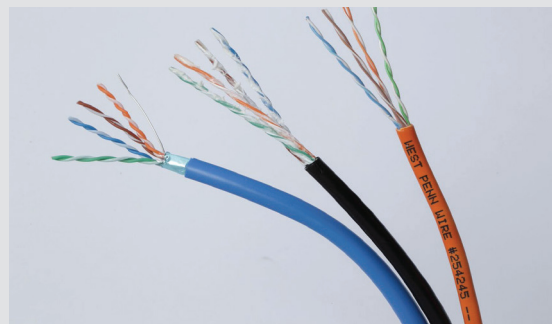


# IP CCTV

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 (328 feet) 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 1,000 ft (304 m) 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 750 feet (228 m) 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 1500 meters (5,000 feet) 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 causes 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 multi-story 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 not available 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, stand-alone 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 may have to visit the location of the incident to view the video or a tape or DVD would need to be shipped by overnight courier. These inefficiencies no longer exist with IP-based systems and WAN connectivity to the physical location.

**TABLE OF CONTENTS**

IP CCTV design ..... 1

IP CCTV Cabling ..... 2

Category Cable Types ..... 3

Category Cable Connectors ..... 4-5

Category Cable Assemblies ..... 6

Category Cable Patch Panels ..... 7

Fiber Optic Cabling ..... 8

Fiber Optic Termination ..... 9

Fiber Optic Assemblies/Pigtails ..... 10

Fiber Optic Enclosures/Panel ..... 11

Ethernet Switches ..... 12-21

    Fast Ethernet (10/100) ..... 13-14

    Gigabit (10/100/1000) ..... 15-19

    Hardened Switches ..... 20-21

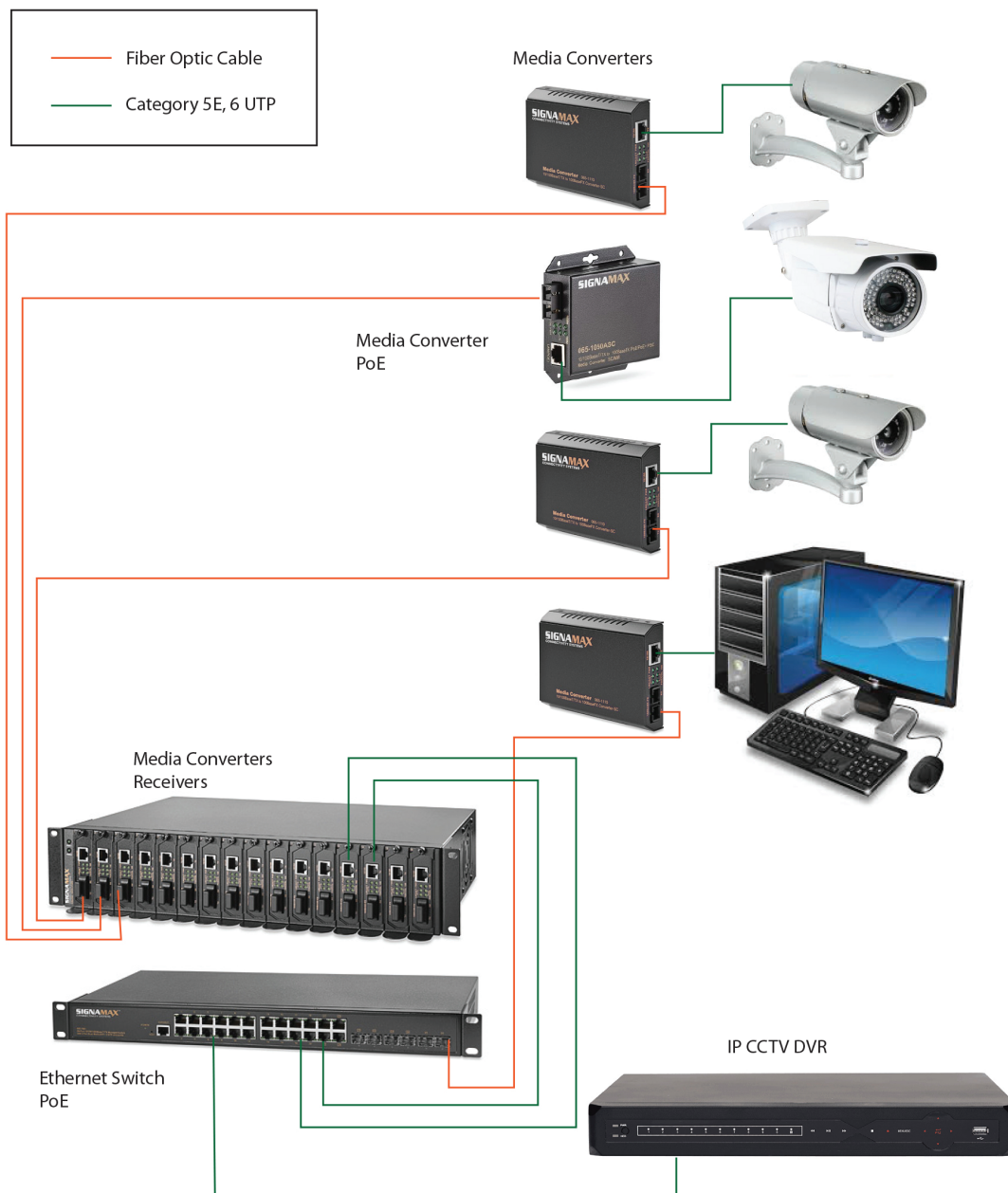
Media Converters ..... 22-23

SFP Modules and PoE Injectors ..... 24

Repeater / Injectors ..... 25

## IP CCTV Design

In an IPCCTV 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 distance beyond 330ft, Fiber Optic cables are needed with Media Converters. Fiber media converters support many different data communication protocols including Ethernet, Fast Ethernet, Gigabit Ethernet, multi-mode 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.



