Connect Devices

When you connect devices on an Ethernet LAN, you need to use the right cable, either a crossover cable or a straight-through cable. When you connect Ethernet devices, it's important that the transmit (Tx) wires from one device are matched with the receive (Rx) wires on the other device.

Cross-Over Cable vs Straight Through Cable

Use a cross-over cable to connect similar devices
A crossover cable crosses or twists so that the transmit pin connects to the receive pin and the receive pin connects to the transmit pin.

Use a straight-through cable to connect different devices.

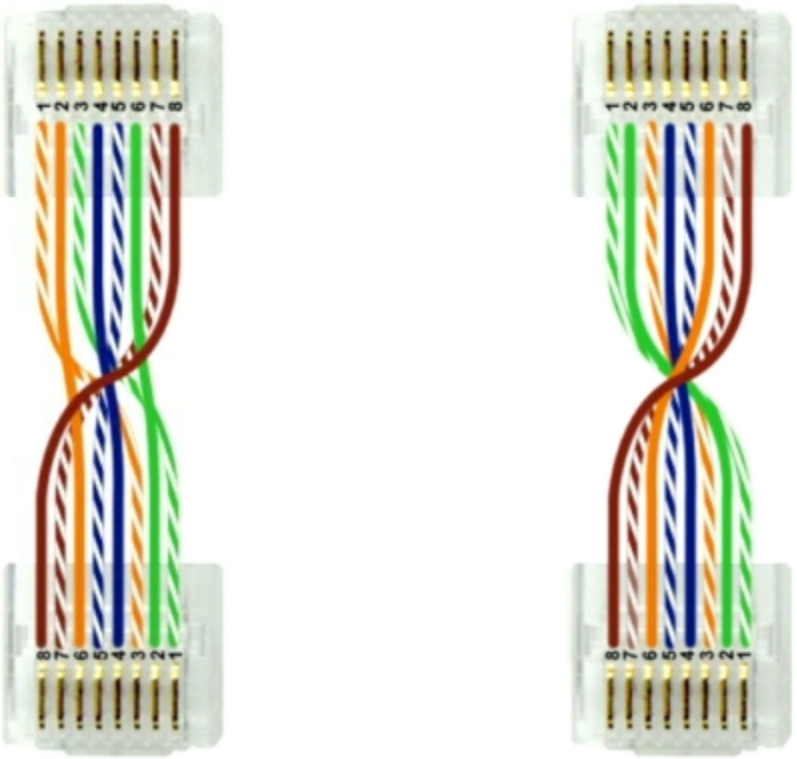
- **Computers:** Computer systems have a network interface card (NIC). The NIC has both a transmit connector and a receive connector. If you use a straight-through cable the transmit pin will connect to the other computer's transmit pin and a connection will not be made.This is why you must use a cross-over cable when connecting these devices.
    - **Computer to Computer:** cross-over cable.
- **Routers:** Routers also use NICs which make them a similar device as a computer.
    - **Routers and Routers:** Use a cross-over cable
    - **Routers and Computers**: use a cross-over cable
    - **Routers and Switches:** Use a straight-through cable.
- **Switch Uplink Ports:** Most switches have an extra port called an uplink port. An uplink port is different from standard ports on a switch because an uplink port doesn't provide the crossover function that a standard port does. The uplink port is used to connect one switch to another switch. This is called cascading.
    - **Uplink Port to Uplink Port:** If you connect two switches together through the uplink ports use a crossover cable.
    - **Uplink Port to Regular Port:** When you go from an uplink port to a regular port, use a straight-through cable. The crossing is performed within the switch.
    - **Regular Port to Regular Port:** Use a cross-over cable. Because crossing is performed in both places, there's an even number of crossovers. Because there needs to be an odd number of crossovers between any two devices, we'll use a crossover cable here.
- **Switch to Computer:** Straight through cable.
- **Switch to Router:** Straight through cable.

Cable Identification

https://www.lifewire.com/crossover-cable-ethernet-817870

- Crossover cables are usually red.

Examine the connectors at the end of the cables and compare how the wires are ordered.



