Basic Software Configuration Using the Setup Command Facility

You can configure your router by using the Cisco Router and Security Device Manager (SDM), the Cisco IOS setup command facility, or the Cisco IOS command-line interface (CLI).

Note Wherever possible, we recommend that you use SDM to configure your router. For information on the availability and use of SDM, see the quick start guide that shipped with your router.

The software configuration documentation describes how to perform configuration tasks by using the CLI. However, this specific document describes how to perform basic configurations by using the Cisco IOS setup command facility.

Contents

Platforms Supported by This Document

Use this document with the following platforms:

- Cisco 1800 series routers
- Cisco 2800 series routers
- Cisco 3800 series routers

Information About the Setup Command Facility

The setup command facility prompts you to enter the information that is needed to configure a router quickly. The facility steps you through a basic configuration, including LAN and WAN interfaces. For more general information about the setup command facility, see the following document:

Cisco IOS Configuration Fundamentals Configuration Guide, Release 12.2:
Part 1: Cisco IOS User Interfaces:
Using AutoInstall and Setup

http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122cgcr/ffun_c/ffcprt1/fcf002.htm

Using the Setup Command Facility to Perform Basic Configuration

This section shows how to configure a hostname for the router, set passwords, and configure an interface for communication with the management network.

> **Note** The messages that will be displayed will vary, depending on your router model, the installed interface modules, and the software image. The following example and the user entries (in **bold**) are shown as examples only.

> **Note** If you make a mistake while using the setup command facility, you can exit and run the setup command facility again. Press **Ctrl-C**, and enter the **setup** command in privileged EXEC mode (`Router#`).

Step 1 Enter the setup command facility by using one of the following methods:

- From the Cisco IOS CLI, enter the **setup** command in privileged EXEC mode:

```
Router> enable
Password: <password>
Router# setup

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

- If your router reloads and does not already have a configuration file, you are prompted to enter the setup command facility:

```
Would you like to enter the initial configuration dialog? [yes/no]:
```

Step 2 To proceed using the setup command facility, enter **yes**.

Step 3   When the following messages appear, enter **yes** to enter basic management setup:

```
At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '[]'.

Basic management setup configures only enough connectivity
for management of the system, extended setup will ask you
to configure each interface on the system

Would you like to enter basic management setup? [yes/no]: yes
```

Step 4   Enter a hostname for the router (this example uses myrouter):

```
Configuring global parameters:
Enter host name [Router]: myrouter
```

Step 5   Enter an enable secret password. This password is encrypted (for more security) and cannot be seen when viewing the configuration.

```
The enable secret is a password used to protect access to
privileged EXEC and configuration modes. This password, after
entered, becomes encrypted in the configuration.
Enter enable secret: xxxxxx
```

Step 6   Enter an enable password that is different from the enable secret password. This password is *not* encrypted (and is less secure) and can be seen when viewing the configuration.

```
The enable password is used when you do not specify an
enable secret password, with some older software versions, and
some boot images.
Enter enable password: xxxxxx
```

Step 7   Enter the virtual terminal password, which prevents unauthenticated access to the router through ports other than the console port:

```
The virtual terminal password is used to protect
access to the router over a network interface.
Enter virtual terminal password: xxxxxx
```

Step 8   Respond to the following prompts as appropriate for your network:

```
Configure SNMP Network Management? [yes]:
    Community string [public]:
```

A summary of the available interfaces is displayed.

✎

Note   The interface numbering that appears is dependent on the type of Cisco modular router platform and on the installed interface modules and cards.

```
Current interface summary

Controller Timeslots D-Channel Configurable modes Status
T1 0/0     24        23        pri/channelized    Administratively up

Any interface listed with OK? value "NO" does not have a valid configuration

Interface                IP-Address      OK? Method Status            Prol
FastEthernet0/0          unassigned      NO  unset  up                up
FastEthernet0/1          unassigned      NO  unset  up                dow
```

Step 9   Select one of the available interfaces for connecting the router to the management network:

```
Enter interface name used to connect to the
management network from the above interface summary: fastethernet0/0
```

Step 10   Respond to the following prompts as appropriate for your network:

```
Configuring interface FastEthernet0/0:
Use the 100 Base-TX (RJ-45) connector? [yes]: yes
Operate in full-duplex mode? [no]: no
Configure IP on this interface? [yes]: yes
    IP address for this interface: 172.1.2.3
    Subnet mask for this interface [255.255.0.0] : 255.255.0.0
    Class B network is 172.1.0.0, 16 subnet bits; mask is /16
```

The configuration is displayed:

```
The following configuration command script was created:

hostname myrouter
enable secret 5 $1$D5P6$PYx41/lQIASK.HcSbfO5q1
enable password xxxxxx
line vty 0 4
password xxxxxx
snmp-server community public
!
no ip routing

!
interface FastEthernet0/0
no shutdown
media-type 100BaseX
half-duplex
ip address 172.1.2.3 255.255.0.0
!
interface FastEthernet0/1
shutdown
no ip address
!
end
```

Step 11   Respond to the following prompts. Select [2] to save the initial configuration:

```
[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.

Enter your selection [2]: 2
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.

Press RETURN to get started! RETURN
```

The user prompt is displayed:

```
myrouter>
```

After you complete the initial configuration tasks, you can start configuring your Cisco router for specific functions.

Examples of Using the Setup Command Facility to Configure Interface Parameters

The setup command facility prompts vary and depend on which fixed or modular interfaces are in your router. This section provides examples that use the setup command facility to perform the following operations:

Note The messages that will be displayed will vary, depending on your router model, the installed interface modules, and the software image. The following example and the user entries (in **bold**) are shown as examples only.

Fast Ethernet Interface Configuration

The following is a brief example of configuring a Fast Ethernet interface by using the setup command facility:

```
Do you want to configure FastEthernet0/0 interface [yes]:
 Use the 100 Base-TX (RJ-45) connector? [yes]:
 Operate in full-duplex mode? [no]:
 Configure IP on this interface? [no]: yes
 IP address for this interface: 6.0.0.1
 Number of bits in subnet field [0]:
 Class A network is 6.0.0.0, 0 subnet bits, mask is /8
Configure IPX on this interface? [yes]:
    IPX network number [1]:
    Need to select encapsulation type
            [0] sap (IEEE 802.2)
            [1] snap (IEEE 802.2 SNAP)
            [2] arpa (Ethernet_II)
            [3] novell-ether (Novell Ethernet_802.3)
    Enter the encapsulation type [2]:
```

Note Cisco 1841 and Cisco 2801 routers have a hardware limitation on the Fast Ethernet ports FE0/0 and FE0/1. In half-duplex mode, when traffic reaches or exceeds 100% capacity (equal to or greater than 5 Mbps in each direction), the interface will experience excessive collisions and reset once per second. To avoid this problem, traffic must be limited to less than 100% of capacity.

Gigabit Ethernet Interface Configuration

The following is a brief example of configuring a Gigabit Ethernet interface by using the setup command facility:

Note The Gigabit Ethernet interface is not supported on Cisco 1841, Cisco 2801, or Cisco 2811 routers.

