

# DDR Commands

---

This chapter lists dial-on-demand routing (DDR) commands, explains the command syntax, and provides usage guidelines. For information about configuring DDR and configuration examples, refer to the “Configuring DDR” chapter in the *Router Products Configuration Guide*.

## backup delay

To define how much time should elapse before a secondary line status changes after a primary line status has changed, use the **backup delay** interface configuration command. To return to the default, which means as soon as the primary fails, the secondary is immediately brought up without delay, use the **no** form of this command.

```
backup delay {enable-delay | never} {disable-delay | never}
no backup delay {enable-delay | never} {disable-delay | never}
```

### Syntax Description

|                      |                                                                                                                |
|----------------------|----------------------------------------------------------------------------------------------------------------|
| <i>enable-delay</i>  | Number of seconds that elapse after the primary line goes down before the router activates the secondary line. |
| <i>disable-delay</i> | Number of seconds that elapse after the primary line goes up before the router deactivates the secondary line. |
| <b>never</b>         | Prevents the secondary line from being activated or deactivated.                                               |

### Default

0 seconds

### Command Mode

Interface configuration

### Usage Guidelines

For environments in which there are spurious signal disruptions that may appear as intermittent lost carrier signals, it is recommended that some delay be enabled before activating and deactivating a secondary line.

### Example

The following example sets a 10-second delay on deactivating the secondary line (interface serial 0); however, the line is activated immediately:

```
interface serial 0
 backup delay 0 10
```

## backup interface

To configure an interface as a secondary or dial backup line, use the **backup interface** interface configuration command. To disable this feature, use the **no** form of this command.

**backup interface serial** *number*  
**no backup interface serial** *number*

**backup interface** *slot/port*  
**no backup interface** *slot/port* (For the Cisco 7000 series)

### Syntax Description

|               |                                              |
|---------------|----------------------------------------------|
| <i>number</i> | Serial port to be set as the secondary line. |
| <i>slot</i>   | Slot number of the AIP interface.            |
| <i>port</i>   | Port number.                                 |

Default  
 Disabled

Command Mode  
 Interface configuration

Usage Guidelines  
 The interface you define with this command can back up only one interface.

Example  
 The following example sets serial 1 as the backup line for serial interface 0:

```
interface serial 0
 backup interface serial 1
```

## backup load

To set traffic load threshold for dial backup service, use the **backup load** interface configuration command. To return to the default value, use the **no** form of this command.

```
backup load {enable-threshold | never} {disable-load | never}
no backup load {enable-threshold | never} {disable-load | never}
```

### Syntax Description

|                         |                                                                    |
|-------------------------|--------------------------------------------------------------------|
| <i>enable-threshold</i> | Percentage of the primary line's available bandwidth.              |
| <i>disable-load</i>     | Percentage of the primary line's available bandwidth.              |
| <b>never</b>            | Sets the secondary line to never be activated due to traffic load. |

### Default

No threshold is predefined.

### Command Mode

Interface configuration

### Usage Guidelines

When the transmitted or received load on the primary line is greater than the value assigned to the *enable-threshold* argument, the secondary line is enabled.

The secondary line is disabled when one of the following conditions occur:

- The transmitted load on the primary line plus the transmitted load on the secondary line is less than the value entered for the *disable-load* argument.
- The received load on the primary line plus the received load on the secondary line is less than the value entered for the *disable-load* argument.

If the **never** keyword is used instead of an enable-threshold value, the secondary line is never activated because of a traffic load. If the **never** keyword is used instead of a *disable-load* argument, the secondary line is never activated because of traffic load.

### Example

The following example sets the traffic load threshold to 60 percent of the primary line serial 0. When that load is exceeded, the secondary line is activated, and will not be deactivated until the combined load is less than 5 percent of the primary bandwidth.

```
interface serial 0
backup load 60 5
backup interface serial 1
```

## chat-script

To create a script that will place a call over a modem, use the **chat-script** global configuration command. To disable the specified chat script, use the **no** form of this command.

```
chat-script script-name expect-send
no chat-script script-name expect-send
```

### Syntax Description

|                    |                             |
|--------------------|-----------------------------|
| <i>script-name</i> | Name of the chat script.    |
| <i>expect-send</i> | Content of the chat script. |

### Default

No chat scripts are defined.

### Command Mode

Global configuration

### Usage Guidelines

Chat scripts are used in dial-on-demand routing to give commands to dial a modem and commands to log on to remote systems. The defined script will be used to place a call over a modem.

Some characteristics of chat scripts are as follows:

- Chat scripts are case sensitive.
- You can have any number of ABORT sequences active at once.
- When a chat script starts, the default timeout is 5 seconds. Changes to the timeout persist until the next time you change them in the script.
- A string within quotation marks is treated as a single entity.

It is recommended that one chat script (a “modem” chat script) be written for placing a call and another chat script (a “system” or “login” chat script) be written to log onto remote systems, where required.

### Suggested Chat Script Naming Conventions

A suggested chat script naming convention is as follows:

```
vendor-type-modulation
```

In other words, the syntax of the **chat-script** command becomes the following:

```
chat-script vendor-type-modulation expect send
```

For example, if you have a Telebit T3000 modem that uses V.32bis modulation, you would name your chat script as follows:

```
telebit-t3000-v32bis
```

For example, the chat-script command could become the following:

```
chat-script telebit-t3000-v32bis ABORT ERROR ABORT BUSY ABORT "NO ANSWER" "" "AT H" OK
"AT DT \T" DIALING \c TIMEOUT 30 CONNECT \c
```

For example, you could have script names like the following

- telebit-tb-b103
- telebit-tb-v21
- telebit-tb-v22
- codex-326x-b103
- codex-326x-v21
- codex-326x-v22
- codex-326x-v22bis
- codex-326x-v32
- codex-326x-v32bis
- usr-courier-v22bis
- usr-courier-hst
- usr-courier-v32
- usr-courier-v32bis

Adhering to this naming convention allows you to use partial chat script names with regular expressions to specify a range of chat scripts that can be used. This is particularly useful for dialer rotary groups and is explained further in the next section.

Escape Sequences

Chat scripts are in the form *expect send*, where the send string following the hyphen is executed if the preceding expect string fails. Each send string is followed by a return unless it ends with \c. ^x gets translated into the appropriate control character, and \x gets translated into x if \x is not one of the special sequences listed in Table 8-1.

See the book entitled *Managing uucp and Usenet* by Tim O'Reilly and Grace Todino for more information about chat scripts.

The escape sequences used in chat scripts are listed in Table 8-1.

Table 8-1 Chat Script Escape Sequences

| Escape Sequence | Description                                                                                                           |
|-----------------|-----------------------------------------------------------------------------------------------------------------------|
| ""              | Expect a null string.                                                                                                 |
| EOT             | Send an end-of-transmission character.                                                                                |
| BREAK           | Cause a BREAK. This is sometimes simulated using line speed changes and null characters. May not work on all systems. |
| \c              | Suppress new line at the end of the send string.                                                                      |
| \d              | Delay for 2 seconds.                                                                                                  |
| \K              | Insert a BREAK.                                                                                                       |

| Escape Sequence | Description                           |
|-----------------|---------------------------------------|
| \n              | Send a newline or linefeed character. |
| \p              | Pause for 1/4 second.                 |
| \r              | Send a return.                        |
| \s              | Send a space character.               |
| \t              | Send a tab character.                 |
| \\              | Send a backslash (\) character.       |
| \T              | Replaced by phone number.             |
| \q              | Reserved, not yet used.               |

## Expect-Send Pairs

Sample supported *expect-send* pairs are described in Table 8-2.

**Table 8-2 Sample Supported Expect-Send Pairs**

| Expect and Send Pair       | Function                                                                                                      |
|----------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>ABORT</b> <i>string</i> | Starts scanning for the string in the input and if it is seen this indicates that the chat script has failed. |
| <b>TIMEOUT</b> <i>time</i> | Sets the time to wait for input, in seconds. The default is five seconds.                                     |

As an example of how expect-send pairs function, if the modem reports BUSY when the number is busy, you can indicate that you want the attempt stopped at this point by including ABORT BUSY in your chat script.

