GEM
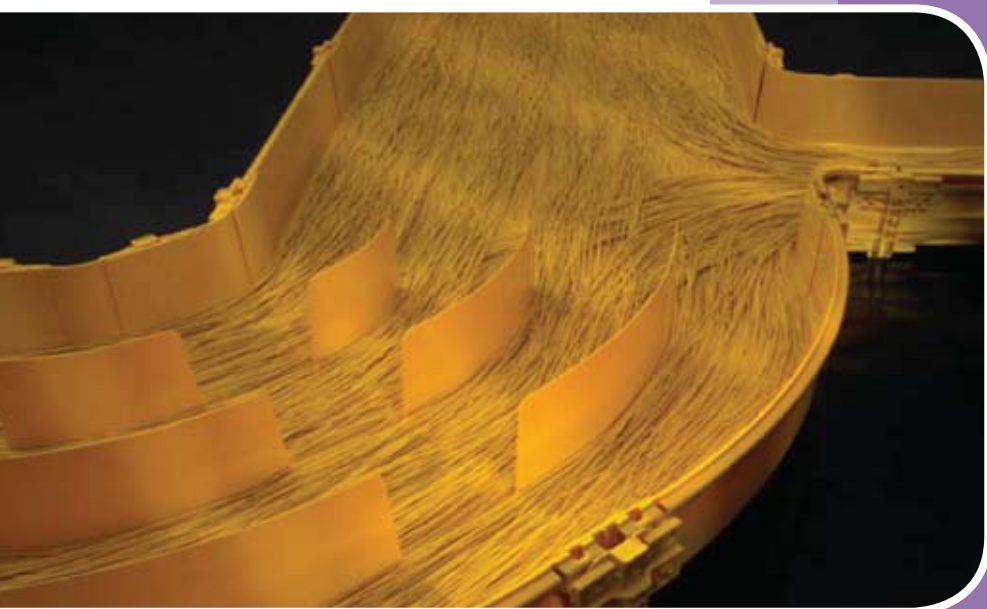## CABLE SOLUTIONS

ADC

FIBER MANAGEMENT SYSTEMS

Fiber Connectivity Solutions

2nd Edition

SMARTER GLOBAL CONNECTIONS

Table of Contents

FiberGuide® Systems

FiberGuide® Systems

The Industry's Most Comprehensive Optical Raceway System
ADC's FiberGuide® fiber management systems offer the greatest breadth of optical raceway products in the industry. In response to customer requirements, ADC continues to innovate and improve FiberGuide systems, adding greater flexibility and driving down installation time to ensure a smooth deployment.

FiberGuide is a raceway system designed to protect and route fiber optic patch cords, multi-fiber cable assemblies and intrafacility fiber cable (IFC) to and from fiber splice enclosures, fiber distribution frames and fiber optic terminal devices. FiberGuide ensures a two-inch minimum bend radius is maintained throughout the system. Tool-less, Snap-Fit™ junctions, cover options and Plenum Express Exit™ drops significantly reduce the amount of time required for installation.

The FiberGuide system is a complete set of products designed and manufactured to ensure total off-frame protection and ease of use. Basic components include horizontal and vertical straight sections, horizontal and vertical elbows, downspouts, junctions and numerous support hardware and flex-tube kits.

Available in a variety of sizes:

2x2 – Ideal for smaller installations or for vertical routing of a maximum of four hundred 2 mm fiber optic patch cords. All 2x2 FiberGuide products are shipped with covers.

2x6 – Designed for height restricted environments, this robust system provides the same support and system flexibility of the traditional 4-inch-high system while saving 2 inches of overhead space. It features a maximum capacity of 1,200, 2 mm patch cords.

4x4 – Features the maximum capacity to support 1,600, 2 mm patch cords. It has been engineered to allow straight sections to be self-supporting over a span of up to 1.83 m (6 feet).

4x6 – Features the same benefits of the 4-inch system and a maximum trough capacity of 2,400, 2 mm patch cords.

4x12 – The 12-inch-wide trough has a maximum capacity to support nearly 5,000, 2 mm patch cords. Perfect for runs over fiber frame lineups and perimeter routes.

4x24 – The 4x24-inch system is the ultimate raceway solution to securely route and protect patch cords over high-density optical distribution frames including ADC's Next Generation Frame (NGF) and Next Generation 3 Frame (NG3®). Designed for maximum capacity, this robust system provides the same support and flexibility as the traditional 4x12-inch system while doubling capacity.

See page 16 for patch cord density tables.

