



## FTTX Solutions

### Multiport Service Terminal (MST) and Hardened Drop Cables

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CommScope's FTTX infrastructure solutions are designed from the ground up to meet the unique requirements of FTTX networks. Designed for operational efficiency and scalability, CommScope's FTTX solutions simplify network installation, maintenance and management from the central office/head end to the outside plant.

The Multiport Service Terminal (MST) incorporates hardened connector technology that is designed to withstand the rugged outside plant environment. These uniquely designed hardened connectors are factory-terminated and environmentally sealed for use in optical drop cable deployments.

CommScope's Hardened Cables are environmentally robust to provide a reliable interface for fiber drop cables in the outside plant environment. At the same time, the hardened connector approach dramatically reduces splicing labor requirements. The rugged optical connector is hardened to protect against extreme temperature, moisture, UV, chemical exposure and other harsh conditions typically found in the outside plant.

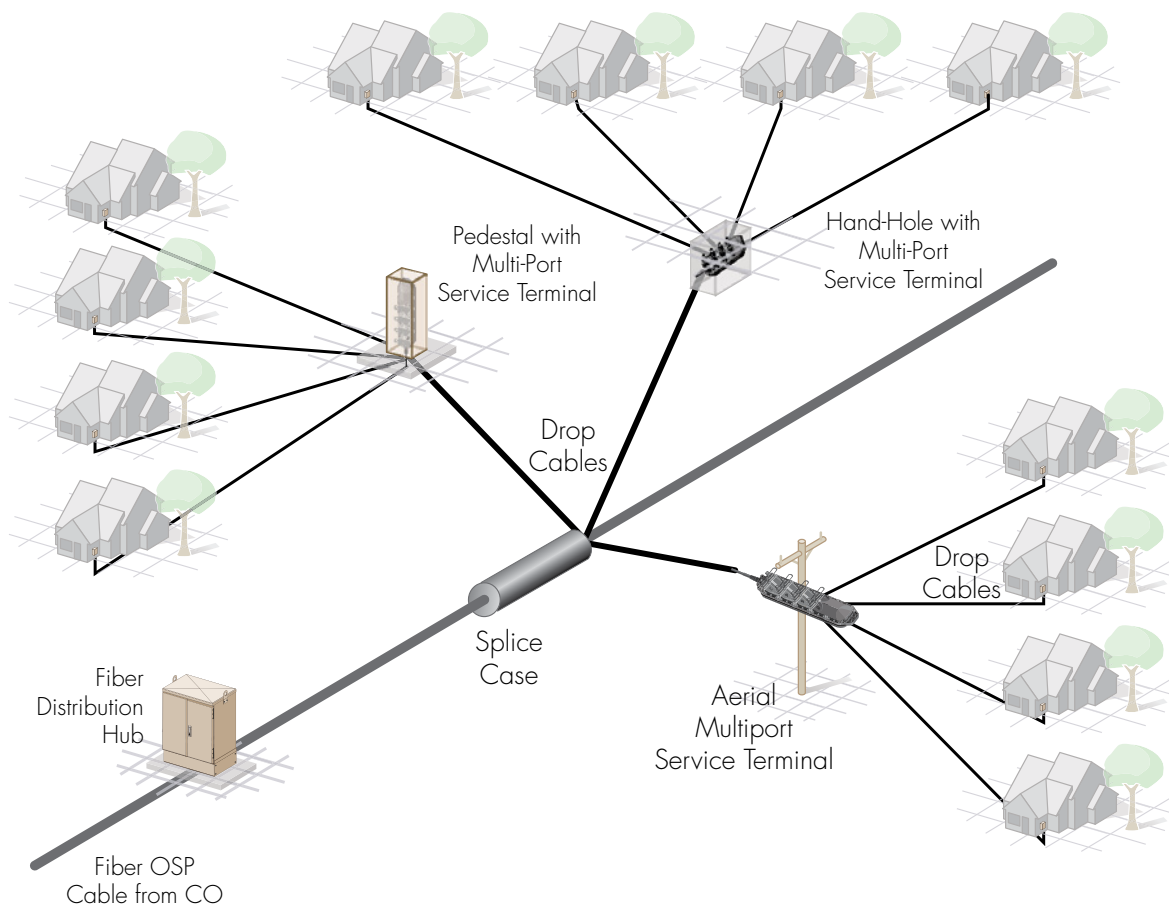
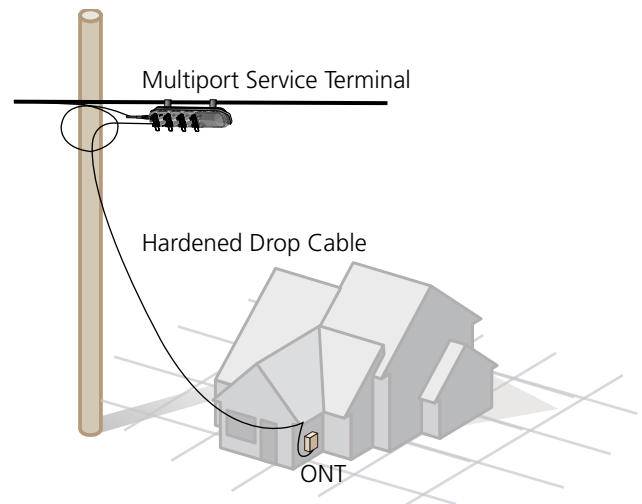
#### Benefits:

