

EXCELERATOR

MTP Optical Fibre Configurations

excel
without compromise.

Background

The Excelerator MPO range from Excel utilises the MTP Elite connector manufactured by US Conec. The range is made up of:

- MTP to MTP Trunk Cables
- MTP to LC Cassettes
- MTP Cassette Patch Panels
- MTP Through Coupler Panels
- MTP to LC Fan Out Cables
- MTP Patch Leads

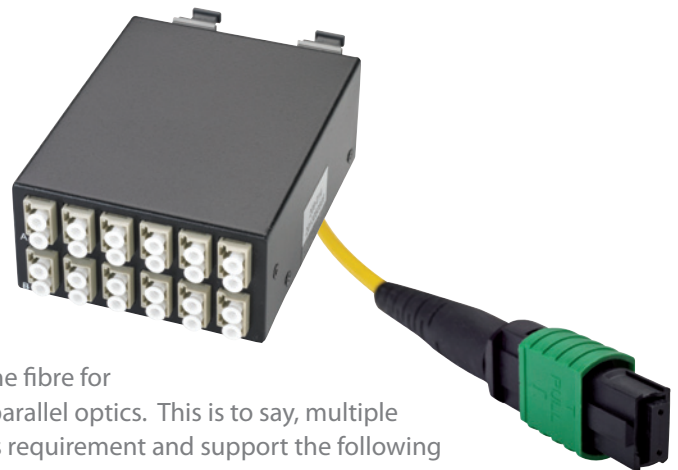
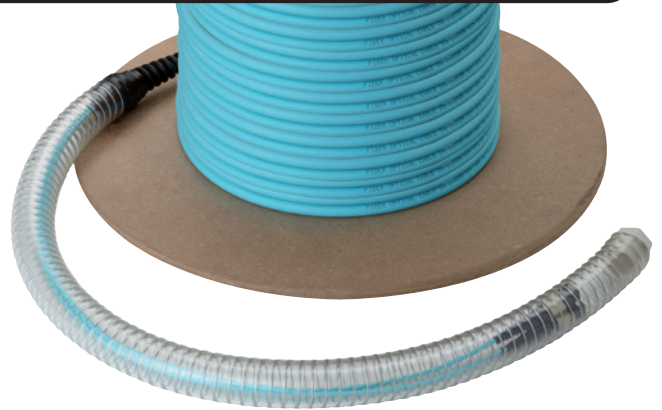
The MTP is a multi-fibre connector with the most popular accepting 12 cores. The connector was developed many years ago, primarily for use in pre-terminated systems. The pre-terminated systems allow fibre to be deployed and connected without the need for onsite termination. More recently the MTP (and the generic MPO connector) has been identified as the method of delivering parallel optic systems.

Over multimode fibre, up to and including 10 Gigabit Ethernet, duplex configuration has been used (2 fibre). One fibre for Transmit (Tx) and one fibre for Receive (Rx). New Ethernet applications over multimode fibre will use parallel optics. This is to say, multiple fibres for transmit and receive. The MTP, having 12 cores, will satisfy this requirement and support the following emerging Ethernet applications.

- 40GBASE-SR4 – 40 Gigabit Ethernet – 4 fibres transmit & 4 fibres receive
 - 1 qty 12 Core MTP Connector
- 100GBASE-SR10 – 100 Gigabit Ethernet – 10 fibres transmit & 10 fibres receive
 - 2 qty 12 Core MTP Connector
 - or
 - 1 qty 24 Core MTP Connector
- 100GBASE-SR4 – 100 Gigabit Ethernet – 4 fibres transmit & 4 fibres receive
 - 1 qty 12 Core MTP Connector

The MTP connector is “keyed”. A keyed connector is made in such a way that ensures that the orientation is determined by product design, and not by the user (much like the RJ45 plug and socket). i.e. it can only correctly be inserted into the adapter or connector one way up. MTP adapters are made in two versions – “aligned” or “non-aligned”. The aligned is sometime referred to as “Key Up to Key Up” and the un-aligned as “Key Up to Key Down”.

