Security

Application & Product Guide

For Today's IP-Based Security Systems

SIEMON™

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Connecting Today's Security Systems to a Higher Standard

Advancements in IP-based physical security technology combined with increasing concerns for public safety have given rise to the deployment of surveillance, access control and other security systems across all public and private spaces—from office buildings, parking garages, hospitality venues and transportation hubs, to places of worship, parks and city-wide streets.

As a leading global manufacturer of low-voltage copper and fiber optic cabling systems, Siemon understands that high-performance cables and connectors play an important role in supporting today's IP-based physical security devices and the delivery of Power over Ethernet (PoE) to surveillance cameras, access controllers and other IP-based security devices.

Converge™
Intelligent Building Solutions

A Digital Evolution

When it comes to physical security, a lot has changed since the first commercial CCTV and simple key-pad access control systems of the 1950s. Digital has overtaken analog, and IP-based security systems have evolved at an incredible pace since Axis Communications released the first IP camera in 1996. Fueled by open architecture, advanced digital video compression and sophisticated digital megapixel technology, the IP surveillance camera market is expected to grow rapidly.

Now increased concern for crime and terror attacks, regulations and global acceptance of ubiquitous video surveillance, combined with advancements in resolution, data analytics, artificial intelligence and cloud-based solutions are making IP-based security systems more prevalent and sophisticated than ever, including technologies such as:

- High-definition 360-degree and long-range surveillance
- Low-light, night vision and thermal imaging
- Facial, voice and iris recognition and behavioral analytics
- Mobile access and biometric access control readers
- Integrated surveillance, access control and life-safety systems
- Cloud-based physical security as a service (PSaaS) solutions

Part of Siemon's ConvergeIT Intelligent Building Solutions

The integration of low-voltage applications is happening as part of the intelligent building movement, and security is converging over an IP-based platform along with Wi-Fi, AV, PoE lighting, distributed antenna systems (DAS) and building automation systems.

Siemon's ConvergeIT Intelligent Building Solutions includes Digital Building Architecture that supports the design, installation and administration of integrated systems and Digital Building Delivery that ensures a robust, scalable standards-compliant infrastructure, from construction planning through implementation and delivery.

This security application and product guide is just one in a series for all the low-voltage applications that fall under Siemon's Digital Building Architecture and Digital Building Delivery. These guides are specifically developed to help our customers optimize the design, performance and administration of converged applications, while best fitting their technology roadmap and budget and ensuring return on investment.

Why Security over IP?

Traditional analog security systems require separate installations for power, video and control, resulting in increased labor and material costs. As the physical security market migrates to IP-based systems for increased return on investment, the demand for stand-alone, proprietary security systems is virtually disappearing. Not only is the image quality of IP-based security surveillance systems substantially superior due to multi-megapixel technology, but IP-based security systems offer a wide range of operational and cost-saving benefits:

Cost-Effectiveness:

Delivers significant savings in materials, labor and maintenance due to ease of installation and one cable used for video, power and control, eliminating the need for AC power runs to devices

Increased Functionality:

Enables security system integration, supports advanced video analytics and network encryption, allows for centralized control from any location and offers improved flexibility and scalability

Improved Performance:

Higher image quality, better coverage and the ability to handle larger amounts of data and surveillance footage from a greater number of devices over longer distances and across multiple locations

Security is Everywhere

To ensure public safety, prevent crime and mitigate risk and liability, physical security deployments touch all public and private environments, scenarios and businesses today – essentially any space where people work, play and gather.

- Multi- or single-tenanted commercial office buildings and spaces
- Hospitality and retail venues like hotels, restaurants and convention centers
- Transportation hubs such as airports, seaports, subway stations and parking garages
- Indoor and outdoor gathering spaces such as parks, arenas and community centers
- Sidewalks, intersections, streets and other pedestrianized municipal locations
- Hospitals and healthcare facilities
- K-12 schools and universities

Security Cabling Configurations

TIA and ISO/IEC structured cabling standards are the foundation of networks supporting IP-based security applications. These standards allow for various cabling configurations to support security device deployments, and Siemon's technical services team can help you select the best configuration based on your specific need, application and environment.

The primary cabling recommendations for today's IP-based security applications are as follows:

- Minimum category 6A/class E_A cabling and laser-optimized 50/125m OM3 multimode fiber for all new deployments to enable faster 10 Gb/s throughput of high-resolution video and support for future technologies
- Use of shielded twisted-pair category 6A/class E_A to provide superior support of advanced PoE and wherever electromagnetic interference can disrupt critical security data transmission
- The use of optical fiber to connect security devices can support extended distance requirements beyond 100 meters but may require media conversion and/or local power

IP-Based Access Control

While smaller in market size than IP video surveillance, demand for IP-based access control systems is also on the rise. These systems include networked door, gate or turnstile readers that communicate with relays, door contacts and sensors to provide access to controlled spaces. IP-based access control offers the following benefits:

- Enhances functionality via centralized management that logs input and output data from multiple doors and sites
- Improves security by integrating with video surveillance systems and enabling facial recognition to prevent intruder access via stolen cards
- Improves public safety by integrating with life-safety and alarm systems for instant lock-downs, opening of fire exits or disseminating public address messages
- Enables better employee management through integration with time and attendance systems

