IP CCTV

Networking Cabling, Accessories & Active Equipment
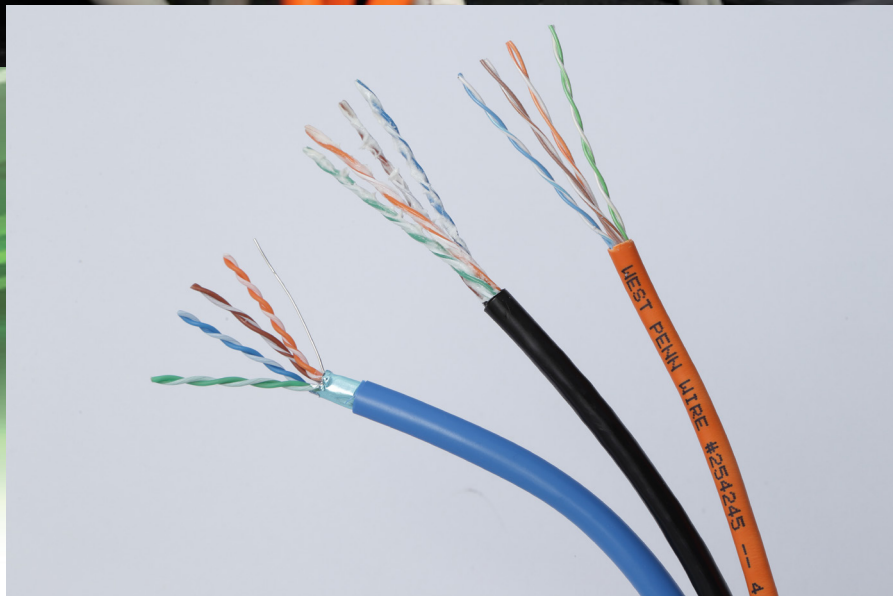
IP Video Systems
IP surveillance systems are relatively new to the market. In a typical IP-based video surveillance system, network (IP) cameras are connected directly to the Local Area Network (LAN) and transport digital video across the IP network via UTP cabling and switches, recording video to any PC or server on the network. Since the cameras are IP addressable, they are able to be accessed from anywhere in the world, provided the user has the sufficient network access and security privileges.

Benefits of Using Fiber Optics in Video Security and Surveillance
In the ever-increasing reach of today's video security and surveillance systems, many security professionals are finding that the quality, bandwidth and distance needed to perform even the most basic surveillance is beyond the reach of coaxial and UTP cabling. In fact, even though IP-based video security systems are gaining popularity, they face a serious distance limitation of 100 meters (328ft) or less over UTP cabling infrastructure. This poses an insurmountable hurdle when trying to monitor the many outreach locations of a typical surveillance installation.

While fairing slightly better in copper distance limitations, most analog-based CCTV systems prove effective and economical only if the coaxial cabling runs are held to less than 750ft (228m). Utilizing coax beyond that distance, however, poses a number of problems, some of which are not immediately obvious. For instance, let's say your monitor is located 1,000ft (304m) from the camera. In that scenario, without any active signal conditioning, approximately 37 percent of the high frequency information will be lost in transmission, providing a seriously degraded image. In fact, since you cannot see information that is not there, you may not even realize that information has been deleted.

To accommodate lengths greater than 750ft (228m) on a coax infrastructure, you must make certain that some provision has been made to guarantee the video signal's transmission strength such as the use of signal amplification, ground fault correction and surge protection. Installing these items will inevitably increase the cost of the system considerably, making alternative cabling methods more attractive.

In fact, the use of fiber optic cable will allow for cable runs of over 1500m (5,000ft) on multimode and distances of over 10km (6.2 miles) on single-mode cable. In addition to distance extension, fiber optics also presents a number of other unique benefits not present in either coax or UTP cabling:
• Smaller size and better tensile strength, making it easier to install when pulling through conduit or in overhead cable trays
• High degree of security as fiber is inherently difficult to tap into or interfere with
• Immunity to electrical interference such as:
   o Electromagnetic interference (EMI)
   o Radio frequency interference (RFI)
   o High voltages found in fluorescent lights, card access door strikes and outdoor lighting systems
   o Induced voltages (ground loops), which cause picture distortion and audio interference
• Higher bandwidth
• Improved reliability and overall transmission performance

Local area networks (LANs) very commonly deploy fiber optics as the network backbone between buildings or in vertical risers of multistory buildings. Utilizing this infrastructure already in place would be an attractive transmission alternative to risking the distance and quality issues common to coax and UTP video systems. Accessing this fiber optic cabling can be a challenge for most video security professionals, as the majority of new cameras and monitors on the market today are unavailable with fiber optic ports on them. In addition, most existing video security and surveillance systems were designed and installed with coax or UTP cabling. To improve the quality, bandwidth and distance of these existing systems by transporting the video on fiber optic cabling, a method is required to convert the electrical video signal over to an optical format.

IP Video Conversion
• Ethernet Media Converters – powered devices that convert an IP- based video signal on UTP over to a fiber optic medium
• Power over Ethernet (PoE) Media Converters – powered devices that convert an IP-based video signal UTP over to a fiber optic medium, as well as inject the power onto the UTP necessary to power remote IP cameras

Media converters come in a variety of form factors and sizes ranging from miniature, standalone devices that attach directly to a camera to managed, chassis-based devices allowing for full SNMP monitoring and management of the media converters.

