



US009885845B2

(12) **United States Patent
Case**

(10) **Patent No.: US 9,885,845 B2**
(45) **Date of Patent: Feb. 6, 2018**

(54) **MODULE AND ASSEMBLY FOR FIBER
OPTIC INTERCONNECTIONS**

(71) Applicant: **CommScope, Inc. of North Carolina,**
Hickory, NC (US)

(72) Inventor: **Richard L. Case,** Omaha, NE (US)

(73) Assignee: **CommScope, Inc. of North Carolina,**
Hickory, NC (US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/995,966**

(22) Filed: **Jan. 14, 2016**

(65) **Prior Publication Data**

US 2016/0209614 A1 Jul. 21, 2016

Related U.S. Application Data

(60) Provisional application No. 62/103,850, filed on Jan.
15, 2015.

(51) **Int. Cl.**
G02B 6/44 (2006.01)
G02B 6/38 (2006.01)

(52) **U.S. Cl.**
CPC **G02B 6/4452** (2013.01); **G02B 6/3897**
(2013.01)

(58) **Field of Classification Search**
CPC G02B 6/3897; G02B 6/4452
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,773,940 A * 12/1956 Lebedinsky H04Q 1/04
370/200
3,833,840 A * 9/1974 Sinden H04Q 1/142
361/730

4,510,565 A * 4/1985 Dummermuth G05B 19/4147
700/169
4,536,052 A * 8/1985 Baker H04Q 1/06
361/827
4,824,196 A * 4/1989 Bylander G02B 6/3821
385/134
4,989,317 A * 2/1991 Firl B41J 2/14072
174/535
5,093,885 A * 3/1992 Anton G02B 6/4452
385/134
5,175,673 A * 12/1992 Roger H04Q 1/14
174/382
5,289,558 A * 2/1994 Teichler G02B 6/4452
174/50
5,323,454 A * 6/1994 Shay H02G 15/076
174/59
5,401,193 A * 3/1995 Lo Cicero H01R 13/518
361/823
5,420,958 A * 5/1995 Henson G02B 6/3806
385/135

(Continued)

FOREIGN PATENT DOCUMENTS

JP 2001119177 A * 4/2001
WO WO 2009045396 A2 * 4/2009 G02B 6/4454
(Continued)

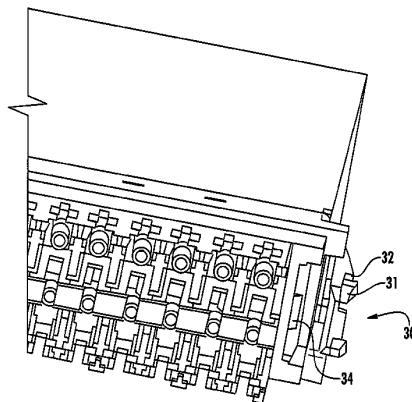
Primary Examiner — Peter Radkowski

(74) *Attorney, Agent, or Firm* — Merchant & Gould P.C.

(57) **ABSTRACT**

A module for interconnecting fiber optic cables and/or cords includes: a housing having a rear wall; a plurality of MPO adapters mounted in the rear wall; and forty-eight fiber optic adapters mounted to a front portion of the housing, the duplex adapters being operatively connected with the MPO adapters.