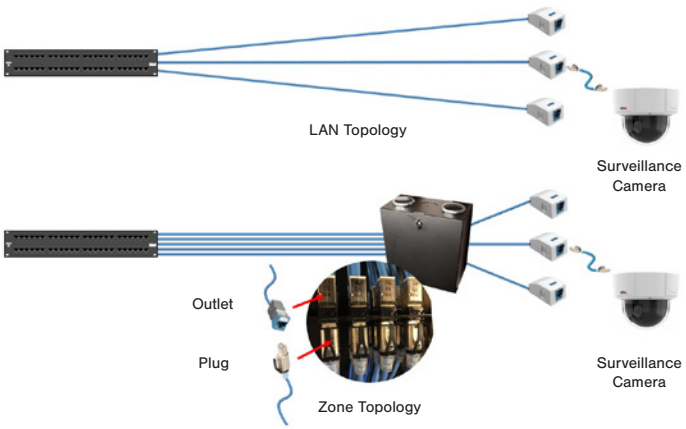
Security Cabling Configurations

Zone Cabling

A standards-based zone cabling topology incorporates horizontal consolidation point (HCP) or service concentration point (SCP) outlets, typically housed in a zone enclosure, that serve as intermediate connection points between the patch panels in the telecommunications room (TR) and service outlets (SO) or end devices. The benefits of zone cabling include:

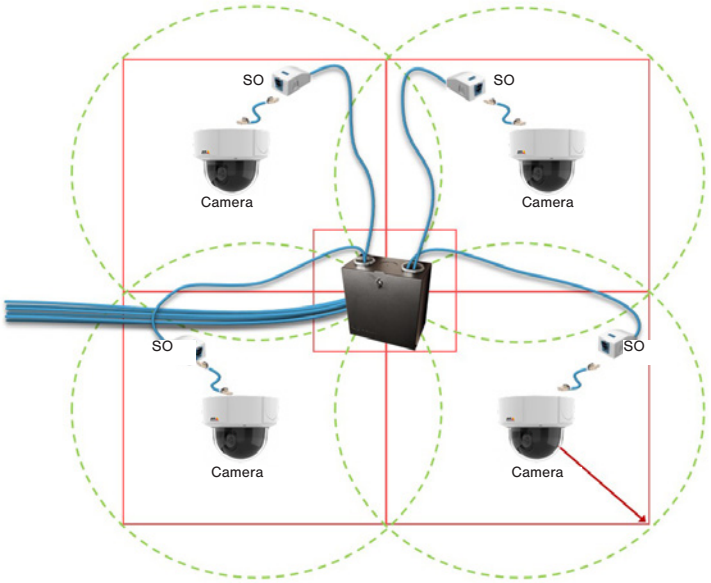
- Fast, easy deployment of new devices via spare outlet capacity in the zone enclosure
- Rapid reorganization and less disruptive moves, adds, and changes by isolating changes to the shorter cabling link between the zone enclosure and the SO or device
- Conveniently combining outlets serving cameras (and other intelligent building devices) within one enclosure

Zone vs LAN Topology



Zone cabling is especially ideal for the deployment of grid-based security coverage areas. In this scenario, the diameter of coverage is larger than the square grid pattern to ensure security across a facility with no gaps where the coverage areas intersect.

Security Coverage Areas via Zone Cabling



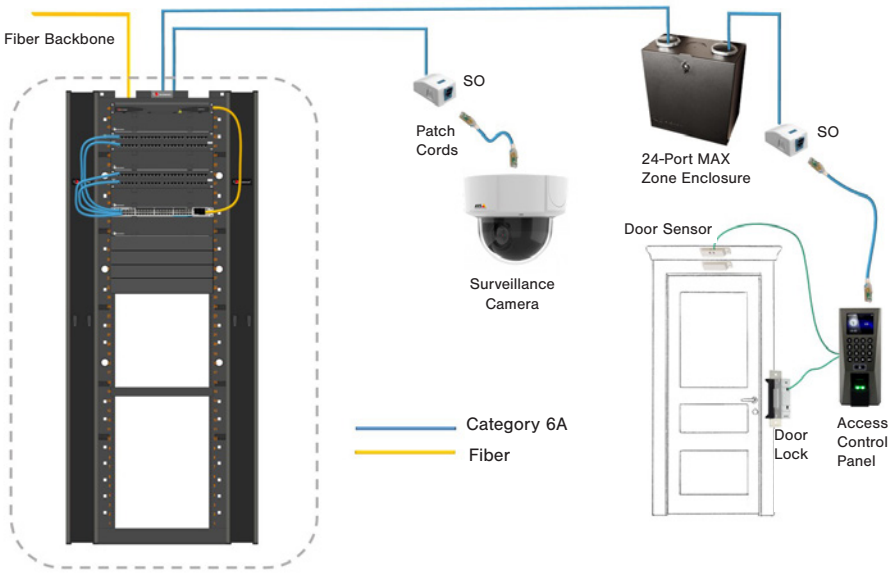
Plenum Space Requirements for North America

In accordance with the National Electric Code® (NFPA 70), plenum-rated components that meet UL 2043 requirements for smoke and heat release are required when located within a building's air-handling spaces, including above drop ceilings and under raised floors.

