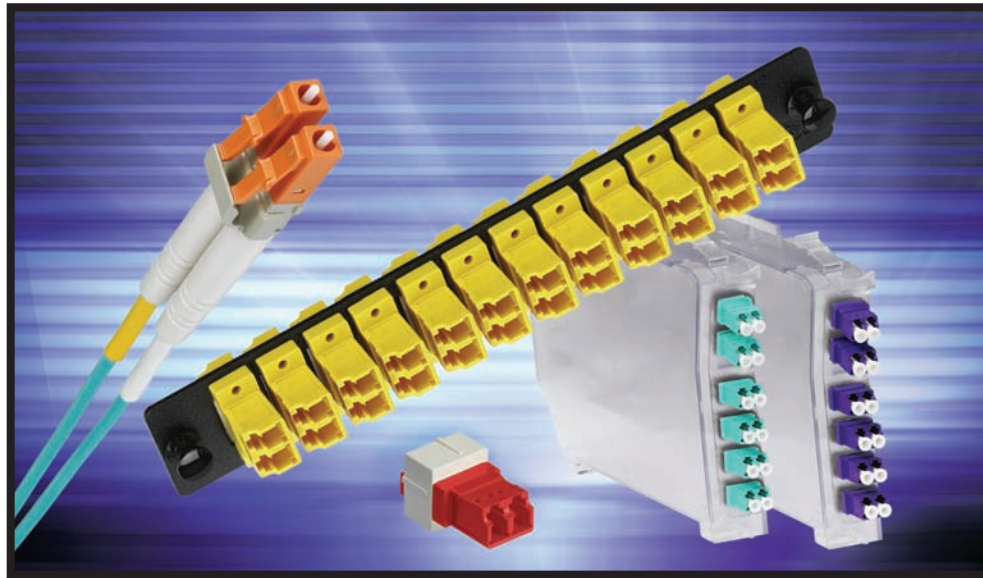


NP 275

**Belden FiberExpress Secure/Keyed LC System**

Belden's Patented Secure/Keyed system is a family of specially-keyed and color-coded optical fiber connectivity components that have been designed to meet today's stringent network security requirements. This system allows for the physical segregation of various network segments in an infrastructure.



**Belden's FiberExpress Secure/Keyed LC System is an Easy-to-Install, Flexible Network System That Enables Multiple Levels of Infrastructure Security**

In recent years, physically discrete fiber connection systems have emerged in response to a demand for infrastructure security, propelled by Homeland Security considerations and a number of new business regulations such as Sarbanes-Oxley and HIPPA. While security in the network can be improved with sophisticated software tools, it is imperative that the right decisions be made in the early stage of the infrastructure design in order to protect the ever-increasing amount of sensitive data being exchanged over today's networks.

**The Small Form Factor Decision**

Today's secure networks typically use a fiber-to-the-desk topology, incorporating multi-mode fiber and offering 1 Gb/s capacity in the horizontal and 10 Gb/s in the backbone. All physically discrete connector systems are based on Small Form Factor (SFF) formats, which offer twice the density of an SC connector. Some SFF connectors have been based on a proprietary connector format, while others have been based on the MT-RJ design. Belden has designed its secure fiber connector system based on LC technology because of its proven high performance, reliability and ruggedness for applications requiring 1 Gb/s or more. In comparison to the MT-RJ design, the LC Duplex format also delivers:

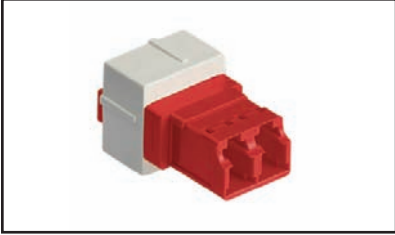
- Better Insertion Loss and Return Loss characteristics

- Easier cleaning capability – which protects optical performance over time
- Design flexibility – since two simplex connectors are attached together with a clip, they can be easily un-assembled to reverse patch cord polarity
- Field installation – LC connectors can be field-installed on any cable construction using the same, proven field-installation method as SC and ST-compatible connectors
- LC is the only SFF connector that can be used with XFP (next generation) optical transceivers.

