A collection of white line-art illustrations of fiber optic components on a dark gray background. At the top right is a patch panel with two circular ports. Below it are several fiber optic cables with different connector types, including LC, SC, and ST. The cables are arranged in a way that suggests they are connected to the patch panel. The overall style is technical and clean.

# Fiber Optic Cabling Solutions

IDEAL FOR DIRECT CONNECT AND INTER-CONNECT APPLICATIONS

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## 10G to 10G Inter-connect Solution

### Inter-connect Connectivity

This section introduces the products required for 10G to 10G inter-connect solutions. These products include 10G SR/LR, fiber optical cables, FHD cable management etc. Fiber optical cables provide connectivity to the active components. FHD cassettes are used if the distance between two devices is too long. The use of FHD enclosures provides a robust solution that allows the cables to be protected in the enclosures. Inter-connect cabling allows for easier moves, adds, and changes (MACs).

### FHD MTP®-12 Cassettes Connection

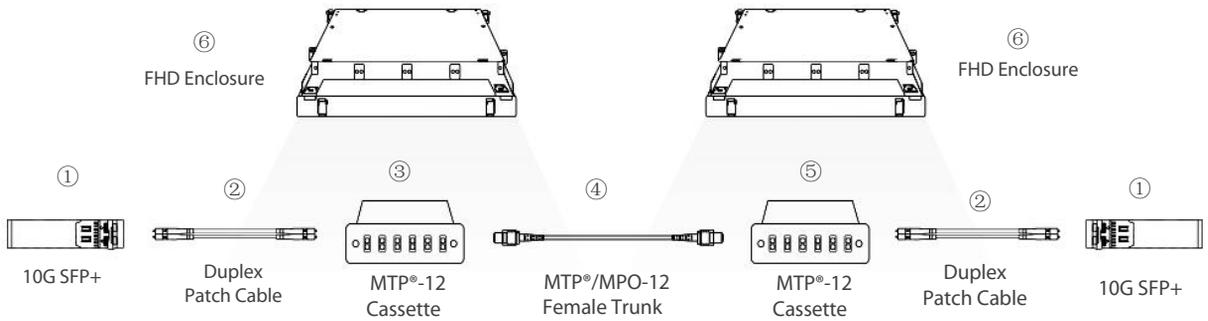


Figure 1: 10G to 10G Inter-connect Cabling with FHD MTP®-12 Cassettes

No.	①	②	③	④	⑤	⑥
Solutions						
<b>Multimode Connectivity</b>						
1	10G SFP+ SR	A-to-B*1	Type A*2	Type A	Type AF*2	FHD Enclosure*3
<b>Single Mode Connectivity</b>						
2	10G SFP+ LR	A-to-B	Type A	Type A	Type AF	FHD Enclosure

Notes:

\*1 The polarity type of FS duplex fiber patch cable is A-to-B by default.

\*2 Type A and AF cassettes are used as a pair with type A trunk cable, the transmission of the signal is P2 in and P1 out. While two type A cassettes are used as a pair when choosing type B trunk cable, the transmission is P12 in and P1 out.

\*3 FHD enclosure is designed to hold up to 4x FHD MTP® cassettes or FAPs, up to 96 fibers in 1U space.

### FHD MTP®-24 Cassettes Connection

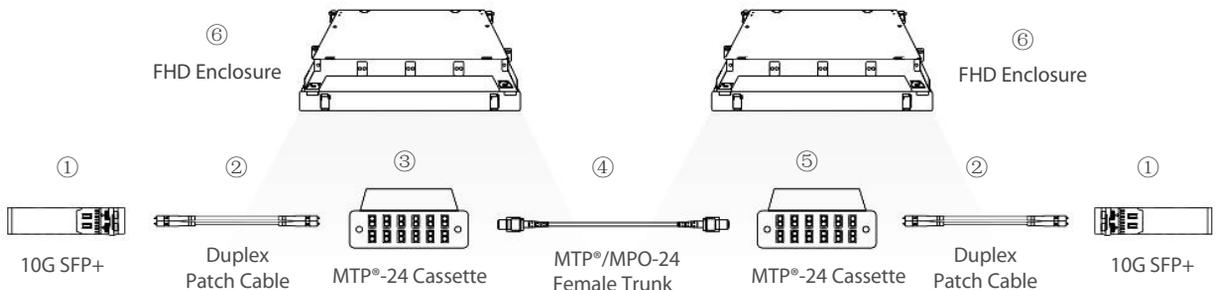
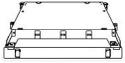


