CHAPTER 9

SLIP and PPP Configuration Commands

SLIP and PPP define methods of sending Internet Protocol (IP) packets over standard EIA/TIA-232 asynchronous serial lines with minimum line speeds of 1200 baud.

Using SLIP or PPP encapsulation over asynchronous lines is an inexpensive way of connecting PCs to a network. SLIP and PPP over asynchronous dial-up modems allow a home computer to be connected to a network without the cost of a leased line. Dial-up SLIP and PPP links can also be used for remote sites that need only occasional telecommuting or backup connectivity. Both public-domain and vendor-supported SLIP and PPP implementations are available for a variety of computer applications.

Use the commands in this chapter to configure SLIP and PPP on your router. For configuration information and examples, refer to the chapter “Configuring SLIP and PPP” earlier in this publication.

See the *Cisco Access Connection Guide* for information about SLIP and PPP user-level EXEC connection commands.

async default ip address

To set the address used on the remote (PC) side, use the **async default ip address** interface configuration command. To remove the default address from your configuration, use the **no** form of this command.

async default ip address *address*
no async default ip address

Syntax Description

address	Address of the client interface.

Default

No default address is specified.

Command Mode

Interface configuration

Example

The following example specifies address 182.32.7.51 on asynchronous interface 6:

```
line 20
speed 19200
interface async 6
async default ip address 182.32.7.51
```

Related Command

async dynamic address

async dynamic address

To specify dynamic asynchronous addressing, use the **async dynamic address** interface configuration command. To disable dynamic addressing, use the **no** form of this command.

async dynamic address
no async dynamic address

Syntax Description

This command has no arguments or keywords.

Default

Dynamic addressing is disabled.

Command Mode

Interface configuration

Usage Guidelines

You can control whether addressing is dynamic (you specific the address at the EXEC level when making the connection), or whether default addressing is used (the system forces the address). If you specify dynamic addressing, the router must be in interactive mode.

It is common to configure an asynchronous interface to have a default address and to allow dynamic addressing. With this configuration, the choice between the default address or dynamic addressing is made when you enter the **slip** or **ppp** EXEC command. If you enter an address, it is used, and if you enter the **default** keyword, the default address is used.

Example

The following example shows dynamic addressing assigned to asynchronous interface 6:

```
interface ethernet 0
ip address 1.0.0.1 255.0.0.0
interface async 6
async dynamic address
```

Related Command

async default ip address

async dynamic routing

To allow the use of routing protocols on an interface, use the **async dynamic routing** interface configuration command. To disable the use of routing protocols, use the **no** form of this command.

async dynamic routing
no async dynamic routing

Syntax Description

This command has no arguments or keywords.

Default

Dynamic routing is disabled.

Command Mode

Interface configuration

Usage Guidelines

The use of routing protocols is further controlled by the use of the **/routing** keyword in the **slip** and **ppp** EXEC command.

Example

The following example shows how to enable asynchronous routing on asynchronous interface 6. The **ip tcp header-compression passive** command enables Van Jacobson TCP header compression and prevents transmission of compressed packets until a compressed packet arrives from the asynchronous link.

```
interface async 6
async dynamic routing
async dynamic address
async default ip address 1.1.1.2
ip tcp header-compression passive
ip unnumbered ethernet 0
```

Related Commands

async dynamic address
ip tcp header-compression

async mode dedicated

To place a line into dedicated asynchronous mode using SLIP or PPP encapsulation, use the **async mode dedicated** interface configuration command. To return the line to interactive mode, use the **no** form of this command.

async mode dedicated
no async mode

Syntax Description

This command has no arguments or keywords.

Default

Asynchronous mode is disabled.

Command Mode

Interface configuration

Usage Guidelines

With dedicated asynchronous network mode, the interface uses either SLIP or PPP encapsulation, depending on which **encapsulation** method is configured for the interface. An EXEC prompt does not appear, and the router is not available for normal interactive use.

If you configure a line for dedicated mode, you will not be able to use the **async dynamic address** command, because there is no user prompt.

Example

The following example assigns an IP address to an asynchronous line and places the line into network mode. Setting the stop bits to 1 enhances performance.

```
interface async 4
async default ip address 182.32.7.51
async mode dedicated
encapsulation slip

line 20
location Joe's computer
stopbits 1
speed 19200
```

Related Command

async mode interactive

async mode interactive

To return a line that has been placed into dedicated asynchronous network mode to interactive mode, thereby enabling the **slip** and **ppp** EXEC commands, use the **async mode interactive** interface configuration command. To prevent users from implementing SLIP and PPP at the EXEC level, use the **no** form of this command.

async mode interactive
no async mode

Syntax Description

This command has no arguments or keywords.