## IP Cabling:

Network cabling is used to describe cabling that links network devices in user work areas (WA's) to network equipment located in the Telecommunications Room (TR). This cabling generally extends horizontally along floors, walls, and ceilings.

**Distance:** 90 m link - Link is the bulk cable run without assemblies or patch cables.

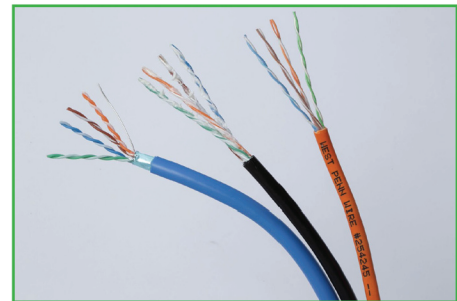
100 m channel- Channel is the entire run of cable including assemblies and patch cables.

**Topology:** Star Conguration: From Hub to Desktop

## Cabling Media Types:

- 4 pair 100ohm 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 Cat 6
  - 4 Pair 23AWG
  - Data: 100/1000/10000BaseT Ethernet
  - UTP or F/UTP Design
- Category 7 (Not Available)
  - 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

### Network - Category Cables

West Penn Wire offers Category cables ranging from Category 5E to Category 6 to Category 6A. Our designs include Unshielded Twisted Pair (UTP) and Foil/Unshielded Twisted Pair (F/UTP).

#### Construction :

Category 5E	4 Pair 24 AWG	100Ω Impedance	Low Capacitance	10/100BaseT Ethernet
Category 6	4 Pair 23 AWG	100Ω Impedance	Low Capacitance	10/100/1000BaseT Ethernet
Category 6A	4 Pair 23 AWG	100Ω Impedance	Low Capacitance	10/100/1000/10,000 Ethernet

Environment	Category 5E UTP	Category 5E F/UTP	Category 6 UTP	Category 6 F/UTP	Category 6A UTP	Category 6A F/UTP
Non Plenum	4245	4245F	4246	4246F	4246A	4246AF
Plenum	254245	254245F	254246	254246F	254246A	254246AF
Indoor/Outdoor	4245IO		4246IO			
Outside Plant	4245OSP		4246OSP			
Armored	M57562					

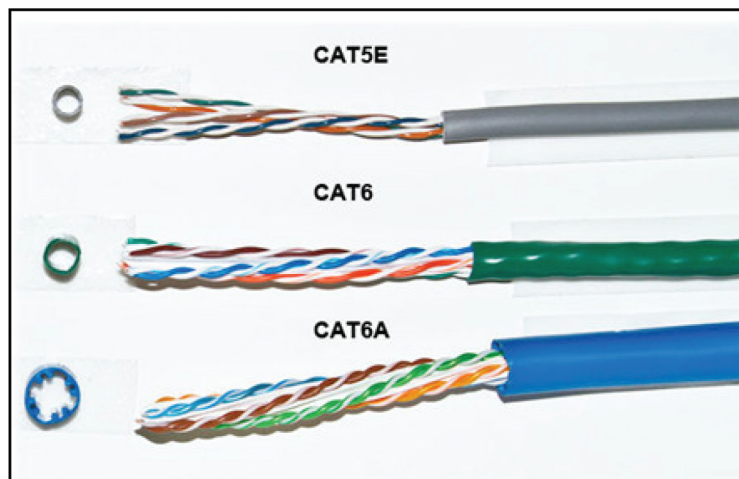
### Mechanical Characteristics

#### Pull Tension:

Cat 5E	25lbF.
Cat 6	25lbF.
Cat6A	35lbs

#### Bend Radius:

Category Cable      4 x Cable OD



## Connectors

### RJ45 Jacks

Registered Jacks (RJ)45 is a data connector 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



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

Category 6 UTP or Shielded

Category 6A UTP or Shielded

UTP RJ45 Jacks are available in Multiple Colors:

Black, Blue, Red, Yellow, Orange, Green

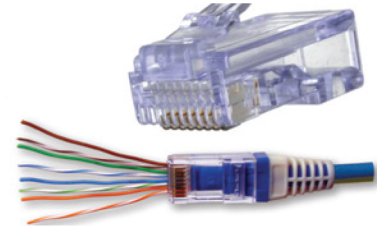
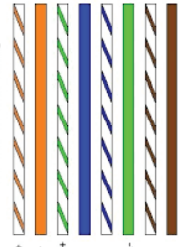
F/UTP RJ45 Jacks have to be shielded or Metal.

Type	Category 5E UTP	Category 5E F/ UTP	Category 6 UTP	Category 6 F/ UTP	Category 6A UTP	Category 6A F/ UTP
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
- Category 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 modular complete 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		32-6198UL	106190	106190	106090
Standard Plug	32-5998UL	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



### Cable Assemblies Work Area

Cable assemblies are needed at the Work Area location to allow signals to be guided from the wall plate (RJ45 Jack) to the computer or IP device.