```
Configuring interface GigabitEthernet0/0:
  Configure IP on this interface? [yes]:
    IP address for this interface [192.168.200.215]: 1.0.0.1
    Subnet mask for this interface [255.255.255.0] : 255.0.0.0
    Class A network is 1.0.0.0, 8 subnet bits; mask is /8
```

Note On Cisco 3800 series routers, the port gig 0/0 supports both the small form-factor pluggable Gigabit Ethernet Interface Converter (SFP GBIC) and RJ-45 media types. The port gig 0/1 supports only RJ-45. To select between SFP or RJ-45 for port gig 0/0, use the **media-type** command. More details follow in the "Selecting the Port for the Gigabit Ethernet Interface" section on page 6.

The following are two examples of configurations for the Gigabit Ethernet (GE) interface. The first example shows a sample configuration for RJ-45 mode, applicable to either port gig 0/0 or port gig 0/1:

```
interface GigabitEthernet0/0
 ip address 1.3.153.13 255.0.0.0
 duplex auto
 speed auto
 media-type RJ-45
```

SFP mode (on Cisco 3800 seriers routers only) is available only on port gig 0/0:

```
interface GigabitEthernet0/0
 ip address 1.3.153.13 255.0.0.0
 duplex auto
 speed auto
 media-type sfp
```

Selecting the Port for the Gigabit Ethernet Interface

The SFP port is supported for the GE port 0 only. GE port 1 supports only RJ-45 (or copper mode) operation.

To select SFP type for GE port 0, use the following commands from the command-line interface (CLI):

```
router(config)# int gigabitEthernet 0/0

router(config-if)# media-type sfp

GigabitEthernet0/0: Changing media to SFP.
```

Note The SFP port can only be set to 1000-Mbps or automatic speed. Duplex can be set to full-duplex or automatic mode. Half-duplex communication is not supported.

The following is a typical **show running config** command output for gig 0/0:

```
router# show run int gigabitEthernet 0/0

Building configuration...

Current configuration : 156 bytes
!
interface GigabitEthernet0/0
 no ip address
 load-interval 30
 shutdown
 duplex auto
 speed auto
 media-type sfp
 no cdp enable
end
```

Flow Control Capabilities

Both the RJ-45 (copper) and SFP (fiber) modes of operations suppot flow control. This means that during congestion conditions, pause frames are sent to the far end by the Media Access Control (MAC) hardware. Also, the MAC hardware will react to the pause frames received. There is no way in current MAC hardware to track the number of pause frames received or sent.

Flow control is on by default

Currently, there is no command to turn off the flow control capability for any of the Gigabit Ethernet ports in any of the RJ45 or SFP modes.

Speed/Duplex Settings for the Gigabit Ethernet Ports

Typically, speed and/or duplex communications are configured manually using the **speed** and/or **duplex** CLI commands.

Note For the SFP port, the speed settings can be set to 1000 Mbps or auto only, and duplex can be set to full or auto only.

The following examples show the available options:

```
interface gigabitEthernet 0/[0-1]
router(config-if)# speed ?

  10    Force 10 Mbps operation
  100   Force 100 Mbps operation
  1000  Force 1000 Mbps operation
  auto  Enable AUTO speed configuration

router(config-if)# duplex ?

  auto  Enable AUTO duplex configuration
  full  Force full duplex operation
  half  Force half-duplex operation
```

If the speed is set to 1000 Mbps, the CLI duplex options change as follows:

```
router(config-if)# speed 1000
router(config-if)# duplex ?

  auto  Enable AUTO duplex configuration
  full  Force full duplex operation
```

Similarly, when duplex is set to half, the supported speeds are 10 Mbps, 100 Mbps, or "auto" as shown here:

```
router(config-if)# speed ?

  10    Force 10 Mbps operation
  100   Force 100 Mbps operation
  auto  Enable AUTO speed configuration
```

If the media type is SFP, the available speed and duplex settings are as follows:

```
router(config-if)# media-type sfp

GigabitEthernet0/0: Changing media to SFP.
You may need to update the speed and duplex settings for this interface.
router(config-if)# speed  ?

  1000  Force 1000 Mbps operation
  auto  Enable AUTO speed configuration

router(config-if)# duplex ?

  auto  Enable AUTO duplex configuration
  full  Force full duplex operation
```

> **Note** If the speed and duplex setting for g0/0 in SFP mode is *speed=1000* and *duplex=full*, autonegotiation is in forced mode and autonegotation is turned off. For all other mode settings of speed or duplex for SFP, autonegotiation is turned on.
>
> If *speed=1000* and *duplex=full* modes are specified for both g0/0 and g0/1 interfaces in copper mode (RJ-45), autonegotiation is still turned on. This is considered to be in forced mode for *speed=1000*. This occurence is per the Annex 28D.5 extensions required for clause 40 (1000-BASE-T) IEEE 802.3.
>
> When the speed and duplex modes are forced for 10/100, and full or half modes are forced for g0/0 and g0/1 interfaces, autonegotiation is turned off. If the interfaces are not in forced mode for 10/100 speeds, then autonegotation will be turned on.

1- or 2-Port Serial Interface Configuration

The following is a sample configuration for a 1- or 2-port serial interface:

```
Do you want to configure Serial0/0/0 interface? [yes]:

    Some encapsulations supported are
            ppp/hdlc/frame-relay/lapb/atm-dxi/smds/x25
    Choose encapsulation type   [ppp]:
```

> ✎
>
> **Note** The following sections describe the prompts for each encapsulation type. For PPP and High-Level Data Link Control (HDLC) encapsulation, no further configuration is needed.

