G-DR4*

Maximum channel lengths DR4 500 m









MPO8 (non-pinned) APC to MPO8 (non-pinned) APC cord, ULL	
Fiber type	Part number
OS2	UQGQPQPJ8



EHD adpater pack MPO, Polarity B	
# of connectors	Part number
12	760235622 EHD-DP-12MPO-ALL-B

F	=

LC-duplex cord, ULL	
Fiber type	Part number
OS2	UDGLULUK2

^{*}Applications on the Ethernet roadmap

400G-FR8

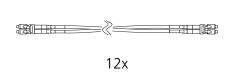
400G-LR8

800G-FR4*

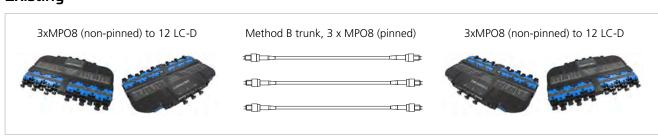
Maximum channel lengths	
FR4	2 km
FR8	2 km
LR8	10 km

F

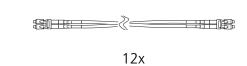
400G-FR8 400G-LR8 800G-FR4*



Existing



F



400G-FR8 400G-LR8 800G-FR4*

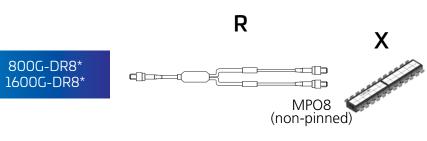
F

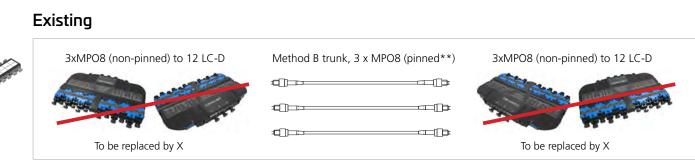


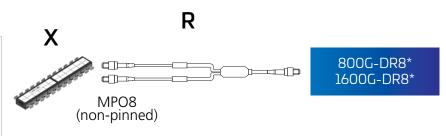
LC-duplex cord, ULL	
Fiber type	Part number
OS2	UDGLULUK2

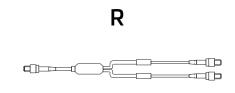
Connection to 800G-DR8* 1600G-DR8*

Maximum channel lengths	
DR8	500 m











MPO16 (non-pinned) APC to 2x MPO8 (non-pinned) UPC cord	
Fiber type	Part number
OS2	URGRPQP7R

EHD adpater pack MPO, Polarity B	
# of connectors	Part number
12	760235622 EHD-DP-12MPO-ALL-B

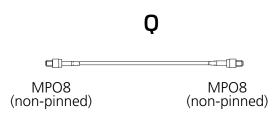


400G-DR4

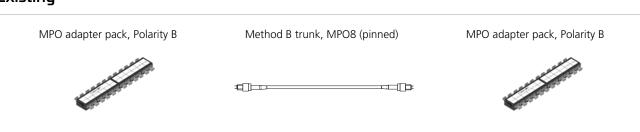
800G-DR4*

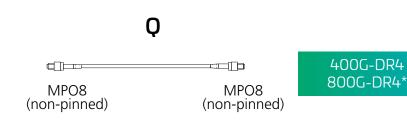
Maximum channel lengths DR4 500 m

400G-DR4 800G-DR4*











MPO8 (non-pin	d) cord, ULL
Fiber type	Part number
OS2	UQGQPQPJ8

Connection to 400G-FR8

400G-LR8

800G-FR4*

Maximum channel lengths	
FR4	2 km
FR8	2 km
LR8	10 km

N

400G-FR8 400G-LR8 800G-FR4*





Method B trunk, MPO8 (pinned)



MPO adapter pack, Polarity B

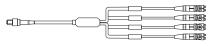


MPO8 (non-pinned)

Ν

400G-FR8 400G-LR8 800G-FR4*

Ν

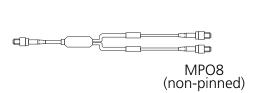


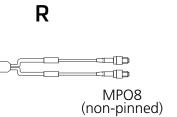
LC-duplex cord, ULL	
Fiber type	Part number
OS2	UQGQPLUJ8

