



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 for configuration examples, refer to the “Configuring DDR” chapter in the *Wide-Area Networking 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, so that 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 Cisco IOS software activates the secondary line.
<i>disable-delay</i>	Number of seconds that elapse after the primary line comes up before the Cisco IOS software deactivates the secondary line.
never	Prevents the secondary line from being activated or deactivated.

Default

0 seconds

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

For environments in which there are spurious signal disruptions that may appear as intermittent lost carrier signals, we recommend that you enable some delay 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, use the **backup interface** interface configuration command. To disable this feature, use the **no** form of this command.

backup interface *type number*
no backup interface *type number*

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

Syntax Description

<i>type number</i>	Interface type and port number to use as the backup interface.
<i>slot</i>	Slot number of the ATM Interface Processor (AIP) interface.
<i>port</i>	Port number.

Default

Disabled

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

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

Note Routers support only serial and ISDN backup interfaces. Access servers support both asynchronous and serial backup interfaces.

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 a 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 that the traffic load must exceed to enable dial backup.
<i>disable-load</i>	Percentage of the primary line's available bandwidth that the traffic load must be less than to disable dial backup.
never	Sets the secondary line never to be activated due to traffic load.

Default

No threshold is predefined.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

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 occurs:

- 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 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

This command first appeared in Cisco IOS Release 10.0.

Chat scripts are used in dial-on-demand routing (DDR) 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.

We recommend 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 on to remote systems, where required.

Suggested Chat Script Naming Conventions

A suggested chat script naming convention is as follows:

```
vendor-type-modulation
```

If you follow this convention, 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
```

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 capability is particularly useful for dialer rotary groups and is explained further in the next section.

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 the escape sequence \c. The sequence ^x is translated into the appropriate control character, and the sequence \x is translated into x if \x is not one of the special sequences listed in Table 8.

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

Escape Sequences

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

Table 8 Chat Script Escape Sequences

Escape Sequence	Description
" "	Expect a null string.
EOT	Send an end-of-transmission character.
BREAK	Cause a BREAK. This sequence is sometimes simulated with 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.
\n	Send a newline or linefeed character.

Table 8 Chat Script Escape Sequences (Continued)

Escape Sequence	Description
\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 9.

Table 9 Sample Supported Expect-Send Pairs

Expect and Send Pair	Function
ABORT <i>string</i>	Designates a string whose presence in the input indicates that the chat script has failed.
TIMEOUT <i>time</i>	Sets the time to wait for input, in seconds. The default is 5 seconds.

For example, if a modem reports **BUSY** when the number dialed is busy, you can indicate that you want the attempt stopped at this point by including **ABORT BUSY** in your chat script.

Alternate Handlers

If you use the *expect-send* pair **ABORT SINK** instead of **ABORT ERROR**, the system terminates abnormally when it encounters **SINK** instead of **ERROR**.

Missed Characters

After the connection is established and you press the Return key, you must often press Return a second time before the prompt appears.

For example, you might include the following as part of your chat script:

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

This part of the script specifies that, after the connection is established, you want **ssword** to be displayed. If it is not displayed, you must press 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 interfaces or Basic Rate Interfaces (BRIs) 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

interface	(Optional) Indicates that one interface will be specified.
<i>type</i>	(Optional) Interface type, either async , serial , or bri .
<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

This command first appeared in Cisco IOS Release 11.0.

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
```

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 first appeared in Cisco IOS Release 11.0.

This command configures the Cisco IOS software 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 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 or access server. If you enable caller ID screening but do not have such a switch, no calls will be allowed in.

Examples

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

```
dialer caller 4155551234
```

The following example configures a router or access server 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.25*bis* modems using Electronic Industries Association (EIA) signaling only—the data terminal ready (DTR) signal—use the **dialer dtr** interface configuration command. To disable dial-on-demand routing (DDR) 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

This command first appeared in Cisco IOS Release 10.0.

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 (legacy DDR)

dialer enable-timeout

To set the length of time an interface stays down after a call has completed or failed and 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 Cisco IOS software 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 first appeared in Cisco IOS Release 10.0.

This command applies to inbound and outbound calls.

If your phone lines are often 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 overloaded.

