

# FlexNAP System Component Polarity

## AEN111, Revision 2

The purpose of this Applications Note is to describe the fiber construction scheme and polarity in the Corning Optical Communications FlexNAP Distribution System. It is important for the user to understand how these products are configured to manage this system effectively.

This document will cover the following topics:

1. FlexNAP System Components.
2. Component construction scheme and polarity.
3. Mating OptiTip connectors.

## FlexNAP System Components

Diagram 1a outlines the components in the FlexNAP system.

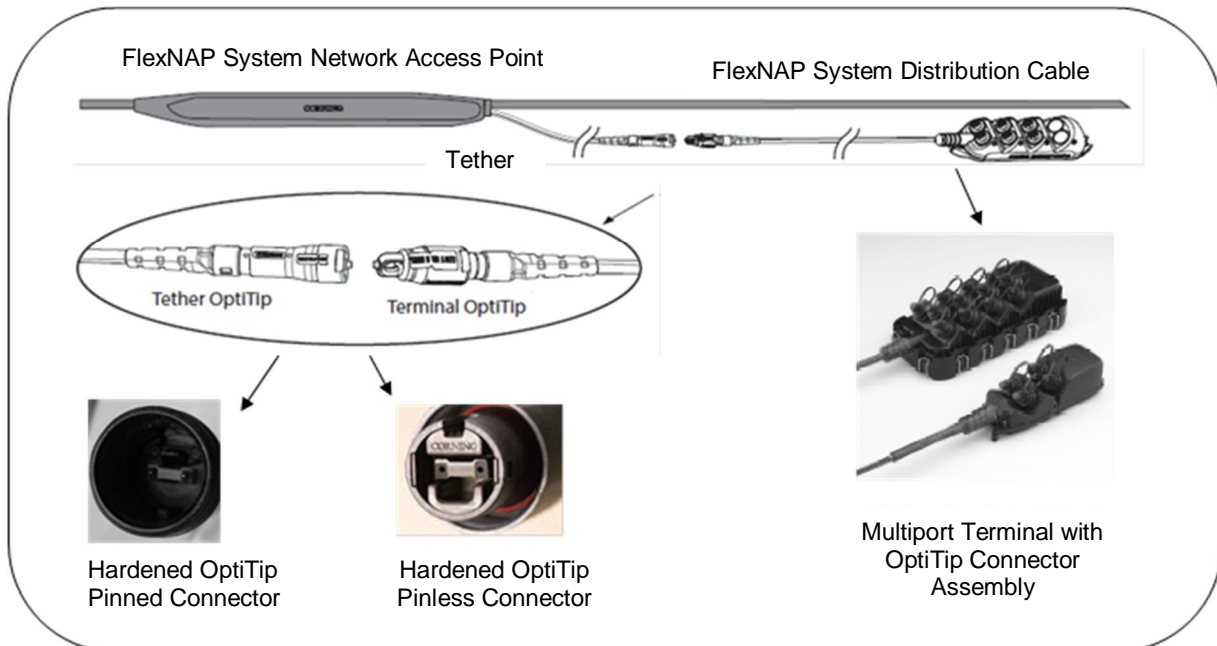


Diagram – 1a

## OptiTip Description

The key to the FlexNAP solution set is the OptiTip connector. The OptiTip connector is an environmentally hardened multi-fiber connector designed to meet the applicable performance criteria of GR-3152, IP68, and IP69k. Available in fiber counts of 2, 4, 6, 8, and 12, the OptiTip connector is used for termination of Distribution Trunk Tethers, Direct Trunks, and Direct Harness Assemblies.

The single-mode OptiTip connector has an 8° angled end face, while the multimode OptiTip connector has a flat end face. The connector housings are keyed to ensure proper connector mating and fiber orientation. The precise connector alignment is achieved via two alignment pins located in the “pinned” OptiTip connector. The OptiTip connector is always mated key-up to key-down with the blue fiber to the left of the connector ferrule when looking at the connector endface in the key-up position.



Diagram – 1b

The Pinned OptiTip Connector can be found on the end of Extender Trunks, Harness Assemblies, and Distribution Trunk Tethers.

The Pinless OptiTip Connector can be found on the end of Direct Trunks, Multiport Terminals, Extender Trunks, and Façade Flexnap Tethers.