Siemon's cable, zone enclosures, outlets, plugs, patch cords and surface mount boxes all meet UL 2043 requirements for providing connectivity in the plenum space to ceiling-mounted surveillance cameras or other ceiling-mounted security devices.

Traditional Configuration

In a traditional LAN-style cabling configuration, horizontal cable is terminated to an SO (Z-MAX®) housed in a faceplate or surface mount box located near the device. Patch cords are used to connect devices to the SOs. The use of an SO provides a convenient end-user location to support labeling and administration of the cabling and identify channels for future use. To facilitate moves, adds and changes, a zone-style topology where shorter links run from outlets in the zone enclosure to the SOs can also be deployed.

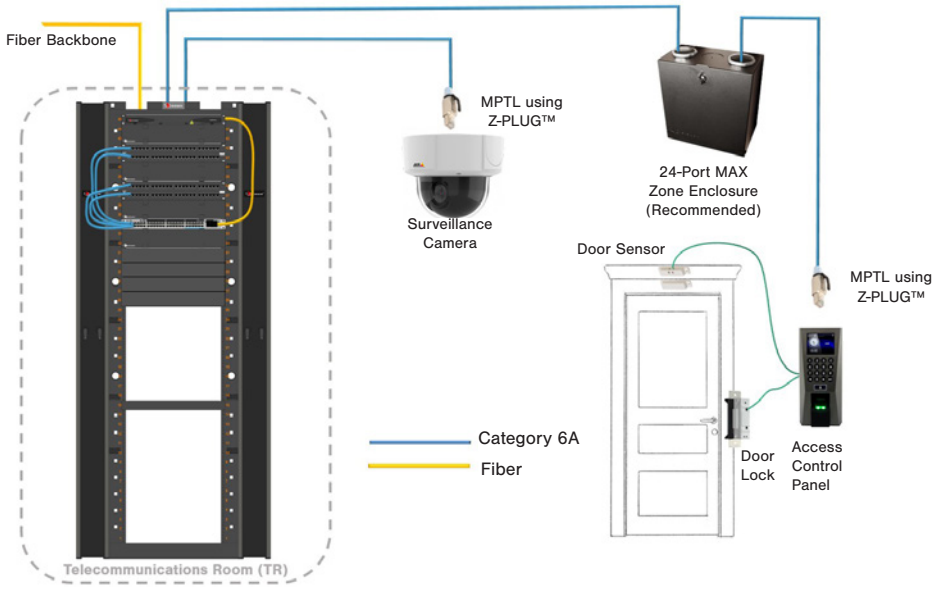


Traditional Configurations

Modular Plug Terminated Link (MPTL)

The MPTL topology eliminates both the service and SCP outlets and plugs the horizontal cable directly into the end device. In an MPTL, horizontal cables from the distribution panel in the TR are terminated to field-terminated plugs (Z-PLUG™) and connected directly into the end device, essentially creating a one-connector channel. MPTLs often support applications-specific commissioning when the security device is not expected to be moved or rearranged after deployment. For example, where surveillance cameras are publicly mounted, an MPTL may be considered to improve security by eliminating visible and accessible patch cords that can be intentionally or unintentionally disconnected.

To facilitate moves, adds and changes, it is strongly recommended that an MPTL be deployed in a zone topology where field-terminated shorter links run from outlets in a zone enclosure (24-Port MAX® Zone Enclosure) to the device. MPTL configurations using a zone topology are a two-channel configuration.



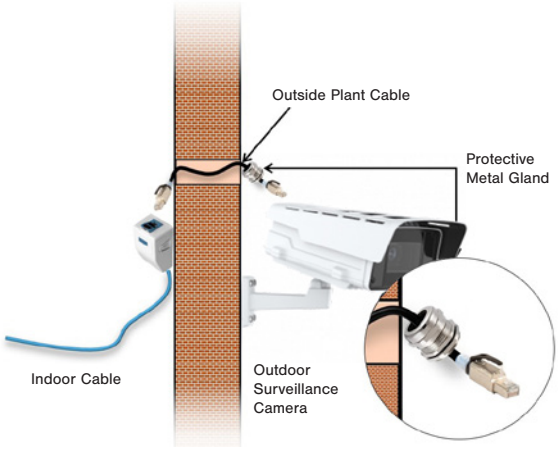
Modular Plug Terminated Link (MPTL) Configurations

Wi-Fi Cabling Configurations

Outdoor Security Configurations

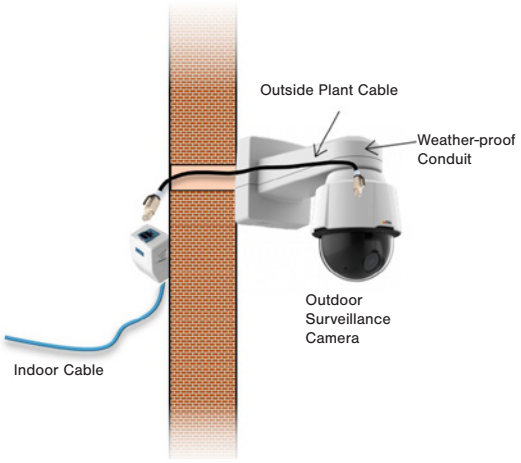
With security now ubiquitous across all environments and vertical markets, the demand for outdoor video surveillance has increased significantly, especially where large numbers of people congregate outdoors, such as universities, amusement parks, city centers, stadiums and resorts. Connecting surveillance cameras outdoors requires cables and connectivity that are protected from the elements. There are a variety of options for cabling outdoor cameras mounted on the outside of buildings or poles.

