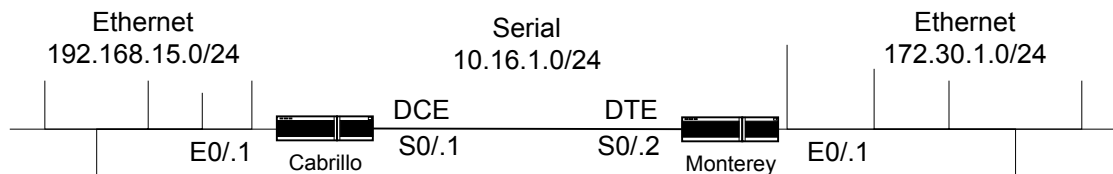


# I. Basic Router Configuration - 8 Steps to Success: IP Basics

The commands listed below are to assist you in setting up your router. **The commands are only examples and do not reflect the configuration of any actual network.** Your actual commands, ip addresses, network addresses, passwords, etc., will depend upon your network design. **Caution:** Some of the show commands may be done in user mode, while others may only be done in privileged mode.

**Sample Network:** You may wish to configure the network below.

## IP Basics



### Step 1: Physical Connections

Connect all of the interfaces including:

- **Console:** Connect your PC/terminal to the console port via HyperTerminal (**9600-8-N-1-no flow**)
- **Ethernet:** Connect Ethernet ports to a hub or a switch using a straight-through cable. Use a cross-over cable if going directly between Ethernet ports on two routers.
- **Serial:** If going directly between two routers, don't forget to connect one port via the DTE cable and the other via the DCE cable.

### Step 2: Boot up the router

You may use the setup mode (setup dialogue) but this is to help you with configuring the router using the Cisco IOS commands. The setup mode will only allow you to configure the router with the basic features and not with any advanced features.

### Step 3: Host Name and Passwords

It is a good idea to begin your configuration with the hostname and passwords. This will remind you what router you are configuring and it is also a good idea to add the security of passwords right away. Router(config)# **hostname** Cabrillo

```
Cabrillo(config)# enable secret class
```

```
Cabrillo(config)# line vty 0 4
```

*{If you are running EFS, you may increase the number of telnet sessions to more than 5.}*

```
Cabrillo(config-line)# login
```

```
Cabrillo(config-line)# password cisco
```

```
Cabrillo(config-line)# logging synchronous
```

*{debug and other messages will not mess up screen when inputting commands.}*

```
Cabrillo(config)# line con 0
```

```
Cabrillo(config-line)# login
```

```
Cabrillo(config-line)# password cisco
```

```
Cabrillo(config-line)# logging synchronous
```

*{debug and other messages will not mess up screen when inputting commands.}*

#### Step 4: Adding IP Addresses

Next lets add the IP addresses, as this is a basic function of configuring routers. Below is an example of configuring both an Ethernet and Serial interface. Don't forget to use the proper subnet mask! For Serial interface with the DCE cable you will need to also add the clocking with the clockrate command.

```
Cabrillo(config)# interface ethernet 0
Cabrillo(config-if)# ip address 192.168.15.1 255.255.255.0
Cabrillo(config-if)# description Engineering Network
Cabrillo(config-if)# no shutdown

Cabrillo(config)# interface serial 0
Cabrillo(config-if)# ip address 10.16.1.0 255.255.255.0
Cabrillo(config-if)# clock rate 56000 {DCE interface only!}
Cabrillo(config-if)# no shutdown
Cabrillo(config-if)# description Network to ISP
```

#### Step 5a: Adding Dynamic Routing: RIP

If this router will be participating in a dynamic routing protocol like RIP or IGRP, you will need to enable the routing protocol along with those directly connected networks that will be participating. Only use the classful network address, not the subnet address of the network!

```
Cabrillo(config)# router rip
Cabrillo(config-router)# network 192.168.15.0 {NOT Subnet Address}
Cabrillo(config-router)# network 10.0.0.0 {NOT Subnet Address}
```

#### Step 5b: Adding Dynamic Routing: IGRP

If this router will be participating in a dynamic routing protocol like RIP or IGRP, you will need to enable the routing protocol along with those directly connected networks that will be participating. Only use the classful network address, not the subnet address of the network!

```
Cabrillo(config)# router igrp 10 {autonomous-system a.k.a. process-id}
Cabrillo(config-router)# network 192.168.15.0 {NOT Subnet Address}
Cabrillo(config-router)# network 10.0.0.0 {NOT Subnet Address}
```