## Hardened MT Connector Components

The Single-mode MT connector has an angled end face, which creates the connector “Key”. When the connectors are mated “key up” to “key down” (shown in diagram 2a) polarity is ensured since the fiber (color) position scheme is always the same relative to the “Key”. The MT connector housings are also keyed to ensure proper connector mating relative to the connector angle. Connector alignment is achieved through the two alignment pins located in the Tether (pinned) connector.

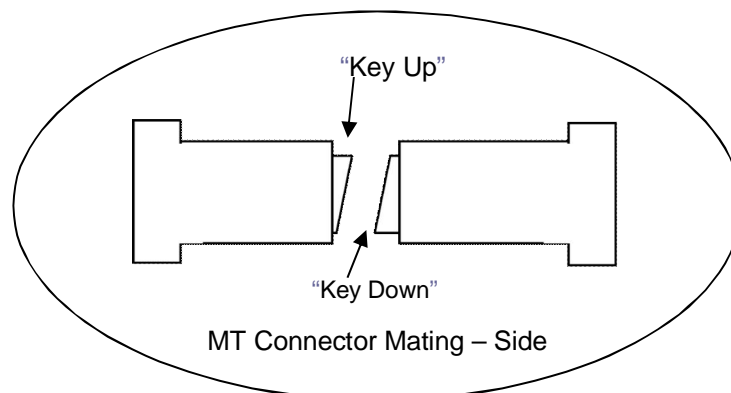


Diagram – 2a

Diagram 2b shows how to identify the fiber positions in the MT connector used in the OptiTips. Later sections outline how to define active fibers and the fiber location for each fiber count OptiTip / Terminal.

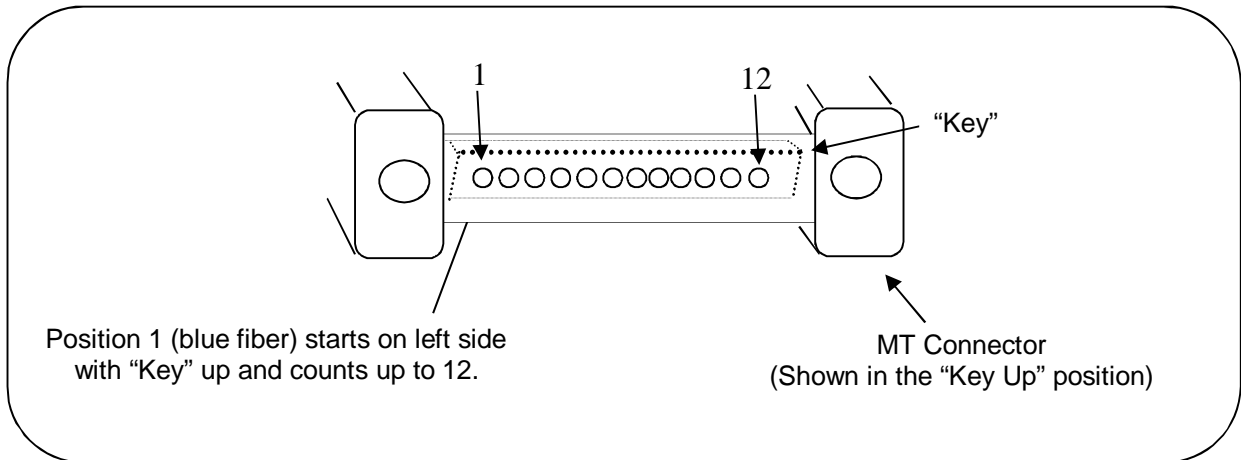


Diagram – 2b

Diagram 2c below shows the orientation of the MT connector inside the Tether (pinned) and Terminal (pinless). Alignment pins are located in the MT connector installed on the Tether.