FiberGuide® Systems

Examples of FiberGuide® Integration

FL2000 Panel

FiberGuide Flex Tubing *

FiberGuide Express Exit *

FPL Panel

Intermediate FDF Solutions (8" FCM)

RiserGuide

Vertical FiberGuide *

FL1000 Wall Box

Fiber Raceway Solutions (FGS)

FMT Panel

Traditional ODF Lineup Solutions (8" FCM, LSX)

Fiber Optic Transport Lineup Fiber Optic Panel Solutions (FOP)

High-Density ODF Lineup Solutions (NGF, NG3®)

Cable Entrance Solutions (FEC)

Fiber Cable Assembly & Connector Solutions (FCC)

Value-Added Module (VAM) Solutions (Monitors, Splitters, WDM, CWDM)

Splice Vault

Fiber Management Systems
Innovative Products

ADC continues to add innovative products to FiberGuide® fiber management systems to ensure they remain the most comprehensive solutions for all optical raceway requirements and applications. These products increase functionality and flexibility and are compatible with existing raceway components.

Snap-Fit™ and Hinged Cover Options
To drive down valuable installation time, ADC provides tool-less Snap-Fit™ and hinged cover options. Featuring simple, durable molded hardware, these covers install in minutes and require no tools. The hinged cover option provides easy access, enabling installers and technicians to deploy the product quickly and easily. In addition, the covers do not need to be fully opened for maintenance.

Snap-Fit Junction
ADC's Snap-Fit Junction is the industry's first and only completely tool-less junction. No additional tools are needed for installation or removal. Quick and easy to install, the FiberGuide Snap-Fit Junction saves valuable time and money.

Express Exits™
ADC features a number of innovative Express Exit™ options: Low profile, 2-inch and 4-inch options round out this innovative product line, designed to meet your most demanding network requirements. Plenum Express Exit systems are also available. By simply securing an Express Exit to the sidewall of a FiberGuide straight section, jumpers can be permanently or temporarily routed to the fiber optic terminal (FOT) equipment or fiber frames. No cutting is required. Positioning a drop with a member of the Express Exit family greatly simplifies installation, protects the integrity of existing fibers and increases the overall flexibility of the raceway system.

Raceway Reconfiguration Solutions
ADC offers two products to facilitate easy on-site raceway reconfigurations. Available for the 4x4, 4x6, 4x12 and 4x24* systems, the cut-in "T" and the expandable straight section offer the required flexibility to optimize raceway systems in retrofit applications without jeopardizing the integrity of existing cables.

*Expandable straight section not available for 4x24 system.

Hinged Cover System

Express Exit™ Family

Cut-in T

FiberGuide® Systems

FiberGuide® Materials Product Statement

The FiberGuide fiber management system is a UL-listed (E151158) general purpose fiber optic raceway system. All FiberGuide products are manufactured from flame-retardant materials. No FiberGuide system parts contain PVC. The table summarizes the fire-resistant properties of FiberGuide straight sections, molded parts and flex tube.

	Raw Material Meets UL Requirement	Finished Product Meets UL Requirement
FiberGuide Straight Sections (All FiberGuide Systems)	Flame rated: UL94V-0	UL94V-0 and UL2024
FiberGuide Molded Fittings (All FiberGuide Systems)	Flame rated: UL94V-0	UL94V-0 and UL2024
FiberGuide Flex Tube (2")	Flame rated: UL94V-0	UL2024
FiberGuide Flex Tube (1")	Flame rated: UL94V-0	UL2024
FiberGuide Flex Tube (7/8")	Flame rated: UL94V-2	UL2024

Note: FiberGuide flex tube complies with the National Electrical Code (NEC) Article 770-51 and Underwriters Laboratory UL2024 requirements for General Purpose Fiber Optic Raceways.

FiberGuide® Systems

Features and Benefits

Speed of Installation
FiberGuide® systems feature a variety of products that allow for quick and easy installation. Express Exit™ drops as well as tool-less products including Snap-Fit™ junctions, snap-on covers and new hinged cover options save valuable time for installers.

Speed of Deployment
The Express Exit system enables new drops to be added or removed quickly and easily. A drop can be added into a fully loaded raceway in seconds—without cutting.

Raceway Flexibility
FiberGuide features 38 support structures, over 75 fittings, multiple drop options and several other components to suit any application you create.