Figure 2: 10G to 10G Inter-connect Cabling with FHD MTP®-24 Cassettes

No.	①	②	③	④	⑤	⑥
Solutions						
<b>Multimode Connectivity</b>						
1	10G SFP+ SR	A-to-B	Type A	Type A	Type AF	FHD Enclosure
<b>Single Mode Connectivity</b>						
2	10G SFP+ LR	A-to-B	Type A	Type A	Type AF	FHD Enclosure

## 40G to 40G Direct and Inter-connect Solution

This section introduces the products required for 40G to 40G direct and inter-connect solutions. These products include 40G SR4/BiDi SR/PLR4/LR4, fiber optical cables, FHD cable management etc.

### 1. Direct Connectivity

When directly connecting two QSFP+ transceivers, a type B MTP®/MPO-12 female trunk is required. This type of direct connectivity is suggested for short distances within a given row of racks/cabinets.



Figure 3: 40G to 40G Direct-connect Cabling Utilizing a Type B MTP®/MPO-12\*1 Trunk

No.	①	②
Solutions		
<b>Multimode Connectivity</b>		
1	40G QSFP+ SR4*2	Type B
<b>Single Mode Connectivity</b>		
2	40G QSFP+ PLR4	Type B

Notes:

\*1 8 fibers used (4 fibers at each end) for 40G to 40G direct connect applications.

\*2 40G QSFP+ CSR4 transceivers are available for solution 1.

### 2. Inter-connect Connectivity

This part is similar to the 10G to 10G Inter-connect Solution part. The inter-connect cabling allows for easier moves, adds, and changes (MACs).

#### FHD MTP®-12 Cassettes Connection

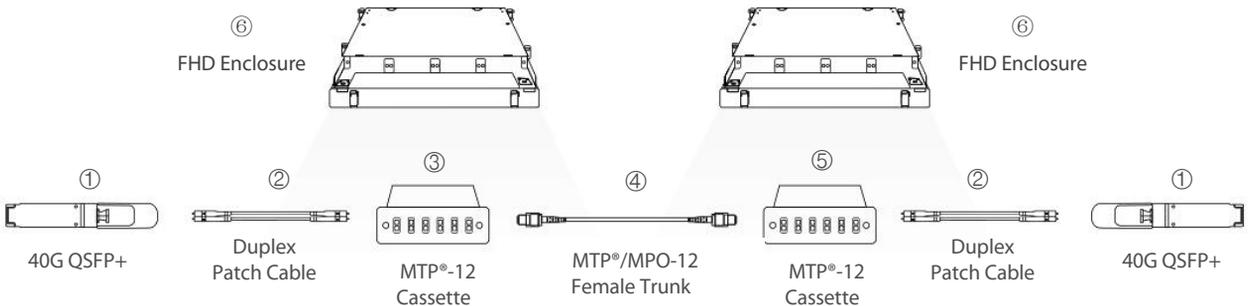


Figure 4: 40G to 40G Inter-connect Cabling with FHD MTP®-12 Cassettes

No.	①	②	③	④	⑤	⑥
Solutions						
<b>Multimode Connectivity</b>						
1	40G BiDi QSFP+ SR	A-to-B	Type A	Type A	Type AF	FHD Enclosure
<b>Single Mode Connectivity</b>						
2	40G QSFP+ LR4*	A-to-B	Type A	Type A	Type AF	FHD Enclosure

Note: \* 40G QSFP+ LRL4 and ER4 transceivers are available for solution 2.