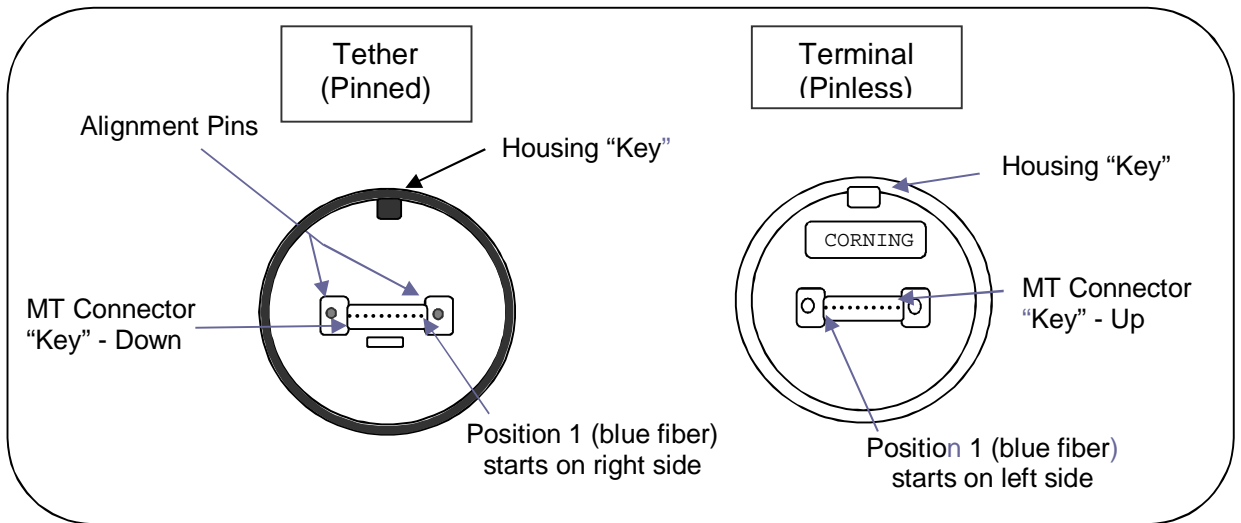


Diagram – 2c

## Active Fiber Positions and Color Codes for OptiTip Connectors

All OptiTip systems are designed with 1:1 or straight through polarity. OptiTip connectors follow a “Center Out” fiber position schematic. The fiber positions for standard OptiTip connectors can be seen in Table 1 below. Standard OptiTip connectors can be found in Distribution Trunks, Direct Trunks, Direct Harnesses, and Terminals.

Position	Fiber Count				
	2	4	6	8	12
1	No Fiber				Active
2					Active
3					Active
4					Active
5					Active
6	Active	Active	Active	Active	Active
7	Active	Active	Active	Active	Active
8	No Fiber				Active
9					Active
10					Active
11					Active
12					Active

Table 1 – Standard OptiTip Polarity

Façade Flexnap solutions offer a non-standard fiber position schematic to properly mate up with indoor MT cable assemblies. The fiber position for the OptiTip connector on Façade Flexnap Trunks can be found in Table 2 below.

Position	Fiber Count		
	4	8	12
1	Active	Active	Active
2	Active	Active	Active
3	Active	Active	Active
4	Active	Active	Active
5	No Fiber		Active
6			Active
7			Active
8			Active
9			Active
10	No Fiber		Active
11			Active
12			Active

Table 2 – Façade Flexnap Polarity

## OptiTip and Terminal Cabled Fibers

This section outlines how each cable is “wired” for each fiber count. OptiTip and Terminal stub cables less than twenty (20) feet contain all 12 fibers in the standard color code configuration. Terminal stub cables and OptiTip cables twenty (20) feet or greater in length have the exact number of fibers in the standard color code configuration. The OptiTip connector always has 12 fibers inserted in the connector. The fibers that are actually used to transmit the signal (active fibers) depend on OptiTip / Terminal stub fiber count; see tables below. The position of the fibers within the MT connector is detailed in the section above. For more information, see the fiber schematics in Appendix A.

Fiber Position in OptiTip	Fiber Order in Cable Stub				
	2F	4F	6F	8F	12F
1					Active - 1
2					Active - 2
3				Active - 1	Active - 3
4			Active - 1	Active - 2	Active - 4
5		Active - 1	Active - 2	Active - 3	Active - 5
6	Active - 1	Active - 2	Active - 3	Active - 4	Active - 6
7	Active - 2	Active - 3	Active - 4	Active - 5	Active - 7
8	Active - 4		Active - 5	Active - 6	Active - 8
9			Active - 6	Active - 7	Active - 9
10				Active - 8	Active - 10
11					Active - 11
12					Active - 12

Table 3 – OptiTip Assemblies < 20 ft.