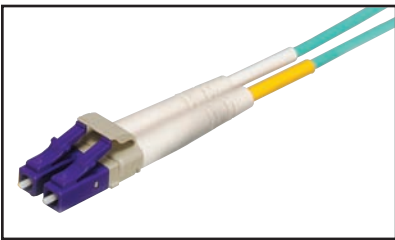
**The Belden Secure/Keyed System Offering**

The FiberExpress Secure/Keyed LC System is a patented, Small Form Factor (SFF) connection system that exceeds all industry standards for optical performance and complies with the FOCIS 10 standard. The Belden system also exhibits the following attributes:

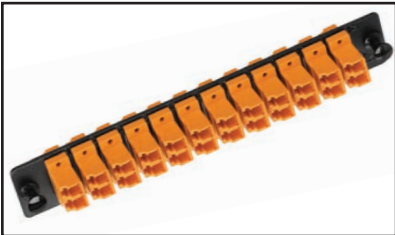
- Twelve physically discreet, color-coded keying options – allows for design flexibility and facilitate network administration
- Tamper-resistant key design – prevents intruders' access and the design cannot be reproduced inside a standard LC connector



Secure/Keyed LC Duplex Adapter Module



Secure/Keyed LC Duplex Patch Cord



Secure/Keyed LC Adapter Strip



Secure/Keyed LC Manager Module



Secure/Keyed LC Optimax Connector

- High-quality ceramic ferrule – provides low insertion loss and excellent durability
- High-density SFF connectors with removable clip – allows for polarity reversal
- Available in multimode 62.5  $\mu\text{m}$ , 50  $\mu\text{m}$  and 50  $\mu\text{m}$  laser-optimized – ready for high-performance networks
- Offered in KEYx-KEYx and hybrid configurations (KEYx-LC and KEYx-SC) – allows interface with network equipment
- Offered in LC simplex 900  $\mu\text{m}$  pigtailed – allows for fusion splicing.

### Component Overview

The Secure/Keyed LC Duplex Adapter Modules are offered in both MDVO and Keystone styles. The keying detail inside the modules makes them tamper-resistant, plus the keying detail cannot be reproduced inside a standard LC adapter. They are keyed on both the front and back to prevent installation errors and avoid a possible security breach. The high-quality construction of these Modules includes a high-quality phosphor-bronze sleeve for low insertion loss and excellent durability.

The Secure/Keyed Modules can be used in all Belden mounting hardware for Workstation Area, Consolidation Point or Telecom Room applications.

The Secure/Keyed LC Patch Cords and Pigtails are offered in multimode 62.5/125  $\mu\text{m}$  (FX300), 50/125  $\mu\text{m}$  (FX600) and laser-optimized 50/125  $\mu\text{m}$  (FX2000) for the most demanding network performance. Available configurations are KEYx-KEYx as well as KEYx-LC Duplex and KEYx-SC Duplex, they are offered in standard lengths of 2 m (6 ft.), 3 m (10 ft.) and 5 m (16 ft.). Other lengths and configurations may be offered as custom orders.

The Secure/Keyed LC Adapter Strips are available in 12 and 24-fiber configurations for a total capacity of 192 fibers in a 4U FiberExpress Patch Panel.

The Secure/Keyed LC Manager Modules are clear which allows the inside to be seen at all times. The modules are available in 12- and 24- fibers which allows for very high-density configurations, up to 3820 fibers in a 23 in. frame.

The Secure/Keyed LC Manager Modules can be used in 4U (19 and 23 in.) FiberExpress Manager Shelves. They can also be used in the FiberExpress Manager 1U Rack Mount Patch Panel for a capacity of 72 fibers in a 1U rack space. The upper connectors are mounted at an angle, preventing patch cord bend radius violation and the fiber slack is contained within the individual connector modules for easy management and the protection of the fibers. Additionally, an integrated splice holder within the module (for up to 12 splices) eliminates the need for cumbersome splice trays. Pre-terminated MPO-Keyed LC modules are also available to configure Plug-and-Go systems for quick deployment.

**The Secure/Keyed LC Optimax® Connectors –** Based on Belden's patented Optimax Technology, this field-mount connector with a pre-polished ceramic ferrule offers great reliability performance and can be successfully installed in less than one minute. The LC Optimax connector has a spring-loaded ceramic ferrule that improves connector performance, increases its durability and makes it a suitable solution for repair of a patch cord or a multi-fiber cable assembly.

To facilitate logistics and material ordering processes, the Secure/Keyed Optimax connector uses the same inexpensive tool kit as the standard Optimax connector.