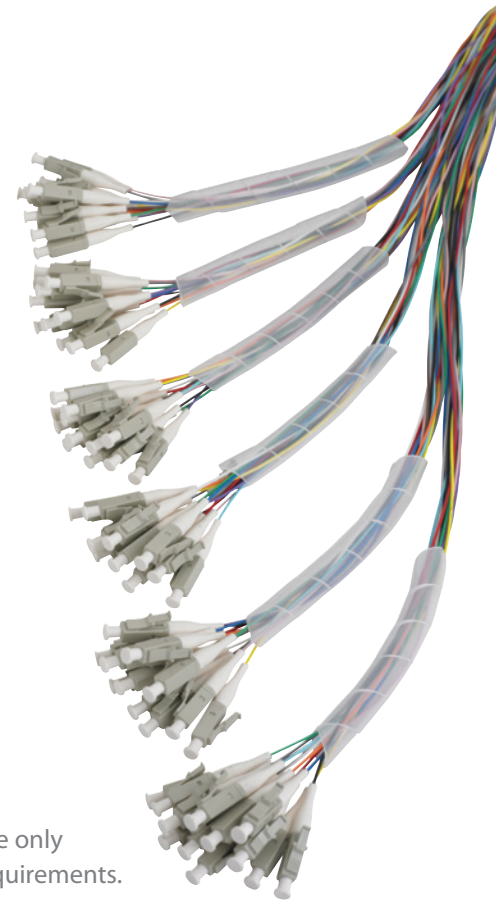
Furthermore, MTP connectors are either made with pins (Male versions) or without pins (Female versions). It is critical that a pinned MTP and unpinned MTP are used as a mated pair to ensure fibre core alignment. If this is not maintained and two unpinned MTP connectors are connected in the adapter you will find that excessive losses are experienced as the alignment is not secured. The loss measurement is also liable to change over time. Conversely, if two pinned connectors are connected they are liable to damage the end faces of the connector.



The Choices of System

When configuring an MTP system a number of design options should be considered for both Duplex and Parallel optics connectivity:

- Adapters – Options
 - Aligned Keys
 - Unaligned Keys
- MTP Pins – Options (specify within)
 - Trunk Cables
 - Cassettes / Fan Out Cable
 - MTP Patch Cords
- Trunk Cables – Options
 - Straight through
 - Cross over
- Cassettes / Fan Out Cables – Options
 - Internal configuration
 - Same cassette at each end or different



The different Standards bodies make different suggestions. It should be noted that these are only suggestions and it is up to the client (or their representative) to specify the configuration requirements.

The EN (published by CENELEC) and the ISO (International) standards make one suggestion for the Parallel and one for Duplex optics. They do not suggest which side of the MTP should be pinned.

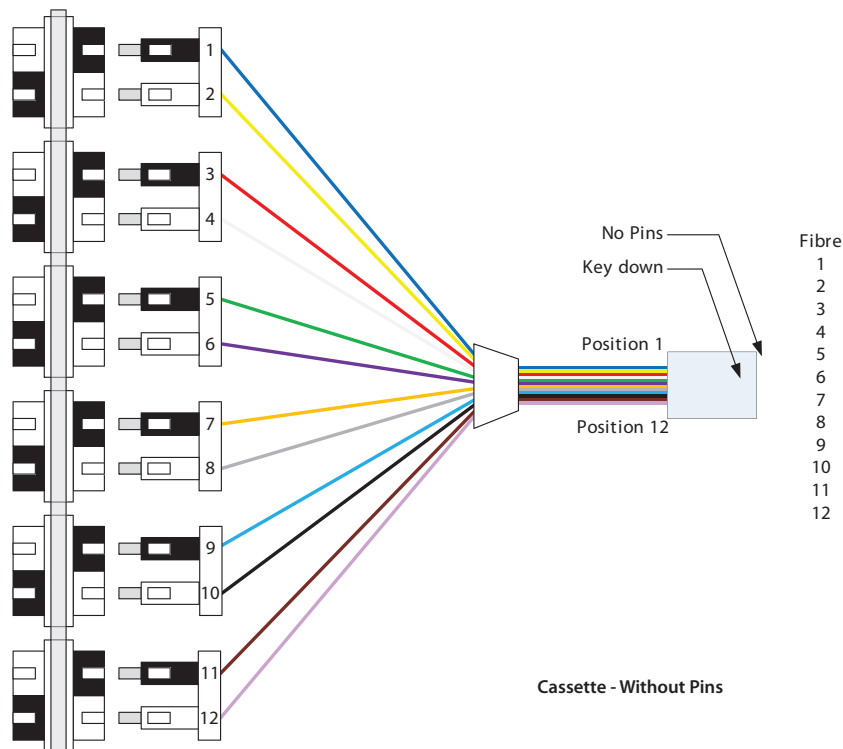
The TIA (American) shows 3 different Methods (A, B & C) for each of the Duplex and Parallel optics. They do specify where the pins are fitted in the MTP. However, this is different between the Trunk Cables used in the Duplex and Parallel optics. So following the TIA standards results in various different components that need to be manufactured to satisfy the various options.

