Modem Always-On; and Network Element Dial-Out Prevention

This feature enables a TTY X.28-configured line to interpret characters from network elements without first having to receive a RING, CTS, or DSR signal. The feature also allows you to require that a DSR signal be received by the line before the router will interpret characters from network elements or the network. Finally, this feature enables you to have the TTY line prevent network elements from sending characters until an appropriate X.25 switched virtual circuit (SVC) has been set up.

History for the Modem Always-On and Network Element Dial-Out Prevention Feature

Release	Modification
12.3(11)YN	This feature was introduced.
12.4(4)T	This feature was integrated into Cisco IOS 12.4(4)T.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** when presented with the login screen and follow the instructions that appear.

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Prerequisites for Modem Always-On and NE Dial-Out Prevention

- Because legacy PAD provides insufficient support for Modem Always-On, you must enter the **autocommand x28** command during its configuration. You will see this illustrated in detail in the configuration sections further on in this document.
- For NE Dial-Out Prevention, the TTY line being configured must run an X.28 user emulation session.

Restrictions for Modem Always-On and NE Dial-Out Prevention

This feature is supported only for X.28 PAD connections.

Information About Modem Always-On and NE Dial-Out Prevention

When the **modem always-on** command has taken effect, the TTY line can interpret characters received from network elements without waiting for a RING, CTS, or DSR signal to arrive. (Similarly, when the **modem printer always-on** command has taken effect, the TTY line can interpret characters received from network elements without waiting for a CTS signal to arrive). These arrangements can be useful, for example, when you need to run an X.28 user emulation session on a TTY line that has only TX, RX, and Ground signals.

However, until an appropriate X.25 SVC has also been set up, all characters received through the TTY line from the network element will be dropped.

Also, because some network elements might then be capable of sending characters without first dialing out or receiving an inbound call, the command **x28 no-outgoing** has become available. With this command you can prevent the network element from dialing out (until an appropriate X.25 SVC has been set up).

How to Configure Modem Always-On

If you want the router to wait for an incoming DSR signal before it will interpret network element characters, use the **modem printer always-on** command. However, if you prefer that the router begin interpreting network element characters without waiting for a DSR signal (nor a RING or CTS signal) use the **modem always-on** command.

Requiring a DSR Signal ("modem printer always-on")

Prerequisites

The line must be configured with "**autocommand x28**".

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **line** *line_number*
4. **autocommand x28**
5. **modem printer [delay | always-on [delay]]**
6. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**line [aux | console | tty | vty]** *line-number* [*ending-line-number*] **Example:** `Router(config)# line 48`	Identifies a specific line for configuration, and enters line configuration mode.
Step 4	**autocommand x28** **Example:** `Router(config-line)# x28 autocommand`	Makes this line available to receive calls coming from the network via the router.

	Command or Action	Purpose
Step 5	**modem printer always-on [delay | always-on [delay]]** **Example:** `Router(config-line)# modem printer always-on`	Enables the line to interpret characters received from network elements after it receives a DSR signal. The line need not wait for a CTS signal.
Step 6	**exit** **Example:** `Router# exit`	Moves back into global configuration mode.

Example

```
Router> enable
Router# configure terminal
    Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# line 48
Router(config-line)# autocommand x28
Router(config-line)# modem printer always-on
Router(config-line)# exit
Router(config)#
```

What to Do Next

If you want to see confirmation of the new ‘modem-on’ state of the line, use the **show line** command. The line’s modem is displayed as "printer" (in the 5th column), its Capability as "Modem...Always on" (8th line), and its state is shown as "Ready" (9th line):

```
Router# show line tty 48
   Tty  Typ     Tx/Rx    A Modem    Roty AccO AccI   Uses   Noise  Overruns   Int
*   48  TTY   9600/9600  - printer    1    -    -      0       0     0/0       -

Line 48, Location: "", Type: ""
Length: 24 lines, Width: 80 columns
Baud rate (TX/RX) is 9600/9600, no parity, 2 stopbits, 8 databits
Status: Ready, Modem Signals Polled
Capabilities: Modem CTS-Required, Always on
Modem state: Ready
Modem hardware state: CTS* DSR*  DTR RTS
. . .
```

Requiring no DSR, CTS, or RING Signal (”modem always-on“)

Prerequisites

The line must be configured with "**autocommand x28**".

SUMMARY STEPS

1. **enable**

2. **configure terminal**
3. **line** *line_number*
4. **autocommand x28**
5. **modem always-on**
6. **exit**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**line [aux | console | tty | vty]** *line-number* [*ending-line-number*] **Example:** `Router(config)# line 35`	Identifies a specific line for configuration, and enters line configuration mode.
Step 4	**autocommand x28** **Example:** `Router(config-line)# x28 autocommand`	Makes this line available to receive calls coming from the network via the router.
Step 5	**modem always-on** **Example:** `Router(config-line)# modem always-on`	Enables the line to interpret characters received from network elements without waiting for a RING, CTS, or DSR signal.
Step 6	**exit** **Example:** `Router# exit`	Moves back into global configuration mode.