## Alternate Handlers

ABORT sink instead of ABORT ERROR means that the system will abort when it sees sink instead of when it sees ERROR.

## Missed Characters

After the connection is established and Return is pressed, a second Return is often required before the prompt appears.

You might include the following as part of your chat script:

```
ssword: -/r-ssword
```

This means that after the connection is established you want “ssword” to be displayed. If it is not displayed, send a return again after the timeout passes.

## Example

The following example shows the **chat-script** command being used to create a chat script named t3000:

```
chat-script t3000 ABORT ERROR ABORT BUSY ABORT "NO ANSWER" "" "AT H" OK "AT DT \T" DIALING
\c TIMEOUT 30 CONNECT \c
```

Related Commands

**dialer map**

**script dialer**

## clear dialer

To clear the values of dialer statistics for one or more serial or BRI interfaces configured for DDR, use the **clear dialer** privileged EXEC command.

**clear dialer** [**interface** *type number*]

**clear dialer** [**interface serial** *slot/port*] (Cisco 7000 series only)

### Syntax Description

|                  |                                                                           |
|------------------|---------------------------------------------------------------------------|
| <b>interface</b> | (Optional) Indicates that one interface will be specified.                |
| <i>type</i>      | (Optional) Interface type, either <b>serial</b> or <b>bri</b> .           |
| <i>number</i>    | (Optional) Interface number.                                              |
| <i>slot/port</i> | (Optional) On the Cisco 7000 series, specifies the slot and port numbers. |

### Command Mode

Privileged EXEC

### Usage Guidelines

If the **interface** keyword and the arguments are not used, dialer statistics are cleared on all interfaces.

### Example

The following example clears the dialer statistics on serial interface 1:

```
clear dialer interface serial 1
```

## clear snapshot quiet-time

To end the quiet period on a client router within two minutes, use the **clear snapshot quiet-time EXEC** command.

## clear snapshot quiet-time *interface*

## Syntax Description

*interface*

Interface type and number.

## Command Mode

EXEC

## Usage Guidelines

The **clear snapshot quiet-time** command places the client router in a state to reenter the active period within two minutes. The two-minute hold period ensures a quiet period of at least two minutes between active periods.

### Example

The following example ends the quiet period on dialer interface 1:

```
clear snapshot quiet-time dialer 1
```

## Related Commands

```
show snapshot
snapshot client
```

## dialer callback-secure

To enable callback security, use the **dialer callback-secure** interface configuration command.

**dialer callback-secure**

### Syntax Description

This command has no arguments or keywords.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command ensures that the initial call is always disconnected at the receiving end and the return call is made only if the username is configured for callback. If the username (*hostname* in the **dialer map** command) is not configured for callback, the initial call stays up and no return call is made.

### Related Commands

**dialer callback-server**

**dialer map**

**map-class**

**ppp callback accept**

## dialer callback-server

To enable an interface to make return calls when callback is successfully negotiated, use the **dialer-callback server** interface configuration command.

**dialer callback-server** [**username**] [**dialstring**]

### Syntax Description

|                   |                                                                                                                                     |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>username</b>   | Identify the return call's dialstring by looking up the authenticated hostname in a <b>dialer map</b> command. This is the default. |
| <b>dialstring</b> | Identify the return call's dialstring during callback negotiation.                                                                  |

### Default

Disabled. The default keyword is **username**.

### Command Mode

Interface configuration

### Related Commands

**dialer callback-secure**  
**dialer enable-timeout**  
**dialer hold-queue**  
**dialer map**  
**map-class**  
**ppp callback**

## dialer caller

To configure caller ID screening, use the **dialer caller** interface configuration command. To disable this feature, use the **no** form of this command.

**dialer caller** *number*  
**no dialer caller** *number*

### Syntax Description

*number* Telephone number for which to screen. Specify an x to represent a single “don’t-care” character. The maximum length of each number is 25 characters.

**Default**  
Disabled

**Command Mode**  
Interface configuration

### Usage Guidelines

This command configures the router to accept calls from the specified number.

Caller ID screening is available on Cisco 7000 series, Cisco 4000 series, Cisco 3000 series, and Cisco 2500 series routers that have dialer interfaces.

The maximum length of each number is 25 characters.

---

**Note** Caller ID screening requires a local switch that is capable of delivering the caller ID to the router. If you enable caller ID screening but do not have such a switch, no calls will be allowed in.

---

### Examples

The following example configures the router to accept a call with a delivered caller ID equal to 4155551234:

```
dialer caller 4155551234
```

The following example configures the router to accept a call with a delivered caller ID having 41555512 and any numbers in the last two positions:

```
dialer caller 41555512xx
```

**Related Command**  
**show dialer**

## dialer dtr

To enable DDR on an interface and specify that the serial line is connected by non-V.25bis modems using EIA signaling only (the data terminal ready [DTR] signal), use the **dialer dtr** interface configuration command. To disable dial-on-demand routing for the interface, use the **no** form of this command.

**dialer dtr**  
**no dialer dtr**

### Syntax Description

This command has no keywords or arguments.

### Default

DTR dialing is disabled.

### Command Mode

Interface configuration

### Usage Guidelines

A serial interface configured for DTR dialing can place calls only; it cannot accept them.

When a local interface is configured for DTR dialing, the remote interface (that will be receiving the calls) can be configured for in-band dialing or not configured for anything but encapsulation, depending on the desired behavior. If the remote interface is expected to terminate a call when no traffic is transmitted for some time, it must be configured for in-band dialing (along with access lists and a dummy dialer string). If the remote interface is purely passive, no configuration is necessary.

Rotary groups cannot be configured for DTR dialing.

The **dialer map** and **dialer string** commands have no effect on DTR dialers.

### Example

The following example enables DDR and specifies DTR dialing on an interface:

```
dialer dtr
```

### Related Commands

**dialer in-band**  
**dialer map**  
**dialer string**

## dialer enable-timeout

To set the length of time an interface stays down after a call has completed or failed, before it is available to dial again, use the **dialer enable-timeout** interface configuration command. To return to the default value, use the **no** form of this command.

**dialer enable-timeout** *seconds*  
**no dialer enable-timeout**

### Syntax Description

*seconds*

Time in seconds that the router waits before the next call can occur on the specific interface. Acceptable values are positive, nonzero integers.

This value must be greater than the serial pulse interval for this interface, set via the **pulse-time** command.

### Default

15 seconds

### Command Mode

Interface configuration

### Usage Guidelines

This command applies to inbound and outbound calls.

If your phone lines are busy or down, you might want to enforce a certain period of time before the system repeats an attempt to make a connection with a remote site. Configuring this timeout can prevent outgoing lines and switching equipment from being needlessly loaded down.

### Example

The following example specifies a waiting period of 30 seconds on interface async 1:

```
interface async 1
dialer enable-timeout 30
```

## dialer fast-idle

To specify the amount of time that a line for which there is contention will stay idle before the line is disconnected and the competing call is placed, use the **dialer fast-idle** interface configuration command. To return to the default value, use the **no** form of this command.

**dialer fast-idle** *seconds*  
**no dialer fast-idle**

### Syntax Description

|                |                                                                                                                                           |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <i>seconds</i> | Idle time, in seconds, that must occur on an interface before the line is disconnected. Acceptable values are positive, nonzero integers. |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------|

### Default

20 seconds

### Command Mode

Interface configuration

### Usage Guidelines

The fast idle timer is activated if there is contention for a line. In other words, if a line is busy, a packet for a different next hop address is received, and the busy line is required to send the competing packet, the dialer fast idle timer is activated.

If the line becomes idle for configured length of time, the current call is disconnected immediately and the new call is placed.

If the line has not yet been idle as long as the fast idle timer, the packet is dropped because there is no way to get through to the destination. After the packet is dropped, the fast idle timer remains active and the current call is disconnected as soon as it has been idle for as long as the fast idle timeout.

If, in the meanwhile, there is another packet transmitted to the currently connected destination, and it is classified as interesting, the fast idle timer will be restarted.

This command applies to inbound and outbound calls.