In addition to providing a means for transparently connecting one type of media to another, media conversion can provide a cost-effective method for integrating a hybrid video security and surveillance system into one, seamless and manageable entity. Imagine the cost savings that can be realized by utilizing an existing, analog-based CCTV infrastructure, while implementing the latest technology of IP-based cameras for specialized video capture, storage or analysis, as well as additional surveillance locations.
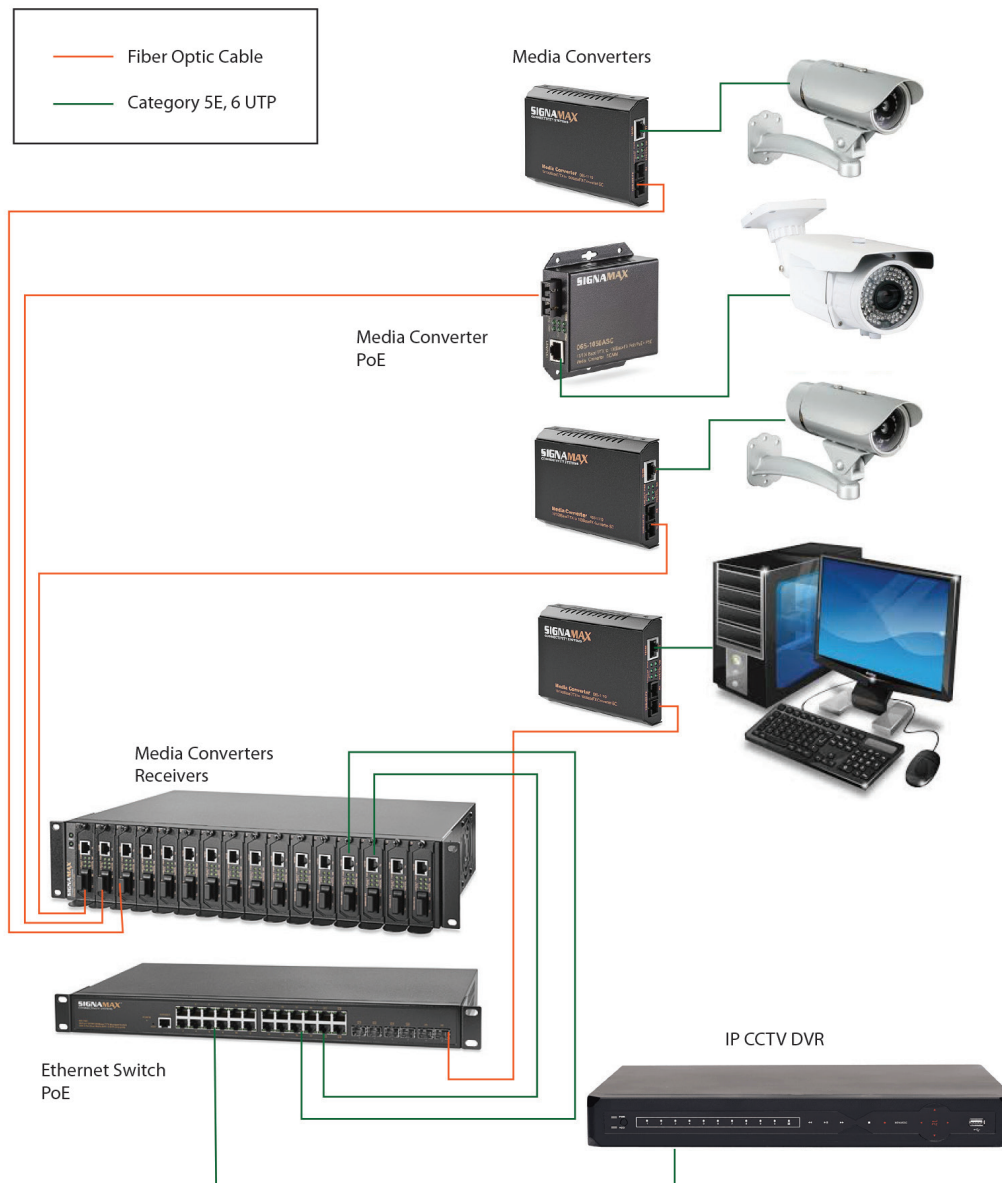
Access Video Any Time, Any Place
With IP-based systems, video feeds are encoded into Motion JPEG or MPEG-4/H.264 formats and stored as a digital image on a computer disk array. This provides the ability to access the video, by way of the networked digital video recorder, through the IP network at any time, from any place. These digital images do not degrade in quality from duplication like analog recordings on magnetic tape. They can be replicated and posted on web servers, distributed to law enforcement as E-mail attachments, and sent to news outlets. When analog-based systems were the norm, loss prevention/investigations staff had to visit the location of the incident to view the video on a tape or DVD, which would need to be shipped by overnight courier. These inefficiencies no longer exist with IP-based systems and WAN connectivity to the physical location.

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IP CCTV Design

In an IP-CCTV design, the cable is an important link from equipment to camera. Category cables such as Category 5E and Category 6 UTP are essential to this design. The cabling distance of category cables is up to 330ft. For distances beyond 330ft, fiber optic cables are needed with media converters. Fiber media converters support many different data communication protocols including Ethernet, Fast Ethernet overtwisted pair, multimode and single-mode fiber optics. Media converter types range from small standalone devices and PC card converters to high port-density chassis systems that offer many advanced features for network management.