What is generally accepted is that it is good practice for Patch/Equipment Cords to be unpinned to reduce the risk of damage during operation. Also, equipment is pinned. Hence, for parallel optics, the MTP Patch Cord is unpinned.

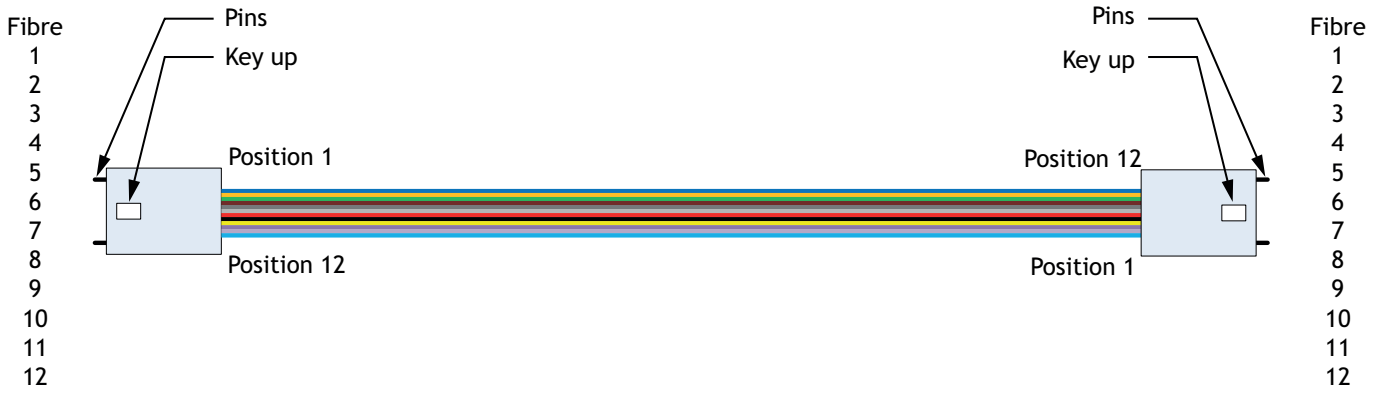
The Excelerator Choice

In order to offer maximum choice across what we have discussed is a very wide range of product design options, Excelerator from Excel offers an approach to meet customer needs. This is based on a standard configuration that matches the ISO & EN standards that suggests one configuration.

