

# An-Najah National University



**Networks-Lab**

**Dr. Muhannad Al-Jabi**

**Thursday 8:00am – 2:00pm**

**Summer Semester**

Experiment Information	
Experiment Name: Network Cables	Experiment Number: #1
Performed: 17 of June, 2021	Submitted: 27 of June, 2021
Partner Students	
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## **Introduction:**

Cables are a demonstration of the physical layer. Cables have different types in real life, and they evolved through the years in conjunction with technology.

The quality of cable and connections is a major factor in reducing network problems and time spent troubleshooting. Unshielded Twisted Pair (UTP) copper cable is the most common cable used in Ethernet networks.

## **Objectives:**

- Building a straight-through Ethernet patch cable to T568-B (OR T568-A) standards for connection from workstation to switch or hub/switch or patch panel to switch or hub/switch.
- Building a crossover Ethernet patch cable to T568-B (or T-568-A) standards for connection from workstation to workstation or from switch to switch.

## **Procedure:**

### **Straight-Through Cable**

#### **➤ Cabling Information:**

In this part, we will learn how to build a Category 5 Unshielded Twisted Pair Ethernet network patch cable and test it for good connections and correct pinouts. This will be a 4-pair "straight-through" cable.

This patch cable will conform to the structured cabling standards and is considered to be part of the "horizontal" cabling which is limited to 100 meters total between workstation and switch or hub or switch. Patch cables are wired straight through since the cable from the workstation to the switch is normally crossed over automatically. Note that the ports on the most switches have an X next to them. This means the send and receives pairs will be crossed when the cabling reaches the switch.

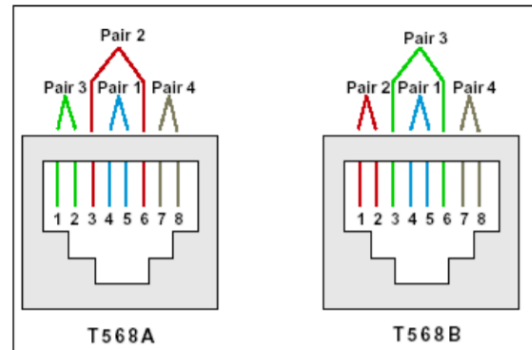
Instructions are provided here for building a T568-A or T568-B cable. Either can be used as long as all connections from the workstation to the wiring closet and terminating electronics are consistent. It is important to keep the same standard as already exists (either T568-A or B). A patch cable that is wired "straight-through" will have the same color of wire on the same pin (1 – 8) at both ends. A straight-through patch cable (T568-A or B) can be used to connect a PC workstation to a wall plate in a work area.

## Create a T568B straight-through patch panel cable:

Both cable ends should be wired the same when looking at the conductors. Only four wires are used with 10Base-T or 100Base-TX Ethernet.

T568-B Cabling

Pin#	Pair#	Function	Wire Color	Used with 10/100 Base-T Ethernet?	Used with 100 Base-T4 and 1000 Base-T Ethernet?
1	2	Transmit	White/Orange	YES	YES
2	2	Transmit	Orange/White	YES	YES
3	3	Receive	White/Green	YES	YES
4	1	Not used	Blue/White	NO	YES
5	1	Not used	White/Blue	NO	YES
6	3	Receive	Green/White	YES	YES
7	4	Not used	White/Brown	NO	YES
8	4	Not used	Brown/White	NO	YES



- ✓ All the practical steps are noted inside the manual, so there is no need to repeat them here.

## Cross-Over Cable

### ➤ Cabling Information:

In this part, we will learn how to build a Category 5 Unshielded Twisted Pair Ethernet crossover network cable and test it for good connections and correct pinouts. This will be a 4-pair "crossover" cable which means that pairs 2 and 3 on one end of the cable will be reversed on the other end. The pinouts will be T568-A on one end and T568-B on the other end.

This patch cable will conform to the structured cabling standards and, if it is used between switches, is considered to be part of the "vertical" cabling also known as backbone cable. A crossover cable can be used as a backbone cable to connect two or more switches in a LAN or to connect 2 isolated workstations to create a mini-LAN. This will allow you to connect two workstations together without the need for a switch between them. This can be very helpful for training and testing.

### ➤ Create a crossover patch cable:

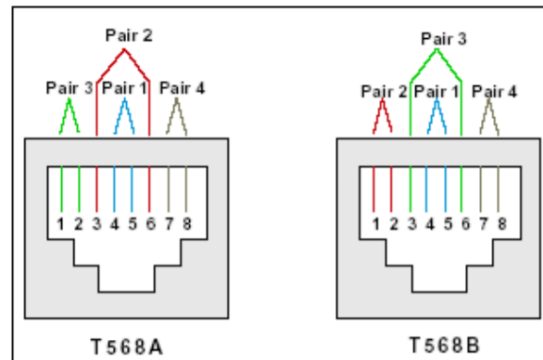
One end of the cable should be wired to the T568-A standard and the other end to the T568-B standard. This crosses the transmit and receive pairs (2 and 3) to allow communication to take place. Only four wires are used with 10 Base-T or 100 Base-TX Ethernet.

#### T568-A Cabling

Pin#	Pair#	Function	Wire Color	Used with 10/100 Base-T Ethernet?	Used with 100 Base-T4 and 1000 Base-T Ethernet?
1	3	Transmit	White/Green	YES	YES
2	3	Transmit	Green/White	YES	YES
3	2	Receive	White/Orange	YES	YES
4	1	Not used	Blue/White	NO	YES
5	1	Not used	White/Blue	NO	YES
6	2	Receive	Orange/White	YES	YES
7	4	Not used	White/Brown	NO	YES
8	4	Not used	Brown/White	NO	YES

#### T568-B Cabling

Pin#	Pair#	Function	Wire Color	Used with 10/100 Base-T Ethernet?	Used with 100 Base-T4 and 1000 Base-T Ethernet?
1	2	Transmit	White/Orange	YES	YES
2	2	Transmit	Orange/White	YES	YES
3	3	Receive	White/Green	YES	YES
4	1	Not used	Blue/White	NO	YES
5	1	Not used	White/Blue	NO	YES
6	3	Receive	Green/White	YES	YES
7	4	Not used	White/Brown	NO	YES
8	4	Not used	Brown/White	NO	YES



#### Straight-Through



#### Cross-Over



## **Questions:**

- Which cable is created to connect PC with PC?
- ✓ Cross-Over Cable.
- Which pins are crossed of the RJ45 cable?
- ✓ Pins 1 & 2 (green) and pins 3 & 6 (orange).
- Which cable is created to connect PC with Router ethernet?
- ✓ Straight-Through Cable.
- Which cable is created to connect switch with switch?
- ✓ Cross-Over Cable.
- What would happen if pin3 is not connected with a straight-Thru cable? Why?
- ✓ Transmit-Data from one side would be connected to the Transmit-Data on the other side, and they would never communicate.

## **Conclusion:**

At the end of this experiment, we made the straight-through cable and cross-over cable successfully, and we test them in the lab to ensure the result, and we learned the differentiate between straight-through cable and cross-over cable.