

DATA COMMUNICATION & NETWORKING LAB

CEL 222

Lab 5



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Q1: Introduction to Router and establishing a console session Using HyperTerminal.

Tasks:

1. **Router Introduction**
2. **Devices Connectivity**
3. **Router Ports and internal Memories details**
4. **Hyper Terminal Configurations**

Router Introduction

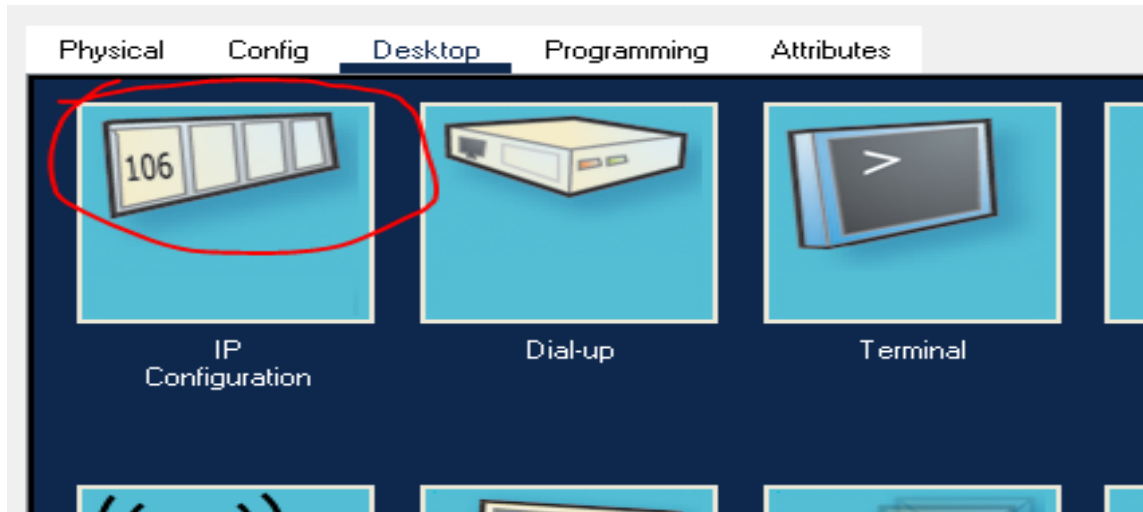
A router is an electronic device that interconnects two or more computer networks, and selectively interchanges packets of data between them. A router receives and sends data on computer networks. Routers are sometimes confused with network hubs, modems, or network switches. However, routers can combine the functions of these components, and connect with these devices, to improve Internet access or help create business networks. Each data packet contains address information that a router can use to determine if the source and destination are on the same network, or if the data packet must be transferred from one network to another. Where multiple routers are used in a large collection of interconnected networks, the routers exchange information about target system addresses, so that each router can build up a table showing the preferred paths between any two systems on the interconnected networks.

Devices Connectivity and IP Assigning.

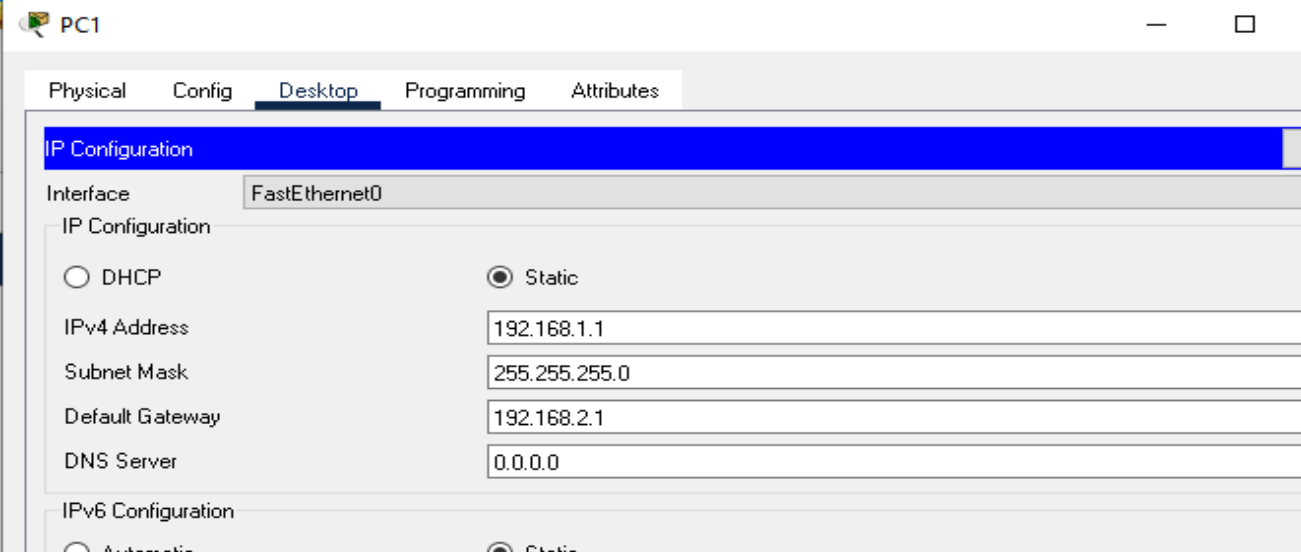
1. Open software packet tracer
2. Click End Devices icon (lower left corner) or press CTRL + ALT + V
3. Drag icon general (Personal Computer 4x) and drop to worksheets.
4. Drag a Router and drop to worksheets.