```
No serial cable seen.
Choose mode from (dce/dte) [dte]:
```

If no cable is plugged in to your router, you must indicate whether the interface is to be used as DTE or DCE. If a cable is present, the setup command facility determines the DTE/DCE status. If the serial cable is DCE, you see the following prompt:

```
Serial interface needs clock rate to be set in dce mode.
 The following clock rates are supported on the serial interface.
    0
    1200, 2400, 4800, 9600, 19200, 38400
    56000, 64000, 72000, 125000, 148000, 500000
    800000, 1000000, 1300000, 2000000, 4000000, 8000000

 Choose clock rate from above: [2000000]:
 Configure IP on this interface? [yes]:
    IP address for this interface: 192.0.0.1
    Subnet mask for this interface [255.0.0.0]:
    Class A network is 2.0.0.0, 8 subnet bits; mask is /8
Configure IPX on this interface? [no]: yes
    IPX network number [8]:
```

Frame Relay Encapsulation

The following is a sample configuration for Frame Relay encapsulation:

```
The following lmi-types are available to be set,
   when connected to a frame relay switch
                [0] none
                [1] ansi
                [2] cisco
                [3] q933a
 Enter lmi-type [2]:
```

> ✎
>
> **Note** The setup command facility prompts you for the data-link connection identifier (DLCI) number only if you specify **none** for the Local Management Interface (LMI) type. If you accept the default or specify another LMI type, the DLCI number is provided by the specified protocol.

```
Enter the DLCI number for this interface [16]:

Do you want to map a remote machine's IP address to dlci? [yes]:
    IP address for the remote interface: 192.0.0.2
Do you want to map a remote machine's IPX address to dlci? [yes]:
    IPX address for the remote interface: 40.1234.5678

Serial interface needs clock rate to be set in dce mode.
The following clock rates are supported on the serial interface.
    0
    1200, 2400, 4800, 9600, 19200, 38400
    56000, 64000, 72000, 125000, 148000, 500000
    800000, 1000000, 1300000, 2000000, 4000000, 8000000

choose speed from above: [2000000]: 1200
Configure IP on this interface? [yes]:
  IP address for this interface: 192.0.0.1
  Subnet mask for this interface [255.0.0.0]:
```

```
      Class A network is 2.0.0.0, 8 subnet bits; mask is /8
```

If Internetwork Packet Exchange (IPX) is configured on the router, the setup command facility prompts you for the IPX map:

```
Do you want to map a remote machine's IPX address to dlci? [yes]:
  IPX address for the remote interface: 40.0060.34c6.90ed
```

Link Access Procedure, Balanced Encapsulation

The following is a sample of configuration for Link Access Procedure, Balanced (LAPB) encapsulation, selecting either DCE or DTE mode, with DTE as the default:

```
  lapb circuit can be either in dce/dte mode.
  Choose either from (dce/dte) [dte]:
```

X.25 Encapsulation

The following is an example of X.25 encapsulation:

```
x25 circuit can be either in dce/dte mode.
  Choose from either dce/dte [dte]:
  Enter local x25 address: 1234

We will need to map the remote x.25 station's x25 address
  to the remote station's IP/IPX address
Enter remote x25 address: 4321

Do you want to map the remote machine's x25 address to IP address? [yes]:
   IP address for the remote interface: 192.0.0.2
Do you want to map the remote machine's x25 address to IPX address? [yes]:
   IPX address for the remote interface: 40.1234.5678

 Enter lowest 2-way channel [1]:
 Enter highest 2-way channel [64]:
 Enter frame window (K) [7]:
 Enter Packet window (W) [2]:
 Enter Packet size (must be powers of 2) [128]:
```

ATM Data Exchange Interface Encapsulation

The following is an example of asynchronous transfer mode data exchange interface (ATM-DXI) encapsulation:

```
Enter VPI number [1]:
Enter VCI number [1]:

Do you want to map the remote machine's IP address to vpi and vci? [yes]:
    IP address for the remote interface: 192.0.0.2
Do you want to map the remote machine's IPX address to vpi and vci? [yes]:
    IPX address for the remote interface: 40.1234.5678
```

Switched Multimegabit Data Service Encapsulation

The following is a sample configuration for switched multimegabit data service (SMDS) encapsulation:

```
Enter smds address for the local interface: c141.5556.1415

We will need to map the remote smds station's address
  to the remote station's IP/IPX address
Enter smds address for the remote interface: c141.5556.1414
```

```
Do you want to map the remote machine's smds address to IP address? [yes]:
      IP address for the remote interface: 192.0.0.2
Do you want to map the remote machine's smds address to IPX address? [yes]:
      IPX address for the remote interface: 40.1234.5678
```

Asynchronous/Synchronous Serial Interface—Asynchronous Configuration

The following is a sample configuration for asynchronous configuration for an
asynchronous/synchronous serial interface:

```
Do you want to configure Serial1/1 interface? [yes]:
Enter mode (async/sync) [sync]: async
Configure IP on this interface? [yes]:
Configure IP unnumbered on this interface? [no]:
      IP address for this interface: 192.0.0.0
      Subnet mask for this interface [255.0.0.0]:
      Class A network is 2.0.0.0, 0 subnet bits; mask is /8
Configure LAT on this interface? [no]:
Configure AppleTalk on this interface? [no]:
Configure DECnet on this interface? [no]:
Configure CLNS on this interface? [no]:
Configure IPX on this interface? [no]: yes
  IPX network number [8]:
Configure Vines on this interface? [no]:
Configure XNS on this interface? [no]:
Configure Apollo on this interface? [no]:
```

Asynchronous/Synchronous Serial Interface—Synchronous Configuration

The following is a sample configuration for synchronous configuration for an
asynchronous/synchronous serial interface:

```
Do you want to configure Serial1/0 interface? [yes]:
Enter mode (async/sync) [sync]:

Some supported encapsulations are
    ppp/hdlc/frame-relay/lapb/x25/atm-dxi/smds
  Choose encapsulation type [hdlc]:
```

✎

Note   The following sections describe the prompts for each encapsulation type. For PPP and High-Level Data
Link Control (HDLC) encapsulation, no further configuration is needed.