Fiber Protection
ADC's broadband expertise translates into maximum protection for your network. Two-inch minimum bend radius is maintained throughout the system regardless of the raceway size.
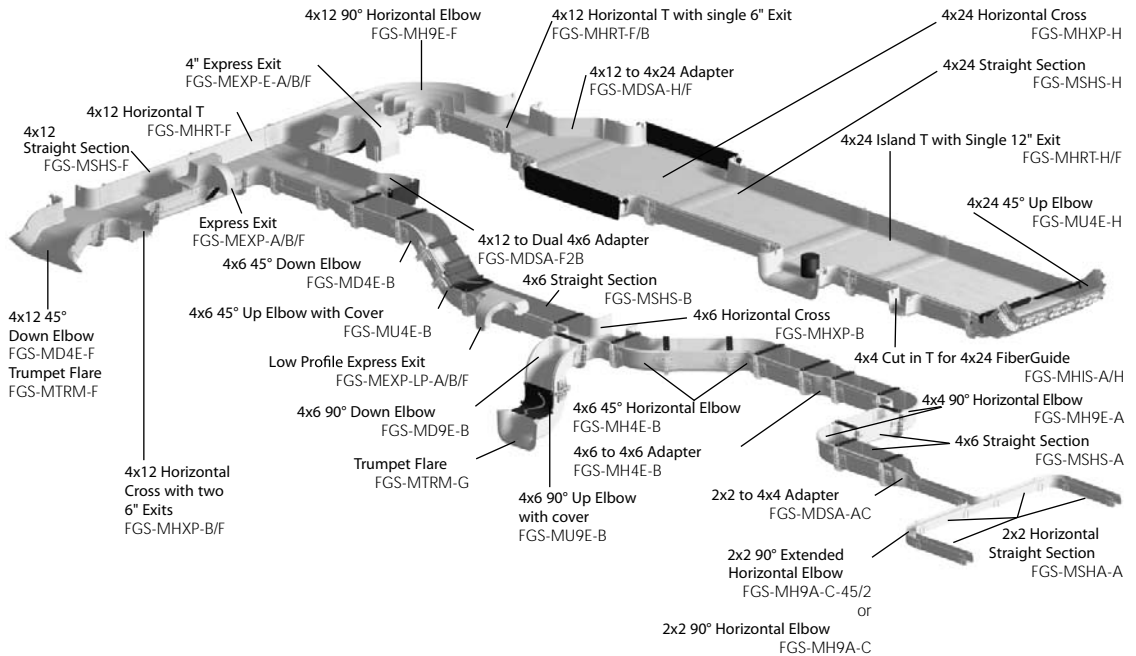
Strength and Durability
100% raceway reliability—stands up to any challenge.

FiberGuide® Systems

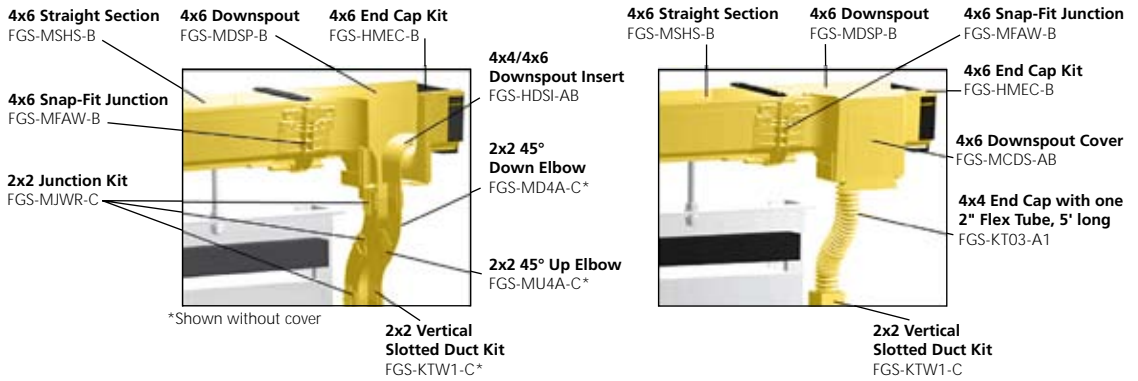# Applications
Combining System Parts

A combination of components from the various sized raceway systems typically comprise overhead FiberGuide® systems. Adapters are used to make the transition between sizes. An example of an overhead system that combines many of ADC's FiberGuide systems can be seen below.