Default

Asynchronous mode is disabled.

Command Mode

Interface configuration

Usage Guidelines

Interactive mode enables the **slip** and **ppp** EXEC commands. In dedicated mode, there is no user EXEC level. You do not enter any commands, and a connection is automatically established when you log in, according to the configuration.

Example

The following example places asynchronous interface 6 into interactive asynchronous mode:

```
interface async 6
async default ip address 182.32.7.51
async mode interactive
ip unnumbered ethernet 0
```

Related Command

async mode dedicated

async-bootp

To support the extended BOOTP request specified in RFC 1084, and to specify information that will be sent in response to BOOTP requests, use the **async-bootp** global configuration command. To clear the list, use the **no** form of this command.

async-bootp *tag* [**:***hostname*] *data*
no async-bootp *tag* [**:***hostname*] *data*

Syntax Description

tag	Item being requested; expressed as a filename, an integer, or an IP dotted decimal address. See Table 9-1 in the "Usage Guidelines" section for possible values.
:*hostname*	(Optional) This entry applies only to the specified host. The argument can be either an IP address or a logical host name.
data	List of IP addresses entered in dotted decimal notation or as logical host names, a number, or a quoted string.

Default

If no extended BOOTP commands are entered, the software generates a gateway and subnet mask appropriate for the local network.

Command Mode

Global configuration

Usage Guidelines

Each of the *tag* keyword-argument pairs is a field that can be filled in and sent in response to BOOTP requests from clients.

BOOTP supports the extended BOOTP requests specified in RFC 1084 and works for both SLIP and PPP encapsulation.

Use the **show async bootp** EXEC command to list the configured parameters. BOOTP works for both SLIP and PPP.

Table 9-1 Supported Extended BOOTP Requests

Keyword and Argument Pair	Use
bootfile	Server boot file from which to download the boot program. Use the optional **:***hostname* and *data* arguments to specify the host or hosts.
subnet-mask *mask*	Dotted decimal address specifying the network and local subnetwork mask (as defined by RFC 950).
time-offset *offset*	A signed 32-bit integer specifying the time offset of the local subnetwork in seconds from Coordinated Universal Time.
gateway *address*	Dotted decimal address specifying the IP addresses of gateways for this subnetwork. A preferred gateway should be listed first.
time-server *address*	Dotted decimal address specifying the IP address of time servers (as defined by RFC 868).
ien116-server *address*	Dotted decimal address specifying the IP address of name servers (as defined by IEN 116).
dns-server *address*	Dotted decimal address specifying the IP address of Domain Name Servers (as defined by RFC 1034).
log-server *address*	Dotted decimal address specifying the IP address of an MIT-LCS UDP log server.
quote-server *address*	Dotted decimal address specifying the IP address of Quote of the Day servers (as defined in RFC 865).
lpr-server *address*	Dotted decimal address specifying the IP address of Berkeley UNIX Version 4 BSD servers.
impress-server *address*	Dotted decimal address specifying the IP address of Impress network image servers.
rlp-server *address*	Dotted decimal address specifying the IP address of Resource Location Protocol (RLP) servers (as defined in RFC 887).
hostname *name*	Name of the client (which might or might not be domain qualified, depending upon the site).
bootfile-size *value*	Two-octet value specifying the number of 512 octet (byte) blocks in the default boot file.

Examples

The following example specifies different boot files: one for a PC and one for a Macintosh. With this configuration, a BOOTP request from the host on 128.128.1.1 results in a reply listing the boot filename as *pcboot*. A BOOTP request from the host named *mac* results in a reply listing the boot filename as *macboot*.

```
async-bootp bootfile :128.128.1.1 “pcboot”
async-bootp bootfile :mac “macboot”
```

The following example specifies a subnet mask of 255.255.0.0:

```
async-bootp subnet-mask 255.255.0.0
```

The following example specifies a negative time offset of the local subnetwork of -3600 seconds:

```
async-bootp time-offset -3600
```

The following example specifies the IP address of a time server:

```
async-bootp time-server 128.128.1.1
```

Related Command

show async bootp

clear line

To return a line to its idle state, enter the **clear line** privileged EXEC command at the system prompt.

clear line *line-number*

Syntax Description

line-number	Asynchronous line port number assigned with the **interface async** command.

Command Mode

Privileged EXEC

Usage Guidelines

Normally, this command returns the line to its conventional function as a terminal line, with the interface left in a “down” state.