- Robust environmental performance: Withstands extremes in temperature and conditions
- Technician-friendly features: Intuitive design for ease of use
- Decreased installation and incremental maintenance hours: Significant savings
- Protection: Self-contained unit features hardened connectors for superior durability and reliability in the drop segment of the network
- Compatibility: Interoperability with industry standard hardened connectors

### Hardened Connector Architecture

#### Benefits

- The ultimate "Plug and Play" solution for durable and reliable service connection in the outside plant/drop segment of the network
- Technician-friendly and greatly simplifies installation and maintenance by minimizing splicing required on the distribution side of the network
- Cost effective solutions that provide for lower overall installed costs throughout the FTTX network
- Facilitates easy troubleshooting as maintenance can be done at the MST by simply unplugging a connector rather than breaking a splice or going directly to the side of the home



Hardened Connector Architecture

### Business Case: Hardened Connector Technology vs. Field Splicing

A cost model comparing the installation costs of the traditional spliced FTTX architecture with one that incorporates MST hardened connector technology in a 192-home subdivision is provided below. Using the MST model, cable costs decreased by over 85% due primarily to the cable now being included in the terminal costs. The cost of pulling fiber cables decreased by about 25% and splicing costs were about 70% lower. Even though the MST approach added additional costs for service terminals, the overall cost was significantly lower for the distribution side of the network—approximately 19% less per home passed.

The drop cable portion of the network, between the service terminals and the ONTs, also reaps many advantages through a hardened drop connector approach. The technician can simply use a pre-connectorized drop cable, pre-connectorized at both ends in the factory and cut to specific lengths, to install between the service terminal and the home. These cables can be installed by any technician, possibly the same person connecting the electronics at each home. This greatly reduces the cost of drop cable installations in terms of time and skill level. A technician simply has to clean the connector faces at each end and plug them in.

The overall cost of using factory-connectorized drop cables in place of spliced bulk drop cable was at least 25% less. Since service providers can realize a combined savings of nearly 25% in the entire OSP portion of the fiber plant, the business case for the architecture that incorporates MST hardened connectors is compelling.

Furthermore, additional operational savings can be reaped over the life of the network. The operational cost savings gained from having a connectorized FTTX infrastructure becomes evident in terms of faster service turn-up, ease of maintenance and troubleshooting, the need for fewer splice technicians/equipment, and overall fewer truck rolls. Overall, the hardened drop connector approach incurs lower total installed costs for the FTTX network.

Spliced Approach		Hardened Drop Connector Approach	
Hand-Hole Costs	\$10,000.00	Hand-Hole Costs	\$11,194.00
Cable Costs	\$15,000.00	Cable Costs	\$1,538.00
Cable Placing Costs	\$75,000.00	Cable Placing Costs	\$56,650.00
Splicing Costs	\$9,072.00	Splicing Costs	\$2,988.00
Terminal Costs	\$0.00	Terminal Costs	\$16,072.00
<b>Total Costs</b>	<b>\$109,072.00</b>	<b>Total Costs</b>	<b>\$88,442.00</b>
<b>Cost/Home Passed</b>	<b>\$568.08</b>	<b>Cost/Home Passed</b>	<b>\$460.63</b>

Specific cost model based on a phased project for a 192 home subdivision, featuring eight homes per block.

