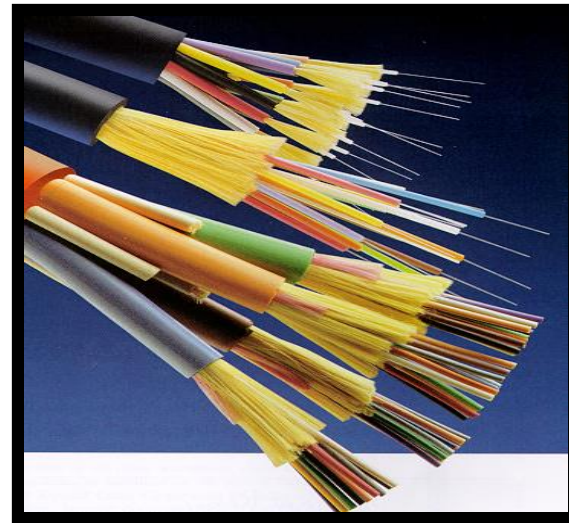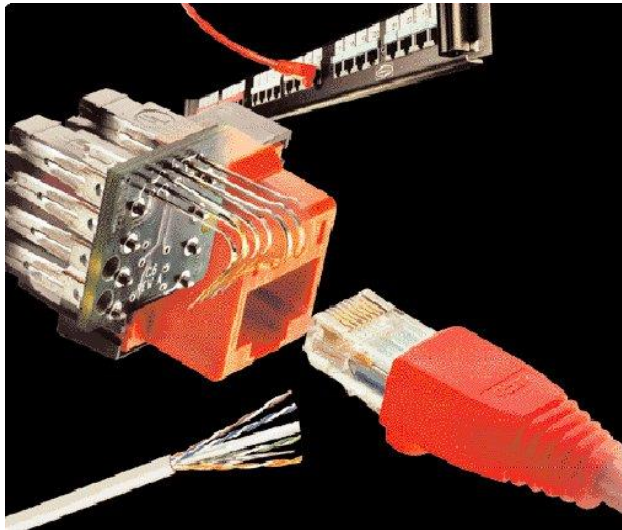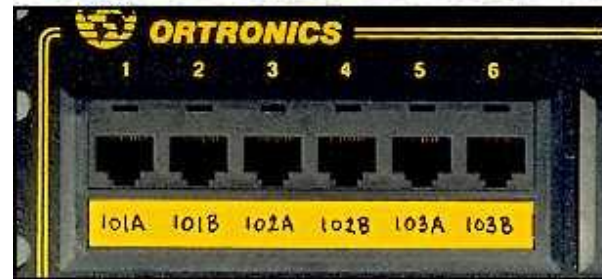# UTP AND FIBER CABLING

Structured Cabling Infrastructure

- **Mounted and permanent**

- **Allows patching**

- **Comfort that infrastructure is OK**

- **Components:**
  - **Information Outlet with Face Plate**
  - **Patch Panel**
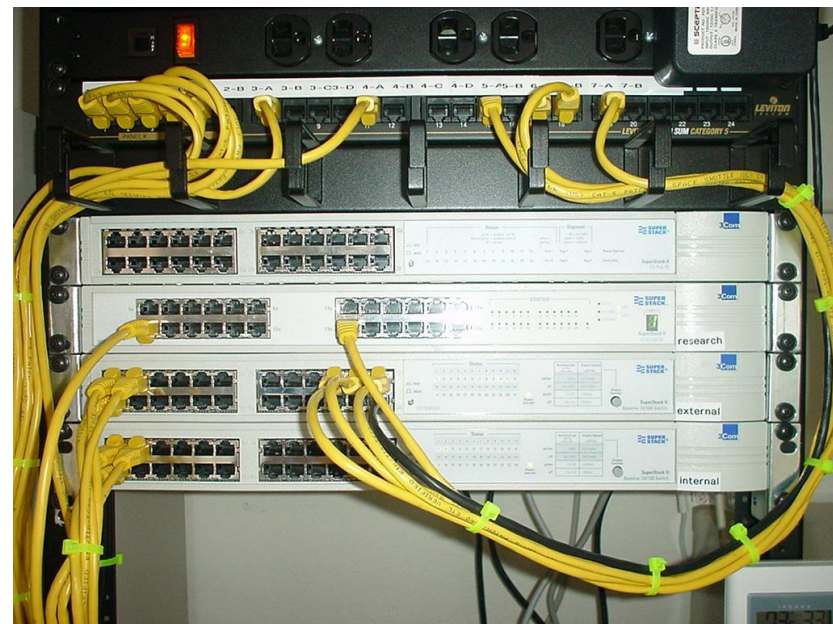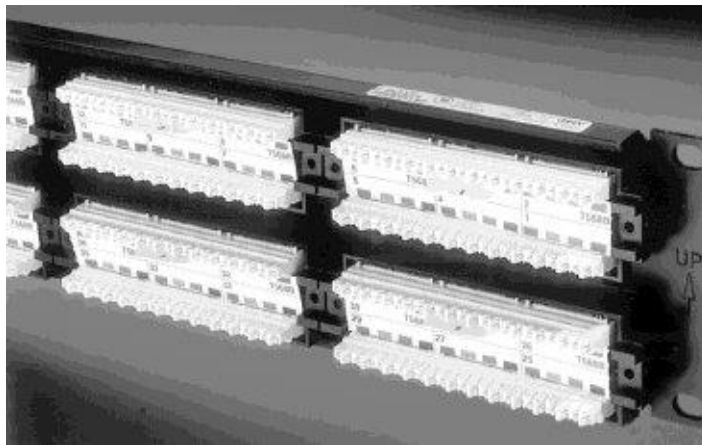 - **UTP Cable**
  - **Patch Cord**