Fiber Position in OptiTip	Fiber Order in Cable Stub				
	2F	4F	6F	8F	12F
1	No Fiber				1
2	No Fiber				2
3	No Fiber			1	3
4	No Fiber		1	2	4
5		1	2	3	5
6	1	2	3	4	6
7	2	3	4	5	7
8	No Fiber		4	5	6
9	No Fiber			6	7
10	No Fiber				8
11	No Fiber				11
12	No Fiber				12

Table 4 – OptiTip Assemblies ≥ 20 ft

Fiber Position in OptiTip	Fiber Position in Terminal				
	2 Port	4 Port	6 Port	8 Port	12 Port
1					1
2					2
3				1	3
4			1	2	4
5		1	2	3	5
6	1	2	3	4	6
7	2	3	4	5	7
8	4		5	6	8
9			6	7	9
10				8	10
11					11
12					12

Table 5 – Terminal w/ OptiTip < 20 ft

Fiber Position in OptiTip	Fiber Position in Terminal				
	2 Port	4 Port	6 Port	8 Port	12 Port
1	No Fiber				1
2	No Fiber				2
3	No Fiber			1	3
4	No Fiber		1	2	4
5		1	2	3	5
6	1	2	3	4	6
7	2	3	4	5	7
8	No Fiber		4	5	6
9	No Fiber			6	7
10	No Fiber				8
11	No Fiber				11
12	No Fiber				12

Table 6 – Terminal w/ OptiTip ≥ 20 ft

## Mating OptiTip Connectors

OptiTip connectors have the ability to be mated together without the use of an adapter/coupler panel. The key and alignment pins within the Pinned (Tether) connector allow proper mating between it and the Pinless (Terminal) connector.

As shown in Diagram 3a, to mate the OptiTip connectors together, the keys must be aligned

and the Pinless (Terminal) connector inserted the into the Pinned (Tether) connector. Once aligned, the coupling nut on the Pinless (Terminal) connector should be threaded until hand tight.

**Note:** Consult the SRP for the particular product in use to ensure proper routing and mounting procedures.

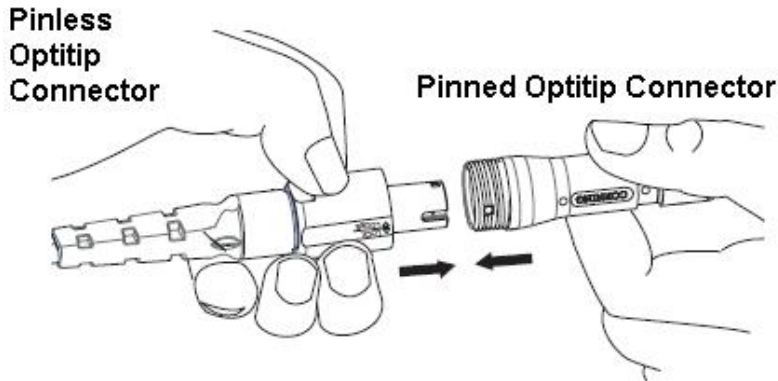


Diagram - 3a

The OptiTip can also be mounted to a standard MT connector found in many pieces of hardware. When using an OptiTip to MT adapter, ensure that the proper connectors are being used. The MT connector must be a pinned version and the OptiTip connector must be the Pinless (Terminal) connector. The MT connector is typically already installed, so the process to insert an MT into the adapter will not be covered.

As shown in Diagram 3b, to mate the Pinless (Terminal) connector to a pinned MT, the key on the Pinless (Terminal) connector is aligned and inserted into the OptiTip adapter. Once aligned and inserted, the coupling nut on the Pinless (Terminal) connector should be threaded until hand tight.