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 (interface configuration)

To specify the amount of time that a line for which there is contention will stay idle before it 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

seconds 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

This command first appeared in Cisco IOS Release 10.0.

The dialer fast idle timer is activated if there is contention for a line. The dialer fast idle timer is activated 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.

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 timeout period, 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.

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

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 no 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 (interface configuration)

dialer map

dialer-group

To control access by configuring an interface to belong to a specific dialing group, 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

group-number Number of the dialer access group to which the specific interface belongs. This access group is defined with the **dialer-list** command. Acceptable values are nonzero, positive integers between 1 and 10.

Default

No access is predefined.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

An interface can be associated with a single dialer access group only; 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, either 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 igrp 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 list

dialer idle-timeout (interface configuration)

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 the interface before the line is disconnected. Acceptable values are positive, nonzero integers.

Default

120 seconds

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

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.

Use the **dialer idle-timeout** command to set a very high idle timer when multilink PPP is configured and you want a multilink bundle to be connected indefinitely. (The **dialer-load threshold 1** command no longer keeps a multilink bundle of *n* links connected indefinitely and the **dialer-load threshold 2** command no longer keeps a multilink bundle of 2 links connected indefinitely.)

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 (interface configuration)
dialer-group

dialer idle-timeout (map-class dialer configuration)

To specify the idle time before the calls in this map class are disconnected, use the **dialer idle-timeout** map-class dialer 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 associated with a map class before calls are disconnected. Acceptable values are positive, nonzero integers.

Default

Defaults to a value set for the interface.

Command Mode

Map-class configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

The **dialer string class** command defines the map class associated with the dial string and interface.

Example

The following example sets a dialer idle-timeout interval of 180 seconds:

```
dialer idle-timeout 180
```

Related Command

dialer string (dialer profiles)

dialer in-band

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

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

Syntax Description

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

Default

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

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

The **dialer in-band** command specifies that chat scripts will be used on asynchronous interfaces 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 as the parity bit.)

If an interface 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 (legacy DDR)

dialer isdn

To specify the bit rate used on the B channel associated with a specified map class and to specify whether to set up semipermanent connections for this map class, use the **dialer isdn** map-class configuration command.

```
dialer isdn [speed speed] [spc]  
no dialer isdn [speed speed] [spc]
```

Syntax Description

speed <i>speed</i>	(Optional) Bit rate, in kilobytes per second (Kbps), used on the ISDN B channel. Values are 56 and 64 . Default is 64.
spc	(Optional) Specifies that an ISDN semipermanent connection is to be used for calls associated with this map class.

Default

Bit rate is 64 Kbps. Semipermanent connections are not set up.

Command Mode

Map-class dialer configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

This command is valid for ISDN interfaces only.

Example

The following example configures a speed of 56 Kbps and no semipermanent connections for the *Eng* map class:

```
dialer string 4156884540 class Eng  
  
! This map-class ensures that these calls use an ISDN speed of 56 kbps and that  
! no semipermanent connection is set up.  
map-class dialer Eng  
isdn speed 56
```

Related Command

dialer string (dialer profiles)

dialer-list list

To apply an access list to a specified dialer group (and thus to specify which packets can initiate a dialed call), use the **dialer-list list** global configuration command. To remove a prior association between an access list and the dialer group, 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>	Number of a dialer access group identified in any dialer-group interface configuration command.
<i>access-list-number</i>	Access list number specified in any IP or Novell IPX access lists, including Novell IPX extended service access point (SAP) access lists and bridging types. See Table 10 for the supported access list types and numbers.

Default

No dialer list group is defined.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

The **dialer-list list** command applies access lists to dialer groups to control dialing using DDR. This command applies access lists to the dialer groups that are defined with the **dialer-group** command.

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

Table 10 lists the access list types and numbers that the **dialer-list list** command supports.

