

Practice - Crimping practice of CAT5 cables

Aim : Crimping a Network Cable & Testing using Cable Tester

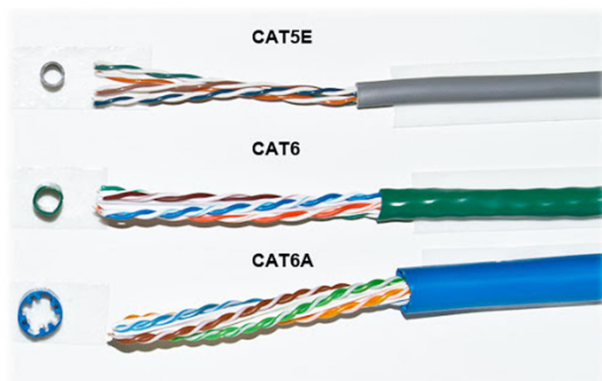
Apparatus required:

1. Cat.5e or cat6 Ethernet(LAN) Cable - min 10 meter.
2. Crimping tool – 01 Number
3. LAN Cable tester -01 Number
4. RJ45 – min. 02

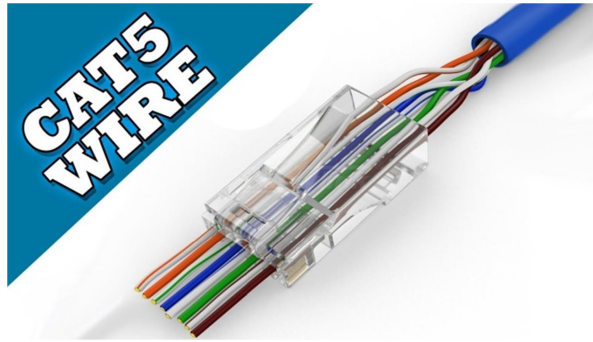


Theory:

Ethernet cables are forms of network cables that are utilized on connected networks. They were created to link network devices. These cables come in all sizes. Based on your need you can get whatever length you want. Ethernet cables are mostly used to connect devices located on LAN systems, such as routers, PCs, and switches. There are many Ethernet cable options available, and each one of them has its unique purpose and use. The most popular are



Category 5e : Cat5e is one of the most popular cabling types of an Ethernet cable used for deployments because of its ability to support Gigabit speeds at a cost-effective price. Cat 5e can support up to 1000 Mbps speeds, so it is flexible enough for small space installations. Therefore, it is widely used in residential areas. Cat5e is one of the least expensive cabling options available in the market.



Category 6 : Cat6 cabling support up to 10 Gbps and frequencies of up to 250 MHz. These types of cables are more tightly twisted and feature two or more twists per centimeter. It only supports 37-55 meters when transmitting 10 Gbps speeds. The following table briefly describes each cable and their specifications.

Cat Types:

Cable Type	Shielding	Maximum Frequency	Max Data Rate	Speed
Cat 3	No	16Mhz		10Mbps
Cat 5	No	100MHz	100 Mbps	100Mbps
Cat 5e	No	100MHz	1,000 Mbps / 1 Gbps	1Gbps
Cat 6,	Sometimes	250Mhz	1,000 Mbps / 1 Gbps	1Gbps
Cat 6a	Sometimes	500MHz	10,000 Mbps / 10 Gbps	10Gbps
Cat 7	Yes	600Mhz	40,000 Mbps/ 40 Gbps	600 MHz
Cat 8	Yes	2GHz	25 Gbps or 40 Gbps	40Gbps

RJ45 is a type of connector commonly used for [Ethernet](#) networking. It looks similar to a telephone jack, but is slightly wider. Since Ethernet cables have an RJ45 connector on each end, Ethernet cables are sometimes also called RJ45 cables.



The "RJ" in RJ45 stands for "registered jack," since it is a standardized networking interface. The "45" simply refers to the number of the interface standard. Each RJ45 connector has eight pins, which means an RJ45 cable contains eight separate wires. If you look closely at the end of an Ethernet cable, you can actually see the eight wires, which are each a different color. Four of them are solid colors, while the other four are striped.