**Note:** Consult the SRP for the particular product in use to ensure proper routing and mounting procedures.

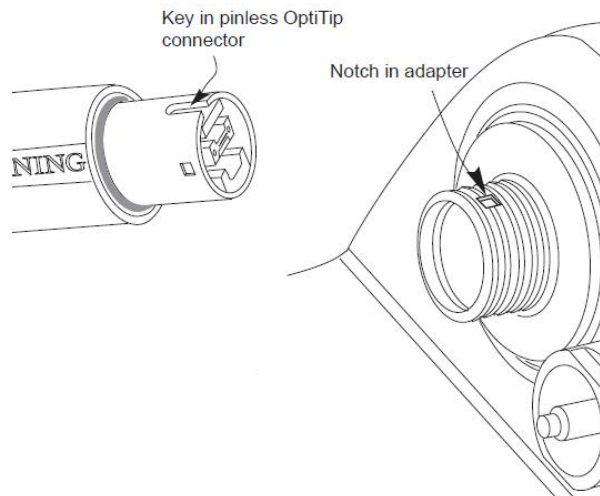
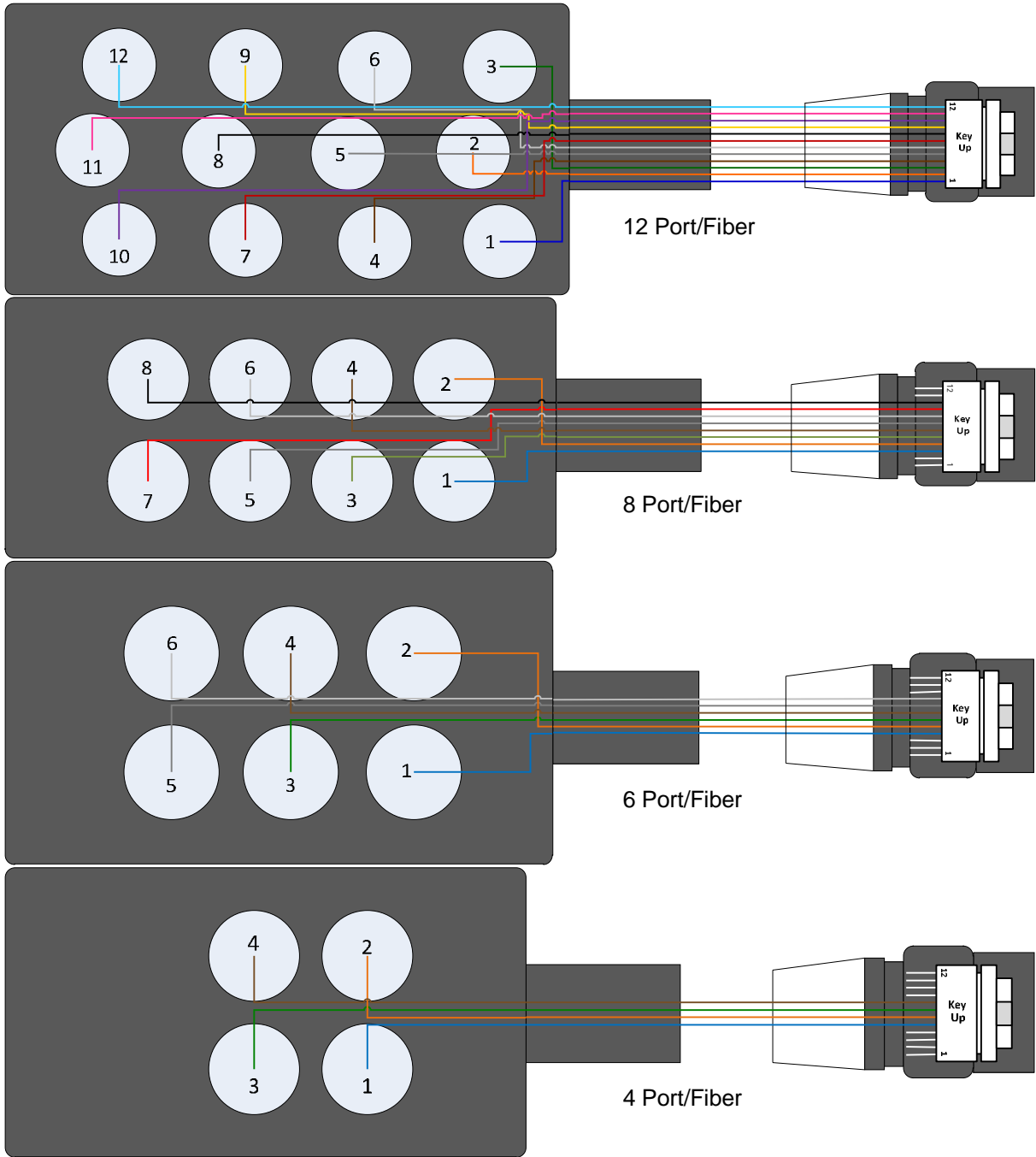