Fiber Optic Cable

Category 5E, 6 UTP

Media Converters

Media Converter
PoE

Media Converters
Receivers

Media Converters
Receivers

Ethernet Switch
PoE

IP CCTV DVR

![WEST PENN WIRE — Since 1971]

AV, SECURITY & NETWORKING SOLUTIONS

IP Cabling

Network cabling is used to describe cabling that links network devices in user work areas (WAs) to network equipment located in the telecommunications room (TR). This cabling generally extends horizontally along floors, walls and ceilings.

Distance: 90m link - Link is the bulk cable run without assemblies or patch cables.
100m channel - Channel is the entire run of cable, including assemblies and patch cables.

Topology: Star configuration - from hub to desktop.

Cabling Media Types

• 4-pair 100 ohm Impedance UTP (Unshielded Twisted Pair) or F/UTP (Foil over UTP - Shielded).

    • **Category 5E:** TIA/EIA-568.B.2
        • 4-Pair 24AWG
        • Voice or Data - Data: 10/100BaseT Ethernet
        • UTP or F/UTP Design

    • **Category 6:** TIA/EIA-568-B.2-1
        • 4-Pair 24 or 23AWG
        • Data: 100/1000BaseT Ethernet
        • UTP or F/UTP Design

    • **Category 6A:** TIA/EIA-568-B.2-10
        • Augmented Cat6
        • 4-Pair 23AWG
        • Data: 100/1000/10000BaseT Ethernet
        • UTP or F/UTP Design

    • **Category 7:**
        • 4-Pair 23 or 22AWG
        • Data: 10GBaseT Ethernet
        • S/FTP Design - Shielded over Shielded Pair
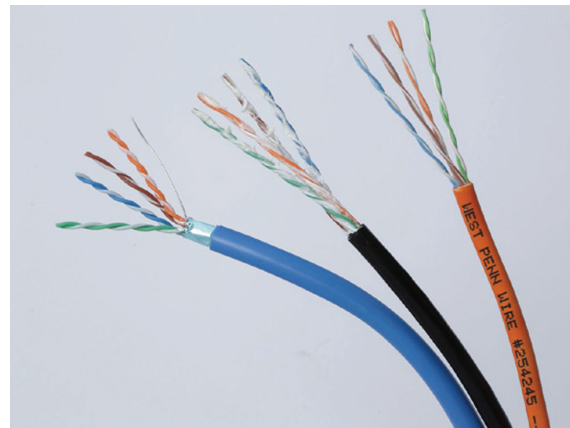
• Optical Fiber OM1, OM2, OM3, OM4 Design

    • **OM1:** 62.5/125µm Fiber Shorter Runs
    • **OM2:** 50/125µm
    • **OM3:** 50/125µm Laser Optimized 10G Network
    • **OM4:** 50/125µm 40G Network

West Penn Wire Bulk Cables
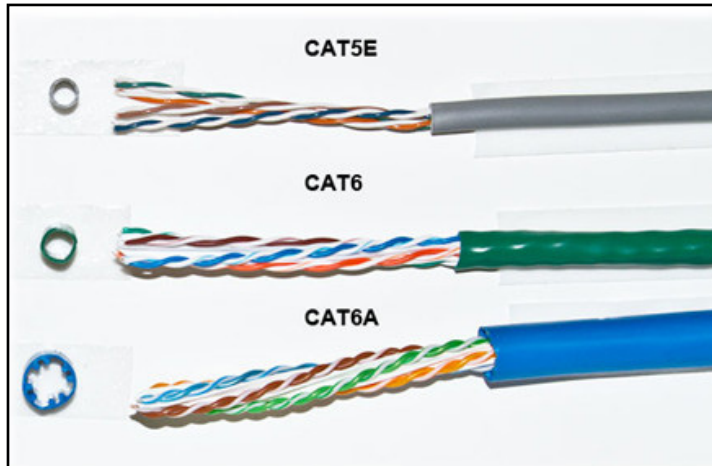
Environment	Category 5E UTP	Category 6 UTP	Category 6A UTP
Non-Plenum	4245	4246	4246A
Plenum	254245	254246	254246A
Indoor/Outdoor	4245IO	4246IO	
Outside Plant	4245OSP	4246OSP	
Armored	M57562		

Mechanical Characteristics

Pull Tension:
Cat5E   25lbf
Cat6   25lbf
Cat6A   35lbs

Bend Radius:
Category Cable   4 x cable O.D.

Connectors

RJ45 Jacks

Registered Jacks (RJ)45 are data connectors with 8P8C. There are a variety of RJ-style connectors.
RJ11/RJ12 - Found in houses and offices for telecommunication voice.
RJ45 - Found for networking and data applications.

The RJ45 Jacks allow T568A or T568B wiring.

Back View of Keystone Jack

SX-KJMT-8600
4-Pair Termination Tool

RJ45 Jacks can be terminated by a single punchdown tool or a multi-termination tool, such as our KJMT-8600.

RJ45 Jack Style

Category 5E   UTP or Shielded
Categoy 6   UTP or Shielded
Category 6A   UTP or Shielded

UTP RJ45 Jacks are available in multiple colors:
Black, Blue, Red, Yellow, Orange, Green.

F/UTP RJ45 Jacks have to be shielded or metal.