Example

The following example shows how to use the **clear line** command to return serial interface 5 to its idle state:

```
clear line 5
```

encapsulation

To configure SLIP or PPP encapsulation as the default on an asynchronous interface, use the **encapsulation** interface configuration command. To disable encapsulation, use the **no** form of this command.

encapsulation {**slip** | **ppp**}
no encapsulation {**slip** | **ppp**}

Syntax Description

slip	Specifies SLIP encapsulation for an interface configured for dedicated asynchronous mode or DDR.
ppp	Specifies PPP encapsulation for an interface configured for dedicated asynchronous mode or DDR.

Default

SLIP encapsulation is enabled by default.

Command Mode

Interface configuration

Usage Guidelines

On lines configured for interactive use, you select encapsulation when you establish a connection with the **slip** or **ppp** EXEC command.

IP Control Protocol (IPCP) is the part of PPP that brings up and configures IP links. After devices at both ends of a connection communicate and bring up PPP, they bring up the control protocol for each network protocol they intend to run over the PPP link such as IP or IPX. If you have problems passing IP packets and the **show interface** command shows that line is up, use the **debug ppp negotiations** debugging command to see if and where the negotiations are failing. You might have different versions of software running, or different versions of PPP, in which case you might need to upgrade your software or turn off PPP option negotiations. All IPCP options as listed in RFC 1332 are supported on asynchronous lines. Only Option 2, TCP/IP header compression, is supported on synchronous interfaces.

PPP echo requests are used as keepalives to detect line failure. The **no keepalive** command can be used to disable echo requests. For more information about the **no keepalive** command, refer to the chapter “IP Routing Protocols Commands” in the *Router Products Command Reference,* and the chapter “Configuring IP Routing Protocols” in the *Router Products Configuration Guide*.

In order to use SLIP or PPP, the router must be configured with an IP routing protocol or with the **ip host-routing** command. This configuration is done automatically if you are using old-style **slip address** commands. However, you must configure it manually if you configure SLIP or PPP via the **interface async** command.

Note Disable software flow control on SLIP and PPP lines.

Example

In the following example, asynchronous interface 1 is configured for PPP encapsulation:

```
config
interface async 1
encapsulation ppp
```

Related Commands

A dagger (†) indicates that the command is documented in the *Router Products Command Reference* publication.

keepalive†

hold-queue

To limit the size of the IP output queue, use the **hold-queue** interface configuration command. To return the output queue to the default size, use the **no** form of this command.

hold-queue *packets*
no hold-queue

Syntax Description

packets	Maximum number of packets. The range of values is 0 through 65535.

Default

10 packets (default for asynchronous interfaces only)

Command Mode

Interface configuration

Usage Guidelines

The default of 10 packets allows the router to queue a number of back-to-back routing updates. This is the default for asynchronous interfaces only; other media types have different defaults.

The hold queue stores packets received from the network that are waiting to be sent to the client. It is recommended that the queue size not exceed ten packets on asynchronous interfaces. For most other interfaces, the queue length should not exceed 100 packets.

Example

The following example changes the packet queue length of a line to five packets:

```
interface async 2
async default ip address 182.32.7.5
hold-queue 5
```

interface

To specify the interface you want to configure, use the **interface** global configuration command. To clear the interface configuration, use the **no** form of this command.

interface *type number*
no interface

Syntax Description

type Interface type.

number Interface number. See Table 9-2 for a list of interface numbers by router model.

Default

No interface is specified by default; you must specify an interface to configure it.

Command Mode

Global configuration

Usage Guidelines

Table 9-2 Lists Interface Numbers by Router Model

Router Model	Interface Number
508-CS	1 to 8
516-CS	1 to 16
ASM-CS (fully configured)	1 to 113
2509 or 2510	1 to 8
2511 or 2512	1 to 16

Example

The following example specifies asynchronous interface 1:

```
interface async 1
```

ip access-group

To configure an access list to be used for packets transmitted to and from the asynchronous host, use the **ip access-group** interface configuration command. To disable control over packets transmitted to or from an asynchronous host, use the **no ip access-group** command.

ip access-group *access-list-number* {**in** | **out**}
no ip access-group *access-list-number*

Syntax Description

access-list-number	Assigned IP access list number.
in	Defines access control on packets transmitted from the asynchronous host.
out	Defines access control on packets being sent to the asynchronous host.

Default

Disabled

Command Mode

Interface configuration

Usage Guidelines

With this command enabled, the IP destination address of each packet is run through the access list for acceptability and is either dropped or passed.

