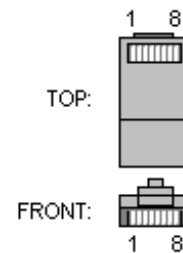


Source: [South Hills DataComm](#) and University of Minnesota

10 Base-T uses two pairs of wires: one pair for transmission and the second pair for receive. The physical connector commonly used is an 8 position modular plug, referred to as an RJ-45. All cables must be wired such that pins 1 & 2 are on one twisted pair and pins 3 & 6 are on a second pair.

There are two pinouts used: MDI for DTE devices (such as computers, printers, etc.) and MDI-X (hubs). Connecting an MDI port to an MDI-X port requires a straight through cable, and connecting either MDI to MDI or MDI-X to MDI-X requires a crossover cable. Pinouts of the MDI and MDI-X interfaces are shown below.

Note on pin numbers - when assigning pin numbers, plugs are as viewed from the end that the cable enters the jack. The latching tab is to the bottom and the contacts are on top. Pins are numbered starting from the left. Jacks are as viewed looking into the jack. The latching tab slot is to the bottom and the contacts are on top. Pins are numbered starting from the left. These conventions make the pin numbering the same on both plugs and jacks (i.e., pin 1 goes to pin 1).



MDI PINOUT		
<i>also for straight through cables</i>		
Pin	Signal	
1	T+	White/Orange
2	T-	Orange/White
3	R+	White/Blue
6	R-	Blue/White

MDI-X PINOUT	
Pin	Signal
1	R+
2	R-
3	T+
6	T-

There are several applications for crossover cables in 10 Base-T networks. The most common reason is to cascade hubs together in a tree topology. If both hubs have only MDI-X ports then a crossover cable is needed. Another application for a crossover cable is to connect two DTE devices together without a hub.

A standard 10 Base-T crossover cable wiring diagram is shown below.

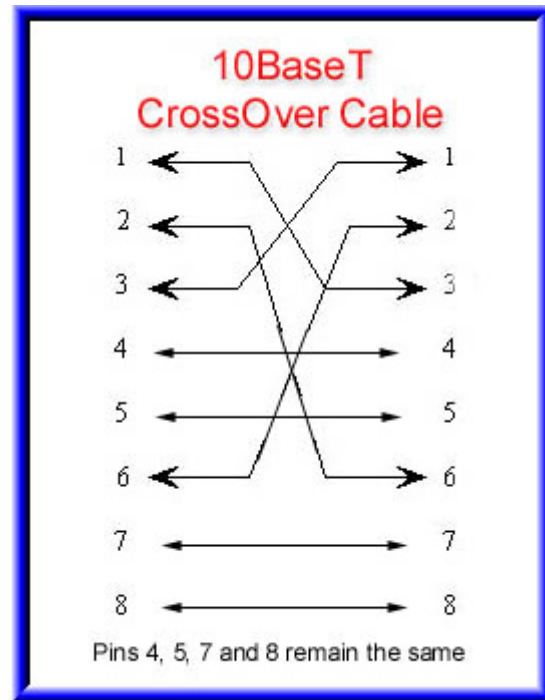
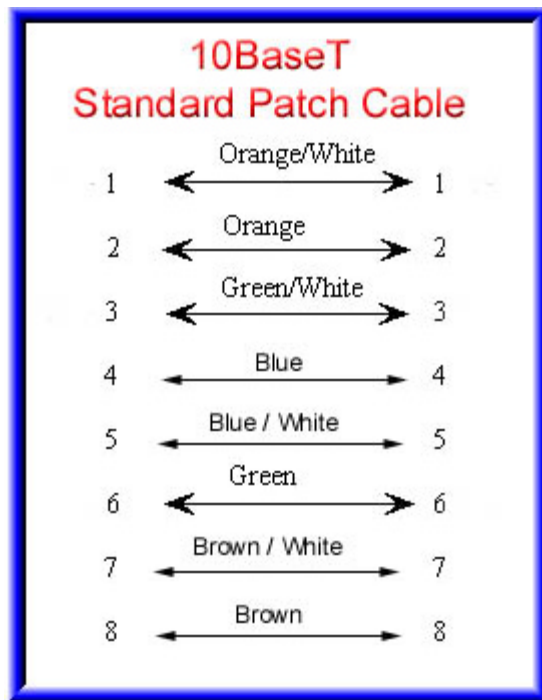
10 Base-T Crossover Cable		
SIDE 1	WIRE COLOR	SIDE 2
1	White/Orange	3
2	Orange/White	6
3	White/Blue	1
6	Blue/White	2

Table Two
Crossover Cable Pinout

In-Wall Wiring Conventions

Here is how all the wires should be connected in the wall and at junction boxes.

10 Base-T wall wiring conventions				
	Recv+	Recv-	Xmit+	Xmit-
Pin on 66 block (first conn. on block)	1	2	3	4
In-wall wire color	White/Blue	Blue/White	White/Orange	Orange/White



Straight-Through vs. Cross-Over

In general, the patch cords that you use with your Ethernet connections are "straight-through", which means that pin 1 of the plug on one end is connected to pin 1 of the plug on the other end. In this particular case it is not then important to

wire them as above. Pin 1 is Pin 1 etc etc. However for the sake of uniformity it may be best to wire your cables with the same colour sequence. Cross-Over cables are "crossed" end to end data cables aren't. If you have a network hub that has an uplink port on it then you do not need to make (or purchase a cross-over cable). Just switch the port on the hub to the 'uplink' mode. If your hub does not have an 'uplink' port on it then the only way to cascade another hub or attach a cable modem is to use a cross-over cable. It helps for future reference to mark or attach a tag to the cross-over cable so that you do not attempt to use it as a 'normal' patch lead at some time in the future.

The only time you cross connections in 10/100BaseT is when you connect two Ethernet devices directly together without a hub. This can be two computers connected without a hub, or two hubs via standard Ethernet ports in the hubs. Then you need a "cross-over" patch cable, which crosses the transmit and receive pairs, the orange and green pairs in normal wiring. In a cross-over cable, one end is normal, and the other end has the cross-over configuration. Remember you can only network two computers together with Cat5 cable. To add extra PC's to your network you will require a hub.