
Field Term Plug Installation Guidelines

Today's enterprise networks support a growing number of deployed devices which raise several questions for those who build and maintain the network infrastructure for those environments.

This guide addresses these questions by reviewing common cabling methods and components used to connect devices to the network, identifying key factors for choosing a cabling method, showing cabling examples using the field terminable plug and other connection methods with several common devices.

[Cabling Methods for Network Devices | 1](#)

[Which Cabling Method is Better? | 2](#)

[Selecting a Cabling Method | 3](#)

[Device Cabling Examples | 8](#)

[Field Term Plug Part Number Reference | 10](#)

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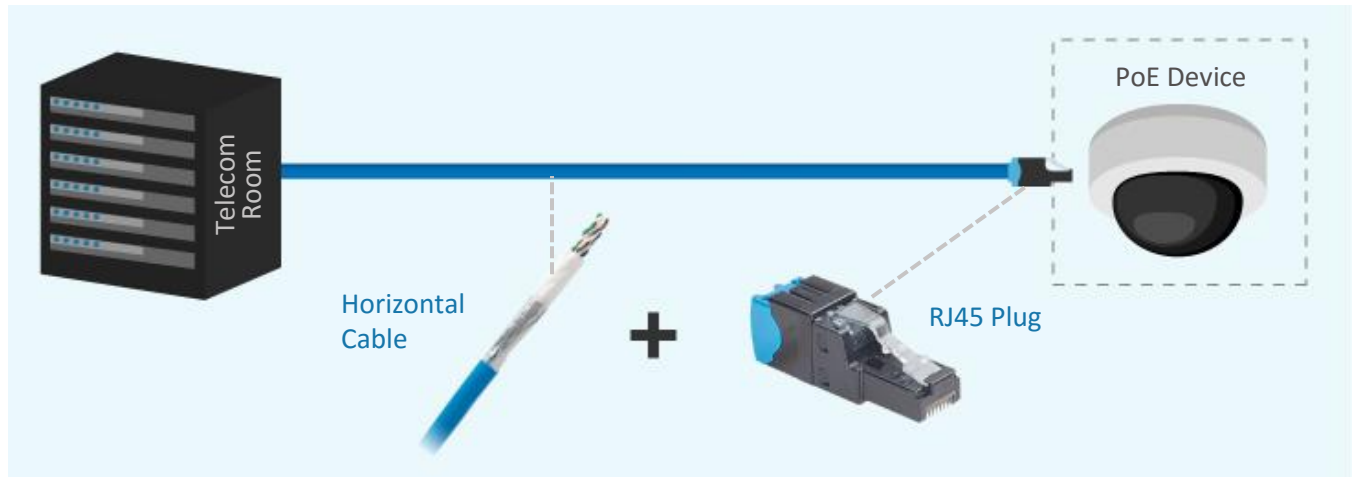
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1 | Cabling Methods for Network Devices

Like traditional network equipment such as computers or printers, most modern network devices include one or more RJ45 ports for being connected to the network. The two most common methods used to provide plug-ended network cabling to network devices are described below.