Example

The following example assumes that users are restricted to certain servers designated as SLIP or PPP servers, but that normal terminal users can access anything on the local network:

```
! access list for normal connections
access-list 1 permit 131.108.0.0 0.0.255.255
!
! access list for SLIP packets.
access-list 2 permit 131.108.42.55
access-list 2 permit 131.108.111.1
access-list 2 permit 131.108.55.99
!
! Specify the access list
interface async 6
async dynamic address
ip access-group 1 out
ip access-group 2 in
```

ip address

To set IP addresses for an interface, use the **ip address** interface configuration command. To remove the specified addresses, use the **no ip address** interface configuration command.

ip address *address mask* [**secondary**]
no ip address *address mask* [**secondary**]

Syntax Description

address	IP address.
mask	Network mask for the associated IP network.
secondary	(Optional) Specifies additional IP addresses.

Default

No IP addresses are specified.

Command Mode

Interface configuration

Usage Guidelines

The subnet mask must be the same for all interfaces connected to subnets of the same network. Hosts can determine subnet masks using the Internet Control Message Protocol (ICMP) *Mask Request* message. Routers respond to this request with an ICMP *Mask Reply* message.

You can disable IP processing on a particular interface by removing its IP address with the **no ip address** interface configuration command. If the router detects another host using one of its IP addresses, it will print an error message on the console.

Example

In the following example, 131.108.1.27 is the primary address and 192.31.7.17 and 192.31.8.17 are secondary addresses for asynchronous interface 1:

```
interface async 1
ip address 131.108.1.27 255.255.255.0
ip address 192.31.7.17 255.255.255.0 secondary
ip address 192.31.8.17 255.255.255.0 secondary
```

ip mtu

To specify the size of the largest IP packet, use the **ip mtu** interface configuration command. To return to the default MTU size of 1500 bytes, use the **no** form of this command.

ip mtu *bytes*
no ip mtu

Syntax Description

bytes	Maximum number of bytes. The range of values is 64 to 1000000.

Default

1500 bytes

Command Mode

Interface configuration

Example

The following example sets the packet MTU size to 200 bytes:

```
interface async 5
async default ip address 182.32.7.5
ip mtu 200
```

ip tcp header-compression

To configure Van Jacobson TCP header compression on the asynchronous link, use the **ip tcp header-compression** line configuration command. To disable header compression, use the **no** form of this command.

ip tcp header-compression [**on** | **off** | **passive**]
no ip tcp header-compression

Syntax Description

on	(Optional) Turns header compression on.
off	(Optional) Turns header compression off.
passive	(Optional) On SLIP lines, prevents transmission of compressed packets until a compressed packet arrives from the asynchronous link, unless a user specifies SLIP on the command line. For PPP, this option functions the same as the **on** option.

Default

Header compression is on.

Command Mode

Line configuration

Usage Guidelines

Header compression data areas are initialized to handle up to 16 simultaneous TCP connections. Currently, you cannot change this number. You can only turn header compression on or off or use the **passive** keyword.

On lines configured for PPP encapsulation, the keywords **passive** and **on** cause the same behavior because, before attempting header compression, PPP automatically negotiates whether it is available at each end of the connection.

There are two ways to implement header compression when the line is configured for **ip tcp header-compression passive**:

- Enter the **/compressed** option with the **slip** EXEC commands to force the line into compressed mode. This overrides the passive setting and causes the interface to behave as if header compression is enabled.
- Enter **slip** or **slip default** and the connecting system sends compressed packets to the server. The server detects the use of compression by the connecting system and automatically enters compressed mode.

If a line is configured for passive header compression and you use the **slip** or **ppp** EXEC command to enter asynchronous mode, you will see that the interface is set to match compression status used by the host at the other end of the asynchronous line.

```
Server> slip 1.0.0.1
Password:
Entering SLIP mode.
Interface IP address is 1.0.0.1, MTU is 1500 bytes
Header compression will match your system.
```

The message “Header compression will match your system” indicates that the interface is set to match the compression status used by the host at the other end of the asynchronous line. If the line was configured to have header compression on, this line would read “Header compression is On.” Refer to the *Cisco Access Connection Guide* for more information about making SLIP and PPP connections.

Example

The following example illustrates how to enable Van Jacobson TCP header compression. The **passive** keyword prevents transmission of compressed packets until a compressed packet arrives from the IP link. Notice that asynchronous routing and dynamic addressing are also enabled.

```
interface async 6
async dynamic routing
async dynamic address
ip tcp header-compression passive
```

Related Commands

Two daggers (††) indicate that the command is documented in the *Cisco Access Connection Guide*.

ppp ††
slip ††

ip unnumbered

To conserve network resources, use the **ip unnumbered** line configuration command. To disable unnumbered interfaces, use the **no** form of this command.

ip unnumbered *type number*
no ip unnumbered

Syntax Description

type	Interface type.
number	Interface number.

Default

Disabled

Command Mode

Line configuration

Usage Guidelines

You must use either the **ip address** or **ip unnumbered** command to provide the local address for an interface.