Type	Category 5E UTP	Category 5E F/UTP	Category 6 UTP	Category 6 F/UTP	Category 6A UTP	Category 6A F/UTP
West Penn Branded	RJ456U-C6C-cc KJWP-TOOL	RJ456S-C6C-24	RJ456U-C6C-cc KJWP-TOOL	RJ456S-C6C-24		RJ456AS-C6A-24
MT Series	KJ458MT-C5E-xx	KJS458MT-C5E	KJ458MT-C6C-xx	KJS458MT-C6C	KJ458MT-C6AC-xx	KJS458MT-C6AC
Tool Less		KJS458TL-C5E		KJS458TL-C6C		KJS458TL-C6AC
MT Tool	KJMT-8600	KJMT-8600	KJMT-8600	KJMT-8600	KJMT-8600	KJMT-8600
Pair Separation	TL-CATWIREST	TL-CATWIREST	TL-CATWIREST	TL-CATWIREST	TL-CATWIREST	TL-CATWIREST

Modular Plugs

Modular plugs are not normally part of the installation techniques in the work area. But there might be times where you may have to install and terminate a modular plug.

T568B cable color code, while loading into a modular plug.
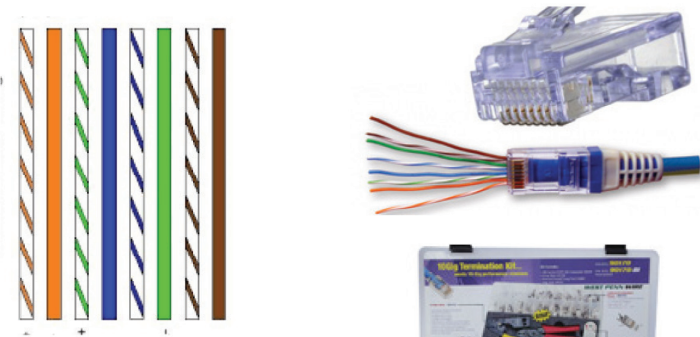
Modular Plug Style

Category 5E	UTP or Shielded
Categoy 6	UTP or Shielded
Category 6A	UTP or Shielded

West Penn Wire offers EZ Modular Connectors and standard plugs for Category 5E and 6 UTP.
For our Category 6 and 6A shielded cables, West Penn Wire offers complete modular kits (90170-BI).

Type	Category 5E UTP	Category 5E F/UTP	Category 6 UTP	Category 6 F/UTP	Category 6A UTP	Category 6A F/UTP
EZ Plug	32-EZP	CN-EZP-STP	32-6EZP			
Loading Bar	32-2198UL		HL-326198UL	106190	106190	106090
Standard Plug	HJ-325998UL	32-2098UL			CN-CAPFMUL-S1	
Kits				90170-BI	90170-BI	90170-BI
Crimp Tool	TL-EZRJ45PROCT	TL-EZRJ45PROCT	TL-EZRJ45PROCT	12515C	12515C for 106190	12515C
Strip Tool	TL-15015	TL-15015	TL-15015	15010C	15010C	15010C
Pair Separation	TL-CATWIREST	TL-CATWIREST	TL-CATWIREST	TL-CATWIREST	TL-CATWIREST	TL-CATWIREST
Boats	32-1900-xx	32-1900-xx	32-1900-xx	CN-B0051	CN-B0051	CN-B0051

Wall Plates

Wall plates can come in Keystone, Decora or Modular styles. The Keystone plates are mostly used in IP-CCTV installations.

KEYSTONE Type	Keystone Style Plates West Penn	Keystone Style Plates	Keystone Style Plates w/Label	Keystone Style Plates Stainless	Keystone Adapters
1G, 1 Port	SGKF-1	SKF-1	SKFL-1	SSKF-1	CMK-BA
1G, 2 Port	SGKF-2	SKF-2	SKFL-2	SSKF-2	CMK-BL
1G, 3 Port	SGKF-3	SKF-3	SKFL-3	SSKF-3	CMK-BNC75
1G, 4 Port	SGKF-4	SKF-4	SKFL-4	SSKF-4	CMK-F3
1G, 6 Port		SKF-6	SKFL-6	SSKF-6	CMK-HDMI
2G, 6 Port		DKF-6	DKFL-6		CMK-LC
2G, 8 Port		DKF-8		DSKF-8	CMK-PCTRS
2G, 12 Port		DKF-12	DKFL-12	DSKF-12	CMK-SC
					CMK-USB

Decora

DECORA® Type	Keystone Adapter Plates	1G Decora Style	2G Decora Style
1G, 1 Port	DA-1	SKFD-1	DKFD-2
1G, 2 Port	DA-2		
1G, 3 Port	DA-3		
1G, 4 Port	DA-4		
1G, 6 Port	DA-6		
2G, 6 Port	DKF-6		
2G, 8 Port	DKF-8		
2G, 12 Port	DKF-12		

Modular Style

MODULAR Type	Plates	Adapters	Adapters 2 Port
1G Modular	SGF-06		
2G Modular	SGF-12		
BNC		SCM-1BNC	SCM-2BNC
"F" Type		SCM-1F	SCM-2F
LC		SCM-1LC	SCM-2LC
SC			SCM-2SC
CAT 5E			SCM245-C5E
CAT 6			SCM245-C6C
HDMI		SCM-1HDMI	SCM-2HDMI
USB		SCM-1USB	SCM-2USB
VGA		SCM-1VGATB	

Cable Assemblies Work Area

Cable assemblies are needed at the work area location to allows signals to be guided from the wall plate (RJ45 Jack) to the computer or IP device.

