



SYSTIMAX[®] cabling design and installation guidelines for the ION[®]-E solution

COMMScope[®]

Introduction

CommScope's ION®-E is a multiband, multioperator and multitechnology Unified Wireless Infrastructure Solution that operates over a Category 6A and fiber-optic infrastructure, making it friendly to both wireless operators and business enterprises alike.

The flexibility, scalability, and simplicity of the system solve the biggest roadblocks associated with rapidly changing indoor coverage and capacity demands:

- The ION-E platform simplifies implementation by using the structured cabling systems familiar to IT installers, and also provides a simple and straightforward user interface for ease of setup and configuration.
- Today's modern buildings require flexibility to handle floor space layout changes, relocation of employees, or other changes that can require an extensive rework of the wireless systems. ION-E is deployed in a flexible grid arrangement and can be easily adapted in software to support changing requirements.
- The ION-E platform scales to support buildings of any size, including campuses. It is frequency agile and wireless technology agnostic, eliminating the need for costly infrastructure upgrades.

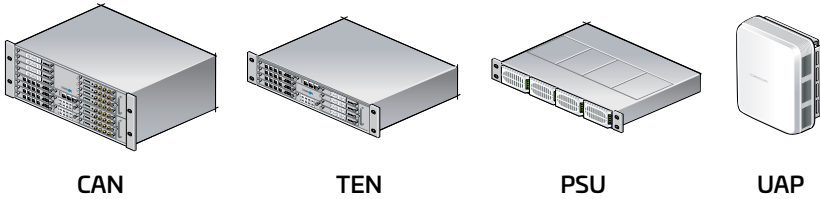
This document reviews the system architecture and provides cabling design guidelines. The ION-E cabling infrastructure is based on CommScope's 10 Gigabit media, including SYSTIMAX® GigaSPEED X10D® twisted pair cabling, LazrSPEED® multimode and TeraSPEED® singlemode fiber solutions. These high-performance solutions are commonly used for a wide range of other premises and campus applications that can now operate alongside the ION-E solution.

This document provides guidelines for implementing the cabling infrastructure to support ION-E. For details regarding ION-E equipment installation, commissioning and operation, consult the ION-E Users manual. Additionally, the CommScope Infrastructure Academy provides training courses covering various aspects of SYSTIMAX SCS design and installation.

The ISO/IEC 11801 standard, the CENELEC EN 50173 series standards, and the ANSI/TIA-568-D series standards provide detailed information and specifications on cabling infrastructure.