### Features

- Available in 2, 4, 6, and 8 port configurations
- Flexible mounting options including pole, pedestal, hand hole or strand to support both aerial and below grade applications
- Tested to meet GR-326, GR-771 and GR-3120 standards for robust environmental performance
- Connection interface utilize factory terminated high-performance SC/APC connectors
- Hardened adapters provide environmentally secure interface for fiber drops
- Factory sealed enclosure provides resistance to environment
- Improved structural design withstands stress and impact
- Re-enterable enclosure allows for easy technician access for repairs
- Superior cable and fiber management ensures proper bend radius, prevents cable strain and minimizes kinking
- Available with dielectric and armored input stub cables in standard lengths
- Compatible with legacy hardened connector systems
- User-friendly packaging allows for easy un-spooling

# FTTX Solutions

## Multipoint Service Terminal (MST)

### MST Specifications

Terminal	Dimensions (LxWxH)	Ports/Homes Served
MST-04	12.14" x 3.95" x 2.86" (30.84 x 10.03 x 7.26 cm)	4
MST-02	12.14" x 3.95" x 2.86" (30.84 x 10.03 x 7.26 cm)	2
MST-06	17.34" x 3.95" x 2.86" (44.04 x 10.03 x 7.26 cm)	6
MST-08	17.34" x 3.95" x 2.86" (44.04 x 10.03 x 7.26 cm)	8



### MST Ordering Information

MST - XX M H 0 0 - X XXXX X

#### Terminal Model

02	2-Port
04	4-Port
06	6-Port
08	8-Port

#### Cable Type

A	Dielectric – Flat – Loose Tube
B	Locatable – Flat – Loose Tube
C	Armored – Round – Loose Tube

#### Mounting Style\*

U	Universal: Terminal is on top of the spool, stub deploys first
A	Reverse Spool: Terminal is on the bottom of the spool, terminal deploys first

\* 0 - 300' length of cable is automatically coiled (option U), greater than 300' cable length, chose U or A option.

#### Cable Stub Length

0050	50 Feet
0100	100 Feet
0250	250 Feet
0500	500 Feet
0750	750 Feet
1000	1000 Feet
1500	1500 Feet
2000	2000 Feet

Standard lengths shown.



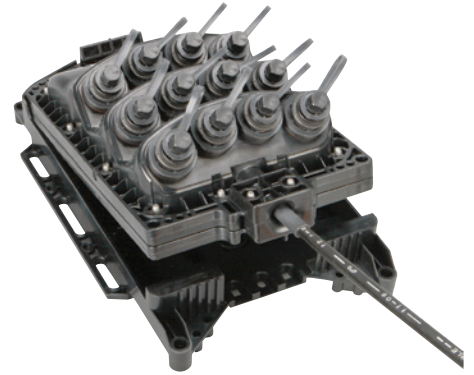
### Spool Specifications

Spool	Dimensions	Cable Length: Dielectric	Cable Length: Toneable	Quantity per Pallet
Small	20 x 20 Flange, 5.5" CORE	301' - 1000'	301' - 750'	12
Medium	20 x 20 Flange, 9" CORE	1001' - 2000'	751' - 1500'	8
Large	20 x 20 Flange, 12.5" CORE	2001' - 3000'	1501' - 2250'	8

# FTTX Solutions

## Multiport Service Terminal (MST)

The 4x3 terminal body is optimized form factor below grade enclosures and hand holes. The 12 port configuration provides superior technician access by providing three rows of four hardened adapters.



### MST Specifications

Terminal	Dimensions (LxWxH)	Ports/Homes Served
MST-06	11" x 6" x 3.25" (27.94 x 15.24 x 8.25 cm)	6
MST-08	11" x 6" x 3.25" (27.94 x 15.24 x 8.25 cm)	8
MST-12	11" x 6" x 3.25" (27.94 x 15.24 x 8.25 cm)	12

### MST Ordering Information

MST - XX R H 0 0 - X XXXX X

#### Terminal Model

06	6-Port
08	8-Port
12	12-Port

#### Cable Type

A	Dielectric – Flat – Loose Tube
B	Locatable – Flat – Loose Tube

#### Mounting Style\*

U	Universal: Terminal is on top of the spool, stub deploys first
A	Reverse Spool: Terminal is on the bottom of the spool, terminal deploys first

\* 0 - 300' length of cable is automatically coiled (option U), greater than 300' cable length, chose U or A option.

