Configuring Asynchronous Connections

This chapter describes how to configure the Cisco 1700 router to dial into a central-site router over a standard telephone line and provides verification steps and troubleshooting tips.

This chapter contains the following sections:

- Before You Begin

- Asynchronous Dial-Up Connection

- Asynchronous Dial-In Pool

- Troubleshooting Asynchronous Problems

Before You Begin

The configurations in this chapter are based on the following assumptions:

- Your Cisco 1700 router hardware is correctly installed according to the *Cisco 1700 Router Hardware Installation Guide* that came with the router.

- Your Cisco 1700 router is using Point-to-Point Protocol (PPP).

Before you begin configuration, be aware of the following:

- You need to enter the commands in the order shown in the task tables.

- The values shown in italic are examples. You should substitute the values shown with values that are appropriate for your network.

- You should be familiar with Cisco IOS software and its conventions.

Note To use the verification steps described in this chapter, you must be familiar with Cisco IOS commands and command modes. When you use the verification steps, you need to change to different command modes. If you are not familiar with command modes, refer to the "Understanding Command Modes" section in the "Cisco IOS Basic Skills" chapter.
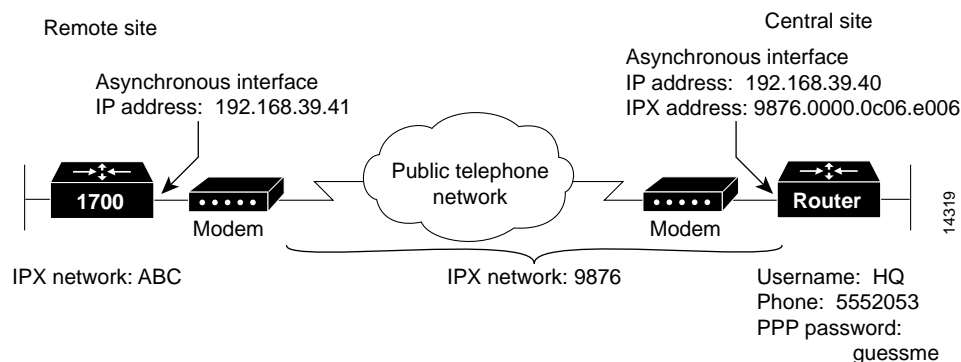

Asynchronous Dial-Up Connection

In this configuration, a modem is attached to the router serial port and dials into the central-site router over a standard telephone line, which is an asynchronous connection. The Cisco 1700 router is dialing into a central-site router.

These are the major tasks when configuring your router for an asynchronous dial-up connection:

- Configuring Global Parameters
- Configuring Security
- Configuring the Fast Ethernet Interface
- Configuring the Asynchronous Interface
- Configuring When the Router Dials
- Configuring Command-Line Access to the Router

Figure 6-1 illustrates the example configuration used in this chapter.

Figure 6-1   Asynchronous Dial-Up Example Configuration

Configuring Global Parameters

Use this table to configure some global parameters.

Step	Task	Router Prompt	Command
1	Enter configuration mode.	Router#	**configure terminal**
2	Configure the router to show the date and time of all debug messages. This command is optional, but recommended if you use debug commands to troubleshoot your configuration.	Router(config)#	**service timestamps debug datetime msec**

3	Configure the router to show the date and time of all log messages. This command is optional, but recommended if you use the verification steps described in this guide. This feature is enabled for all the example command output shown in this guide.	`Router(config)#`	**service timestamps log datetime msec**
4	Enable IPX routing and configure the router with an IPX address.	`Router(config)#`	**ipx routing** *0060.834f.66dd*
5	Create a script that causes the modem connected to the router to place a call to the central site.	`Router(config)#`	**chat-script** *dialout "atdt\t" timeout 60 connect\c*

Configuring Security

Use this table to configure the router with some security measures.

Step	Task	Router Prompt	Command
1	Specify a password to prevent unauthorized access to the router.	`Router(config)#`	**enable password** *<1700user>*
2	Configure the router with a host name, which is used in prompts and default configuration file names. For PPP authentication, the host name entered with this command must match the username of the central-site router.	`Router(config)#`	**hostname** *1700*
3	Specify the password used during caller identification and CHAP and PAP authentication. For CHAP and PAP authentication, the username entered with this command must match the host name of the central-site router.	`1700(config)#`	**username** *HQ* **password** *<guessme>*

Configuring the Fast Ethernet Interface

Use this table to configure the Fast Ethernet interface, which connects your router to the local network.

