3G Wireless High-Speed WAN Interface Card for Cisco 1800, 2800, and 3800 Series Routers

The Third Generation (3G) Wireless High-Speed WAN interface card (HWIC) is a multiband, multiservice WAN card. Its primary application is WAN connectivity as a backup datalink for critical data applications. It is an alternative to ISDN as a backup line because it offers 3G wireless sustainable data rates of 150 to 500 kbps. However, the cellular HWIC can also function as the primary WAN connection. It supports the following Cisco integrated services routers (Cisco ISRs):

- Cisco 1841
- Cisco 2800
- Cisco 3800

The cellular WAN HWIC has the following features:

- Broadband WAN connectivity using high speed cellular data technology
- Cellular interface based on the async interface in Cisco IOS
- Multiple product SKUs for CDMA and GSM standards
- Multiple external antenna options
- Supports different speeds with different networks.
- Static and dynamic IP addressing
- Modem-based support for mobile IP
- Automatic best network selection
- Supports CDMA Over the Air Service Provisioning (OTASP)
- NAT support
- Security features like Firewall, IDS/IPS and IPSec VPN on the router
- WAN switchover using IOS backup interface feature

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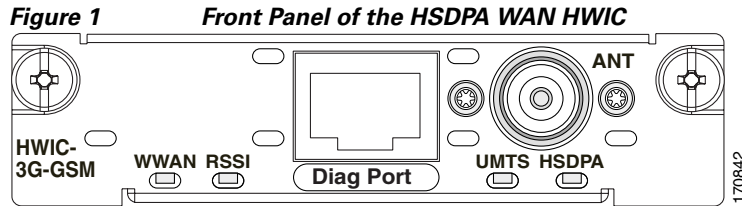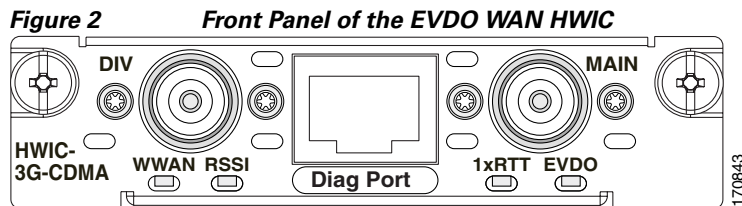
Figure 1 shows the GSM (HSDPA/UMTS) WAN HWIC:

Figure 1   Front Panel of the HSDPA WAN HWIC

Figure 2 shows the front panel of the CDMA (EVDO) WAN HWIC:

Figure 2   Front Panel of the EVDO WAN HWIC

The cellular WAN HWIC will provide the following software functionality:

- Dialup connection (DDR)—Dialup allows users to build up connections from a local network to remote locations, e.g., to an Internet Provider (ISP) and to exchange data.

- Fallback connection (DDR backup)—the cellular HWIC allows the user to configure the cellular modem to initiate a dialup connection when connection to a primary service is lost.

- Teardown after Fallback (Part of Fallback DDR)—Once a primary connection has failed and the cellular connection is in "fallback" mode, the cellular HWIC tears down the connection once the primary connection is available.

- Automatic teardown—After a configurable timeout value, the cellular HWIC automatically tears down a connection if there has been no activity.

- Portable Application—You can move the router into different coverage areas (different Base stations within the same service provider) and the router establishes a connection with the nearest cell infrastructure automatically. This is different from the mobile capability that cell phones offer.

- Remote Access—The cellular HWIC allows users to connect with the cellular HWIC router through the cellular network.

- Bidirectional Keepalive—The cellular HWIC allows you to configure keep alive to check the WAN connection at an interval that you can configure. In the event of a failure of the keep-alive request, the cellular HWIC will clear the existing connection and reestablish a new connection. This feature works in both directions—from the cellular network to the router, and from the router to the cellular network

- Auto-detect—The cellular HWIC automatically detects and utilizes the best available connection from a selected service provider.

- Mobile IP Support—The cellular HWIC allows you to maintain a seamless connection while transitioning between areas covered by different foreign agents.

Table 1 shows the different SKUs and the frequencies supported by the cellular WAN HWICs:

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Table 1   SKU Description and Supported Frequencies

SKU Number	Description	Region	Frequency
HWIC-3G-GSM	HSDPA/UMTS/EDGE/GPRS	Worldwide	850/900/1800/1900/2100 MHz
HWIC-3G-CDMA-V	EVDO Rev A/Rel 0/1xRTT	US	800/1900MHz
HWIC-3G-CDMA-S	EVDO Rev A/Rel 0/1xRTT		800/1900MHz

Feature History

Release	Modification
Release # TBD	This feature was introduced.

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** at the login dialog box and follow the instructions that appear.

Contents

Prerequisites for Configuring the Wireless WAN HWIC

The following are prerequisites to configuring the Wireless WAN HWICs:

- Familiarity with Cisco IOS
- Use of the Cisco IOS T-release, beginning with release *TBD* or later for Cisco HWIC support. (Refer to the Cisco IOS documentation.)
- HWIC must be supported by a carrier. Please see data sheet for a list of supported carriers.

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- Service availability on the HWIC and certification on the carrier network

Restrictions for the Wireless WAN HWIC

The following restrictions apply to the Cisco Wireless WAN HWICs:

- Data connection can be originated only by the host platform call; the call by the other peer connected to the cellular network is not supported.
- Throughput—due to the shared nature of wireless communications, the experienced throughput varies depending on the number of users in a given network.
- Latency—Wireless networks have higher latency compared to other wired networks.
- Coverage in your area, at your site, and in the specific location where the router is placed.
- Congestion on the network.
- Any restrictions that are a part of the terms of service from your carrier.