Example

```
Router> enable
Router# configure terminal
    Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# line 97
Router(config-line)# autocommand x28
Router(config-line)# modem always-on
Router(config-line)# exit
Router(config)#
```

What to Do Next

If you want to see confirmation of the new ‘modem-on’ state of the line, use the **show line** command. In the following sample output display, line 35 has been configured with the feature. (Modem status is given in the fifth column.)

```
Router# show line
   Tty Typ     Tx/Rx    A Modem  Roty AccO AccI   Uses   Noise  Overruns   Int
*    0 CTY              -    -      -    -    -      0       0     0/0       -
    33 TTY   9600/9600  -    -      -    -    -      0       0     0/0       -
    34 TTY 115200/115200- inout     1    -    -      0       0     0/0       -
*   35 TTY   9600/9600  - always-on 1    -    -      0       0     0/0       -
    36 TTY   9600/9600  -    -      -    -    -      0       0     0/0       -
```

You can also use the **show line** command to display information only about the line you configured. In that case, the line’s modem state will be displayed as "Ready":

```
Router# show line 35
   Tty Typ     Tx/Rx    A Modem  Roty AccO AccI   Uses   Noise  Overruns   Int
*   35 TTY   9600/9600  - always-on   1    -    -      0       0     0/0       -

Line 35, Location: "", Type: ""
Length: 24 lines, Width: 80 columns
Baud rate (TX/RX) is 9600/9600, no parity, 2 stopbits, 8 databits
Status: Ready, Active, No Exit Banner
Capabilities: Modem RI is CD, Round Robin Selection
Modem state: Ready
Modem hardware state: noCTS noDSR  DTR RTS
. . .
```

How to Prevent NE Dial-Out

Prerequisites

The TTY line must already have been configured for X.28 user emulator mode.

SUMMARY STEPS

1. **enable**
2. **x28 no-outgoing**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**x28 no-outgoing** **Example:** `Router# x28 no-outgoing`	Configures X.28 user emulation mode to prevent network elements from dialing out.

Caution Do not use the **x28 no-outgoing** command on the console, because that will lock the console. Then, to unlock it, you will have to log in from a different TTY (or a VTY), and if such a line is not available, you will have to reload the router.

Examples

The following example configures X.28 user emulation mode for all TTY lines on the router to prevent network elements from calling out:

```
Router# x28 no-outgoing
```

The following example configures X.28 user emulation mode only on TTY line 33, in autocommand, to prevent network elements from calling out through that line:

```
Router# configure terminal
    Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# line 33
Router(config-line)# autocommand x28 no-outgoing
Router(config-line)# exit
```

Configuration Example for Modem Always-On and NE Dial-Out Prevention

```
Router> enable
Router# configure terminal
    Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)# line 35
Router(config-line)# modem always-on
Router(config-line)# autocommand x28 no-outgoing
Router(config-line)# end
Router# show line 35
Tty Typ     Tx/Rx     A Modem     Roty AccO AccI   Uses   Noise  Overruns   Int
*35 TTY    9600/9600   - always-on   1    -    -      0   0       0/0        -


Line 35, Location: "", Type: ""
Length: 24 lines, Width: 80 columns
Baud rate (TX/RX) is 9600/9600, no parity, 2 stopbits, 8 databits
Status: Ready, Active, No Exit Banner
Capabilities: Modem RI is CD, Round Robin Selection
Modem state: Ready
Modem hardware state: noCTS noDSR  DTR RTS
Rotary address 45678
Special Chars: Escape  Hold  Stop  Start  Disconnect  Activation
                ^^x    none   -     -       none
Timeouts:      Idle EXEC    Idle Session   Modem Answer  Session   Dispatch
               00:10:00        never                        none     not set
                            Idle Session Disconnect Warning
                              never
                            Login-sequence User Response
                             00:00:30
                            Autoselect Initial Wait
                              not set
Modem type is unknown.
Session limit is not set.
Time since activation: 00:04:27
Editing is enabled.
History is enabled, history size is 20.
DNS resolution in show commands is enabled
Full user help is disabled
Allowed input transports are pad.
Allowed output transports are pad v120 telnet rlogin.
Preferred transport is telnet.
Automatically execute command "x28 no-outgoing"
No output characters are padded
No special data dispatching characters
Router#
```

Technical Assistance

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/techsupport

Command Reference

This section documents new and modified commands only.