#### Cable Stub Length

0050	50 Feet
0100	100 Feet
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0500	500 Feet
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Standard lengths shown.

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Spool	Dimensions	Cable Length: Dielectric	Cable Length: Toneable	Quantity per Pallet
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## FTTX Solutions

### Multiport Service Terminal (MST)

## MST Universal Mounting Brackets

CommScope's MST products have a versatile mounting scheme, allowing all versions of the product to be mounted on a pole, in a pedestal, in a hand hole or to a strand in support of both aerial and below grade applications. All mounting solutions provide a robust, user friendly and cost-effective option for delivering fiber optic service drops in FTTX deployments and allow for efficient craft access to connections.



Pole Mount



Pedestal Mount



Hand Hole Mount

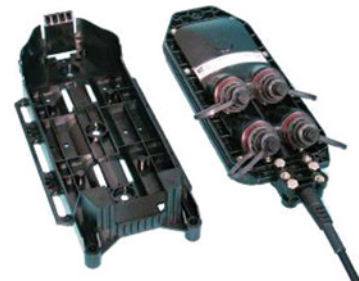


Strand Mount

CommScope's MST Universal Mounting Brackets provide a universal mounting solution to support the versatile MST mounting options including pole, pedestal, hand hole and strand applications. These brackets provide for simple, secure, economical and rapid terminal installation in any FTTP deployment.

## Features

- Single bracket compatibility for all mounting schemes
- Designed to save time and cost, reduce complexity and necessary logistics, and streamline process of mounting MST
- Snap-in/snap-out installation easily engages/disengages MST with an audible snap engagement and single latch release making MST readily available for drop cable connections or re-connections
- Rigid plastic structure using same materials as MST to withstand environmental exposures, including contracting/expanding temperatures
- Bracket mounted separately minimizing risk of damage to MST
- Eliminates need for additional bracket inventory and materials in field
- Stands up under high vibration or stress created by cables placed in the MST

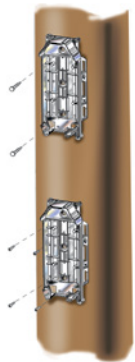


# MST Mounting Accessories

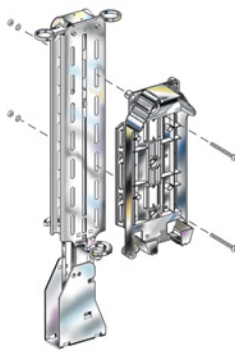
## Ordering Information

Product Description	Part Number
<b>Universal Mounting Bracket</b>	
2- and 4-port dielectric cable stub MST	MSTUMB-0204
6- and 8-port dielectric cable stub MST / 2- and 4-port armored stub MST	MSTUMB-0608
4x3 Terminal in all Configurations.	MSTUMB-4312
Strand Mount Bracket	MSTACC-M02
<b>8" Pedestals<sup>1</sup></b>	
with Vented Cover	MSTACC-W10
with Bell Jar Cover	MSTACC-Y10
with Vented Cover and Grounding	MSTACC-W10G
with Bell Jar Cover and Grounding	MSTACC-Y10G
<b>Hand Hole Kits</b>	
33.25" L x 22.50" W x 24.00" H kit with swing arm	MSTACH-C730Y300
40.00" L x 28.50" W x 24.00" H kit with swing arm	MSTACH-C436Y300

<sup>1</sup> Industry standard pedestals with mounting hardware also available. Please contact the CommScope Technical Assistance Center at 1-800-366-3891 for more information.