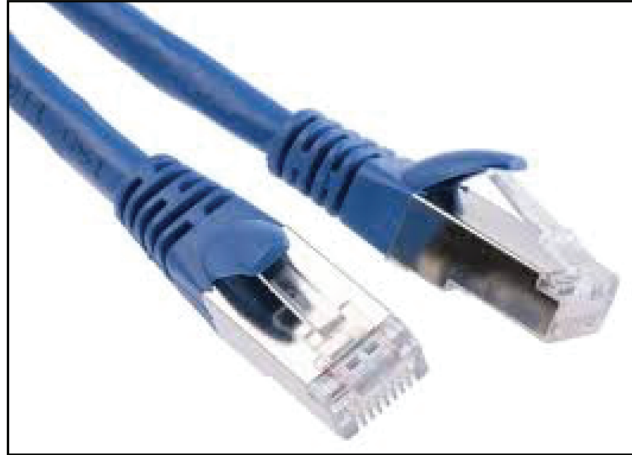
Network assemblies are available for Category 5E, Category 6, and Category 6A.

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 ft.

West Penn Wire also offers long length with Pulling Eye.



### 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
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

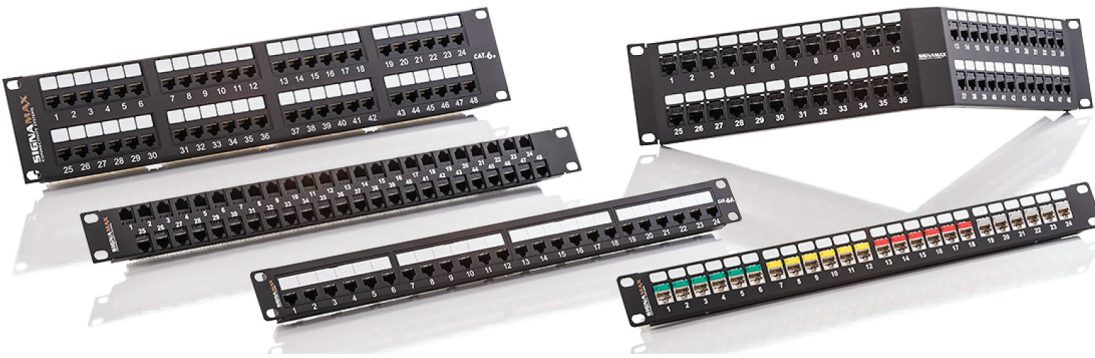
3, 5, 7, 10, 15, 20, 25 feet.

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

In the 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
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	3.0	3500
		1300	1.2	500
8/125 SingleMode	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
Outdoor OSP	WP9X150	WP9X152	WP9X155	
Outdoor Direct Burial		WP9X172	WP9X175	

### Myth Busting

Installers are worried about Pulling, and terminating fiber optics. DO NOT WORRY!!

Pull Tension:

6 Fiber Optic Cable:	300lb.
Cat 5E	25lb.
RG59/U	45lb.

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.
Crimp BNC	3 Min.



## Fiber Optic Termination Kit and Connectors

West Penn Wire's Field termination kit provides an easy and quick termination to multiple types of fiber optic connectors.

The Brilliance Field Kit will connect SC, ST and LC

### Connector Types.

The Kit is a unique design that incorporates 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 30seconds). 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.



Type	Kit	OM1	OM3	Single-Mode	Single-Mode Angled Polished APC
Fiber Optic Kit	FI-4270				
ST Connectors		FI-4248	FI-4250	FI-4251	
SC Connectors		FI-4244	FI-4246	FI-4247	FI-5209
LC Connectors		FI-4240	FI-4242	FI-4243	

## Fiber Optic Assemblies and Pigtaills

Types: ST, SC, LC

Glass Types: SingleMode and Multi-Mode

Simplex or Duplex Designs

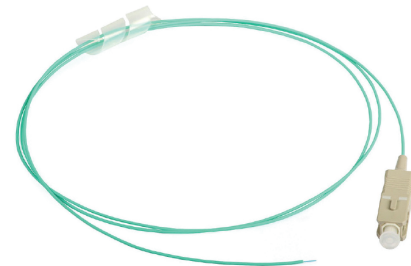
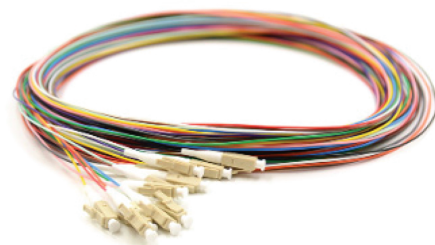
Catalog PN	Description
<b>ST Assemblies</b>	
FI-X001-xx	Simplex ST to ST Replace xx with:3,6,10,15,30
FI-X002-xx	Duplex ST to ST Replace xx with:3,6,10,15,30
<b>SC Assemblies</b>	
FI-X001-xxSC	Simplex SC to SC Replace xx with:3,6,10,15,30
FI-X002-xxSC	Duplex SC to SC Replace xx with:3,6,10,15,30
<b>LC Assemblies</b>	
FI-X001-xxLC	Simplex LC to LC Replace xx with:3,6,10,15,30
FI-X002-xxLC	Duplex LC to LC Replace xx with:3,6,10,15,30
<b>SC to LC Assemblies</b>	
FI-X001-xxSC/LC	Simplex LC to SC Replace xx with:3,6,10,15,30
FI-X002-xxSC/LC	Duplex LC to SC Replace xx with:3,6,10,15,30



REPLACE (X)  
2 - 62.5/125 OM1  
3 - 8/125 SINGLEMODE  
4 - 50/125 OM3

## FIBER OPTIC PIGTAILS

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 SINGLEMODE 3M
FP12-9-9-003M	LC 12 FIBER SINGLEMODE 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 SINGLEMODE 3M
FP1-9-9-003M	LC SINGLE SINGLEMODE 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 SINGLEMODE 3M
FP6-9-9-003M	LC 6 FIBER SINGLEMODE 3M