```
No serial cable seen.
Choose mode from (dce/dte) [dte]:
```

If no cable is plugged in to your router, you must indicate whether the interface is to be used as DTE or
DCE. If a cable is present, the setup command facility determines the DTE/DCE status. If the serial cable
is DCE, you see the following prompt:

```
Configure IP on this interface? [no]: yes
Configure IP unnumbered on this interface? [no]:
      IP address for this interface: 192.0.0.0
      Subnet mask for this interface [255.0.0.0]:
      Class A network is 2.0.0.0, 0 subnet bits; mask is /8
Configure LAT on this interface? [no]:
```

Frame Relay Encapsulation

The following is a sample configuration for Frame Relay encapsulation:

```
The following lmi-types are available to be set,when connected to a frame relay switch:
            [0] none
            [1] ansi
            [2] cisco
            [3] q933a
   Enter lmi-type [2]:
```

> **Note** The setup command facility prompts you for the data-link connection identifier (DLCI) number only if you specify **none** for the Link Management Interface (LMI) type. If you accept the default or specify another LMI type, the DLCI number is provided by the specified protocol.

```
Enter the DLCI number for this interface [16]:

Do you want to map a remote machine's IP address to dlci? [yes]:
   IP address for the remote interface: 2.0.0.2
Do you want to map a remote machine's IPX address to dlci? [yes]:
   IPX address for the remote interface: 40.1234.5678

Serial interface needs clock rate to be set in dce mode.
The following clock rates are supported on the serial interface.
    0
    1200, 2400, 4800, 9600, 19200, 38400
    56000, 64000, 72000, 125000, 148000, 500000
    800000, 1000000, 1300000, 2000000, 4000000, 8000000

choose speed from above: [2000000]: 1200
Configure IP on this interface? [yes]:
  IP address for this interface: 192.0.0.1
  Subnet mask for this interface [255.0.0.0]:
  Class A network is 2.0.0.0, 8 subnet bits; mask is /8
```

If Internetwork Packet Exchange (IPX) is configured on the router, the setup command facility prompts you for the IPX map:

```
Do you want to map a remote machine's IPX address to dlci? [yes]:
  IPX address for the remote interface: 40.0060.34c6.90ed
```

LAPB Encapsulation

The following is an example of configuration for LAPB encapsulation, selecting either DCE or DTE mode, with DTE as the default:

```
 lapb circuit can be either in dce/dte mode.
 Choose either from (dce/dte) [dte]:
```

X.25 Encapsulation

The following is a sample configuration for X.25 encapsulation:

```
x25 circuit can be either in dce/dte mode.
  Choose from either dce/dte [dte]:
  Enter local x25 address: 1234

  We will need to map the remote x.25 station's x25 address
  to the remote station's IP/IPX address
  Enter remote x25 address: 4321
```

```
Do you want to map the remote machine's x25 address to IP address? [yes]:
    IP address for the remote interface: 2.0.0.2
Do you want to map the remote machine's x25 address to IPX address? [yes]:
    IPX address for the remote interface: 40.1234.5678

 Enter lowest 2-way channel [1]:
 Enter highest 2-way channel [64]:
 Enter frame window (K) [7]:
 Enter Packet window (W) [2]:
 Enter Packet size (must be powers of 2) [128]:
```

ATM-DXI Encapsulation

The following is a sample configuration for asynchronous transfer mode, data exchange interface (ATM-DXI) encapsulation:

```
Enter VPI number [1]:
Enter VCI number [1]:

Do you want to map the remote machine's IP address to vpi and vci? [yes]:
    IP address for the remote interface: 2.0.0.2
Do you want to map the remote machine's IPX address to vpi and vci? [yes]:
    IPX address for the remote interface: 40.1234.5678
```

SMDS Encapsulation

The following is a sample configuration for switched multimegabit data service (SMDS) encapsulation:

```
Enter smds address for the local interface: c141.5556.1415

We will need to map the remote smds station's address
 to the remote station's IP/IPX address
Enter smds address for the remote interface: c141.5556.1414

Do you want to map the remote machine's smds address to IP address? [yes]:
     IP address for the remote interface: 2.0.0.2
Do you want to map the remote machine's smds address to IPX address? [yes]:
     IPX address for the remote interface: 40.1234.5678
```

ISDN Basic Rate Interface Configuration

Valid Integrated Services Digital Network (ISDN) switch types are shown in Table 1.

Table 1   ISDN Switch Types

Country	ISDN Switch Type	Description
Australia	basic-ts013	Australian TS013 switches
Europe	basic-1tr6	German 1TR6 ISDN switches
	basic-nwnet3	Norwegian NET3 ISDN switches (phase 1)
	basic-net3	NET3 ISDN switches (UK and others)
	basic-net5	NET5 switches (UK and others)
	vn2	French VN2 ISDN switches
	vn3	French VN3 ISDN switches
Japan	ntt	Japanese NTT ISDN switches

Table 1   ISDN Switch Types (continued)

Country	ISDN Switch Type	Description
New Zealand	basic-nznet3	New Zealand NET3 switches
North America	basic-5ess	AT&T basic rate switches
	basic-dms100	NT DMS-100 basic rate switches
	basic-ni1	National ISDN-1 switches

The following is a sample configuration for ISDN basic rate communication:

```
BRI interface needs isdn switch-type to be configured
   Valid switch types are:
           [0]   none..........Only if you don't want to configure BRI.
           [1]   basic-1tr6....1TR6 switch type for Germany
           [2]   basic-5ess....AT&T 5ESS switch type for the US/Canada
           [3]   basic-dms100..Northern DMS-100 switch type for US/Canada
           [4]   basic-net3....NET3 switch type for UK and Europe
           [5]   basic-ni......National ISDN switch type
           [6]   basic-ts013...TS013 switch type for Australia
           [7]   ntt...........NTT switch type for Japan
           [8]   vn3...........VN3 and VN4 switch types for France

   Choose ISDN BRI Switch Type [2]:

Do you want to configure BRI0/0/0 interface? [yes]:

   Some encapsulations supported are
             ppp/hdlc/frame-relay/lapb/x25
   Choose encapsulation type   [ppp]:
```

Note The following sections describe the prompts for each encapsulation type. No further configuration is needed for HDLC encapsulation.