4x12 90° Horizontal Elbow
FGS-MH9E-F

4x12 Horizontal T with single 6" Exit
FGS-MHRT-F/B

4x24 Horizontal Cross
FGS-MHXP-H

4" Express Exit
FGS-MEXP-E-A/B/F

4x24 Straight Section
FGS-MSHS-H

4x12 to 4x24 Adapter
FGS-MDSA-H/F

4x12 Horizontal T
FGS-MHRT-F

4x24 Island T with Single 12" Exit
FGS-MHRT-H/F

4x12
Straight Section
FGS-MSHS-F

4x24 45° Up Elbow
FGS-MU4E-H

Express Exit
FGS-MEXP-A/B/F

4x12 to Dual 4x6 Adapter
FGS-MDSA-F2B

4x6 45° Down Elbow
FGS-MD4E-B

4x6 Straight Section
FGS-MSHS-B

4x6 Horizontal Cross
FGS-MHXP-B

4x6 45° Up Elbow with Cover
FGS-MU4E-B

4x4 Cut in T for 4x24 FiberGuide
FGS-MHIS-A/H

4x12 45°
Down Elbow
FGS-MD4E-F
Trumpet Flare
FGS-MTRM-F

Low Profile Express Exit
FGS-MEXP-LP-A/B/F

4x6 45° Horizontal Elbow
FGS-MH4E-B

4x4 90° Horizontal Elbow
FGS-MH9E-A

4x6 90° Down Elbow
FGS-MD9E-B

4x6 to 4x6 Adapter
FGS-MH4E-B

4x6 Straight Section
FGS-MSHS-A

4x12 Horizontal
Cross with two
6" Exits
FGS-MHXP-B/F

Trumpet Flare
FGS-MTRM-G

4x6 90° Up Elbow
with cover
FGS-MU9E-B

2x2 to 4x4 Adapter
FGS-MDSA-AC

2x2 Horizontal
Straight Section
FGS-MSHA-A

2x2 90° Extended
Horizontal Elbow
FGS-MH9A-C-45/2
or

2x2 90° Horizontal Elbow
FGS-MH9A-C

FiberGuide® Systems

A downspout drop is recommended over optical distribution frame lineups. The rigid 2-inch drop option and 2-inch flex tube option are two methods for directing fibers out of overhead FiberGuide® downspouts and into optical equipment bays. The rigid system is recommended because it offers excellent bend radius control and ensures a quality fiber backbone installation.

4x6 Straight Section FGS-MSHS-B
4x6 Downspout FGS-MDSP-B
4x6 End Cap Kit FGS-HMEC-B

4x4/4x6 Downspout Insert FGS-HDSI-AB

4x6 Snap-Fit Junction FGS-MFAW-B

2x2 45° Down Elbow FGS-MD4A-C*

2x2 Junction Kit FGS-MJWR-C

2x2 45° Up Elbow FGS-MU4A-C*

Shown without cover

2x2 Vertical Slotted Duct Kit FGS-KTW1-C*

4x6 Straight Section FGS-MSHS-B
4x6 Downspout FGS-MDSP-B
4x6 Snap-Fit Junction FGS-MFAW-B