## 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 - Wallmount 15.625"x13"x2.125"
PP-WM4S	4 Adapter Plate - Wallmount 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 SingleMode - 6 Fiber
AS-WC12M	SC Simplex Multimode - 12 Fiber
AS-WC12G	SC Simplex 10G Multimode - 12 Fiber
AS-WC12S	SC Simplex SingleMode - 12 Fiber
AS-WT06M	ST Simplex Multimode - 6 Fiber
AS-WT06S	ST Simplex SingleMode - 6 Fiber
AS-WT12M	ST Simplex Multimode - 12 Fiber
AS-WT12S	ST Simplex SingleMode - 12 Fiber
AS-WL12M	LC Simplex Multimode - 12 Fiber
AS-WL12G	LC Simplex 10G Multimode - 12 Fiber
AS-WL12S	LC Simplex SingleMode - 12 Fiber
AS-WC24M	LC Simplex Multimode - 24 Fiber
AS-WC24G	LC Simplex 10G Multimode - 24 Fiber
AS-WC24S	LC Simplex SingleMode - 24 Fiber



### Cassette Plates

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



## Ethernet (Network) Switches

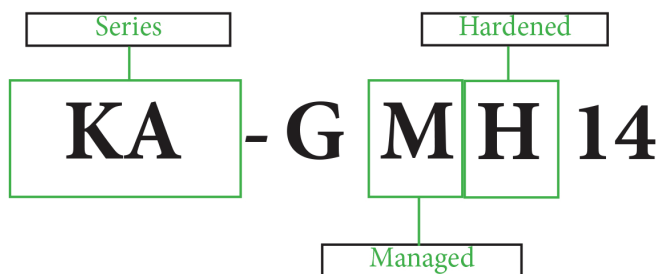
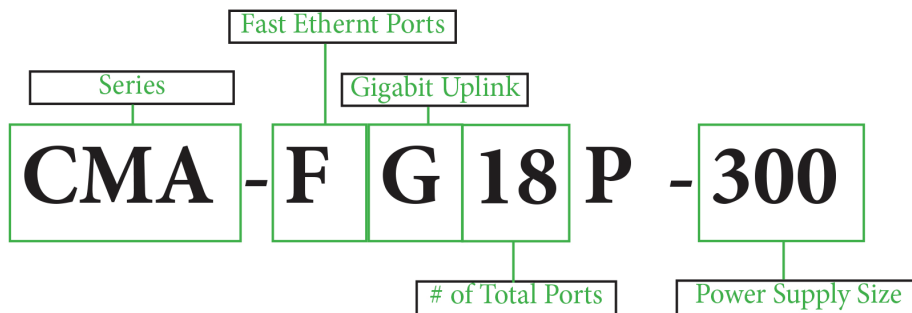
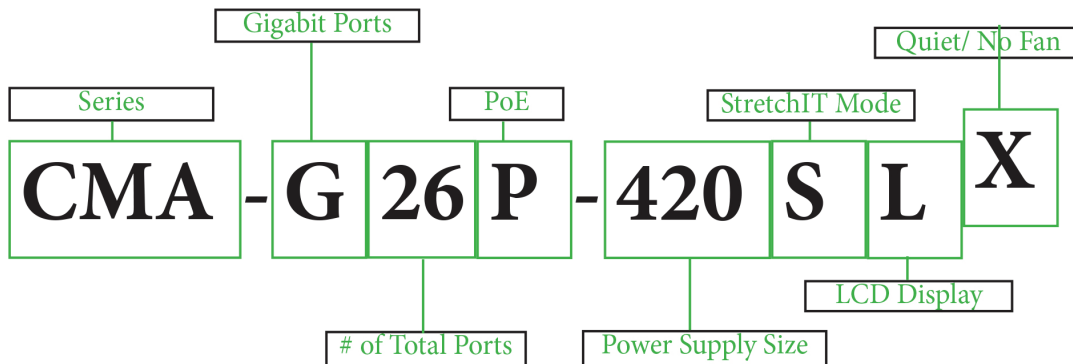
Managed switches give you more control over your LAN traffic and offer advanced features to control that traffic.

An Unmanaged switch simply allows Ethernet devices to communicate with one another, such as a PC or network printer, and those are typically what we call “plug and play.”

West Penn Wire Installation Environment Switches:

- IT Room: Environmentally Controlled Environment
- Desk/Wall: Fan Switch - Desk/Wall Environment
- Indoor: Fan Switch - Any place Indoor - Closet.
- Industrial: No Fan - Higher Temperature range - Above ceiling
- Hardened: No Fan - Extreme Temperature range

## Network Switch Part Number Structure



## Fast Ethernet (10/100) Ethernet Switches



### CA-F5

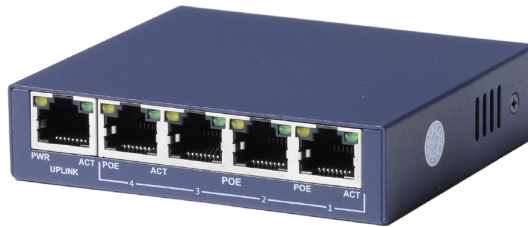
#### 5 Port Fast Ethernet Switch

- Unmanaged
- Fast Ethernet
- Indoor Switch
- Desk/Wall
- 5 Active Ports
- 5 LAN Ports
- Non-PoE

### CA-F5P-65X

#### 4 Port Fast Ethernet PoE Switch

- Unmanaged
- Fast Ethernet
- Indoor Switch
- Desk/Wall
- 5 Active Ports
- 4 LAN Ports
- POE - 55W Power Budget



### CA-F9P-96X

#### 8 Port Fast Ethernet PoE Switch with 1 Port Fast Ethernet Uplink

- Unmanaged
- Fast Ethernet
- Indoor Switch
- Desk/Wall
- 8 Active Ports
- 8 LAN Ports
- POE - 90W Power Budget



