IT – 304 | CN | LAB-2
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Lab Report: Making RJ45 Pinout Ethernet Cables

→ We were given a twisted pair cable and a RJ45 connected from which we had to make a RJ45 pinout ethernet cable.

→ A twisted pair cable consists of: outer jacket (sheath), insulation on copper wires, twisted pair of conductors (copper wires), shielding (optional).

→ Steps to make a RJ 45 Pinout Ethernet Cable from a twisted pair cable:

- Strip down the outer layer (sheath) till the inner conductors appear.

- Cut down the nylon strands on the wire.

- Untwist the twisted pairs of wires and then straighten the wires.

- Arrange them according to the correct colour codes for the pinout. In our case we arranged it according to T-568B colour codes.

- Cut down the wires so that all the wires are of same length.

- Insert those wires into the RJ45 connector.

- Make sure all the wires are inserted till the end properly and then crimp them.

- Do the same on the other side and then check the ethernet cable via a tester.

Sample Questions:

Q1. How twists in twisted pair give an advantage over coaxial cable? On what factors no. of twist depends?

→ Advantages of Twists in Twisted Pair Cable:

- Electromagnetic Interference (EMI) Reduction: twisting helps cancel out EMI from external sources.

- Crosstalk Minimization: twisting helps minimizing cross-talks between the wires of same cable, leading to reliable data transmission.

- Cost-Effective: generally, more cost-effective and easier to install than coaxial cables.

→ <u>Factors Affecting the Number of Twists:</u>

- Frequency of Operation: Higher frequencies often require more twists per unit length.

- Cable Category: Higher category cables typically have more twists per inch to support higher data rates.

- Purpose and Standards: The specific use case such as voice or data transmission influence the number of twists.

Q2. Briefly, discuss about connectors available for coaxial cable and optical fiber?

→ <u>Connectors for Coaxial Cable:</u>

- BNC (Bayonet Neill-Concelman): provides a secure connection through a bayonet mechanism. Commonly used in television broadcasting, radio-frequency electronics, and in professional video applications.

- F-Type Connector: screws onto the cable for a secure fit. Widely used in residential and commercial cable television (CATV) and broadband internet connections.

- N-Type Connector: Used in wireless systems, it is designed for higher frequencies and provides a reliable and durable connection.

- SMA (SubMiniature version A): threaded and offer excellent performance in high-frequency systems. Often used in microwave applications.

→ <u>Connectors for Coaxial Cable:</u>

- SC (Subscriber Connector): A common square-shaped connector that snaps into place, widely used in data communication networks.

- LC (Lucent Connector): Smaller than SC, LC connectors are used for high-density connections and are common in data centers.

- ST (Straight Tip): Featuring a bayonet-style twist-lock, ST connectors are often used in long-distance networks.

- MTP/MPO (Multi-Fiber Push-On/Pull-Off): These connectors can handle multiple fibers in a single connector, making them suitable for high-density networks like data centers.

Q3. List down different uses and applications of Coaxial cable?

→ Television and Cable TV Distribution

→ Internet Broadband Connectivity

→ Radio Transmissions

→ CCTV Systems

→ Audio Equipment

→ Telephone Networks

Q4. Study about different types of networks: MAN, WAN, PAN, CAN, SAN, TAN?

→ <u>MAN (Metropolitan Area Network):</u> A MAN spans a city or a large campus. It connects multiple LANs within a metropolitan area, providing high-speed connectivity over a large geographic area. MANs are often used by local governments, large companies, and universities.

→ <u>WAN (Wide Area Network):</u> A WAN covers a large geographic area, often a country or continent. It connects multiple LANs and MANs, using leased telecommunication lines or satellites. The internet is the most well-known example of a WAN.

→ <u>PAN (Personal Area Network):</u> A PAN is the smallest network, usually covering a range of a few meters around a person. It connects personal devices such as smartphones, laptops, and wearable devices. Bluetooth and USB are common technologies used in PANs.

→ <u>CAN (Campus Area Network):</u> A CAN connects multiple LANs within a limited geographic area, such as a university campus, corporate campus, or industrial complex. It is larger than a LAN but smaller than a MAN.

→ <u>SAN (Storage Area Network):</u> A SAN is a specialized network that provides access to consolidated, block-level data storage. SANs are commonly used in data centers and enterprise environments to enhance storage devices' performance and availability.

→ <u>TAN (Tiny Area Network):</u> Although less commonly discussed, a TAN is typically a very small network, often used in limited spaces or single-room setups, connecting a minimal number of devices. It can be seen as a subset of a PAN or LAN in very constrained environments.