10 Claims, 5 Drawing Sheets



US 9,885,845 B2

Page 2

(56)	References Cited		6,487,356 B1 *	11/2002	Harrison	G02B 6/4452
	U.S. PATENT DOCUMENTS					385/135
5,448,675 A *	9/1995	Leone	G02B 6/43			324/66
5,461,693 A *	10/1995	Pimpinella	G02B 6/4452			385/134
5,473,717 A *	12/1995	Baptiste	G02B 6/3897			385/56
5,511,144 A *	4/1996	Hawkins	G02B 6/4452			385/134
5,566,836 A *	10/1996	Lerman	H05K 7/186			211/189
5,575,668 A *	11/1996	Timmerman	A47B 21/06			174/482
5,613,030 A *	3/1997	Hoffer	G02B 6/4452			385/135
5,638,481 A *	6/1997	Arnett	G02B 6/3817			385/135
5,639,261 A *	6/1997	Rutkowski	G02B 6/4452			439/31
5,642,447 A *	6/1997	Pan	G02B 6/2746			385/11
5,659,648 A *	8/1997	Knapp	G02B 6/1221			385/129
5,659,650 A *	8/1997	Arnett	G02B 6/3817			385/135
5,664,955 A *	9/1997	Arnett	G02B 6/3817			174/67
5,708,742 A *	1/1998	Beun	G02B 6/3897			385/134
5,712,942 A *	1/1998	Jennings	H04B 10/079			385/134
5,734,776 A *	3/1998	Puetz	G02B 6/4442			385/134
5,737,475 A *	4/1998	Regester	G02B 6/4454			385/134
5,788,087 A *	8/1998	Orlando	H04Q 1/13			211/26
5,793,909 A *	8/1998	Leone	H04B 10/071			385/134
5,901,033 A *	5/1999	Crawford	H02B 1/32			174/51
5,959,767 A *	9/1999	Fatehi	H04Q 11/0005			359/337.11
5,969,294 A *	10/1999	Eberle	G02B 6/3825			174/57
5,984,720 A *	11/1999	Milner	G02B 6/3897			439/534
6,024,610 A *	2/2000	Schaffer	G02B 6/4452			439/719
6,088,497 A *	7/2000	Phillips	G02B 6/28			385/134
6,175,079 B1 *	1/2001	Johnston	G02B 6/4452			174/50
6,195,493 B1 *	2/2001	Bridges	G02B 6/4452			385/134
6,208,796 B1 *	3/2001	Williams Vigliaturo	G02B 6/4453			324/66
6,215,938 B1 *	4/2001	Reitmeier	G02B 6/4441			385/134
6,250,816 B1 *	6/2001	Johnston	G02B 6/3897			385/135
6,259,850 B1 *	7/2001	Crosby, Jr.	G02B 6/3807			385/134
6,278,829 B1 *	8/2001	BuAbbud	G02B 6/4452			385/135
6,293,707 B1 *	9/2001	Wild	G02B 6/3897			385/55
6,327,059 B1 *	12/2001	Bhalla	H04Q 11/0005			398/163
6,424,781 B1 *	7/2002	Puetz	G02B 6/4452			385/135
6,487,356 B1 *	11/2002	Harrison	G02B 6/4452			385/135
6,489,565 B1 *	12/2002	Krietzman	H02G 3/045			174/101
6,524,134 B2 *	2/2003	Flickinger	H05K 9/0058			439/607.2
6,535,682 B1 *	3/2003	Puetz	G02B 6/4452			385/135
6,537,106 B1 *	3/2003	Follingstad	H01R 13/518			439/534
6,565,260 B2 *	5/2003	Belaidi	G02B 6/4466			385/135
6,579,014 B2 *	6/2003	Melton	G02B 6/3825			385/55
6,584,267 B1 *	6/2003	Caveney	G02B 6/4452			385/134
6,587,630 B2 *	7/2003	Spence	G02B 6/4471			385/134
6,616,344 B1 *	9/2003	Van Deventer	H04Q 11/0005			385/135
6,631,237 B2 *	10/2003	Knudsen	G02B 6/4452			174/50
6,668,127 B1 *	12/2003	Mahony	G02B 6/4451			385/135
6,758,600 B2 *	7/2004	Del Grosso	G02B 6/4471			385/59
6,760,531 B1 *	7/2004	Solheid	G02B 6/4452			385/135
6,761,585 B2 *	7/2004	Clark	H01R 13/518			439/540.1
6,766,095 B1 *	7/2004	Bjorklund	G02B 6/4452			385/135
6,804,447 B2 *	10/2004	Smith	G02B 6/4453			385/134
6,809,258 B1 *	10/2004	Dang	H02G 15/117			174/50
6,824,312 B2 *	11/2004	McClellan	H05K 7/1448			385/53
6,850,685 B2 *	2/2005	Tinucci	G02B 6/4455			385/134
6,866,541 B2 *	3/2005	Barker	G02B 6/4452			439/540.1
6,869,227 B2 *	3/2005	Del Grosso	G02B 6/4471			385/71
6,870,095 B1 *	3/2005	Whitted	H04Q 1/066			174/135
6,881,076 B2 *	4/2005	Baker	H04Q 1/146			333/260
6,885,564 B2 *	4/2005	Hockett	G06F 1/181			174/50
6,916,199 B2 *	7/2005	Follingstad	H01R 13/518			385/75
6,944,389 B2 *	9/2005	Giraud	G02B 6/4455			385/134
6,955,479 B2 *	10/2005	Erdman	G02B 6/3871			385/78
6,974,348 B2 *	12/2005	Bentley	H04Q 1/13			439/540.1
6,980,725 B1 *	12/2005	Swieconeck	G02B 6/4452			385/135
6,981,893 B2 *	1/2006	Barker	G02B 6/4452			439/540.1
6,983,095 B2 *	1/2006	Reagan	G02B 6/4452			385/135
7,070,459 B2 *	7/2006	Denovich	H04Q 1/13			385/134
7,088,899 B2 *	8/2006	Reagan	G02B 6/4452			385/135
7,094,095 B1 *	8/2006	Caveney	G02B 6/3897			385/134
7,103,255 B2 *	9/2006	Reagan	G02B 6/4452			385/135
7,118,286 B2 *	10/2006	Gurreri	G02B 6/3831			385/58
7,142,764 B2 *	11/2006	Allen	G02B 6/4454			385/134