### CMA-F6P-60X

#### 4 Port Fast Ethernet PoE Switch with 2 Port Fast Ethernet Uplinks

- Unmanaged
- Fast Ethernet
- Indoor
- Desk/Wall
- 6 Active Ports
- 4 LAN Ports - Fast Ethernet
- 2 Uplink Ports - RJ45 (Fast Ethernet)
- POE - 55W Power Budget



Model Number	CA-F5P-65X	CA-F9P-96X	CA-F9P-96X
Camera Count:	Up to 4	Up to 8	Up to 4
PoE+(30W) Ports:	4   10/100	8   10/100	4   10/100
PoE Budget:	55W	90W	55W
Average Power:	4 Ports @ 13.75W	8 Ports @ 11W	4 Ports @ 14W
Features:	Silent, Wall Mount, Desktop	Silent, Wall Mount, Desktop	Silent, Wall Mount, Desktop
Total Ports:	5	8	6



## Fast Ethernet (10/100) Ethernet Switches



### CMA-FG18P-330LX

16 Port Fast Ethernet PoE Switch with 1 Gigabit SFP Port & 1 Gigabit RJ45 Port - LCD Display

- Unmanaged
- Fast Ethernet
- IT Room
- Rack
- 18 Active Ports
- 16 LAN Ports - Fast Ethernet
- 2 Uplink Ports - SFP+ RJ45 (Gb)
- POE - 300W Power Budget

### CMA-F10P-120X

8 Port Fast Ethernet PoE Switch with 2 Port Fast Ethernet Uplinks

- Unmanaged
- Fast Ethernet
- Indoor
- Desk/Wall
- 10 Active Ports
- 8 LAN Ports - Fast Ethernet
- 2 Uplink Ports - RJ45 (Fast Ethernet)
- POE - 110W Power Budget



### CMA-FG26P-420LX

24 Port Fast Ethernet PoE Switch with 2 Gigabit Combo Uplink Ports, LCD Display

- Unmanaged
- Fast Ethernet
- IT Room
- Rack
- 26 Active Ports
- 24 LAN Ports - Fast Ethernet
- 2 Uplink Ports - RJ45 (Gb)
- POE - 400W Power Budget

### CMA-FGM10P-150X

8-Port 10/100 Managed Fast Ethernet Switch, 2 Gigabit Combo Fiber/TX Ports, 8-Port 802.3at PoE+ (150W)

- Managed
- Fast Ethernet
- IT Room
- Rack
- 10 Active Ports
- 8 LAN Ports - Fast Ethernet
- 2 Uplink Ports - SFP+ RJ45 (Gb)
- POE - 256W Power Budget

**MANAGED**



Model Number	CMA-FG10P-150X	CMA-FG18P-330LX	CMA-FG26P-420LX	CMA-FG10P-150X	CMA-FGM10P-150X
Camera Count:	Up to 8	Up to 16	Up to 24	Up to 8	Up to 8
PoE+(30W) Ports:	8   10/100	16   10/100	24   10/100	8   10/100	8 10/100 <i>Managed</i>
PoE Budget:	110W	300W	400W	140W	300W
Average Power:	8 Ports @ 14W	16 Ports @ 18.75W	24 Ports @ 16.5W	7 Ports @ 20W	8 Ports @ 30W
Features:	Quiet 2- RJ45 Desk/Wall	Quiet, LCD Display, 2 TP/SFP Combo	Quiet, LCD Display, 2 TP/SFP Combo	Quiet, LCD Display, Rack- mount, Desktop	Rackmount, Desktop
Total Ports:	10	18	26	8	10

## GigaBit (10/100/1000) Ethernet Switches



- CA-G5**  
**5 Port Gigabit Switch**
- Unmanaged
  - Gigabit
  - Indoor Switch
  - Desk/Wall
  - 5 Active Ports
  - 5 LAN Ports
  - Non-PoE

### CA-G5P-65X

**4 Port Gigabit PoE Switch with 1 port Gigabit Uplink**

- Unmanaged
- Gigabit
- Indoor Switch
- Desk/Wall
- 5 Active Ports
- 4 LAN Ports
- PoE - 60W Power Budget



- CA-G8**  
**8 Port Gigabit Switch**
- Unmanaged
  - Gigabit
  - Indoor Switch
  - Desk/Wall
  - 8 Active Ports
  - 8 LAN Ports
  - Non-PoE

### CA-G10P-120X

**8 Port Gigabit PoE Switch with 2 Port Gigabit Uplinks**

- Unmanaged
- Gigabit
- Indoor Switch
- Desk/Wall
- 10 Active Ports
- 8 LAN Ports
- PoE - 110W Power Budget



Model Number	CA-G5P-65X	CA-G10P-120X
Camera Count:	Up to 4	Up to 8
PoE+(30W) Ports:	4   10/100	16   10/100
PoE Budget:	60W	110W
Average Power:	4 Ports @ 15W	8 Ports @ 13.75W
Features:	Silent, Desktop	Silent, Wall/Desk, 2TP RJ45
Total Ports:	5	10

## GigaBit (10/100/1000) Ethernet Switches



### CMA-G5P-EX

4 Port Gigabit PoE Repeater/Switch; 50W, Powered Injection not included

- Unmanaged
- Gigabit
- Indoor
- Desk/Wall
- 4 Active Ports
- 4 LAN Ports - Gigabit
- 1 Uplink Ports - RJ45 (Gb)
- POE - 50W Power Budget

### CMA-G8P-130

8 Port Gigabit Ethernet PoE Switch

- Unmanaged
- Gigabit
- IT Room
- Rack
- 8 Active Ports
- 8 LAN Ports - Gigabit
- POE - 120W Power Budget