I/O & Faceplates

- **Faceplate mounts on or in wall or in raceway**

- **Single or Dual Information Outlet (I/O)**

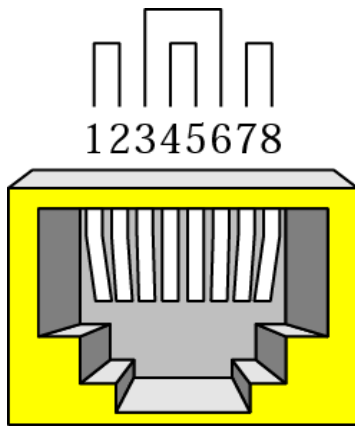- **Provide network connectivity to the Hosts through a Patch Cord**
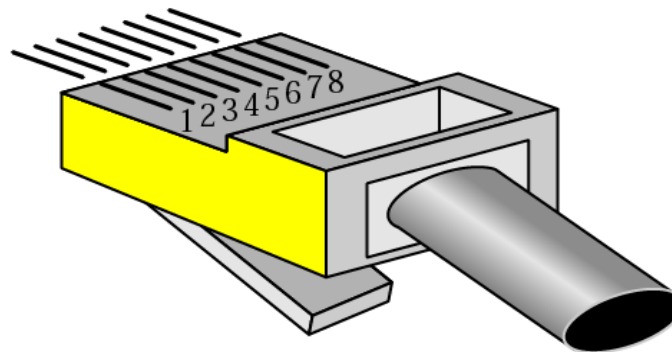
Patch Panel

- **Termination punchdown in back**

- **Patch cord plugin in front**

Patch Cord & UTP Connectors

RJ-45 Female

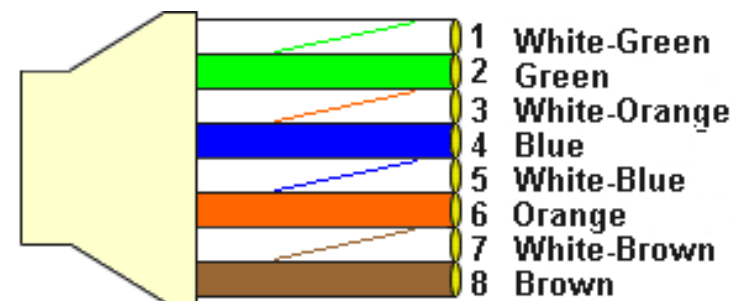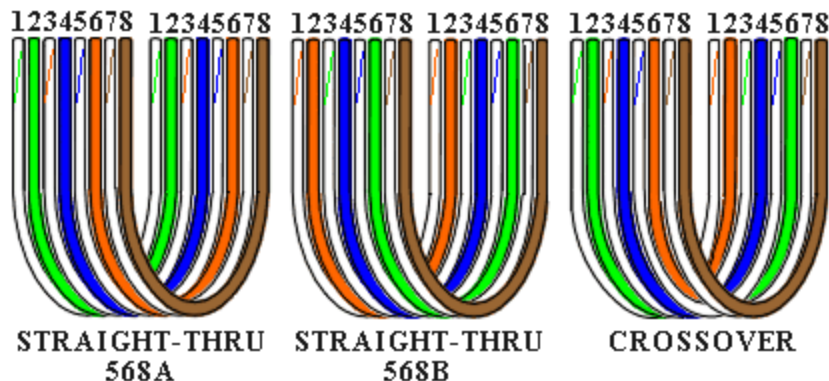RJ-45 Male