Unnumbered interfaces do not have an address. Network resources are conserved because fewer network numbers are used and routing tables are smaller.

Whenever the unnumbered interface generates a packet (for example, a routing update), it uses the address of the specified interface as the source address of the IP packet. It also uses the address of the specified interface to determine which routing processes are sending updates over the unnumbered interface. Restrictions include the following:

- You cannot use the **ping** command to determine whether the interface is up, because the interface has no address. SNMP can be used to remotely monitor interface status.
- You cannot boot from a network (TFTP) server a bootable image over an unnumbered serial interface.
- The arguments *type* and *number* must be another interface in the network server that has an IP address, not another unnumbered interface.

Example

The following example shows how to configure asynchronous interface 6 as unnumbered:

```
interface async 6
ip unnumbered ethernet 0
```

Related Command

ip address

show async bootp

To display the parameters that have been configured for extended BOOTP requests, use the **show async bootp** privileged EXEC command.

show async bootp

Syntax Description

This command has no arguments or keywords.

Command Mode

Privileged EXEC

Sample Display

The following is sample output from the **show async bootp** command:

```
router# show async bootp

The following extended data will be sent in BOOTP responses:

bootfile (for address 128.128.1.1) "pcboot"
bootfile (for address 131.108.1.111) "dirtboot"
subnet-mask 255.255.0.0
time-offset -3600
time-server 128.128.1.1
```

Table 9-3 describes significant fields shown in the display.

Table 9-3 Show Async BOOTP Field Descriptions

Field	Description
bootfile... “pcboot”	Indicates that the boot file for address 128.128.1.1 is named pcboot.
subnet-mask 255.255.0.0	Specifies the subnet mask.
time-offset -3600	Indicates that the local time is one hour (3600 seconds) earlier than Coordinated Universal Time (UTC).
time-server 128.128.1.1	Indicates the address of the time server for the network.

show async status

To display the status of activity on all lines configured for asynchronous support, use the **show async status** privileged EXEC command.

show async status

Syntax Description

This command has no arguments or keywords.

Command Mode

Privileged EXEC

Usage Guidelines

The display resulting from this command shows all asynchronous sessions, whether they are using SLIP or PPP encapsulation.

Sample Display

The following is sample output from the **show async status** command:

```
router# show async status

Async protocol statistics:
  Rcvd: 5448 packets, 7682760 bytes
        1 format errors, 0 checksum errors, 0 overrun, 0 no buffer
  Sent: 5455 packets, 7682676 bytes, 0 dropped


 Tty           Local          Remote Qd InPack OutPac Inerr  Drops  MTU Qsz
   1     192.31.7.84         Dynamic  0      0      0     0      0 1500  10
*  3     192.31.7.98            None  0   5448   5455     1      0 1500  10
```

Table 9-4 describes significant fields shown in the display.

Table 9-4 Show Async Status Display Field Descriptions

Field	Description
Rcvd:	Statistics on packets received.
5448 packets	Packets received.
7682760 bytes	Total number of bytes.
1 format errors	Spurious characters received when a packet start delimiter is expected.
0 checksum errors	Count of checksum errors.
0 overrun	Number of giants received.
0 no buffer	Number of packets received when no buffer was available.
Sent	Statistics on packets sent.
5455 packets	Packets sent.
7682676 bytes	Total number of bytes.
0 dropped	Number of packets dropped.

Field	Description
Tty	Line number.
*	Line currently in use.
Local	Local IP address on the link.
Remote	Remote IP address on the link; “Dynamic” indicates that a remote address is allowed but has not been specified; “None” indicates that no remote address is assigned or being used.
Qd	Number of packets on hold queue (Qsz is the maximum).
InPack	Number of packets received.
OutPac	Number of packets sent.
Inerr	Number of total input errors; sum of format errors, checksum errors, overruns and no buffers.
Drops	Number of packets received that would not fit on the hold queue.
MTU	Current maximum transmission unit size.
Qsz	Current output hold queue size.

show line

Use the **show line** privileged EXEC command to display connection status for a line running in asynchronous mode.

show line [*line-number*]

Syntax Description

line-number	(Optional) Particular line about which information will be displayed. If you do not specify a line number, information about all lines is displayed.

