Lab (01)
Interconnecting terminals through LAN (I)

Dr. Ahmed ElShafee

Agenda

1. Building Ethernet cable.
2. Building crossover Ethernet cable
3. Building straight through Ethernet cable.
4. Testing Ethernet cable using Ethernet tester.

1. Building Ethernet cable

Components

1. **Cable** - Be sure the cable(s) you are using is properly rated for CAT 5.
2. **Connectors** – Ethernet cables are terminated with CAT 5 RJ-45 (RJ stands for "Registered Jack") modular plugs.

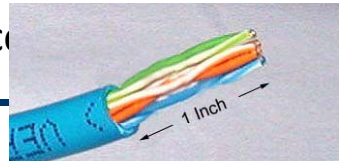
RJ-45 plugs are similar to those you'll see on the end of your telephone cable except they have eight versus four contacts on the end of the plug.

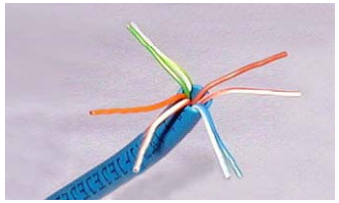
1. Building Ethernet cable (cont,..)

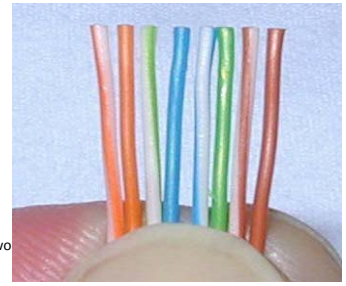
3. RJ-45 Crimping tool

Used to connect RJ45 connectors to Cat5 cables.

1. Building Ethernet cable (c







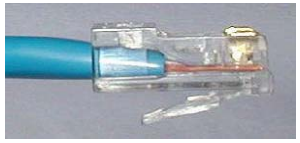
Steps

1. cut into the plastic sheath **1 inch** from the end of the cut cable. The crimping tool has a razor blade that will do the trick with practice.
2. Unwind and pair of the similar colors
3. pinch the wires between your fingers and straighten them out as shown.

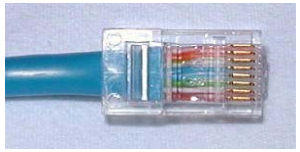
   (The wire colors line up to form a straight through standard cat 5 cable as described above).

1. Building Ethernet cable (cont,..)

4. Use scissors to make a straight cut across the wires **1/2 Inch** from the cut sleeve to the end of the wires.
5. Push the wires into the connector. Note the position of the blue plastic shielding. Also note how the wires go all the way to the end.

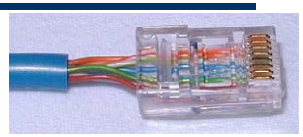


6. A view from the top. All the wires are all the way in. There are no short wires.

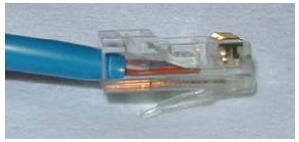


1. Building Ethernet cable (cont,..)

WRONG WAY - Note how the blue plastic shielding is not inside the connector where it can be locked into place. The wires are too long. They should be 1/2 inch from the sleeve.



WRONG WAY - Note how the cables do not go all the way to the end of the connector.



1. Building Ethernet cable (cont,..)

7. RIMPING THE CABLE ... carefully place the connector into the Ethernet Crimper and cinch down on the handles tightly. The copper splicing tabs on the connector will pierce into each of the eight wires. There is also a locking tab that holds the blue plastic sleeve in place for a tight compression fit. When you remove the cable from the crimper, the cable is ready to use.

8. Repeat all steps on the other end of the Ethernet cable exactly. There is no need to reverse any order of the wires.

2. Build crossover Ethernet cable

1. You can use only two pairs to build cross over Ethernet cable as shown

RJ45 Pin # (END 1)	Function	Wire Color	Diagram End #1	RJ45 Pin # (END 2)	Function	Wire Color	Diagram End #2
1	Tx+	White/Orange		1	Tx+	White/Green	
2	Tx-	Orange		2	Tx-	Green	
3	Rx+	White/Green		3	Rx+	White/Orange	
6	Rx-	Green		6	Rx-	Orange	

2. Or you can use the four pairs to build it (to get the full speed)

RJ45 Pin # (END 1)	Function	Wire Color	Diagram End #1	RJ45 Pin # (END 2)	Function	Wire Color	Diagram End #2
1	Tx+	White/Orange		1	Rx+	White/Green	
2	Tx-	Orange		2	Rx+	Green	
3	Rx+	White/Green		3	Tx+	White/Orange	
4	X	Blue		4	X	White/Brown	
5	X	White/Blue		5	X	Brown	
6	Rx-	Green		6	Tx-	Orange	
7	X	White/Brown		7	X	Blue	
8	X	Brown		8	X	White/Blue	

3. Building straight through Ethernet cable

1. Using two pairs out of four

RJ45 Pin # (END 1)	Function	Wire Color	Diagram End #1	RJ45 Pin # (END 2)	Function	Wire Color	Diagram End #2
1	Tx+	White/Orange		1	Tx+	White/Orange	
2	Tx-	Orange		2	Tx-	Orange	
3	Rx+	White/Green		3	Rx+	White/Green	
6	Rx-	Green		6	Rx-	Green	

2. Using four pairs

RJ45 Pin # (END 1)	Function	Wire Color	Diagram End #1	RJ45 Pin # (END 2)	Function	Wire Color	Diagram End #2
1	Tx+	White/Orange		1	Tx+	White/Orange	
2	Tx-	Orange		2	Tx-	Orange	
3	Rx+	White/Green		3	Rx+	White/Green	
4	X	Blue		4	X	Blue	
5	X	White/Blue		5	X	White/Blue	
6	Rx-	Green		6	Rx-	Green	
7	X	White/Brown		7	X	White/Brown	
8	X	Brown		8	X	Brown	

3. Building straight through Ethernet cable (cont,..)

- There are two different configuration for Ethernet wires order,
- AT&T 258A, or EIA/TIA 568B

RJ45 Pin # (END 1)	Function	Wire Color	Diagram End #1	RJ45 Pin # (END 2)	Function	Wire Color	Diagram End #2
1	Tx+	White/Orange		1	Tx+	White/Orange	
2	Tx-	Orange		2	Tx-	Orange	
3	Rx+	White/Green		3	Rx+	White/Green	
4	X	Blue		4	X	Blue	
5	X	White/Blue		5	X	White/Blue	
6	Rx-	Green		6	Rx-	Green	
7	X	White/Brown		7	X	White/Brown	
8	X	Brown		8	X	Brown	

- EIA/TIA 568A

RJ45 Pin # (END 1)	Function	Wire Color	Diagram End #1	RJ45 Pin # (END 2)	Function	Wire Color	Diagram End #2
1	Tx+	White/Green		1	Tx+	White/Green	
2	Tx-	Green		2	Tx-	Green	
3	Rx+	White/Orange		3	Rx+	White/Orange	
4	X	Blue		4	X	Blue	
5	X	White/Blue		5	X	White/Blue	
6	Rx-	Orange		6	Rx-	Orange	
7	X	White/Brown		7	X	White/Brown	
8	X	Brown		8	X	Brown	

4. Testing Ethernet cable using Ethernet tester

- Cable testers are devices used to verify the electronic connections in a cable or wired assembly.
- The Ethernet cable tester is an essential tool that will help you repair most cable problems in your computer system or other electronic devices.
- The cable tester is equipped with three basic components; the source of electric current, a volt meter and a switch matrix that will test the connection to the source to the volt meter.

Thanks,…