Step	Task	Router Prompt	Command
1	Enter configuration mode for the Fast Ethernet interface.	`1700(config)#`	**interface fastethernet0**
2	Configure this interface with an IP address and a subnet mask.	`1700(config-if)#`	**ip address** *172.16.25.42 255.255.255.224*
3	Configure an IPX network address for this interface.	`1700(config-if)#`	**ipx network** *ABC*
4	Enable the interface and the configuration changes that you have just made on the interface.	`1700(config-if)#`	**no shutdown**
5	Exit configuration mode for the interface.	`1700(config-if)#`	**exit**

Configuring the Asynchronous Interface

Use this table to configure the asynchronous interface, which connects your router to the central-site router over the wide-area network.

Step	Task	Router Prompt	Command
1	Enter configuration mode for the serial interface.	1700(config)#	**interface Serial0**
2	Specify the mode of this slow-speed serial interface as asynchronous.	1700(config-if)#	**physical-layer async**
3	Configure the asynchronous line for data traffic, not EXEC command line sessions.	1700(config-if)#	**async mode dedicated**
4	Configure this interface with an IP address and a subnet mask.	1700(config-if)#	**ip address** *192.168.39.41 255.255.255.0*
5	Enable IPX routing on this interface.	1700(config-if)#	**ipx network** *9876*
6	Specify that dial-on-demand routing (DDR) is supported on this interface.	1700(config-if)#	**dialer in-band**
7	Configure a static route to the central-site device.	1700(config-if)#	**ipx route** *1234 9876.0000.0c06.ecc6*
8	Enable snapshot routing. Because your router is dialing into a central-site router, it is considered the client router. The first number is the amount of "active time" (in minutes) during which routing updates are exchanged between your router and the central-site router. The second number is the amount of "quiet time" (in minutes) during which routing entries are frozen and remain unchanged.	1700(config-if)#	**snapshot client** *5 60*
9	Assign the dialer interface to a dialer group.	1700(config-if)#	**dialer-group** *1*
10	Set the encapsulation method on this interface to PPP.	1700(config-if)#	**encapsulation ppp**
11	Enable CHAP or PAP authentication on this interface. CHAP authentication is attempted first.	1700(config-if)#	**ppp authentication chap pap callin**
12	Enable the interface and the configuration changes that you have just made on the interface.	1700(config-if)#	**no shutdown**
13	Exit configuration mode for this interface.	1700(config-if)#	**exit**
14	Enter configuration mode for the serial0 interface.	1700(config)#	**line 1**
15	Configure the baud rate for the asynchronous line.	1700(config-line)#	**speed** *19200*
16	Configure parity on the asynchronous line.	1700(config-line)#	**parity** *n*
17	Configure data bits on the asynchronous line.	1700(config-line)#	**datab** *8*
18	Configure stop bits on the asynchronous line.	1700(config-line)#	**stopb** *1*
19	Exit line configuration mode.	1700(config-line)#	**exit**

Verifying Your Configuration

You can verify your configuration to this point by

- Confirming Connectivity to the Central-Site Router.
- Confirming the Serial Interface Status.
- Confirming the Asynchronous Line Configuration

Confirming Connectivity to the Central-Site Router

Step 1   From the privileged EXEC command mode, enter the **ping** command followed by the IP address of the central-site router:

Note   The modem might need time to synchronize with the central-site modem. You might have to enter the **ping** command several times before you get a response.

```
1700# ping 192.168.37.40

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echoes to 192.168.37.40, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 40/43/48 ms
1700#
*Mar  1 03:37:46.526: %LINK-3-UPDOWN: Interface BRI0:1, changed state to up
*Mar  1 03:37:46.923: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1,
changed state to up
*Mar  1 03:37:46.939: %LINK-3-UPDOWN: Interface Virtual-Access1, changed state to
up
*Mar  1 03:37:47.923: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Virtual-Access1, changed state to up
 *Mar  1 03:35:57.217: %ISDN-6-CONNECT: Interface BRI0:1 is now connected to
5552053 HQ
```

Step 2   Note the percentage in the "Success rate..." line (shown in bold in the example). A success rate of 60 percent (3/5) or greater means that your router is successfully transferring data to the central-site router.