Information About the Wireless WAN HWIC

To configure the third generation wireless HWIC feature, you must understand the following concepts:

- IOS CLI
- Asynchronous communication commands
- Modem configuration commands

For detailed information on Cisco IOS and related topics, go to:
http://www.cisco.com/en/US/products/sw/iosswrel/tsd_products_support_category_home.html

How to Configure the Wireless WAN HWIC

This section contains the following procedures:

- Configuring NAT Using the Cellular Modem
- Creating and Activating a New CDMA Profile Using OTASP
- Activating a GSM Account
- Configuring DDR
- Asynchronous Line and Reverse Telnet\

Configuring NAT Using the Cellular Modem

Network Address Translation (NAT) operates on a router that is connecting two networks; one of these networks (designated as the inside network) is addressed with either private or obsolete addresses that must be converted into legal addresses before it forwards packets to the other network (designated as the outside network). The translation operates in conjunction with routing, so that NAT can simply be enabled on a customer-side Internet access router when translation is desired.

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> **Note** To configure NAT on your router, see the NAT documentation, which is available at the following URL:
> http://www.cisco.com/en/US/tech/tk648/tk361/tk438/tsd_technology_support_sub-protocol_home.html

Creating and Activating a New CDMA Profile Using OTASP

To create and activate a new CDMA profile using Over-the-Air-Service-Provisioning (OTASP), perform the steps in this section. This section contains the following subsections:

- Over the Air Service Provisioning
- SUMMARY STEPS
- DETAILED STEPS

> **Note** To create and activate a profile, you must have an active CDMA wireless account.

Over the Air Service Provisioning

Over-the-Air Service Provisioning allows you to activate new wireless services over a wireless network. It also allows carriers to add new types of services to a customer's handset by using the wireless network instead of requiring the customer to bring a wireless device to a carrier's location for reprogramming.

SUMMARY STEPS

1. **cellular cdma profile create**
2. **cellular cdma profile activate**
3. **cellular activate ota cdma | gsm**
4. **show cellular profile**

DETAILED STEPS

Use the following commands to create and activate a new CDMA profile with OTASP:

	Command or Action	Purpose
Step 1	`cellular`<slot/wic_slot/port>`cdma profile create` <profile number><mdn><min><sid><nid><msl>	Creates a new profile.
Step 2	`cellular`<slot/wic_slot/port>`cdma profile activate` <profile number>	Activates the created profile.
Step 3	`cellular`<slot/wic_slot/port>`activate ota cdma	gsm` <phone number>	Initiates over the air activation using OTA/OTASP.
Step 4	`show cellular`<slot/wic_slot/port> `profile`	Verifies the profile data.

Activating a GSM Account

The GSM WAN HWIC is equipped with a SIM card slot. The card is pre-provisioned and is available with cellular account-specific information. You must subscribe to a GSM service from a carrier to obtain this card.

Configuring DDR

To configure DDR on the interface, perform the steps in this section. This section contains the following subsections:

- Dial-on-Demand Routing
- SUMMARY STEPS
- DETAILED STEPS

Dial-on-Demand Routing

Dial-On-Demand Routing (DDR) is a technique whereby a router can automatically initiate and close a circuit-switched session as transmitting stations demand. The router spoofs keepalives so that end stations treat the session as active. DDR permits routing over ISDN or telephone lines using an external ISDN terminal adaptor or modem.

DDR addresses the need for intermittent network connections over circuit-switched WANs.

SUMMARY STEPS

1. **interface cellular dialer in-band**
2. **chat-script "ATDT*99#" interface cellular dialer-string**
3. **dialer-list protocol permit**
4. **ip access-list permit**
5. **show cellular dialer-group**

DETAILED STEPS

	Command or Action	Purpose
Step 1	`interface cellular`*<slot/wic_slot/port>*`dialer in-band`	Enables DDR on the interface.
Step 2	`chat-script`*<carrier string name>*`""ATDT*99#" interface cellular`*<slot/wic_slot/port>* `dialer-string`*<carrier string name>*	Defines chat-script for the dialer interface.
Step 3	`dialer-list` *<dialer-group>* `protocol` *<protocol-name>* {`permit` | `deny` | `list` *<access-list-number>* | `access-group`}>	Creates dialer list for interesting traffic and permits access to an entire protocol.
Step 4	`ip access-list`*<access list number>*`permit` *<ip source address>*	Defines interesting traffic.
Step 5	`show cellular`*<slot/wic_slot/port>* `dialer-group`*<dialer group number>*	Maps dialer list to the dialer interface.

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Asynchronous Line and Reverse Telnet

Each cellular interface has one TTY line associated with it. The line will allow you to use reverse telnet to the cellular modem located in the cellular HWIC.

Note   Reverse telnet to the modem is allowed only when the modem is not in the data connection.

To reverse telnet to the cellular modem, perform the steps in this section. This section contains the following subsections:

- SUMMARY STEPS
- DETAILED STEPS

SUMMARY STEPS

1. **show line**
2. **telnet**
3. **ati**

DETAILED STEPS

	Command or Action	Purpose
Step 1	`show line`	In Exec mode, this command shows the line that is communicating to the interface.
Step 2	`telnet`*<cellular interface IP address><line number>* **Example:** `Router# telnet 10.0.0.1 2001`	Starts the reverse telnet session. **Note** Add prefix 20 to line number.
Step 3	`ATI`	Gives information on the modem and verifies that the modem is in the reverse telnet session.
Step 4	Press Ctrl+Shift+6 together, followed by lower case **x**	Prepares to disconnect the reverse telnet session.
Step 5	At router prompt (#), enter **disconnect**	Disconnects the reverse telnet session.