Indoor/outdoor cable can be used to connect outdoor cameras. However, if the link to the outdoor camera requires cable to be deployed in a direct burial, lashed aerial or underground conduit application subject to moisture and UV radiation, outside plant (OSP) cable is required and must transition from indoor cable at the building entrance. For remote security devices located beyond 100 meters, hybrid copper/fiber cable can be used to provide both network connectivity and remote power.



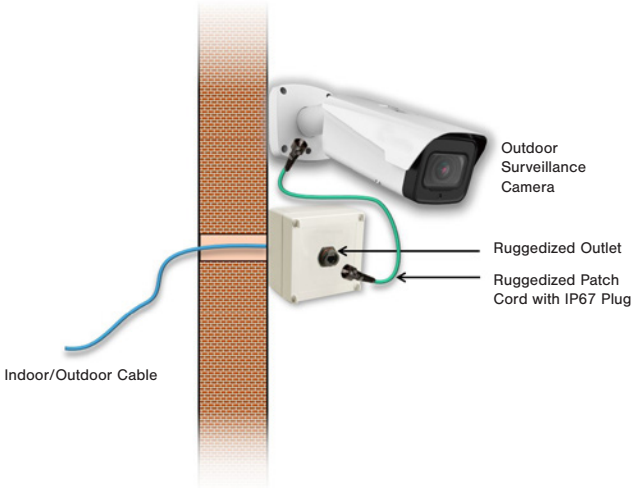
Outdoor Security Application using a Protective Metal Gland

Protective metal glands protect plugs that connect directly to the outdoor camera, requiring field termination of the plug (e.g., Siemon's Z-PLUG) after the cable passes through the gland.



Outdoor Security Configuration using Weather-proof Conduit

Plug-terminated links or patch cords can pass through weather-proof conduit to connect outdoor cameras.

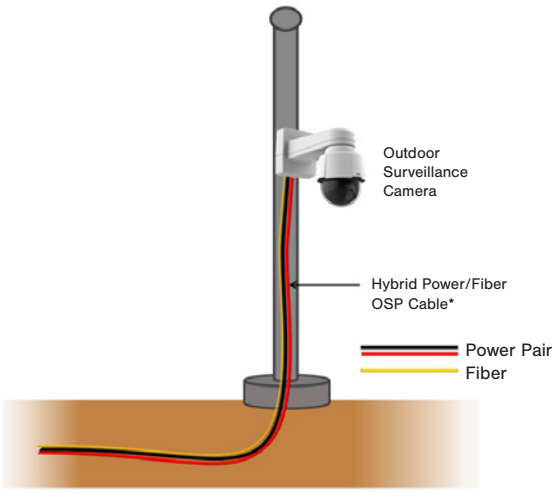


Outdoor Security Configuration using Ruggedized Connectivity

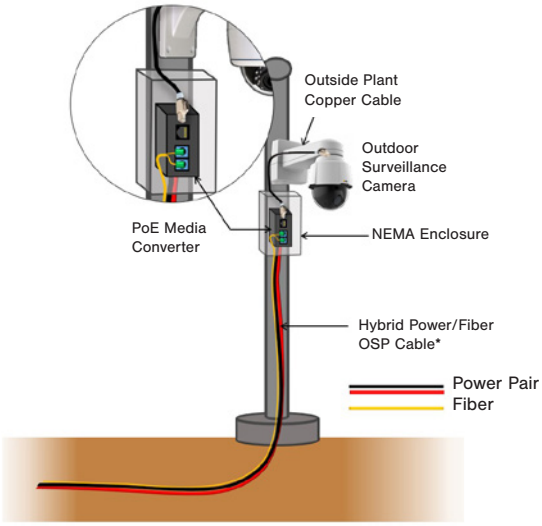
Ruggedized patch cords with IP66/IP67-rated plugs connect outdoor cameras to ruggedized outlets housed in an IP66/IP67 (NEMA 4X) surface mount box.

Extended Distance Configurations

With security devices required in more remote and outdoor environments, they are often located farther than the 100-meter distance limitation allowed with twisted-pair copper cabling. For these scenarios, duplex multimode or singlemode fiber cabling can transmit signals much greater distances—up to 550m on multimode and up to 10 km on singlemode depending on the active equipment. Because fiber does not support remote power delivery such as PoE, power is typically provided to the device via hybrid power/fiber cable. These hybrid cables include duplex fiber for data transmission along with insulated 12 AWG conductors for power, all within a single jacket. Power can also be delivered to security devices via separate power cables from an alternative or local power source.



*Power can also be delivered via separate power cables



*Power can also be delivered via separate power cables

Extended Distance Configuration Using Direct Fiber and Power Connections

Hybrid power/fiber cable can connect directly to devices that feature a duplex fiber port for data and power terminals for power.