4x6 End Cap Kit FGS-HMEC-B

4x6 Downspout Cover FGS-MCDS-AB

4x4 End Cap with one 2" Flex Tube, 5' long FGS-KT03-A1

2x2 Vertical Slotted Duct Kit FGS-KTW1-C

2x2 Rigid Drop Option

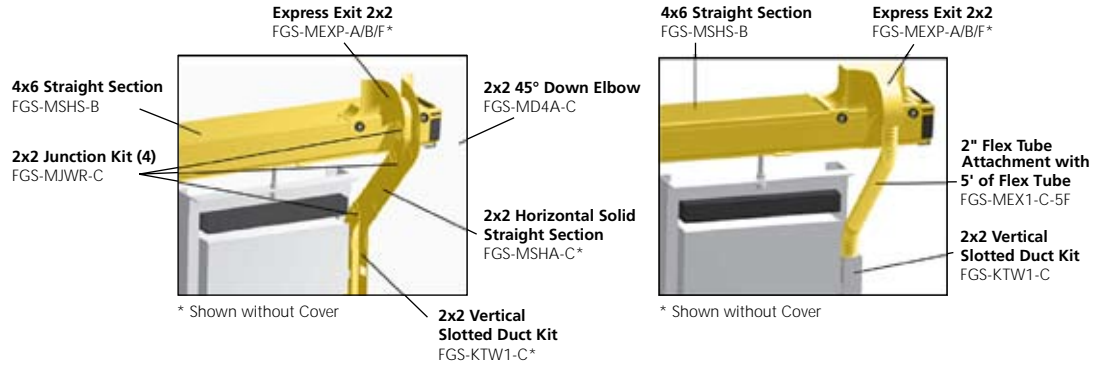**2" Flex Tube Drop Option**

An Express Exit is recommended over active equipment racks or cabinets. The rigid 2-inch drop option and 2-inch flex tube option are two methods for directing fibers out of overhead FiberGuide® downspouts and into optical equipment bays. The rigid system is recommended because it offers excellent bend radius control and ensures a quality fiber backbone installation.
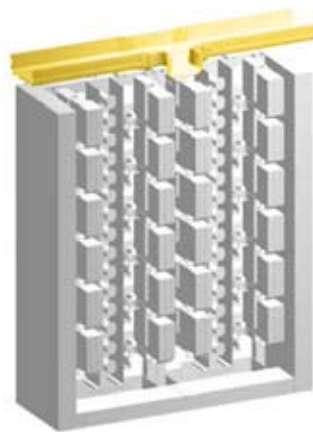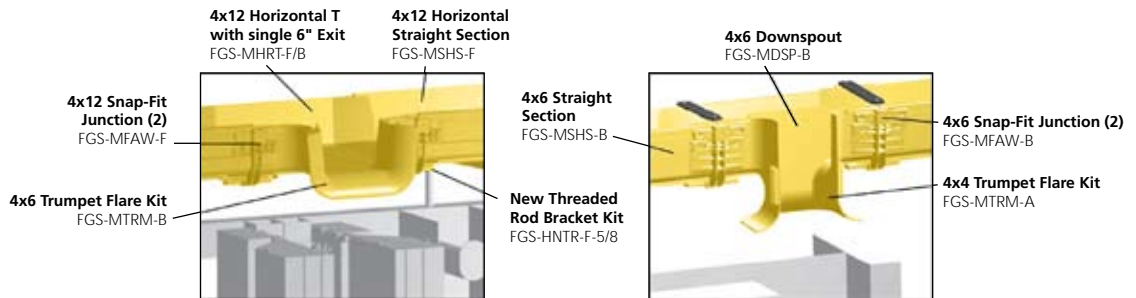
Express Exit 2x2
FGS-MEXP-A/B/F*

4x6 Straight Section
FGS-MSHS-B

2x2 45° Down Elbow
FGS-MD4A-C

2x2 Junction Kit (4)
FGS-MJWR-C

2x2 Horizontal Solid Straight Section
FGS-MSHA-C*

2x2 Vertical Slotted Duct Kit
FGS-KTW1-C*

* Shown without Cover

4x6 Straight Section
FGS-MSHS-B

Express Exit 2x2
FGS-MEXP-A/B/F*

2" Flex Tube Attachment with 5' of Flex Tube
FGS-MEX1-C-5F

2x2 Vertical Slotted Duct Kit
FGS-KTW1-C

* Shown without Cover

2x2 Rigid Drop Option

2" Flex Tube Drop Option

Applications
Trumpet Flare Options

FiberGuide® Systems

The trumpet flare is recommended at the bottom of a downspout when directing fibers into a fiber distribution bay. Trumpet flares provide bend radius protection and allow for a large number of fiber patch cords to transition into a fiber bay. A 4x4 trumpet flare is used for the 4x4 and 4x6 downspouts and a 4x6 trumpet flare is used for the 4x12 downspout.

4x12 Horizontal T with single 6" Exit
FGS-MHRT-F/B

4x12 Horizontal Straight Section
FGS-MSHS-F

4x6 Downspout
FGS-MDSP-B

4x12 Snap-Fit Junction (2)
FGS-MFAW-F

4x6 Straight Section
FGS-MSHS-B

4x6 Snap-Fit Junction (2)
FGS-MFAW-B

4x4 Trumpet Flare Kit
FGS-MTRM-A

4x6 Trumpet Flare Kit
FGS-MTRM-B

New Threaded Rod Bracket Kit
FGS-HNTR-F-5/8

Horizontal T and Trumpet Flare

Downspout with Trumpet Flare

When attaching a straight section or fitting to the exit of a 4x4 or 4x6 downspout, the FGS-MJWR-A junction must be used. This junction is only required to connect the vertical part, the FGS-MFAW-X junction can be used to connect the horizontal parts.
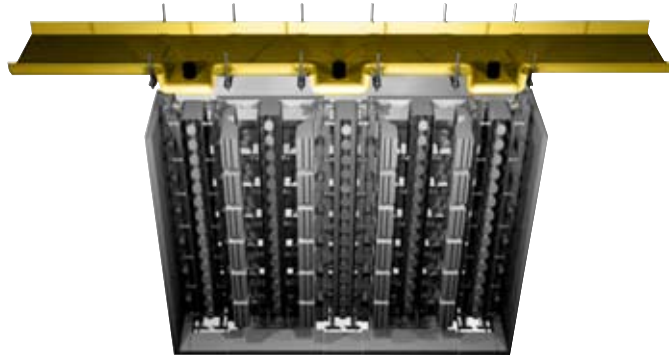
FGS-MFAW-X