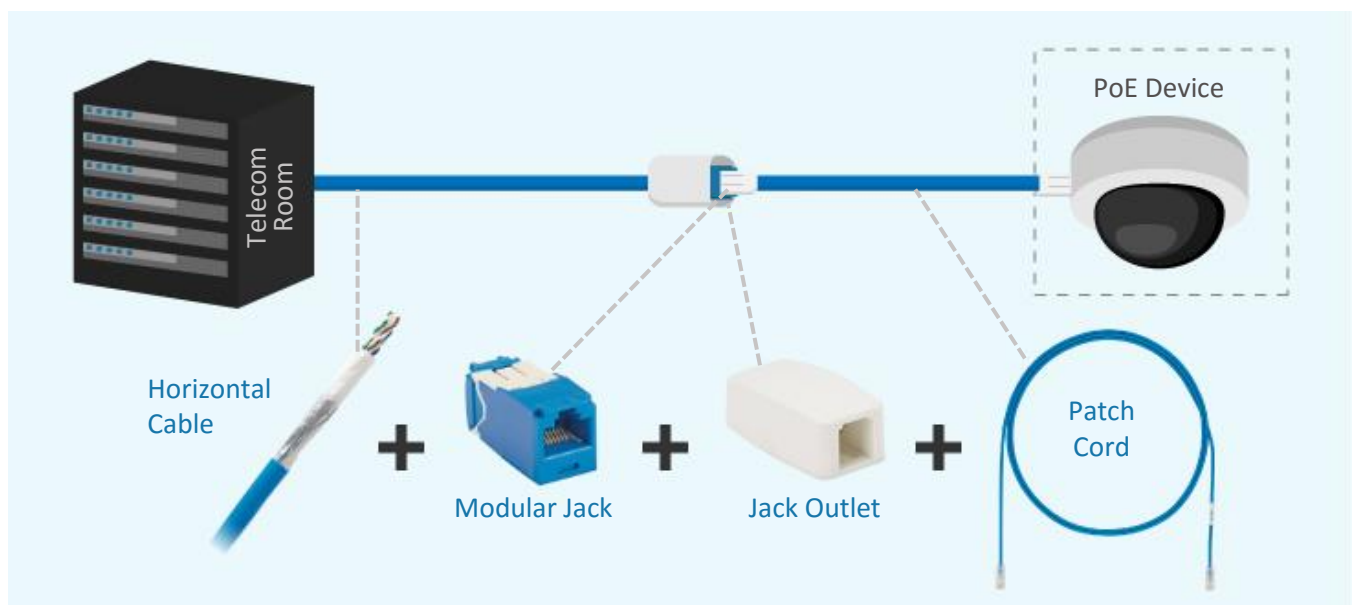
Direct Connect Method

The newest method is the “direct connect” approach where a field terminable plug is attached directly to the end of the horizontal cabling which is then plugged into the device, connecting it to the network.



Patch Cord Method

The second method is the traditional structured cabling approach – referred to here as simply the “patch cord” method – in which the horizontal cable terminates to a modular jack and a patch cord is used to connect the device to the network.



2 | Which Cabling Method is Better?

Given their differences, each method has inherent advantages in different areas as listed below.

Direct Connect Method



Provides cost savings, faster installation, and increased reliability.

- ✓ Lower install cost and faster installation with fewer components
- ✓ Plug terminated directly to horizontal cable avoids need for junction box
- ✓ Increased reliability due to fewer points of failure
- ✓ Included upcoming TIA-568 revision draft

Patch Cord Method



Familiar method that provides modularity and physical flexibility.

- ✓ Familiar approach doesn't require training
- ✓ Modular plugs on patch cords are generally more compact than field terminable plugs, allowing better fit in confined ports
- ✓ Flexible cable routing options
- ✓ Easier device movement
- ✓ Included in TIA-568

As you can see, neither cabling method is better in every case. In addition, the features of the cable and connector components used in the cabling system can have a big impact on how well each method works in an application.

The compelling cost and time benefits of the direct connect method make it highly desired by installers and end customers, while the adaptability and accessibility benefits of the patch cord method make it useful in many applications. Therefore, it is easy to see a good rule of thumb is:



Use Direct Connect for lower cost and faster installation.

Use Patch Cord for tight spaces and flexibility.

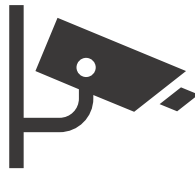


3 | Selecting a Cabling Method

The question then is when should you use each method? To answer this question, Panduit has identified three key factors to selecting the best cabling method for a specific application and/or device.



Port and Cabling Layout of the Device



Device Mounting Environment



Cabling and Connector Solutions Used



3.1 | Port and Cabling Layout of the Device

Two features of the device – the port layout and the cable routing path – have perhaps the largest influence on the cabling method selected for a device.

Both areas are discussed in detail below.