Pole Mount Installation



Below Grade Installation



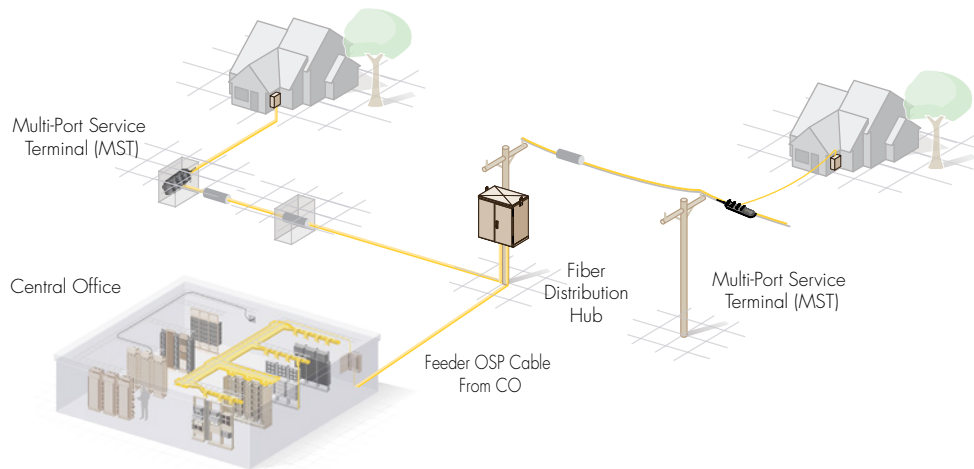
Aerial Mount Installation

## FTTX Solutions

### Multiport Service Terminal (MST)

#### Application

Hardened Connectors are used to connect Multiport Service Terminals (MST) typically located at the street with Optical Network Terminals (ONTs) located at the premises. The hardened connector is connected to hardened adapters on the enclosure's external surface so that connections can be completed without opening the enclosure. The application facilitates rapid deployment of optical services by quickly and efficiently connecting hardened connectors to the terminal at the street and the ONT at the premises. Hardened connectors may be installed anywhere fiber terminals are installed including aerial and below grade applications.



#### SC Technology

The hardened connector is based on standard SC connector technology. The hardened connector contains an SC style inner connector as the basis for coupling inside the connector thus conforming to industry standards including GR-326 and FOCIS. The SC connector allows easy and secure connection while ensuring reliability and compatibility with a wide range of SC connectors and adapters currently on the market. This hardened connector is fully compatible with legacy hardened adapter systems that utilize the SC as the core of the adapter design.

#### Cable Types

CommScope's Drop Cable assemblies are available with hardened connectors in several different cable configurations, including:

- Flat Dielectric Cable
- Flat Dielectric Cable with 24AWG Toneable Wire

All cables used with the hardened connector are tested to GR-20 and designed to GR-3120.

#### Size and Configuration

CommScope's drop cable assemblies with hardened connectors are available in standard lengths from 75 to 2000 feet. Longer or shorter assemblies are available upon request. Cable assemblies are available with one or both ends connectorized. Single ended connectorized cables may sometimes be spliced at the premises.



# FTTX Solutions

## Multiport Service Terminal (MST)

### Features

- Single-fiber, single-mode hardened connector SC APC drop cable assemblies
- Available with one or both ends connectorized
- Available standard lengths – from 75 to 2000 ft increments (longer assemblies available upon request)
- Environmentally sealed connector
- Easy connection to hardened adapters on terminals or closures
- Arrow on hardened connector shell ensures precise alignment of connector into optical port.
- Connector can be pulled through 1.25-inch conduit
- Pulling eye on connector cap is designed for 100 lb. maximum pulling tension
- Drop cable fully tested to GR-20 and designed to GR-3120
- Provide the ultimate “Plug and Play” solution for durable and reliable service connection in the outside plant/drop segment of the network
- Technician-friendly to greatly simplify installation and maintenance by minimizing splicing required on the distribution side of the network
- Cost effective solutions that provide for lower overall installed costs throughout the FTTX network



### Hardened Drop Cable Ordering Information

**FHD - H X 1 X - XXXX X X**

**Connector 1**

H	Hardened ASC
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**Connector 2**

H	Hardened ASC
O	Stub end/none
J	SC/APC Connector

**Cable Type**

A	Dielectric/Flat
B	Locatable/Flat

**Special Request\***

L	Coiled
L	Spoiled: Connector 1 deploys first from spool
R	Spoiled: Connector 2 deploys first from spool

\* Cable length 0 - 1000 FT is automatically coiled unless the code "L" or "R" is specified.