Command Mode

EXEC

Sample Display

The following is sample output from the **show line** command:

```
router> show line

 Tty Typ    Tx/Rx    A Modem  Roty AccO AccI  Uses    Noise   Overruns
*  0 CTY             -    -      -    -    -     0        0        0/0
A  1 TTY  9600/9600  -    -      -    -    1     0        0        0/0
   2 TTY  9600/9600  -    -      -    -    -     0        0        0/0
   3 TTY  9600/9600  -    -      -    -    -     0        0        0/0
   4 TTY  9600/9600  -    -      -    -    -     0        0        0/0
   5 TTY  9600/9600  -    -      -    -    -     0        0        0/0
   6 TTY  9600/9600  -    -      -    -    -     0        0        0/0
   7 TTY  9600/9600  -    -      -    -    -     0        0        0/0
   8 TTY  9600/9600  -    -      -    -    -     0        0        0/0
   9 TTY  9600/9600  -    -      -    -    -     0        0        0/0
  10 TTY  9600/9600  -    -      -    -    -     0        0        0/0
  11 TTY  9600/9600  -    -      -    -    -     0        0        0/0
  12 TTY  9600/9600  -    -      -    -    -     0        0        0/0
  13 TTY  9600/9600  -    -      -    -    -     0        0        0/0
  14 TTY  9600/9600  -    -      -    -    -     0        0        0/0
  15 TTY  9600/9600  -    -      -    -    -     0        0        0/0
  16 TTY  9600/9600  -    -      -    -    -     0        0        0/0
* 17 VTY  9600/9600  -    -      -    -    -    18        0        0/0
```

Table 9-5 describes significant fields shown in the display.

Table 9-5 Show Line Field Descriptions

Tasks	Descriptions
(first character in line)	The field preceding the number in the Tty field can be blank or contain one of the following characters: * The line is currently active, running a terminal-oriented protocol. A The line is currently active in asynchronous mode. I The line is free and can be used for asynchronous modes because it is configured for **async mode interactive.**
Tty	Indicates the absolute line number of the specified line.

Tasks	Descriptions
Typ	Type of line. Possible values follow: CTY—Console AUX—Auxiliary port TTY—Asynchronous terminal port VTY—Virtual terminal LPT—Parallel printer
Tx/Rx	Transmit rate of the line (baud)/receive rate of the line (baud).
A	Indicates whether or not autobaud has been configured for the line. A value of F indicates that autobaud has been configured; a hyphen (-) indicates that it has not been configured for the line.
Modem	Types of modem signal that has been configured for the line. Possible values include the following: callin callout cts-req DTR-Act inout RIisCD
Roty	Rotary Group configured for this line.
AccO	Output access list number configured for the specified line.
AccI	Input access list number configured for the specified line.
Uses	Number of connections established to or from this line since the system was restarted.
Noise	Number of times noise has been detected on the line since the system restarted.
Overruns	Hardware (UART) overruns/software buffer overflows, both defined as the number of overruns or overflows that have occurred on the specified line since the system was restarted. Hardware overruns are buffer overruns; the UART chip has received bits from the software faster than it can process them. A software overflow occurs when the software has received bits from the hardware faster than it can process them.

The following is sample output from the **show line** command when a line is specified:

```
router> show line 1

 Tty Typ    Tx/Rx    A Modem  Roty AccO AccI  Uses    Noise Overruns
   1 TTY  9600/9600  -    -      -    -   10     0        0        0

Line 1, Location: "charnel console", Type: ""
Length: 24 lines, Width: 80 columns
Baud rate (TX/RX) is 9600/9600, no parity, 2 stopbits, 8 databits
Status: Ready, Hardware XON/XOFF
Capabilities: none
Modem state: Ready
Special Chars: Escape  Hold  Stop  Start  Disconnect  Activation
                ^^x    none   -     -       none
Timeouts:      Idle EXEC    Idle Session   Modem Answer  Session   Dispatch
               0:10:00        never         0:00:15      not imp   not set
Session limit is not set.
Allowed transports are telnet lat rlogin.  Preferred is lat
```

```
No output characters are padded
Characters causing immediate data dispatching:
   Char    ASCII
Group codes:    0
```

Related Commands

async dynamic address
async dynamic routing
ip tcp header-compression

vty-async

To configure all virtual terminal lines on a router to support asynchronous protocol features, use the **vty-async** global configuration command. Use the **no vty-async** command to disable asynchronous protocol features on virtual terminal lines.

vty-async
no vty-async

Syntax Description

This command has no arguments or keywords.

Default

Asynchronous protocol features are not enabled by default on virtual terminal lines.

Command Mode

Global configuration

Usage Guidelines

The **vty-async** command extends asynchronous protocol features from physical asynchronous interfaces to virtual terminal lines. Normally, SLIP and PPP can function only on asynchronous interfaces, not on virtual terminal lines. However, extending asynchronous functionality to virtual terminal lines permits you to run SLIP and PPP on these *virtual asynchronous interfaces*. One practical benefit is the ability to tunnel SLIP and PPP over X.25 PAD, thus extending remote node capability into the X.25 area. You can also tunnel SLIP and PPP over Telnet or LAT on virtual terminal lines. When tunneling SLIP and PPP over X.25, LAT, or Telnet, you do so by using the protocol translation feature in the IOS software.