Extended Distance Configuration Usinga PoE Media Converter

For devices with a copper port only, hybrid power/fiber cable can terminate to a PoE media converter placed in a NEMA enclosure. The PoE media converter transforms the optical signal and provides both a data and PoE connection for the device, which is connected to the converter using a copper patch cord.

Category 6A Shielded Cabling

Category 6A or Higher Shielded Cabling is the Best Choice for Today's and Tomorrow's IP-Based Security Applications

Supporting remote powering technology is critical as most IP-based security devices are powered via PoE over the same twisted-pair copper cabling that connects them to the network. There have been significant advancements in PoE that enable delivery of higher levels of remote power to support more sophisticated devices. For example, first generation IEEE 802.3af Type 1 (15W) PoE only supported simple surveillance cameras. Subsequent 802.3at Type 2 (30W) PoE then enabled enough power to support basic pan-tilt-zoom (PTZ) cameras. Now with higher level IEEE 802.3bt Type 3 (60W) and Type 4 (90W) combined with 10 Gb/s transmission speeds via category 6A/class E_A or higher cabling, the latest and future security devices can be connected to and powered over the IP-based networks, including:

- Ultra-high-definition 4K 360-degree view and virtualized IP cameras
- Outdoor thermal IP cameras with heater/blower functions
- Low-light, night vision and thermal imaging PTZ cameras
- Door access control panels, readers, door strikes and battery charging circuits

Considering industry standards and the impact of higher-level PoE capable of powering security devices, category 6A/class E_A shielded cabling systems should be the minimum twisted-pair cabling system deployed for security applications.

PowerGUARD®

Superior Remote Powering Support

Deploying a cabling infrastructure for today's converged networks that deliver remote power to a wide range of devices requires cables and connectivity designed to provide superior remote powering support – that's Siemon's PowerGUARD® technology.

- Siemon's Z-MAX®, MAX® and TERA® jacks with PowerGUARD technology feature a patented crowned jack contact shape allowing you to connect and disconnect to the latest remote powering applications with zero risk of connector damage from electrical arcing.
- Shielded category 6A/class E_A or higher cabling systems with PowerGUARD® technology offers improved heat dissipation to reduce heat buildup within cable bundles delivering remote power that can lead to performance degradation.
- Siemon shielded category 6A/class E_A and category 7A/class F_A systems with PowerGUARD technology provide maximum support of remote powering applications with a higher 75°C operating temperature qualified for mechanical reliability in high temperature environments.

Industry Leading Solutions and Support

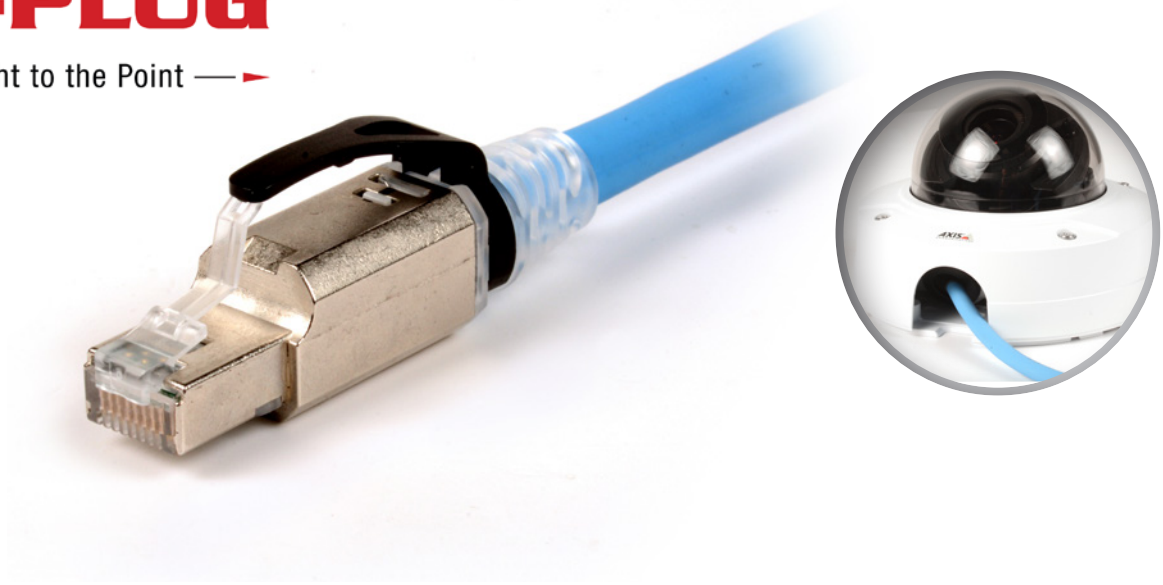
As an industry leader, Siemon participates in global cabling standards development initiatives and is dedicated to understanding and supporting the unique needs of the market. Siemon offers technical support and expert guidance on designing and deploying high-performance, reliable cabling systems for the latest IP-based security applications.

With high performance copper cabling and innovative, easy-to-deploy connectivity solutions, Siemon delivers standards-based end-to-end cabling systems with the performance and reliability to support today's advanced security systems. Siemon's LightHouse™ Advanced Fiber Solutions and High-Speed Interconnects support backbone, switch and extended distance connections while our full range of racks, enclosures, and cable management solutions provide the support for housing and protecting active equipment and connections.