Configuration Examples for the Wireless WAN HWIC

This section provides the following configuration examples:

- Configuring NAT Using the Cellular Modem
- Asynchronous Line and Reverse Telnet
- Configuring the Cellular Interface

Configuring NAT Using the Cellular Modem

The following sample configuration shows the configuration of the router with NAT:

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```
!
version 12.3
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router
!
boot-start-marker
boot-end-marker
!
no network-clock-participate aim 0
no network-clock-participate aim 1
no aaa new-model
ip subnet-zero
!
ip cef
!
ip ips po max-events 100
no ftp-server write-enable
!
chat-script cdma_1x "" "ATDT#19788" TIMEOUT 30 CONNECT
!
interface Loopback0
 ip address 7.7.7.7 255.255.255.0
!
interface GigabitEthernet0/0
 ip address 1.8.12.55 255.0.0.0
 duplex auto
 speed auto
!
interface GigabitEthernet0/1
 ip address 20.0.0.1 255.255.0.0
 ip nat inside
 ip virtual-reassembly
 duplex auto
 speed auto
!
interface Cellular0/0/0
 physical-layer async
 ip address negotiated
 ip nat outside
 ip virtual-reassembly
 encapsulation ppp
 no ip mroute-cache
 dialer in-band
 dialer idle-timeout 2147000
 dialer string cdma_1x
 dialer-group 1
 async mode interactive
 no peer default ip address
 keepalive 5 3
 no fair-queue
 ppp accm 0
 no ppp lcp fast-start
!
ip classless
ip route 0.0.0.0 0.0.0.0 Cellular0/0/0
ip route 223.255.254.254 255.255.255.255 GigabitEthernet0/0
!
ip http server
no ip http secure-server
ip nat pool sky 69.82.2.206 69.82.2.206 netmask 255.255.0.0
ip nat inside source list 1 pool sky overload
```

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```
!
access-list 1 permit 20.0.0.0 0.0.255.255
dialer-list 1 protocol ip permit
!
control-plane
!
line con 0
line aux 0
 exec-timeout 0 0
 no exec
 transport input all
line 0/0/0
 exec-timeout 0 0
 script dialer cdma_1x
 login
 modem InOut
 no exec
 transport input all
 autoselect during-login
 autoselect ppp
 stopbits 1
 speed 115200
 flowcontrol hardware
line vty 0 4
 login
!
scheduler allocate 20000 1000
end
```

Asynchronous Line and Reverse Telnet

Each cellular interface has one TTY line associated with it. The line will allow you to use reverse telnet to the cellular modem located in the cellular HWIC.

Note Reverse telnet to the modem is allowed only when the modem is not in the data connection.

The following CLI command starts the Reverse Telnet session:

```
telnet <cellular interface IP address> <line number>
```

An example of the use of this command is:

```
Router# telnet 10.0.0.1 2001
```

To verify if the modem is in the reverse telnet session, enter the command AT. If you see an OK response from the modem, then the session is successful.

Configuring the Cellular Interface

The following is an example of the cellular interface configuration on Next Generation platforms:

```
interface Cellular0/0/0
 encapsulation ppp
 ip address negotiated
 no ip mroute-cache
 dialer in-band
```

```
dialer idle-timeout 2147000
dialer string cdma_1x
dialer-group 1
async mode interactive
no peer default ip address
keepalive 5 3
no fair-queue
ppp accm 0
no ppp lcp fast-start
ppp chap hostname 4085267374vzw3g.com
ppp chap password vzw
```

Command Reference

This section documents new commands only.

- **cellular cdma profile create**
- **cellular cdma profile activate**
- **cellular cdma otasp**
- **debug cellular messages all**
- **debug cellular messages async**
- **debug cellular messages data**
- **debug cellular messages management**
- **debug cellular messages virt-con**
- **debug cellular messages virt-con**
- **show cellular all**
- **show cellular connection**
- **show cellular hardware**
- **show cellular connection personality**
- **show cellular network**
- **show cellular profile**
- **show cellular radio**
- **show cellular security**
- **show controllers cellular**
- **show interfaces cellular**
- **show interfaces cellular**
- **show run interface cellular**
- **test cellular modem-power-cycle**
- **test cellular modem-reset**
- **test cellular cnm-process-enqueue**

cellular cdma profile create

To create a new CDMA profile, enter the **cellular cdma create profile** command in privileged EXEC mode.

> **cellular** *slot/wic_slot/port* **cdma profile create** *profile_number mdn min sid nid*

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.
cdma profile create	Displays a summary of the profile you create.
profile number	The profile number you create.
mdn	10-digit mobile directory number
min	10-digit mobile identity number
sid	System ID
nid	Network ID

Command Default There is no default for this command.

Command Modes EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines The **cdma profile create** command is used to create a new CDMA profile for a cellular modem. Multiple profiles can be created, but only one profile will be active at one time.