To tunnel SLIP or PPP inside X.25, LAT, or Telnet, you can use two-step protocol translation or one-step protocol translation, as follows:

- If you are tunnelling SLIP or PPP using the two-step method, you need to first enter the **vty-async** command on the router. Next, you perform two-step translation. For more information about two-step protocol translation, refer to the protocol translation chapter in the *Cisco Access Connection Guide*.
- If you are tunnelling SLIP or PPP using the one-step method, you do not need to enter the **vty-async** command. Instead, you would issue the **translate** command with the SLIP or PPP keywords, because the **translate** command automatically enables asynchronous protocol features on virtual terminal lines. For more information about protocol translation, refer to the "Configuring Protocol Translation Sessions" chapter in this publication. For more information about using the **translate** command with the SLIP or PPP keywords, refer to the "Protocol Translation Session Commands" chapter in this publication.

To make a connection to a network device using any supported protocol, refer to the *Cisco Access Connection Guide*.

On a Cisco 3000, Cisco 4000, or Cisco 4500, you can create up to 180 protocol translation sessions, whether or not routing is enabled. Increase the number of virtual terminal lines using the **line vty** command.

Example

```
vty-async
```

Related Commands

A dagger (†) indicates that the command is documented in another chapter. Two daggers (††) indicate that the command is documented in the *Cisco Access Connection Guide*.

ppp ††
slip ††
translate†

vty-async dynamic-routing

To enable dynamic routing on all virtual asynchronous interfaces, use the **vty-async dynamic-routing** global configuration command. Use the **no vty-async** command to disable asynchronous protocol features on virtual terminal lines and, therefore, disable routing on virtual terminal lines.

vty-async dynamic-routing
no vty-async

Syntax Description

This command has no arguments or keywords.

Default

Dynamic routing is not enabled on virtual asynchronous interfaces.

Command Mode

Global configuration

Usage Guidelines

This feature enables IP routing on virtual asynchronous interfaces. When you issue this command and a user later makes a connection to another host using SLIP or PPP, the user must specify /**routing** at the SLIP or PPP command line.

If you had not previously entered the **vty-async** command, the **vty-async dynamic-routing** command creates virtual asynchronous interfaces on the router, then enables dynamic routing on them.

Command Mode

Global Configuration.

Example

The following command enables dynamic routing on virtual asynchronous interfaces.

```
vty-async dynamic-routing
```

Related Command

async dynamic routing

vty-async header-compression

To compress the headers of all TCP packets on virtual asynchronous interfaces, use the **vty-async header-compression** global configuration command. Use the **no vty-async** command to disable virtual asynchronous interfaces and header compression.

vty-async header-compression [**passive**]
no vty-async

Syntax Description

passive	(Optional) Specifies that outgoing packets to be compressed only if TCP incoming packets on the same virtual asynchronous interface are compressed. For SLIP, if you do not specify this option, the router will compress all traffic. The default is no compression. For PPP, the IOS software always negotiates header compression.

Default

Header compression is not enabled on virtual asynchronous interfaces.

Command Mode

Global configuration

Usage Guidelines

This feature compress the headers on TCP/IP packets on virtual asynchronous connections to reduce the size of the packets and to increase performance.This feature only compresses the TCP header, so it has no effect on UDP packets or other protocol headers. The TCP header compression technique, described fully in RFC 1144, is supported on virtual asynchronous interfaces using SLIP or PPP encapsulation. You must enable compression on both ends of a connection.

Example

The following example compresses outgoing TCP packets on virtual asynchronous interfaces only if incoming TCP packets are compressed:

```
vty-async header-compression passive
```

Related Command

async dynamic routing

vty-async keepalive

To change the frequency of keepalive packets on all virtual asynchronous interfaces, use the **vty-async keepalive** global configuration command. Use the **no vty-async** command to disable asynchronous protocol features on virtual terminal lines, or the **vty-async keepalive 0** command to disable keepalive packets on virtual terminal lines.

vty-async keepalive *seconds*
no vty-async
vty-async keepalive 0

Syntax Description

seconds	The frequency, in seconds, with which the IOS software sends keepalive messages to the other end of a virtual asynchronous interface. To disable keepalives, use a value of 0. The active keepalive interval is 1 through 32767 seconds.

Default

10 seconds

Command Mode

Global configuration

Usage Guidelines

Use this command to change the frequency of keepalive updates on virtual asynchronous interfaces from the default of 10, or to disable keepalive updates.