### Conclusion

The FiberExpress Secure/Keyed LC System is a modular connectivity system that perfectly integrates into the Belden FiberExpress Solutions portfolio. It was designed to respond to an urgent need for products that perform well for use in secure fiber networks and it is based on the best Small Form Factor connector available in the market. It offers great performance and reliability and can be installed very efficiently in all areas of a fiber cabling infrastructure.



### Secure/Keyed LC FiberExpress® Duplex Adapter Modules, Keystone-style

Description	Part Number
Key1, Red	AX102422
Key2, Green	AX102423
Key3, Yellow	AX102424
Key4, Black	AX102425
Key5, Orange	AX102426
Key6, Blue	AX102427
Key7, Violet	AX103154
Key8, Rose	AX103155
Key9, Aqua	AX103156
KeyA, Brown	AX103157
KeyB, Slate	AX103158
KeyC, White	AX103159

### Secure/Keyed LC FiberExpress® Duplex Adapter Modules, MDVO-style

Description	Part Number / Color			
	Gray Holder	Almond Holder	White Holder	Black Holder
LC Key1, Red	AX102089	AX102095	AX102101	AX102107
LC Key2, Green	AX102090	AX102096	AX102102	AX102108
LC Key3, Yellow	AX102091	AX102097	AX102103	AX102109
LC Key4, Black	AX102092	AX102098	AX102104	AX102110
LC Key5, Orange	AX102093	AX102099	AX102105	AX102111
LC Key6, Blue	AX102094	AX102000	AX102106	AX102112
LC Key7, Violet	AX103010	AX103015	AX103022	AX103028
LC Key8, Rose	AX103011	AX103017	AX103023	AX103029
LC Key9, Aqua	AX103012	AX103018	AX103024	AX103030
LC KeyA, Brown	AX103013	AX103019	AX103025	AX103031
LC KeyB, Slate	AX103014	AX103020	AX103026	AX103032
LC KeyC, White	AX103015	AX103021	AX103027	AX103033

### Secure/Keyed LC FiberExpress® Optimax® Connectors

Description	Part Number	
	Multimode 50 $\mu$ m for 900 $\mu$ m Buffered Fiber Only	Multimode 62.5 $\mu$ m for 900 $\mu$ m Buffered Fiber Only
LC Key1, Red	AX102197	AX102203
LC Key2, Green	AX102198	AX102204
LC Key3, Yellow	AX102199	AX102205
LC Key4, Black	AX102200	AX102206
LC Key5, Orange	AX102201	AX102207
LC Key6, Blue	AX102202	AX102208
LC Key7, Violet	AX103174	AX103168
LC Key8, Rose	AX103175	AX103169
LC Key9, Aqua	AX103176	AX103170
LC KeyA, Brown	AX103177	AX103171
LC KeyB, Slate	AX103178	AX103172
LC KeyC, White	AX103179	AX103173

### LC FiberExpress® Optimax Accessory Kit for Jacketed Fiber

Description	Part Number
Kit contains a 2 mm boot and crimp sleeve	AX101984

### Secure/Keyed LC FiberExpress® Manager Modules

Description	Part Number	
	12-fiber	24-fiber
LC Key1, Red	AX102113	AX102310
LC Key2, Green	AX102114	AX102311
LC Key3, Yellow	AX102115	AX102312
LC Key4, Black	AX102116	AX102313
LC Key5, Orange	AX102117	AX102314
LC Key6, Blue	AX102118	AX102315
LC Key7, Violet	AX103034	AX103040
LC Key8, Rose	AX103035	AX103041
LC Key9, Aqua	AX103036	AX103042
LC KeyA, Brown	AX103037	AX103043
LC KeyB, Slate	AX103038	AX103044
LC KeyC, White	AX103039	AX103045

### Secure/Keyed LC FiberExpress® Manager Pre-terminated Modules, MPO-keyed LC

Description	Part Number			
	12-fiber, Multimode 62.5 µm	12-fiber, Multimode 50 µm	24-fiber, Multimode 62.5 µm	24-fiber, Multimode 50 µm
LC Key1, Red	AX102362	AX102368	AX102374	AX102380
LC Key2, Green	AX102363	AX102369	AX102375	AX102381
LC Key3, Yellow	AX102364	AX102370	AX102376	AX102382
LC Key4, Black	AX102365	AX102371	AX102377	AX102383
LC Key5, Orange	AX102366	AX102372	AX102378	AX102384
LC Key6, Blue	AX102367	AX102373	AX102379	AX102385
LC Key7, Violet	AX103180	AX103186	AX103192	AX103198
LC Key8, Rose	AX103181	AX103187	AX103193	AX103199
LC Key9, Aqua	AX103182	AX103188	AX103194	AX103200
LC KeyA, Brown	AX103183	AX103189	AX103195	AX103201
LC KeyB, Slate	AX103184	AX103190	AX103196	AX103202
LC KeyC, White	AX103185	AX103191	AX103197	AX103203