US 9,885,845 B2

Page 3

(56)	References Cited			8,203,450 B2 *	6/2012	German	G02B 6/3895
	U.S. PATENT DOCUMENTS			8,410,364 B2 *	4/2013	Dunwoody	340/10.1 H05K 7/1491 174/68.1
7,146,089 B2 *	12/2006	Reagan	G02B 6/4452	8,576,580 B2 *	11/2013	Kelly	H04Q 1/064 361/825
7,147,383 B2 *	12/2006	Sullivan	G02B 6/4472	9,042,699 B2 *	5/2015	Barry	G02B 6/4452 361/826
7,171,102 B2 *	1/2007	Reagan	G02B 6/4452	2001/0001270 A1 *	5/2001	Williams Vigliaturo	G02B 6/4453
7,182,523 B2 *	2/2007	Abendschein	G02B 6/3831	2002/0125800 A1 *	9/2002	Knudsen	G02B 6/4452
7,188,415 B2 *	3/2007	Robinson	G02B 6/4471	2002/0181896 A1 *	12/2002	McClellan	312/223.6 H05K 7/1448 385/88
7,200,317 B2 *	4/2007	Reagan	G02B 6/4452	2003/0113086 A1 *	6/2003	Jun	G02B 6/3897
7,207,835 B2 *	4/2007	Levesque	H04Q 1/066	2003/0129871 A1 *	7/2003	Follingstad	385/135
7,220,145 B2 *	5/2007	Denovich	G02B 6/4452	2003/0174996 A1 *	9/2003	Henschel	H01R 13/518 439/534 G02B 6/2804
7,233,731 B2 *	6/2007	Solheid	G02B 6/3849	2003/0185535 A1 *	10/2003	Tinucci	385/135 G02B 6/4455
7,244,144 B2 *	7/2007	Follingstad	H01R 13/518	2003/0194187 A1 *	10/2003	Simmons	385/134 B60R 16/0215
7,300,308 B2 *	11/2007	Laursen	G02B 6/3897	2004/0022494 A1 *	2/2004	Liddle	385/53 G02B 6/3636
7,302,153 B2 *	11/2007	Thom	G02B 6/4452	2004/0086252 A1 *	5/2004	Smith	385/48 G02B 6/4453
7,306,468 B2 *	12/2007	Baker	H04Q 1/146	2004/0114326 A1 *	6/2004	Dodgen	385/135 H05K 7/206
7,315,681 B2 *	1/2008	Kewitsch	G02B 6/4457	2004/0184741 A1 *	9/2004	Del Grosso	361/694 G02B 6/4471
7,325,976 B2 *	2/2008	Gurreri	G02B 6/3831	2004/0209515 A1 *	10/2004	Caveney	385/71 H01R 13/518
7,335,056 B1 *	2/2008	Clark	H01R 13/518	2005/0002633 A1 *	1/2005	Solheid	439/540.1 G02B 6/3849
7,357,667 B2 *	4/2008	Clark	H04Q 1/136	2005/0105873 A1 *	5/2005	Reagan	385/135 G02B 6/4452
7,367,823 B2 *	5/2008	Rapp	G02B 6/4453	2005/0111800 A1 *	5/2005	Cooke	385/135 G02B 6/4473
7,393,243 B2 *	7/2008	Caveney	H01R 25/16	2005/0129375 A1 *	6/2005	Elkins, II	385/100 G02B 6/4472
7,416,347 B2 *	8/2008	Livingston	G02B 6/3831	2005/0129379 A1 *	6/2005	Reagan	385/100 G02B 6/4452
7,439,449 B1 *	10/2008	Kumar	G02B 6/4292	2005/0135770 A1 *	6/2005	McClellan	385/135 H05K 7/1448
7,455,548 B2 *	11/2008	Clark	H01R 13/518	2005/0146828 A1 *	7/2005	Baker	385/135 H04Q 1/146
7,457,503 B2 *	11/2008	Solheid	G02B 6/3849	2005/0175308 A1 *	8/2005	Elkins, II	361/119 G02B 6/4472
7,488,205 B2 *	2/2009	Spisany	H04Q 1/13	2005/0191010 A1 *	9/2005	Gurreri	385/135 G02B 6/3831
7,563,102 B2 *	7/2009	Nordin	H04Q 1/136	2005/0207134 A1 *	9/2005	Belady	385/58 H05K 1/14
7,623,749 B2 *	11/2009	Reagan	G02B 6/4452	2005/0220393 A1 *	10/2005	Riester	361/796 G02B 6/4201
7,651,277 B2 *	1/2010	Gurreri	B29D 11/0075	2006/0008231 A1 *	1/2006	Reagan	385/15 G02B 6/3849
7,668,430 B2 *	2/2010	McClellan	H05K 7/1448	2006/0029334 A1 *	2/2006	Quinby	385/135 G02B 6/3851
7,689,079 B2 *	3/2010	Burnham	G02B 6/4453	2006/0063436 A1 *	3/2006	Gurreri	385/59 G02B 6/3831
7,760,516 B2 *	7/2010	Johnson, Jr.	H05K 7/1457	2006/0133736 A1 *	6/2006	Sullivan	439/680 G02B 6/4472
7,762,839 B2 *	7/2010	Chen	H01R 4/2416	2006/0165365 A1 *	7/2006	Feustel	385/59 G02B 6/4452
7,821,792 B2 *	10/2010	Belady	H05K 1/14	2006/0165366 A1 *	7/2006	Feustel	385/135 G02B 6/2804
7,844,159 B2 *	11/2010	Solheid	G02B 6/3849	2006/0193591 A1 *	8/2006	Rapp	385/135 G02B 6/4453
7,874,869 B2 *	1/2011	Chern	H01R 13/518	2006/0203460 A1 *	9/2006	Aviv	385/137 H05K 7/1492
7,945,138 B2 *	5/2011	Hill	G02B 6/4454	2006/0269208 A1 *	11/2006	Allen	361/788 G02B 6/4471
8,014,171 B2 *	9/2011	Kelly	H04Q 1/064				385/135