#### Step 6: Adding Default and Static Routes

If your router needs a default route (normally on a boundary router) or a static route to another network (normally to a stub network which is not participating in the dynamic routing protocol of Step 5), then you will need to configure these.

```
Cabrillo(config)# ip route 0.0.0.0 0.0.0.0 10.16.1.2 (ip-address-of-next-hop-router)
Cabrillo(config)# router rip
Cabrillo(config-router)# network 172.30.0.0
Cabrillo(config-router)# default-information originate
    {IOS 12.1 and later you must use this command when configuring a default route
    using a "quad-zero" static route.
    Can use for RIP, but does not work with IGRP.}
Cabrillo(config)# ip default-network 10.0.0.0
    {Adding a default route using a the ip default-network command.
    Either one, not both of these commands. Also need a default route at the router.
    This is the only option with IGRP. Works also with RIP.}

Cabrillo(config)# ip route 172.30.1.0 255.255.255.0 10.16.1.2
    {Configuring a static route: network-address subnet-mask ip-address-of-next-hop-router}
```

### **Step 7: Testing and Monitoring**

At this point it is a good idea to start testing your network using various commands.

```
Cabrillo# show ip route
Cabrillo# show ip interface brief           (Great command!)
Cabrillo# show controller s 0 {Shows whether or not the serial cable is DCE or DTE.}
Cabrillo# ping ip-address - Extended ping, press return.
Cabrillo# tracert ip-address
Cabrillo# debug ip rip           {Remember to turn debug off when done, undebug all}
Cabrillo# terminal monitor {If using debug from a telnet session, otherwise debug output will go to the console. Caution: This will cause the debug output to go to all telnet sessions on this router.}}
Cabrillo# terminal no monitor       {To un-do the command above.}
```

Be familiar with when you would use these and what they are showing you:

```
Cabrillo# show ip protocols
Cabrillo# show version
Cabrillo# show flash
Cabrillo# show running config
Cabrillo# show startup-config
Cabrillo# show protocol
Cabrillo# show ip protocols
Cabrillo# show interface
Cabrillo# show interface s 0
Cabrillo# show interface e 0
Cabrillo# show controller s 0
Cabrillo# show controller e 0
Cabrillo# show ip interface brief
Cabrillo# show cdp interface
Cabrillo# show cdp neighbor
Cabrillo# show cdp neighbor detail
Cabrillo# show ip route
Cabrillo# show version
Cabrillo# show flash
```

### **More Testing Commands**

Here are some commands which may help you troubleshoot the router. Many of the commands might be used while you are speaking with a Tech Support Engineer.

```
Cabrillo# show memory
Cabrillo# show stacks
Cabrillo# show buffers
Cabrillo# show arp
Cabrillo# show processes
Cabrillo# show processes cpu
Cabrillo# show tech-support
```

### **Step 8: Finishing up**

Once everything is working you may wish to add some commands to make your work easier.

```
Cabrillo(config)# ip host Monterey 10.16.1.2 {Mapping names and IP addresses.}
Cabrillo(config)# ip name-server ip-address {Adding a name server.}
Cabrillo(config)# no ip domain-lookup {When there is no domain server.}
Cabrillo(config)# banner motd # This is the Cabrillo Router #
Cabrillo(config-router)# passive-interface s 0
{When you do not want to advertise routing tables out of a specific interface.}
```

*And don't forget to...*

```
Cabrillo# show running-config
Cabrillo# copy running-config startup-config
```

### **Miscellaneous**

```
Cabrillo# ? {This command can be used by itself or following at the end of any partial command line.}
Cabrillo> enable
Cabrillo# disable
Cabrillo# configure terminal
Cabrillo(config)# exit
Cabrillo(config-if)# control-z
Cabrillo# clock set hh:mm:ss day month year
```

### **Editing Commands**

**Control-A:** Moves to the beginning of the command line.

**Control-E:** Moves to the end of the command line.

**Esc-B:** Moves back one word.

**Control F:** Moves forward one character.

**Control-B:** Move back one character.

**Esc F:** Moves forward one word.

### **Command History Commands**

**Control P** or **up arrow key:** Recalls last (previous command).

**Control N** or **down arrow key:** Recalls most recent command

**Tab key:** completes the entry.

```
Cabrillo# show history
```

```
Cabrillo# terminal history
```

```
Cabrillo# terminal editing
```

```
Cabrillo# no terminal editing
```