Examples The following example shows output of the cdma profile create command:

```
2851-b1-sprint#cellular 0/0/0 cdma prof create 0 9134390870 9132214671 4183 87 333830
Profile 0 will be Created and will become Active
Modem will be activated with following Parameters
MDN :9134390870; MSID :9132214671; SID :4183; NID 87:
Oct 27 00:02:34.051: Checking Current Activation Status
Oct 27 00:02:34.107: Modem activation status: Not Activated
Oct 27 00:02:34.107: Begin Activation
Oct 27 00:02:34.107: Beginning Profile Provisioning - Step 1 of 5
Oct 27 00:02:34.219: Beginning Profile Provisioning - Step 2 of 5
Oct 27 00:02:34.271: Beginning Profile Provisioning - Step 3 of 5
Oct 27 00:02:34.383: Beginning Profile Provisioning - Step 4 of 5
Oct 27 00:02:34.439: Beginning Profile Provisioning - Step 5 of 5
Oct 27 00:02:34.495: Secure Commit Result: Succeed (success for all non-provisioning
commit
Oct 27 00:02:34.495: Done Configuring the profile - Resetting the Modem
Oct 27 00:02:34.551: The Provisioning of the profile is Complete
Oct 27 00:02:37.547: %CELLWAN-2-MODEM_UP: Cellular0/1/0 modem is now UP
```

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```
Beginning IOTA
2851-b1-sprint#
Oct 27 00:02:44.595: IOTA Status Message Received. Event: IOTA Start, Result: SUCCESS
Oct 27 00:02:44.595: Please wait till IOTA END message is received
Oct 27 00:02:44.595: It can take up to 5 minutes
2851-b1-sprint#
Oct 27 00:03:10.623: OTASP State = SPL unlock, Result = Successdeb modem
2851-b1-sprint#
Oct 27 00:03:14.987: OTASP State = Parameters commited to NVRAM, Result = Success
Oct 27 00:03:22.375: IOTA Status Message Received. Event: IOTA End, Result: SUCCESS
```

Related Commands	Command	Description
	cellular cdma profile activate	Activates an existing CDMA profile.
	cellular cdma otasp	Activates a cellular account using the over the air (OTA) procedure or over the air service provisioning (OTASP)

cellular cdma profile activate

To activate an existing CDMA profile, use the **cellular cdma profile activate** command in EXEC mode.

cellular *slot/wic_slot/port* **cdma profile activate** *profile number*

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.
profile number	The existing profile number you want to activate.

Command Default There is no default for this command.

Command Modes EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines You can verify the profile data using the **show cellular** *slot/wic_slot/port* **profile** CLI.

Examples The following is a sample output of the cellular cdma profile activate command:

```
Rc2800#cellular 0/3/0 cdma profile activate 1
Profile 1 will become Active
Activate Profile Successful
```

Related Commands

Command	Description
cellular cdma profile create	Creates a new CDMA profile.
cellular cdma otasp	Activates a cellular account using the over the air (OTA) procedure or over the air service provisioning (OTASP)

cellular cdma otasp

To activate a cellular account using the over the air (OTA) procedure or over the air service provisioning (OTASP), use the **cellular activate ota cdma|gsm** command in EXEC mode.

     cellular *slot/wic_slot/port* **cdma otasp** *phone_number*

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.
phone_number	Phone number of the carrier that you must dial to begin activation using OTASP. This number is provider-specific. For Verizon, it is *228 or *22899.

Command Default

There is no default for this command.

Command Modes

EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines

You can verify the profile data using the **show cellular** *slot/wic_slot/port* **profile** CLI.

Note   Use this command only if you have an HWIC-CDMA-V for Verizon.

Examples

The following example shows output of the for a CDMA account:

```
Enzo#cellular 0/3/0 cdma otasp *22899
Beginning OTASP activation
OTASP number is *22899
Enzo#
Enzo#
Nov 15 16:32:03.883: OTASP State = SPL unlock, Result = Success
Nov 15 16:32:23.935: OTASP State = PRL downloaded, Result = Success
Nov 15 16:32:24.783: OTASP State = Profile downloaded, Result = Success
Nov 15 16:32:24.783: OTASP State = MDN downloaded, Result = Success
Nov 15 16:32:28.711: OTASP State = Parameters commited to NVRAM, Result = Succes
c3845-1#
```

Related Commands

Command	Description
cellular cdma profile create	Creates a new CDMA profile.
cellular cdma profile activate	Activates an existing CDMA profile.

debug cellular messages all

To print all Cisco IOS driver debug messages, use the **debug cellular messages all** command in EXEC mode.

debug cellular *slot/wic_slot/port* **messages all**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   There is no default for this command.

Command Modes   EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines   Use this command for debugging purposes only.

Related Commands

Command	Description
debug cellular messages async	Debugs cellular async.
debug cellular messages data	Prints Cisco IOS data path debug messages.
debug cellular messages management	Prints management path messages, such as CnS.
debug cellular messages virt-con	Prints Diagnostics Monitor (DM) messages from the Qualcomm CDMA chipset.
debug cellular messages virt-con	Redirects the Nios II console driver messages to display them in the Cisco IOS router console environment.

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debug cellular messages async

To debug cellular async, use the **debug cellular messages async** command in EXEC mode.

debug cellular *slot/wic_slot/port* **messages async**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   There is no default for this command.

Command Modes   EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines   Use this command for debugging purposes only.

Related Commands

Command	Description
debug cellular messages all	Prints all Cisco IOS driver debug messages.
debug cellular messages data	Prints Cisco IOS data path debug messages.
debug cellular messages management	Prints management path messages, such as CnS.
debug cellular messages virt-con	Prints Diagnostics Monitor (DM) messages from the Qualcomm CDMA chipset.
debug cellular messages virt-con	Redirects the Nios II console driver messages to display them in the Cisco IOS router console environment.

debug cellular messages data

To print IOS data path debug messages, use the **debug cellular messages data** command in EXEC mode.

show cellular *slot/wic_slot/port* **messages data**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   There is no default for this command.

Command Modes   EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines   Use this command for debugging purposes only.

Related Commands

Command	Description
debug cellular messages all	Prints all Cisco IOS driver debug messages.
debug cellular messages async	Debugs cellular async.
debug cellular messages management	Prints management path messages, such as CnS.
debug cellular messages virt-con	Prints Diagnostics Monitor (DM) messages from the Qualcomm CDMA chipset.
debug cellular messages virt-con	Redirects the Nios II console driver messages to display them in the Cisco IOS router console environment.

debug cellular messages dm

To print Diagnostics Monitor (DM) messages from the Qualcomm CDMA chipset, use the **debug cellular messages dm** command in EXEC mode.

debug cellular *slot/wic_slot/port* **messages dm**

Syntax Description	*slot/wic_slot/port*	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default There is no default for this command.

Command Modes EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines Use this command for debugging purposes only.

Related Commands

Command	Description
debug cellular messages all	Prints all Cisco IOS driver debug messages.
debug cellular messages async	Debugs cellular async.
debug cellular messages data	Prints Cisco IOS data path debug messages.
debug cellular messages management	Prints management path messages, such as CnS.
debug cellular messages virt-con	Redirects the Nios II console driver messages to display them in the Cisco IOS router console environment.

debug cellular messages management

To print management path messages, such as CnS, use the **debug cellular messages management** command in EXEC mode.

debug cellular *slot/wic_slot/port* **messages management**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   There is no default for this command.

Command Modes   EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines   Use this command for debugging purposes only.

Related Commands

Command	Description
debug cellular messages all	Prints all Cisco IOS driver debug messages.
debug cellular messages async	Debugs cellular async.
debug cellular messages data	Prints Cisco IOS data path debug messages.
debug cellular messages virt-con	Prints Diagnostics Monitor (DM) messages from the Qualcomm CDMA chipset.
debug cellular messages virt-con	Redirects the Nios II console driver messages to display them in the Cisco IOS router console environment.

debug cellular messages virt-con

To redirect the Nios II console driver messages to display them in the Cisco IOS router console environment, use the **debug cellular virt-con** command in EXEC mode.

> **debug cellular** *slot/wic_slot/port* **virt-con {clear | disable | dump-data-structs | log | monitor | wrapper-on | wrapper-off}**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.
clear	(Optional) Clears all virtual console debug log messages.
disable	(Optional) Disables virtual console real time debug monitoring.
dump-data-structs	(Optional) Dumps virtual console data structures.
log	(Optional) Displays virtual console messages from the debug log.
monitor	(Optional) Enables monitoring of real time virtual console debug messages.
wrapper-on	(Optional) Disables wrap around for virtual console log messages.
wrapper-off	(Optional) Enables wrap around for virtual console log messages.

Command Default

There is no default for this command.

Command Modes

EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines

Use this command for debugging purposes only.

Related Commands

Command	Description
debug cellular messages all	Prints all Cisco IOS driver debug messages.
debug cellular messages async	Debugs cellular async.
debug cellular messages data	Prints Cisco IOS data path debug messages.
debug cellular messages management	Prints management path messages, such as CnS.
debug cellular messages virt-con	Prints Diagnostics Monitor (DM) messages from the Qualcomm CDMA chipset.

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show cellular all

To display all the cellular information in one listing, use the **show cellular all** command in EXEC mode.

show cellular *slot/wic_slot/port* **all**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default There is no default for this command.

Command Modes EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines The command usage is the same for GSM and CDMA, though the output is different for each.

Examples The following example shows the **show cellular all** output for slot 0, WIC slot 0, port 0 for GSM:

```
c2800# show cellular 0/0/0 all
Hardware Information
====================
Modem Firmware Version = U1_2_22MCAP G:/WORK
Modem Firmware built = 04/17/06
Hardware Version = E2
International Mobile Subscriber Identity (IMSI) = <number>
International Mobile Equipment Identity (IMEI) = <number>
Factory Serial Number (FSN) = S2128751274E2OK
Modem Status = Online
Current Modem Temperature = 28 deg C, State = Normal

Profile Information
===================
Profile 1 = INACTIVE*
--------
PDP Type = IPv4, Header Compression = OFF
Data Compression = OFF
Access Point Name (APN) = vpn.com
Authentication = CHAP
Username: wapuser1, Password: wap

 * - Default profile

Data Connection Information
===========================
Data Transmitted = 0 bytes, Received = 0 bytes
Profile 1, Packet Session Status = INACTIVE
```

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```
              Inactivity Reason = Normal inactivate state
      Profile 2, Packet Session Status = INACTIVE
              Inactivity Reason = Normal inactivate state
      Profile 3, Packet Session Status = INACTIVE
              Inactivity Reason = Normal inactivate state
      Profile 4, Packet Session Status = INACTIVE
              Inactivity Reason = Normal inactivate state
      Profile 5, Packet Session Status = INACTIVE
              Inactivity Reason = Normal inactivate state
      Profile 6, Packet Session Status = INACTIVE
              Inactivity Reason = Normal inactivate state
      Profile 7, Packet Session Status = INACTIVE
              Inactivity Reason = Normal inactivate state
      Profile 8, Packet Session Status = INACTIVE
              Inactivity Reason = Normal inactivate state
      Profile 9, Packet Session Status = INACTIVE
              Inactivity Reason = Normal inactivate state
      Profile 10, Packet Session Status = INACTIVE
              Inactivity Reason = Normal inactivate state
      c2800#
      Network Information
      ===================
      Current Service Status = No service, Service Error = None
      Current Service = Invalid
      Packet Service = None
      Packet Session Status = Inactive
      Current Roaming Status = Home
      Network Selection Mode = Automatic
      Country = 0, Network =
      Mobile Country Code (MCC) = 0
      Mobile Network Code (MNC) = 0
      Location Area Code (LAC) = 0
      Routing Area Code (RAC) = 255
      Cell ID = 0
      Primary Scrambling Code = 0
      PLMN Selection = Automatic

      Radio Information
      =================
      Current Band = None, Channel Number = 0
      Current RSSI = -110 dBm

      Modem Security Information
      ==========================
      Card Holder Verification (CHV1) = Disabled
      SIM Status = OK
      SIM User Operation Required = None
      Number of Retries remaining = 3
      c2800#
```