Port Layout of the Device

This refers to the physical location, orientation, and space surrounding the RJ45 port on the device. To determine the port layout of the device, ask the following questions:



Where is the port located on the device and how is it oriented?

Is there surrounding geometry on the device, such as walls or obstructions, that limit access to the plug latch or the port itself?

What types of plug will physically fit in the space available?

Is there room for the cable as it exits the plug?

Once the plug is inserted, how is the latch actuated to remove the plug?

Recommendations

The size and configuration of space around the device port can affect the type of plug which will work best. Below are cabling method recommendations based on the space available around the port.

1 | If space is relatively open:

Either method may be used because space is not an issue.

2 | If space is somewhat limited:

Either method may be used, but the direct connect method will require an angled plug because less space is needed for the cable exit.

3 | If space is very limited or access to the plug latch is constrained:

The patch cord method is preferred when space is limited because the modular plugs, used on patch cords, can be smaller than field-terminable plugs allowing for easier access to the plug latch for removal.



Examples: The devices above provide the widest range of cabling options because they have minimal space restrictions around the port and easy access to the plug latch for removal.



Examples: These devices show features which (1) position the port in a way which makes access to the plug latch difficult, (2) limit room for the cable to immediately exit the plug, and/or (3) limit space for the plug itself. Such cases may require an angled entry direct connect plug, a patch cord, or in the tightest spaces, a 28 AWG patch cord.

Cable Routing Path of the Device

This refers to the physical space and required path the cable must follow at the mounted device to reach the RJ45 port. To determine the cable routing path, ask the following questions:

Is the cable path open or tightly constrained? Is it straight or are multiple bends required?

During normal device operation or maintenance, is movement of the cable required such as a security camera which hinges to open for maintenance?

Along the cable routing path to the device, is there space and structure available for fitting a modular jack interface?

Recommendations

The cable routing path can influence which cabling method is best suited for connecting the device due to the different types of cable used in each method. Below are cabling method recommendations based on cable routing path.

1 | If the cable routing path is open:

Either method may be used because routing is not an issue.

2 | If the cable routing path is tightly constrained or requires movement:

The patch cord method is more suitable since patch cord cabling is generally smaller in diameter and more flexible than the horizontal cabling.

3 | If the cable routing path is challenging:

28 AWG patch cords may be required since they use half the size of traditional patch cords and are much more flexible to accommodate tight bends in the routing path.



Examples: The devices above have open or unconstrained routing paths, providing the most cabling options. The direct connect method can easily be used because there are no bend radius concerns.

Examples: The devices above have constrained cable routing paths that require tight bends. In these cases, a patch cord may be preferred because of its smaller size and flexibility. In the most extreme cases, 28 AWG patch cords may be required.



3.2 | Device Mounting Environment

Several aspects of the mounting of the device, such as the physical location, means of attachment, mounting environment, and likelihood of the device being moved in the future. To determine the device mounting environment, ask the following questions:

Is the mounting location easy or difficult to access?

Is the space around the mounted device generally open or are there nearby obstructions that complicate cable routing or access to the device port?

Is the device location expected to be relocated in the future?

Recommendations

Due to basic differences between the cabling methods in the cable options available and the level of system modularity, the device mounting location can have a large impact on the cabling method and components used. Below are cabling method recommendations based on the device mounting environment.

1 | If the mounting environment limits cable routing options, due to obstructions:

Either angled entry direct connect plugs or patch cords.

2 | If the mounting environment is hard to access:

The direct connect method is recommended because of the increased reliability.

3 | If the device is likely to be relocated:

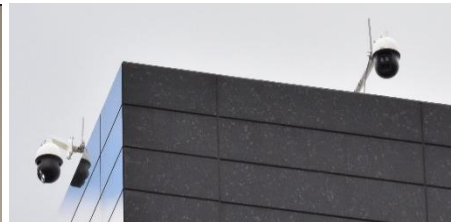
The patch cord cabling method is recommended because of its modularity, which requires the least effort to run to the new location.