Page 4

References Cited

U.S. PATENT DOCUMENTS

2009/0245743	A1 *	10/2009	Cote	G02B 6/4454 385/135
2009/0283488	A1 *	11/2009	McMillan, III	H05K 7/186 211/183
2009/0317045	A1 *	12/2009	Reagan	G02B 6/4452 385/135
2010/0006317	A1 *	1/2010	Hruby	G02B 6/4459 174/97
2010/0027953	A1 *	2/2010	Russell	G02B 6/4452 385/135
2010/0061691	A1 *	3/2010	Murano	G02B 6/4452 385/135
2010/0129040	A1 *	5/2010	Zamzow	G02B 6/4452 385/135
2010/0142910	A1 *	6/2010	Hill	G02B 6/4454 385/135
2010/0158465	A1 *	6/2010	Smrha	G02B 6/4453 385/135
2010/0159742	A1 *	6/2010	Chen	H01R 4/2416 439/540.1
2010/0183270	A1 *	7/2010	Davis	G02B 6/4471 385/100
2010/0202740	A1 *	8/2010	Barlowe	G02B 6/4471 385/100
2010/0279519	A1 *	11/2010	Mei	H01R 31/005 439/55
2010/0316334	A1 *	12/2010	Kewitsch	G02B 6/3502 385/78
2010/0322554	A1 *	12/2010	Barnes	G02B 6/0365 385/24
2010/0322581	A1 *	12/2010	Cooke	G02B 6/4453 385/135
2010/0322583	A1 *	12/2010	Cooke	G02B 6/4452 385/135
2011/0007470	A1 *	1/2011	Belady	H05K 1/14 361/679.31
2011/0044020	A1 *	2/2011	Hruby	G02B 6/4452 361/827
2011/0192631	A1 *	8/2011	Burek	G02B 6/4452 174/101
2011/0286198	A1 *	11/2011	Kelly	H04Q 1/064 361/826
2011/0299266	A1 *	12/2011	Barry	G02B 6/4452 361/826
2011/0299822	A1 *	12/2011	Barry	G02B 6/4452 385/135
2012/0019177	A1 *	1/2012	Kaufmann	B25F 5/001 318/379
2012/0057836	A1 *	3/2012	Andrzejewski	G02B 6/1228 385/135
2013/0308915	A1 *	11/2013	Buff	G02B 6/4452 385/135

FOREIGN PATENT DOCUMENTS

WO	WO 2009045396	A9 *	6/2009		G02B 6/4454
WO	WO 2009089041	A1 *	7/2009		G02B 6/3897
WO	WO 2009091465	A2 *	7/2009		G02B 6/4442
WO	WO 2009091465	A3 *	9/2009		G02B 6/4442
WO	WO 2009045396	A3 *	10/2009		G02B 6/4454
WO	WO 2010024842	A1 *	3/2010		G02B 6/4471

* cited by examiner

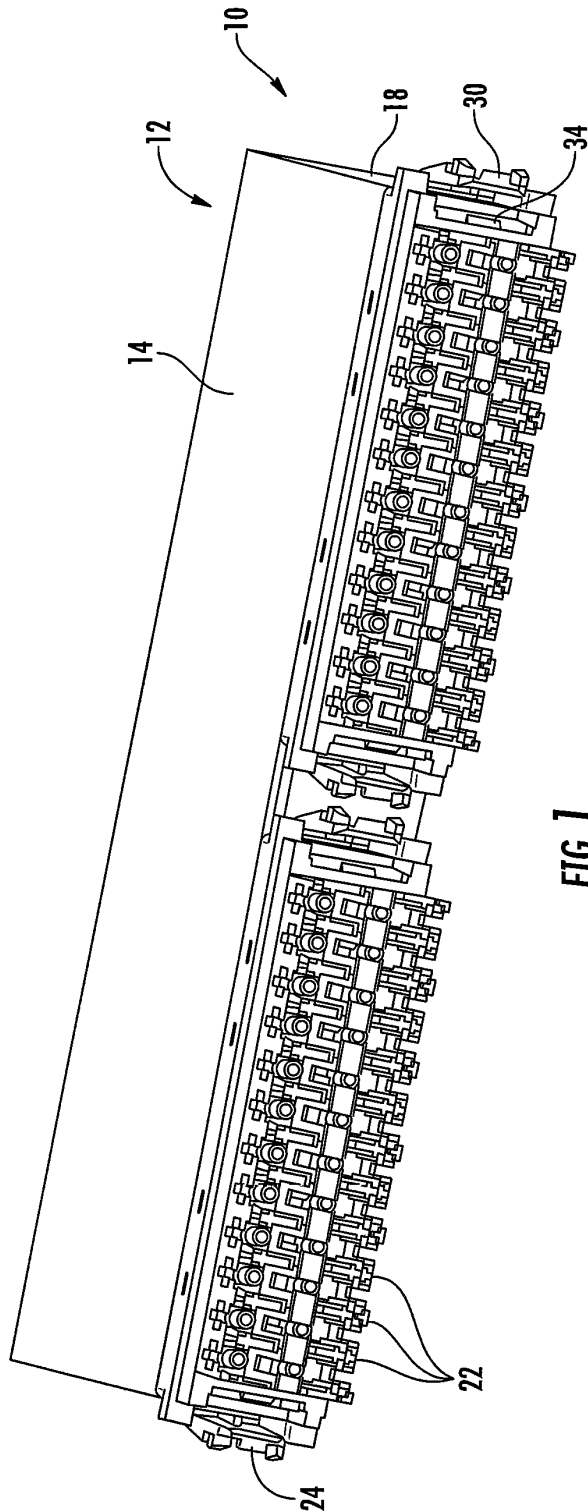
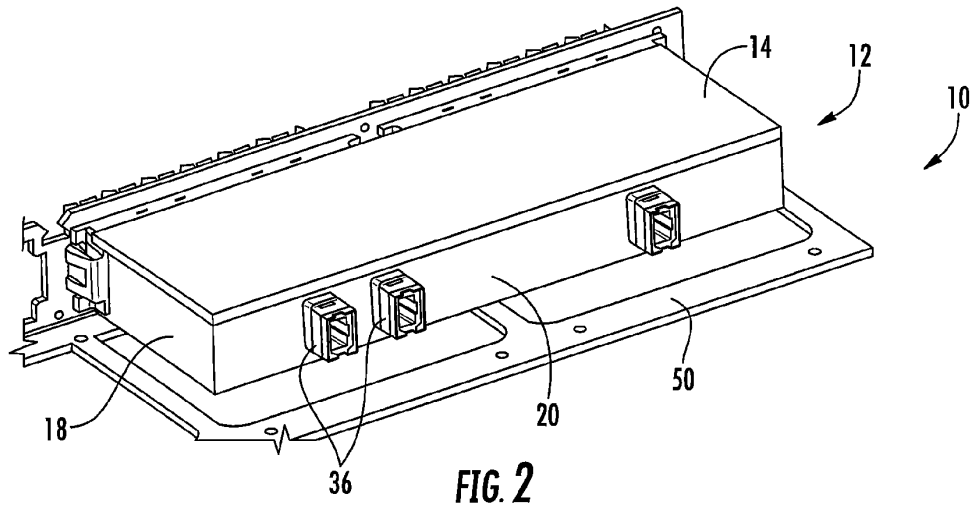
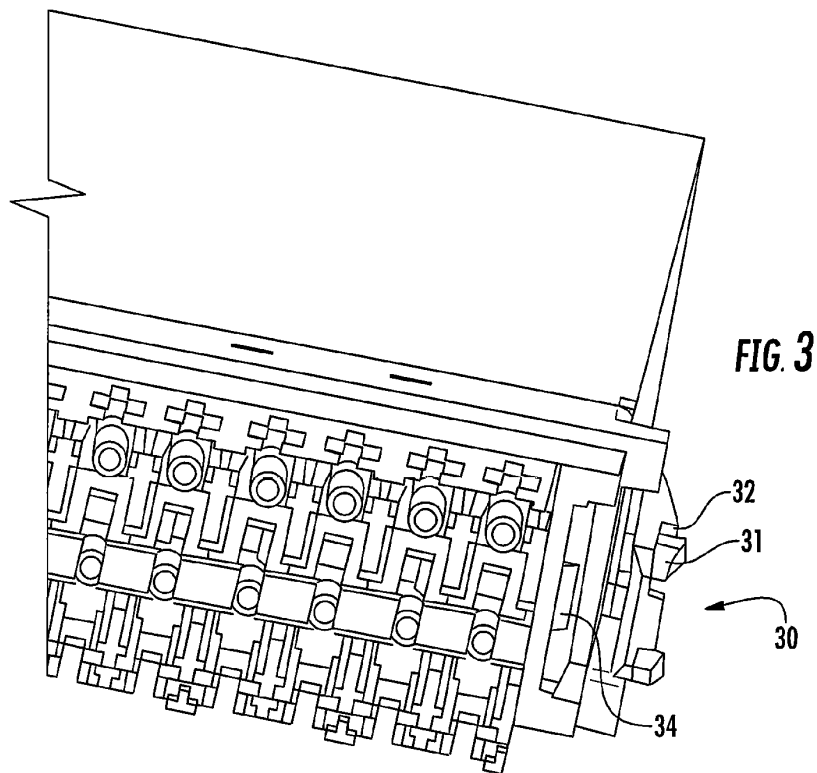