Combining this command with the **dialer idle-timeout** command allows you to configure lines to stay up for a longer period of time when there is not contention, but to be reused more quickly when there are not enough lines for the current demand.

### Example

The following example specifies a fast idle timeout of 35 seconds on interface async 1:

```
interface async 1
dialer fast-idle 35
```

#### Related Commands

**dialer idle-timeout**

**dialer map**

## dialer-group

To control access, use the **dialer-group** interface configuration command. To remove an interface from the specified dialer access group, use the **no** form of this command.

**dialer-group** *group-number*  
**no dialer-group**

### Syntax Description

|                     |                                                                                                                                                                                                                  |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>group-number</i> | Number of the dialer access group to which the specific interface belongs. This access group is defined using the <b>dialer-list</b> command. Acceptable values are nonzero, positive integers between 1 and 10. |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Default

No access is predefined.

### Command Mode

Interface configuration

### Usage Guidelines

An interface can only be associated with a single dialer access group; multiple **dialer-group** assignment is not allowed. A second dialer access group assignment will override the first. A dialer access group is defined with the **dialer-group** command. The **dialer-list** command associates an access list with a dialer access group.

Packets that match the dialer group specified trigger a connection request.

### Example

The following example specifies dialer access group number 1.

The destination address of the packet is evaluated against the access list specified in the associated **dialer-list** command. If it passes, a call is initiated (if no connection has already been established) or the idle timer is reset (if a call is currently connected).

```
interface async 1
dialer-group 1
access-list 101 deny igmp 0.0.0.0 255.255.255.255 255.255.255.255 0.0.0.0
access-list 101 permit ip 0.0.0.0 255.255.255.255 0.0.0.0 255.255.255.255
dialer-list 1 list 101
```

### Related Command

**dialer-list**

## dialer hold-queue

To allow “interesting” outgoing packets to be queued until a modem connection is established and to specify a timeout period for Point-to-Point Protocol (PPP) callback connections to be established, use the **dialer hold-queue** interface configuration command. To disable the hold queue, use the **no** form of this command.

**dialer hold-queue** *packets* **timeout** *seconds*

### Syntax Description

|                |                                                                                                                                                                  |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>packets</i> | Number of packets, in the range 0 to 100 packets, to hold in the queue. This argument is optional with the <b>no</b> form of the command.                        |
| <i>seconds</i> | The value of <i>seconds</i> plus the dialer enable timeout equals the number of seconds that packets are to be held for a callback connection to be established. |

Default  
Disabled

### Command Mode

Interface configuration

### Usage Guidelines

A dialer hold queue can be configured on any type of dialer, including in-band synchronous, asynchronous, Data Terminal Ready (DTR), and Integrated Services Digital Network (ISDN) dialers. Rotary groups can be configured with a dialer hold queue. If a rotary group is configured with a hold queue, all members of the group will be configured with a dialer hold queue and no individual member’s hold queue can be altered.

If no hold queue is configured, packets are dropped during the time required to establish a connection.

If no callback connection is established within the timeout period, the packets are discarded.

### Related Commands

**dialer callback-secure**  
**dialer map**  
**map-class**  
**ppp callback**

## dialer idle-timeout

To specify the idle time before the line is disconnected, use the **dialer idle-timeout** interface configuration command. To reset the idle timeout to the default, use the **no** form of this command.

**dialer idle-timeout** *seconds*  
**no dialer idle-timeout**

### Syntax Description

*seconds*

Idle time, in seconds, that must occur on an interface before the line is disconnected. Acceptable values are positive, nonzero integers.

### Default

120 seconds

### Command Mode

Interface configuration

### Usage Guidelines

This command is used on lines for which there is no contention. When contention occurs, the dialer fast-idle command is activated. For example, when a busy line is requested to send another packet to a different destination than it is currently connected to, line contention occurs and the **dialer fast-idle** command is activated.

This command applies to inbound and outbound calls. For example, if a receiving system needs to make outgoing calls, you might configure it with a short idle timeout.

Only packets that match the dialer group reset the idle timer.

### Example

The following example specifies of an idle timeout of 3 minutes (180 seconds) on interface async 1:

```
interface async 1
dialer idle-timeout 180
```

### Related Commands

**dialer fast-idle**  
**dialer group**

## dialer in-band

To specify that DDR is to be supported, use the **dialer in-band** interface configuration command. To disable dial-on-demand routing for the interface, use the **no** form of this command.

**dialer in-band** [**no-parity** | **odd-parity**]  
**no dialer in-band**

### Syntax Description

|                   |                                                                                                                                                   |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>no-parity</b>  | (Optional) Indicates that no parity is to be applied to the dialer string that is sent out to the modem on synchronous interfaces.                |
| <b>odd-parity</b> | (Optional) Indicates that the dialed number has odd parity (7-bit ASCII characters with the eighth bit the parity bit) on synchronous interfaces. |

### Default

Disabled. By default, no parity is applied to the dialer string.

### Command Mode

Interface configuration

### Usage Guidelines

The **dialer in-band** command specifies that chat scripts will be used on the auxiliary port and V.25bis will be used on synchronous interfaces.

The parity keywords do not apply to asynchronous interfaces.

The parity setting applies to the dialer string that is sent out to the modem. If you do not specify a parity, or if you specify no parity, no parity is applied to the output number. If odd parity is configured, the dialed number will have odd parity (7-bit ASCII characters with the eighth bit, the parity bit.)

If an interface is only accepts calls and does not place calls, the **dialer in-band** interface configuration command is the only command needed to configure it. If an interface is configured in this manner, with no dialer rotary groups, the idle timer never disconnects the line. It is up to the remote end (the end that placed the call) to disconnect the line based on idle time.

### Example

The following example specifies DDR for asynchronous interface 1:

```
interface async 1
dialer in-band
```

### Related Commands

**dialer map**  
**dialer string**

## dialer-list list

To group access lists, use the **dialer-list list** global configuration command. To disable automatic dialing, use the **no** form of this command.

**dialer-list** *dialer-group* **list** *access-list-number*  
**no dialer-list** *dialer-group* **list** *access-list-number*

### Syntax Description

|                           |                                                                                                                                                                                                                                          |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>dialer-group</i>       | Specifies the number of a dialer access group identified in any <b>dialer-group</b> interface configuration command.                                                                                                                     |
| <i>access-list-number</i> | Specifies the access list number specified in any IP or Novell IPX access lists including Novell IPX extended, Service Access Point (SAP) access lists and bridging type. See Table 8-3 for the supported access list types and numbers. |

### Default

None

### Command Mode

Global configuration

### Usage Guidelines

The **dialer-list list** command applies access lists to dialer access groups to control dialing using DDR. This command applies access lists to dialer access groups defined with the **dialer-group** command. See the *Router Products Configuration Guide* for more information about configuring access lists.

To specify additional protocols and access control with a finer granularity, see the **dialer-list protocol** command.

Table 8-3 lists the access list types and numbers that the **dialer-group** command supports.