Color Codes

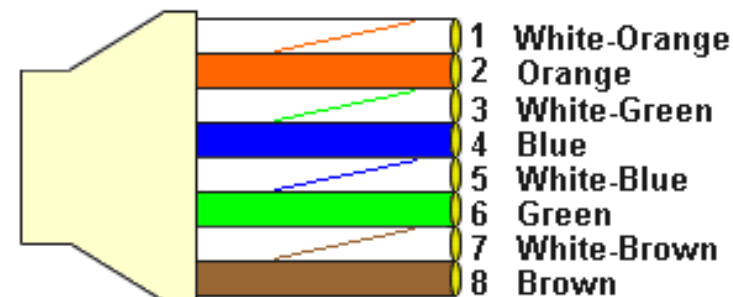- **Data Tx: 1 & 2**
- **Data Rx: 3 & 6**
- **Crossover**
  - 1 ⇔ 3
  - 2 ⇔ 6
- **PoE +VDC: 4 & 5**
- **PoE -VDC: 7 & 8**

1	White-Green
2	Green
3	White-Orange
4	Blue
5	White-Blue
6	Orange
7	White-Brown
8	Brown

568A CABLE END

1	White-Orange
2	Orange
3	White-Green
4	Blue
5	White-Blue
6	Green
7	White-Brown
8	Brown

568B CABLE END

12345678 12345678   12345678 12345678   12345678 12345678

STRAIGHT-THRU 568A   STRAIGHT-THRU 568B   CROSSOVER

difference between a straight and a crossover Ethernet cable

Cable type	Typical application
Straight-through	•**Between a computer and a modem, router, or switch** •**CAT5/CAT6 peripheral extenders** •**Between other dissimilar networking equipment**
Crossover	•**Between two computers** •**Between two similar networking devices**

Many modern network devices support Auto MDI-X (Medium-dependent interface), which automatically negotiates which wiring standard is required. For example, a computer with Auto MDI-X can use either a straight-through or crossover cable for any application.
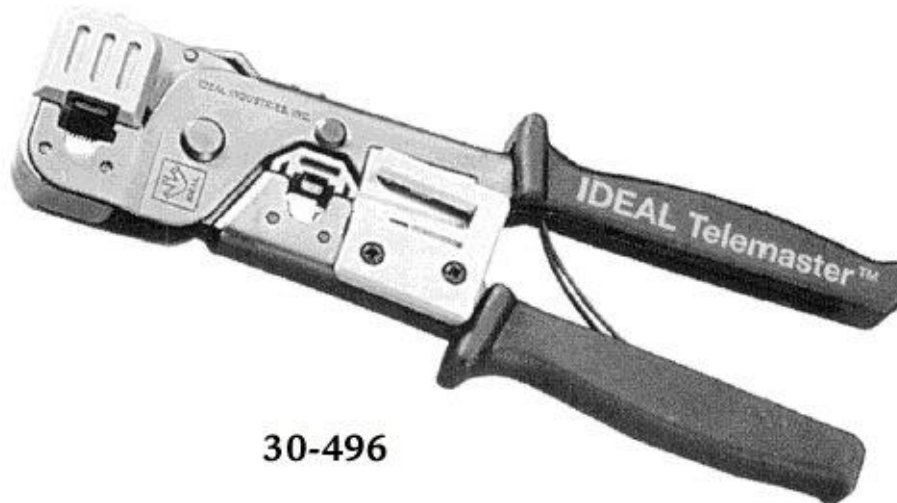