### Secure/Keyed LC FiberExpress® Adapter Strips

Description	Part Number	
	12-fiber	24-fiber
LC Key1, Red	AX102119	AX102125
LC Key2, Green	AX102120	AX102126
LC Key3, Yellow	AX102121	AX102127
LC Key4, Black	AX102122	AX102128
LC Key5, Orange	AX102123	AX102129
LC Key6, Blue	AX102124	AX102130
LC Key7, Violet	AX103046	AX103052
LC Key8, Rose	AX103047	AX103053
LC Key9, Aqua	AX103048	AX103054
LC KeyA, Brown	AX103049	AX103055
LC KeyB, Slate	AX103050	AX103056
LC KeyC, White	AX103051	AX103057



## Secure/Keyed FiberExpress® LC Duplex Patch Cords

Description	Part Number / Length		
<b>KeyX-KeyX Multimode FX300 62.5 μm</b>	<b>2 m (6 ft.)</b>	<b>3 m (10 ft.)</b>	<b>5 m (16 ft.)</b>
LC Key1-Key1, Red	AX201365	AX201371	AX201377
LC Key2-Key2, Green	AX201366	AX201372	AX201378
LC Key3-Key3, Yellow	AX201367	AX201373	AX201379
LC Key4-Key4, Black	AX201368	AX201374	AX201380
LC Key5-Key5, Orange	AX201369	AX201375	AX201381
LC Key6-Key6, Blue	AX201370	AX201376	AX201382
LC Key7-Key7, Violet	AX202940	AX202946	AX202952
LC Key8-Key8, Rose	AX202941	AX202947	AX202953
LC Key9-Key9, Aqua	AX202942	AX202948	AX202954
LC KeyA-KeyA, Brown	AX202943	AX202949	AX202955
LC KeyB-KeyB, Slate	AX202944	AX202950	AX202956
LC KeyC-KeyC, White	AX202945	AX202951	AX202957
<b>KeyX-KeyX Multimode FX600 50 μm</b>	<b>2 m (6 ft.)</b>	<b>3 m (10 ft.)</b>	<b>5 m (16 ft.)</b>
LC Key1-Key1, Red	AX201383	AX201389	AX201395
LC Key2-Key2, Green	AX201384	AX201390	AX201396
LC Key3-Key3, Yellow	AX201385	AX201391	AX201397
LC Key4-Key4, Black	AX201386	AX201392	AX201398
LC Key5-Key5, Orange	AX201387	AX201393	AX201399
LC Key6-Key6, Blue	AX201388	AX201394	AX201400
LC Key7-Key7, Violet	AX202958	AX202964	AX202970
LC Key8-Key8, Rose	AX202959	AX202965	AX202971
LC Key9-Key9, Aqua	AX202960	AX202966	AX202972
LC KeyA-KeyA, Brown	AX202961	AX202967	AX202973
LC KeyB-KeyB, Slate	AX202962	AX202968	AX202974
LC KeyC-KeyC, White	AX202963	AX202969	AX202975
<b>KeyX-KeyX Multimode FX2000 50 μm</b>	<b>2 m (6 ft.)</b>	<b>3 m (10 ft.)</b>	<b>5 m (16 ft.)</b>
LC Key1-Key1, Red	AX201401	AX201407	AX201413
LC Key2-Key2, Green	AX201402	AX201408	AX201414
LC Key3-Key3, Yellow	AX201403	AX201409	AX201415
LC Key4-Key4, Black	AX201404	AX201410	AX201416
LC Key5-Key5, Orange	AX201405	AX201411	AX201417
LC Key6-Key6, Blue	AX201406	AX201412	AX201418
LC Key7-Key7, Violet	AX202976	AX202982	AX202988
LC Key8-Key8, Rose	AX202977	AX202983	AX202989
LC Key9-Key9, Aqua	AX202978	AX202984	AX202990
LC KeyA-KeyA, Brown	AX202979	AX202985	AX202991
LC KeyB-KeyB, Slate	AX202980	AX202986	AX202992
LC KeyC-KeyC, White	AX202981	AX202987	AX202993