**FHD MTP®-24 Cassettes Connection**

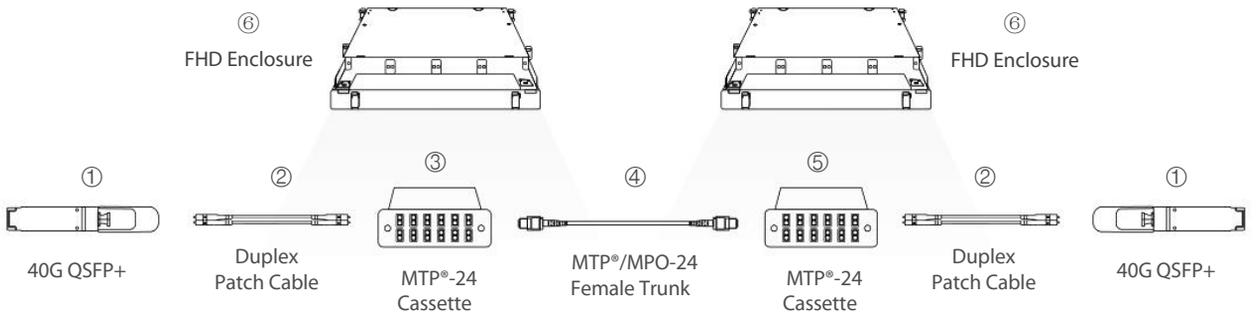


Figure 5: 40G to 40G Inter-connect Cabling with FHD MTP®-24 Cassettes

No.	①	②	③	④	⑤	⑥
Solutions						
<b>Multimode Connectivity</b>						
1	40G BiDi QSFP+ SR	A-to-B	Type A	Type A	Type AF	FHD Enclosure
<b>Single Mode Connectivity</b>						
2	40G QSFP+ LR4	A-to-B	Type A	Type A	Type AF	FHD Enclosure

## 100G to 100G Direct and Inter-connect Solution

This section discusses the products required for 100G to 100G direct and inter-connect solutions. These products include 100G SR4/CFP/PSM4/LR4, fiber optical cables, FHD cable management etc.

### 1. Direct Connectivity

In a direct connectivity, a MTP®/MPO trunk cable directly connects the switch ports. This type of cabling would typically be deployed when the two switch ports that are being connected are within the same row of racks/cabinets, thus a very short distance.



Figure 6: 100G to 100G Direct-connect Cabling Utilizing a Type B MTP®/MPO-12 Trunk

No.	①	②
Solutions		
<b>Multimode Connectivity</b>		
1	100G QSFP28 SR4	Type B
<b>Single Mode Connectivity</b>		
2	100G QSFP28 PSM4	Type B

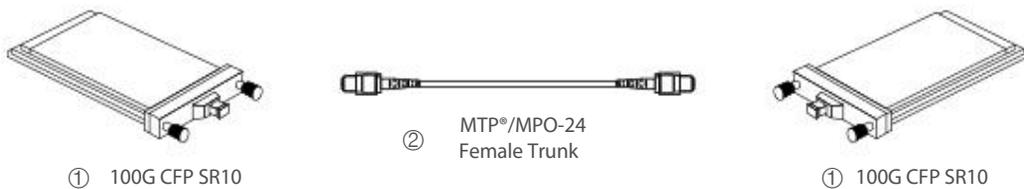


Figure 10: 100G to 100G Direct-connect Cabling Utilizing a Type A MTP®/MPO-24 Trunk

No.	①	②
Solution		
Multimode Connectivity	100G CFP SR10	Type A

Note: This direct connect solution is only for multimode connectivity.

## 2. Inter-connect Connectivity

This part is similar to the 40G to 40G Inter-connect Connectivity part. The inter-connect cabling allows for easier moves, adds, and changes (MACs).

### FHD MTP®-12 Cassettes Connection

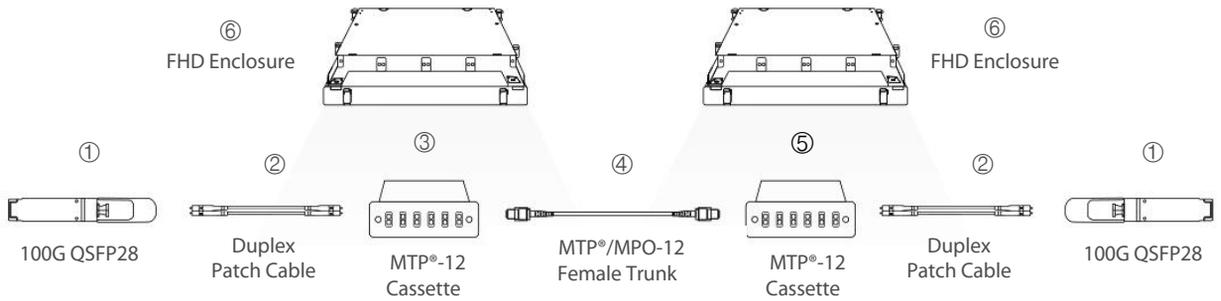


Figure 7: 100G to 100G Inter-connect Cabling with FHD MTP®-12 Cassettes

No.	①	②	③	④	⑤	⑥
Solution						
Single Mode Connectivity*1	100G QSFP28 LR4*2	A-to-B	Type A	Type A	Type AF	FHD Enclosure

Notes:

\*1 This inter-connect solution is only for single mode connectivity.