A connection is declared down after three update intervals have passed without receiving a keepalive packet.

Examples

In the following example, the keepalive interval is set to 30 seconds.

```
vty-async keepalive 30
```

In the following example, the keepalive interval is set to 0 (off), and the sample output for **write terminal** is shown.

```
vty-async keepalive 0
...
router# write terminal
no vty-async keepalive
```

Related Command

A dagger (†) indicates that the command is documented in the *Router Products Command Reference* publication.

keepalive†

vty-async mtu

To set the maximum transmission unit (MTU) size on virtual asynchronous interfaces, use the **vty-async mtu** global configuration command. Use the **no vty-async** command to disable asynchronous protocol features on virtual terminal lines.

vty-async mtu *bytes*
no vty-async

Syntax Description

bytes	MTU size of IP packets that the virtual asynchronous interface can support. The default MTU is 1500 bytes, the minimum MTU is 64 bytes, and the maximum is 1000000 bytes.

Default

1500 bytes

Command Mode

Global configuration

Usage Guidelines

Use this command to modify the maximum transmission unit (MTU) for packets on a virtual asynchronous interfaces. You might want to change to a smaller MTU size for IP packets transmitted on a virtual terminal line configured for asynchronous functions for any of the following reasons:

- The SLIP or PPP application at the other end only supports packets up to a certain size.
- You want to assure a shorter delay by using smaller packets.
- The host echoing takes longer than 0.2 seconds.

Do not change the MTU size unless the SLIP or PPP implementation running on the host at the other end of the virtual asynchronous interface supports reassembly of IP fragments. Because each fragment occupies a spot in the output queue, it might also be necessary to increase the size of the SLIP or PPP hold queue, if your MTU size is such that you might have a high amount of packet fragments in the output queue.

Example

The following example sets the MTU for IP packets to 256 bytes:

```
vty-async mtu 256
```

Related Command

A dagger (†) indicates that the command is documented in the *Router Products Command Reference* publication.

mtu†

vty-async ppp authentication

To enable PPP authentication on virtual asynchronous interfaces, use the **vty-async ppp authentication** {**chap** | **pap**} global configuration command. Use the **no vty-async** command to globally disable asynchronous protocol features on virtual terminal lines, or the no **vty-async ppp authentication** {**chap** | **pap**} command to disable PPP authentication.

vty-async ppp authentication {**chap** | **pap**}
no vty-async
no vty-async ppp authentication {**chap** | **pap**}

Syntax Description

chap	Enable CHAP on all virtual asynchronous interfaces on the router.
pap	Enable PAP on all virtual asynchronous interfaces on the router.

Default

No CHAP or PAP authentication for PPP.

Command Mode

Global configuration

Usage Guidelines

This command configures the virtual asynchronous interface to authenticate either CHAP or PAP while running PPP. Once you have enabled CHAP or PAP, the local router requires a password from remote devices. If the remote device does not support CHAP or PAP, no traffic will be passed to that device.

Example

The following example enables CHAP authentication for PPP sessions on virtual asynchronous interfaces:

```
vty-async authentication ppp chap
```

Related Commands

A dagger (†) indicates that the command is documented in the *Router Products Command Reference* publication.

ppp authentication chap †
ppp authentication pap †
ppp use-tacacs †
vty-async ppp use-tacacs

vty-async ppp use-tacacs

To enable TACACS authentication for PPP on virtual asynchronous interfaces, use the **vty-async ppp** global configuration command. Use the **no vty-async** command to disable virtual asynchronous interfaces, or the no **vty-async use-tacacs** command to disable TACACS authentication on virtual asynchronous interfaces.

vty-async ppp use-tacacs
no vty-async
no vty-async ppp use-tacacs

Syntax Description

This command has no arguments or keywords.

Default

TACACS for PPP is disabled.

Command Mode

Global configuration

Usage Guidelines

Use this command only when you have set up an extended TACACS server. This command requires the extended TACACS server.

Once you have enabled TACACS, the local router requires a password from remote devices.

This feature is useful when integrating TACACS with other authentication systems that require a clear-text version of a user's password. Such systems include one-time password systems, token card systems, and others.

If the username and password are contained in the CHAP password, then the CHAP secret is not used by the router. Because most PPP clients require that a secret be specified, you can use any arbitrary string; the router ignores it.

You cannot enable TACACS authentication for SLIP on asynchronous or virtual asynchronous interfaces.

Example

The example enables TACACS authentication for PPP sessions:

```
vty-async ppp use-tacacs
```

Related Commands

A dagger (†) indicates that the command is documented in the *Router Products Command Reference* publication.

ppp use-tacacs †
vty-async ppp authentication {**chap** | **pap**}