```
   Do you have service profile identifiers (SPIDs) assigned? [no]: y
   Enter SPID1: 12345
   Enter SPID2: 12345
```

Note The setup command facility prompts you for the service profile identifier (SPID) number only if you specify basic-5ess, basic-ni1, or basic-dms100 for the switch type.

```
Do you want to map the remote machine's IP address in dialer map? [yes]:
   IP address for the remote interface: 192.0.0.1
Do you want to map the remote machine's IP address in dialer map? [yes]:
   IPX address of the remote interface: 40.0060.34c6.90ed

To get to 192.0.0.1 we will need to make a phone call.
Please enter the phone number to call: 1234567890
Configure IP on this interface? [yes]:
```

Note If your router has at least one configured LAN interface, you can choose to use an unnumbered IP address on the interface.

```
Configure IP unnumbered on this interface? [no]: y
   Assign to which interface [Ethernet0/0]:
```

> **Note** If your router does not have a configured LAN interface, you must use a numbered IP address.

```
IP address for this interface: 192.0.0.1
  Enter the subnet mask [255.0.0.0]:
```

Point-to-Point Protocol Encapsulation

The following is a sample configuration for point-to-point protocol (PPP) encapsulation:

```
Would you like to enable multilink PPP [yes]:

Enter a username for CHAP authentication [Router]:remote_router
Enter a password for CHAP authentication: secret
```

> **Note** The password, which is used by the Challenge Handshake Authentication Protocol (CHAP) authentication process, is case sensitive and must exactly match the password for the remote router.

Frame Relay Encapsulation

The following is a sample configuration for Frame Relay encapsulation:

```
The following lmi-types are available to be set,
  when connected to a frame relay switch
                [0] none
                [1] ansi
                [2] cisco
                [3] q933a
  Enter lmi-type [2]:
```

> **Note** The setup command facility prompts you for the DLCI number only if you specify **none** for the LMI type. If you accept the default or specify another LMI type, the DLCI number is provided by the specified protocol.

```
Enter the DLCI number for this interface [16]:

Do you want to map a remote machine's IP address to dlci? [yes]:
   IP address for the remote interface: 2.0.0.2
Do you want to map a remote machine's IPX address to dlci? [yes]:
   IPX address for the remote interface: 40.1234.5678

Serial interface needs clock rate to be set in dce mode.
The following clock rates are supported on the serial interface.
    0
    1200, 2400, 4800, 9600, 19200, 38400
    56000, 64000, 72000, 125000, 148000, 500000
    800000, 1000000, 1300000, 2000000, 4000000, 8000000

choose speed from above: [2000000]: 1200
Configure IP on this interface? [yes]:
  IP address for this interface: 192.0.0.1
  Subnet mask for this interface [255.0.0.0]:
  Class A network is 2.0.0.0, 8 subnet bits; mask is /8
```

> **Note** If IPX is configured on the router, the setup command facility prompts you for the IPX map:

```
Do you want to map a remote machine's IPX address to dlci? [yes]:
```

```
        IPX address for the remote interface: 40.0060.34c6.90ed
```

Link Access Procedure, Balanced Encapsulation

The following is a sample configuration for Link Access Procedure, Balanced (LAPB) encapsulation, with DTE mode as the default:

```
lapb circuit can be either in dce/dte mode
Choose either from (dce/dte) [dte]:
```

ATM-DXI Encapsulation

The following is a sample configuration for asynchronous transfer mode data exchange interface (ATM-DXI) encapsulation:

```
Enter VPI number [1]:
Enter VCI number [1]:
 Do you want to map the remote machine's IP address to vpi and vci? [yes]:
    IP address for the remote interface: 6.0.0.1
 Do you want to map the remote machine's IPX address to vpi and vci? [yes]:
     IPX address for the remote interface: 40.0060.34c6.90ed
```

SMDS Encapsulation

The following is a sample configuration for switched multimegabit data service (SMDS) encapsulation:

```
Enter smds address for the local interface: c141.5556.1415

  We will need to map the remote smds station's address to the remote station's IP address
   Enter smds address for the remote interface: c141.5556.1414

 Do you want to map the remote machine's smds address to IP address? [yes]:
    IP address for the remote interface: 192.0.0.1
 Do you want to map the remote machine's smds address to IP address? [yes]:
    IPX address for the remote interface: 40.0060.34c6.90ed
```

X.25 Encapsulation

The following is a sample configuration for X.25 encapsulation:

```
x25 circuit can be either in dce/dte mode.
Choose from either dce/dte [dte]:
Enter local x25 address: 1234