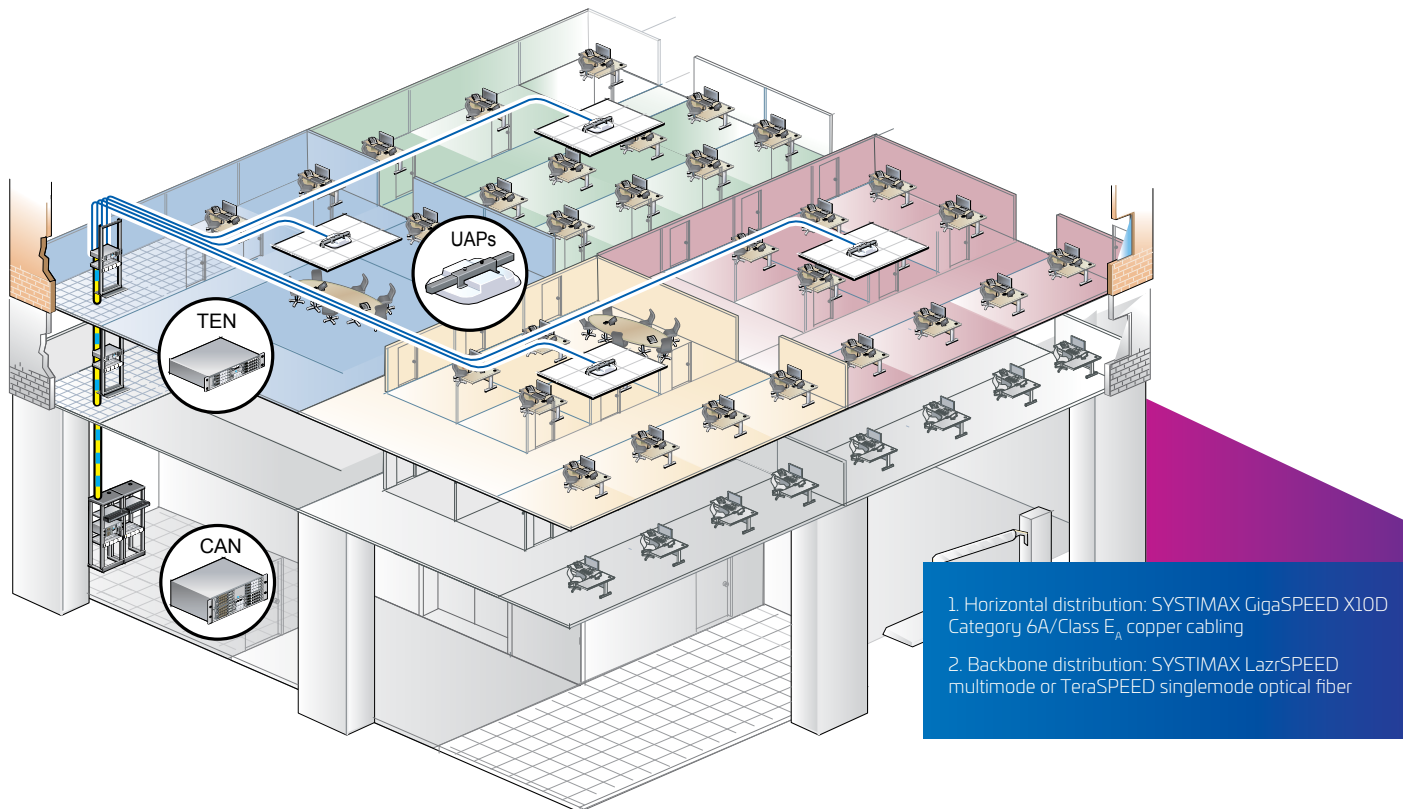
The ION-E system components

The ION-E system includes four basic building blocks designed to provide reliable mobile network services throughout a facility. This in-building wireless solution consists of a central access node (CAN), transport expansion node (TEN), power supply unit (PSU), and universal access point (UAP).



ION-E CABLING INFRASTRUCTURE

The recommended media for the ION-E cabling infrastructure include SYSTIMAX GigaSPEED X10D Category 6A/Class EA copper cabling for horizontal distribution from the CANs or TENs to the UAPs serving floor coverage areas, and SYSTIMAX LazrSPEED multimode or TeraSPEED singlemode fiber for backbone distribution between the CAN located in the equipment room (or where the network services enter the facility) and the TENs in the telecommunications closet, as shown in the figure below.



COVERAGE AREAS

In a typical installation, each floor is divided into UAP coverage areas. Coverage areas can be evenly divided, but the building structure may restrict RF coverage and dictate adjustments to coverage size, shape and UAP position.

Throughout the coverage areas, GigaSPEED X10D cables are run from a GigaSPEED X10D panel in the serving telecommunications closet or equipment room to the middle of each area and terminated in GigaSPEED X10D MGS600 connectors. GigaSPEED X10D cords are used to connect the UAP to the MGS600 outlet. The UAP locations within each cell can be predetermined and adjusted after an RF review. To allow maximum flexibility in UAP placement, and for future expansion, consider cabling an additional outlet in each coverage area.

TYPICAL CABLING CONFIGURATIONS

An example of a small installation illustrates the basic configuration of the cabling systems. A minimal panel configuration can be deployed with the SYSTIMAX 360® GigaSPEED X10D Evolve 1U U/UTP panel kit, three GigaSPEED X10D 1100GS6 Evolve six-port distribution modules, and a LazrSPEED or TeraSPEED 12 LC distribution module with EVOLVE G2 bezel.