**Table 8-3** Dialer-List List Command Access List Types and Numbers

| Access List Type     | Access List Number Range |
|----------------------|--------------------------|
| Standard IP          | 1-99                     |
| Extended IP          | 100-199                  |
| Transparent Bridging | 200-299                  |
| Standard Novell IPX  | 800-899                  |
| Extended Novell IPX  | 900-999                  |

### Example

Dialing occurs when an interesting packet (one that matches access list specifications) needs to be output on an interface. Using the standard access list method, packets can be classified as interesting or uninteresting. In the following example, IGRP TCP/IP routing protocol updates are not classified as interesting and do not initiate calls:

```
access-list 101 deny igmp 0.0.0.0 255.255.255.255 255.255.255.255 0.0.0.0
```

The following example classifies all other IP packets as interesting and permits them to initiate calls:

```
access-list 101 permit ip 0.0.0.0 255.255.255.255 0.0.0.0 255.255.255.255
```

Then the following command places list 101 into dialer access group 1:

```
dialer-list 1 list 101
```

### Related Commands

**dialer-group**

**dialer-list protocol**

## dialer-list protocol

To define a DDR dialer list to control dialing by protocol or by a combination of protocol and access list, use the **dialer-list protocol** global configuration command. To delete a dialer list, use the **no** form of this command.

```
dialer-list dialer-group protocol protocol-name {permit | deny | list access-list-number |  
                                access-group}  
no dialer-list dialer-group [protocol protocol-name [list access-list-number | access-group]]
```

### Syntax Description

|                           |                                                                                                                                                                                                                                                                                                                       |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>dialer-group</i>       | Number of a dialer access group identified in any <b>dialer-group</b> interface configuration command.                                                                                                                                                                                                                |
| <i>protocol-name</i>      | One of the following protocol keywords: <b>appletalk</b> , <b>bridge</b> , <b>clns</b> , <b>clns_es</b> , <b>clns_is</b> , <b>decnet</b> , <b>decnet_router-L1</b> , <b>decnet_router-L2</b> , <b>decnet_node</b> , <b>ip</b> , <b>ipx</b> , <b>vines</b> , or <b>xns</b> .                                           |
| <b>permit</b>             | Permits access to an entire protocol.                                                                                                                                                                                                                                                                                 |
| <b>deny</b>               | Denies access to an entire protocol.                                                                                                                                                                                                                                                                                  |
| <b>list</b>               | Specifies that an access list will be used for defining a granularity finer than an entire protocol.                                                                                                                                                                                                                  |
| <i>access-list-number</i> | Access list number. Access list numbers include any DECnet, Banyan VINES, IP, Novell IPX, or XNS standard or extended access lists, Novell IPX extended, Service Access Point (SAP) access lists and bridging types. See Table 8-4 in the “Usage Guidelines” section for the supported access list types and numbers. |
| <i>access-group</i>       | Filter list name used in the <b>clns filter-set</b> and <b>clns access-group</b> commands.                                                                                                                                                                                                                            |

### Default

No dialer lists are defined.

### Command Mode

Global configuration

### Usage Guidelines

The various **no** forms of this command have the following effects:

- The **no dialer-list 1** command deletes all lists configured with list 1, regardless of the keyword previously used (**permit**, **deny**, **protocol**, or **list**).

- The **no dialer-list 1 protocol** *protocol-name* command deletes all lists configured with list 1 and protocol *protocol-name*.
- The **no dialer-list 1 protocol** *protocol-name* **list** *access-list-number* command deletes the specified list.

The **dialer-list protocol** form of this command permits or denies access to an entire protocol. The **dialer-list protocol list** form of this command provides a finer permission granularity and also supports protocols that were not previously supported.

The **dialer-list protocol list** form of this command applies protocol access lists to dialer access groups to control dialing using DDR. The dialer access groups are defined with the **dialer-group** command. See the *Router Products Configuration Guide* for more information about configuring access lists for protocols.

Although the **dialer-list list** command is still supported for IP, IPX, DECnet, AppleTalk, XNS, and bridging, the new **dialer-list protocol list** form of this command should be used for all protocols. The **dialer-list protocol list** form of this command is supported for all those protocols and also for Banyan VINES and ISO CLNS.

Table 8-4 lists the access list types and numbers that the **dialer-list protocol list** command supports. The table does not include ISO CLNS because that protocol uses filter names instead of predefined access list numbers.

**Table 8-4 Dialer-List Supported Access List Types and Numbers**

| Access List Type        | Access List Number Range (decimal) |
|-------------------------|------------------------------------|
| AppleTalk               | 600-699                            |
| Banyan VINES (standard) | 1-100                              |
| Banyan VINES (extended) | 101-200                            |
| DECnet                  | 300-399                            |
| IP (standard)           | 1-99                               |
| IP (extended)           | 100-199                            |
| Novell IPX (standard)   | 800-899                            |
| Novell IPX (extended)   | 900-999                            |
| Transparent Bridging    | 200-299                            |
| XNS                     | 500-599                            |

## Examples

Dialing occurs when an interesting packet (one that matches access list specifications) needs to be output on an interface. Using the standard access list method, packets can be classified as interesting or uninteresting. In the following example, IGRP TCP/IP routing protocol updates are not classified as interesting and do not initiate calls:

```
access-list 101 deny igmp 0.0.0.0 255.255.255.255 255.255.255.255 0.0.0.0
```

The following example classifies all other IP packets as interesting and permits them to initiate calls:

```
access-list 101 permit ip 0.0.0.0 255.255.255.255 0.0.0.0 255.255.255.255
```

Then the following command places list 101 into dialer access group 1:

```
dialer-list 1 protocol ip list 101
```

In the following example, DECnet access lists allow any DECnet packets with source area 10 and destination area 20 to trigger calls:

```
access-list 301 permit 10.0 0.1023 10.0 0.1023
access-list 301 permit 10.0 0.1023 20.0 0.1023
```

Then the following command places list 301 into dialer access group 1:

```
dialer-list 1 protocol decnet list 301
```

In the following example, both IP and VINES access lists are defined. The IP access lists define IGRP packets as uninteresting, but permits all other IP packets to trigger calls. The VINES access lists do not allow RTP routing updates to trigger calls, but allow any other data packets to trigger calls.

```
access-list 101 deny igrp 0.0.0.0 255.255.255.255 0.0.0.0 255.255.255.255
access-list 101 permit ip 0.0.0.0 255.255.255.255 0.0.0.0 255.255.255.255
!
vines access-list 107 deny RTP 00000000:0000 FFFFFFFF:FFFF 00000000:0000 FFFFFFFF:FFFF
vines access-list 107 permit IP 00000000:0000 FFFFFFFF:FFFF 00000000:0000 FFFFFFFF:FFFF
```

Then the following two commands place the IP and VINES access lists into dialer access group 1:

```
dialer-list 1 protocol ip list 101
dialer-list 1 protocol vines list 107
```

In the following example, a CLNS filter is defined and then the filter is placed in dialer access group 1:

```
clns filter-set ddrline permit 47.0004.0001....
!
dialer-list 1 protocol clns list ddrline
```

### Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**access-list**<sup>†</sup>  
**clns filter-set**<sup>†</sup>  
**dialer-group**  
**dialer-list list**  
**vines access-list**<sup>†</sup>

## dialer load-threshold

To configure bandwidth on demand by setting the maximum load before the dialer places another call to a destination or brings up another interface, use the **dialer load-threshold** interface command. To disable the setting, use the **no** form of this command.

**dialer load-threshold** *load* [**either** | **outbound** | **inbound**]  
**no dialer load-threshold** *load*

### Syntax Description

|                                                  |                                                                                                                                                                                                                 |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>load</i>                                      | Interface load used to determine whether to initiate another call or to drop a link to the destination. This argument represents a utilization percentage; it is a number between 1 and 255, where 255 is 100%. |
| <b>either</b>   <b>outbound</b>   <b>inbound</b> | (Optional) Determine the threshold on the maximum outbound or inbound traffic, outbound traffic only, or inbound traffic only. The default is <b>outbound</b> .                                                 |

### Default

No maximum load is predefined. The default threshold determination is **outbound**.

### Command Mode

Interface configuration

### Usage Guidelines

This command applies to dialer rotary groups only.

When the cumulative load of all UP links (a number  $n$ ) exceeds the load threshold the dialer adds an extra link and when the cumulative load of all UP links minus one ( $n - 1$ ) is at or below load threshold then the dialer can bring down that one link. The dialer will make additional calls or drop links as necessary but will never interrupt an existing call to another destination.

The argument *load* is the calculated weighted average load value for the interface; 1 is unloaded, 255 is fully loaded. The load is calculated by the system dynamically, based on bandwidth. You must set the bandwidth for an interface in kilobits per second, using the **bandwidth** command.

If the interface is configured for multilink PPP and the threshold is set to 1, all available members of a rotary group are connected to the same destination. After the initial link is connected, it stays connected; dial-on-demand routing (DDR) does not disconnect it. To disconnect, either clear the interface or shut it down.

See the “Interface Commands” chapter for a full description of the **bandwidth** command.