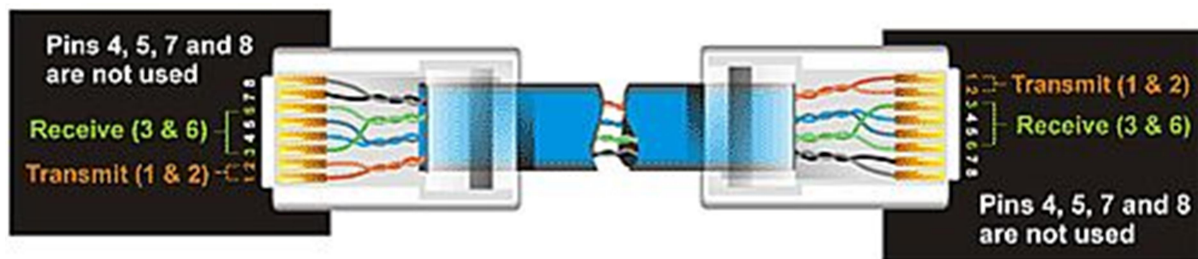
RJ45 cables can be wired in two different ways. One version is called T-568A and the other is T-568B. The T-568B wiring scheme is by far the most common, though many devices support the T-568A wiring scheme as well. Some [networking](#) applications require a crossover Ethernet cable, which has a T-568A connector on one end and a T-568B connector on the other. This type of cable is typically used for direct computer-to-computer connections when there is no [router](#), [hub](#), or [switch](#) available. These wiring standards are listed below:

T-568A

1. White/Green (Receive +)
2. Green (Receive -)
3. White/Orange (Transmit +)
4. Blue
5. White/Blue
6. Orange (Transmit -)
7. White/Brown
8. Brown

T-568B

1. White/Orange (Transmit +)
2. Orange (Transmit -)
3. White/Green (Receive +)
4. Blue
5. White/Blue
6. Green (Receive -)
7. White/Brown
8. Brown



Pin number	Wire Color
Pin 1 ==>	Orange/White
Pin 2 ==>	Orange
Pin 3 ==>	Green/White
Pin 4 ==>	Blue
Pin 5 ==>	Blue/White
Pin 6 ==>	Green
Pin 7 ==>	Brown/White
Pin 8 ==>	Brown

Straight-Through		
Wire		Becomes
1	→	1
2	→	2
3	→	3
6	→	6

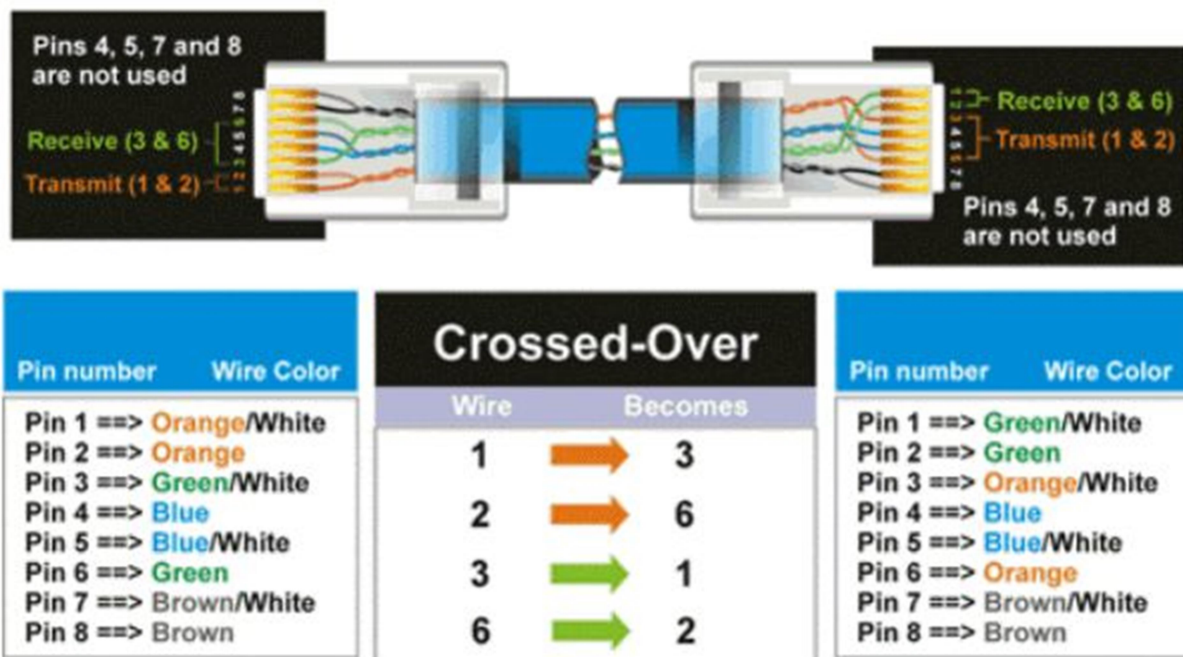
Pin number	Wire Color
Pin 1 ==>	Orange/White
Pin 2 ==>	Orange
Pin 3 ==>	Green/White
Pin 4 ==>	Blue
Pin 5 ==>	Blue/White
Pin 6 ==>	Green
Pin 7 ==>	Brown/White
Pin 8 ==>	Brown