Note: Use caution when routing and administering fiber and copper distribution in a common panel. This arrangement offers no fiber shelf for the additional protection of terminated fiber links.

The TEN uses GigaSPEED X10D 360GS10E patch cords to connect to the X10D horizontal links for the UAP. LazrSPEED patch cords (TeraSPEED for singlemode) are used for the fiber links to the CAN.

Note: PSUs (not shown) are required for power.

Warning: Port power must be turned off to the UAP before disconnecting it from the twisted pair cable.

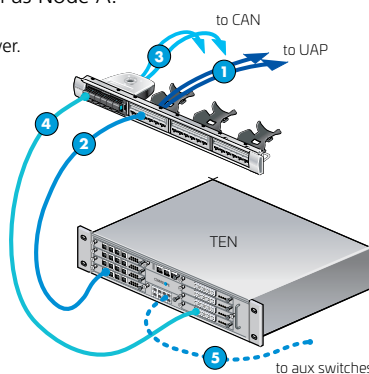
The CAN also uses GigaSPEED X10D 360GS10E patch cords to connect to the GigaSPEED X10D horizontal links for the UAP. LazrSPEED patch cords (TeraSPEED for singlemode) are used for the fiber links to the TENS.

The coaxial RF links are sourced locally from the provider network through an ePOI or a repeater such as Node A.

Note: PSU (not shown) is required for power.

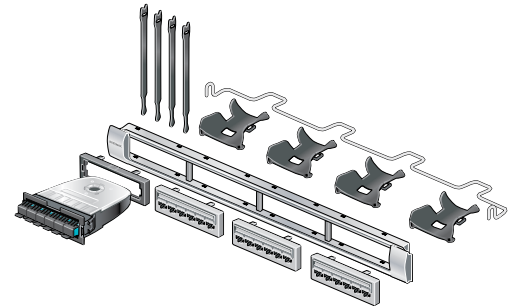
TEN

1. GigaSPEED X10D horizontal cabling
2. GigaSPEED X10D patch cord
3. LazrSPEED backbone cabling
4. LazrSPEED LC-LC patch cord
5. GigaSPEED X10D patch cord



Design notes:

- 1) The UAPs are powered from the TEN or CAN over Category 6A horizontal cabling using "enhanced Power over Ethernet technology." Cable heating can limit maximum ambient temperature and distance when bundled. Bundling is typical toward the equipment room end leading to the TEN and CAN. Metal conduit installation should be limited to 25 percent of normal fill, and nonmetallic conduit (PVC, fiber) should be avoided.
- 2) UAP power and control requires Category 6A cabling. Maximum length is 100 meters with a typical configuration having 90 meters of cabling and 10 meters of cordage.
- 3) Optical card slots accept standard 10GBASE-SR and 10GBASE-LR SFP+ transceivers.
 - a. 10GBASE-SR limited to 300 meters with LazrSPEED 300 and 550 meters with LazrSPEED 550 or LazrSPEED OM5.
 - b. 10GBASE-LR supports up to 10 km with TeraSPEED.