### Example

In the following example, if the load to a particular destination on an interface in dialer rotary group 5 exceeds interface load 200 outbound, the dialer will initiate another call to the destination. If used with multilink PPP, another interface in the same dialer rotary group will be brought up when the load exceeds the outbound threshold:

```
interface dialer 5
dialer load-threshold 200
```

### Related Commands

**bandwidth**  
**dialer rotary-group**  
**interface dialer**  
**ppp multilink**

## dialer map

To configure any non-DTR dialer interface as a PPP callback server, use the following form of the **dialer map** interface configuration command. To remove a prior dialer map class configuration, use the **no** form of the command.

```
dialer map protocol next-hop-address name hostname class classname dial-string
no dialer map protocol next-hop-address name hostname class classname dial-string
```

### Syntax Description

|                               |                                                                                                                                                                                                                                       |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>protocol</i>               | Protocol keyword. See Table 8-5 for a list of supported protocols and their keywords.                                                                                                                                                 |
| <i>next-hop-address</i>       | Protocol address used to match against addresses to which packets are destined. This argument is not used with the <b>bridge</b> protocol keyword.                                                                                    |
| <b>name</b>                   | (Optional) Indicates the remote system with which the local router communicates.                                                                                                                                                      |
| <i>hostname</i>               | (Optional) Case-sensitive name or ID of the remote device (usually the host name). (The PPP callback feature does not support the use of ISDN calling line identification (caller ID) in the <i>hostname</i> argument.)               |
| <b>class</b> <i>classname</i> | Name of the class created by the <b>map-class</b> command for this PPP callback client and server.                                                                                                                                    |
| <i>dial-string</i>            | (Optional) Telephone number sent to the dialing device when it recognizes packets with the specified next-hop-address that matches the access lists defined.<br><br><i>The dial string must be the last item in the command line.</i> |

### Default

No dialer map is defined; no default values are defined.

### Command Mode

Interface configuration

### Usage Guidelines

The classname is defined by the **map-class** dialer command. This form of the **dialer map** command identifies a specific host as configured for PPP callback. If the **dialer callback-server** command uses the **username** keyword, this **dialer map** entry is consulted to determine the dialstring for callback.

The *hostname* identified in the **dialer map** command and the *username* identified in the **username password** command must be identical. Both commands are case sensitive.

**Table 8-5      Dialer Map Command Supported Protocols**

| <b>Keyword</b>   | <b>Protocol</b>        |
|------------------|------------------------|
| <b>appletalk</b> | AppleTalk              |
| <b>bridge</b>    | Bridging               |
| <b>clns</b>      | ISO CLNS               |
| <b>decnet</b>    | DECnet                 |
| <b>ip</b>        | IP                     |
| <b>ipx</b>       | Novell IPX             |
| <b>novell</b>    | Novell IPX             |
| <b>snapshot</b>  | Snapshot Routing       |
| <b>vines</b>     | Banyan VINES           |
| <b>xns</b>       | Xerox Network Services |

**Related Commands****dialer callback-secure****dialer callback-server****dialer enable-timeout****map-class****ppp callback****username password**

## dialer map snapshot

To define a dialer map for Cisco's snapshot routing protocol on a client router connected to a DDR interface, use the **dialer map snapshot** interface configuration command. To delete one or more previously defined snapshot routing dialer maps, use the **no** form of this command.

**dialer map snapshot** *sequence-number dial-string*  
**no dialer map snapshot** [*sequence-number*]

### Syntax Description

|                        |                                                                                         |
|------------------------|-----------------------------------------------------------------------------------------|
| <i>sequence-number</i> | An number in the range from 1 to 254, inclusive, that uniquely identifies a dialer map. |
| <i>dial-string</i>     | Telephone number of a remote snapshot server to be called during an active period.      |

### Default

No snapshot routing dialer map is defined.

### Command Mode

Interface configuration

### Usage Guidelines

Enter a command for each remote snapshot server router the client router should call during an active period.

Use the **no dialer map snapshot** form of this command to remove all previously defined snapshot dialer maps on the client router; use the **no dialer map snapshot** *sequence-number* form of this command to delete a specified dialer map.

### Examples

The following examples define snapshot dialer maps on a client router:

```
dialer map snapshot 12 4151231234
dialer map snapshot 13 4151231245
```

The following example removes one of the previously defined snapshot routing dialer maps on the client router:

```
no dialer map snapshot 13
```

### Related Commands

**dialer rotary-group**  
**interface dialer**  
**snapshot client**

## dialer priority

To set the priority of an interface in a dialer rotary group, use the **dialer priority** interface configuration command. Use the **no** form of the command to revert to the default setting.

**dialer priority** *number*  
**no dialer priority**

### Syntax Description

|               |                                                                                                                                                                    |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>number</i> | Priority of an interface in a dialer rotary group; the highest number indicates the highest priority. This is a number from 0 through 255. The default value is 0. |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Default

No priority is predefined. When priority is defined, the default value is 0.

### Command Mode

Interface configuration

### Usage Guidelines

The value 0 indicates the lowest priority and 255 indicates the highest priority. The **dialer priority** command controls which interfaces within a dialer rotary group will be used first. Higher priority interfaces (configured with higher *n* value) are used first. This command is only meaningful for interfaces that are part of dialer rotary groups.

The **priority** command gives the administrator the ability to tell the dialer rotary group which free interface (and by extension which modem) to use first. This command applies to outgoing calls only.

### Example

In the following example, interface async 3 will be used after interfaces with higher and before interfaces with lower priority:

```
interface async 3
dialer priority 5
```

For example, a router has a selection of many modems on it. Some of them are perceived to be better performers than others. You also have two 4800-bps, three 1200-bps, and one 300-bps modem. They are all on interfaces that are in a dialer rotary group. You do not want the router to make the call on the 300-baud modem if any of the faster modems are free. You want the router to use the highest-performance modems first, and the slowest modems last.

### Related Commands

**interface dialer**  
**dialer rotary-group**

## dialer rotary-group

To include an interface in a dialer rotary group, use the **dialer rotary-group** interface configuration command.

**dialer rotary-group** *number*

### Syntax Description

*number*                      Number of the previously defined dialer interface in whose rotary group this interface is to be included. A number from 0 to 255. The dialer interface is defined by the **interface dialer** command.

### Default

No interfaces are included in a dialer rotary group.

### Command Mode

Interface configuration

### Example

The following example places async interfaces 1 and 2 into dialer rotary group 1, defined by the **interface dialer 1** command:

```
hostname central-site
! PPP encapsulation is enabled for interface dialer 1.
interface dialer 1
 encapsulation ppp
 dialer in-band
 ip address 131.108.2.1 255.255.255.0
 ip address 131.126.4.1 255.255.255.0 secondary

! The first dialer map command allows the central site and remote site YYY
! and to call each other and allows the central site to authenticate site YYY
! when it calls in. The second dialer map command, with no! dialer string,
! allows the central site to authenticate remote site ZZZ when it calls in, but
! the central site cannot call remote site ZZZ (no phone number).
dialer map ip 131.108.2.5 name YYY 14155553434
dialer map ip 131.126.4.5 name ZZZ

! The DTR pulse signals for three seconds on the interfaces in dialer
! group 1. This holds the DTR low so the modem can recognize that DTR has been
! dropped.
pulse-time 3

! Interfaces async 1 and async 2 are placed in dialer rotary group 1.
! All of the interface configuration commands (the encapsulation and dialer
! map commands shown earlier in this example) applied to interface
! dialer 1 apply to the physical interfaces assigned to the dialer group.
interface async 1
 dialer rotary-group 1
interface async 2
 dialer rotary-group 1
```

Related Command  
**interface dialer**

## dialer string

To specify the string (telephone number) to be called for interfaces calling a single site, use the **dialer string** interface configuration command. To delete the dialer string specified for the interface, use the **no** form of this command.

```
dialer string dial-string[:isdn-subaddress]
no dialer string
```

### Syntax Description

|                         |                                           |
|-------------------------|-------------------------------------------|
| <i>dial-string</i>      | String of characters to be sent to a DCE. |
| <i>:isdn-subaddress</i> | (Optional) ISDN subaddress.               |

### Default

No strings are predefined.