Connection to 800G-DR8* 1600G-DR8*

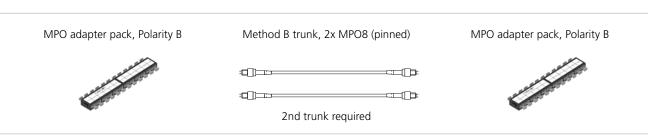
Maximum channel lengths		
DR8	500 m	

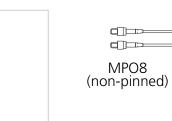
800G-DR8* 1600G-DR8*

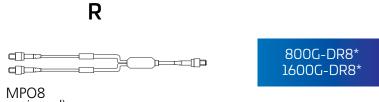


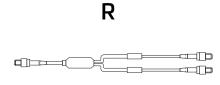


Existing







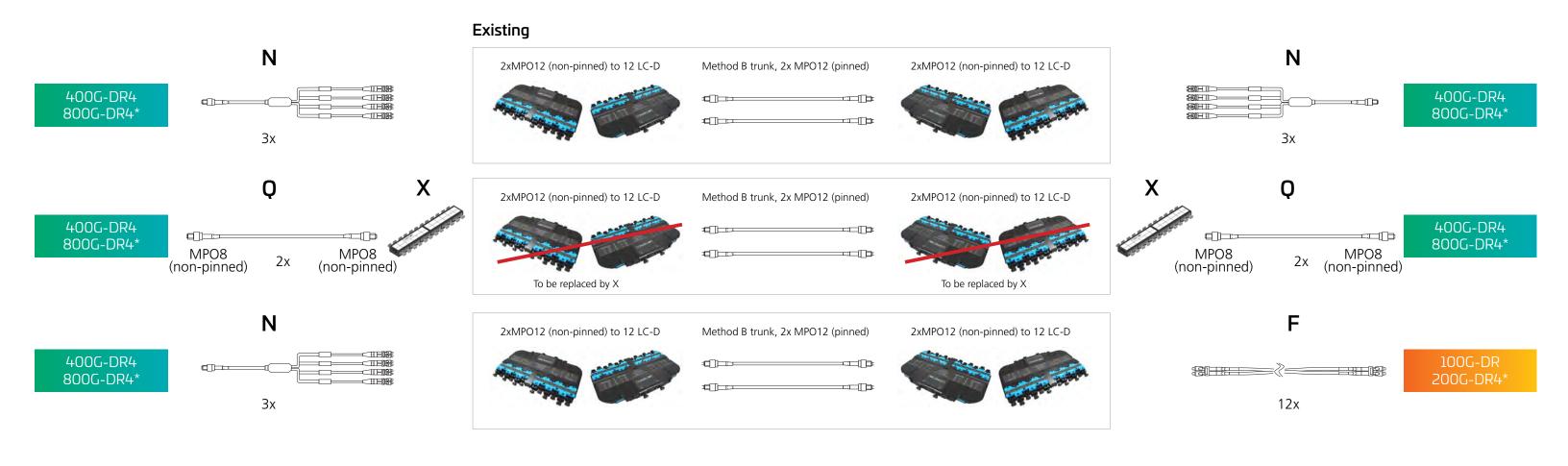


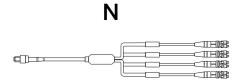
MPO16 (non-pinned) APC to 2x MPO8 (non-pinned) UPC cord	
Fiber type	Part number
OS2	UQGRPQP7R

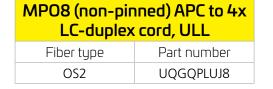


Connection to 400G-DR4 800G-DR4*

Maximum channel lengths	
OS2	500 m









MPO8 (non-pinned) APC to MPO8 (non-pinned) APC cord, ULL	
Fiber type	Part number
OS2	UQGQPQPJ8



EHD adpater pack MPO, Polarity B	
# of connectors	Part number
12	760235622 EHD-DP-12MPO-ALL-B

F	

LC-duplex cord, ULL	
Fiber type	Part number
OS2	UDGLULUK2

^{*}Applications on the Ethernet roadmap

Connection to 400G-FR8

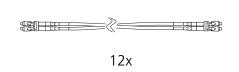
400G-LR8

800G-FR4*

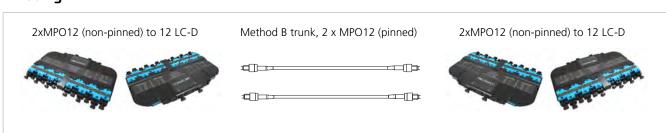
Maximum channel lengths	
FR4	2 km
FR8	2 km
LR8	10 km

