

Computer Hardware & Networking & Server Configurations (H7E3 04)

UNIT 04: Structure Cabling, Termination and Testing

Cable Laying Accessories

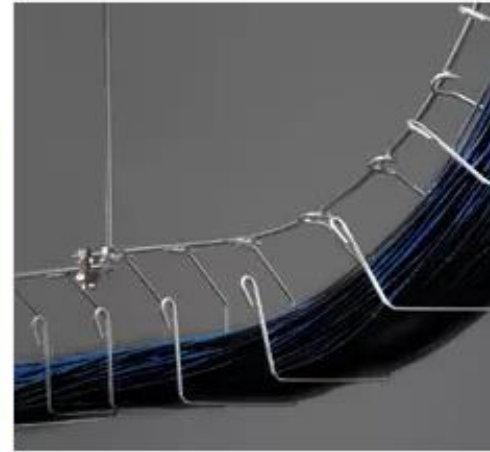
Cable Tray Systems



Basket Cable Trays



Solid & Ladder Cable Trays



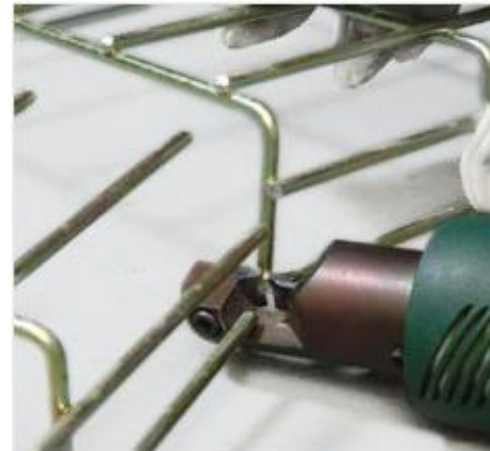
Snake Tray



Under Floor Cable Trays



Ceiling Suspension System



Accessories

Cable Tray Systems for Every Environment and Cable Type

- Cable tray systems are the perfect solution for running large quantities of power or data cables overhead or under-floor. Also known as baskets, trunking, or cable ladders, these systems are designed to both route and provide support for vital wiring.
- Cable tray systems range from simple to highly customized, so it's a good idea to know what your application requires before you start shopping. Here's a quick rundown of a few basic tray styles and what they work best for.

Basket-Style Cable Trays

These trays get their name from the fact that they look like long baskets made of wire. Basket trays can be mounted along walls, suspended from the ceiling, and even run below raised flooring that's often found in data centers and other facilities. Their "open" structure allows air to easily flow through and ensures that cables stay well-ventilated and cool, preventing heat-related malfunctions. Typically, they're made of steel, and come in different finishes, including powder coat and zinc plating.

Solid PVC Cable Routing Systems

- Designed with bend-sensitive fiber optic cabling in mind, the defining features of PVC trays are their solid floor and side walls. Unlike basket-style cable trays that have spaces between each wire rung, these are only open on the top, and their smooth, solid styling creates a perfectly even support system that makes sure delicate fibers don't sag or get pinched at sharp angles.

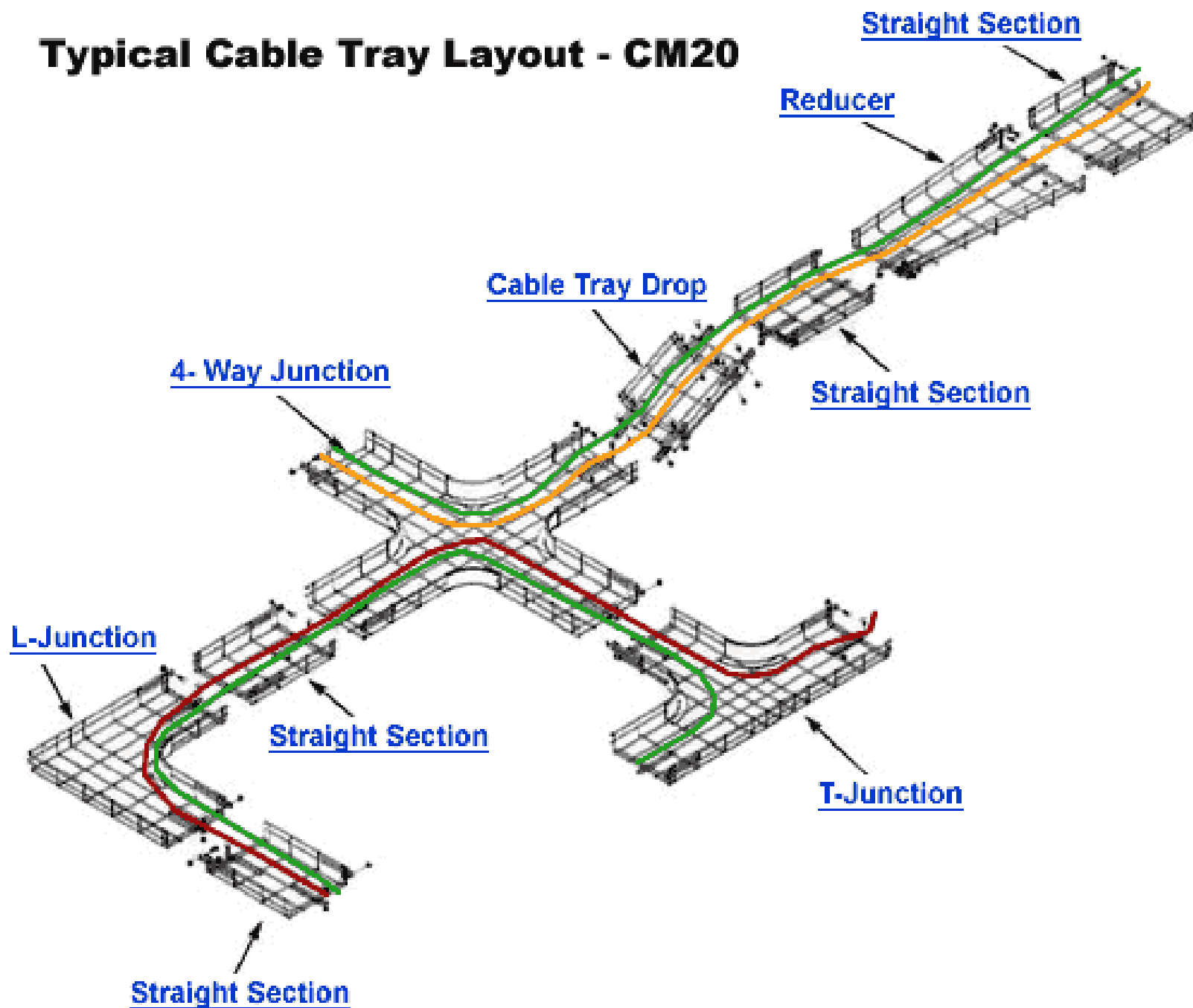
- Fiberglass cable trays are completely non-conductive, so they don't need to be grounded in order to meet electrical codes. They're lightweight, strong, won't interfere with signals, and are often times more resistant to UV, corrosion and chemicals than comparable metal trays.