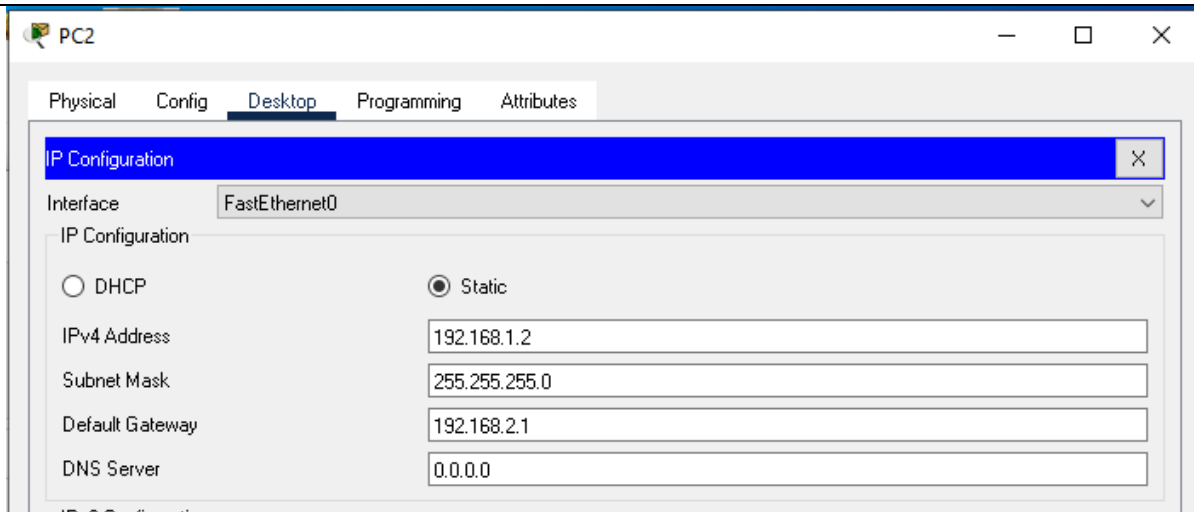
1. Double click PC1.
2. Desktop tab, then click IP Configuration.