Cassette

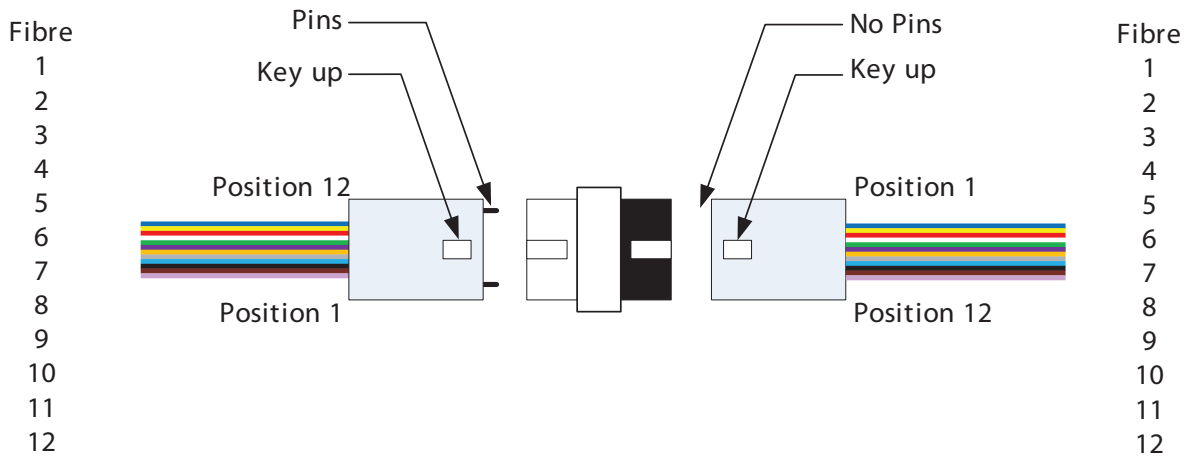


Trunk Cable



Trunk Cable - With Pins

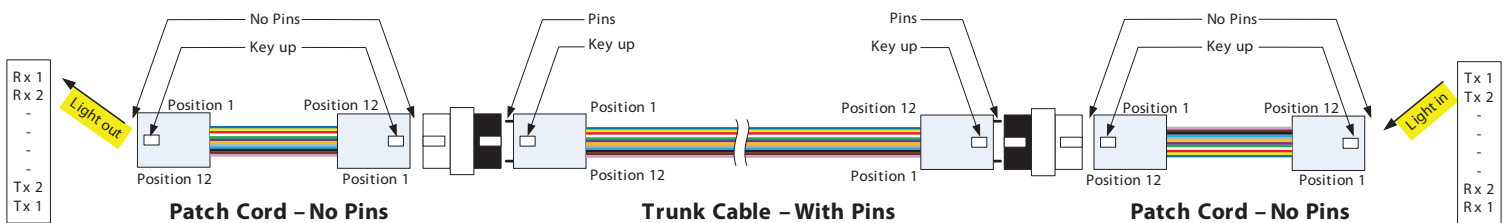
Coupler



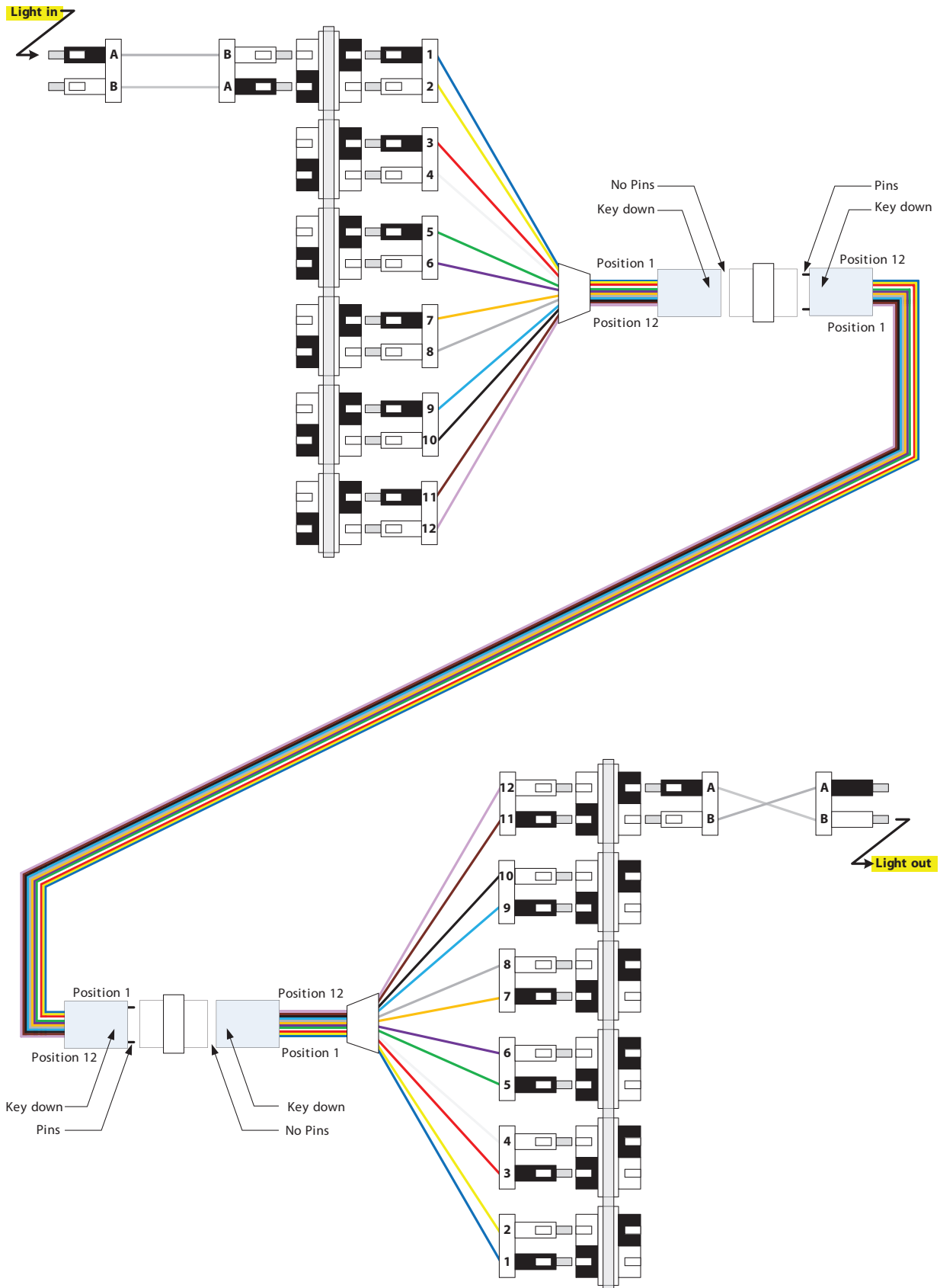
Coupler (part of Cassette) - Key Up to Key Up