F

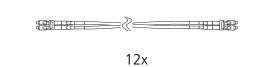
400G-FR8 400G-LR8 800G-FR4*



Existing



F



400G-FR8 400G-LR8 800G-FR4*

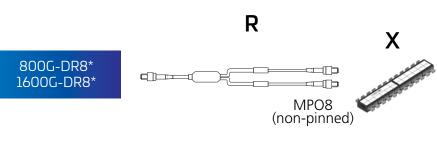
F

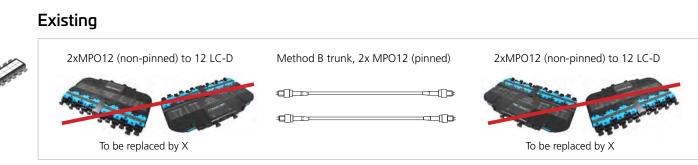


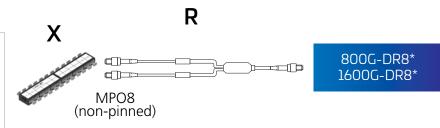
LC-duplex cord, ULL	
Fiber type	Part number
OS2	UDGLULUK2

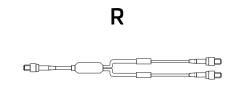
Connection to 800G-DR8* 1600G-DR8*

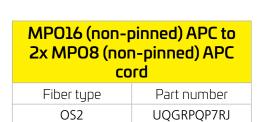
Maximum channel lengths	
DR8	500 m













EHD adpater pack MPO, Polarity B		
# of connectors	Part number	
12	760235622 EHD-DP-12MPO-ALL-B	

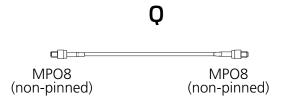


400G-DR4

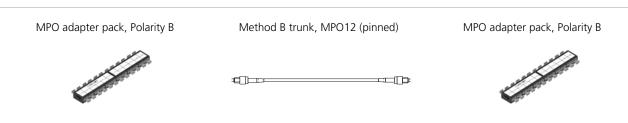
800G-DR4*

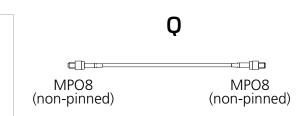
Maximum channel lengths DR4 500 m

400G-DR4 800G-DR4*









400G-DR4 800G-DR4*



MPO8 (non-pinned) to MPO8 (non-pinned) cord, ULL		
Fiber type	Part number	
OS2	UQGQPQPJ8	

400G-FR8

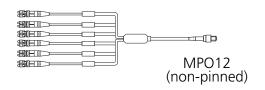
400G-LR8

800G-FR4*

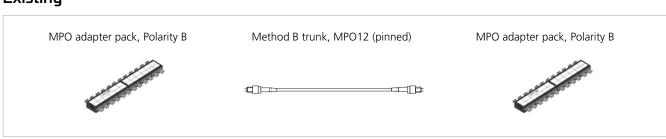
Maximum channel lengths		
FR4	2 km	
FR8	2 km	
LR8	10 km	

W

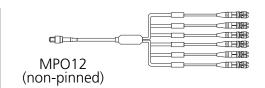
400G-FR8 400G-LR8 800G-FR4*



Existing

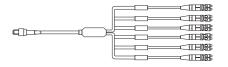


W



400G-FR8 400G-LR8 800G-FR4*

W

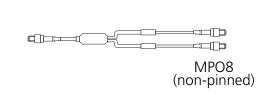


MPO12 (non-pinned) to 6 x LC-duplex cord, ULL Fiber type Part number OS2 UQGMPLUUD

Connection to 800G-DR8* 1600G-DR8*

Maximum channel lengths		
DR8	500 m	

800G-DR8* 1600G-DR8*

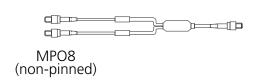


R

Existing



R









MPO16 (non-pinned) APC to 2x MPO8 (non-pinned) APC cord

Fiber type	Part number
OS2	UQGRPQP7R

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