Following are the important physical interfaces in a Cisco Router.

• Ethernet - [Ethernet](https://www.omnisecu.com/basic-networking/lan-technologies-ethernet.php) is typically Ethernet [IEEE 802.3](https://www.omnisecu.com/basic-networking/ieee-802-standards.php) standard based physical interface, which operates at 10 Mbps speed. The [media standard](https://www.omnisecu.com/basic-networking/ethernet-media-standards.php) used is 10BaseT.

• Fast Ethernet - Fast Ethernet is typically Ethernet IEEE 802.3u standard based physical interface which operates at 100 Mbps speed. The [media standard](https://www.omnisecu.com/basic-networking/ethernet-media-standards.php) used is 100BaseT.

• Gigabit Ethernet - Gigabit Ethernet is typically Ethernet IEEE 802.3ab standard based physical interface which operates at 1000 Mbps speed. The [media standard](https://www.omnisecu.com/basic-networking/ethernet-media-standards.php) used is1000BASE-T

• Serial: Serial interfaces are typically used for WAN connections from ISP (Internet Service Providers) for connectivity types like Frame Relay, T1, T3, etc

• FDDI Fiber Distributed Data Interface. - FDDI networks operates at 100 Mbps speed and uses a token-passing mechanism to prevent collisions.

• Token Ring - Token Ring interfaces can operate at either 4 Mbps or 16 Mbps. In Token Ring networks a token is passed around the network (configured in [ring topology](https://www.omnisecu.com/basic-networking/network-topologies-mesh-ring-hybrid-topology.php)), allowing the owner of the token to transmit a frame, to avoid collision.Token Ring networks vanished from networking industry long way back. New Cisco routers do not have a Token Ring interface.

Note : Only 10Mbps [Ethernet](https://www.omnisecu.com/basic-networking/lan-technologies-ethernet.php) interface has a name "Ethernet" in a Cisco Router. A 100Mbps Ethernet interface is called a "FastEthernet" interface and a 1000Mbps Ethernet interface is called a "GigabitEthernet" interface.

Virtual interfaces are also available in a Cisco Router. Examples of virtual interfaces are [Loopback interface](https://www.omnisecu.com/cisco-certified-network-associate-ccna/what-is-loopback-interface-in-a-router.php) and [Null interface](https://www.omnisecu.com/cisco-certified-network-associate-ccna/what-is-null-interface-in-a-router.php).

**Router Interfaces**

Routers can have many different types of connectors; from Ethernet, Fast Ethernet, and Token Ring to Serial and ISDN ports.  Some of the available configurable items are logical addresses (IP,IPX), media types, bandwidth, and administrative commands.  Interfaces are configured in interface mode which you get to from global configuration mode after logging in.

**Logging in to the Router**

Depending on the port you're using, you might have to press enter to get the prompt to appear (console port). The first prompt will look like **Routername>** the greater than sign at the prompt tell you that you are in **user mode**. In user mode you can only view limited statistics of the router in this mode. To change configurations you first need to enter **privileged EXEC mode**. This is done by typing **enable** at the **Routername>** prompt, the prompt then changes to **Routername#**. This mode supports testing commands, debugging commands, and commands to manage the router configuration files. To go back to user mode, type **disable** at the **Routername#** prompt. If you want to leave completely, type **logout** at the user mode prompt. You can also exit from the router while in privileged mode by typing **exit** or **logout** at the **Routername#** prompt.

**Global Configuration Mode**

Enter this mode from the privileged mode by typing **configure terminal** or (**conf t** for short).  The prompt will change to **Routername(config)#**.  Changes made in this mode change the running-config file in DRAM. Use **configure memory** to change the startup-config in NVRAM.  Using **configure network** allows you to change the configuration file on a TFTP server.  If you change the memory or network config files, the router has to put them into memory (DRAM) in order to work with them, so this will change your router's current running-config file.

**Interfaces mode**

While in global configuration mode you can make changes to individual interfaces with the command **Routername(config)#interface ethernet 0** or **Routername(config)#int e0** for short, this enters the interface configuration mode for Ethernet port 0 and changes the prompt to look like **Routername(config-if)#**.

**Bringing Up Interfaces**

If an interface is shown administratively down when the **show interface** command is given in privileged EXEC mode, use the command **no shutdown** to enable the interface while in interface configuration mode.

**Setting IP Addresses**

In global configuration mode, enter the interface configuration mode (**Routername(config)#int e0**) and use the command **Routername(config-if)#ip address [ip address] [network mask]**.  If it is the first time using the interface, also use the **no shutdown** command to enable and bring up the interface.