Snake Trays

- A type of basket tray, Snake Trays are able to bend and flex in many different directions to accommodate the twists and turns your network cables need to take. The installer can bend them by hand without cutting out rungs or using any special tools, making them very convenient.
- Now that you've been introduced to cable tray systems, you might be interested in some further reading. Check out the [cable trays fill capacity and load chart](#), how to make sure [your cables stay compliant and meet the current standards](#), and how to combat [the problem of Zinc Whiskers](#).

Typical Cable Tray Layout - CM20



Network Tools and testers

Side Cutter



Common uses of a side cutter are to cut wire and to substitute for a set of pliers. Side cutters are also known as lineman's pliers. Most professional electricians own a set, but they are also staple items in many non-electrician tool boxes.

Crimping Tool



- A **crimping tool** is a device used to conjoin two pieces of metal by deforming one or both of them in a way that causes them to hold each other. The result of the tool's work is called a **crimp**. A good example of crimping is the process of affixing a connector to the end of a cable. For instance, network cables and phone cables are created using a crimping tool (shown below) to join the RJ-45 and RJ-11 connectors to the both ends of either phone or CAT5 cable.

Wire stripper

- A tool designed to remove the protective covering (jacket) off of a cable to expose the inner wires. Because different wires come in different shapes, there are dozens of different wire strippers available. In the picture is an example of a **wire stripper** that strips cables when placed in-between the blade and the holder and spun around the cable until the cable jacket can be pulled off.



Punch Down Tool



- A **punch down tool**, also called a **krone tool**, is a hand tool used to connect telecommunications and network wires to a patch panel, punch down block, keystone module, or surface mount box. The "punch down" part of the name comes from punching a wire into place using an impact action. It consists of a handle, a spring mechanism, and a removable slotted blade. When the punch down tool connects a wire, the blade cuts off the excess wire.



RJ 45



RJ 11



RJ-45



- Short for **Registered Jack-45**, a **RJ-45** is an 8-pin connection used for Ethernet network adapters. This connector resembles the RJ-11 or 6-pin connector used with telephones in the United States, but they're completely different. The picture is of a RJ-45 connector separated from the cable.
- This connector is most commonly connected to the end of Cat5 cable, which is connected between a computer network card and a network device such as a network router.