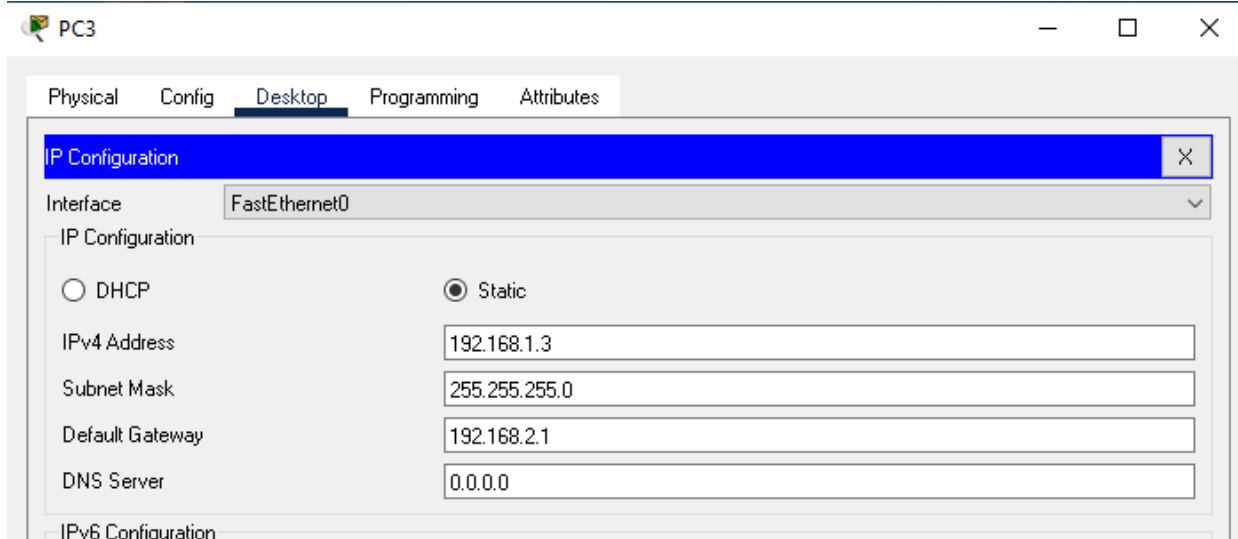
3. Set IP Address for Subnet Mask.
IP Address PC1 = 192.168.1.1
Subnet Mask = 255.255.255.0(will automatically assign after inputting ip)
Default Gateway: 192.168.2.1



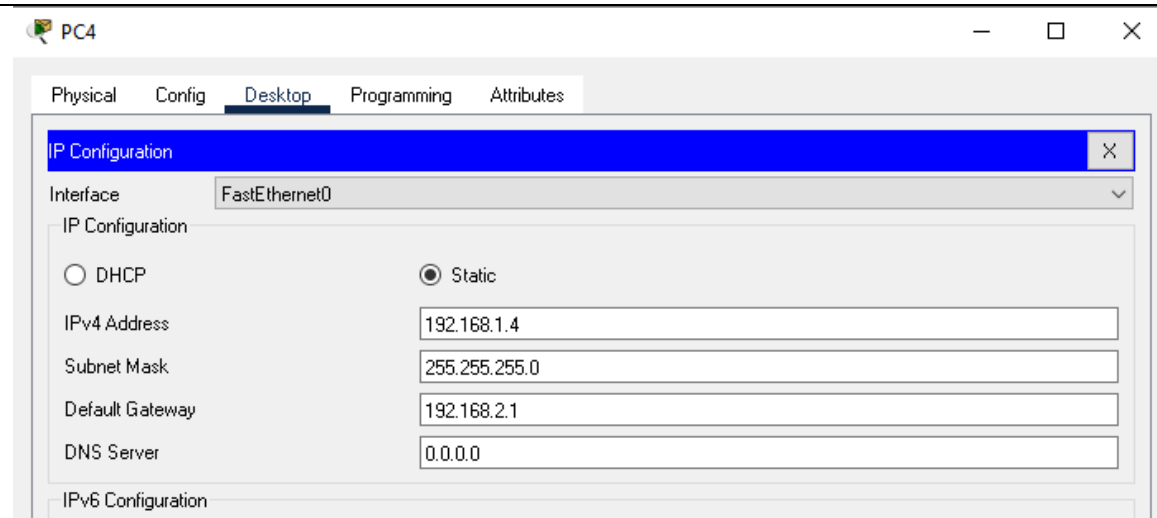
4. Close window PC1
5. Double click PC2.
6. Desktop tab, then click IP Configuration
7. IP Address PC2 = 192.168.1.2
Subnet Mask = 255.255.255.0(will automatically assign after inputting ip)
Default Gateway: 192.168.2.1