**Router\_2(config)#int e0**

**Router\_2(config-if)#ip address 192.168.1.1 255.255.255.0**

**Router\_2(config-if)#no shutdown**

**Secondary IP Addresses**

You can add another IP address to an interface with the secondary command. The syntax is the same as setting an IP address except you add secondary to the end of it.  Using secondary interfaces, it allows you to specify 2 IP addresses for 1 interface.  Use subinterfaces instead, since they allow for more than 2 IP addresses on an interface and secondaries will probably be replaced soon.

**Subinterfaces**

In global configuration mode you can create virtual interfaces (subinterfaces), so at the prompt **Routername(config)#** type **int e0.1** and the prompt will change to **Routername(config-subif)#**.  For all practical purposes there isn't a limit to the amount of subinterfaces an interface can have.

**Show Interfaces**

To view information about an interface, use the command:

**Router\_2#show interface e0**

**Ethernet0 is up, line protocol is up**

**Hardware is Lance, address is 0000.cc34.ec7d (bia 0000.cc34.ec7d)**

**Internet address is 192.168.1.1/24**

**MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255**

**Encapsulation ARPA, loopback not set, keepalive set (10 sec)**

**ARP type: ARPA, ARP Timeout 04:00:00**

**Last input never, output 00:00:07, output hang never**

**Last clearing of "show interface" counters never**

**Queueing strategy: fifo**

**Output queue 0/40, 0 drops; input queue 0/75, 0 drops**

**5 minute input rate 0 bits/sec, 0 packets/sec**

**5 minute output rate 0 bits/sec, 0 packets/sec**

**0 packets input, 0 bytes, 0 no buffer**

**Received 0 broadcasts, 0 runts, 0 giants, 0 throttles**

**0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort**

**0 input packets with dribble condition detected**

**614 packets output, 58692 bytes, 0 underruns**

**0 output errors, 0 collisions, 2 interface resets**

**0 babbles, 0 late collision, 0 deferred**

**0 lost carrier, 0 no carrier**

**0 output buffer failures, 0 output buffers swapped out**

**Interface Problems**

When using the command **show interface [*type #*]** interface problems can be seen and appropriate action taken.

|  |  |
| --- | --- |
| **Message** | **Solution** |
| **Ethernet0 is up, line protocol is up** | None needed, interface working properly |
| **Ethernet0 is up, line protocol is down** | Clocking or framing problem, check clock rate and encapsulation type on both routers |
| **Ethernet0 is down, line protocol is down** | Cable or interface problem, check interfaces on both ends to ensure they aren't shutdown |
| **Ethernet0 is administratively down, line protocol is down** | The interface has been shutdown, use the **no shutdown** command in the interface's configuration mode |

**Serial Interfaces**

The serial interface is usually attached to a line that is attached to a CSU/DSU that provides clocking rates for the line.  However, if two routers are connected together, one of the serial interfaces must act as the DCE device and provide clocking.  The DCE end of the cable is the side of the cable that has a female connector where it connects to the other cable.  The clocking rate on the DCE device is set in interface configuration mode with the commands:

**Router3(config)#int s0**

**Router3(config-if)#clock rate ?**

**Speed (bits per second)**

**1200**

**2400**

**4800**

**9600**

**19200**

**38400**

**56000**

**64000**

**72000**

**125000**

**148000**

**250000**

**500000**

**800000**

**1000000**

**1300000**

**2000000**

**4000000**

**<300-8000000> Choose clockrate from list above**

**Router3(config-if)#clock rate 56000**

**Bandwidth**

Cisco routers ship with T1 (1.544 mbps) bandwidth rates on their serial interfaces.  Some routing protocols use the bandwidth of links to determine the best route.  The bandwidth setting is irrelevant with RIP routing.  Bandwidth is set with the **bandwidth** command and ranges from **1 - 10000000** kilobits per second.

**Router3(config)#int s0**

**Router3(config-if)#bandwidth ?**

**<1-10000000> Bandwidth in kilobits**

**Router3(config-if)#bandwidth 10000000**

**Saving Changes**

Any time you make changes and want them saved over the next reboot, you need to copy the running-config to the startup-config in NVRAM.  Use the command:

**Router3#copy run start**

You can see either of the files by using the commands:

**Router3#show run**

**Router3#show start**

To erase the startup file use the command:

**Router3#erase start**

**Show Controllers**

Tells you information about the physical interface itself, it also gives you the cable type and whether it is a DTE or DCE interface.  Syntax is:

**Router\_2#show controllers s 1**

\*Note there is a space between the **s** and the **1**.