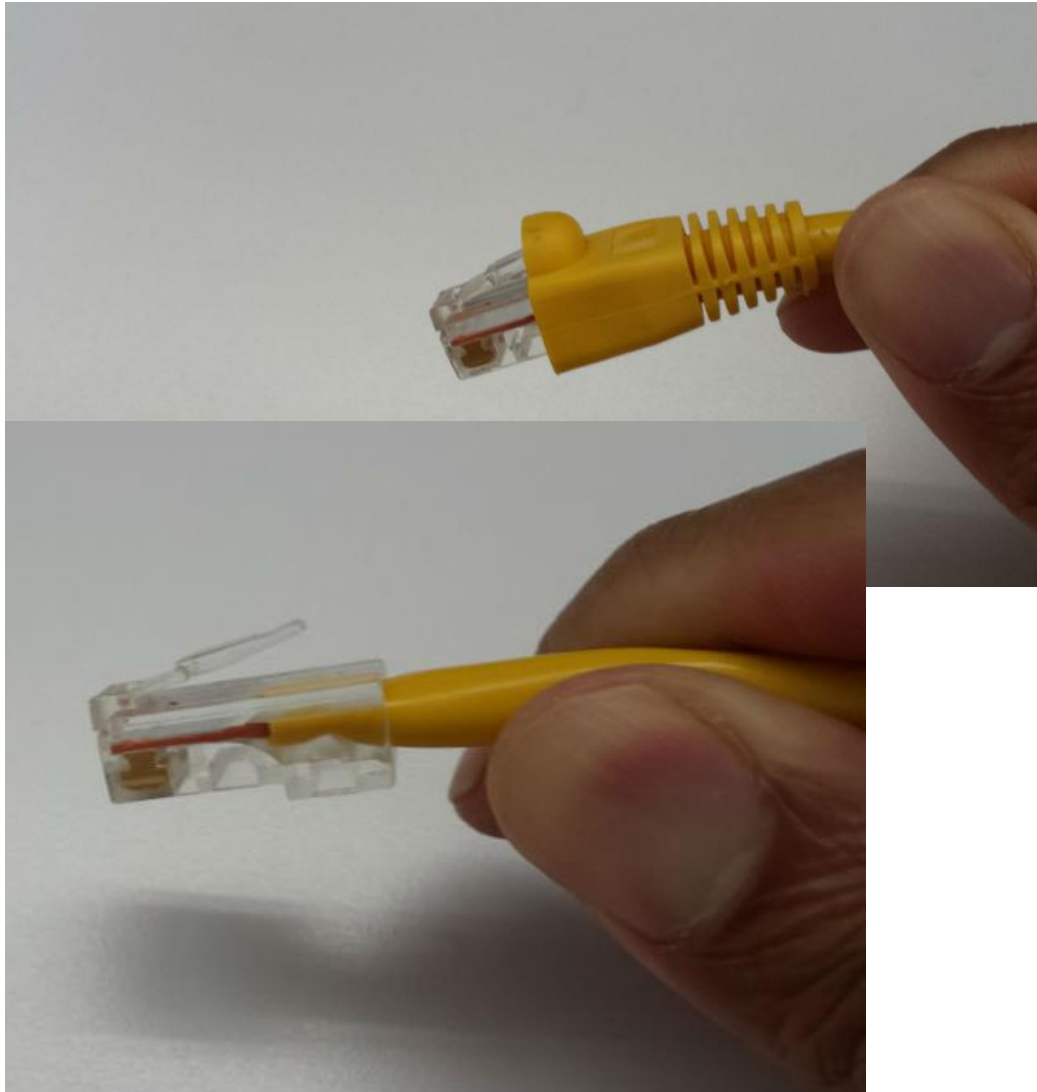
Cable ties



Reasons why you may use cable ties :

- Keep cables organized and prevent them from getting tangled.
 - Keep cables hidden from sight and your environment looking clean.
 - Prevent kids or animals from tripping over cables, which can help prevent cables from getting disconnected and damage to the cable connectors or other hardware.
- **Cable ties** are used to organize all kinds of cables, like those used with a computer, an entertainment system, or in a network. They are usually plastic, nylon, rubber, or Velcro strips that are used either used once or that are reusable.

Why do some RJ45 cables have a rubber boot protecting the clip?



The purpose of the boot

- It turns out removing the boot **does not** have a deleterious effect on the cable but it is there for three reasons:

1. To keep you connected

The chief purpose of the boot is to protect the plastic clip from flipping up and eventually *breaking off* the cable. The plastic clip, also called a *retention clip*, makes that familiar “click” noise as you plug in the cable; it snaps the plug into place and secures it there. Without the clip, would probably randomly get disconnected from your network as the plug would simply slide out with the slightest tug..

2. To protect the clip

- Network engineers often have to pull Cat5 (tech jargon for Ethernet cables) through very tight areas often crowded with dozens of other cables. The boot protects the clip as it makes its odyssey, through the labyrinth of wire spaghetti, around corners and through narrow conduit. For this reason, Ethernet cables with these little rubber boots are often referred to as *anti-snag* cables because it keeps the clip from catching and halting the cable pull.

3. To protect your nails

- It's easy to get jam the clip under a nail as you try to release or plug-in the Ethernet cable so the boot serves as a barrier to block your trusty thumbs from sliding into it.
- If you hate the boot but are afraid to put the cutters to your cable then see if you can gently slide the cable boot down the length of the cable. Some cable boots are just a rubber hood that are loosely connected to the cable sheath. If that's the case it's easy to slide it out of the way.

Network Cable Testers



LAN Cable Testers



LAN Network Certification



Network Cable Qualifiers



Coax Mapping



Tone Generators & More



Telephone Line Testers

- When you're installing a professional network, you'll need to make sure in the end that it's running absolutely smoothly and that your customer is getting the best possible connection. But how do you know before you actually use it ?
- You test it, of course! And right here is where you'll find testers for virtually any type of cable you could conceivably be running. Our coaxial and fiber optic cable testers will help you troubleshoot your video, data, and voice network cables during installation, and our LAN cable certifiers will help you test to make sure your local area network and associated cables are good to go when all is said and done.
- No job is too big or too small. Whether you're doing a professional industrial installation or setting up a home network, we've got a tester to suit your application: LAN Testers, Telephone Line Testers, Mappers, Cable Qualification, Tone Generators, Network Certifiers and more. From the economical Byte Brothers Pocket Cat for RJ45 & Coax cables to professional fiber optic Optical Laser Light Sources, we've got the tester for your network needs.

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**Create and integrate patch
cord**

How To Make an Ethernet Cable

Purchasing Ethernet cables can be quite expensive and pre-made lengths are not always the length you need. Making Ethernet cables is easy with a box of bulk Category 5e Ethernet cable and RJ-45 connectors that are attached to the cut ends of your preferred cable length.



Bulk Ethernet Cable - Category 5e or CAT6 (You may also use Category 6 or CAT6 cabling which has higher performance specifications and is about 20% more expensive than CAT5e.)