Network assemblies are available for Category 5E, Category 6 and Category 6A.

For the network, UTP cables assemblies are available in multiple colors:
Black, Red, Yellow, Orange, Green, Pink

F/UTP network assemblies are usually only available in a gray jacket, but other colors can be ordered.

Network assemblies are available in a variety of lengths:
3, 5, 7, 10, 15, 20, and 25 feet.

West Penn Wire also offers a pulling eye networking tool for pulling long lengths.

Cable Assemblies Telecommunication Closets and Equipment Room

Cable assemblies are needed at the TC or ER location to allow signals to be guided from the patch panel (RJ45 Jack) to the computer or network switching devices.

Type	Category 5E UTP	Category 5E F/UTP	Category 6 UTP	Category 6 F/UTP	Category 6A UTP	Category 6A F/UTP
West Penn Brand	C6-CA1-cc-xx		C6-CA1-cc-xx			
Component Level	C5EC-114cc-xxFB	C5ES-314GY-xxFB	C6C-114cc-xxFB	C6CS-314GY-xxFB	C6A-114cc-xxFB	C6AS-314cc-xxFB
Channel Level No Boots	C5E-121cc-xxFB		C6C-115cc-xxFB			
Channel Level with Boots	C5E-114cc-xxFB					

CC: Colors
Black (BK), Blue (BU), Green (GN), Gray (GY), Orange (OR), Red (RD), White (WH), Yellow (YE)

xx: Lengths
3, 5, 7, 10, 15, 20, 25 feet

Telcommunication Room (TR) / Equipment Room (ER)- TIA/EIA-569

In TR and/or ER networking, passive equipment is needed. These parts are normally a patching system. If a Category 6 system or a 1G network is implemented, a passive network patch panel of the same or better quality is needed.

Patch Panel Style

Category 5E UTP and Shielded
Category 6 UTP and Shielded
Category 6A UTP and Shielded
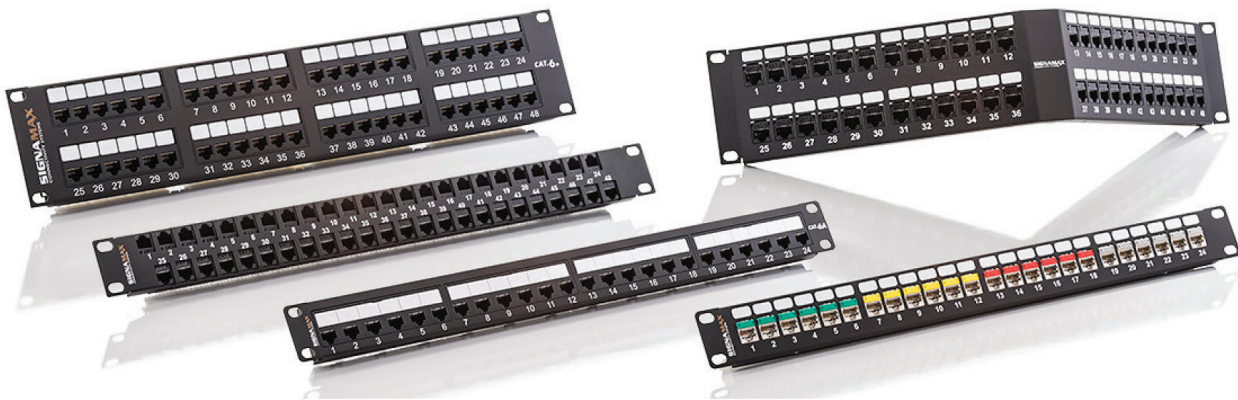
Type	Category 5E UTP	Category 5E F/UTP	Category 6 UTP	Category 6 F/UTP	Category 6A UTP	Category 6A F/UTP
West Penn Branded	24PP-C6C-L 48PP-C6C-L	24PP-C6CS-L 48PP-C6CS-L	24PP-C6C-L 48PP-C6C-L	24PP-C6CS-L 48PP-C6CS-L		24PP-C6AS-L 48PP-C6AS-L
MD Series	12458MD-C5E 24458MD-C5E 48458MD-C5E		12458MD-C6C 24458MD-C6C 48458MD-C6C		24458MD-C6AC 48458MD-C6AC	
MT		24458S-C5E 48458S-C5E	24458-C6C 48458-C6C	24458S-C6C 48458S-C6C	24458-C6A 48458-C6A	24458S-C6A 48458S-C6A
High Density	48458HD-C5E		48458HD-C6C			
Angled	24458A-C5E 48458A-C5E	24458SA-C5E 48458SA-C5E	24458A-C6C 48458A-C6C	24458SA-C6C 48458SA-C6C	24458A-C6A 48458A-C6A	24458SA-C6A 48458SA-C6A

MD Series: 110 Connector Blocks
MT Series: Snap-in Keystone Jacks

Fiber Optic Cable Types

West Penn Wire Bulk Fiber Optic Cables

West Penn Wire offers indoor/outdoor plenum-rated cables to reduce the amount of inventory and SKU numbers.

Part Number Structure:

WP9X043T - The X in the PN has to be with B, C or W to get to the appropriate OM size (fiber optic size).