### CMA-G10SFP

8 Port Gigabit SFP + 2-Port Gigabit Ethernet Switch

- Unmanaged
- Gigabit
- IT Room
- Rack
- 10 Active Ports
- 8 LAN Ports - Gigabit
- 2 Uplink Ports - RJ45 (Gb)



### CMA-G16

16 Port Gigabit Ethernet Switch

- Unmanaged
- Gigabit
- IT Room
- Rack
- 16 Active Ports
- 16 LAN Ports - Gigabit



Model Number	CMA-G5P-EX	CMA-G8P-130	CMA-G10SFP
Camera Count:	Up to 4	Up to 8	Up to 8
PoE+(30W) Ports:	4   Gigabit	8   Gigabit	8   Gigabit
PoE Budget:	50W	120W	-
Average Power:	Ports @ 12.5W	8 ports @ 15W	-
Features:	Desk/Wall	Desk/Wall	Rack Mount 2 RJ45 Port (Gb)
Total Ports:	4	8	10

## GigaBit (10/100/1000) Ethernet Switches



### CMA-G16P-330LX

16 Port Gigabit Ethernet PoE Switch, LCD Usage Display

- Unmanaged
- Gigabit
- IT Room
- Rack
- 16 Active Ports
- 16 LAN Ports - Gigabit
- POE - 300W Power Budget

### CMA-G24

24 Port Gigabit Ethernet Switch

- Unmanaged
- Gigabit
- IT Room
- Rack
- 24 Active Ports
- 24 LAN Ports - Gigabit



### CMA-G26P-330LX

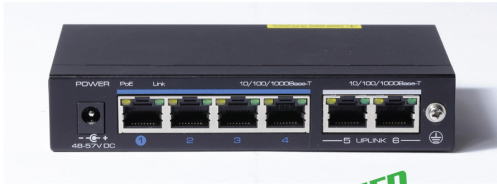
24 Port Gigabit Ethernet Switch - LCD Display

- Unmanaged
- Gigabit
- IT Room
- Rack
- 26 Active Ports
- 24 LAN Ports - Gigabit
- 2 Uplink Ports - SFP (Gb)
- POE - 300W Power Budget



Model Number	CMA-G16P-330LX	CMA-G26P-330LX
Camera Count:	Up to 15	Up to 24
PoE+(30W) Ports:	16   Gigabit	24   Gigabit
PoE Budget:	300W	300W
Average Power:	15 Ports @ 20W	24 ports @ 12.5W
Features:	Quiet, LCD Display - Rackmount	Quiet, LCD Display - 2SFP Rackmount
Total Ports:	16	26

## GigaBit (10/100/1000) Ethernet Switches



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### KA-G6P-60SX

4 Port Industrial Grade Gigabit PoE Switch with 2 Port Gigabit Uplinks

- Unmanaged
- Gigabit
- Industrial
- Desk/Wall
- 6 Active Ports
- 4 LAN Ports - Gigabit
- 2 Uplink Ports - RJ45 (Gb)
- POE - 55W Power Budget

### KA-GM10P-130

8 Port Managed Gigabit PoE+ Switch with 2 Port Gigabit SFP

- Managed
- Gigabit
- IT Room
- Rack
- 10 Active Ports
- 8 LAN Ports - Gigabit
- 2 Uplink Ports - SFP (Gb)
- POE - 110W Power Budget

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### KA-GM10P-250

8 Port Managed Gigabit PoE+ Switch with 2 Port Gigabit SFP

- Managed
- Gigabit
- IT Room
- Rack
- 10 Active Ports
- 8 LAN Ports - Gigabit
- 2 Uplink Ports - SFP (Gb)
- POE - 230W Power Budget



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### KA-GM12P-160SX

8 Port Managed Gigabit PoE+ Switch (Ultra PoE on First Port) with 2 Combo Gigabit Uplink Ports and 2 Ethernet Port Gigabit Uplinks.

- Managed
- Gigabit
- IT Room
- Rack
- 12 Active Ports
- 10 LAN Ports - Gigabit
- 2 Uplink Ports - SFP+ RJ45 (Gb)
- POE - 150W Power Budget

MANAGED



Model Number	KA-G6P-60SX	KA-GM10P-130	KA-GM10P-250	KA-GM12P-160SX
Camera Count:	Up to 4	Up to 8	Up to 8	Up to 8
PoE+(30W) Ports:	4   Gigabit	8   Gigabit	8   Gigabit	8   Gigabit
PoE Budget:	55W	110W	230W	135W
Average Power:	4 Ports @ 13.75W	8 ports @ 13.75W	8 ports @ 28.75W	8 ports @ 16.75W
Features:	Industrial	2 Gb SFP, Console	2 Gb SFP, Console	2 TP + 2 SFP, Web
Total Ports:	6	10	10	12

## GigaBit (10/100/1000) Ethernet Switches



**MANAGED**

### KA-GM26P-400

24 Port Managed Gigabit PoE+ Switch with 2 Port Gigabit SFP (365w power budget)

- Managed
- Gigabit
- IT Room
- Rack
- 26 Active Ports
- 24 LAN Ports - Gigabit
- 2 Uplink Ports - SFP (Gb)
- POE - 365W Power Budget

### KA-GM26P-650

24 Port Managed Gigabit PoE Switch with 2 Port Gigabit SFP (615w power budget)

- Managed
- Gigabit
- IT Room
- Rack
- 26 Active Ports
- 24 LAN Ports - Gigabit
- 2 Uplink Ports - SFP (Gb)
- POE - 615W Power Budget