### Command Mode

Interface configuration

### Usage Guidelines

To use this command on an asynchronous interface, a modem chat script must be defined for the associated line, by using the **script dialer** command. A script must be used to implement dialing.

Dialers configured as **in-band** pass the string to the external dialing device. Specify one **dialer string** command per interface.

To specify multiple strings, use the **dialer map** command. In general, you include a **dialer string** or **dialer map** command if you intend to use a specific interface to initiate a DDR call.

---

**Note** If a **dialer string** command is specified without a **dialer-group** command with access lists defined, dialing never will be initiated. If debug dialer is enabled, an error message will be displayed indicating that dialing never will occur.

---

The string of characters specified for the *dial-string* argument is the default number used under the following conditions:

- A **dialer map** command is not included in the interface configuration.
- The next-hop-address specified in a packet is not included in any of the **dialer map** interface configuration commands recorded—assuming that the destination address passes any access lists specified for DDR with the **dialer-list** command.

### ITU-T V.25bis Options

On synchronous interfaces, depending on the type of modem you are using, International Telecommunication Union Telecommunication (ITU-T) Standardization Sector V.25bis options might be supported as *dial-string* parameters of the **dialer string** command. Supported options are

listed in Table 8-6. The functions of the parameters are nation specific, and they may have different implementations in your country. These options apply only if you have enabled DDR with the **dialer in-band** command. Refer to the operation manual for your modem for a list of supported options.

**Table 8-6**      **ITU-TV.25bis Options**

| Option       | Description                                                                                               |
|--------------|-----------------------------------------------------------------------------------------------------------|
| :            | Wait tone.                                                                                                |
| <            | Pause.<br>Usage and duration of this parameter vary by country.                                           |
| =            | Separator 3.<br>For national use.                                                                         |
| >            | Separator 4<br>For national use.                                                                          |
| <b>P</b>     | Dialing to be continued in pulse mode.<br>Optionally accepted parameter.                                  |
| <b>T</b>     | Tone (Dialing to be continued in Dual Tone Multifrequency, DTMF, mode).<br>Optionally accepted parameter. |
| <b>&amp;</b> | Flash. (The flash duration varies by country.)<br>Optionally accepted parameter.                          |

---

**Note** The ITU-T carries out the functions of the former Consultative Committee for International Telegraph and Telephone (CCITT).

---

### Example

The following example specifies a DDR telephone number to be tone dialed on interface async 1 using the **dialer string** command:

```
interface async 1
dialer string T14085553434
```

### Related Commands

**dialer-group**  
**dialer in-band**  
**dialer map**  
**script dialer**

## dialer wait-for-carrier-time

To specify how long to wait for a carrier, use the **dialer wait-for-carrier-time** interface configuration command. To reset the carrier wait time value to the default, use the **no** form of this command.

**dialer wait-for-carrier-time** *seconds*  
**no dialer wait-for-carrier-time**

### Syntax Description

|                |                                                                                                                                                |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>seconds</i> | Number of seconds that the interface waits for the carrier to come up when a call is placed. Acceptable values are positive, nonzero integers. |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------|

### Default

30 seconds

### Command Mode

Interface configuration

### Usage Guidelines

On asynchronous interfaces, the **dialer wait-for-carrier-time** command sets the total time allowed for the chat script to run.

If a carrier signal is not detected in this amount of time, the interface is disabled until the enable timeout occurs (configured with the **dialer enable-timeout** command).

### Example

The following example specifies a carrier wait time of 45 seconds on interface async 1:

```
interface async 1
dialer wait-for-carrier-time 45
```

### Related Command

**dialer enable-timeout**

## interface dialer

To define a dialer rotary group, use the **interface dialer** global configuration command.

**interface dialer** *number*

### Syntax Description

|               |                                                                                 |
|---------------|---------------------------------------------------------------------------------|
| <i>number</i> | Number of the dialer rotary group. It can be number in the range 0 through 255. |
|---------------|---------------------------------------------------------------------------------|

### Default

No dialer rotary groups are predefined.

### Command Mode

Global configuration

### Usage Guidelines

Dialer rotary groups allow you to apply a single interface configuration to a set of physical interfaces. This allows a group of interfaces to be used as a pool of interfaces for calling many destinations.

Once the interface configuration is propagated to a set of interfaces, those interfaces can be used to place calls using the standard DDR criteria. When multiple destinations are configured, any of these interfaces can be used for outgoing calls.

Dialer rotary groups are useful in environments that require multiple calling destinations. Only the rotary group needs to be configured with all of the **dialer map** commands. The only configuration required for the interfaces is the **dialer rotary-group** command indicating that each interface is part of a dialer rotary group.

Although a dialer rotary group is configured as an interface, it is not a physical interface. Instead it represents a group of interfaces. Interface configuration commands entered after the **interface dialer** command will be applied to all physical interfaces assigned to specified rotary groups. Individual interfaces in a dialer rotary group do not have individual addresses. The dialer interface has a protocol address, and that address is used by all interfaces in the dialer rotary group.

### Example

The following example identifies interface dialer 1 as the dialer rotary group leader. Interface dialer 1 is not a physical interface, but represents a group of interfaces. The interface configuration commands that follow apply to all interfaces included in this group.

```
interface dialer 1
 encapsulation ppp
 authentication chap
 dialer in-band
 ip address 1.2.3.4
 dialer map ip 1.2.2.5 name YYY 14155553434
 dialer map ip 1.3.2.6 name ZZZ
```

**map-class dialer** *classname*

**dialer map**

## ppp authentication

To enable Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP) on a serial interface, use the **ppp authentication** interface configuration command. To disable this encapsulation, use the **no** form of this command.

```
ppp authentication {chap | pap} [if-needed]  
no ppp authentication chap
```

### Syntax Description

|                  |                                                                                                       |
|------------------|-------------------------------------------------------------------------------------------------------|
| <b>chap</b>      | Enables CHAP on a serial interface.                                                                   |
| <b>pap</b>       | Enables PAP on a serial interface.                                                                    |
| <b>if-needed</b> | (Optional) CHAP or PAP authentication is not done on this line if the user has already authenticated. |

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

Once you have enabled CHAP, the local router requires a password from remote devices. If the remote device does not support CHAP, no traffic will be passed to that device.

When PAP is enabled, the remote router attempting to connect to the local router is required to send an authentication request. If the username and password specified in the authentication request are accepted, the router sends an authentication acknowledgment.

The **if-needed** option affects only lines that run EXEC and have teletype devices (TTYs) associated with them. This option affects the router AUX port.

### Example

The following example enables CHAP on serial interface 4:

```
interface serial 4  
encapsulation ppp  
ppp authentication chap
```

The following example enables PAP on serial interface 4:

```
interface serial 4  
encapsulation ppp  
ppp authentication pap
```

### Related Command

**encapsulation ppp**

## ppp callback

To enable a non-DTR dialer interface to function as a callback client that requests callback or to function as a callback server that accepts callback requests, use the **ppp callback** interface configuration command.

**ppp callback {accept | request}**

### Syntax Description

|                |                                                                                          |
|----------------|------------------------------------------------------------------------------------------|
| <b>accept</b>  | This interface accepts PPP callback requests (and functions as the PPP callback server). |
| <b>request</b> | This interface requests PPP callback (and functions as the PPP callback client).         |

### Default

Callback requests are neither accepted nor requested.

### Command Mode

Interface configuration

### Usage Guidelines

An interface can request PPP callback only if the interface is configured for PPP authentication using Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP).

### Related Commands

**dialer callback-secure**  
**map-class dialer**

## ppp multilink

To enable multilink PPP on a selected interface, use the **ppp multilink** interface configuration command. To disable PPP multilink on an interface, use the **no** form of this command.

**ppp multilink**  
**no ppp multilink**

### Syntax Description

This command has no arguments or keywords.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

Multilink PPP is designed to work over single or multiple interfaces that are configured to support both dial-on-demand rotary groups and PPP encapsulation. This command applies asynchronous serial interfaces, ISDN Basic Rate Interfaces (BRIs), and ISDN Primary Rate Interfaces (PRIs).

PPP compression is allowed with multilink PPP.