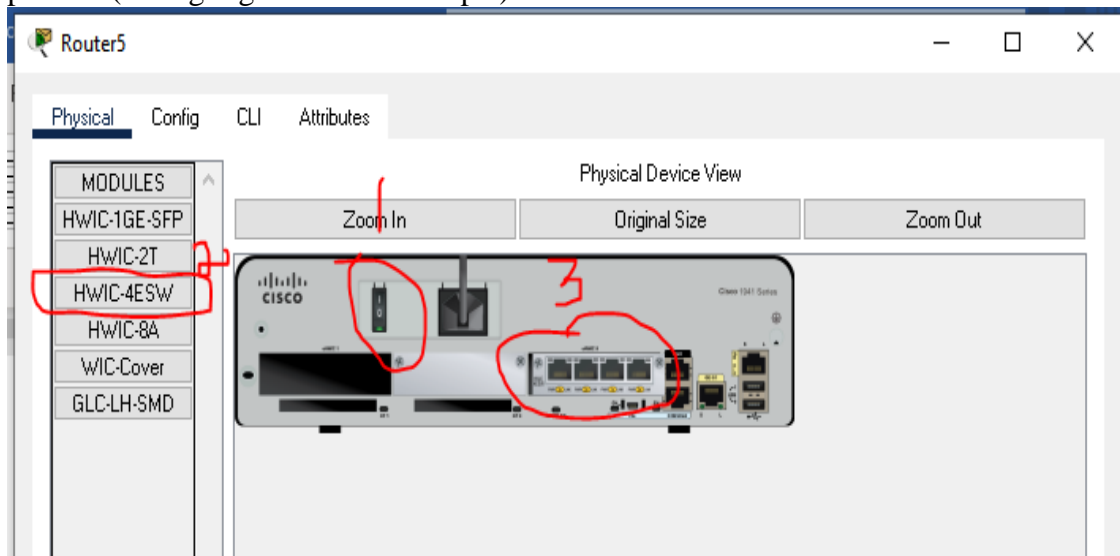
8. close window PC2
9. Double click PC3.
10. Desktop tab, then click IP Configuration
11. IP Address PC3 = 192.168.1.3
 Subnet Mask = 255.255.255.0(will automatically assign after inputting ip)
 Default Gateway: 192.168.2.1



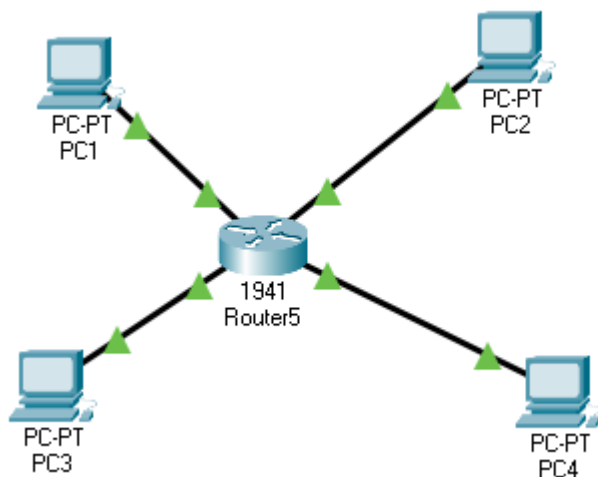
12. close window PC3
13. Double click PC4.
14. Desktop tab, then click IP Configuration
15. IP Address PC4 = 192.168.1.4
 Subnet Mask = 255.255.255.0(will automatically assign after inputting ip)
 Default Gateway: 192.168.2.1



16. Close window PC4
17. Click Router
18. Turn it off by clicking the button.
19. Then Drag the HWIC-4ESW Port(as highlighted 2 in below pic) at the empty position(as highlighted 3 in below pic)



20. Close Router
21. Now Select Copper Straight Through Cable and Attach all the 4 pcs(Fast Ethernet). with the router(Fast Ethernet).



Connection Testing:

For PC1.

