

PowerCert Animated Videos

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(1) Cable vs DSL vs Fiber Internet Explained

<https://youtu.be/qQYiwmmamq38?list=PL7zRJGi6nMRzq0LdsR7F3olyLGoBclvvq>

- Broadband cable uses a cable modem with an attached coaxial cable to provide high-speed internet access, leveraging the existing infrastructure from cable TV providers.
- DSL (Digital Subscriber Line) uses common telephone lines to carry data and can be used simultaneously with phone service. DSL is cheaper than cable and offers a dedicated connection without sharing bandwidth.
- Fiber internet offers the fastest speeds available by using light to transmit data through fiber optic cable. It can travel longer distances without interference, but it is more expensive and less widely available compared to DSL and cable.

(2) Ethernet Cables, UTP vs STP, Straight vs Crossover, CAT (5,5e,6,7,8) Network Cables

<https://youtu.be/NX99ad2FUA?list=PL7zRJGi6nMRzq0LdsR7F3olyLGoBclvvq>

- Ethernet network cables, specifically twisted pair cables, are widely used in local area networks to connect computers to routers or modems. There are two types of twisted pair cables: unshielded twisted pair (UTP) and shielded twisted pair (STP).
- UTP is the most common and is used for home and business networks, while STP is mainly used for industrial purposes. The cables need to be wired correctly and have RJ45 connectors attached to each end.
- The wiring order for twisted pair cables follows two standards: 568A and 568B, with the only difference being the swapping of green and orange wires. Both standards serve the same purpose, but the 568B standard is more commonly used in the U.S.
- When both ends of the cable are wired using the same standard, it is called a straight cable. Straight cables are used to connect dissimilar devices. A crossover cable, on the other hand, is created when both ends are wired using different standards and is used to connect similar devices.
- Twisted pair cables come in categories: CAT 3, CAT 5, CAT 6, and CAT 7. The categories represent the maximum speed the cables can handle without interference. CAT 5e is the most commonly used for gigabit networks, while CAT 6a and 7 are used for 10 gigabit networks. CAT 8 is the latest version with a delivery speed of 40 gigabits per second.

(3) Plenum vs Non Plenum PVC Network Ethernet Cables

<https://youtu.be/XjISrRz98Xq?list=PL7zRJGi6nMRzq0LdsR7F3olyLGoBclvvq>

- PVC ratings refer to the outer jacket of the cable, which determines its suitability for different environments.
- Plenum cables are used in areas with open air flow circulation, such as between drop ceilings and structural ceilings. They are fire-resistant and do not produce toxic fumes if burned. Non-plenum

cables are used in buildings without open air flow circulation and are cheaper, but they are not as fire-retardant and can release toxic gases if burned.

- Riser (CMR) cables, or communications multi-purpose cable riser, are installed vertically between floors to prevent fire spreading. They have lower safety standards than plenum cables. CM (general use) cables, or communications multi-purpose, are general use network cables with minimal fire restrictions and are the cheapest option.
- Plenum rated cables are used in drop ceilings or under floors, riser cables are used on and in walls between floors, and CM cables are used in rooms.

(4) Network Connectors Explained

<https://youtu.be/ktTtAQIvYkq?list=PL7zRJGi6nMRzqOLdsR7F3olyLGoBclvvq>

- The RJ-45 connector is the most common network connector used with unshielded twisted pair cables. It has eight pins and is used to connect computers and network devices in a local area network.
- The RJ-48 is similar to the RJ-45 but used with shielded twisted pair cable instead of unshielded twisted pair. The RJ-11 is a four-wire connector mainly used for telephone equipment but can also be used for networking through a computer's modem.
- The BNC connector is used with coaxial cables for analog and digital video transmissions. It can be found on older networks and there are different types of BNC connectors, including couplers and terminators.
- The F-type connector is threaded and commonly used by cable providers for cable modems and satellite internet.
- The USB connector is commonly used on desktops and laptops and can be used for networking purposes. USB wireless adapters and wired network adapters can be connected to a computer's USB port for network access.
- Fiber optic connectors use pulses of light to send data. Popular types of fiber optic connectors includes SC, MRTJ, LC, and ST. They differ in size and coupling method.
- Fiber couplers are used to join two fiber optic connectors of the same type, while fiber adapters are used to join two different types of fiber optic connectors.
- UPC and APC end faces are used to reduce signal loss in fiber optic connectors, with APC connectors which reduces signal loss by reflecting light at an angle.

(5) Networking Tools - Hardware

<https://youtu.be/HAceoquch1c?list=PL7zRJGi6nMRzqOLdsR7F3olyLGoBclvvq>

- There are various tools used in networking, particularly by network technicians, such as cable strippers, wire crimpers, cable testers, tone generators, time domain reflectometers (TDRs), optical time domain reflectometers (OTDRs), light meters, RJ45 ethernet loopback adapters, butt sets, punch down tools, and multimeters.
- The Cable stripper is used to remove the plastic shielding on the ends of network cables after they have been cut to size. A Wire crimper is used to crimp connectors, such as RJ45 connectors, to the ends of network cables.

- Cable tester is used to verify continuity and correct wiring of network cables. Tone generator is used to trace cables from one end to the other, making it easier to locate specific cables in complex networks.
- Time domain reflectometer (TDR) is an electronic equipment used to test cables and detect problems such as loose connectors, shorts, crimps, bends, etc. There is also an optical version (OTDR) used specifically for fiber optic cables.
- Light meter measures the amount of light passing through fiber optic cable. RJ45 ethernet loopback adapter is used to perform loopback tests to check network ports and connections.
- Butt set is used by telephone technicians to test and monitor telephone lines. Punch down tool is used to connect wires into punch down blocks in telephone equipment. And, Multimeter is used to test electrical circuits, measure voltage, and check continuity in network cables.