RJ45 Connectors

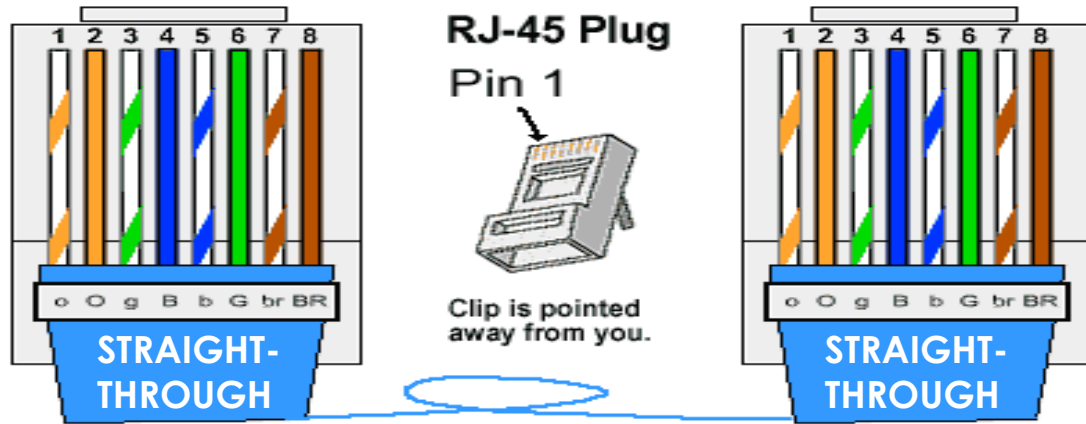
Bulk RJ45 Crimp able Connectors for CAT-5e or Bulk RJ45 Crimp able Connectors for CAT-6



RJ-45 Crimping Tool

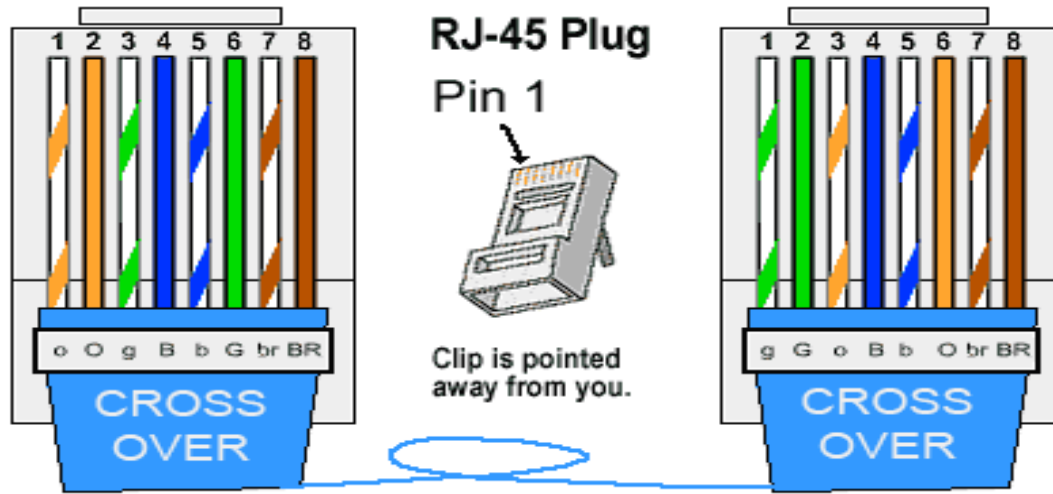
RJ-45 Crimping tool There are two kinds of Ethernet cables you can make, **Straight-Through** and **Crossed-over**.

STRAIGHT-THROUGH

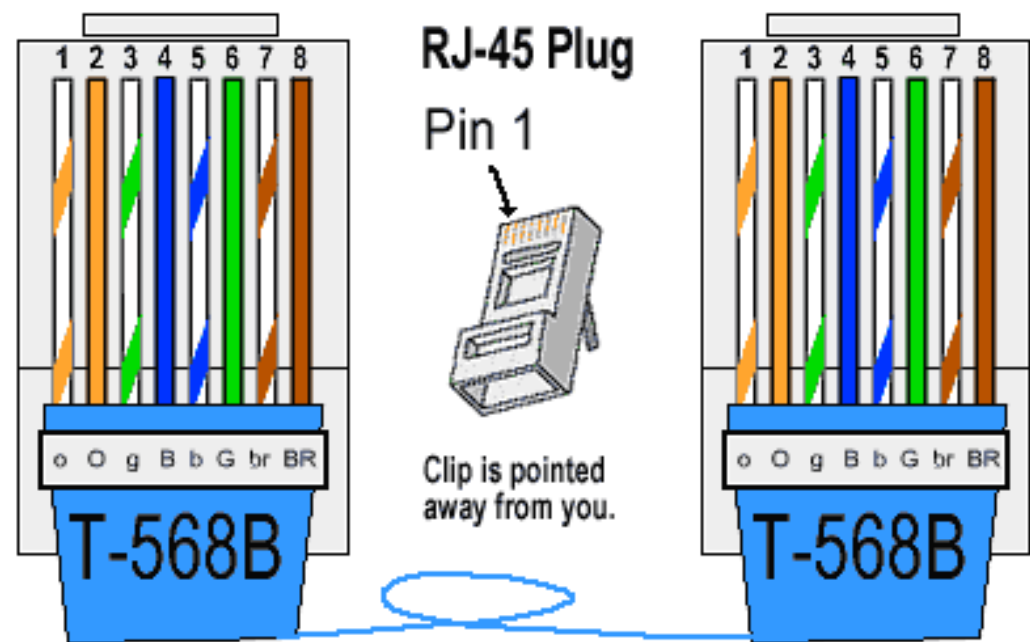
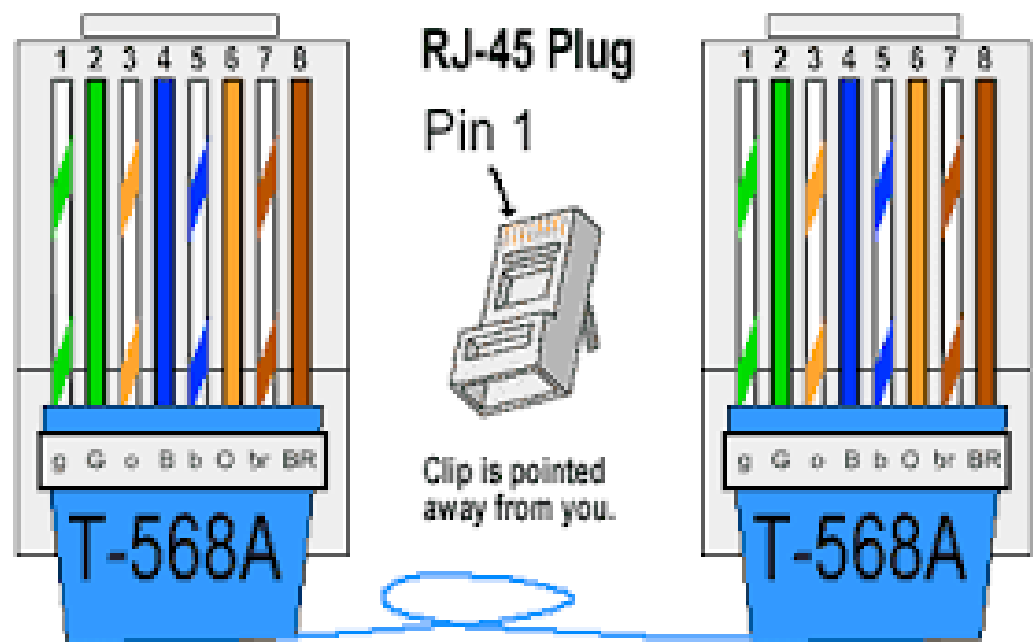