Table 10 Access List Numbers for the Dialer-List List Command

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

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, Interior Gateway Routing Protocol (IGRP) Transmission Control Protocol/Internet Protocol (TCP/IP) routing protocol updates are not classified as interesting and do not initiate calls:

```
access-list 101 deny igrp 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 dialer-group interface configuration command.
<i>protocol-name</i>	One of the following protocol keywords: appletalk , bridge , clns , clns_es , clns_is , decnet , decnet_router-L1 , decnet_router-L2 , decnet_node , ip , ipx , vines , or xns .
permit	Permits access to an entire protocol.
deny	Denies access to an entire protocol.
list	Specifies that an access list will be used for defining a granularity finer than an entire protocol.
<i>access-list-number</i>	Access list numbers specified in any DECnet, Banyan VINES, IP, Novell IPX, or XNS standard or extended access lists, including Novell IPX extended service access point (SAP) access lists and bridging types. See Table 11 for the supported access list types and numbers.
<i>access-group</i>	Filter list name used in the clns filter-set and clns access-group commands.

Default

No dialer lists are defined.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0. The **list** command and *access-list-number* and *access-group* arguments first appeared in Cisco IOS Release 10.3.

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.

Although the **dialer-list list** command is still supported for IP, IPX, DECnet, AppleTalk, XNS, and bridging, the new **dialer-list protocol list** command should be used for all protocols. The **dialer-list protocol list** command is supported for all those protocols and also for Banyan VINES and International Organization for Standardization (ISO) Connectionless Network Service (CLNS).

Table 11 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 11 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 Routing Table Protocol (RTP) routing updates to trigger calls, but allow any other data packets to trigger calls.

```
access-list 101 deny igmp 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 Connectionless Network Service (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 outside this chapter.

access-list †
clns filter-set †
dialer-group
dialer-list list
vines access-list †

dialer load-threshold

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

```
dialer load-threshold load [outbound | inbound | either]  
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%.
outbound	(Optional) Calculates the actual load using outbound data only.
inbound	(Optional) Calculates the actual load using inbound data only.
either	(Optional) Sets the maximum calculated load as the larger of the outbound and inbound loads.

Default

No maximum load is predefined.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

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 and 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.

The load calculation determines how much of the total bandwidth you are using. A *load* value of 255 means that you are using one hundred percent of the bandwidth. The load number is required.

See the “Interface Commands” chapter in the *Configuration Fundamentals Command Reference* for a full description of the **bandwidth** command.

When multilink PPP is configured, the **dialer-load threshold 1** command no longer keeps a multilink bundle of n links connected indefinitely and the **dialer-load threshold 2** command no longer keeps a multilink bundle of 2 links connected indefinitely. If you want a multilink bundle to be connected indefinitely, you must set a very high idle timer.

Example

In the following example, if the load to a particular destination on an interface in dialer rotary group 5 exceeds interface load 200, the dialer will initiate another call to the destination:

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

Related Commands

A dagger (†) indicates that the command is documented outside this chapter.

bandwidth †

interface dialer

dialer rotary-group

dialer map

To configure a serial interface or Integrated Services Digital Network (ISDN) interface to call one or multiple sites, use a form of the **dialer map** interface configuration command; all options are shown in the first form of the command. To delete a particular dialer map entry, use a **no** form of this command.

```
dialer map protocol next-hop-address [name hostname] [spc] [speed 56 | 64] [broadcast]
[modem-script modem-regexp] [system-script system-regexp]
[dial-string[:isdn-subaddress]]
```

```
no dialer map protocol next-hop-address [name hostname] [spc] [speed 56 | 64] [broadcast]
[modem-script modem-regexp] [system-script system-regexp]
[dial-string[:isdn-subaddress]]
```

To configure a serial interface or ISDN interface to place a call to multiple sites and to authenticate calls from multiple sites, use the second form of the **dialer map** command:

```
dialer map protocol next-hop-address [name hostname] [spc] [speed 56 | 64] [broadcast]
[dial-string[:isdn-subaddress]]
```

```
no dialer map protocol next-hop-address [name hostname] [spc] [speed 56 | 64] [broadcast]
[dial-string[:isdn-subaddress]]
```

To configure a serial interface or ISDN interface to support bridging, use the third form of the command:

```
dialer map bridge [name hostname] [spc] [broadcast] [dial-string[:isdn-subaddress]]
no dialer map bridge [name hostname] [spc] [broadcast] [dial-string[:isdn-subaddress]]
```

To configure an asynchronous interface to place a call to a single site that has no modem script assigned or that requires a system script, or to multiple sites on a single line, on multiple lines, or on a dialer rotary group, use the fourth form of the **dialer map** command:

```
dialer map protocol next-hop-address [name hostname] [broadcast] [modem-script
modem-regexp] [system-script system-regexp] [dial-string]
no dialer map protocol next-hop-address [name hostname] [broadcast] [modem-script
modem-regexp] [system-script system-regexp] [dial-string]
```

Syntax Description

<i>protocol</i>	Protocol keywords; one of the following: appletalk , bridge , clns , decnet , ip , ipx , novell , snapshot , vines , and xns .
<i>next-hop-address</i>	Protocol address used to match against addresses to which packets are destined. This argument is not used with the bridge protocol keyword.
name	(Optional) Indicates the remote system with which the local router or access server communicates.
<i>hostname</i>	(Optional) Case-sensitive name or ID of the remote device (usually the host name). For routers with ISDN interfaces, if calling line identification—sometimes called <i>CLI</i> , but also known as <i>caller ID</i> and <i>automatic number identification</i> (ANI)—is provided, the <i>hostname</i> field can contain the number that the calling line ID provides.

spc	(Optional) Specifies a semipermanent connection between customer equipment and the exchange; used only in Germany to configure connections between an ISDN BRI and a 1TR6 ISDN switch type.
speed 56 64	(Optional) Keyword and value indicating the line speed in kilobits per second to use. Used for ISDN only. The default speed is 64 kbps.
broadcast	(Optional) Indicates that broadcasts should be forwarded to this protocol address.
modem-script	(Optional) Indicates the modem script to be used for the connection (for asynchronous interfaces).
<i>modem-regexp</i>	(Optional) Regular expression to which a modem script will be matched (for asynchronous interfaces).
system-script	(Optional) Indicates the system script to be used for the connection (for asynchronous interfaces).
<i>system-regexp</i>	(Optional) Regular expression to which a system script will be matched (for asynchronous interfaces).
<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. <i>The dial string and ISDN subaddress, if used, must be the last item in the command line.</i>
<i>:isdn-subaddress</i>	(Optional) Subaddress number used for ISDN multipoint connections.

Defaults

No dialer map is configured. The default speed is 64 kbps. No scripts are defined for placing calls.

Command Mode

Interface configuration

Usage Guidelines for Synchronous Interfaces

This command first appeared in Cisco IOS Release 10.0.

Use the **dialer map** command with the **name** keyword in configurations in which remote sites are calling a central site, but the central site is not calling the remote site. With this command, the local device will authenticate the remote site using Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP), which will transmit the remote site's host name to the central site. The central site will then use this name to authenticate the caller, and will use the next hop address to transmit packets to the remote site. Because there is no dialer string specified, the central site cannot call the remote router.

Usage Guidelines for ISDN Interfaces

Use the **dialer map** command with the **name** keyword in configurations in which remote sites are calling a central site, but the central site is not calling the remote site. With this command, the local device will authenticate the remote site using CHAP or PAP, which will transmit the remote site's host name to the central site. The central site will then use this name to authenticate the caller, and will use the next hop address to transmit packets to the remote site. Because there is no dialer string specified, the central site cannot call the remote router.

For ISDN interfaces only, you can specify an optional speed parameter for **dialer map** commands if you also specify a dial string. This option informs the ISDN software whether it should place a call at 56 or 64 kbps. If you omit the ISDN speed parameter, the default is 64 kbps.

For routers with ISDN interfaces, if calling line identification (CLI)—also known as *caller ID* and *ANI*—is provided, the *hostname* field may contain the number that calling line ID provides.

Usage Guidelines for Asynchronous Interfaces

Specify chat scripts for a physical interface that is not part of a dialer rotary group if no chat script is specified for the line, or if an additional (system) chat script is required to log on to the remote system.

Configure a **dialer map** command for each remote destination for that interface.

You do not need to specify a system script under the following conditions:

- The modem script can be used to dial in and log on to the remote system.
- You are calling a system that does not require a login script—that is, a system that answers and immediately goes into protocol mode.

If you adhere to the chat script naming convention suggested in the description of the **chat-script** command, use the form [**modem-script** **modulation-type*] in the **dialer map** command; for example, **-v32bis*. This form allows you to specify the modulation type that is best for the system you are calling, and allows the modem type for the line to be specified by the **script dialer** command.

The period (.) is a wildcard that matches any character, and the asterisk (*) indicates that the preceding character can be duplicated multiple times. For more information about regular expressions, see the “Regular Expressions” appendix in the *Access Services Command Reference*.

If a modem script is specified in the **dialer map** interface configuration command and a modem script specified in the **script dialer** line configuration command, the first chat script that matches both is used. If no script matches both, an error message is logged and the connection is not established. If there is no modem chat script specified for the line, the first chat script (that is, the one specified in the **chat-script** global configuration command) that matches the modem script's regular expression is used. If there is a system script specified in the **dialer map** interface configuration command, the first chat script to match the regular expression is used.

The **modem-script** and **system-script** keywords and corresponding arguments are optional. They are ignored on synchronous interfaces.

If you have named your chat script according to the type of modem and modulation (for example, *codex-v32* or *teletbit v32*), your regular expression could be **codex-*** in the **script dialer** line configuration command, and ***-v32bis** in the modem script specified in the **dialer map** command for a system that you wish to connect to using V.32bis modulation.

The modem lines (specified by the argument *regex* in the **script dialer** line configuration 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-.***

With an interface configured for Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP) and configured with the **name** *hostname* keyword and argument pair, the local device authenticates the remote site using CHAP, which transmits the remote site's host name to the central site. The central site then uses this name to authenticate the caller and uses the next hop address to transmit packets to the remote site. Because no dialer string is specified, the central site cannot call the remote router.

For routers with ISDN interfaces, if calling line identification (CLI)—also known as *caller ID* and *ANI*—is provided, the *hostname* field can contain the number that calling line ID provides.

Examples

In the following example, the dialer speed is set at 56 kbps to call a remote site at 131.108.2.5:

```
interface async 1
encapsulation ppp
ppp authentication chap
dialer map ip 131.108.2.5 speed 56
```

The following example shows a dialing chat script and a login chat script. The **dialer in-band** command enables DDR on asynchronous interface 10, and the **dialer map** command looks for the specified dialing and the login scripts and then uses those scripts to dial 96837890.

```
chat-script dial ABORT ERROR "" "AT Z" OK "ATDT \T" TIMEOUT 30 CONNECT \c
chat-script login ABORT invalid TIMEOUT 15 name: billw word: wewpass ">"
                    "slip default"

interface async 10
dialer in-band
dialer map ip 10.55.0.1 modem-script dial system-script login 96837890
```

In the following example, the remote site is calling the central site, and the central site is calling the remote site. The central router can use the name *ZZZ* to authenticate the remote router when they connect and also can use the dialer string 14155553434 to call the remote router if it is not currently connected.

```
interface async 1
dialer map ip 131.108.2.5 name ZZZ 14155553434
```

In the following example, a remote site is calling a central site, but the central site is not calling the remote site. The local device will authenticate the site that is calling in using CHAP. CHAP will cause the remote site's name, *YYY*, to be transmitted to the site it is calling. The central site will then use this name to authenticate the remote site.

```
interface async 1
encapsulation ppp
ppp authentication chap
dialer map ip 131.108.2.5 name YYY
```

Related Commands

A dagger (†) indicates that the command is documented outside this chapter.

chat-script

ppp authentication chap †

ppp authentication pap †

username †

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>	A 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

This command first appeared in Cisco IOS Release 10.3.

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 max-calls

To specify, for a dialer profile, the maximum number of calls to a remote destination that can be up at any one time, use the **dialer max-calls** interface configuration command.

dialer max-calls *number*

Syntax Description

number

Maximum number of calls that can be up to a destination, in the range 1 through 255. Default is 255 calls.

Default

255 calls

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

This command applies to dialer interfaces only.

This command is used mainly to set the maximum number of calls below the maximum possible.

Example

The following example sets a maximum of six calls that can be open concurrently:

```
dialer max-calls 6
```

Related Commands

dialer isdn

dialer string (dialer profiles)

dialer pool-member

To configure a physical interface to be a member of a dialing pool, use the **dialer pool-member** interface configuration command.

dialer pool-member *number* [**priority** *priority*] [**min-link** *minimum*] [**max-link** *maximum*]

Syntax Description

<i>number</i>	Dialing pool number, in the range 1 through 255.
priority <i>priority</i>	(Optional) Priority of this interface within the dialing pool, in the range 0 (lowest) to 255 (highest). Interfaces with the highest priority are selected first for dialing out. Default is 0.
min-link <i>minimum</i>	(Optional) Minimum number of B channels on this interface that are reserved for this dialing pool, in the range 0 to 255. Default is 0. A reserved channel is inactive until the specified interface uses it to place calls. Applies to ISDN interfaces only.
max-link <i>maximum</i>	(Optional) Maximum number of B channels on this interface that can be used by this dialing pool, in the range 0 to 255. Default is 255. Applies to ISDN interfaces only.

Defaults

Disabled. When enabled, no default dialing pool number is assigned; the default value of *priority*, and *minimum* is 0; the default value of *maximum* is 255.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

This command applies to asynchronous serial, synchronous serial, BRI, and PRI *physical* interfaces only. It does not apply to dialer interfaces.

The common number used in the **dialer pool** command and in the **dialer pool-member** command links the physical interface and dialer interface configurations together.

The min-link keyword and value are used primarily for dial backup.

Examples

This following example shows the configuration of one ISDN BRI interface to be a member of dialer pool 2 with priority 100:

```
interface BRI2
 encapsulation ppp
 dialer pool-member 2 priority 100
 ppp authentication chap
```

In the following example, BRI physical interface configuration BRI 1 has a reserved channel in dialer pool 3. That channel is inactive until BRI 1 uses it to place calls.

```
interface BRI1
encapsulation ppp
dialer pool-member 1 priority 50
dialer pool-member 2 priority 50
! BRI 1 has a reserved channel in dialer pool 3; the channel remains inactive
! until BRI 1 uses it to place calls.
dialer pool-member 3 min-link 1
ppp authentication chap
```

Related Command

dialer pool

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

number 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, the lowest priority.

Default

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

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command is meaningful only for interfaces that are part of dialer rotary groups.

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.

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

For example, a router or access server might have a selection of many modems, some of which are better performers than others. You might have a 19.2-kbps, two 4800-bps, three 1200-bps, and one 300-bps modem on interfaces in one dialer rotary group. You do not want the router or access server to make the call on the 300-baud modem if any of the faster modems are free. You want to use the highest-performance modems first, and the slowest modems last.

Example

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

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

Related Commands

interface dialer
dialer rotary-group

dialer remote-name

To specify, for a dialer interface, the authentication name of the remote router on the destination subnetwork, use the **dialer remote-name** interface configuration command.

dialer remote-name *username*

Syntax Description

username Case-sensitive character string identifying the remote device; maximum length is 255 characters.

Default

Disabled. No default username is specified.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

This command applies only to dialer interfaces.

When using CHAP or PAP authentication, *username* is the name of the remote device that is authenticating.

Example

```
dialer remote-name dallas
```

Related Commands

A dagger (†) indicates that the command is documented outside this chapter.

ppp authentication chap †

ppp authentication pap †

dialer rotary-group

To include a specified 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. This is 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

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Example

The following example places asynchronous 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 rotor

To specify the method for identifying the outbound line to be used for ISDN or asynchronous DDR calls, use the **dialer rotor** interface configuration command.

dialer rotor { **priority** | **best** }

Syntax Description

priority	Selects the first outbound line with the highest priority; this is the selection criterion that was previously used.
best	Selects the outbound line with the most recent success. If that line also has the most recent failure, then it will try the line with the least recent failure. If that line also has the most recent failure, it will then try an as-of-yet untried outbound line.

Default

Disabled

Command Mode

Interface Configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command allows the router to skip outbound ISDN BRI and asynchronous lines that have problems. This command would not be useful for ISDN PRI, unless your local telephone service provider has problems keeping your lines properly configured.

Related Command

dialer priority

dialer string (dialer profiles)

To specify the string (telephone number) to be used when placing a call from an interface, use the **dialer string** interface configuration command. To delete the telephone number specified for the interface, use the **no** form of this command.