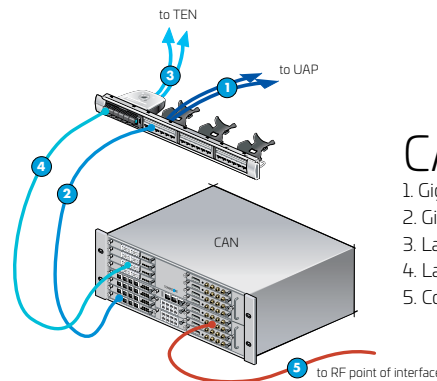


Evolve 1U U/UTP panel kit

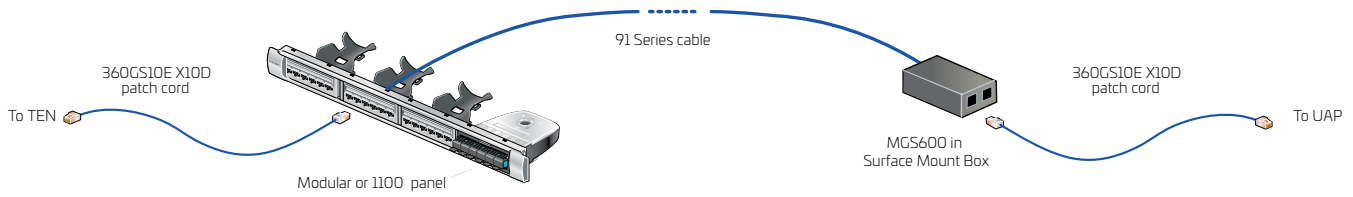
This configuration requires only 1U and includes 18 copper outlets and 6 fiber pairs

CAN

1. GigaSPEED X10D horizontal cabling
2. GigaSPEED X10D patch cord
3. LazrSPEED backbone cabling
4. LazrSPEED LC-LC patch cord
5. Coaxial jumper