Click PC1

Desktop tab, then click Command Prompt

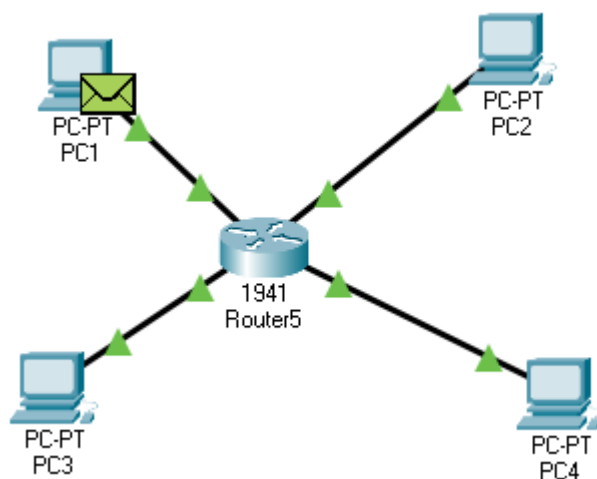
Enter ping 192.168.1.2

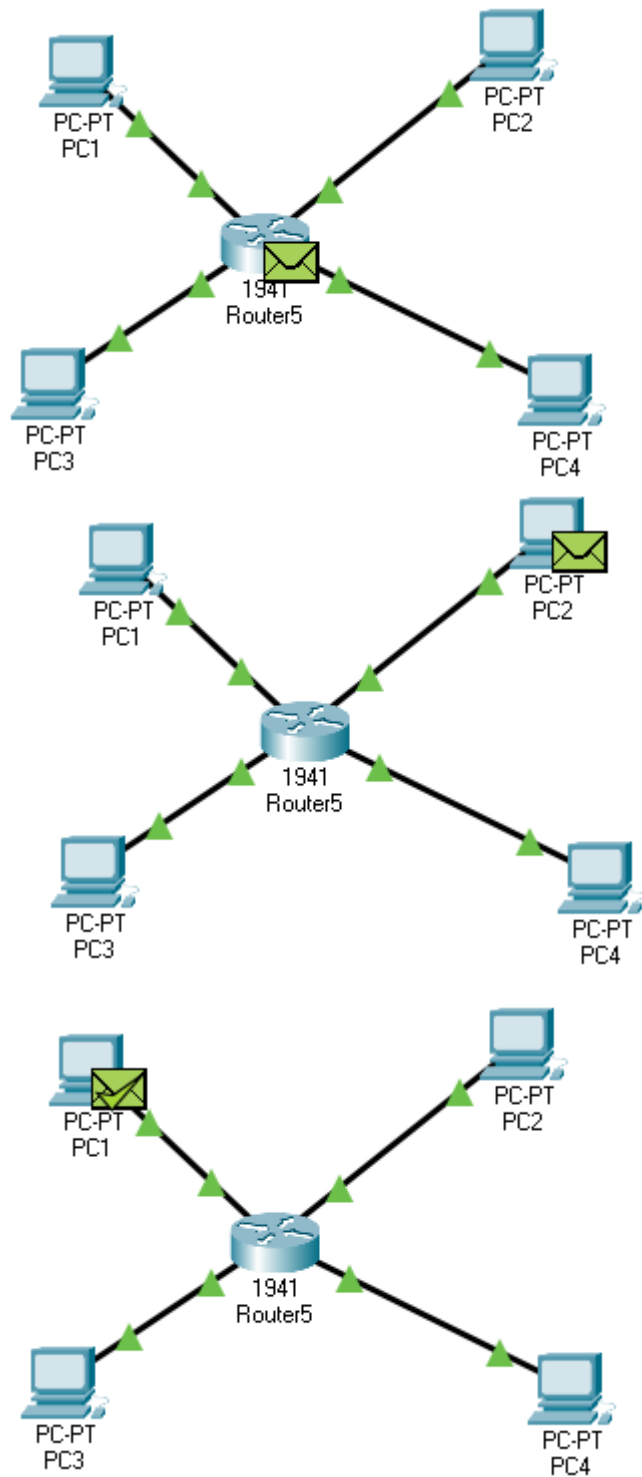
```
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

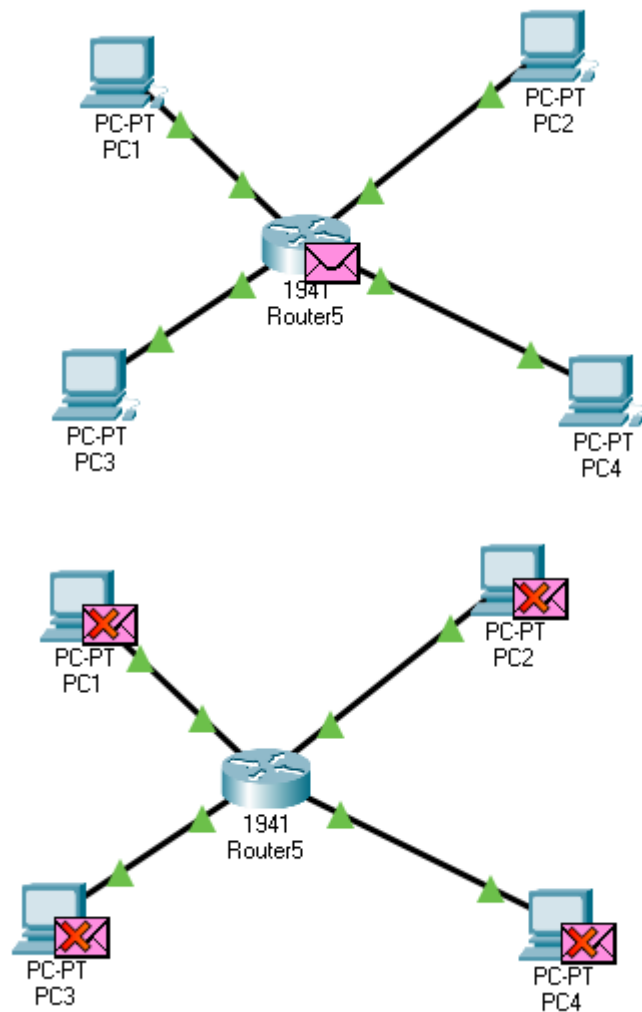
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
```