Ethernet cables are the standard cable used for almost all purposes, and are often called "patch cables". It is highly recommend you duplicate the color order as shown on the left. Note how the green pair is not side-by-side as are all the other pairs. This configuration.

CROSSED-OVER

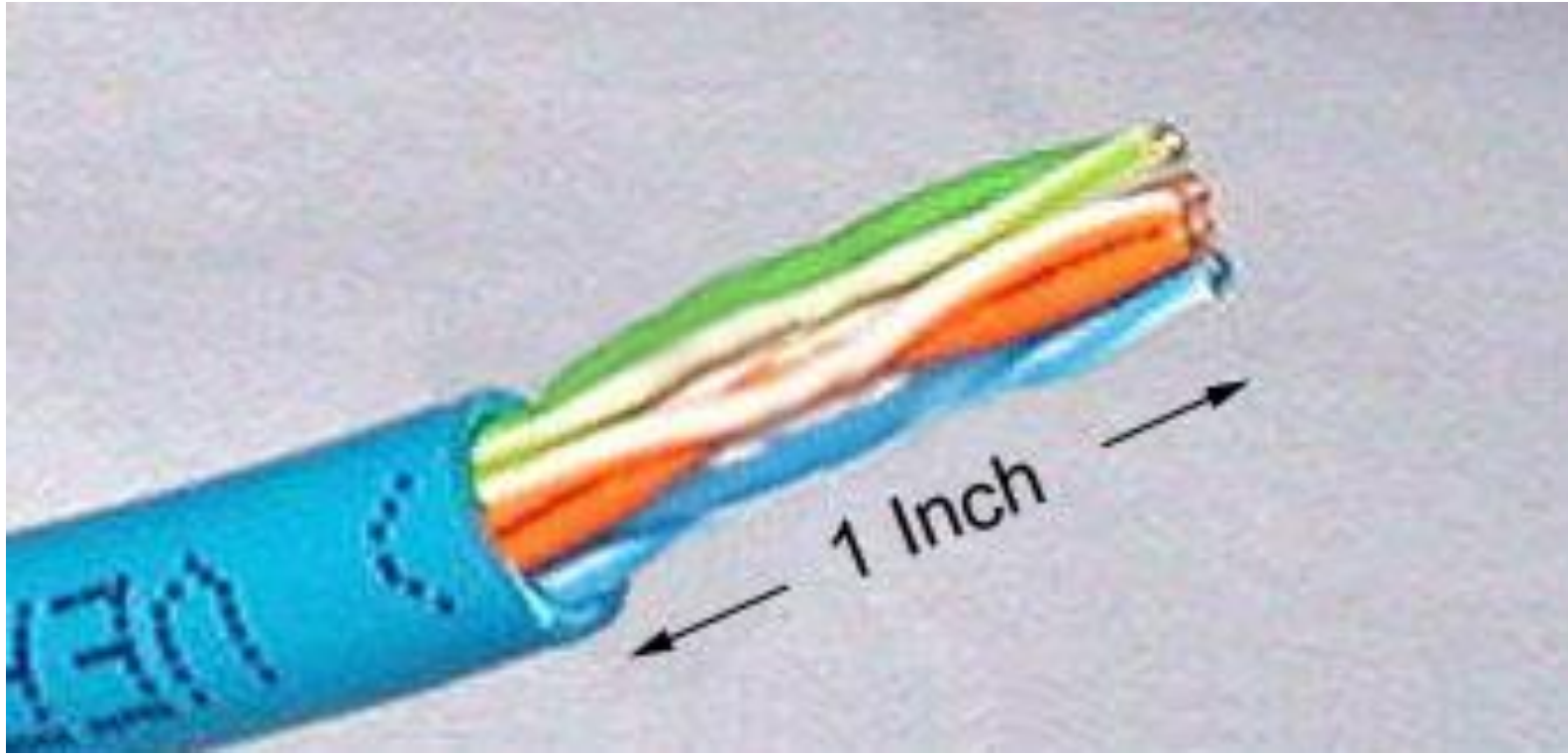


The purpose of a Crossover Ethernet cable is to directly connect one computer to another computer (or device) without going through a router, switch or hub.