FIG. 1



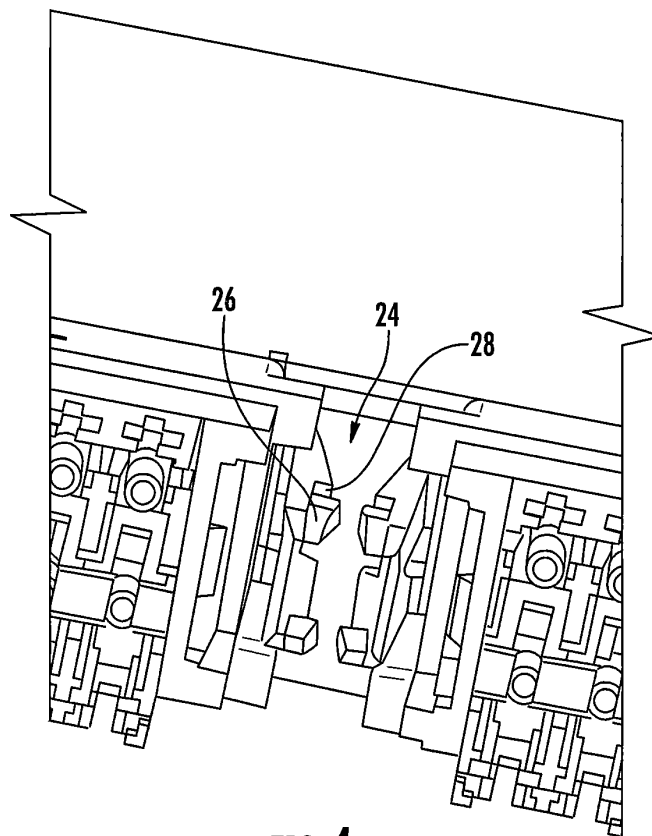
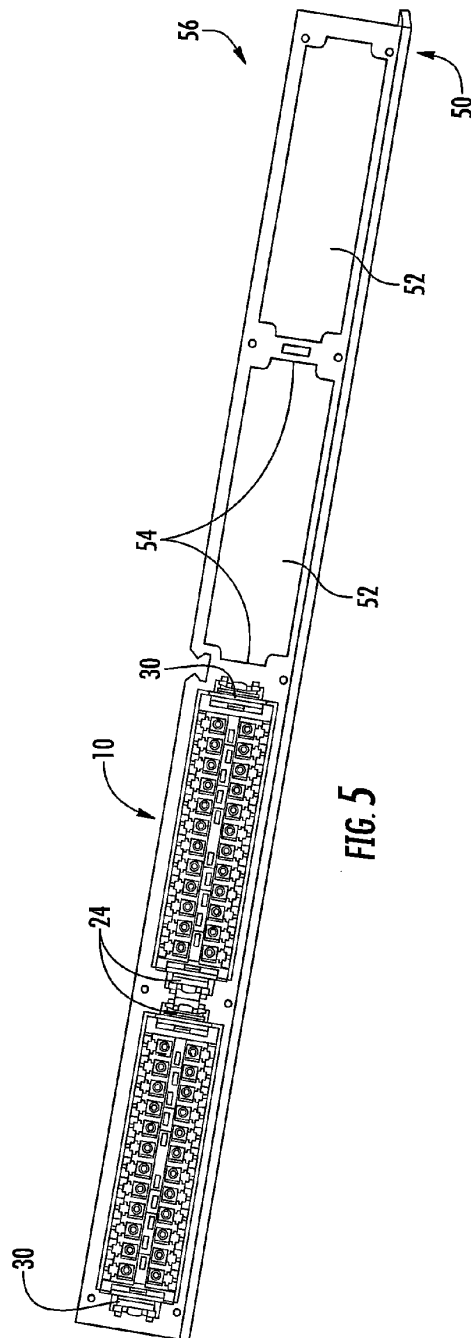
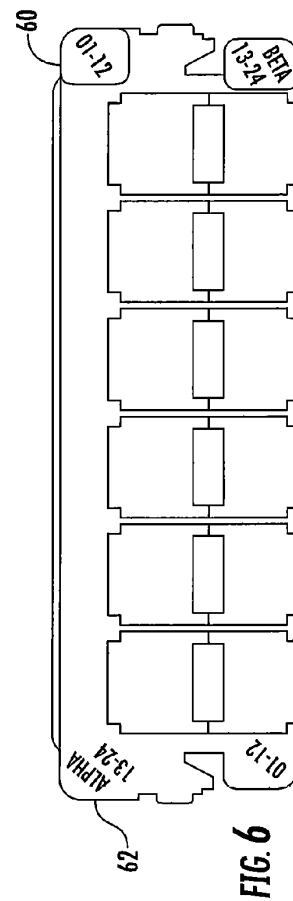