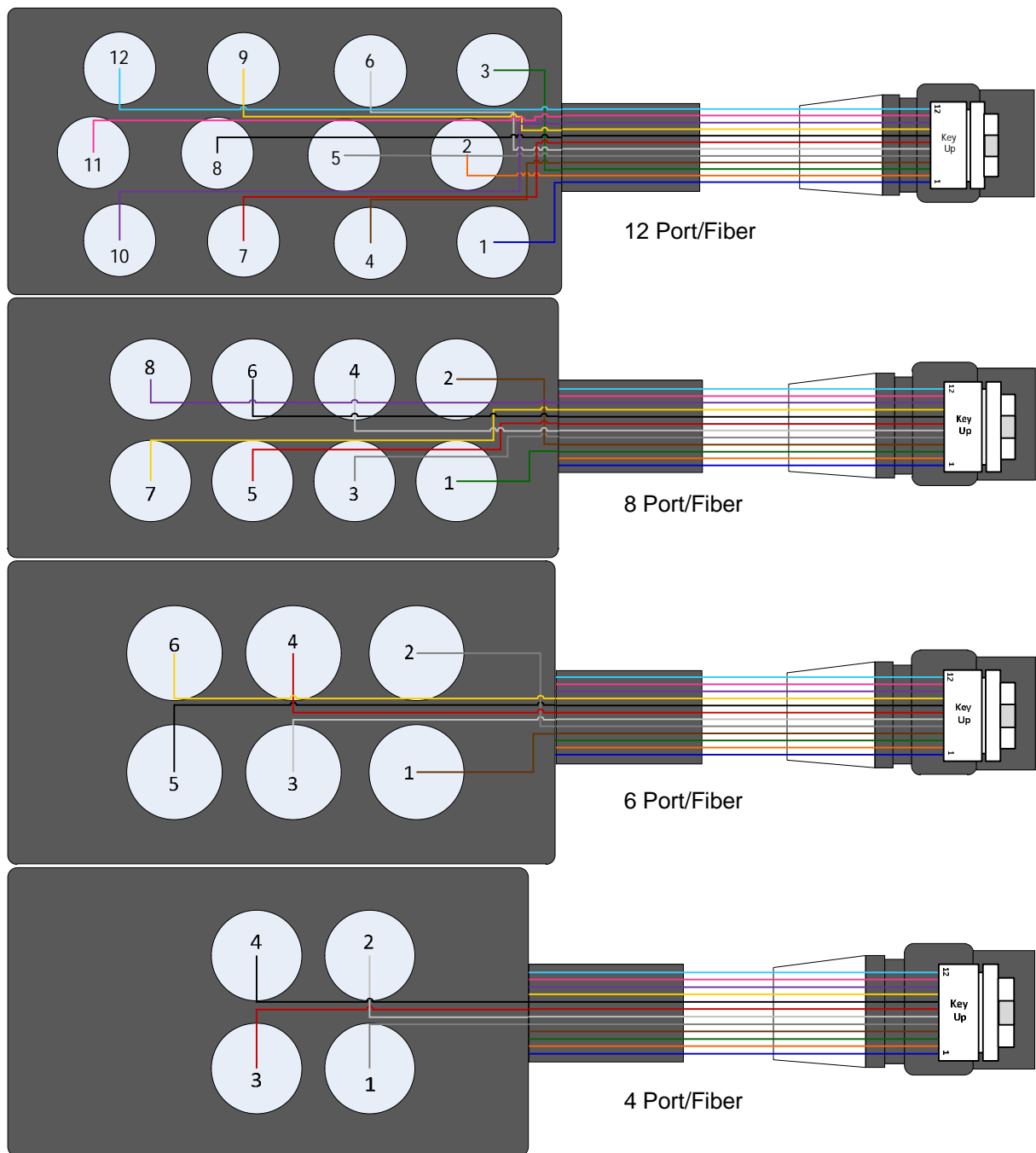
Diagram - 3b

# Appendix A

Terminals with OptiTip connectors and cable stubs  $\geq 20$  ft.

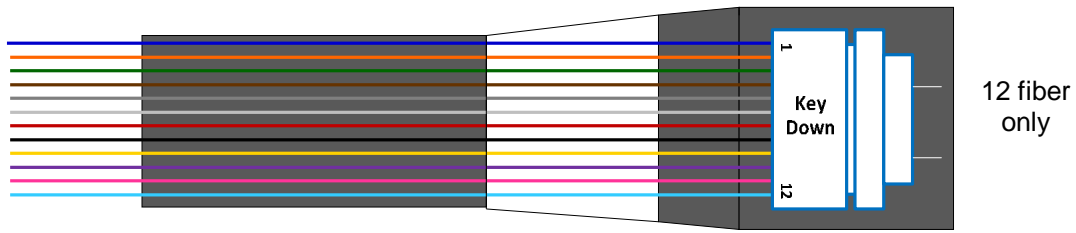


Terminals with OptiTip connectors and cable stubs < 20 ft.





Pinned OptiTip connectors with cable stubs (Tethers) < 20 ft.



Pinned OptiTip connectors with cable stubs (Tethers) ≥ 20 ft.