\*2 100G QSFP28 ER4 transceivers are available for this solution.

### FHD MTP®-24 Cassettes Connection

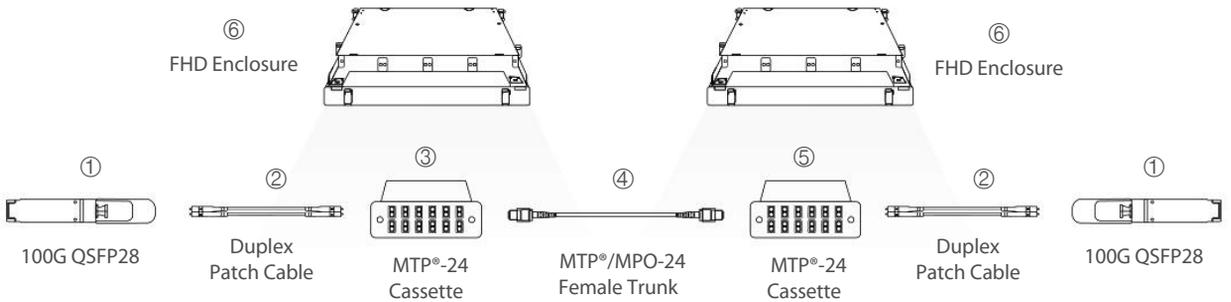


Figure 8: 100G to 100G Inter-connect Cabling with FHD MTP®-24 Cassettes

No.	①	②	③	④	⑤	⑥
Solution						
Single Mode Connectivity*	100G QSFP28 LR4	A-to-B	Type A	Type A	Type AF	FHD Enclosure

Note: \*This inter-connect solution is only for single mode connectivity.

## 10G to 40G Direct and Inter-connect Solution

This section introduces how to migrate from 10G to 40G in direct and inter-connect cabling solutions.

### 1. Direct Connectivity

When directly migrating from 10G to 40G, an 8-fiber LC harness is required. This type of direct connectivity is suggested for short distances within a given row or in the same rack/cabinet.

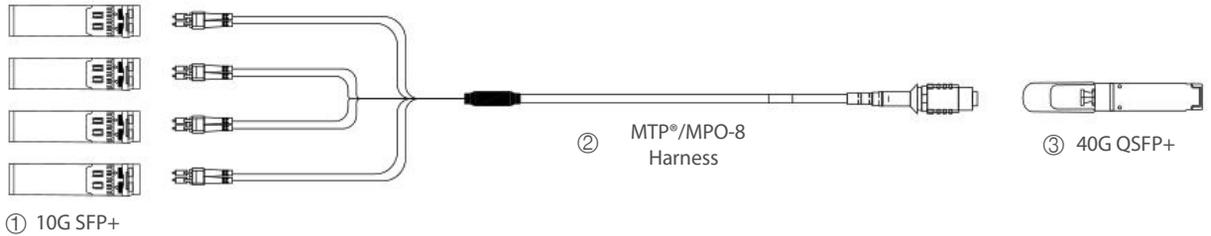


Figure 9: 10G to 40G Direct Connectivity Cabling with an 8-fiber Harness

No.	①	②	③
Solutions			
<b>Multimode Connectivity</b>			
1	10G SFP+ SR	Type B	40G QSFP+ SR4*1
<b>Single Mode Connectivity</b>			
2	10G SFP+ LR	Type B	40G QSFP+ PLR4*2

Notes:

\*1 40G QSFP+ CSR4 transceivers are available for solution 1.

\*2 40G QSFP+ PLRL4 transceivers are available for solution 2.

### 2. Inter-connect Connectivity

Below inter-connect solutions deploy 10G SR/LR, 40G SR4/PLR4, fiber optical cables, FHD cable management etc. They are excellent solutions to port replicate and breakout an 8-fiber transceiver into a 2-fiber patching field.