FIG. 4



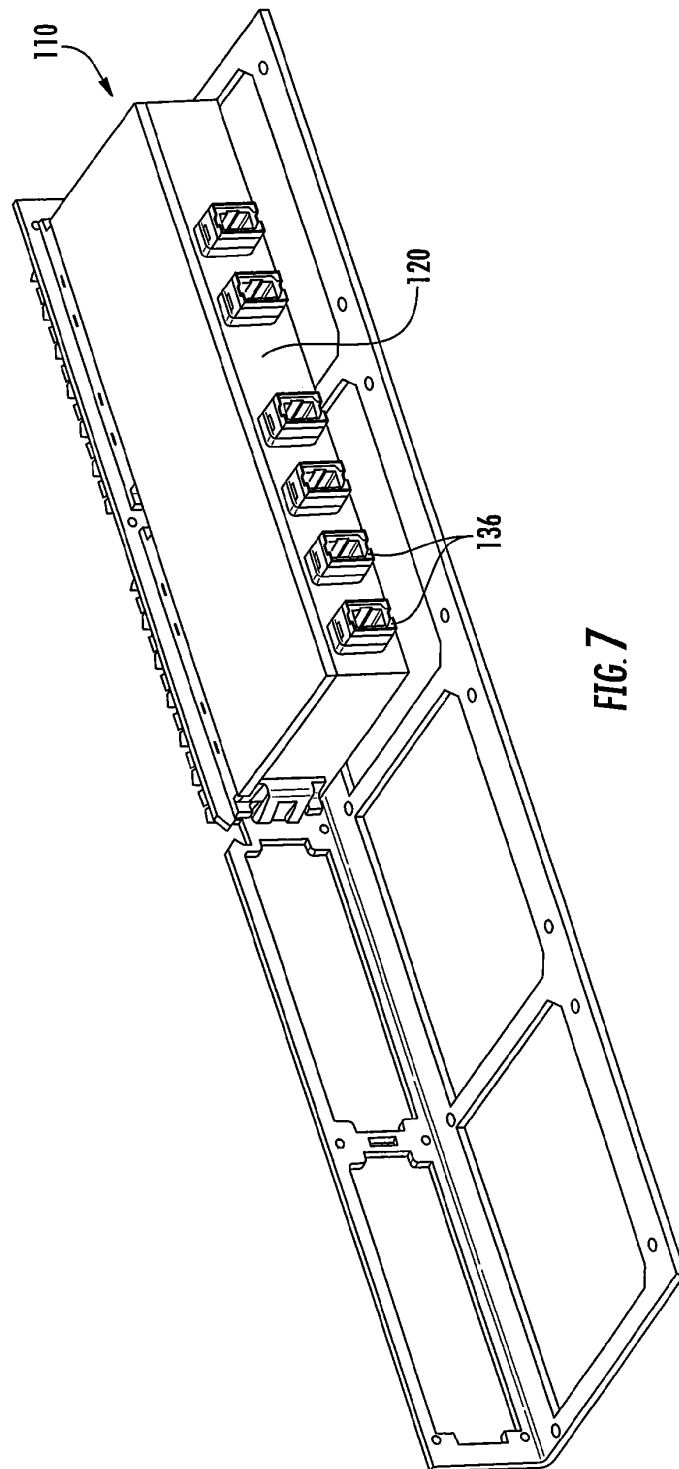


FIG. 7

1

MODULE AND ASSEMBLY FOR FIBER OPTIC INTERCONNECTIONS

RELATED APPLICATION

The present application claims priority from and the benefit of U.S. Provisional Patent Application No. 62/103,850, filed Jan. 15, 2015, the disclosure of which is hereby incorporated herein in its entirety.