Authentication for PPP multilink can be accomplished by using the PPP authentication procedures (**ppp authentication pap** or **ppp authentication chap** commands) or ISDN caller ID (**isdn caller** command).

The **dialer load-threshold** command is used to enable a rotary group to bring up additional links and to add them to a multilink bundle.

### Related Commands

**dialer load-threshold**  
**dialer-group**  
**encapsulation ppp**  
**ppp authentication**  
**ppp compress**  
**isdn caller**

## script dialer

To specify a default modem chat script, use the **script dialer** line configuration command. Use the **no** form of this command to disable this feature.

**script dialer** *regex*  
**no script dialer**

### Syntax Description

|              |                                                                                                                                  |
|--------------|----------------------------------------------------------------------------------------------------------------------------------|
| <i>regex</i> | Specifies the set of modem scripts that might be executed. The first script that matches the argument <i>regex</i> will be used. |
|--------------|----------------------------------------------------------------------------------------------------------------------------------|

### Default

No chat script is defined.

### Command Mode

Line configuration

### Usage Guidelines

This command is used by dial-on-demand routing modules to provide modem dialing commands and commands to log in to remote systems.

The argument *regex* is used to specify the name of the modem script that is to be executed. The first script that matches the argument in this command and the dialer map command will be used. For more information about regular expressions, refer to the “Regular Expressions” appendix in the this publication.

If you adhered to the recommended naming convention for chat scripts, the modem lines (the argument *regex* in the **script dialer** command) would be set to one of the following regular expressions to match patterns, depending on the kind of modem you have:

- codex-.\*
- telebit-.\*
- usr-.\*
- xyz-.\*

In the **dialer map** command, you could specify the modulation but leave the type of modem unspecified, as in “.\*-v32bis.”

### Example

The following example shows line chat scripts being specified for lines connected to Telebit and US Robotics modems:

```
! Some lines have telebit modems
line 1 6
dialer script telebit.*
! Some lines have US robotics modems
line 7 12
dialer script usr.*
```

### Related Commands

A dagger (†) indicates that the command is documented in another chapter.

**chat-script**  
**dialer map modem-script system-script**  
**dialer map name modem-script system-script**  
**script activation**†  
**script connection**†  
**script reset**†  
**script startup**†  
**start-chat**†

## show dialer

To obtain a general diagnostic display for serial interfaces configured for DDR, use the **show dialer** EXEC command.

**show dialer** [**interface** *type number*]

### Syntax Description

|                  |                                                                                                                       |
|------------------|-----------------------------------------------------------------------------------------------------------------------|
| <b>interface</b> | (Optional) Information for the interface specified by the arguments <i>type</i> and <i>number</i> is to be displayed. |
| <i>type</i>      | (Optional) Interface type.                                                                                            |
| <i>number</i>    | (Optional) Interface number.                                                                                          |

### Command Mode

EXEC

### Sample Displays

The following is sample output from the **show dialer** command for an asynchronous interface:

```
Router# show dialer interface async 1
Async1 - dialer type = IN-BAND NO-PARITY
Idle timer (900 secs), Fast idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs)
Time until disconnect 838 secs
Current call connected 0:02:16
Connected to 8986
```

| Dial String | Successes | Failures | Last called | Last status |         |
|-------------|-----------|----------|-------------|-------------|---------|
| 8986        | 0         | 0        | never       |             | Default |
| 8986        | 8         | 3        | 0:02:16     | Success     | Default |

Table 8-7 describes significant fields shown in the display.

**Table 8-7 Show Dialer Field Descriptions for In-Band Dialers**

| Field                      | Description                                        |
|----------------------------|----------------------------------------------------|
| Async 1                    | Name of an asynchronous interface.                 |
| dialer type = IN-BAND      | Indicates that DDR is enabled.                     |
| Idle timer (900 secs)      | Idle timeout specification (in seconds).           |
| Fast idle timer (20 secs)  | Fast idle timer specification (in seconds).        |
| Wait for carrier (30 secs) | Wait for carrier timer specification (in seconds). |
| Re-enable (15 secs)        | Enable timeout specification (in seconds).         |
| Time until disconnected    | Time until line is configured to disconnect.       |
| Current call connected     | Time at which the current call was connected.      |
| Connected to               | Dial string to which line is currently connected.  |

| Field       | Description                                                                                                                                                                                                                             |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dial string | Dial strings of logged calls (telephone numbers). On ISDN BRI interfaces, if you have specified a subaddress number in the <b>dialer string</b> or <b>dialer map</b> command, this number is included in the dial string after a colon. |
| Successes   | Successful connections (even if no data is passed).                                                                                                                                                                                     |
| Failures    | Failed connections; call not successfully completed.                                                                                                                                                                                    |
| Last called | Time that last call occurred to specific dial string.                                                                                                                                                                                   |
| Last status | Status of last call to specific dial string (successful or failed).                                                                                                                                                                     |
| Default     | If the DDR facility is using the dial string specified with the <b>dialer string</b> command, the word Default is appended to the Last status entry.                                                                                    |

When the **show dialer EXEC** command is issued for a synchronous serial interface configured for DTR dialing, output similar to the following is displayed:

```
Serial 0 - dialer type = DTR SYNC
Idle timer (120 secs), Fst idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs)
```

| Dial String | Successes | Failures | Last called | Last status |            |
|-------------|-----------|----------|-------------|-------------|------------|
| ----        | 1         | 0        | 1:04:47     | Success     | DTR dialer |
| 8986        | 0         | 0        | never       |             | Default    |

Table 8-8 describes new fields shown in the display.

**Table 8-8 Show Dialer Field Descriptions for DTR Dialers**

| Field                | Description                                                                                  |
|----------------------|----------------------------------------------------------------------------------------------|
| DTR SYNC             | Indicates that DDR is enabled and that DTR dialing is enabled on this synchronous interface. |
| Last status: Success | Indicates that the last call was successful and that DTR dialing was used.                   |
| DTR dialer           | Phrase appended to the Last status entry to indicate that this is a DTR dialer.              |

If an interface is connected to a destination, a display is provided that indicates the idle time before the line is disconnected (decrements each second). Then the duration of the current connection is shown. The following shows an example of this display; it would appear after the third line in the **show dialer** display.

```
Time until disconnect 596 secs
Current call connected 0:00:25
```

After a call disconnects, the system displays the time remaining before being available to dial again. The following is an example of this display; it would appear after the third line in the **show dialer** display:

```
Time until interface enabled 8 secs
```

If the **show dialer** command is issued for an interface on which DDR is not enabled, the system displays an error message. The following is a sample error message:

```
Async 1 - Dialing not enabled on this interface.
```

If an interface is configured for DDR, the **show interfaces** command displays the following message:

```
Async1 is up, line protocol is up (spoofing)
Hardware is Async Serial
```

The word *spoofing* indicates that the line really is not up, but the dialer is forcing the line to masquerade as “up” so that upper level protocols will continue to operate as expected. (Spoofing is a state added to allow DDR to work. Basically, the interface “dials on demand” in response to packets being routed to it. No packets are routed to down interfaces, so the router interface must pretend to be up [spoof] so packets will be routed to it when it’s not connected. It’s the normal idle state on a dial-on-demand interface.)

If caller ID screening is configured on an ISDN BRI, the **show dialer** command display includes a line similar to the following:

```
1 incoming call(s) have been screened.
```

This line reports the number of calls that have been screened by the router.

## show ppp multilink

To display bundle information for the Multilink PPP bundles, use the **show ppp multilink** EXEC command.

**show ppp multilink**

### Syntax Description

This command has no keywords or arguments.