Hub with three MDI-X ports and one switchable port
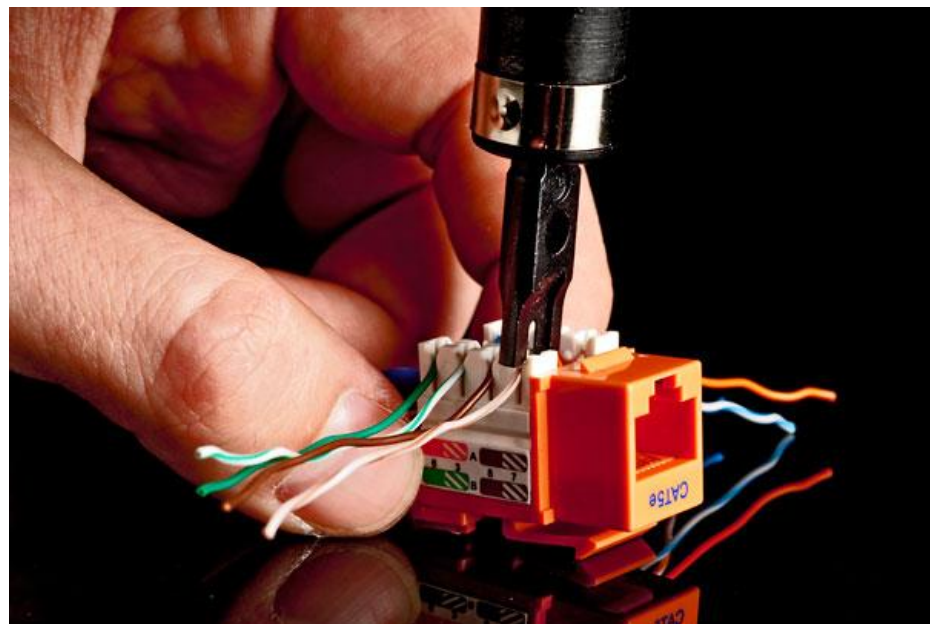
Cutting, Striping & Crimping Tools

- **Make your own patch cords**
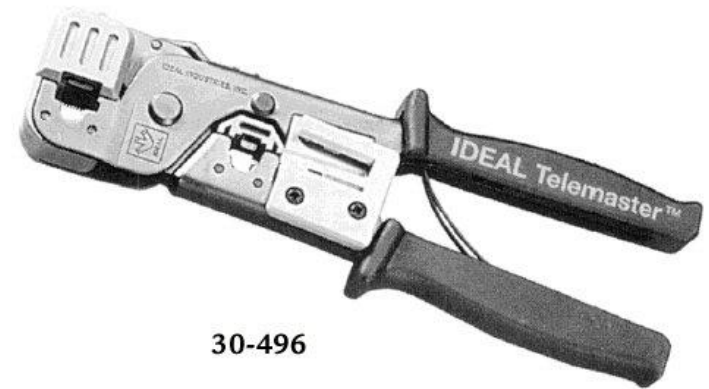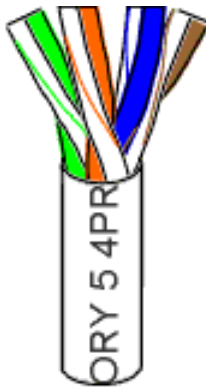- **Cuts and strips pairs**
- **RJ45 end crimped onto ends of wire**

30-496

CPT-RGTP

Punching Tool

Terminates wires to back of patch panels and in Information Outlets

Making Cables

30-496

ORY 5 4PR

ORY 5 4PR/24 A

Wire Testing Equipment

- **Test wire for correct termination of 8 wires**

- **Test for speed capabilities**

Cabling Rules

- Try to avoid running cables parallel to power cables.
- Do not bend cables to less than four times the diameter of the cable.
- If you bundle a group of cables together with cable ties (zip ties), do not over-cinch them. You should be able to turn the tie with fingers.
- Keep cables away from devices which can introduce noise into them. Here's a short list: copy machines, electric heaters, speakers, printers, TV sets, fluorescent lights, copiers, welding machines, microwave ovens, telephones, fans, elevators, motors, electric ovens, dryers, washing machines, and shop equipment.
- Avoid stretching UTP cables (tension when pulling cables should not exceed 25 LBS).
- Do not run UTP cable outside of a building. It presents a very dangerous lightning hazard!
- Do not use a stapler to secure UTP cables. Use telephone wire/RJ6 coaxial wire hangers which are available at most hardware stores.
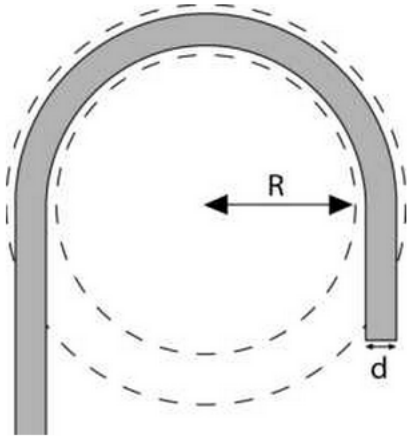
- Category 5, 5e, and 6 cables: four times the cable diameter
- Fiber patch cord: ten to fifteen times the cable diameter