```
dialer string dial-string [class class-name]  
no dialer string
```

Syntax Description

<i>dial-string</i>	Telephone number to be sent to a DCE device.
class <i>class-name</i>	(Optional) Dialer map class associated with this telephone number.

Default

No telephone numbers and class names are predefined.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

When you use dialer profiles for DDR, use the **dialer string class** form of this command to define a map class for a dialer profile.

Dialer profiles make it unnecessary to use dialer maps to configure DDR.

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

Example

```
dialer string 4159991234 class sf
```

Related Commands

dialer remote-name
interface dialer

dialer string (legacy DDR)

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 device.
<i>:isdn-subaddress</i>	(Optional) ISDN subaddress.

Default

No strings are predefined.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

To use this command on an asynchronous interface, you must define a modem chat script 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 is never initiated. If the **debug dialer** command is enabled, an error message is 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 12. 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.

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

Table 12 ITU-T V.25bis Options

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

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 (interface configuration)

To specify the length of time the interface waits 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

seconds 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

This command first appeared in Cisco IOS Release 10.0.

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

dialer wait-for-carrier-time (map-class dialer configuration)

To specify the length of time to wait for a carrier when dialing out to the dial string associated with a specified map class, use the **dialer wait-for-carrier-time** map-class dialer 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

seconds 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

Map-class dialer configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

You can define different dialer map classes with different wait-for-carrier times to suit the different types of lines and interfaces. For example, you must define a longer wait time for a map class used by serial interfaces than for one used by ISDN interfaces.

Example

The following example specifies a carrier wait time of 20 seconds for the *Eng* class on the *Dialer2* interface:

```
interface Dialer2
 ip address 2.2.2.2 255.255.255.0
 encapsulation ppp
 dialer remote-name Mediumuser
 dialer string 5264540 class Eng
 dialer wait-for-carrier-time 20
 dialer load-threshold 50 either
 dialer pool 1
 dialer-group 2
```

Related Command

dialer string (dialer profiles)

interface dialer

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

interface dialer *number*

Syntax Description

number 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

This command first appeared in Cisco IOS Release 10.0.

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 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

To define a class of shared configuration parameters associated with the **dialer map** command, use the **map-class dialer** global configuration command.

map-class dialer *classname*

Syntax Description

classname Unique class identifier.

Default

Disabled; no class name is provided.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

The *classname* must be the same as the *classname* in the **dialer map** command.

Example

```
map-class dialer hawaii
```

Related Command

dialer map

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

regex Specifies the set of modem scripts that might be executed. The first script that matches the argument *regex* will be used.

Default

No chat script is defined.

Command Mode

Line configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

This command is used by DDR 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 *Access Services Command Reference*.

If you adhere to the naming convention recommended for chat scripts (see the **chat-script** command), the modem lines (the argument *regex* in the **script dialer** command) will 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 can 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 outside this 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 display general diagnostic information for interfaces configured for DDR, use the **show dialer EXEC** command.

```
show dialer [interface type number]
```

Syntax Description

interface	(Optional) Displays information for the interface specified by the arguments <i>type</i> and <i>number</i> .
<i>type</i>	(Optional) Interface type.
<i>number</i>	(Optional) Interface number.

Command Mode

EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Sample Displays

If you enter the **show dialer interface** command for the D channel of an ISDN BRI or PRI, the command output also displays the B channels. That is, the command **show dialer interface bri 0** displays information of interfaces bri 0, bri 0:1, and bri 0:2. The command **show dialer interface serial 0:23** (for a channelized T1 line configured for ISDN PRI) displays information for serial interfaces 0:23, 0:0, 0:1, and so forth to 0:22.

If you have defined a dialer group that consists of the interfaces serial 0, serial 1, and bri 2, the command **show dialer interface dialer 1** displays information for interfaces bri 0, bri 0:1, bri 0:2, serial 1, and serial 0.

The following is sample output from the **show dialer** command for a BRI interface when dialer profiles are configured:

```
impulse# show dialer interface bri 0
BRI0 - dialer type = ISDN

Dial String      Successes   Failures    Last called   Last status

0 incoming call(s) have been screened.