We will need to map the remote x.25 station's x25 address
 to the remote station's IP/IPX address
Do you want to map the remote machine's x25 address to IP address? [yes]:
    IP address for the remote interface: 6.0.0.1
Do you want to map the remote machine's x25 address to IPX address? [yes]:
       IPX address for the remote interface: 40.0060.34c6.90ed
Enter remote x25 address: 4321
Enter lowest 2-way channel [1]:
Enter highest 2-way channel [64]:
Enter frame window (K) [7]:
Enter Packet window (W) [2]:
Enter Packet size (must be powers of 2) [128]:
```

ISDN BRI Line Configuration

Before using a router with an ISDN basic rate interface (BRI) interface, you must order a correctly configured ISDN BRI line from your local telecommunications service provider.

The ordering process varies from provider to provider and from country to country. However, some general guidelines apply:

- Ask for two channels to be called by one number.

- Ask for delivery of calling line identification, also known as *Caller ID* or *automated number identification* (ANI).

- If the router will be the only device attached to the ISDN BRI line, ask for point-to-point service and a data-only line.

- If you plan to connect another ISDN device (such as an ISDN telephone) to the ISDN BRI line through the router, ask for point-to-multipoint service (subaddressing is required) and a voice-and-data line.

ISDN BRI Provisioning by Switch Type

ISDN BRI provisioning refers to the types of services provided by the ISDN BRI line. Although provisioning is performed by your ISDN BRI service provider, you must tell the provider what you want.

Table 2 lists the provisioning you that should order for the router, based on switch type.

Table 2   ISDN Provisioning by Switch Type

Switch Type	Provisioning
5ESS Custom BRI	**For data only** 2 B channels for data. Point to point. Terminal type = E. 1 directory number (DN) assigned by service provider. MiniTerm (MTERM) = 1. Request delivery of calling line ID on Centrex lines. Set speed for ISDN calls to 56 kbps outside local exchange.
5ESS Custom BRI	**For voice and data** (Use these values only if you have an ISDN telephone connected.) 2 B channels for voice or data. Multipoint. Terminal type = D. 2 directory numbers assigned by service provider. 2 service profile identifiers (SPIDs) required, assigned by service provider. MTERM = 2. Number of call appearances = 1. Display = No. Ringing/idle call appearances = idle. Autohold= no. Onetouch = no. Request delivery of calling line ID on Centrex lines. Set speed for ISDN calls to 56 kbps outside local exchange. Directory number 1 can hunt to directory number 2.

Table 2   ISDN Provisioning by Switch Type (continued)

Switch Type	Provisioning
5ESS National ISDN (NI-1) BRI	**For voice and data** Terminal type = A. 2 B channels for voice and data. 2 directory numbers assigned by service provider. 2 SPIDs required; assigned by service provider. Set speed for ISDN calls to 56 kbps outside local exchange. Directory number 1 can hunt to directory number 2.
DMS-100 BRI	**For voice and data** 2 B channels for voice and data. 2 directory numbers assigned by service provider. 2 SPIDs required; assigned by service provider. Functional signaling. Dynamic terminal endpoint identifier (TEID) assignment. Maximum number of keys = 64. Release key = no, or key number = no. Ringing indicator = no. Electronic Key Telephone Set (EKTS) = no. Permanent Virtual Circuit (PVC) = 2. Request delivery of calling line ID on Centrex lines. Set speed for ISDN calls to 56 kbps outside local exchange. Directory number 1 can hunt to directory number 2.

Defining ISDN Service Profile Identifiers

Some service providers assign service profile identifiers (SPIDs) to define the services subscribed to by an ISDN device. If your service provider requires SPIDs, your ISDN device cannot place or receive calls until it sends a valid SPID to the service provider when initializing the connection. A SPID is usually a seven-digit telephone number plus some optional numbers, but service providers may use different numbering schemes. SPIDs have significance at the local access ISDN interface only; the SPID is never sent to remote routers.

At present, only DMS-100 and NI-1 switch types require SPIDs. Two SPIDs are assigned for the DMS-100 switch type, one for each B channel. The AT&T 5ESS switch type may support SPIDs, but we recommend that you set up that ISDN service without SPIDs.

If your service provider assigns you SPIDs, you must define these SPIDs on the router. To define SPIDs and the local directory number (LDN) on the router for both ISDN BRI B channels, use the following **isdn spid** command in privileged EXEC mode:

```
Router(config-if)# isdn spid1 spid-number [ldn]
```

```
Router(config-if)# isdn spid2 spid-number [ldn]
```

Note   Although the LDN is an optional parameter in the command, you may need to enter it so that the router can answer calls made to the second directory number.

Channelized E1/T1 ISDN PRI Interface Configuration

Note Channelized E1/T1 ISDN PRI interfaces are not supported on Cisco 1841 routers.

The following is a sample configuration for a channelized E1/T1 ISDN PRI interface:

```
The following ISDN switch types are available:
     [0] none............If you do not want to configure ISDN
     [1] primary-4ess....AT&T 4ESS switch type for US and Canada
     [2] primary-5ess....AT&T 5ESS switch type for US and Canada
     [3] primary-dms100..Northern Telecom switch type for US and Canada
     [4] primary-net5....European switch type for NET5
     [5] primary-ni......National ISDN Switch type for the U.S
     [6] primary-ntt.....Japan switch type
     [7] primary-ts014...Australian switch type
  Choose ISDN PRI Switch Type [2]:

Configuring controller T1 1/0 in pri or channelized mode
  Do you want to configure this interface controller? [no]:
  Will you be using PRI on this controller? [yes]:
```

E1/T1 PRI Mode

The following is a sample configuration for E1/T1 PRI mode:

```
The following framing types are available:
               esf | sf
Enter the framing type [esf]:

The following linecode types are available:
               ami | b8zs
Enter the line code type [b8zs]:
Enter number of time slots [24]:

Do you want to configure Serial1/0:23 interface? [yes]:

Configuring the PRI D-channel
  Would you like to enable multilink PPP? [yes]:
  Configure IP on this interface? [no]: y
  Configure IP unnumbered on this interface? [no]: y
    Assign to which interface [Ethernet0/0]:

All users dialing in through the PRI will need to be
  authenticated using CHAP. The username and password are
  case sensitive.
Enter more username and passwords for PPP authentication? [no]: y
Enter the username used for dial-in CHAP authentication [Router]:
Enter the PPP password of the user dialing in on PRI:
Enter more username and passwords for PPP authentication? [no]:
```

E1 Channelized Mode

The following is a sample configuration for E1 channelized mode:

```
The following framing types are available:
               no-crc4 | crc4
  Enter the framing type [crc4]:
```

```
      The following linecode types are available:
                    ami | hdb3
   Enter the line code type [hdb3]:

Do you want to configure Serial1/1:0 interface?: [Yes]:

Configuring the Channelized E1/T1 serial channels

Some encapsulations supported are
              ppp/hdlc/frame-relay/lapb/atm-dxi/smds/x25
Choose encapsulation type    [ppp]:
Configure IP on this interface? [no]: y
Configure IP unnumbered on this interface? [no]:
   IP address for this interface: 3.0.0.1
   Subnet mask for this interface [255.0.0.0]:
   Class A network is 3.0.0.0, 8 subnet bits; mask is /8
```

> **Note** The following sections describe the prompts you for each encapsulation type. No further configuration is needed for HDLC encapsulation.

PPP Encapsulation

The following is a sample configuration for PPP encapsulation:

```
Would you like to enable multilink PPP [yes]:

Enter a username for CHAP authentication [Router]:remote_router
Enter a password for CHAP authentication: secret
```

> **Note** The password, which is used by the Challenge Handshake Authentication Protocol (CHAP) authentication process, is case sensitive and must exactly match the password for the remote router.

Frame Relay Encapsulation

The following is a sample configuration for Frame Relay encapsulation:

```
The following lmi-types are available to be set,
   when connected to a frame relay switch
                [0] none
                [1] ansi
                [2] cisco
                [3] q933a
   Enter lmi-type [2]:
```

> **Note** The setup command facility prompts you for the data-link connection identifier (DLCI) number only if you specify **none** for the LMI type. If you accept the default or specify another Local Management Interface (LMI) type, the DLCI number is provided by the specified protocol.