STP is being followed Before sending another Packet



Similarly other Messages(packets) are sent.

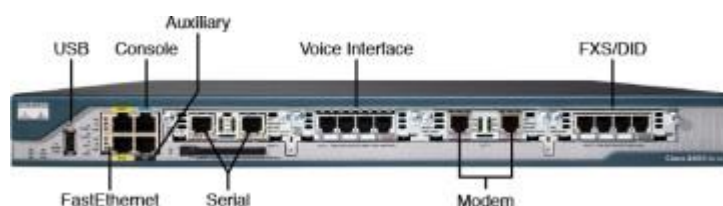
Perform the Above steps with other PCS.

Pings Were Successful So the connection of PCS with Router Was Successfully Tested

3. Router Ports and internal Memories details

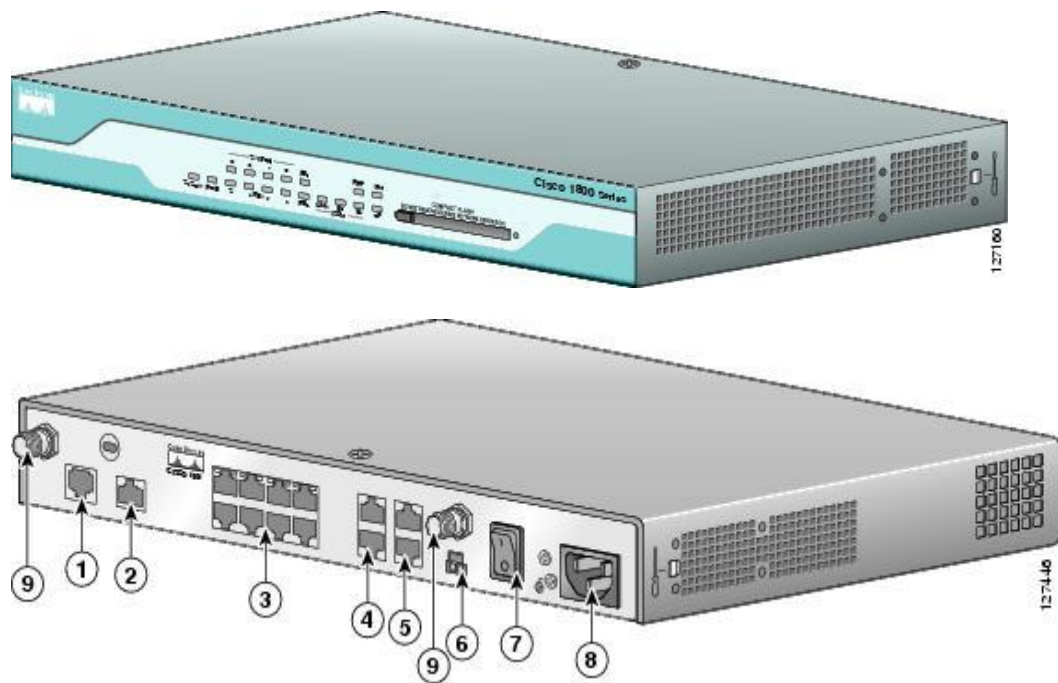
Ports:

The router ports are *bidirectional*, meaning that data can enter and exit the same router port. Often the router ports are called the router interface, the physical connection where the router connects to the