#### FHD MTP®-8 Cassettes Connection

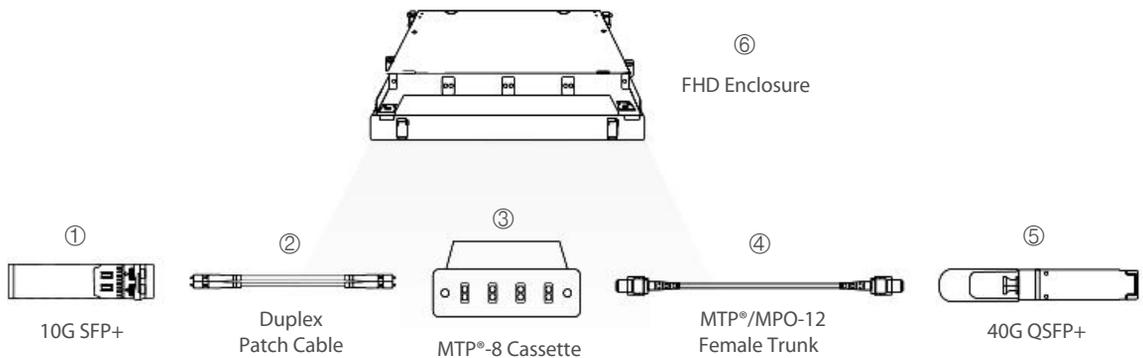


Figure 10: 10G to 40G Inter-connect Connectivity Cabling Utilizing FHD MTP®-8 Cassettes

No.	①	②	③	④	⑤	⑥
Solutions						
<b>Multimode Connectivity</b>						
1	10G SFP+ SR	A-to-B	MTP®-8 Cassette	Type B	40G QSFP+ SR4	FHD Enclosure
<b>Single Mode Connectivity</b>						
2	10G SFP+ LR	A-to-B	MTP®-8 Cassette	Type B	40G QSFP+ PLR4	FHD Enclosure

**FHU MTP®-8 Breakout Patch Panel Connection**



Figure 11: 10G to 40G Inter-connect Connectivity Cabling Utilizing FHU MTP®-8 Breakout Patch Panel

No.	①	②	③	④	⑤
Solutions					
<b>Multimode Connectivity</b>					
1	10G SFP+ SR	A-to-B	MTP®-8 Patch Panel*	Type B	40G QSFP+ SR4
<b>Single Mode Connectivity</b>					
2	10G SFP+ LR	A-to-B	MTP®-8 Patch Panel	Type B	40G QSFP+ PLR4

Note: \*FHU MTP®-8 breakout patch panels and uniboot patch cables are deployed for high density applications.

## 25G to 100G Direct and Inter-connect Solution

This section is similar to the previous section, but instead of discussing 10G to 40G migration, it will discuss the direct and inter-connect connectivity between 100G transceivers and 25G transceivers.

### 1. Direct Connectivity

When directly connecting an 8-fiber transceiver to the four corresponding duplex ports, an 8-fiber LC harness is required. This type of direct connectivity is suggested for short distances within a given row or in the same rack/cabinet.

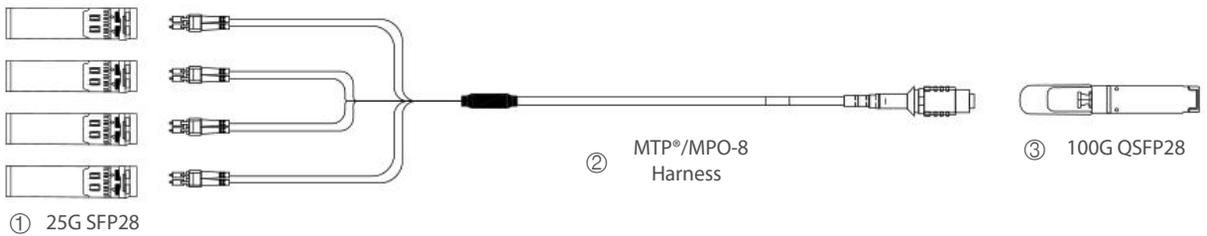


Figure 12: 25G to 100G Direct Connectivity Cabling with an 8-fiber Harness

No.	①	②	③
Solutions			
<b>Multimode Connectivity</b>			
1	25G SFP28 SR	Type B	100G QSFP28 SR4
<b>Single Mode Connectivity</b>			
2	25G SFP28 LR	Type B	100G QSFP28 PSM4

### 2. Inter-connect Connectivity

Below inter-connect connectivity solutions work best when the active equipment is within the same row and are excellent solutions to port replicate and breakout an 8-fiber transceiver to a 2-fiber patching field.