- Lay cables side by side so that connector ends are pointing in same direction.
- Compare the wires within the connector starting with pin one. You can see how this connector has a white and orange wire followed by a solid orange wire. On the other connector, there's a white and green wire followed by a solid green wire. The colored wires within the connectors are in different positions. That means this is a crossover cable.

Auto-MDI or MDIX

Most modern hubs and switches make using the correct cable obsolete because of auto-MDI or MDIX. This feature allows the switch to sense the type of cable used and the type of device on either end. Then it automatically enables or disables crossing on that port.

This means that newer devices can use a straight-through in most situations. On older devices or inexpensive newer devices, be more careful about using crossover cables or straight-through

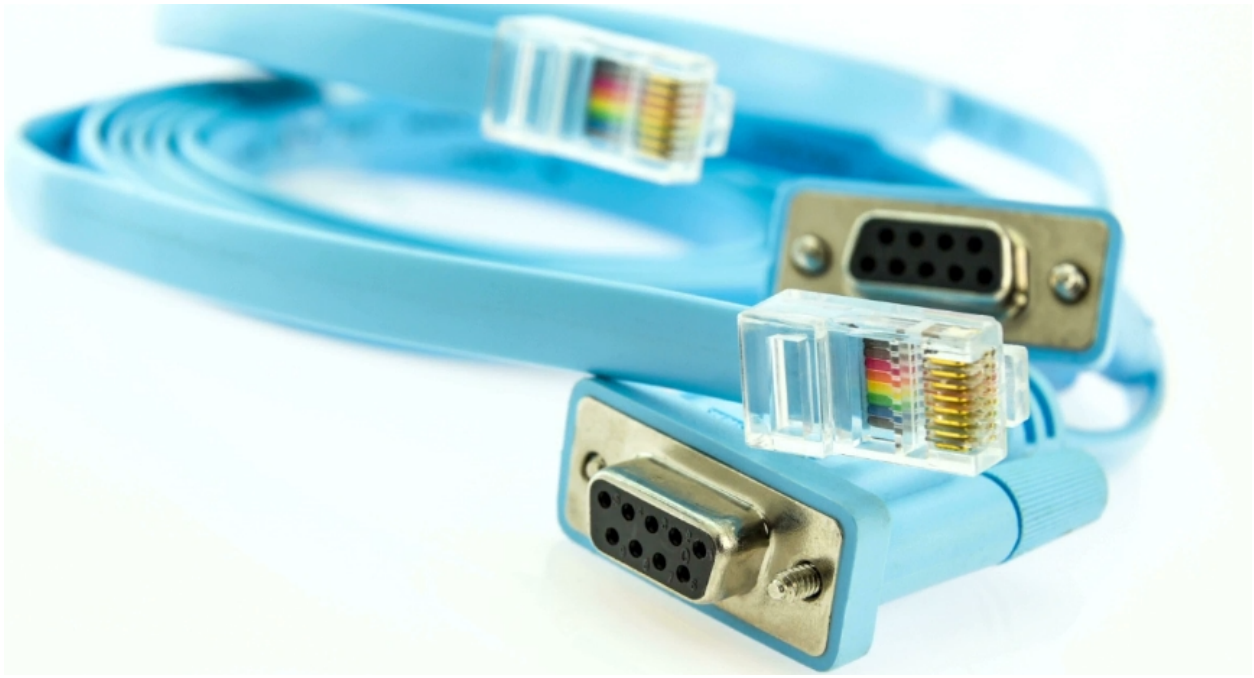
cables. Of course, when you're connecting two devices together without a switch, use a crossover cable.

More information on Network Cables:
https://www.lifewire.com/introduction-to-network-cables-817868

Rollover Cable

The final cable type is the rollover cable. A rollover cable has an RJ45 connector on one end and a serial connector on the other end. The rollover cable is used to connect a workstation to a router or a switch through a console port.

The console port on the router or switch has an RJ45 connector, and that connects to the serial port on the computer. Then you can run terminal emulation software on the workstation to access and manage the router or switch. You can do this to turn ports on and off or configure settings on the router.



SC to LC fiber cables

- SC connectors have square connectors that are pushed in to connect.

- LC connectors have both connectors linked together.