**Secure/Keyed FiberExpress® LC Duplex Hybrid Patch Cords**

<b>Description</b>	<b>Part Number / Length</b>		
<b>KeyX-LCD Multimode FX300 62.5 µm</b>	<b>2 m (6 ft.)</b>	<b>3 m (10 ft.)</b>	<b>5 m (16 ft.)</b>
LC Key1-LCD, Red	AX201419	AX201425	AX201431
LC Key2-LCD, Green	AX201420	AX201426	AX201432
LC Key3-LCD, Yellow	AX201421	AX201427	AX201433
LC Key4-LCD, Black	AX201422	AX201428	AX201434
LC Key5-LCD, Orange	AX201423	AX201429	AX201435
LC Key6-LCD, Blue	AX201424	AX201430	AX201436
LC Key7-LCD, Violet	AX202994	AX203000	AX203006
LC Key8-LCD, Rose	AX202995	AX203001	AX203007
LC Key9-LCD, Aqua	AX202996	AX203002	AX203008
LC KeyA-LCD, Brown	AX202997	AX203003	AX203009
LC KeyB-LCD, Slate	AX202998	AX203004	AX203010
LC KeyC-LCD, White	AX202999	AX203005	AX203011
<b>KeyX-LCD Multimode FX600 50 µm</b>	<b>2 m (6 ft.)</b>	<b>3 m (10 ft.)</b>	<b>5 m (16 ft.)</b>
LC Key1-LCD, Red	AX201437	AX201443	AX201449
LC Key2-LCD, Green	AX201438	AX201444	AX201450
LC Key3-LCD, Yellow	AX201439	AX201445	AX201451
LC Key4-LCD, Black	AX201440	AX201446	AX201452
LC Key5-LCD, Orange	AX201441	AX201447	AX201453
LC Key6-LCD, Blue	AX201442	AX201448	AX201454
LC Key7-LCD, Violet	AX203012	AX203018	AX203024
LC Key8-LCD, Rose	AX203013	AX203019	AX203025
LC Key9-LCD, Aqua	AX203014	AX203020	AX203026
LC KeyA-LCD, Brown	AX203015	AX203021	AX203027
LC KeyB-LCD, Slate	AX203016	AX203022	AX203028
LC KeyC-LCD, White	AX203017	AX203023	AX203029
<b>KeyX-LCD Multimode FX2000 50 µm</b>	<b>2 m (6 ft.)</b>	<b>3 m (10 ft.)</b>	<b>5 m (16 ft.)</b>
LC Key1-LCD, Red	AX201455	AX201461	AX201467
LC Key2-LCD, Green	AX201456	AX201462	AX201468
LC Key3-LCD, Yellow	AX201457	AX201463	AX201469
LC Key4-LCD, Black	AX201458	AX201464	AX201470
LC Key5-LCD, Orange	AX201459	AX201465	AX201471
LC Key6-LCD, Blue	AX201460	AX201466	AX201472
LC Key7-LCD, Violet	AX203030	AX203036	AX203042
LC Key8-LCD, Rose	AX203031	AX203037	AX203043
LC Key9-LCD, Aqua	AX203032	AX203038	AX203044
LC KeyA-LCD, Brown	AX203033	AX203039	AX203045
LC KeyB-LCD, Slate	AX203034	AX203040	AX203046
LC KeyC-LCD, White	AX203035	AX203041	AX203047