Fiber Type	Code Replace (X)	Wavelength (nm)	Max Attenuation dB/km	Bandwidth MHz/km
62.5/125 OM1	B	850	3.5	200
		1300	1.25	500
50/125 OM3	C	850	3.5	1500
		1300	1.25	500
50/125 OM3	E	850	3.5	3500
		1300	1.25	4700
8/125 Single-Mode	W	1310	.8	NA
		1550	.5	NA

West Penn Wire Fiber Optic Cables

Environment	2 Fiber	6 Fiber	12 Fiber	24 Fiber
Indoor/Outdoor Plenum OFNP	WP9X043T	WP9X045T	WP9X048T	WP9X611T
Plenum /Outdoor Direct Burial		WP9X240	WP9X241	WP9X242

Myth Busting

Installers are worried about pulling and terminating fiber optics. **DO NOT WORRY!!**

Pull Tension:
6 Fiber Optic Cable   300lbf
Cat5E   25lbf
RG59/U   45lbf
Optical fiber have the same tensile strength of a piece of steel the same size.

Bend Radius:
Fiber Optic   10 x Cable OD
Category Cable   4 x Cable OD
Coaxial Cable   10 x Cable OD
Audio Cable   10 x Cable OD
Fiber optic cables have the same bend radius of coaxial cables.

Fiber Optic Termination Time: 1 Min. (Brilliance Field Kit)
Category 5E Plug   2 Min.

Fiber Optic Connector Installation Kits

Brilliance Field Kit - FI-4270

The Brilliance Field Kit will connect SC, ST and LC Connector Types.

The Brilliance Field Kit is a unique design that incorporates a factor polished fiber stub in a splice mechanism, which provides a fast, secure and reliable termination of fiber optic cables.

The Brilliance Connectors offer premium quality ceramic ferrule. The patent-pending design offers the quickest termination in the industry (less than 30 seconds). The Brilliance connectors can be used up to 5-6 times.

The Optimax installation consists of:
1. Cleave the Fiber
2. Open connector cavity-activation tab
3. Insert the fiber into the connector
4. Release activation tab on the connector body

Specifications: Brilliance Connector - interconnection compatibility LC/SC/ST

Field Assembly Time 900µm   30 sec. with setup
                                     1 Min.
Insertion Loss dB   .3dB
Storage Temp.   -40˚F - 140˚F
Operating Temp.   -40˚F -167˚F
Tensile Strength 900µm   1.12lbs

Connectors are reusable up to 6 times.

Catalog PN	Description
FI-4270	Fiber Optic Brilliance Field Kit
LC Connectors	
FI-4240	LC - 900µm, Multimode Beige Connector, 62.5um
FI-4242	LC - 900µm, Multimode Aqua Connector, 50um
FI-4243	LC - 900µm, Single-Mode Blue Connector, 8um
SC Connectors	
FI-4244	SC - 900µm, Multimode Beige Connector, 62.5um
FI-4246	SC - 900µm, Multimode Aqua Connector, 50um
FI-4247	SC - 900µm, Single-Mode Blue Connector, 8um
ST Connectors	
FI-4248	ST - 900µm, Multimode Beige Connector, 62.5um
FI-4250	ST - 900µm, Multimode Aqua Connector, 50um
FI-4251	ST- 900µm, Single-Mode Blue Connector, 8um

Fiber Optic Assemblies and Pigtails

Types: ST, SC, LC
Glass Types: Single-Mode and Multimode
Simplex or Duplex Designs
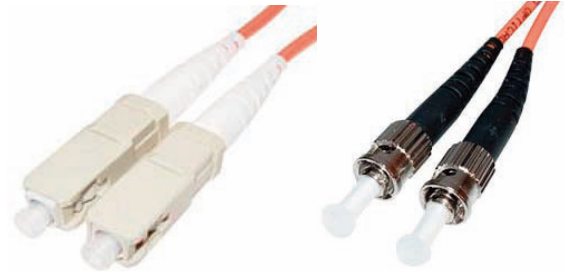
| Catalog PN	Description
ST Assemblies	
FI-X002-xx	Duplex ST to ST Replace xx with: 3, 6, 10, 15, 30
SC Assemblies	
FI-X002-xxSC	Duplex SC to SC Replace xx with: 3, 6, 10, 15, 30
LC Assemblies	
FI-X002-xxLC	Duplex LC to LC Replace xx with: 3, 6, 10, 15, 30

REPLACE (X)

2 - 62.5/125 OM1

3 - 8/125 SINGLE-MODE

4 - 50/125 OM3

5 - 50/125 OM4

Fiber Optic Pigtails

SC to LC Assemblies	
FI-X002-xxLC/SC	Duplex LC to SC Replace xx with: 3, 6, 10, 15, 30