FGS-MJWR-A
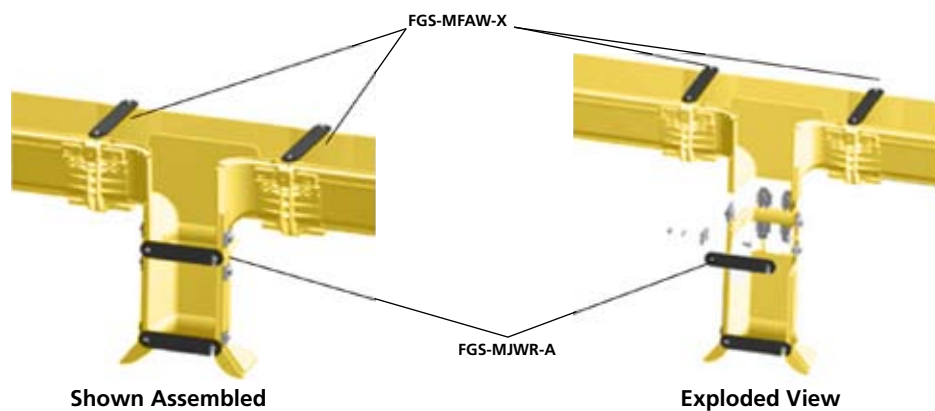
Shown Assembled

Exploded View

GEM
CABLE SOLUTIONS

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Applications

FiberGuide® Systems

The 4x24 Island T with 12-inch exit is designed to be used over the NGF, NG3® or any high-density fiber frame. The 4x24 Island T, a horizontal T with spool and factory-installed trumpet flare, channels fiber directly into the vertical cableways below.

4x24 Island T
(Shown with support brackets over an NGF frame.)

Applications

FiberGuide® Systems

Cut-in T, Fitting and Fixture

ADC's innovative cut-in T fitting and fixture enable on-site raceway modifications without jeopardizing the integrity of installed fibers. Available in 4-, 6-, and 12-inch widths, the cut-in T fitting can be retrofitted to any installed 4-, 6-, 12-, and 24-inch straight section using the cut-in T fixture and the hardware supplied with the fitting. No special tools are required.

Fixture attached to sidewall of raceway

Fixture protects cables during cutting of sidewall
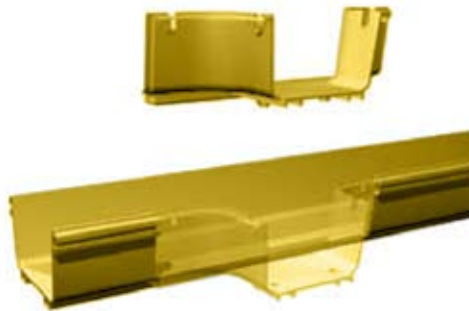
Fitting fills gap left by removed sidewall

Supplied hardware secures fitting to raceway and completes installation

Expandable Straight Sections

ADC's expandable straight section simplifies installation and enhances the overall flexibility of the raceway system. The innovative straight section also provides an access point for future reconfigurations. Available in 4-, 6-, and 12-inch widths, the expandable straight section reduces the installation time necessary to connect opposing runs and provides continuous support for patch cords.