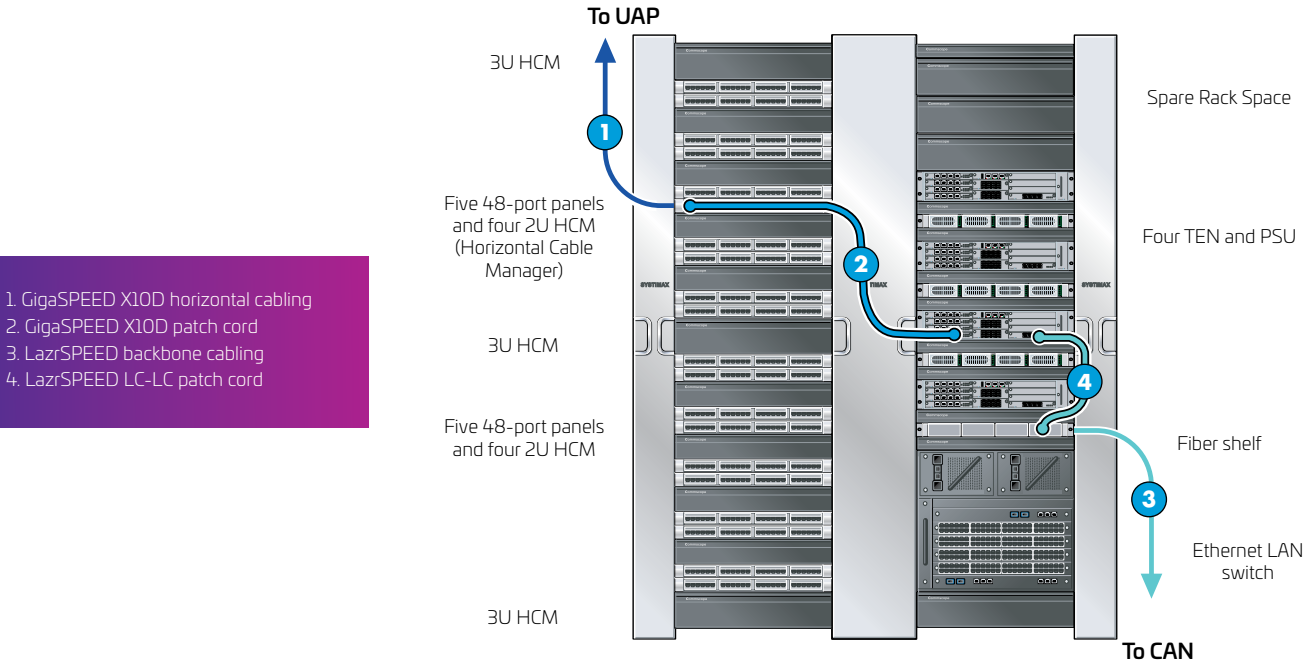
GigaSPEED X10D CHANNEL DIAGRAM



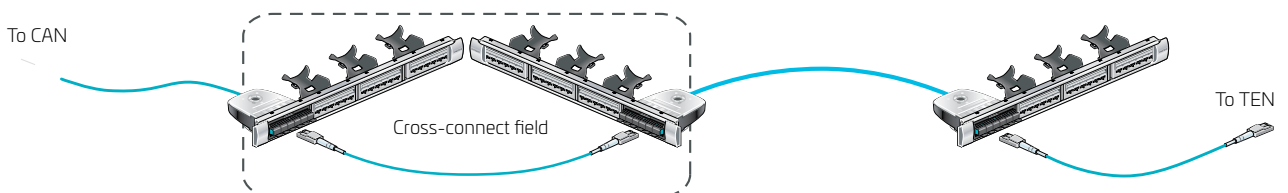
LazrSPEED CHANNEL DIAGRAM



Larger installations typically have a dedicated shelf for separate termination and administration of the fiber. Complete arrangements such as the example below with four TEN supporting multiple floors are also combined with LAN and other telecommunications support.



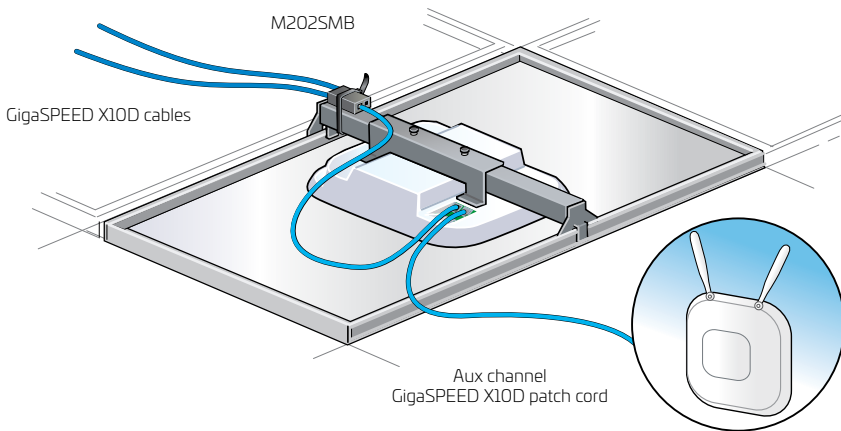
Larger equipment rooms or telecommunications closets typically implement a cross-connect cabling architecture with channel configurations that have an additional connection and patching fields that are separated from the equipment connections (see figure below).



At each coverage area, the GigaSPEED X10D cable is terminated with a MGS600 connector mounted in a M202SMB or similar surface-mount box. The UAP is connected to the MGS600 outlet with a 360GS10E patch cord. Note that while one GigaSPEED X10D cable is enough to operate each UAP, at least two cables should be placed to each coverage area for future expansion.

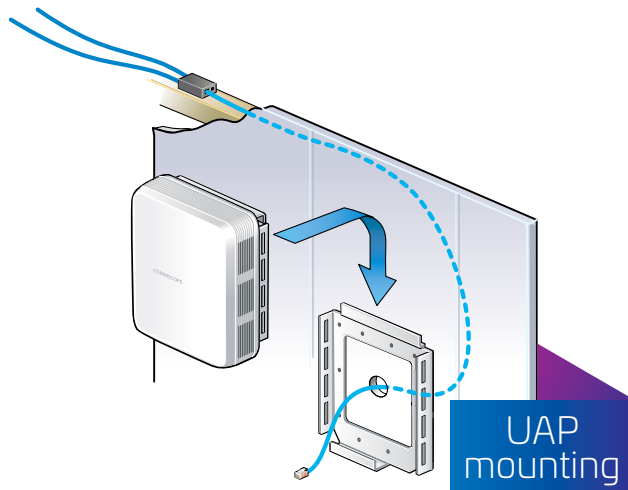
When ceiling mounted, the UAPs are suspended from the ceiling grid using a mounting kit as shown below. The M202 surface-mount box can be strapped to the UAP support bar as shown, although some regions may require fixed mounting on the building structure.