Step 3   To continue configuration, re-enter global configuration mode.

Confirming the Serial Interface Status

Step 1   From the privileged EXEC command mode, enter the **show interface serial 0** command.

Step 2   Confirm that the lines (shown in bold in the example) appear in the command output:

```
1700# show interface serial0
Serial0 is up, line protocol is up
  Hardware is PQUICC Serial in async mode (TTY1)
  Internet address is 12.0.0.2/8
  MTU 1500 bytes, BW 19 Kbit, DLY 100000 usec, rely 255/255, load 1/255
  Encapsulation PPP, loopback not set, keepalive not set
  DTR is pulsed for 5 seconds on reset
  LCP Open
  Listen: CDPCP
  Open: IPCP
  Last input 00:00:01, output 00:00:01, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/10/0 (size/max/drops); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/1/256 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     20 packets input, 1605 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     4 input errors, 0 CRC, 4 frame, 0 overrun, 0 ignored, 0 abort
     23 packets output, 2403 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
```

Step 3   To continue configuration, re-enter global configuration mode.

Confirming the Asynchronous Line Configuration

Step 1   From the privileged EXEC mode, enter the show line command.

Step 2   Confirm that the lines (shown in bold in the example) appear in the command output.

The asynchronous line settings should be the same as those that you configured in the "Configuring the Asynchronous Interface" section earlier in this chapter.

The IP address in the "Line is running" message should be the IP address of the WAN interface of the central-site router.

```
1700# show line 1
Tty Typ     Tx/Rx     A Modem  Roty AccO AccI  Uses    Noise    Overruns
A  1 TTY  19200/19200  -    -     -    -    -    2       4        0/0

Line 1, Location: "", Type: ""
Length: 24 lines, Width: 80 columns
Baud rate (TX/RX) is 19200/19200, no parity, 1 stopbits, 8 databits
Status: Ready, Active, Async Interface Active, HW PPP Support Active
Capabilities: Line is permanent async interface
Modem state: Ready
Line is running PPP for address 192.168.39.40
0 output packets queued, 0 input packets.
 Async Escape map is 000000000000000001010000000000000
Modem hardware state: CTS DSR  DTR RTS
Special Chars: Escape  Hold  Stop  Start  Disconnect  Activation
               ^^x     none   -     -          none
.
.
```

Configuring When the Router Dials

Use this table to configure how and when the router dials the central-site router.

Step	Task	Router Prompt	Command
1	Enter configuration mode for the serial interface.	1700(config)#	**interface Serial0**
2	Define a dialer map for snapshot routing.	1700(config)#	**dialer map snapshot** *1* **name** *HQ*
3	Configure a dialer map to send IP data over the modem line to the central-site router.	1700(config)#	**dialer map ip** *192.168.39.40* **name** *HQ* **modem-script dialout** *5552053*
4	Configure a dialer map to send IPX data over the modem line to the central-site router.	1700(config)#	**dialer map ipx** *9876.0000.0c06.ecc6* **modem-script dialout** *5552053*
5	Configure a route to IPX services, such as servers and printers, on the central-site network.	1700(config)#	**ipx sap** *4 HQ* **server** *AA 1234.0000.0000.0001* **2**
6	Exit configuration mode for this interface.	1700(config-if)#	**exit**

Configuring Command-Line Access to the Router

Use this table to configure some parameters that control access to the router.

| Step	Task	Router Prompt	Command
1	Specify the console terminal line.	1700(config)#	**line console** *0*
2	Set the interval in minutes that the EXEC command interpreter waits until user input is detected.	1700(config-line)#	**exec-timeout** *5*
3	Specify a virtual terminal for remote console access.	1700(config-line)#	**line vty** *0 4*
4	Specify a password on the line.	1700(config-line)#	**password** *<lineaccess>*
5	Enable password checking at terminal session login.	1700(config-line)#	**login**
6	Exit configuration mode.	1700(config-line)#	**end**

Asynchronous Dial-In Pool

This section describes how to configure a Cisco 1700 router with multiple asynchronous interfaces for dial-in connections. In this example, the Cisco 1700 router functions as the central-site router that accepts connections from remote users.