**MANAGED**



### KA-G10M32-SFP

24 Port SFP Managed Gigabit Switch with 4 SFP 10GB Ports and 4 Ports Gigabit Ethernet

- Unmanaged
- Gigabit
- Industrial
- Rack
- 32 Active Ports
- 28 LAN Ports - Gigabit
- 4 Uplink Ports - SFP (10Gb)



**MANAGED**

Model Number	KA-GM26P-400	KA-GM26P-650	KA-G10M32-SFP
Camera Count:	Up to 24	Up to 24	NA
PoE+(30W) Ports:	24   Gigabit	24   Gigabit	NA
PoE Budget:	365W	615W	NA
Average Power:	24 ports @ 15W	24 ports @ 25.5W	NA
Features:	2 Gb SFP, Console	2 Gb SFP, Console	4 Gb TP + 28 Gb SFP Console
Total Ports:	26	26	32

## Hardened Ethernet Switches



### KA-GH4SFP

*Hardened Media Converter with 2 Port Gigabit Ethernet & 2 Port Gigabit SFP*

- Unmanaged
- Gigabit
- Hardened
- Din
- 2 Active Ports
- 2 LAN Ports - Gigabit
- 2 Uplink Ports - SFP (Gb)

### KA-GH4P

*4 Port Hardened Gigabit Switch with 2 PoE+ Ports and 2 Gigabit Fiber Ports*

- Unmanaged
- Gigabit
- Hardened
- Din
- 4 Active Ports
- 2 LAN Ports - Gigabit
- 2 Uplink Ports - SFP (Gb)
- POE - 120W Power Budget



### KA-GH6P

*4 Port Hardened Gigabit PoE+ Switch with 2 Port Gigabit SFP*

- Unmanaged
- Gigabit
- Hardened
- Din
- 6 Active Ports
- 4 LAN Ports - Gigabit
- 2 Uplink Ports - SFP (Gb)
- POE - 120W Power Budget

### KA-GMH6P

*4 Port Managed & Hardened Gigabit PoE Switch with 2 Port Gigabit SFP*

- Managed
- Gigabit
- Hardened
- Din
- 6 Active Ports
- 4 LAN Ports - Gigabit
- 2 Uplink Ports - SFP (Gb)
- POE - 120W Power Budget

**MANAGED**



Model Number	KA-GH4SFPH	KA-GH4P	KA-GMH6P	KA-GH6P
Camera Count:	Up to 2	Up to 4	Up to 4	Up to 4
PoE+(30W) Ports:	2   Gigabit	4   Gigabit	4   Gigabit	4   Gigabit
Temp Rating:	-40F to 167F	-40F to 167F	-40F to 167F	-40F to 167F
Uplink Ports:	2 Gb SFP	2 Gb SFP	2 Gb SFP	2 Gb SFP/UTP
Features:	Wall/DIN Rail mount	Wall/DIN Rail mount	Managed	Wall/DIN Rail mount
PWR Supply:	JDR-120-48*	JDRP-240-48*	JDR-120-48*	JDRP-240-48*

## Hardened Ethernet Switches

**MANAGED**



### KA-GMH10

8 Port Managed and Hardened Gigabit Switch with 2 Port Gigabit SFP

- Managed
- Gigabit
- Industrial
- Rack
- 10 Active Ports
- 8 LAN Ports - Gigabit
- 2 Uplink Ports - SFP (Gb)

### KA-GMH10P

8 Port Managed and Hardened Gigabit Switch with 2 Port Gigabit SFP - PoE

- Managed
- Gigabit
- Industrial
- Rack
- 10 Active Ports
- 8 LAN Ports - Gigabit
- 2 Uplink Ports - SFP (Gb)
- POE - 240W Power Budget



**MANAGED**

**MANAGED**



### KA-GMH14

10 Port Managed & Hardened Gigabit Switch with 4 Port Gigabit SFP

- Managed
- Gigabit
- Industrial
- Rack
- 14 Active Ports
- 10 LAN Ports - Gigabit
- 4 Uplink Ports - SFP (Gb)

### KA-GMH14P

10 Port Managed & Hardened Gigabit Switch with 4 Port Gigabit SFP

- Managed
- Gigabit
- Industrial
- Rack
- 14 Active Ports
- 10 LAN Ports - Gigabit
- 4 Uplink Ports - SFP (Gb)
- POE - 240W Power Budget



**MANAGED**

Model Number	KA-GMH10	KA-GMH10P	KA-GMH14	KA-GMH14P
Camera Count:	Up to 8 Non PoE	Up to 8	Up to 10 Non PoE	Up to 10
PoE+(30W) Ports:	8   Gigabit	8   Gigabit	8   Gigabit	8   Gigabit
Temp Rating:	-40F to 167F	-40F to 167F	-40F to 167F	-40F to 167F
Uplink Ports:	2 Gb SFP	2 Gb SFP	2 Gb UTP + 4 GB SFP	2 Gb UTP + 4 GB SFP
Features:	Managed	Managed	Managed	Managed



## Media Converters



### KA-EOCP-4R

*4 Coax to 1 Port Gigabit Ethernet Uplink Media Converter*

- Media Converter
- Gigabit
- Industrial
- Desk/Wall
- 5 Active Ports
- 4 LAN Ports - Fast Ethernet
- 1 Uplink Ports - RJ45 (Gb)
- POE - 180W Power Budget

### KA-GSFPH

*Hardened Gigabit Ethernet to Gigabit SFP Media Converter*

- Media Converter
- Gigabit
- Hardened
- Din
- 2 Active Ports
- 2 LAN Ports - Gigabit
- 2 Uplink Ports - RJ45 (Gb)