- **USB Interface:** The USB ports are used for storage and security support.
- **FastEthernet Ports:** FE0/0: Fast Ethernet (10/100Mbps) and FE0/1: Fast Ethernet (10/100Mbps).
- **Console Input:** This input provides an RS-232 serial communications link into the router for initial router configuration. A special cable, called a *console cable*, is used to connect the console input to the serial port on a computer. The console cable can have RJ-45 plugs on each end and requires the use of an RJ-45 to DB9 adapter for connecting to the computer's COM1 or COM2 serial port. The console cable can also have an RJ-45 connector on one end and an integrated DB9 connector on the other end.
- **Auxiliary Input:** This input is used to connect a dial-in modem into the router. The auxiliary port provides an alternative way to remotely log in to the router if the network is down. This port also uses an RJ-45 connection.
- **Serial Interface:** CTRLR T1 1 and CTRLR T1 0.

The Cisco 1811 and Cisco 1812 routers offer an 8-port 10/100Base-T switch, dual 10/100Base-T WAN ports, two USB 2.0 ports, and either an ISDN S/T or an analog modem port.



Memory of A Router

ROM (Read Only Memory)

This is a form of permanent memory used by the Router to store:

- The "Power-On Self-Test" that checks the Router on boot up.

- The "Bootstrap Startup Program" that gets the Router going.
- A very basic form of the Cisco IOS software (to change the ROM you have to remove and replace chips).

Flash Memory

- An Electronically Erasable and Re-Programmable memory chip.
- The "Flash" contains the full Operating System, or "Image". This allows you to upgrade the OS without removing chips.

NVRAM (Non-Volatile RAM)

This stores your Router's "Startup Configuration File". Like Flash memory, this retains data even when power is lost.

RAM (Random Access Memory)

This is a regular computer memory chip. These are the working memory of the Router, and provide Caching, Packet Buffering, and hold Routing Tables. The RAM is also where the Running Operating System lives when the Router is on. RAM loses all its data when reset or powered off.

Interfaces

Interfaces - Where the Router meets the Outside World. Basically, your Router will have **Serial** interfaces, which are mostly used to connect long-distance as in a WAN (Wide-Area Network)

1. Hyper Terminal Configurations

HyperTerminal is terminal emulator software which is included with Windows Operating Systems, up to Windows XP. HyperTerminal is no longer available from Windows Vista onwards. If you are using Windows XP, you can use HyperTerminal to configure, monitor and manage Cisco Routers and Switches.

Most Cisco devices do not have a graphical Web-based interface by default. You must configure them from the command line using the serial-based console port on the switch or router. While there are a variety of serial terminal emulation programs available, most people use HyperTerminal to do this because it is included free with Windows. This article will show you how to configure HyperTerminal to talk to a new Cisco device.

Steps to config Cisco Router Using Hyper Terminal

1. Hook up the power cable to the router.
2. Connect the serial console cable from the router's console port (RJ-45) to the back of a PC or laptop (DB-9 Serial, "COM1 Port").
3. Because HyperTerminal comes with Windows, many people use it to configure Cisco routers. To open HyperTerminal from Windows, go to Start | Programs | Accessories | Communications | HyperTerminal.
4. Create a new connection called Cisco, click OK to accept the default of using COM1, change the baud rate to 9600 baud on the Serial Port settings, and click OK, which should take you to the router's console.

5. Power-on the router and watch the boot-up sequence. **Listing A** shows a sample boot-up sequence of a 2600 series router.
6. Following the prompt, press [Enter]. Because it's a new router, you'll automatically go into Setup Mode. You should see something like this:

```
--- System Configuration Dialog ---  
Continue with configuration dialog? [yes/no]:
```

You have successfully configured HyperTerminal and connected to your Cisco device.

When you are done and try to close out HyperTerminal, you will be asked if you want to save this connection. I suggest saving it with the name you gave it, **cisco**, so that you don't have to configure it again next time.

HyperTerminal Features

HyperTerminal can also be used to telnet to your Cisco network devices once they are configured with an IP address and are on the network. Thus, you don't have to stop using HyperTerminal once you have configured your device.

HyperTerminal can be used to paste Cisco commands into your device so that you can more quickly configure devices. For example, you can do a **show running-config**, copy the output to the Windows clipboard, paste it into notepad, edit parts of it, and paste it back into your router's configuration.

HyperTerminal can also log anything that scrolls by on the window to a log file, for record keeping or analysis.