Application-specific cabling considerations are an integral part of Siemon's Digital Building Architecture

Z-PLUG®

Straight to the Point

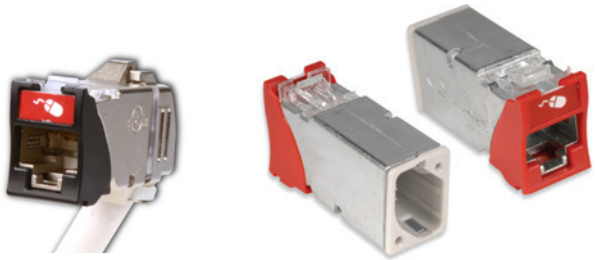


Z-PLUG™ Field-Terminated Plug

Siemon's patented Z-PLUG Field-Terminated Plug offers quick, reliable high-performance field terminations for custom length direct connections to security devices. Z-PLUG exceeds all category 6A performance requirements to easily support current and future security devices.

- Terminates shielded and UTP, solid and stranded cable in conductor sizes from 22 to 26 gauge – all with a single part number
- Features shorter plug design with rounded edges and the ability to eliminate the boot and latch protector makes it ideal for connecting to devices with limited space
- The user-friendly Z-PLUG termination tool and intuitive hinged lacing module that eliminates cable feed through enables best-in-class termination speed and repeatable performance
- Dual-purpose latch protector clip is available in nine colors for easy identification of various applications and devices
- PowerGUARD® technology with fully-shielded, 360-degree enclosure and 75°C operating temperature improves heat dissipation for PoE and PoH

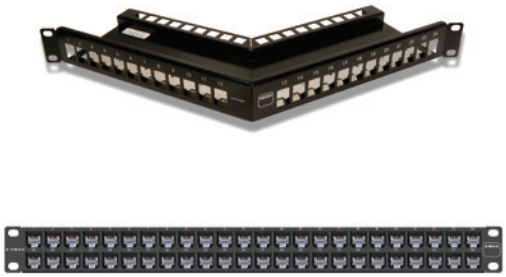
go.siemon.com/SECZplug



Z-MAX UTP and Shielded Outlets

Z-MAX category 6A shielded and unshielded outlets combine exceptional performance with best-in-class termination time. Also available in a Z-MAX 45 category 6A version for terminating cable at a 45-degree angle in shallow back boxes or wall-mounted raceway systems.
All Z-MAX products features PowerGUARD® technology to prevent erosion due to arcing when a plug is unmated while under DC remote power load.

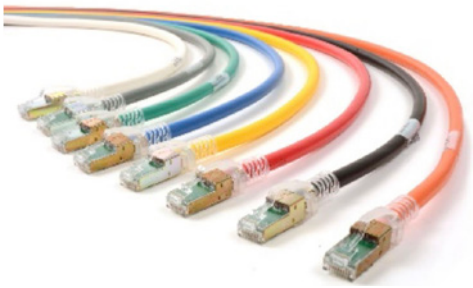
go.siemon.com/SECOutlets



TERA-MAX and Z-MAX Patch Panels

Available in flat and angled versions, TERA-MAX patch panels provide outstanding performance and reliability in a modular solution for equipment rooms. Shielded and UTP Z-MAX modules can be easily configured in the TERA-MAX and Z-MAX panels.

go.siemon.com/SECTERA



Z-MAX Category 6A Modular Patch Cords

Ideal for facilitating connections to surveillance cameras from a service outlet or for patching in the telecommunications room, Siemon Z-MAX category 6A UTP and shielded cords offer the unparalleled performance of an exclusive PCB-based smart plug, alien crosstalk resistant construction and a host of innovative end-user features.

go.siemon.com/SECZMAX

LockIT™ Patch Cords

The LockIT RJ45 patch cords prevent unintended or unauthorized disconnection of the plug. LockIT cords are the perfect choice for use in public areas such as schools, retail stores, transportation, hospitality and waiting areas, and in mission-critical networks such as data centers, health care environments and government systems.

go.siemon.com/SECLockIT

MAX Faceplates

Available in double- and single-gang for housing up to 12 modules, durable MAX faceplates are designed to be used with angled or flat Z-MAX outlets.

go.siemon.com/SECFaceplates

Surface Pack Boxes

Siemon's plenum-rated surface pack boxes are ideal for mounting to a fixed location above the ceiling to support up to six ceiling-mounted surveillance cameras or other security devices. They support Z-MAX outlets and come in 3- or 6-port versions.

go.siemon.com/SECSurfacePack

Z-MAX Surface Mount Boxes

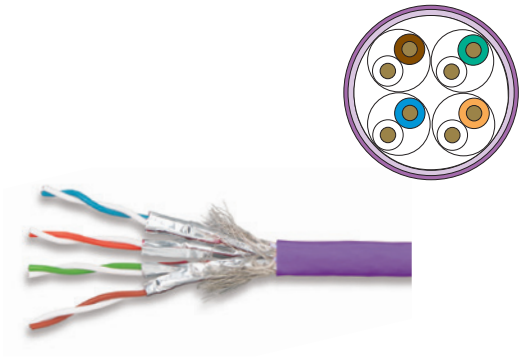
Siemon's plenum-rated surface mount boxes offer an option where an outlet cannot be recessed into a wall or floor box. They support Z-MAX outlets and come in 1, 2, 4 and 6-port configurations.

go.siemon.com/SECSurfaceMount

Ruggedized Outlets, Plugs and Patch Cords

Siemon Ruggedized category 6A outlets, patch cords and plugs are the answer for security deployments in harsh environments such as laboratories, hospitals, cafeterias or any other place where connections may be exposed to dust, moisture or chemicals.