The following example shows the **show cellular all** output for slot 0, WIC slot 3, port 0 for CDMA:

```
      c2800#sh cellular 0/3/0 all
      Hardware Information
      ====================
      Modem Firmware Version = p2005300
      Modem Firmware built = 09-13-06
      Hardware Version = 1.0
      Electronic Serial Number (ESN) = 0x6032692A
      Preferred Roaming List (PRL) Version = 10
      Current Modem Temperature = 30 degrees Celsius

      Profile Information
      ===================
```

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```
Electronic Serial Number (ESN) = 0x6032692A
Modem activated = NO
Profile   Prov Date        MDN            MSID
=======   ==========   ===============   ===========
    0         None       0000006458      0000006458
   *1         None       8585551515      0000006951

 * - Default Profile

Data Connection Information
===========================
Phone number of outgoing call =
HDR AT State = Inactive, HDR Session State = Open
HDR Session Info:
     UATI (Hex) = FEA0:0000:0000:0000:0000:0000:0000:0003
     Color Code = 64, RATI = 0xFFFFFFFF
     Session duration = 0 msecs, Session start = 0 msecs
     Session end = 0 msecs, Authentication Status = Authentication disabled
HDR DRC Value = 0, DRC Cover = 0, RRI = Pilot only
Current Transmitted = 0 bytes, Received = 0 bytes
Total Transmitted = 0 KB, Received = 0 KB
Current Call Status = None
Current Call Duration = 0 secs
Total Call Duration = 234255 seconds
Current Call State =
Last Call Disconnect Reason = Modem offline
Last Connection Error = None
HDR DDTM (Data Dedicated Transmission Mode) Preference = Off


Network Information
===================
Current Service = No Service
Current Roaming Status(1xRTT) = HOME, (HDR) = HOME
Current Idle Digital Mode = No Service
Current System Identifier (SID) = 0
Current Network Identifier (NID) = 0
Serving Base Station Longitude = 0 deg 0 min 0 sec
Serving Base Station Latitude = 0 deg 0 min 0 sec
Current System Time = Sun Jan 6 0:28:57 1980


Radio Information
=================
1xRTT related info
------------------
Current RSSI = -125 dBm, ECIO = -2 dBm
Current Channel Number = 88
Current Channel State = Scanning
Current Band Class = Band Class 1


HDR related info
----------------
Current RSSI = -125 dBm, ECIO = -2 dBm
Current Channel Number = 88
Current Band Class = Band Class 1
Sector ID (Hex) = 0000:0000:0000:0000:0000:0000:0000:0000
Subnet Mask = 0, Color Code = 0, PN Offset = 0
Rx gain control(Main) = Unavailable, Diversity = Unavailable
Tx total power = 0 dBm, Tx gain adjust = 0 dBm
Carrier to interference (C/I) ratio = 0


Modem Security Information
==========================
Modem PIN Security UNLOCKED
Power-up lock DISABLED
```

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```
c2800#
```

Related Commands	Command	Description
	cellular cdma otasp	Displays the current active connection state and statistics.
	debug cellular messages all	Displays the cellular modem hardware information.
	debug cellular messages data	Displays the cellular network (base station) information.
	debug cellular messages management	Displays the cellular profile information.
	show cellular radio	Displays the cellular modem radio statistics.
	show cellular security	Displays the modem lock state.
	show controllers cellular	Displays the SMS messages received by the cellular modem.

show cellular connection

To display the current active connection state and statistics, use the **show cellular connection** command in EXEC mode.

> **show cellular** *slot/wic_slot/port* **connection**

Syntax Description	*slot/wic_slot/port*	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   There is no default for this command.

Command Modes   EXEC

Command History	**Release**	**Modification**
		This command was introduced.

Usage Guidelines   The command usage is the same for GSM and CDMA, though the output is different for each.

Examples   The following example shows output for code division multiple access (CDMA) for slot 0, WIC slot 0, port 0:

```
c2800#sh cellular 0/0/0 connection
Phone number of outgoing call = #777
HDR AT State = Connected, HDR Session State = Open
HDR Session Info:
    UATI (Hex) = 0080:0580:0000:0000:000A:CCC5:45C1:8E52
    Color Code = 237, RATI = 0xC739C302
    Session duration = 672 msecs, Session start = 368388914 msecs
    Session end = 368390063 msecs, Authentication Status = Not authenticated
HDR DRC Value = 9, DRC Cover = 1, RRI = 38.4 kbps
Current Transmitted = 379707 bytes, Received = 374429 bytes
Total Transmitted = 83514 KB, Received = 454699 KB
Current Call Status = CONNECTED
Privacy Mode = OFF, Service Option = 33023
Current Call Duration = 1554 secs
Total Call Duration = 234255 seconds
Current Call State = AT Packet Call
Last Call Disconnect Reason = Base station release (No reason)
Last Connection Error = None
HDR DDTM (Data Dedicated Transmission Mode) Preference = Off
Mobile IP Error Code (RFC-2002) = 0 (Registration accepted)
```

Table 8 describes the output fields for CDMA for this command:

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Table 2   Output Description

Field	Description
Phone number of outgoing call	Shows the phone number of the data call dialed.
HDR AT State	Indicates the AT state. Will show as CONNECTED when the CONNECT is received from the modem while dialing out. This is valid only for 1xEVDO.
HDR Session State	Will indicate as OPEN once the HDR session is established. This is valid only for 1xEVDO
UATI	Unicast Access Terminal Identifier (UATI) obtained by the modem/access terminal (AT) from the base station during session establishment.
Color Code	HDR session color code of the sector.
RATI	HDR Random Access Terminal Identifier used for opening the session
Session Duration	HDR Session duration in milliseconds.
Session Start	Phone uptime in units of milliseconds at session start.
Session End	Phone uptime in units of milliseconds at session end.
Authentication Status	Modem/Access terminal authentication status with the base station.
HDR DRC Value	The data rate channel value specified by the access terminal. The access terminal uses DRC value to specify the requested transmission rate
DRC Cover	DRC cover value used by the access terminal to specify the transmitting sector.
RRI	Indicates the rate of the reverse traffic data channel.
Current Transmitted	Number of bytes transmitted by the modem to the base station. This will be cleared when the call is disconnected.
Current Received	Number of bytes received by the modem from the base station. This will be cleared when the call is disconnected.
Current call status	Current call status of the modem, e.g., Connected, Disconnected, Dormant, Connecting, Error.
Privacy Mode	Current privacy status of the call in progress.
Service Option	Service option for the call in progress.
Current Call Duration	Duration of the call in progress. If the call status is DISCONNECTED, it indicates the call duration of the last call.
Total Transmitted	Total number of KB transmitted from the modem. This will be cleared on "clear counters".

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Table 2   Output Description (continued)

Field	Description
Total Received	Total number of KB received by the modem. This will be cleared on "clear counters".
Total Call Duration	Total duration of calls made from the modem. This will be updated when the current call in progress is disconnected.
Current Call State	Indicates the type of call made. Since Enzo supports only data calls dialed using chat script, this will show as AT Packet Call.
Last Call Disconnect Reason	Indicates why the last call was disconnected.
Last Connection Error	Indicates the error code if the call status indicates error.
Mobile IP Error Code	Indicates the error code as per RFC-2002 if the call is a mobile IP call.

The following example shows output for global system for mobile communication (GSM):

```
# show cellular 1/0/1 connection
Data Transmitted = 1066807500 bytes, Received = 1066807500 bytes
Profile 1, Packet Session Status = ACTIVE
        IP address = 1.5.97.2
Profile 2, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
```

Table 9 describes the output for the GSM command:

Table 3   Output Description

Field	Description
Data Transmitted	Total data transmitted by the modem. Can be cleared by the clear counters command.
Data Received	Total data received by the modem. Can be cleared by the clear counters command.
Profile <profile number>	Indicates the profiles configured in the modem. Total of 16 profiles can be configured
Packet Session Status	PDP session status of the profile. Active when the call is made and PDP context has become active in the modem.
IP Address	IP address of the cellular interface received during IPCP negotiation
Inactivity Reason	Reason why the profile is inactive.

Related Commands

Command	Description
cellular cdma profile activate	Displays all the show cellular information in one listing.
debug cellular messages all	Displays the cellular modem hardware information.
debug cellular messages data	Displays the cellular network (base station) information.

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Command	Description
debug cellular messages management	Displays the cellular profile information.
show cellular radio	Displays the cellular modem radio statistics.
show cellular security	Displays the modem lock state.
show controllers cellular	Displays the SMS messages received by the cellular modem.

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show cellular connection personality

To display the negotiated personalities when the 1xEVDO-Rev A service is acquired by the modem, use the **show cellular connection personality** command in EXEC mode.

show cellular *slot/wic_slot/port* **connection personality**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   There is no default for this command.

Command Modes   EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines   None

Examples   The following example shows output for code division multiple access (CDMA) for slot 0, WIC slot 0, port 0:

```
c2800#sh cellular 0/0/0 connection personality
Current Active Personality = Personality1
Personality 1:
=============
Physical Layer Protocol =
Control Channel MAC Protocol =
Access Channel MAC Protocol =
Forward Traffic Channel MAC Protocol =
Reverse Traffic Channel MAC Protocol =
Key Exchange Protocol =
Authentication Protocol =
Encryption Protocol =
Security Protocol =
Idle State Protocol =
Generic Multimode Capability Discovery Protocol =
Generic Virtual Stream Protocol =

Other Negotiated Personalities
==============================
Personality 2:
=============

Stream 0 Application Subtype =
Stream 1 Application Subtype =
Stream 2 Application Subtype =
Stream 3 Application Subtype =
```

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Related Commands	Command	Description
	cellular cdma profile activate	Displays all the show cellular information in one listing.
	debug cellular messages all	Displays the cellular modem hardware information.
	debug cellular messages data	Displays the cellular network (base station) information.
	debug cellular messages management	Displays the cellular profile information.
	show cellular radio	Displays the cellular modem radio statistics.
	show cellular security	Displays the modem lock state.
	show controllers cellular	Displays the SMS messages received by the cellular modem.

show cellular connection statistics single-user

To display the forward traffic and control channel, use the **show cellular connection statistics single-user** command in EXEC mode.

show cellular *slot/wic_slot/port* **connection statistics single-user**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default

There is no default for this command.

Command Modes

EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines

To clear the statictics, use the **clear counters** command.