FIELD OF THE INVENTION

The present invention is directed to datacommunications equipment, and in particular datacommunications equipment for fiber optic interconnections.

BACKGROUND

A network patching system is typically used to interconnect the various communication lines within a closet or computer room. In a conventional network patching system, the communication lines are terminated within a closet in an organized manner via one or more patch panels mounted on a rack or frame. Multiple ports are included in the patch panel, typically in some type of organized array. Each of the different ports is connected with a communications line. In small patching systems, all communications lines may terminate on the patch panels of the same rack. In larger patching systems, multiple racks may be used, wherein different communications lines terminate on different racks. Interconnections between the various communications lines are made connecting patch cords to the ports. By selectively connecting the various communications lines with patch cords, any combination of communications lines can be interconnected.

It may be desirable to provide different devices for interconnecting datacommunications lines.

SUMMARY

As a first aspect, embodiments of the invention are directed to a module for interconnecting fiber optic cables and/or cords. The module comprises: a housing having a rear wall; a plurality of MPO adapters mounted in the rear wall; and forty-eight fiber optic adapters mounted to a front portion of the housing, the fiber optic adapters being operatively connected with the MPO adapters.

As a second aspect, embodiments of the invention are directed to an assembly for interconnecting fiber optic cables and/or cords comprising a 1 U telecommunications shelf and two fiber optic telecommunications modules mounted to the shelf. Each of the modules comprises: a housing having a rear wall; a plurality of MPO adapters mounted in the rear wall; and forty-eight fiber optic adapters mounted to a front portion of the housing, the fiber optic adapters being operatively connected with the MPO adapters.

As a third aspect, embodiments of the invention are directed to an assembly for interconnecting fiber optic cables and/or cords comprising a 1 U telecommunications shelf having a window with side edges and two fiber optic telecommunications modules mounted to the shelf. Each module comprises: a housing having a rear wall; a plurality of MPO adapters mounted in the rear wall; forty-eight fiber optic adapters mounted to a front portion of the housing, the fiber optic adapters being operatively connected with the MPO adapters; and latches that engage the side edges of the window to snap-mount the module to the shelf. Each of the

2

modules is configured to be oriented in the shelf in an upright or an inverted orientation, and wherein each module further comprises a faceplate indicating the upright and inverted orientations.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is a front perspective view of a module for interconnecting fiber optic cables and cords according to embodiments of the invention.

FIG. 2 is a rear perspective view of the module of FIG. 1.

FIG. 3 is an enlarged partial front perspective view of one of the latches of the module of FIG. 1 used to attach the module to a fiber shelf.

FIG. 4 is an enlarged partial front perspective view of another of the latches of the module of FIG. 1 used to attach the module to a fiber shelf.

FIG. 5 is front perspective view of the module of FIG. 1 attached to a fiber shelf.

FIG. 6 is a front view of a labeling plate attached to the front side of the module of FIG. 1.

FIG. 7 is a rear perspective view of an alternative embodiment of a module for interconnecting fiber optic cables and cords.

DETAILED DESCRIPTION

The present invention is described with reference to the accompanying drawings, in which certain embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments that are pictured and described herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. It will also be appreciated that the embodiments disclosed herein can be combined in any way and/or combination to provide many additional embodiments.

Unless otherwise defined, all technical and scientific terms that are used in this disclosure have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. The terminology used in the below description is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used in this disclosure, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will also be understood that when an element (e.g., a device, circuit, etc.) is referred to as being "connected" or "coupled" to another element, it can be directly connected or coupled to the other element or intervening elements may be present. In contrast, when an element is referred to as being "directly connected" or "directly coupled" to another element, there are no intervening elements present.

Referring now to FIGS. 1 and 2, a telecommunications module for interconnecting fiber optic cables and cords, designated broadly at 10, is shown therein. The module 10 includes a box-like housing 12 with a ceiling 14, a floor (not shown), side walls 18, and a rear wall 20. The housing 12 is sized to mount on a shelf sized at 1 U (i.e., approximately 1.75 inches in height). On its front side, the module 10 includes two sets of 24 duplex fiber optic adapters 22. Each set of fiber optic adapters 22 is arranged in upper and lower rows of twelve adapters each, with the sets of adapters 22 being side-by-side across the front of the module 10. The adapters 22 are conventional fiber optic adapters and need not be described in detail herein.

3

Referring now to FIGS. 1 and 4, the front side of the module 10 also includes features that enable the module 10 to be attached to a 1 U fiber shelf 50. A pair of snap latches 24 are located between the sets of adapters 22 and project forwardly. Each of the snap latches 24 has a hook 26 and an opposed shoulder 28 that enables it to receive a vertical edge of the shelf 50. In addition, a latch 30 (FIG. 3) projects forwardly from each of the lateral edges of the module 10; each latch 30 includes a hook 31 and a shoulder 32 that can receive a vertical edge of the shelf 50.

Referring now to FIGS. 1 and 3, the front side of the module 10 also includes two latching projections 34 that are located on opposite sides of the sets of adapters 22. These latching projections 34 enable the module to mount a kit for “intelligent patching” (i.e., a system that can track connectivity of cords and cables connected to the adapters 22). An exemplary system/kit is the iPATCH® system, available from CommScope, Inc., (Hickory, N.C.).