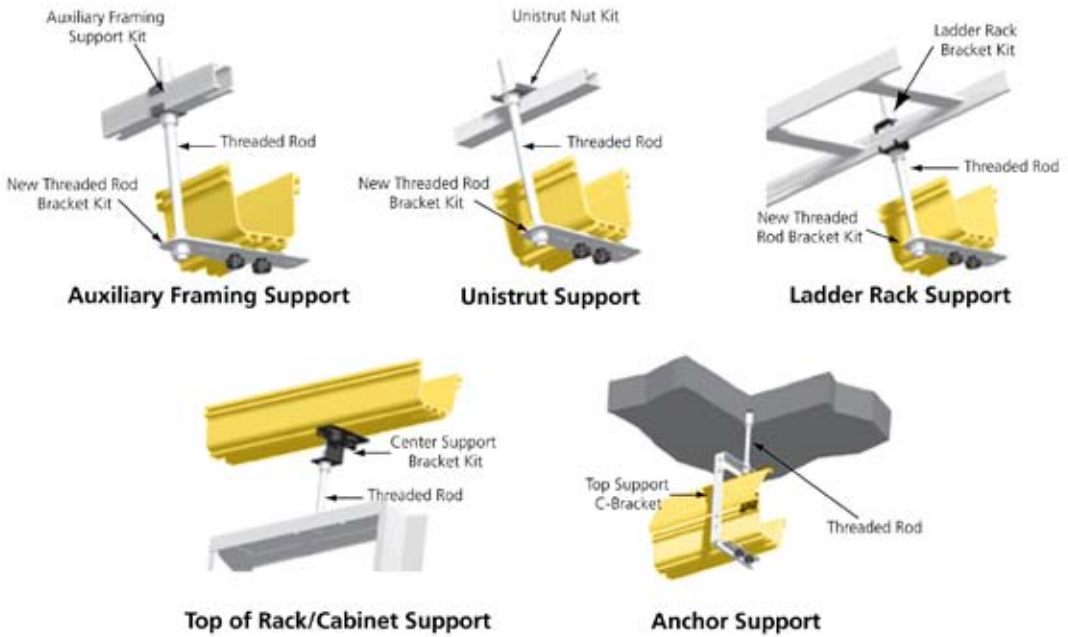**Raceway system with gap between opposing runs**
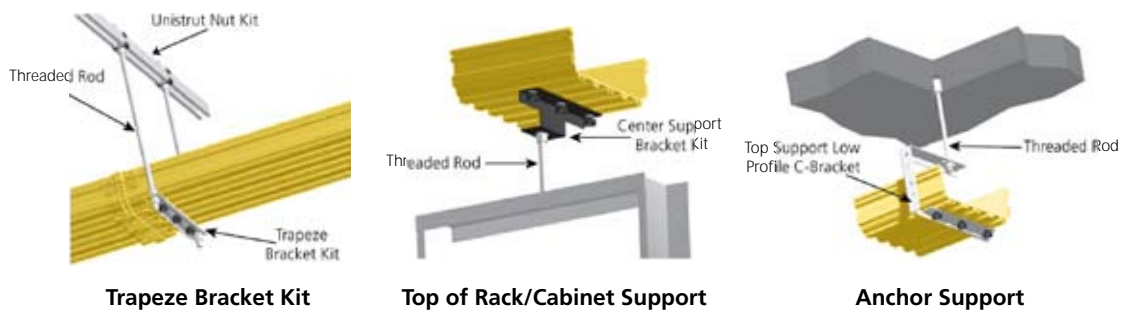
Expandable straight section extends to connect runs

Completed installation

FiberGuide® Systems

Applications

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FiberGuide® Systems

A variety of support kits are available for each FiberGuide® system. Whenever possible, FiberGuide support kits should be attached to existing hardware (cable racks, digital cableways, existing threaded rods or equipment racks).

2x6, 4x4, 4x6 Systems

Auxiliary Framing Support

Unistrut Support

Ladder Rack Support

Top of Rack/Cabinet Support

Anchor Support

4x12 System

Trapeze Bracket Kit

Top of Rack/Cabinet Support

Anchor Support

4x12 and 4x24 Systems

The straight sections on the 4x12 and 4x24 FiberGuide® system are exceptionally strong, making frequent placement of supports beneath them unnecessary. Whenever possible the supports should be placed under the fittings using the mounting bosses as shown (photos 1 and 2). This placement provides the strongest system and requires the least amount of support hardware to be used. Occasionally it is not possible to attach the support bracket to the mounting bosses on the fittings; in those instances the variable fitting support locator can be installed on the bottom of the fitting, allowing the support to be attached anywhere along the fitting bottom (photos 3, 4 and 5). When combining several straight sections, it is recommended that support brackets are installed on both sides of each junction.
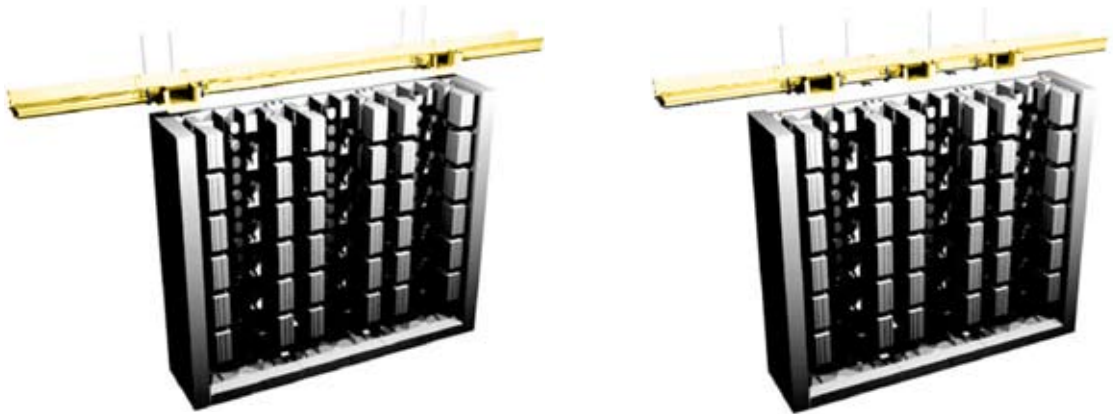
Typical 4x12 system installation over a Next Generation Frame Line-up