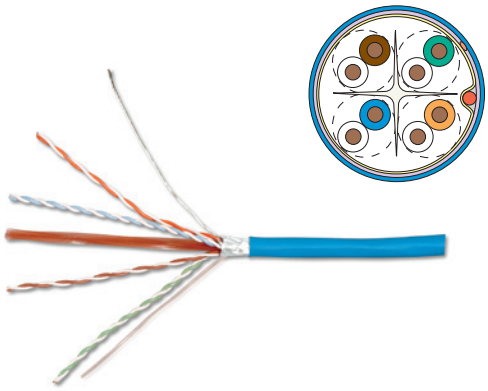
go.siemon.com/SECRuggedized



Category 7A S/FTP Cable

Category 7A fully shielded cable is the highest-performing and most secure twisted-pair copper system available for connecting security devices, featuring excellent noise immunity and heat dissipation for optimum signal transmission and remote powering support.

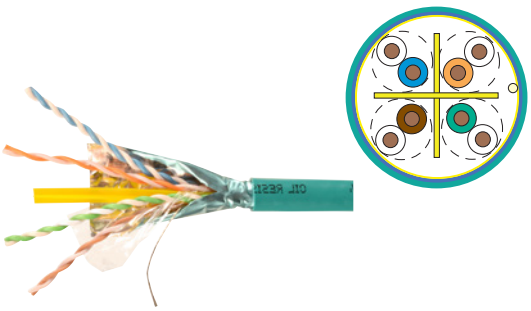
go.siemon.com/SECCat7a



Category 6A UTP and F/UTP Cable

Our category 6A UTP and F/UTP cables feature the highest performance margins across all critical transmission parameters, which are the perfect solution for today's security applications where reliable throughput is paramount.

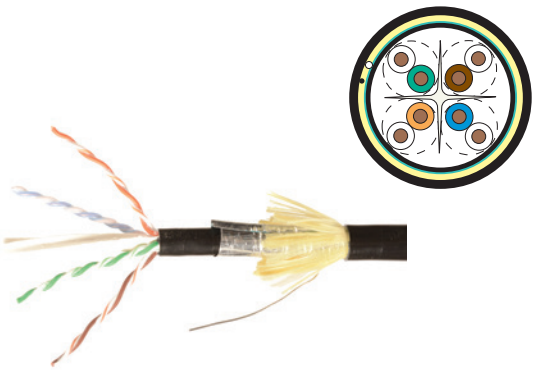
go.siemon.com/SECCat6a



Category 6A UTP and F/UTP Indoor/Outdoor Cable

Our category 6A UTP and F/UTP indoor/outdoor cables offer oil and sunlight resistance, as well as cold bend performance, for easily transitioning from indoor to outdoor environments when connecting outdoor surveillance cameras where cable is not subject to long-term emersion and does not have to be direct buried.

go.siemon.com/SECOutdoorCable



Category 6A UTP and F/UTP Outside Plant Cable

Our category 6A UTP and F/UTP OSP cables are designed to support the latest IP-based security applications in outside wet environments. Suitable for direct burial, lashed aerial, duct and underground conduit installations.

go.siemon.com/SECOutsidePlant

LightBow™ Fiber Termination Kit

Fiber optic cabling is ideal for security deployments that require greater than 100-meter distances, and Siemon's LightBow Mechanical Splice Termination System is a simple termination system that makes fiber deployments faster and easier than ever before without the cost and learning curve required for other fiber termination methods. LightBow's patented, easy-to-use termination simplifies fiber insertion and avoids connector damage, offering significant time savings and ensuring consistent, reliable performance.

- Factory assembled singlemode (UPC and APC) and multimode LC and SC simplex connectors
- Low-cost, simple robust termination process that combines splice activation and mechanical crimping to reduce termination time
- Built-in verification window on connectors for use with 0.5mW visual fault locator (VFL)
- Connectors can be adjusted after verification and re-terminated
- Termination kit includes LightBow termination tool, strippers, precision cleaver, strip template, VFL and everything needed for termination – all in a convenient carrying case
- Compatible with Siemon and Corning Unicam® cleaver

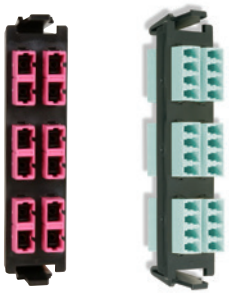
Note: Unicam is a registered trademark of Corning Cable Systems

go.siemon.com/SECLightBow

RIC Fiber Enclosure

Siemon's Rack Mount Interconnect Center (RIC) Enclosures offer secure, superior fiber density without sacrificing protection and accessibility. Used with Siemon's Quick-Pack® adapter plates, RIC enclosures are available in 2U, 3U and 4U, as well as in preloaded versions to save time.