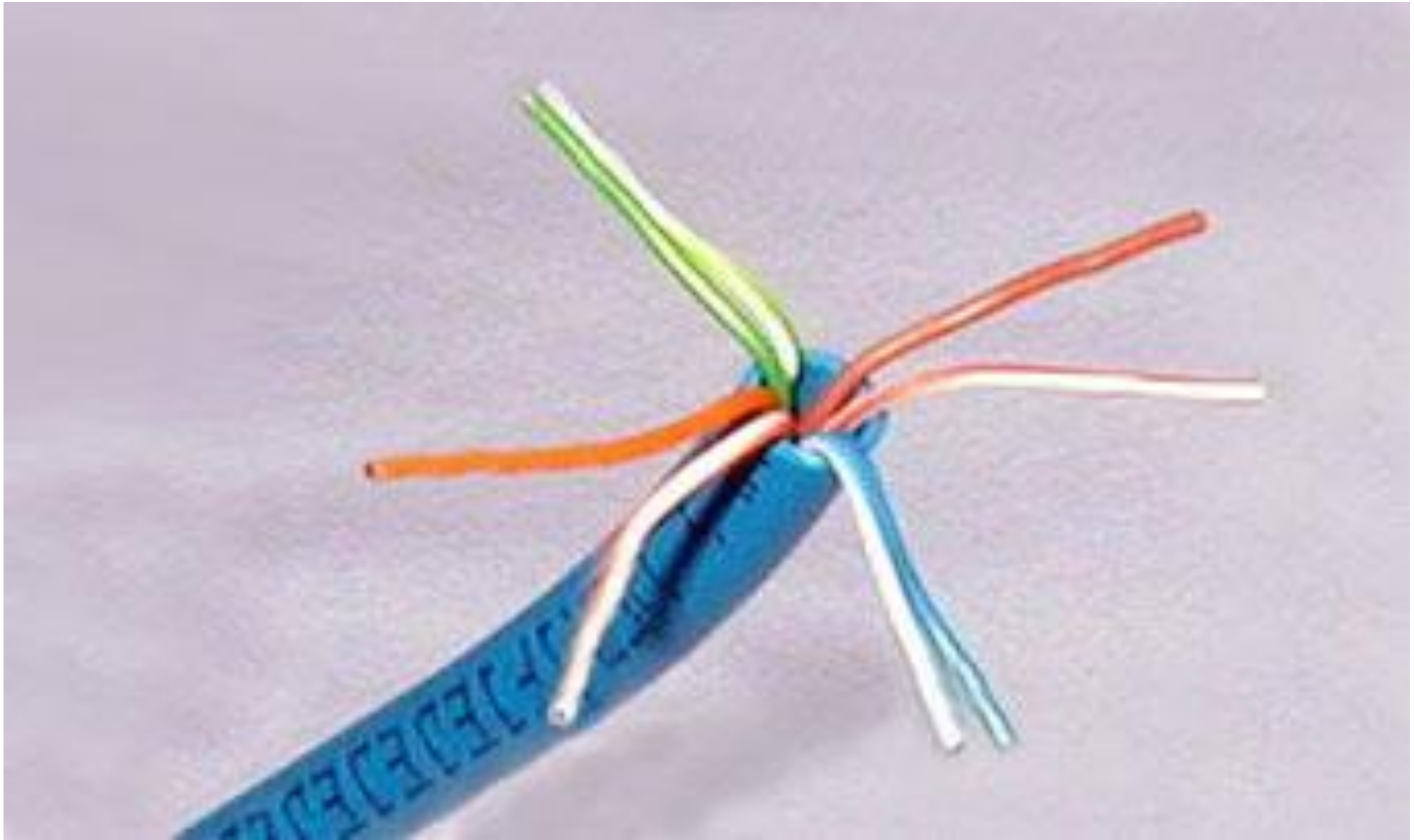


	Hub	Switch	Router	Workstation
Hub	Crossover	Straight	Straight	Straight
Switch	Straight	Crossover	Straight	Straight
Router	Straight	Straight	Crossover	Straight
Workstation	Straight	Straight	Straight	Crossover