### Command Mode

EXEC

### Sample Display

The following is the output when no bundles are on a system.

```
impulse#sh ppp multilink
No active bundles
```

The following is sample output when a single Multilink PPP bundle (named rudder) is on a system:

```
systema# show ppp multilink

Bundle rudder, 3 members, first link is BRI0: B-channel 1
0 lost fragments, 8 reordered, 0 unassigned, sequence 0x1E/0x1E rcvd/sent
```

The following is sample output when two active bundles are on a system. Subsequent bundles would be displayed below the previous bundle.

```
impulse# show ppp multilink

Bundle rudder, 3 members, first link is BRI0: B-Channel 1
0 lost fragments, 8 reordered, 0 unassigned, sequence 0x1E/0x1E rcvd/sent
Bundle dallas, 4 members, first link is BRI2: B-Channel 1
0 lost fragments, 28 reordered, 0 unassigned, sequence 0x12E/0x12E rcvd/sent
```

## show snapshot

To display snapshot routing parameters associated with an interface, use the **show snapshot** EXEC command.

**show snapshot** [*interface*]

### Syntax Description

*interface* (Optional) Interface type and number.

### Command Mode

EXEC

### Sample Display

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

```
Router# show snapshot serial 1

Serial1 is up, line protocol is up, snapshot up
Options: dialer support
Length of each activation period: 3 minutes
Period between activations:      10 minutes
Retry period on connect failure: 10
For dialer address 240
  Current queue: active, remaining active time: 3 minutes
  Updates received this cycle: ip, ipx, appletalk
For dialer address 1
  Current queue: client quiet, time until next activation: 7 minutes
```

Table 8-9 describes the fields shown in the display.

**Table 8-9 Show Snapshot Fields**

| Field                              | Description                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Serial1 is up, line protocol is up | Indicates whether the interface hardware is currently active (whether carrier detect is present) and if it has been taken down by an administrator.                                                                                                                                                                                                                                                |
| snapshot up                        | Indicates whether the snapshot protocol is enabled on the interface.                                                                                                                                                                                                                                                                                                                               |
| Options:                           | Options configured on the <b>snapshot client</b> or <b>snapshot server</b> interface configuration command. It can be one of the following: <ul style="list-style-type: none"> <li>dialer support—Snapshot routing is configured with the <b>dialer</b> keyword.</li> <li>stay asleep on carrier up—Snapshot routing is configured with the <b>suppress-statechange-update</b> keyword.</li> </ul> |
| Length of each activation period   | Length of the active period.                                                                                                                                                                                                                                                                                                                                                                       |
| Period between activations         | Length of the quiet period.                                                                                                                                                                                                                                                                                                                                                                        |
| Retry period on connect failure    | Length of the retry period.                                                                                                                                                                                                                                                                                                                                                                        |
| For dialer address                 | Displays information about each dialer rotary group configured with the <b>dialer map</b> command.                                                                                                                                                                                                                                                                                                 |

| Field                                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Current queue:                                      | <p>Indicates which period snapshot routing is currently in. It can be one of the following:</p> <ul style="list-style-type: none"><li>• active—Routing updates are being exchanged.</li><li>• client quiet—The client router is in a quiet period and routing updates are not being exchanged.</li><li>• server quiet—The server router is in a quiet period, awaiting an update from the client router before awakening, and routing updates are not being exchanged.</li><li>• post active—Routing updates are not being exchanged. If the server router receives an update from the client router, it processes it but does not begin an active period. This allows time for resynchronization of active periods between the client and server routers.</li><li>• no queue—This is a temporary holding queue for new snapshot routing interfaces and for interfaces being deleted.</li></ul> |
| remaining active time<br>time until next activation | Time remaining in the current period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Updates received this cycle                         | Protocols from which routing updates have been received in the current active period. This line is displayed only if the router is in an active period.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## snapshot client

To configure a client router for snapshot routing, use the **snapshot client** interface configuration command. To disable a client router, use the **no** form of this command.

**snapshot client** *active-time* *quiet-time* [**suppress-statechange-updates**] [**dialer**]  
**no snapshot client** *active-time* *quiet-time* [**suppress-statechange-updates**] [**dialer**]

### Syntax Description

|                                     |                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>active-time</i>                  | Amount of time, in minutes, that routing updates are regularly exchanged between the client and server routers. This can be an integer in the range 5 to 100. There is no default value. A typical value would be 5 minutes.                                                                                                                                       |
| <i>quiet-time</i>                   | Amount of time, in minutes, that routing entries are frozen and remain unchanged between active periods. Routes are not aged during the quiet period, so they remain in the routing table as if they were static entries. This argument can be an integer from 8 to 100000. There is no default value. The minimum quiet time is generally the active time plus 3. |
| <b>suppress-statechange-updates</b> | (Optional) Disables the exchange of routing updates each time the line protocol goes from “down” to “up” or from “dialer spoofing” to “fully up.”                                                                                                                                                                                                                  |
| <b>dialer</b>                       | (Optional) Used if the client router has to dial up the remote router in the absence of regular traffic.                                                                                                                                                                                                                                                           |

### Default

Snapshot routing is disabled.

The *active-time* and *quiet-time* arguments have no default values.

### Command Mode

Interface configuration

### Usage Guidelines

The value of the *active-time* argument must be the same for the client and server routers.

To specify the remote server routers to be called by this client router during each active period, use the **dialer map snapshot** command.

### Example

The following example configures a client router for snapshot routing:

```
interface dialer 1
 snapshot client 5 600 suppress-statechange-updates dialer
```

Related Commands

**clear snapshot quiet-time**

**dialer map**

**show snapshot**

**snapshot server**

## snapshot server

To configure a server router for snapshot routing, use the **snapshot server** interface configuration command. To disable a server router, use the **no** form of this command.

**snapshot server** *active-time* [**dialer**]  
**no snapshot server** *active-time* [**dialer**]

### Syntax Description

|                    |                                                                                                                                                                                                                              |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>active-time</i> | Amount of time, in minutes, that routing updates are regularly exchanged between the client and server routers. This can be an integer in the range 5 to 100. There is no default value. A typical value would be 5 minutes. |
| <b>dialer</b>      | (Optional) Allows the client router to dial up the remote router in the absence of regular traffic.                                                                                                                          |

### Default

Snapshot routing is disabled.

The *active-time* argument has no default value.

### Command Mode

Interface configuration

### Usage Guidelines

The value of the *active-time* argument must be the same for the client and server routers.

### Example

The following example configures a server router for snapshot routing:

```
interface dialer 1
 snapshot server 5
```

### Related Commands

**show snapshot**  
**snapshot client**

## username

To specify the password to be used in Challenge Handshake Authentication Protocol (CHAP) caller identification and Password Authentication Protocol (PAP), use the **username** command.

**username** *name* **password** *secret*

### Syntax Description

|                 |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>name</i>     | Host name, server name, user ID, or command name.                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>password</b> | Possibly an encrypted password for this username.                                                                                                                                                                                                                                                                                                                                                                                    |
| <i>secret</i>   | For CHAP authentication: specifies the secret for the local router or the remote device. The secret is encrypted when it is stored on the local router. This prevents the secret from being stolen. The secret can consist of any string of up to 11 printable ASCII characters. There is no limit to the number of username/password combinations that can be specified, allowing any number of remote devices to be authenticated. |

### Default

No password is predefined.

### Command Mode

Global configuration

### Usage Guidelines

Add a **name** entry for each remote system that the local router requires authentication from.

The **username** command is required as part of the configuration for authentication protocols, such as CHAP and PAP. For each remote system that the local router communicates with from which it requires authentication, you add a **username** entry.

---

**Note** To enable the local router to respond to remote CHAP challenges, one **username** *name* entry must be the same as the **hostname** *name* entry that has already been assigned to your router.

---

If there is no secret specified and **debug serial-interface** is enabled, an error is displayed when a link is established and the authentication protocol challenge is not implemented. Debugging information about authentication protocols is available using the **debug serial-interface** and **debug serial-packet** commands. See the *Debug Command Reference* publication for more information.

### Example

The following example configuration enables CHAP on interface serial 0. It also defines a password for the local server, Adam, and a remote server, Eve.

```
hostname Adam
interface serial 0
encapsulation ppp
ppp authentication chap
username Eve password theirsystem
```

When you look at your configuration file, the passwords will be encrypted and the display will look similar to the following:

```
hostname Adam
interface serial 0
encapsulation ppp
ppp authentication chap
username Eve password 7 121F0A18
```

### Related Command

A dagger (†) indicates that the command is documented in another chapter.

**hostname**<sup>†</sup>