The UAP includes an auxiliary channel that supports a second UAP for MIMO designs, or supports 1000BASE-T Ethernet pass-through for additional applications such as WiFi access points or IP cameras. Consult the ION-E documentation for more information on the port.



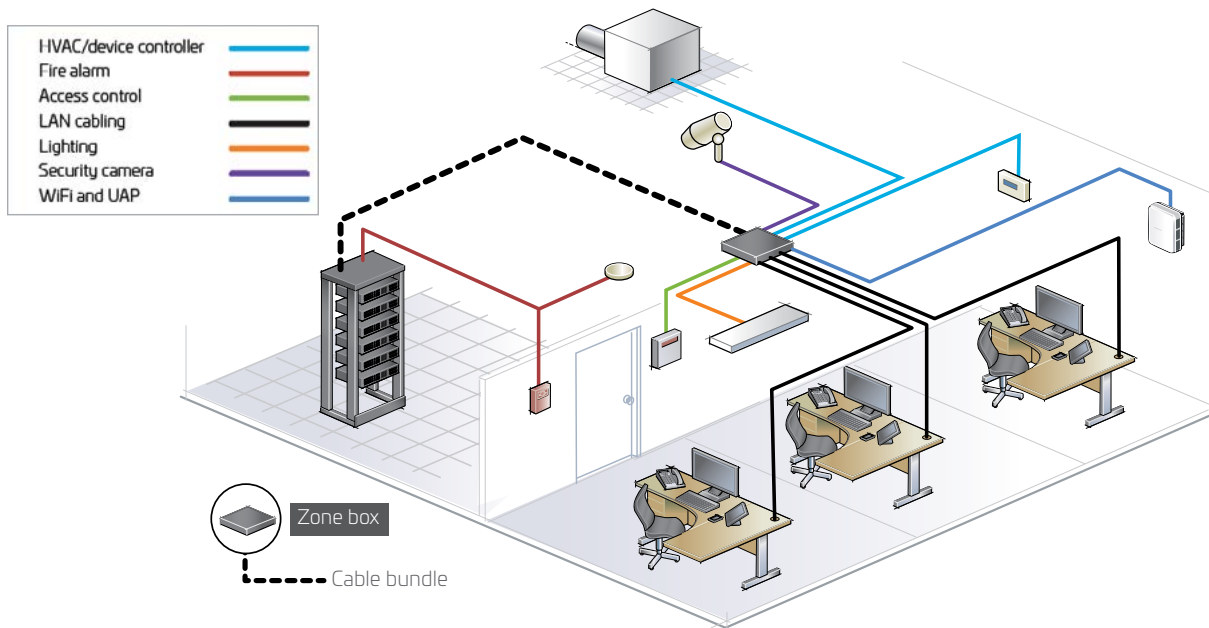
UAP can be mounted on wall surfaces using a wall-mount frame. The X10D 360GS10E patch cord feeds through a small hole, and the M202SMB with MGS600 connector can be mounted on the back side of the wall surface or any other building support.

Warning: To avoid damage to the UAP connector contacts, power must be turned OFF before disconnecting. There is a red button on the UAP that can be pressed to turn off the power.



UNIVERSAL CONNECTIVITY GRID

A universal connectivity grid can be deployed for horizontal cabling to provide support for other applications. Many other premises applications can be supported with GigaSPEED X10D horizontal cabling, and the placement of a zone box central to each coverage area provides a fixed but flexible connection point for changes in that area. GigaSPEED X10D 360GS10E patch cord connections can be made directly to the zone box, or zone extension cables can extend to the MGS600 at the UAP. For more information, please consult the universal connectivity grid design guide.



CABLING INSTALLATION PRACTICES

This guideline is not intended to serve as a comprehensive installation guide for the ION-E equipment or the installed cabling. Design and installation of low-voltage cabling must follow proper cabling installation practices and must comply with applicable national and local regulations, as well as manufacturer's instructions.

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TP-1082191-EN (10/17)