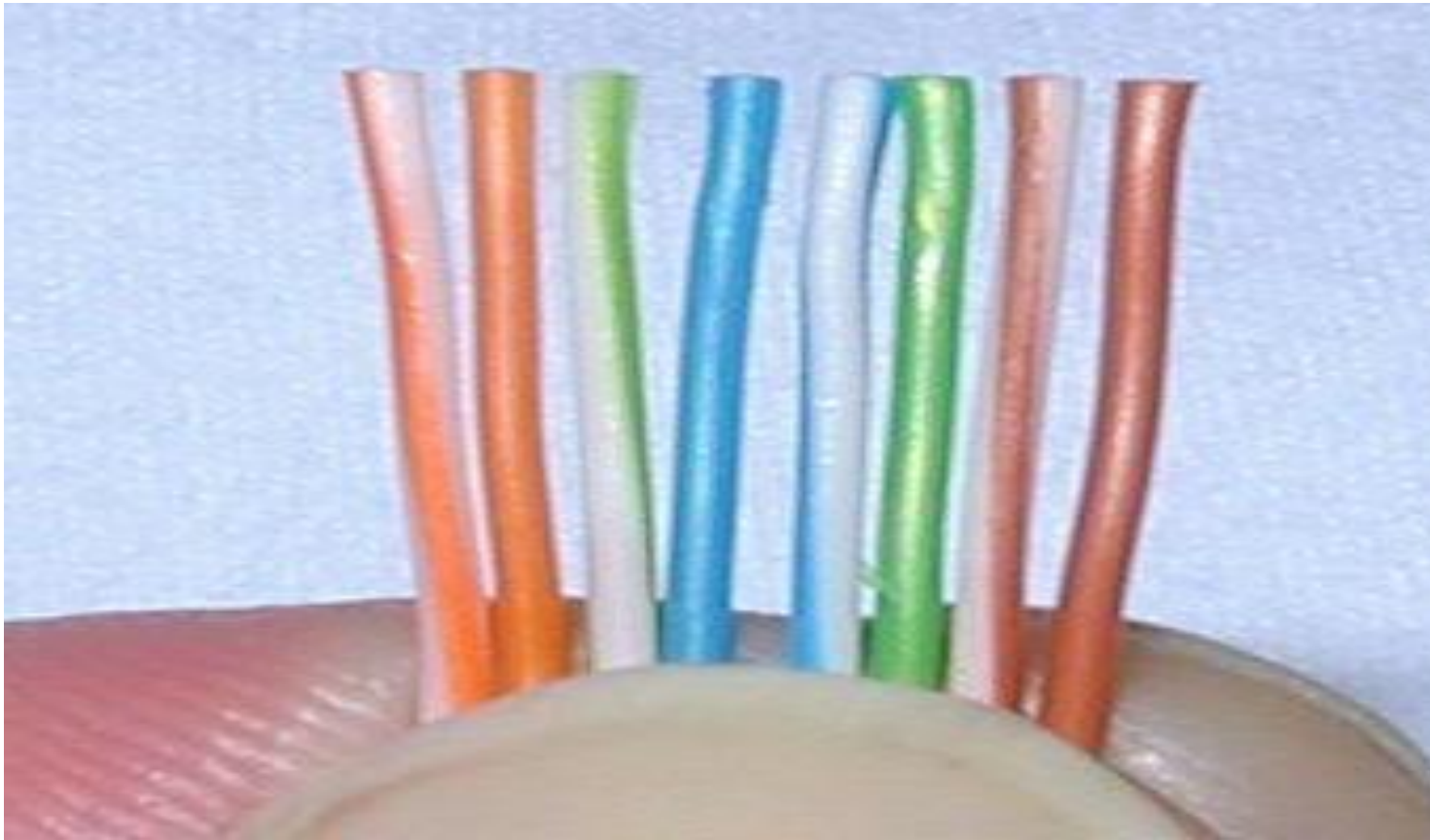
Here's how to make a standard cable:



Cut into the plastic sheath about **1 inch** (2.5 cm) from the end of the cut cable. The crimping tool has a razor blade that will do the trick with practice



Unwind and pair the similar colors.



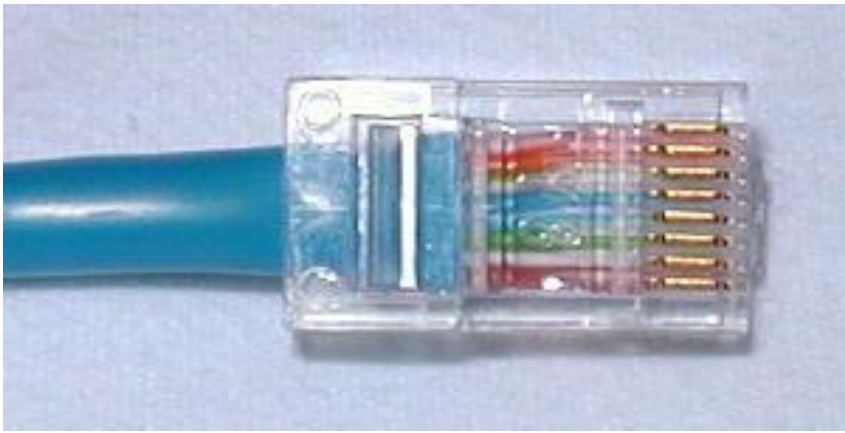
Pinch the wires between your fingers and straighten them out as shown. The color order is important to get correct.



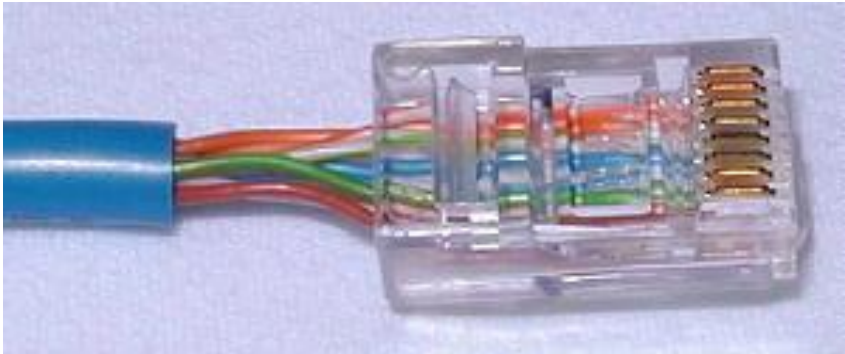
Use scissors to make a straight cut across the 8 wires to shorten them to **1/2 Inch** (1.3 cm) from the cut sleeve to the end of the wires.