telephone wire/RJ6 coaxial wire hangers

RG6 Coaxial Cable

Fiber Optic Cabling Infrastructure

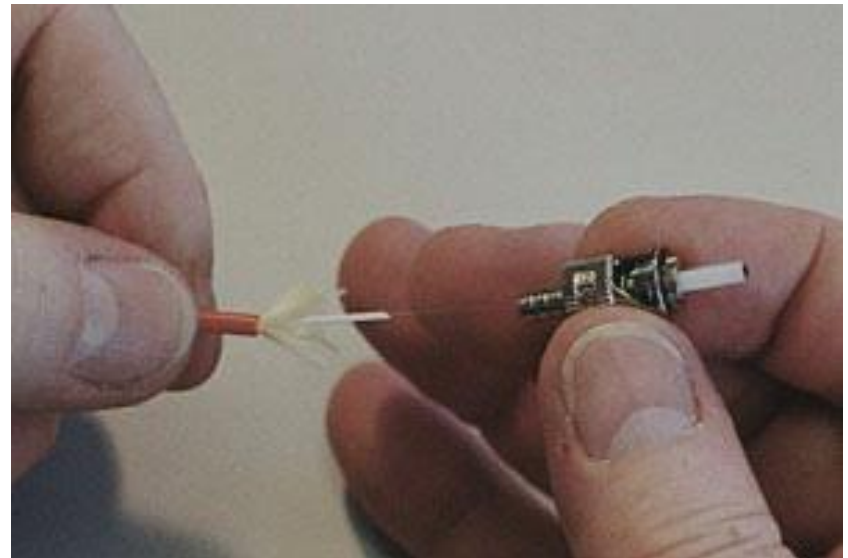- **Components:**
  - Fiber Cable
  - Fiber Pigtail
 - Fiber Connectors
  - LIU
  - Coupler
  - Fiber Patch Cord

Fiber Optic Connectors

- Terminates the fibers

- Connects to other fibers or transmission equipment

Fiber Patch Cords & Pigtails

- **Ends are typically either SC or ST**

- **Pigtails have connectors on only one side and Patch Cords have it on both sides.**

- **Pigtails are spliced to the fiber to terminate the fiber**

- **Patch Cord connects switches to the Fiber cable**
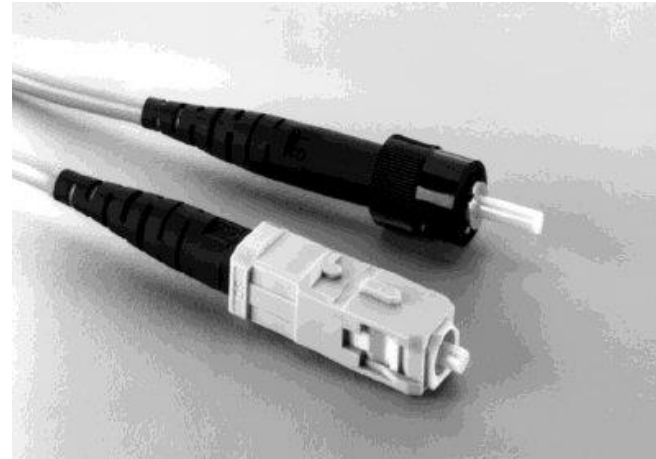
LIU & Couplers

Fiber Optic Installation – Outside Plant

Fiber Optic Installation – Outside Plant

- **Fiber is blown in HDPE Pipes, 1 m deep.**

- **The HDPE pipes is covered with sand and brick lining**

- **Fiber Roles are typically 2 Km. Fiber cables are spliced using Jointers**

- **Faults like fiber cut are located using OTDR (Optical Time Domain Reflectometer)**