Straight-through cable is a type of CAT5 with RJ-45 connectors at each end, and each has the same pin out. It is in accordance with either the T568A or T568B standards. It uses the same color code throughout the LAN for consistency. This type of twisted-pair cable is used in LAN to connect a computer or a network hub such as a router. It is one of the most common types of network cable.

A **Crossover cable** is a type of CAT 5 where one end is T568A configuration and the other end as T568B Configuration. In this type of cable connection, Pin 1 is crossed with Pin 3, and Pin 2 is crossed with Pin 6.

Crossover cable is used to connect two or more computing devices. The internal wiring of crossover cables reverses the transmission and receives signals. It is widely used to connect two devices of the same type: e.g., two computers or two switches to each other.

In regard to physical appearance, Crossover Ethernet cables are very much similar to regular Ethernet cables. Still, they are different with regard to the order with which the wires are arranged. This type of Ethernet cable is made to connect to network devices of the same kind over Ethernet directly. Crossover cables are mostly used to connect two hosts directly.



A **cable tester** is a device used to test the strength and connectivity of a particular type of cable or other wired assemblies. A cable tester can test whether a cable or wire is set up properly, connected correctly, and the communication strength between the source and destination.

For computers, one of the most common types of cable testers used is for testing [Cat 5](#), Cat 5e, and Cat 6 network cables. Because so many different types of data are transmitted over a network cable, a proper connection needs to be established between the computer and server. Also, make sure the signal strength is adequate for transmitting data and that there is no outside interference. A cable tester can test for these factors and verify the network cables connections are correct and work for the intended purpose.



Procedure:

STEP 1

Using a Crimping Tool, trim the end of the cable you're terminating, to ensure that the ends of the conducting wires are even.



STEP 2

Being careful not to damage the inner conducting wires, strip off approximately 1 inch of the cable's jacket, using a modular crimping tool or a UTP cable stripper.



STEP 3

Separate the 4 twisted wire pairs from each other, and then unwind each pair, so that you end up with 8 individual wires. Flatten the wires out as much as possible, since they'll need to be very straight for proper insertion into the connector.



STEP 4

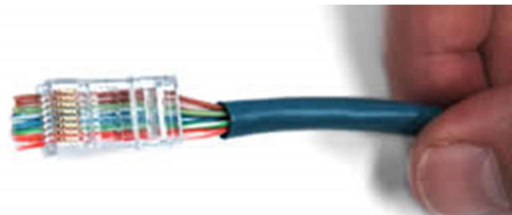
Holding the cable with the wire ends facing away from you. Moving from left to right, arrange the wires in a flat, side-by-side ribbon formation, placing them in the following order: white/orange, solid orange, white/green, solid blue, white/blue, solid green, white/brown, solid brown.

**STEP 5**

Holding the RJ45 connector so that its pins are facing away from you and the plug-clip side is facing down, carefully insert the flattened, arranged wires into the connector, pushing through until the wire ends emerge from the pins. For strength of connection, also push as much of the cable jacket as possible into the connector.

**STEP 6**

Check to make sure that the wire ends coming out of the connector's pin side are in the correct order; if not, remove them from the connector, rearrange into proper formation, and re-insert. Remember, once the connector is crimped onto the cable, it's permanent. If you realize that a mistake has been made in wire order after termination, you'll have to cut the connector off and start all over again!

**STEP 7**

Insert the prepared connector/cable assembly into the RJ45 slot in your crimping tool. Firmly squeeze the crimper's handles together until you can't go any further. Release the handles and repeat this step to ensure a proper crimp.

**STEP 8**

If your crimper doesn't automatically trim the wire ends upon termination, carefully cut wire ends to make them as flush with the connector's surface as possible. The closer the wire ends are trimmed, the better your final plug-in connection will be.



STEP 9 Check the cable for working using Ethernet(LAN) cable tester.



Video link: <https://www.youtube.com/watch?v=WvP0D0jiyLg>

Result: Crimped a Network Cable & Tested using Cable Tester