BRI0: B-Channel 1
Idle timer (120 secs), Fast idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs)

Dialer state is data link layer up

Dial reason: ip (s=6.1.1.8, d=6.1.1.1)

Interface bound to profile Dialer0

Time until disconnect 102 secs
Current call connected 00:00:19
```

```

Connected to 5773872 (wolfman)

BRI0: B-Channel 2
Idle timer (120 secs), Fast idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs)
Dialer state is idle

```

Table 13 describes significant fields shown in the display.

Table 13 Show Dialer Interface BRI Field Descriptions

Field	Description
BRI0 - dialer type = ISDN	ISDN dialer.
Dial string	Dial strings of logged calls (telephone numbers). On ISDN BRI interfaces, if you have specified a subaddress number in the dialer string , 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).
0 incoming call(s) have been screened.	Number of calls subjected to Dialer Profiles screening to determine how the call is to be treated.
BRI0: B-Channel 1	Header indicating the following data is for B channel 1.
Idle timer (120 secs), Fast idle timer (20 secs)	Settings (in seconds)for the idle timer and the fast idle timer.
Wait for carrier (30 secs), Re-enable (15 secs)	Settings (in seconds)for the wait for carrier timer and the renewable timer.
Dialer state is data link layer up	The message “data link layer up” suggests that the dialer came up properly; if it says anything else then dialer did not come up properly. The message “physical layer up” means the line protocol (LCP) came up, but the NCP did not come up. The show interfaces command also provides the similar information.
Dial reason: ip (s=6.1.1.8, d=6.1.1.1)	What initiated the dial, namely an IP packet, plus source and destination address in the packet.
Interface bound to profile Dialer0	Dialer profile that is bound to this interface or B channel.
Time until disconnect	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.

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)

```

show dialer

```
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 14 describes significant fields shown in the display.

Table 14 Show Dialer Interface Async 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.
Dial string	Dial strings of logged calls (telephone numbers). On ISDN BRI interfaces, if you have specified a subaddress number in the dialer string or dialer map 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 dialer string command, the word <i>Default</i> 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 14 describes additional fields shown in the display.

Table 15 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. (The value decrements each second.) Then the duration of the current connection is shown. The following shows an example of this display; it appears 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 it can dial again. The following is an example of this display; it appears 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:

```
Asyncl 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. The interface “dials on demand” in response to packets being routed to it. But because no packets are routed to down interfaces, the interface must pretend to be up (spoo) so packets will be routed to it when it is not connected. Spoofing is 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.

show snapshot

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

```
show snapshot [type number]
```

Syntax Description

type number (Optional) Interface type and number.

Command Mode

EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

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 16 describes the fields shown in the display.

Table 16 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:	Option configured on the snapshot client or snapshot server interface configuration command. It can be one of the following: <ul style="list-style-type: none"> dialer support—Snapshot routing is configured with the dialer keyword. stay asleep on carrier up—Snapshot routing is configured with the suppress-statechange-updates keyword.
Length of each activation period	Length of the active period.
Period between activations	Length of the quiet period.

Table 16 Show Snapshot Fields (Continued)

Field	Description
Retry period on connect failure	Length of the retry period.
For dialer address	Displays information about each dialer rotary group configured with the dialer map command.
Current queue:	Indicates which period snapshot routing is currently in. It can be one of the following: <ul style="list-style-type: none"> • active—Routing updates are being exchanged. • client quiet—The client router is in a quiet period and routing updates are not being exchanged. • 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. • 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. • no queue—This is a temporary holding queue for new snapshot routing interfaces and for interfaces being deleted.
remaining active time 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 or access server 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 is 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.
suppress-statechange-updates	(Optional) Disables the exchange of routing updates each time the line protocol goes from “down” to “up” or from “dialer spoofing” to “fully up.”
dialer	(Optional) Used if the client router has to dial up the remote router in the absence of regular traffic.

Defaults

Snapshot routing is disabled.

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

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

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 snapshot

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 is 5 minutes.
dialer	(Optional) Allows the client router to dial up the remote router in the absence of regular traffic.

Defaults

Snapshot routing is disabled.

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

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

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