

Experiment No. 1

Aim : Study of RJ45 and CAT16 Cabling and connections using crimping tool.

Theory :

- RJ45 Connectors

→ RJ45 is a standard type of connector for network cables. RJ45 connector due most commonly seen with ethernet cables featuring 8 pins to which otherwise standard of a cable interface electrically.

- Standard of RJ45 pinouts defines the arrangement of the individual wires needed when attaching connectors to a cable.
- An 8-pin / 8-position plug or jack is commonly used to connect computers onto Ethernet-based local area networks (LAN).
- Two wiring schemes - T568A and T568B - are used to terminate the twisted-pair cable onto the connector interface.

- Standard (straight-through) connections

→ A standard ethernet cable is wired in a way that the pins at one end of the cable are connected to the same pin numbers at the other end.

- In other words, the wire at pin 1 on one end of the cable is connected to pin 1 at the other end, the wire at pin 2 is

connected to pin 2, and so on.

- This type of connection is especially used to connect different types of devices, such as a computer to a switch or a router, where the transmit (Tx) pin of one device is connected to the receiver (Rx) pin of the other device.
- The standard ethernet cable follows the T568B or T568A wiring standard, which determines the color coding of the wires.

• Crossed-wire connection:

- A crossed-wire ethernet cable, on the other hand, is wired in a way that certain pins at one end are swapped with corresponding pins at other end.
- The purpose of this wiring is to allow direct communication between two similar devices without the need for an intermediate device like a switch or a hub.
- In past, crossover cables were commonly used to connect two computers directly together without a switch or router.
- In this scenario, the transmit pin of one computer is connected to the receive pin of other and vice-versa.
- The proper sequence of colors codes: Orange|white, Orange, Green|white, Blue, Blue|white, Green, brown|white, brown.

- Cat 5 Cable

⇒ Cat 5 stands for category 5, and it was one of the earlier twisted-pair Ethernet cable standards.

→ It supports data transmission up to 100Mbps and can handle network speeds up to 100 MHz.

→ Cat 5 cables consist of four twisted pairs of copper wires and use the RJ45 modular connector to plug into network devices.

- Cat 6 cable

⇒ Cat 6 cable stands for category 6, and is an improved version of cat 5 cable.

→ It offers higher performance and bandwidth compared to Cat 5.

→ Cat 6 cables can support data transmission speeds up to 10Gbps over a maximum distance of 55 meters, and they can handle network speeds up to 250 MHz.

→ Cat 6 cables are built with tighter specifications and better shielding to reduce crosstalk and interference, which allows for higher data rates and better performance in noisy environments.

• Crimping Process

⇒ *Handwritten notes*

- 1) Strip the cable back 2 inch (25mm) from the end. Insert the cable into stripper section of the crimper and squeeze it tight. Then rotate the crimping tool around the cable in a smooth and even motion to create a clean cut. Keep the tool clamped and pull away towards the end of the wire to remove sheathing.
- 2) Untwist and straighten the wires inside the cable cut off the small plastic wire separator or core so its out of the way.
- 3) Arrange the wires into right order. Use your fingers to put the wires in the correct order so they can be properly crimped.
- 4) Cut the wire into an even line 1/2 inch from the sheathing. Hold the wire with your thumb and index finger to keep them in order. Thus, use the cutting section of crimper to cut the wires into an even line.
- 5) Insert the wires into RJ45 connector. Hold the RJ45 connector so the clip of it is on the underside and the small metal pins are facing up. Insert the cable into the connector so that each of the small wires fit in the small grooves.

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