Referring now to FIG. 2, three MPO connectors 36 are mounted to the rear wall 20 of the housing 12. These MPO connectors 36 are sixteen fiber connectors that receive a sixteen fiber MPO attached to a fiber optic cable.

The housing 12 protects optical fibers (not shown) that extend between the MPO connectors 36 and the adapters 22. There are multiple arrangements of such fibers known to those of skill in this art that need not be described in detail herein.

FIG. 5 illustrates the module 10 mounted in the shelf 50. As can be seen in FIG. 5, the shelf 50 includes four windows 52 with vertical side edges 54 (only two windows 52 are visible in FIG. 5). The module 10 is mounted on the shelf 50 by inserting the adapters 22 through the windows 50; the latches 24 contact the side edges 54 and deflect, then recover, as the module 10 is moved forward to snap-mount the module 10 on the shelf 50. The side edges 54 of the window 50 are captured between the hooks 26 and the shoulders 28 of the latches 24. Similarly, the latches 30 engage respective side edges 54 of the window 50 and deflect, then recover to capture the side edges 54 between the hooks 31 and the shoulders 32. The latching projections 34 are free to receive an intelligent patching kit if desired. The resulting assembly 56 comprising the shelf 50 and two modules 10 can be mounted within a 1 U space on a conventional telecommunications rack or cabinet.

FIG. 6 shows the module 10 with a faceplate 60 attached thereto for assisting with orientation of the module 10. As discussed at length in U.S. Pat. No. 7,416,347, the disclosure of which is hereby incorporated herein in its entirety, fiber optic modules often have an “ALPHA” or “BETA” orientation in order to provide proper connectivity for the fibers connected thereto. The faceplate 60 includes indicia 62 that is oriented so that an operator can quickly discern an “ALPHA” or “BETA” configuration of the module 10 irrespective of whether the module 10 is horizontally or vertically oriented.

FIG. 7 illustrates another fiber optic module 110 according to embodiments of the invention. The module 110 includes three TAP connectors 136 on its rear wall 120.

It should also be noted that, because the modules 10, 110 include 48 fiber optic adapters 22, they are configured to be able to receive either three 16-fiber MPOs or four 12-fiber MPOs. As such, the modules can be employed through transitions between 12-fiber based systems and 16-fiber based systems. Thus, as higher data transmission speeds (such as 40 Gb, 100 Gb, or even 400 Gb) become more standard and/or commonplace, the modules can be modified to address the changing needs of end users.

4

The foregoing is illustrative of the present invention and is not to be construed as limiting thereof. Although exemplary embodiments of this invention have been described, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this invention as defined in the claims. The invention is defined by the following claims, with equivalents of the claims to be included therein.

That which is claimed is:

1. An assembly for interconnecting fiber optic cables and/or cords, comprising:

a 1 U telecommunications shelf; and

two fiber optic telecommunications modules mounted to the shelf, each comprising:

a housing having a rear wall;

a plurality of MPO adapters mounted in the rear wall;

forty-eight fiber optic adapters mounted to a front portion of the housing, the fiber optic adapters being operatively connected with the MPO adapters, wherein each module comprises a first set of latches that snap-mount the module to the shelf, wherein each module further comprises a second set of latches having a different configuration than the first set of latches, the second set of latches configured to allow the module to be snap-mounted to a piece of telecommunications equipment different than the telecommunications shelf, the second set of latches being configured such that the second set of latches are free to receive the piece of telecommunications equipment that is different than the telecommunications shelf when the module has been mounted to the telecommunications shelf with the first set of latches.

2. The assembly defined in claim 1, wherein the plurality of MPO adapters is three adapters.

3. The assembly defined in claim 1, wherein the plurality of MPO adapters is four adapters.

4. The assembly defined in claim 1, wherein each of the modules is configured to be oriented in an upright or an inverted orientation, and wherein each module further comprises a faceplate indicating the upright and inverted orientations.

5. The assembly defined in claim 1, wherein the shelf includes at least one window with side edges, and wherein the first set of latches of the modules engage the side edges of the window.

6. The assembly defined in claim 1, wherein the forty-eight fiber optic adapters comprise twenty-four duplex fiber optic adapters.

7. An assembly for interconnecting fiber optic cables and/or cords, comprising:

a 1 U telecommunications shelf having a window with side edges; and

two fiber optic telecommunications modules mounted to the shelf, each comprising:

a housing having a rear wall;

a plurality of MPO adapters mounted in the rear wall;

forty-eight fiber optic adapters mounted to a front portion of the housing, the fiber optic adapters being operatively connected with the MPO adapters; and

a first set of latches that engage the side edges of the window to snap-mount the module to the shelf and a second set of latches having a different configuration than the first set of latches, the second set of latches configured to allow the module to be snap-mounted to

5

6

a piece of telecommunications equipment different than the telecommunications shelf, the second set of latches being configured such that the second set of latches are free to receive the piece of telecommunications equipment that is different than the telecommunications shelf 5 when the module has been mounted to the telecommunications shelf with the first set of latches;

wherein each of the modules is configured to be oriented in the shelf in an upright or an inverted orientation, and wherein each module further comprises a faceplate 10 indicating the upright and inverted orientations.

8. The assembly defined in claim 7, wherein the plurality of MPO adapters is three adapters.

9. The assembly defined in claim 7, wherein the plurality of MPO adapters is four adapters. 15

10. The assembly defined in claim 7, wherein the forty-eight fiber optic adapters comprise twenty-four duplex fiber optic adapters.

* * * * *