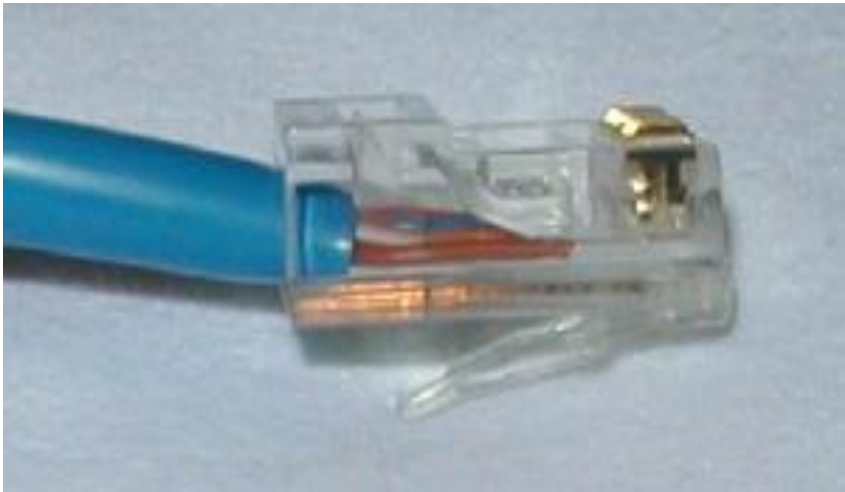
Carefully push all 8 unstripped colored wires into the connector. Note the position of the blue plastic sleeve. Also note how the wires go all the way to the end.



A view from the top. All the wires are all the way in. There are no short wires.



WRONG WAY - Note how the blue plastic sleeve is not inside the connector where it can be locked into place. The wires are too long. The wires should extend only 1/2 inch from the blue cut sleeve.



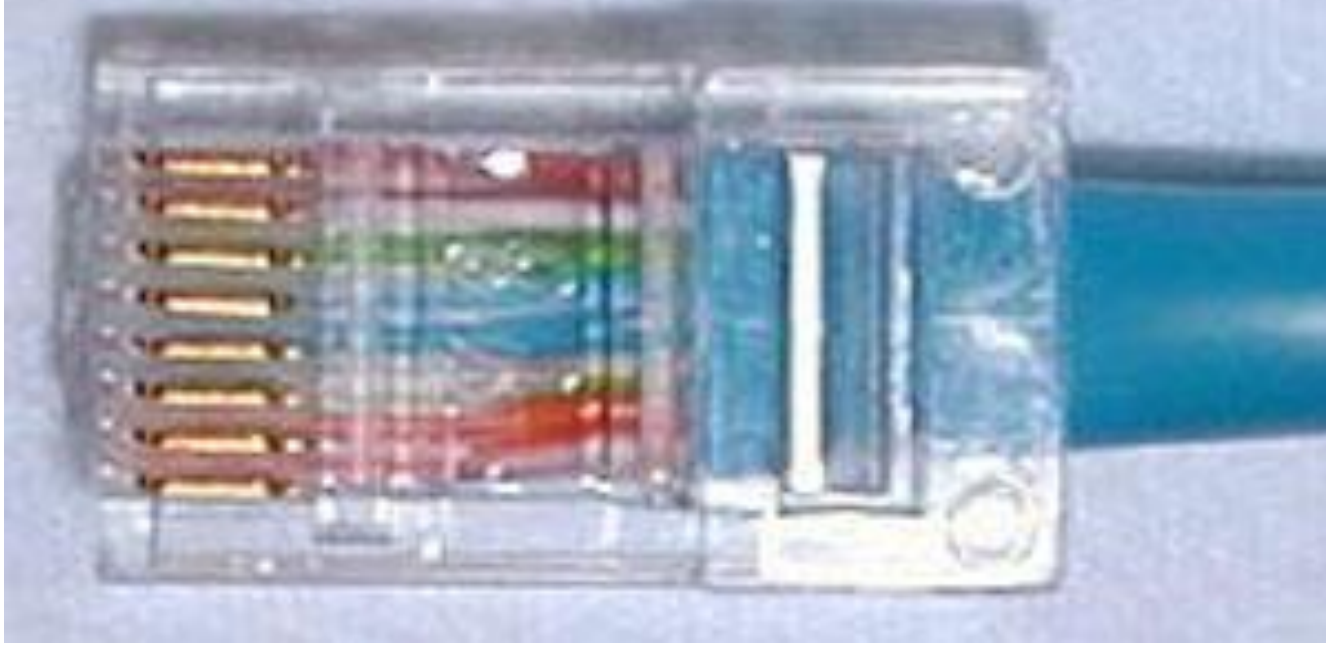
WRONG WAY - Note how the wires do not go all the way to the end of the connector

CRIMPING THE CABLE ...



carefully place the connector into the Ethernet Crimper and cinch down on the handles tightly. The copper splicing tabs on the connector will pierce into each of the eight wires. There is also a locking tab that holds the blue plastic sleeve in place for a tight compression fit. When you remove the cable from the crimper, that end is ready to use.

REPEAT STEPS OTHER END



For a standard "Straight Through" cable, repeat all steps and wire color order on the other end of cable. For a cross-over cable, the other end will have a different color order as shown by the crossover picture above



Make sure to test the cables before installing them. An inexpensive Ethernet cable tester does this quite well.

NOTE -

The maximum cable length of CAT-5, CAT-5e or CAT-6 Ethernet cable is 328 feet or 100 meters.

Contact Me ...

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THANK YOU