Using these components results in an Array and Duplex Fibre Optic channel that matches the EN & ISO and is a version of TIA Method B.

Array Channel



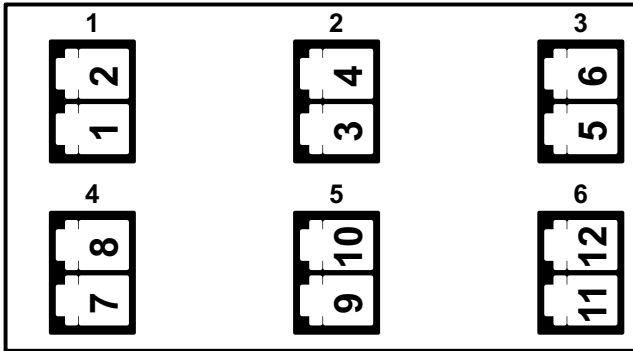
Duplex Channel



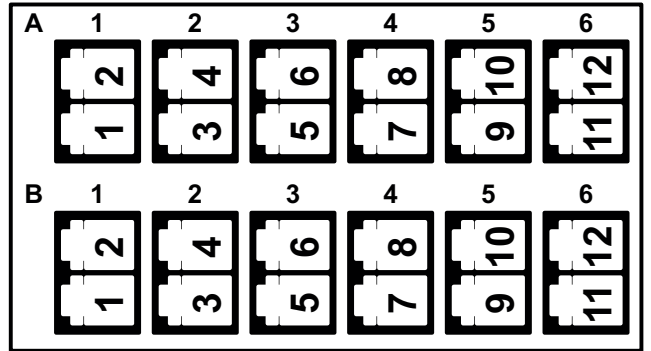
Connecting the standard Excelerator products will achieve this connectivity. However, Excel recognises that clients wish to have the option. For simplicity Excelerator has standardised on the suggested configuration detailed in EN 50174-2 standard as shown above. ISO 11801 follows this configuration. However the American, ANSI/TIA-568-C standard, details three configurations. Excelerator is able to offer modified cassettes to achieve the "Light In / Light Out" performance of the various configurations listed in the standards. Please note that it is the "Light In / Light Out" that is matched, and not all of the component connection methodology. Should further "Light In / Light Out" arrangements be required, please contact the Excel Distributor.

The cassettes are available in two sizes:

12 Core – 6 Port (1 x 12 core MTP Connector)



24 Core – 12 Port (2 x 12 core MTP Connectors)

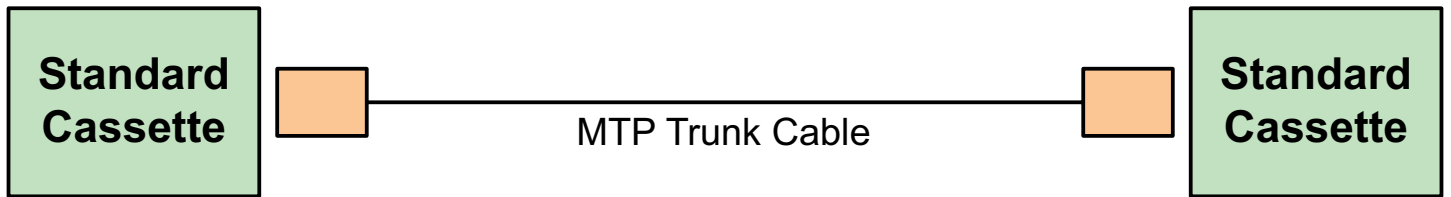


Standard

Using a standard cassette at each end of the trunk cable will achieve the following configurations:

- EN 50174-1
- ISO/IEC 14763-2
- ANSI/TIA-568-C Method B (modified)*

* This configuration matches the LC connectors inside of the cassettes in Method B, relabeling of ONE of the cassettes is required to match this exactly.