Variable Fitting Support Locator

Patch Cord Densities

FiberGuide® Systems

FiberGuide® Systems

Fiber Management Systems
Recommended Patch Cord Densities

Recommended capacity takes into consideration random jumper placement into the FiberGuide® system. Maximum density refers to the maximum number of fiber jumpers in a given cross-section of a FiberGuide installation. The TracerLight® Connector Identification System is ADC's newest patch cord solution. It features slightly different dimensions than standard patch cords.

Recommended/Maximum Density

1.7 mm Patch Cords (per in²)	2.0 mm Patch Cords (per in²)	3.0 mm Patch Cords (per in²)
120/142	90/102	40/44

Trough Pileup
Recommended/Maximum Density

	2-Inch	3-Inch	4-Inch
4x24 System			
1.7 mm	5760/6816	8640/10224	11520/13632
2.0 mm	4320/4869	6480/7344	8640/9792
3.0 mm	1920/2112	2880/3168	3840/4224
4x12 System			
1.7 mm	2880/3408	4320/5112	5760/6816
2.0 mm	2160/2448	3240/3672	4320/4896
3.0 mm	960/960	1440/1584	1920/2112
4x6 System			
1.7 mm	1440/1704	2160/2556	2880/3408
2.0 mm	1080/1224	1620/1836	2160/2448
3.0 mm	480/528	720/792	960/1056
4x4 System			
1.7 mm	960/1136	1440/1704	1920/2272
2.0 mm	720/816	1080/1224	1440/1632
3.0 mm	320/352	480/528	640/704
2x6 System			
1.7 mm	1440/1740	–	–
2.0 mm	1080/1224	–	–
3.0 mm	480/528	–	–
2x2 System			
1.7 mm	480/568	–	
2.0 mm	360/408	–	–
3.0 mm	160/176	–	–

TracerLight® Patch Cords—
65 Patch Cords per in²

	2-inch	3-inch	4-inch
4x24 System	3120	4680	6420
4x12 System	1560	2340	3120
4x6 System	780	1170	1560
4x4 System	520	780	1040
2x6 System	780	–	–
2x2 System	260	–	–

adc@gemcable.co.uk · www.gemcable.co.uk · 01727 845750

FiberGuide® Systems

For a more complete guide to engineering and planning a FiberGuide® installation, see ADCP-90-166, 4th Edition, Issue 3, March 1996, Section 4, Engineering and Installation Section. For additional technical information see ADCP95-005.

For main aisle runs and/or installations above high density fiber frame equipment, consider the 12" and 24" FiberGuide product.

For tributary runs and/or installations above fiber optic terminals (FOTs), consider the 4" and 6" FiberGuide product.

For height restricted environments, consider the 2x6" FiberGuide system.

Consider the use of variable support locators for the 4x12" and 4x24" FiberGuide systems. The variable support locators provide additional mounting options for support brackets underneath larger fittings such as horizontal T's or elbows.

Consider the use of Express Exits™ rather than the traditional downspouts for bringing fiber out of a straight section run and into a fiber optic terminal (FOT) bay. The Express Exit installs without tools and does not require any cutting for installation.

Calculate the maximum potential amount of fiber in a given line-up to determine the proper sized FiberGuide over that line-up. Considerations should be given to pile-up densities (see page 16 for recommended pile-up densities) and redundant routing paths which will have an effect on proper FiberGuide sizing.

For ordering information on system and support kit accessories, consider the use of the retrofit fin kit for potentially high traffic areas on the 4x4" or 4x6" FiberGuide systems (fins come molded into certain fittings on the 2x6", 4x12" and 4x24" systems). The fin helps to spread the pile-up of jumpers efficiently across the width of a given FiberGuide system especially at horizontal turns and intersections.

FiberGuide® Systems

For further details, please visit our new online catalogue or call our sales team.

Gem Cable Solutions
Unit 10, The Dencora Centre
Campfield Road
St. Albans
Hertfordshire
AL1 5HN

T. +44 (0) 1727 845 750

F. +44 (0) 1727 838 780

E. adc@gemcable.co.uk