These are the major task when configuring an asynchronous dial-in pool:

- Configuring Global Parameters
- Configuring Security
- Configuring the Fast Ethernet Interface
- Configuring the Asynchronous Interfaces
- Configuring Command-Line Access to the Router

Figure 6-2 illustrates the example configuration used in this chapter.

Figure 6-2   **Asynchronous Dial-In Pool Example Configuration**
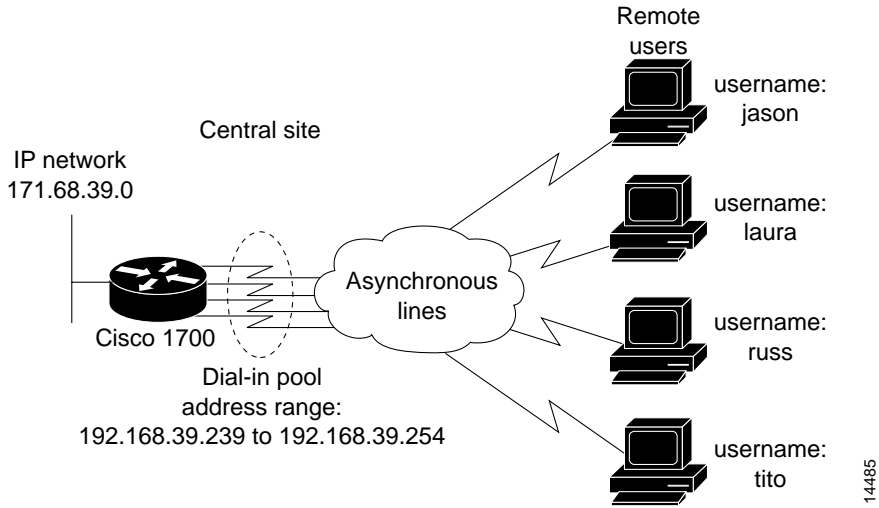
Interface Numbering

This example configuration includes multiple interfaces of the same type being configured with the same commands. When entering commands for one of multiple interfaces, you must enter interface configuration mode for the correct interface. The table below describes how the interfaces are numbered in this configuration example.

Table 6-1   **Serial Interface Numbering**

Line	Interface Name and Number
1	Serial0
2	Serial1
3	Serial2
4	Serial3
5 (AUX port)	Async5

Configuring Global Parameters

Use this table to configure some global parameters.

Step	Task	Router Prompt	Command
1	Enter configuration mode.	Router#	**configure terminal**
2	Configure the router to show the date and time of all debug messages. This command is optional, but recommended if you use debug commands to troubleshoot your configuration.	Router(config)#	**service timestamps debug datetime msec**
3	Configure the router to show the date and time of all log messages. This command is optional, but recommended if you use the verification steps described in this guide. This feature is enabled for all the example command output shown in this guide.	Router(config)#	**service timestamps log datetime msec**

Configuring Security

Use this table to configure the router with some security measures.

Step	Task	Router Prompt	Command
1	Configure the router to encrypt passwords.	Router(config)#	**service password-encryption**
2	Specify a password to prevent unauthorized access to the router.	Router(config)#	**enable password** *<1700user>*
3	Configure the router with a host name, which is used in prompts and default configuration file names. For PPP authentication, the host name entered with this command must match the username of the central-site router.	Router(config)#	**hostname** *1700*
4	Specify the password used during caller identification and CHAP and PAP authentication. For CHAP and PAP authentication, the hostname of every remote router that dials into the Cisco 1700 router must be entered with this command, and the password used to authenticate that router.	1700(config)#	**username** *jason* **password** *<foot>* **username** *laura* **password** *<letmein>* **username** *russ* **password** *<opensesame>* **username** *tito* **password** *<knockknock>*

Configuring the Fast Ethernet Interface

Use this table to configure the Fast Ethernet interface, which connects the router to your local network.