## Secure/Keyed FiberExpress® LC Duplex Hybrid Patch Cords (continued)

Description	Part Number / Length		
<b>KeyX-SCD Multimode FX300 62.5 μm</b>	<b>2 m (6 ft.)</b>	<b>3 m (10 ft.)</b>	<b>5 m (16 ft.)</b>
LC Key1-SCD, Red	AX201473	AX201479	AX201485
LC Key2-SCD, Green	AX201474	AX201480	AX201486
LC Key3-SCD, Yellow	AX201475	AX201481	AX201487
LC Key4-SCD, Black	AX201476	AX201482	AX201488
LC Key5-SCD, Orange	AX201477	AX201483	AX201489
LC Key6-SCD, Blue	AX201478	AX201484	AX201490
LC Key7-SCD, Violet	AX203048	AX203054	AX203060
LC Key8-SCD, Rose	AX203049	AX203055	AX203061
LC Key9-SCD, Aqua	AX203050	AX203056	AX203062
LC KeyA-SCD, Brown	AX203051	AX203057	AX203063
LC KeyB-SCD, Slate	AX203052	AX203058	AX203064
LC KeyC-SCD, White	AX203053	AX203059	AX203065
<b>KeyX-SCD Multimode FX600 50 μm</b>	<b>2 m (6 ft.)</b>	<b>3 m (10 ft.)</b>	<b>5 m (16 ft.)</b>
LC Key1-SCD, Red	AX201491	AX201497	AX201503
LC Key2-SCD, Green	AX201492	AX201498	AX201504
LC Key3-SCD, Yellow	AX201493	AX201499	AX201505
LC Key4-SCD, Black	AX201494	AX201500	AX201506
LC Key5-SCD, Orange	AX201495	AX201501	AX201507
LC Key6-SCD, Blue	AX201496	AX201502	AX201508
LC Key7-SCD, Violet	AX203066	AX203072	AX203078
LC Key8-SCD, Rose	AX203067	AX203073	AX203079
LC Key9-SCD, Aqua	AX203068	AX203074	AX203080
LC KeyA-SCD, Brown	AX203069	AX203075	AX203081
LC KeyB-SCD, Slate	AX203070	AX203076	AX203082
LC KeyC-SCD, White	AX203071	AX203077	AX203083
<b>KeyX-SCD Multimode FX2000 50 μm</b>	<b>2 m (6 ft.)</b>	<b>3 m (10 ft.)</b>	<b>5 m (16 ft.)</b>
LC Key1-SCD, Red	AX201509	AX201515	AX201521
LC Key2-SCD, Green	AX201510	AX201516	AX201522
LC Key3-SCD, Yellow	AX201511	AX201517	AX201523
LC Key4-SCD, Black	AX201512	AX201518	AX201524
LC Key5-SCD, Orange	AX201513	AX201519	AX201525
LC Key6-SCD, Blue	AX201514	AX201520	AX201526
LC Key7-SCD, Violet	AX203084	AX203090	AX203096
LC Key8-SCD, Rose	AX203085	AX203091	AX203097
LC Key9-SCD, Aqua	AX203086	AX203092	AX203098
LC KeyA-SCD, Brown	AX203087	AX203093	AX203099
LC KeyB-SCD, Slate	AX203088	AX203094	AX203100
LC KeyC-SCD, White	AX203089	AX203095	AX203101

**Secure/Keyed FiberExpress® LC Pigtaills**

<b>Description</b>	<b>Part Number / Length</b>
<b>KeyX-Open Multimode FX300 62.5 μm</b>	<b>2 m (6 ft.)</b>
LC Key1-Open, Red	AX201527
LC Key2-Open, Green	AX201528
LC Key3-Open, Yellow	AX201529
LC Key4-Open, Black	AX201530
LC Key5-Open, Orange	AX201531
LC Key6-Open, Blue	AX201532
LC Key7-Open, Violet	AX203102
LC Key8-Open, Rose	AX203103
LC Key9-Open, Aqua	AX203104
LC KeyA-Open, Brown	AX203105
LC KeyB-Open, Slate	AX203106
LC KeyC-Open, White	AX203107
<b>KeyX-Open Multimode FX600 50 μm</b>	<b>2 m (6 ft.)</b>
LC Key1-Open, Red	AX201533
LC Key2-Open, Green	AX201534
LC Key3-Open, Yellow	AX201535
LC Key4-Open, Black	AX201536
LC Key5-Open, Orange	AX201537
LC Key6-Open, Blue	AX201538
LC Key7-Open, Violet	AX203108
LC Key8-Open, Rose	AX203109
LC Key9-Open, Aqua	AX203110
LC KeyA-Open, Brown	AX203111
LC KeyB-Open, Slate	AX203112
LC KeyC-Open, White	AX203113
<b>KeyX-Open Multimode FX2000 50 μm</b>	<b>2 m (6 ft.)</b>
LC Key1-Open, Red	AX201539
LC Key2-Open, Green	AX201540
LC Key3-Open, Yellow	AX201541
LC Key4-Open, Black	AX201542
LC Key5-Open, Orange	AX201543
LC Key6-Open, Blue	AX201544
LC Key7-Open, Violet	AX203114
LC Key8-Open, Rose	AX203115
LC Key9-Open, Aqua	AX203116
LC KeyA-Open, Brown	AX203117
LC KeyB-Open, Slate	AX203118
LC KeyC-Open, White	AX203119