Catalog PN	Description
FP12-51-9-003M	LC 12 Fiber OM3 3M
FP12-6-2-003M	ST 12 Fiber OM1 3M
FP12-9-2-003M	ST 12 Fiber Single-Mode 3M
FP12-9-9-003M	LC 12 Fiber Single-Mode 3M
FP1-51-4-003M	SC Single OM3 3M
FP1-51-9-003M	LC Single OM3 3M
FP1-6-4-003M	SC Single OM1 3M
FP1-9-4-003M	SC Single Single-Mode 3M
FP1-9-9-003M	LC Single Single-Mode 3M
FP6-51-4-003M	SC 6 Fiber OM3 3M
FP6-51-9-003M	LC 6 Fiber OM3 3M
FP6-6-4003M	SC 6 Fiber OM1 3M
FP6-9-4-003M	SC 6 Fiber Single-Mode 3M
FP6-9-9-003M	LC 6 Fiber Single-Mode 3M
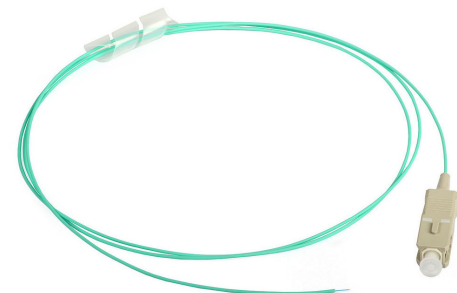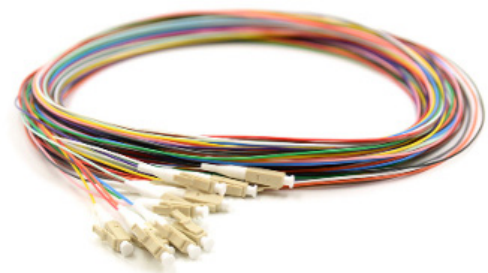
Indoor/Outdoor OFNP Pre-Terminated Fiber Optic Assemblies

West Penn Wire's indoor/outdoor OFNP pre-terminated fiber optic assemblies are perfect for fiber optic installations within a building or between two buildings.

West Penn Wire can provide fully tested long-length assemblies to allow plug-and-play fiber optic installation.

West Penn Wire pre-terminated long length fiber assemblies are built to your specifications, using the best materials, by highly skilled technicians, in an environmentally controlled work space. All terminations are fully tested and ready for immediate installation.

We provide either 2 or 6 fiber indoor/outdoor OFNP OM1, OM3 OM4 and OS2 (single-mode) long-length assemblies. The assemblies are terminated at each end with ST, SC, LC connectors. We can provide a pulling eye on one end or pulling eye with staggered connectors. Provide the part number with A, B or no designation.

ST to ST		Glass Size (X)				Pulling Eye (P)	Length xxx
Part Number	**Cable Description**	**OM1**	**OM3**	**OM4**	**OS2**	**Replace p with A,B or No Letter**	**Replace xxx:**
FI-9X043-pxxxST FI-9X045-pxxxST FI-9X048-pxxxST	Indoor/Outdoor OFNP 2 Fiber - 4 ST Connections Indoor/Outdoor OFNP 6 Fiber - 12 ST Connections Indoor/Outdoor OFNP 12 Fiber - 24 ST Connections	B	C	E	W	A: Pulling Eye B: Pulling Eye- Connectors staggered	50-1000 feet
FI-9X240-pxxxST FI-9X241-pxxxST	Armored Indoor/Outdoor OFNP 6 Fiber - 12 STConn Armored Indoor/Outdoor OFNP 12 Fiber - 24 STConn	B	C	E	W	A: Pulling Eye B: Pulling Eye- Connectors staggered	50-1000 feet
LC to LC		**Glass Size (X)**					**Replace xxx:**
FI-9X043-pxxxLC FI-9X045-pxxxLC FI-9X048-pxxxLC	Indoor/Outdoor OFNP 2 Fiber - 4 LC Connections Indoor/Outdoor OFNP 6 Fiber - 12 LC Connections Indoor/Outdoor OFNP 12 Fiber - 24 LC Connections	B	C	E	W	A: Pulling Eye B: Pulling Eye- Connectors staggered	50-1000 feet
FI-9X240-pxxxLC FI-9X241-pxxxLC	Armored Indoor/Outdoor OFNP 6 Fiber - 12 LC Conn Armored Indoor/Outdoor OFNP 12 Fiber - 24 LC Conn	B	C	E	W	A: Pulling Eye B: Pulling Eye- Connectors staggered	50-1000 feet
SC to SC		**Glass Size (X)**					**Replace xxx:**
FI-9X043-pxxxLC FI-9X045-pxxxLC FI-9X048-pxxxLC	Indoor/Outdoor OFNP 2 Fiber - 4 SC Connections Indoor/Outdoor OFNP 6 Fiber - 12 SC Connections Indoor/Outdoor OFNP 12 Fiber - 24 SC Connections	B	C	E	W	A: Pulling Eye B: Pulling Eye- Connectors staggered	50-1000 feet
FI-9X240-pxxxSC FI-9X241-pxxxS	Armored Indoor/Outdoor OFNP 6 Fiber - 12 SC Conn Armored Indoor/Outdoor OFNP 12 Fiber - 24 SC Conn	B	C	E	W	A: Pulling Eye B: Pulling Eye- Connectors staggered	50-1000 feet
SC to LC		**Glass Size (X)**					**Replace xxx:**
FI-9X043-pxxxCL FI-9X045-pxxxCL FI-9X048-pxxxCL	Indoor/Outdoor OFNP 2 Fiber - 2 LC /2SC Connections Indoor/Outdoor OFNP 6 Fiber - 6 LC/6SC Connections Indoor/Outdoor OFNP 12 Fiber - 12 LC /12SCConn.	B	C	E	W	A: Pulling Eye B: Pulling Eye- Connectors staggered	50-1000 feet
FI-9X240-pxxxCL FI-9X241-pxxxCL	Armored Indoor/Outdoor OFNP 6 Fiber - 6SC/6LC Armored Indoor/Outdoor OFNP 12 Fiber - 12SC/12LC	B	C	E	W	A: Pulling Eye B: Pulling Eye- Connectors staggered	50-1000 feet
SC to ST		**Glass Size (X)**					**Replace xxx:**
FI-9X043-pxxxCT- FI-9X045-pxxxCT FI-9X048-pxxxCT	Indoor/Outdoor OFNP 2 Fiber - 2 ST/2SC Connections Indoor/Outdoor OFNP 6 Fiber - 6 ST/6SC Connections Indoor/Outdoor OFNP 12 Fiber - 12 ST /12SCConn.	B	C	E	W	A: Pulling Eye B: Pulling Eye- Connectors staggered	50-1000 feet
FI-9X240-pxxxCT FI-9X241-pxxxCT	Armored Indoor/Outdoor OFNP 6 Fiber - 6SC/6ST Armored Indoor/Outdoor OFNP 12 Fiber - 12SC/12ST	B	C	E	W	A: Pulling Eye B: Pulling Eye- Connectors staggered	50-1000 feet