**Unit of Measure**

F	Feet
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**Length\***

0050	50 feet	0300	300 feet	0600	600 feet	1100	1100 feet	1600	1600 feet
0100	100 feet	0350	350 feet	0700	700 feet	1200	1200 feet	1700	1700 feet
0150	150 feet	0400	400 feet	0800	800 feet	1300	1300 feet	1800	1800 feet
0200	200 feet	0450	450 feet	0900	900 feet	1400	1400 feet	1900	1900 feet
0250	250 feet	0500	500 feet	1000	1000 feet	1500	1500 feet	2000	2000 feet

### Spool Specifications

Spool	Dimensions	Cable Length: Dielectric	Cable Length: Toneable	Quantity per Pallet
Medium	20 x 20 Flange, 9" CORE	1001' - 2000'	1001' - 1500'	12
Large	20 x 20 Flange, 12.5" CORE	2001' - 3000'	1501' - 2500'	8

## FTTX Solutions

### Multiport Service Terminal (MST)

As the leader in flexible, value added cable management solutions, CommScope allows customers to connect the Optical Network Terminal (ONT) to the drop point in multiple ways:

- Hardened connectors
- Spliced cables
- Standard SC adapters

### Features

- Standard connector on one end, stub or hardened connector on other end
- 18" 2.0 mm breakout from flat drop cable
- Dielectric toneable cable type
- Ability to be pulled through smaller conduit sizes (1/2", 3/4")
- Eliminates need for purchased pigtails and splice tray at ONT



### Ordering Information

Product Description	Part Number
<b>Hybrid Cables; Hardened to Standard APC SC, locatable cable</b>	
105'	FHD-HJ1B-0105F
120'	FHD-HJ1B-0120F
135'	FHD-HJ1B-0135F
150'	FHD-HJ1B-0150F
165'	FHD-HJ1B-0165F
180'	FHD-HJ1B-0180F
200'	FHD-HJ1B-0200F
250'	FHD-HJ1B-0250F
300'	FHD-HJ1B-0300F
350'	FHD-HJ1B-0350F
<b>Standard APC SC Single End to Stub; locatable cable</b>	
100'	FHD-J01B-0100F
150'	FHD-J01B-0150F
200'	FHD-J01B-0200F
250'	FHD-J01B-0250F
300'	FHD-J01B-0300F
500'	FHD-J01B-0500F
1000'	FHD-J01B-1000F
1500'	FHD-J01B-1500F
2000'	FHD-J01B-2000F

\*Other Lengths and Configurations Available, Contact CommScope's Technical Assistance Center 800-366-3891

## FTTX Solutions

### Multiport Service Terminal (MST)

CommScope's Hardened Connector Test Kit is a durable, waterproof and portable bag that houses all the testing and maintenance tools needed for a hardened connector architecture. This kit includes a heavy duty water-resistant carrying case with individual pockets for organizing the test cables, adapters, cleaning kit, technical cleaning and turn-up documentation and the product reference sheet. The rugged case also allows for additional space for carrying other related items and/or test equipment required by the technician.



## Features

- Durable, waterproof, and portable bag houses all testing and maintenance tools needed for a hardened connector architecture
- Test cables and adapters provide transition from hardened to standard SC connector interfaces
- Cleaning kit for the hardened drop cable/adaptor includes a cleaning cassette and 50 hardened adapter cleaning swabs
- Quick reference ordering guide is included to replenish kit consumables
- Simplified turn-up and cleaning instructions
- “One-stop” test resource for technicians supporting hardened connector architectures
- “User friendly” packaging to accommodate additional space/ compartments for key testing equipment (i.e. OTDRs, power meters) to support overall technician needs

## Ordering Information

Product Description	Quantity	Part Number
<b>Hardened Connector Test Kit</b>	1	FHD-TKIT-1
<b>Individual Components of the Hardened Connector Test Kit:</b>		
Hardened Connector Test Kit Bag	1	FHD-TKIT-BAG
Test Cable, 10', 3.0 mm, hardened connector to standard APC - SC connector	1	FHD-HJ1R-0010F
Test Cable, 10', 3.0 mm, hardened connector to standard UPC - SC connector	1	FHD-HN1R-0010F
Test Cable, 10', 3.0 mm, hardened connector to stub	1	FHD-HO1R-0010F
APC SC to APC SC Jumper, 3M	1	FPC-APSC-S-3M
APC SC to UPC SC Jumper, 3M	1	FPC-SPSC/APSC-S-3M
Hardened Adapter - Hardened to standard APC SC	2	RC-ADP-SCA-SM
Hardened drop cable/adaptor cleaning kit; includes hardened connector cleaning cassette (150 uses) and fifty (50) hardened adapter cleaning sticks	1	FHD-ACC-CLINKIT1
MST/hardened drop cable user manual	1	ADCP-96-040
<b>Accessories</b>		
Cleaning swabs	50	FHD-ACC-CLINCTN
Cleaning Cassette	1	FHD-ACC-CLNCSS



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