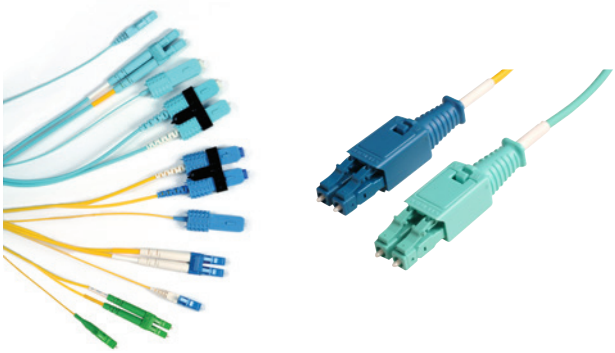
go.siemon.com/SECRIC



Quick-Pack® Adapter Plates

Siemon's Quick-Pack Adapter Plates are available in a wide range of fiber connector types, including LC, SC, ST and MTP, and can be easily installed into Siemon RIC enclosures to facilitate backbone or extended distances for security LAN applications.

go.siemon.com/SECAdapterPlates



LC BladePatch® and XGLO Fiber Jumpers

LC BladePatch OM4 multimode and singlemode LC fiber jumpers offer an innovative push-pull action for high-density environments, while XGLO Fiber Jumpers come in both standard SC and LC for connecting switches and devices.

go.siemon.com/SECLCBlade

Fiber Cable

Siemon offers a full line of indoor, indoor/outdoor and outside plant bend-insensitive bulk singlemode and multimode cables available in tight buffer and loose tube and in a variety of jacket ratings for extended distances and campus-wide security applications.

go.siemon.com/SECFiberCable

Equipment Support Solutions

Value Rack

Siemon's Value Rack provides an economical, durable solution for mounting and securing cabling and active equipment in telecommunications rooms, and features integrated bonding and grounding and visible U space markings.

go.siemon.com/SECValueRack

4-Post Rack

Siemon's adjustable-depth, 4-Post Rack provides a stable platform for mounting extended depth/size active equipment.

go.siemon.com/SEC4Post

Value Vertical Cable Managers

The Value Vertical Cable Manager is an economical, full-featured solution with every aspect optimized to minimize assembly time and simplify steps. This versatile manager is ideal when used with the economical Value Rack.

go.siemon.com/SECValueVertical

Wall Mount Cabinets

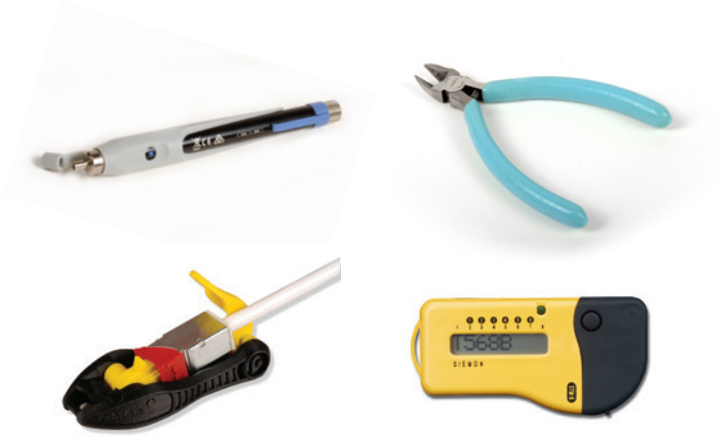
The wall-mount cabinet is ideal as a mini telecommunications room or for remote distribution and consolidations points to deliver security in open, unprotected spaces such as warehouses, retail facilities and schools.

go.siemon.com/SECWallMount

RouteIT Horizontal Cable Managers

RouteIT horizontal cable managers are available in multiple sizes and its high-capacity fingers can accommodate over 48 category 6A cables.

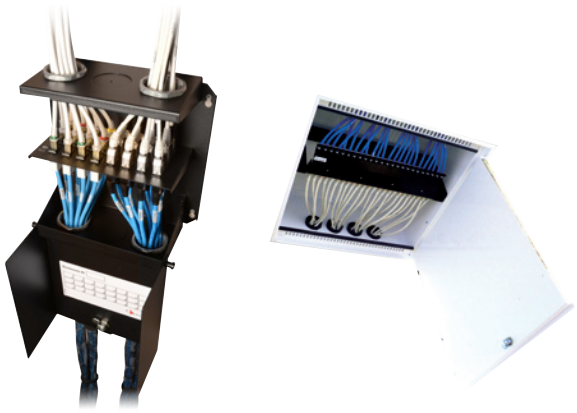
go.siemon.com/SECRoutIt



Cabling Tools & Testers

From cable prep and easy-to-use, innovative termination tools for Siemon copper and fiber connectivity, to visual fault locators and versatile hand-held testers, Siemon offers a variety of cabling tools and testers.

go.siemon.com/SECTools



Zone Cabling Enclosures

Ideal for supporting zone cabling topologies, Siemon plenum-rated zone enclosures come in a 24-Port MAX Zone Unit Enclosure and a 96-Port Passive Ceiling Zone Enclosure that accept flat Z-MAX outlets.

go.siemon.com/SECZone

Want to Learn More About Security Applications?

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AG_SecurityGuide_RevC 3/22

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