#### FHD MTP®-8 Cassettes Connection

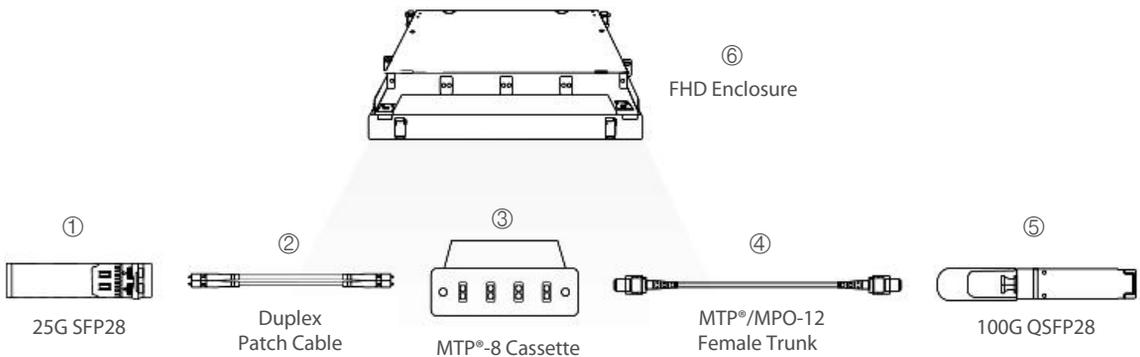


Figure 13: 25G to 100G Inter-connect Connectivity Cabling Utilizing FHD MTP®-8 Cassettes

No.	①	②	③	④	⑤	⑥
Solutions						
<b>Multimode Connectivity</b>						
1	25G SFP28 SR	A-to-B	MTP®-8 Cassette	Type B	100G QSFP28 SR4	FHD Enclosure
<b>Single Mode Connectivity</b>						
2	25G SFP28 LR	A-to-B	MTP®-8 Cassette	Type B	100G QSFP28 PSM4	FHD Enclosure

**FHU MTP®-8 Breakout Patch Panel Connection**



Figure 14: 25G to 100G Inter-connect Connectivity Cabling Utilizing FHU MTP®-8 Breakout Patch Panel

No.	①	②	③	④	⑤
Solutions					
<b>Multimode Connectivity</b>					
1	25G SFP28 SR	A-to-B	MTP®-8 Patch Panel	Type B	100G QSFP28 SR4
<b>Single Mode Connectivity</b>					
2	25G SFP28 LR	A-to-B	MTP®-8 Patch Panel	Type B	100G QSFP28 PSM4

## 10G to 100G Direct Connect Solution

### Direct Connectivity

When directly connecting a 20-fiber transceiver to ten corresponding duplex ports, a 20-fiber LC harness can be used. This type of direct connectivity is suggested for short distances where the SFP+ ports are all in the same or adjacent cabinet.

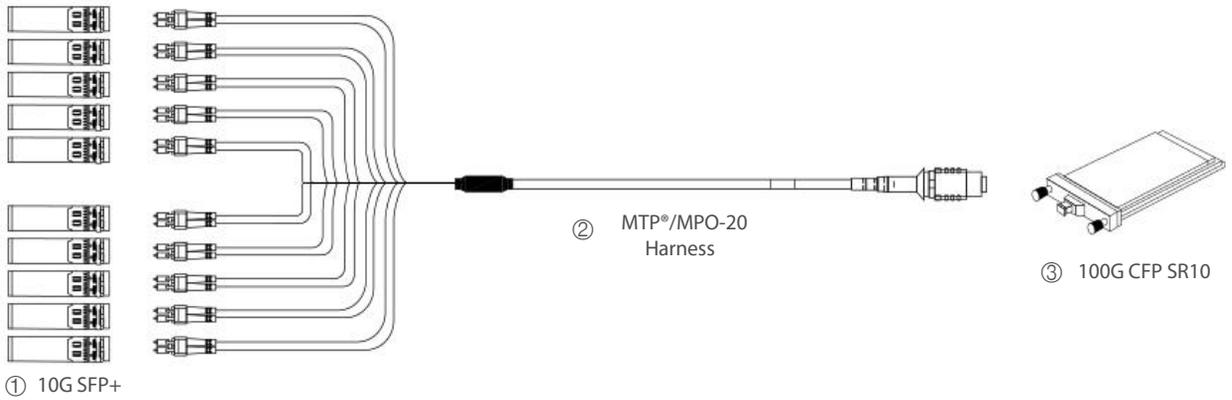


Figure 15: 10G to 100G Direct Connectivity Cabling with a 20-fiber Harness

No.	①	②	③
Solution			
Multimode Connectivity	10G SFP+ SR	Type C	100G CFP SR10



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