Example: Drop ceiling locations can usually accommodate either cabling method, as there is normally open space to work with and the ceiling conceals the cabling.



Example: If a jack outlet can be located close by, the patch cord method may be better for wall mounted devices because either a faceplate or surface mount box provides a housing for the modular jack that is visually clean.



Example: The direct connect method is recommended for hard to access environments, such as roof-mounted security cameras, due to its increased reliability and the ability of the cable to feed directly through the conduit to the device without a need for an intermediate jack connection.



3.3 | Cabling and Connector Solutions Used

Finally, the features of the cabling and connector solutions themselves can impact which cabling method can be used. While the basic components used in each method are similar – such as horizontal cabling, modular jacks, field terminable plugs, or patch cords – differences in the features of the components can affect the feasibility of each cabling method for an application.

For the following basic cabling components, here are some important questions to consider:



Horizontal Cabling

How large in diameter is the cable, and how does it compare in size to the smallest diameter cables available of that type and performance level?



Modular Jacks

Are options available for angled cable routing paths into the jack? Does the port opening have a protective shutter if the port opening will be exposed to dust and debris? And are those options available in the performance level and type (UTP or shielded) needed?



Jack Housings and Outlets

Are multiple configurations, such as port count, color, or method of attachment, available to accommodate varying application needs?



Field Terminable Plugs

Will the plug be terminated in the field and is it quick and easy to do? Is the plug itself compact in size? Are angled cable routing options available? Can the plug be re-terminated if a change must be made?



Patch Cords

Are small diameter (28 AWG) cord options available in the type and performance level needed? Are reduced size plugs available for fitting in tight spaces?

Recommendations

Component features can impact whether a cabling system will work in the desired method. It is recommended that components be selected based on whether they have the needed features such as smaller cabling size, multiple routing directions into a connector, multiple outlet configurations or multiple cord size options.

4 | Device Cabling Examples

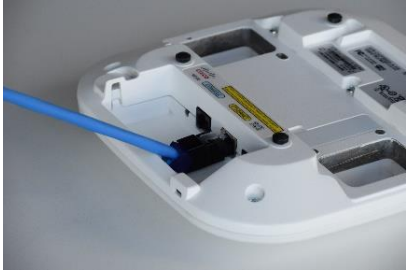
The growing variety of network devices and mounting environments leads inevitably to the question of “What cabling method can I use on this device?” While it is impossible to answer that question given the endless range of devices and mounting environments, the following examples illustrate common device configurations for wireless access points and cameras.

Wireless Access Point Examples - Direct Connect (Angled) or Patch Cord

Cisco 1700 Series



Cisco 3600 Series

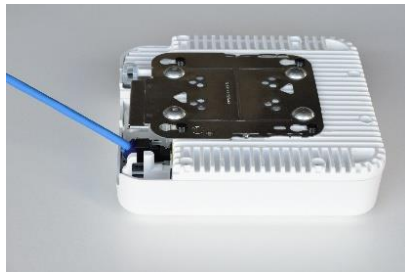


Cisco 3700 Series



Wireless Access Point Examples - Direct Connect or Patch Cord

Cisco 3800 Series



Camera Examples – Direct Connect or Patch Cord

AXIS 233D Series



Vaddio ConferenceSHOT



Hikvision DS-2CD112 Series



Camera Examples – Patch Cord

Cisco 2421 Series



Samsung Snd-L6012 Series



5 | Field Term Plug Part Number Reference

Below are Panduit part numbers for the Field Term Plug.



Straight Field Term Plug
FP6X88MTG (*single pack*)
FP6X88MTG-X (*10-piece bulk pack*)



Angled Field Term Plug
FPUD6X88MTG (*single pack*)
FPUD6X88MTG-X (*10-pc bulk pack*)



Termination Tools
EGPT (*works with both Angled and Straight Field Term Plug versions*)



EGJT-1 (*works with Straight Field Term Plug version and straight TG-style Mini-com modular jacks*)