Step	Task	Router Prompt	Command
1	Enter configuration mode for the Fast Ethernet interface.	`1700(config)#`	**interface fastethernet0**
2	Configure this interface with an IP address and a subnet mask.	`1700(config-if)#`	**ip address** *192.168.39.1 255.255.255.0*
3	Enable the interface and the configuration changes that you have just made on the interface.	`1700(config-if)#`	**no shutdown**
4	Exit configuration mode for the interface.	`1700(config-if)#`	**exit**

Configuring the Asynchronous Interfaces

Use this table to configure how the four asynchronous interfaces to receive calls from remote routers. The table below describes how to configure one interface (Serial0); however, you can use the same commands to configure any of the serial interfaces and the AUX interface (Async5).

Step	Task	Router Prompt	Command
1	Enter configuration mode for the asynchronous serial interface.	`1700(config)#`	**interface serial0**
2	Configure the asynchronous interfaces to use the IP address of the FastEthernet interface.	`1700(config-if)#`	**ip unnumbered fastethernet0**
3	Configure the asynchronous interfaces for PPP encapsulation.	`1700(config-if)#`	**encapsulation ppp**
4	Configure the asynchronous interfaces for interactive mode, which enables **slip** and **ppp** EXEC commands.	`1700(config-if)#`	**async mode interactive**
5	Configure the remote routers to use the IP address configured with the **ip local pool** command.	`1700(config-if)#`	**peer default ip address pool** *dialin*
6	Disable Cisco Discovery Protocol (CDP) on the asynchronous interfaces.	`1700(config-if)#`	**no cdp enable**
7	Configure the asynchronous interfaces to authenticate the remote routers with CHAP.	`1700(config-if)#`	**ppp authentication chap**
8	Enable this interface and the configuration changes you have made.	`1700(config-if)#`	**no shutdown**
9	Exit configuration mode for this interface.	`1700(config-if)#`	**exit**
10	Configure a local pool of IP addressees that are used when a remote router connects to the one of the asynchronous interfaces. The command defines the range of IP address that can be used with the lowest IP address followed by the highest IP address. If you do not include the highest IP address, the pool contains only the lowest IP address defined in the command.	`1700(config)#`	**ip local pool** *dialin 192.168.39.239 192.168.39.254*
11	Enter configuration mode for the serial0 interface.	`1700(config)#`	**line 1**
12	Configure the baud rate for the asynchronous line.	`1700(config-line)#`	**speed** *19200*

13	Configure parity on the asynchronous line.	`1700(config-line)#`	**parity** *n*
14	Configure data bits on the asynchronous line.	`1700(config-line)#`	**datab** *8*
15	Configure stop bits on the asynchronous line.	`1700(config-line)#`	**stopb** *1*
16	Exit line configuration mode.	`1700(config-line)#`	**exit**

Configuring Command-Line Access to the Router

Use this table to configure some parameters that control access to the router.

Step	Task	Router Prompt	Command
1	Specify the console terminal line.	`1700(config)#`	**line console** *0*
2	Set the interval that the EXEC command interpreter waits until user input is detected.	`1700(config-line)#`	**exec-timeout** *5*
3	Specify a virtual terminal for remote console access	`1700(config-line)#`	**line vty** *0 4*
4	Specify a password on the line.	`1700(config-line)#`	**password** *<lineaccess>*
5	Enable password checking at terminal session login.	`1700(config-line)#`	**login**
6	Exit configuration mode.	`1700(config-line)#`	**end**

Troubleshooting Asynchronous Problems

If you are having problems or the output that you received during the verification steps is very different from what is shown, you can troubleshoot your router with the Cisco IOS **debug** commands. The **debug** commands provide extensive command output that is not included in this document.

> **Caution** If you are not familiar with Cisco IOS debug commands, you should read the "Using Debug Commands" section in the "Cisco IOS Basic Skills" chapter before attempting any debugging.

Following are the **debug** commands that are helpful when troubleshooting asynchronous configurations. Follow these commands with the **ping** command to begin debug output:

- **debug modem**
- **debug chat-script**
- **debug dialer**
- **debug ppp negotiation**