Fiber Optic Enclosures, Panels and Adapter Plates

Rack Mount Panels

Catalog PN	Description
PP-W1U1	1 RU Rack Mount Holds 3 Plates
PP-W2U1	2 RU Rack Mount Holds 6 Plates
PP-W4U1	4 RU Rack Mount Holds 12 Plates

Wall Mount Panels

Catalog PN	Description
PP-WM1S	1 Adapter Plate - Wall Mount 7"x6"x1.5"
PP-WM2S	2 Adapter Plate - Wall Mount 15.625"x13"x2.125"
PP-WM4S	4 Adapter Plate - Wall Mount 15.625"x15"x3.5"

Adapter Plates

Catalog PN	Description
AS-WC06M	SC Simplex Multimode - 6 Fiber
AS-WC06G	SC Simplex 10G Multimode - 6 Fiber
AS-WC06S	SC Simplex Single-Mode - 6 Fiber
AS-WC12M	SC Duplex Multimode - 12 Fiber
AS-WC12G	SC Duplex 10G Multimode - 12 Fiber
AS-WC12S	SC Duplex Single-Mode - 12 Fiber
AS-WT06M	ST Simplex Multimode - 6 Fiber
AS-WT06S	ST Simplex Single-Mode - 6 Fiber
AS-WT12M	ST Duplex Multimode - 12 Fiber
AS-WT12S	ST Duplex Single-Mode - 12 Fiber
AS-WL12M	LC Duplex Multimode - 12 Fiber
AS-WL12G	LC Duplex 10G Multimode - 12 Fiber
AS-WL12S	LC Duplex Single-Mode - 12 Fiber
AS-WL24M	LC Quad Multimode - 24 Fiber
AS-WL24G	LC Quad 10G Multimode - 24 Fiber
AS-WL24S	LC Quad Single-Mode - 24 Fiber

Cassette Plates

Catalog PN	Description
DM-1MLCB24	24 LC Single-Mode
DM-1MSCB12	12 SC Single-Mode
DM-4MLCC12	12 LC OM3
DM-4MLCC24	24 LC OM3
DM-4MSCC12	12 SC OM3

Ethernet Switches

Ethernet switches are an important part of the IP-CCTV Design. West Penn Wire has partnered with Signamax to supply this intregal piece of equipment.

Managed Switches

Part Number	No. Of Ports	PoE	Type Ethernet	SFP Ports
SC30010	48	No	Gigabit	4 Ports
SC30020	24	Yes - PoE+	Gigabit	4 Ports
SC30030	24	Yes - PoE+	Gigabit	4 Ports
SC30040	24	No	Gigabit	4 Ports
SC30050	8	Yes - PoE+	Gigabit	2 Ports
SC30060	8	No	Gigabit	2 Ports

Unmanaged Switches

Part Number	No. Of Ports	PoE	Type Ethernet	SFP Ports
SC10010	24	Yes - PoE+	Gigabit	2 Ports
SC10020	24	Yes - PoE+	Fast Ethernet	2 Ports
SC10030	24	Yes - PoE+	Fast Ethernet	2 Ports
SC10040	24	No	Gigabit	2 Ports
SC10050	16	Yes - PoE+	Gigabit	2 Ports
SC10060	16	Yes - PoE+	Fast Ethernet	2 Ports
SC10070	16	No	Gigabit	2 Ports
SC10080	8	Yes - PoE+	Gigabit	2 Ports
SC10090	8	Yes - PoE+	Fast Ethernet	
SC10100	8	No	Gigabit	
SC10110	4	Yes - PoE+	Gigabit	
SC10120	8	No	Gigabit	8 Ports

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West Penn Wire (WPW) designs and manufactures wires, cables, harnesses and related products and accessories for small, mid-sized and Fortune 500 companies worldwide, as well as for audio, video, security and networking applications in these environments:

> Corporate > Higher Education

> Entertainment   > Hospitality

> Government   > Houses of Worship

> Healthcare   > Retail

The company's engineering and manufacturing excellence enables customers to obtain solutions that meet the most demanding requirements for audio, video, security and networking applications.

To help meet customers' wire and cabling needs, WPW also offers value-added services, including:

> Testing for Continuity & Workmanship

> Custom Labeling (barcodes, logos, private labeling)

> Special Packaging

> Custom Kitting

With distribution centers located strategically throughout the country, WPW products can reach customers' places of business or jobsites quickly. WPW was established in 1971 and is based in Washington, PA, near Pittsburgh. It is part of the Belden group of companies (NYSE:BDC).

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