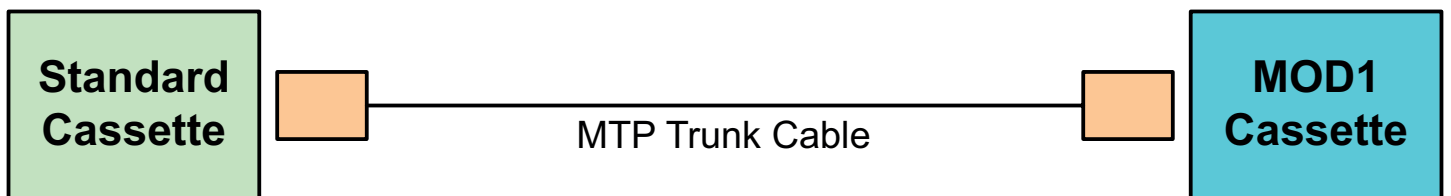
Fibre Core Connectivity

Light In	1	2	3	4	5	6	7	8	9	10	11	12
Light Out	12	11	10	9	8	7	6	5	4	3	2	1

Modification 1

Using a Standard Cassette at one end of the trunk cable, and a MOD1 Cassette at the other will achieve the following configuration:

- ANSI/TIA-568-C Method A



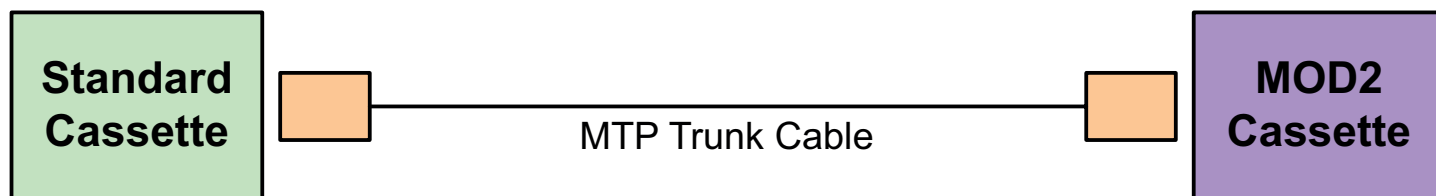
Fibre Core Connectivity

Light In	1	2	3	4	5	6	7	8	9	10	11	12
Light Out	1	2	3	4	5	6	7	8	9	10	11	12

Modification 2

Using a Standard Cassette at one end of the trunk cable, and a MOD2 Cassette at the other will achieve the following configuration:

- ANSI/TIA-568-C Method C



Fibre Core Connectivity

Light In	1	2	3	4	5	6	7	8	9	10	11	12
Light Out	2	1	4	3	6	5	8	7	10	9	12	11

To order a Modified Cassette, simply add **MOD1** or **MOD2** to the cassette.

Part Numbers

Cassette	Standard	Modification 1	Modification 2
High Density OM3 MTP Fibre Cassette 6 Duplex LC (12 Core)	208-011	208-011-MOD1	208-011-MOD2
High Density OM3 MTP Fibre Cassette 12 Duplex LC (24 Core)	208-012	208-012-MOD1	208-012-MOD2
High Density OM4 MTP Fibre Cassette 6 Duplex LC (12 Core)	208-013	208-013-MOD1	208-013-MOD2
High Density OM4 MTP Fibre Cassette 12 Duplex LC (24 Core)	208-014	208-014-MOD1	208-014-MOD2
High Density OS2 MTP Fibre Cassette 6 Duplex LC (12 Core)	208-015	208-015-MOD1	208-015-MOD2
High Density OS2 MTP Fibre Cassette 12 Duplex LC (24 Core)	208-016	208-016-MOD1	208-016-MOD2

In conclusion, these options developed offers clients with the flexibility to install a system to suite their needs.

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