- **modem always-on**
- **modem printer**
- **x28 no-outgoing**

modem always-on

To make a TTY line always ready to interpret characters from network elements, use the **modem always-on** command in line configuration mode. To disable, use the **no** form of this command.

modem always-on

no modem always-on

Syntax Description

No syntax.

Command Default

Off is the default condition.

Command Modes

Line configuration mode.

Command History

Release	Modification
12.3(11)YN	This command was introduced.
12.4(4)T	This command was integrated into the T train.

Usage Guidelines

To make the line available to receive calls coming from the network via the router, you must also configure the line with "**autocommand x28**".

Examples

The following example makes TTY line 97 able to interpret characters received from network elements, without having to wait for other incoming signals:

```
Router(config)# line 97
Router (config-line)# modem always-on
```

Related Commands

Command	Description
modem printer [delay| always-on [delay]]	Configures a line to receive a Data Set Ready (DSR) signal before it will interpret incoming characters from a network element.

modem printer

To configure a line to require receipt of a Data Set Ready (DSR) signal, use the **modem printer** command in line configuration mode. Use the **no** form of this command to require the Clear to Send (CTS) signal instead.

modem printer [delay | always-on [delay]]

no modem printer

Syntax Description

delay	Causes router to delay assertion of the data terminal ready (DTR) signal until a network connection has been established.
always-on	Makes the line ready to interpret characters from network elements.
delay	While the **always-on** option is operating, this delays DTR signal assertion until a network connection has been established.

Command Default

No modem control.

Command Modes

Line configuration mode.

Command History

Release	Modification
11.1	This command was introduced.
12.2T	The ‘delay’ option was added.
12.3(11)YN	The ‘always-on’ option was added.

Usage Guidelines

1. By using DSR as the modem control signal, this command leaves the CTS (Clear to Send) signal free for use with hardware flow control. You therefore can configure hardware flow control concurrently. [Although the **modem dialin** command supports modems concurrently with hardware flow control, the other auxiliary modem control options for printers, such as **modem cts-required**, use CTS instead of DSR/CD, as the carrier detect (CD) signal.]
2. To make the line available to receive calls coming from the network via the router with the **always-on** keyword, you must also configure that line with "**autocommand x28**".

Examples

The following example configures a line to send a DSR signal to the modem:

```
Router(config)# line 5
Router (config-line)# modem printer
```

The following example configures a line to become ready to interpret characters from network elements when it receives a DSR signal:

```
Router(config)# line 5
Router (config-line)# modem printer always-on
```

Related Commands

Command	Description
flowcontrol	Sets the method of data flow control between the router and a terminal or other serial device.
modem always-on	Makes a TTY line always ready to interpret characters from network elements, without waiting to receive a DSR, RING or CTS signal.

x28 no-outgoing

To configure X.28 user emulation mode to prevent a network element from dialing out, use the **x28 no-outgoing** command in user EXEC or privileged EXEC mode. To disable, use the **no** form of this command.

x28 no-outgoing

no x28 no-outgoing

Syntax Description

No syntax.

Command Default

The default condition is not to block network elements from calling out.

Command Modes

1. User EXEC or privileged EXEC mode when the command is used for all TTY lines connected to the router and configured in X.28 emulation mode.
2. Line configuration mode when the command is used with **autocommand** for a particular TTY line configured for X.28 emulation mode.

Command History

Release	Modification
12.3(11)YN	This command was introduced.
12.4(4)T	This command was integrated into the T train.

Usage Guidelines

1. Usually the no-outgoing configuration is used with **autocommand** on a per-line basis (as shown in the second example, below).
2. ***WARNING:*** Do not use the **x28 no-outgoing** command on the console -- because that will lock the console. Then, to unlock it, you will have to log in from a different TTY (or a VTY), and if such a line is not available, you will have to reload the router.

Examples

The following example configures X.28 user emulation mode on all of this router's TTY lines to prevent network elements from calling out:

```
Router# x28 no-outgoing
```

The following example configures X.28 user emulation mode only on TTY line 33, in autocommand, to prevent network elements from calling out through that line:

```
Router# configure terminal
    Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#line 33
Router(config-line)#autocommand x28 no-outgoing
Router(config-line)#exit
```

Glossary

CTS—Clear To Send. The signal sent by a DCE (data communications equipment; modem) when it is ready to receive data.

DSR—Data Set Ready. The signal sent by a modem (DCE) once it is powered up and ready.

DTR—Data Terminal Ready. The signal sent by a DTE (data terminal equipment; computer) when it is ready to receive data.

SVC—Switched Virtual Circuit. The path through an X.25 network that is established at call set-up time.

Note See *Internetworking Terms and Acronyms* for terms not included in this glossary.