### KA-GSFPH

*Hardened Gigabit Ethernet to Gigabit SFP Media Converter*

- Media Converter
- Gigabit
- Hardened
- Din
- 2 Active Ports
- 2 LAN Ports - Gigabit
- 2 Uplink Ports - RJ45 (Gb)
- POE - 120W Power Budget

### KA-FSFPH

*Hardened Gigabit Ethernet to Gigabit SFP Media Converter*

- Media Converter
- Fast Ethernet
- Hardened
- Din
- 2 Active Ports
- 2 LAN Ports - Fast Ethernet
- 2 Uplink Ports - RJ45 (Fast Ethernet)
- POE - 120W Power Budget



## Media Converters



### KA-EOCP-T

*Ethernet Over Coax Transmitter with PoE Media Converter*

- Unmanaged
- Industrial
- Desk/Wall
- 1 Active Ports
- 1 LAN Ports - Fast Ethernet
- 1 Uplink Ports - RJ45 (FE)
- POE - 30W Power Budget

### KA-EOCP-R

*Ethernet Over Coax Receiver with PoE Media Converter*

- Unmanaged
- Industrial
- Desk/Wall
- 1 Active Ports
- 1 LAN Ports - Fast Ethernet
- 1 Uplink Ports - RJ45 (FE)
- POE - 30W Power Budget



### CMA-FSFP

*Fast Ethernet to SFP Media Converter, without SFP Module*

- Unmanaged
- Indoor
- Desk/Wall
- 1 Active Ports
- 1 LAN Ports - Fast Ethernet
- 1 Uplink Ports - SFP (FE)



### CMA-GSFP

*Gigabit to SFP Media Converter, without SFP Module*

- Unmanaged
- Indoor
- Desk/Wall
- 1 Active Ports
- 1 LAN Ports - Gigabit
- 1 Uplink Ports - SFP (Gb)



Model Number	CMA-GSFP	CMA-FSFP	KA-GSFPH	KA-GSFPHP*
Features	10/100/1000 -1000 SX/LX, SFP	10/100 - 100 SX/ LX, SFP	Hardened, Micro, SFP	Hardened, PoE+ (30W), SFP
Temp Rating:	-40F to 167F	-40F to 167F	-40F to 167F	-40F to 167F

## SFP Modules



**KA-MF-FX**  
100Mbps Mini-GBIC Multimode FX Fiber Transceiver  
**KA-MFX-FX**  
Hardened 100Mbps Mini-GBIC Multimode FX Fiber Transceiver

**KA-MG-SX**  
Gigabit Mini-GBIC Multimode SX Fiber Transceiver  
**KA-MG-SX2**  
Gigabit Mini-GBIC Multimode SX Fiber Transceiver (2km)



**KA-MGH-SX**  
Hardened Gigabit Mini-GBIC Multimode SX Fiber Transceiver  
**KA-MGH-SX2**  
Hardened Gigabit Mini-GBIC Multimode SX Fiber Transceiver (2km)

**KA-SF-FX20**  
100Mbps Mini-GBIC Single Mode FX Fiber Transceiver (20km)



**KA-SG-LX**  
Gigabit Mini-GBIC Single Mode LX Fiber Transceiver  
**KA-SG-LX40**  
Gigabit Mini-GBIC Single Mode LX Fiber Transceiver (40km)  
**KA-SG-LX80**  
Gigabit Mini-GBIC Single Mode LX Fiber Transceiver (80km)  
**KA-SG-LX120**  
Gigabit Mini-GBIC Single Mode LX Fiber Transceiver (120km)

**KA-SGH-LX**  
Hardened Gigabit Mini-GBIC Single Mode LX Fiber Transceiver  
**KA-SG-LX40**  
Hardened Gigabit Mini-GBIC Single Mode LX Fiber Transceiver (40km)  
**KA-SG-LX80**  
Hardened Gigabit Mini-GBIC Single Mode LX Fiber Transceiver (80km)



**KA-S10G-LR**  
10 Gigabit Mini-GBIC Single Mode Fiber Transceiver

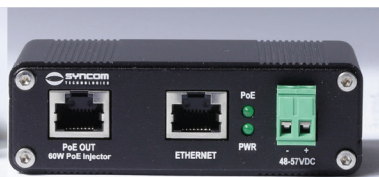
Model Number	KA-MG-SX	KA-MG-SX2	KA-M10G-SR	KA-SG-LX	KA-S10G-LR
Mode:	Multimode, LC	Multimode, LC	Multimode, LC	Singlemode, LC	Singlemode, LC
Speed:	1000BASE-SX	1000BASE-SX	10G, SFP+	1000BASE-LX	10G, SFP+
Features:	850nm, 1640 ft.	1310nm, 1.24 mi.	850nm, 984 ft.	1310nm, 6.21mi.	1310nm, 6.21mi.
Temp Rating:	32F to 122F	32F to 122F	32F to 122F	32F to 122F	32F to 122F
Model Number	KA-MGH-SX	KA-MGH-SX2	KA-SGH-LX	KA-MFH-FX	
Mode:	Multimode, LC	Multimode, LC	Singlemode, LC	Multimode, LC	

## Repeaters/Injectors

Model Number	CMA-FP-EX	CMA-G5P-EX*	CMA-GP-30	CMA-GP-60
Type	Repeater/Injector	Repeater	Injector	Ultra Injector
Power	30W	12W x 4	30W	60W
Features:	Fast Ethernet	Gigabit, 4 out	Gigabit	Gigabit



Model Number	KA-POEH	KA-POEH60	KA-POESH
Type	Repeater/Injector	Repeater/Injector	Repeater/Injector
Power	30W	60W	30W
Features:	Gigabit - DIN	Gigabit - DIN	Gigabit - DIN





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