```
Enter the DLCI number for this interface [16]:

Do you want to map a remote machine's IP address to dlci? [yes]:
   IP address for the remote interface: 2.0.0.2
Do you want to map a remote machine's IPX address to dlci? [yes]:
   IPX address for the remote interface: 40.1234.5678

Serial interface needs clock rate to be set in dce mode.
The following clock rates are supported on the serial interface.
     0
```

```
      1200, 2400, 4800, 9600, 19200, 38400
      56000, 64000, 72000, 125000, 148000, 500000
      800000, 1000000, 1300000, 2000000, 4000000, 8000000

choose speed from above: [2000000]: 1200
Configure IP on this interface? [yes]:
  IP address for this interface: 192.0.0.1
  Subnet mask for this interface [255.0.0.0]:
  Class A network is 2.0.0.0, 8 subnet bits; mask is /8
```

If Internetwork Packet Exchange (IPX) is configured on the router, the setup command facility prompts you for the IPX map:

```
Do you want to map a remote machine's IPX address to dlci? [yes]:
  IPX address for the remote interface: 40.0060.34c6.90ed
```

LAPB Encapsulation

The following is a sample configuration for Link Access Procedure, Balanced (LAPB) encapsulation:

```
lapb circuit can be either in dce/dte mode
Choose either from (dce/dte) [dte]:
```

ATM-DXI Encapsulation

The following is a sample configuration for asynchronous transfer mode data exchange interface (ATM-DXI) encapsulation:

```
Enter VPI number [1]:
Enter VCI number [1]:
 Do you want to map the remote machine's IP address to vpi and vci? [yes]:
    IP address for the remote interface: 6.0.0.1
 Do you want to map the remote machine's IPX address to vpi and vci? [yes]:
     IPX address for the remote interface: 40.0060.34c6.90ed
```

SMDS Encapsulation

The following is a sample configuration for switched multimegabit data service (SMDS) encapsulation:

```
Enter smds address for the local interface: c141.5556.1415

  We will need to map the remote smds station's address to the remote station's IP address
   Enter smds address for the remote interface: c141.5556.1414

  Do you want to map the remote machine's smds address to IP address? [yes]:
    IP address for the remote interface: 192.0.0.1
 Do you want to map the remote machine's smds address to IP address? [yes]:
    IPX address for the remote interface: 40.0060.34c6.90ed
```

X.25 Encapsulation

The following is an example configuration for X.25 encapsulation:

```
x25 circuit can be either in dce/dte mode.
Choose from either dce/dte [dte]:
Enter local x25 address: 1234

We will need to map the remote x.25 station's x25 address
 to the remote station's IP/IPX address
Do you want to map the remote machine's x25 address to IP address? [yes]:
    IP address for the remote interface: 6.0.0.1
Do you want to map the remote machine's x25 address to IPX address? [yes]:
     IPX address for the remote interface: 40.0060.34c6.90ed
```

```
Enter remote x25 address: 4321
Enter lowest 2-way channel [1]:
Enter highest 2-way channel [64]:
Enter frame window (K) [7]:
Enter Packet window (W) [2]:
Enter Packet size (must be powers of 2) [128]:
```

T1 Channelized Mode

The following is a sample configuration for T1 channelized mode:

```
The following framing types are available:
                esf | sf
  Enter the framing type [esf]:

  The following linecode types are available:
                ami | b8zs
  Enter the line code type [b8zs]:

T1 is capable of being configured for channel 1-24
  Enter number of time slots [24]: 3
  Configure more channel groups? [no]: y
  Enter number of time slots [21]: 3
  Configure more channel groups? [no]: y
  Enter number of time slots [18]: 3
  Configure more channel groups? [no]: y
  Enter number of time slots [15]:
  Configure more channel groups? [no]:
```

> **Note** The following sections describe the prompts for each encapsulation type. No further configuration is needed for High-Level Data Link Control (HDLC) encapsulation.

PPP Encapsulation

The following is a sample configuration for PPP encapsulation:

```
Would you like to enable multilink PPP [yes]:

Enter a remote hostname for PPP authentication [Router]:
Enter a password for PPP authentication:
```

> **Note** The password, which is used by the Challenge Handshake Authentication Protocol (CHAP) authentication process, is case sensitive and must exactly match the password for the remote router.

Frame Relay Encapsulation

The following is a sample configuration for Frame Relay encapsulation:

```
The following lmi-types are available to be set,
  when connected to a frame relay switch
                [0] none
                [1] ansi
                [2] cisco
                [3] q933a
  Enter lmi-type [2]:
```

The setup command facility prompts you for the data-link connection identifier (DLCI) number only if you specify **none** for the LMI type. If you accept the default or specify another Local Management Interface (LMI) type, the DLCI number is provided by the specified protocol.

```
Enter the DLCI number for this interface [16]:

Do you want to map a remote machine's IP address to dlci? [yes]:
   IP address for the remote interface: 2.0.0.2
Do you want to map a remote machine's IPX address to dlci? [yes]:
   IPX address for the remote interface: 40.1234.5678

Serial interface needs clock rate to be set in dce mode.
The following clock rates are supported on the serial interface.
    0
    1200, 2400, 4800, 9600, 19200, 38400
    56000, 64000, 72000, 125000, 148000, 500000
    800000, 1000000, 1300000, 2000000, 4000000, 8000000

choose speed from above: [2000000]: 1200
Configure IP on this interface? [yes]:
  IP address for this interface: 192.0.0.1
  Subnet mask for this interface [255.0.0.0]:
  Class A network is 2.0.0.0, 8 subnet bits; mask is /8
```

If Internetwork Packet Exchange (IPX) is configured on the router, the setup command facility prompts you for the IPX map:

```
Do you want to map a remote machine's IPX address to dlci? [yes]:
  IPX address for the remote interface: 40.0060.34c6.90ed
```

LAPB Encapsulation

The following is a sample configuration for Link Access Procedure, Balanced (LAPB) encapsulation:

```
lapb circuit can be either in dce/dte mode
Choose either from (dce/dte) [dte]:
```

ATM-DXI Encapsulation

The following is a sample configuration for asynchronous transfer mode data exchange interface (ATM-DXI) encapsulation:

```
Enter VPI number [1]:
Enter VCI number [1]:
 Do you want to map the remote machine's IP address to vpi and vci? [yes]:
    IP address for the remote interface: 6.0.0.1
 Do you want to map the remote machine's IPX address to vpi and vci? [yes]:
     IPX address for the remote interface: 40.0060.34c6.90ed
```

SMDS Encapsulation

The following is a sample configuration for switched multimegabit data service (SMDS) encapsulation:

```
Enter smds address for the local interface: c141.5556.1415

  We will need to map the remote smds station's address to the remote station's IP address
   Enter smds address for the remote interface: c141.5556.1414

  Do you want to map the remote machine's smds address to IP address? [yes]:
    IP address for the remote interface: 192.0.0.1
```

```
    Do you want to map the remote machine's smds address to IP address? [yes]:
        IPX address for the remote interface: 40.0060.34c6.90ed
```

1-Port, 4-Wire, 56-kbps DSU/CSU Configuration

The switched-56 WAN interface card is configured for dedicated or leased-line service by default, but it can also be configured for circuit-switched service, here known as 1-port, 4-wire 56-kbps DSU/CSU configuration. Depending on the type of data transmissions you typically use, you can configure the switched-56 WAN interface card for either circuit-switched service or dedicated-line service.

Generally, circuit-switched service is ideal for short-duration data transmissions or as an alternative route if a dedicated line fails. For example, circuit-switched service is ideal for sending electronic mail messages or doing such tasks as updating inventory and ordering records from one network database to another at the end of each day.

Dedicated service is ideal for heavy network traffic. Dedicated service is ideal if you need a constant network connection or you need connection for more than eight hours per day.

Switched Mode

The following is a sample configuration for a switched mode interface:

```
Do you want to configure Serial0/0/0 interface? [yes]:
   Some encapsulations supported are
            ppp/hdlc/frame-relay/lapb/atm-dxi/smds/x25
  Choose encapsulation type   [ppp]:

Switched 56k interface may either be in switched/Dedicated mode
  Choose from either (switched/dedicated)  [switched]:

The following switched carrier types are to be set when in switched mode
(at&t, sprint or other)
  Choose carrier (at&t/sprint/other)  [other]:

Do you want to map the remote machine's ip address in dialer map? [yes]:
      IP address for the remote interface : 1.0.0.2
Do you want to map the remote machine's ipx address in dialer map? [yes]:
     IPX  address for the remote interface : 40.0060.34c6.90ed
```

✎ **Note**   The setup command facility asks for only one telephone number for both IP and Internetwork Packet Exchange (IPX) (if enabled).

```
Please enter the phone number to call : 1234567890
  Configure IP on this interface? [yes]:
    IP address for this interface: 1.0.0.1
    Subnet mask for this interface [255.0.0.0] :
    Class A network is 1.0.0.0, 8 subnet bits; mask is /8
```

Dedicated Mode

The following is a sample configuration for a dedicated mode interface:

```
Do you want to configure Serial0/0/0 interface? [yes]:

  Some encapsulations supported are
            ppp/hdlc/frame-relay/lapb/atm-dxi/smds/x25
  Choose encapsulation type   [ppp]:
```

```
        Switched 56k interface may either be in switched/Dedicated mode
        Choose from either (switched/dedicated)  [switched]: dedi

        When in dds mode, the clock for sw56 module can either from line/internal.
        Choose clock from (line/internal)  [line]:
```

✎

Note   If the internal clock is selected, speed cannot be set to "auto." Autosensing is allowed only when the clock source is line.

```
When in dds mode, the clock for the sw56 module can either be line or internal.
  Choose clock from (line/internal)  [line]: internal
  Warning: internal can be chosen only when connected back-to-back.

  Serial interface needs clock rate to be set in dce mode.
  The following clock rates are supported on the serial interface.

      auto, 2.4, 4.8, 9.6, 19.2, 38.4
      56, 64

choose clock rate from above  [56]:
Configure IP on this interface? [yes]:
  IP address for this interface: 1.0.0.1
  Subnet mask for this interface [255.0.0.0] :
  Class A network is 1.0.0.0, 8 subnet bits; mask is /8
```

Completing the Configuration

When you have provided all the information requested by the setup command facility, the configuration appears. To complete your router configuration, follow these steps:

Step 1   A setup command facility prompt asks if you want to save this configuration.

If you answer no, the configuration information you entered is *not* saved, and you return to the router enable prompt (Router#). Enter **setup** to return to the System Configuration Dialog.

If you answer yes, the configuration is saved, and you are returned to the user EXEC prompt (Router>).

```
Use this configuration? {yes/no} : yes
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.


Press RETURN to get started!

%LINK-3-UPDOWN: Interface Ethernet0/0, changed state to up
%LINK-3-UPDOWN: Interface Ethernet0/1, changed state to up
%LINK-3-UPDOWN: Interface Serial0/0/0, changed state to up
%LINK-3-UPDOWN: Interface Serial0/0/1, changed state to down
%LINK-3-UPDOWN: Interface Serial0/2, changed state to down
%LINK-3-UPDOWN: Interface Serial1/0, changed state to up
%LINK-3-UPDOWN: Interface Serial1/1, changed state to down
%LINK-3-UPDOWN: Interface Serial1/2, changed state to down

<Additional messages omitted.>
```

Step 2   When the messages stop appearing on your screen, press **Return** to get the `Router>` prompt.

> ✎
> **Note**   If you see the next message, it means that no other AppleTalk routers were found on the network attached to the port.

```
%AT-6-ONLYROUTER: Ethernet0/0: AppleTalk port enabled; no neighbors found
```

Step 3   The `Router>` prompt indicates that you are now at the command-line interface (CLI) and you have just completed a basic router configuration. Nevertheless, this is *not* a complete configuration. At this point, you have two choices:

- Run the setup command facility again, and create another configuration.

  ```
  Router> enable
  Password: password
  Router# setup
  ```

- Modify the existing configuration or configure additional features by using the CLI:

  ```
  Router> enable
  Password: password
  Router# configure terminal
  Router(config)#
  ```