Examples

The following example shows output for code division multiple access (CDMA) for slot 0, WIC slot 0, port 0:

```
c2800#sh cellular 0/0/0 connection statistics single-user
Forward Traffic Channel Statistics
==================================
DRC Info (kbps)  CRC Count Passed    CRC Count Failed
==============   ================    ================
DRC_00 (     0)  0                   0
DRC_01 (  38.4)  0                   0
DRC_02 (  76.8)  0                   0
DRC_03 ( 153.6)  0                   0
DRC_04 ( 307.2)  0                   0
DRC_05 ( 307.2)  0                   0
DRC_06 ( 614.4)  0                   0
DRC_07 ( 614.4)  0                   0
DRC_08 ( 921.6)  0                   0
DRC_09 (1228.8)  0                   0
DRC_10 (1228.8)  0                   0
DRC_11 (1843.2)  0                   0
DRC_12 (2457.6)  0                   0
DRC_13 (  1536)  0                   0
DRC_14 (  3072)  0                   0

Forward Control Channel Statistics
==================================
    DRC Info                 CRC Count           CRC Count
Kbps    Format               Passed              Failed
==== =============       ===============     ================
```

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```
38.4  1024,16,1024          0                   0
76.8  1024,8,512            0                   0


Total Bad Packets Received = 0
Total Packets Received = 0
Packet Error Rate = 00.00 %
Throughput When Served = 0 kbps
Instantaneous Throughput = 0 kbps
Average Throughput (1sec) = 0 kbps


Forward Traffic Channel Termination Slot Count Statistics
=========================================================
DRC Info              Termination Slot Count
        1         2         3         4         5         6
        7         8         9         10        11        12
        13        14        15        16
======= ========= ========= ========= ========= ========= =========
DRC_00  0         0         0         0         0         0
        0         0         0         0         0         0
        0         0         0         0
DRC_01  0         0         0         0         0         0
        0         0         0         0         0         0
        0         0         0         0
DRC_02  0         0         0         0         0         0
        0         0
DRC_03  0         0         0         0
DRC_04  0         0
DRC_05  0         0         0         0
DRC_06  0
DRC_07  0         0
DRC_08  0         0
DRC_09  0
DRC_10  0         0
DRC_11  0
DRC_12  0
DRC_13  0         0
DRC_14  0


Forward Control Channel Termination Slot Count Statistics
=========================================================
38.4 kbps 0         0         0         0         0         0
          0         0         0         0         0         0
          0         0         0         0
76.8 kbps 0         0         0         0         0         0
          0         0
```

Related Commands

Command	Description
cellular cdma profile activate	Displays all the show cellular information in one listing.
debug cellular messages all	Displays the cellular modem hardware information.
debug cellular messages data	Displays the cellular network (base station) information.
debug cellular messages management	Displays the cellular profile information.
show cellular radio	Displays the cellular modem radio statistics.
show cellular security	Displays the modem lock state.
show controllers cellular	Displays the SMS messages received by the cellular modem.

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show cellular connection statistics multi-user

To display the forward channle statistics for mulit-user traffic for the 1xEVDO-Rev A service, use the **show cellular connection statistics multi-user** command in EXEC mode.

show cellular *slot/wic_slot/port* **connection statistics multi-user**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default

There is no default for this command.

Command Modes

EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines

To clear the statictics, use the **clear counters** command.

Examples

The following example shows output for code division multiple access (CDMA) for slot 0, WIC slot 0, port 0:

```
c2800#sh cellular 0/0/0 connection statistics multi-user
DRC Info (Kbps)    Format       CRC Count Passed   CRC Count Failed
===============  ============  =================  =================
DRC_03 (  19.2)  128,4,256     0                  0
DRC_03 (  38.4)  256,4,256     0                  0
DRC_03 (  76.8)  512,4,256     0                  0
DRC_03 ( 153.6)  1024,4,256    0                  0
DRC_05 ( 307.2)  2048,4,128    0                  0
DRC_08 ( 921.6)  3072,2,64     0                  0
DRC_10 (1228.8)  4096,2,64     0                  0
DRC_13 (1536.0)  5120,2,64     0                  0

Total Bad Packets Received = 0
Total Packets Received = 0Packet Error Rate = 00.00 %
Throughput When Served = 0 kbps
Instantaneous Throughput = 0 kbps
Average Throughput (1sec) = 0 kbps

                                    Termination Slot Count
DRC Info (Kbps)    Format       1         2         3         4
===============  ==========  ==========  ==========  ==========  ==========
DRC_03 (  19.2)  128,4,256   0           0           0           0
DRC_03 (  38.4)  256,4,256   0           0           0           0
DRC_03 (  76.8)  512,4,256   0           0           0           0
DRC_03 ( 153.6)  1024,4,256  0           0           0           0
DRC_05 ( 307.2)  2048,4,128  0           0           0           0
```

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```
DRC_08 ( 921.6)  3072,2,64   0          0
DRC_10 (1228.8)  4096,2,64   0          0
DRC_13 (1536.0)  5120,2,64   0          0
```

Related Commands	Command	Description
	cellular cdma profile activate	Displays all the show cellular information in one listing.
	debug cellular messages all	Displays the cellular modem hardware information.
	debug cellular messages data	Displays the cellular network (base station) information.
	debug cellular messages management	Displays the cellular profile information.
	show cellular radio	Displays the cellular modem radio statistics.
	show cellular security	Displays the modem lock state.
	show controllers cellular	Displays the SMS messages received by the cellular modem.

show cellular hardware

To display the cellular modem hardware information, use the **show cellular hardware** command in EXEC mode.

> **show cellular** *slot/wic_slot/port* **hardware**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   There is no default for this command.

Command Modes   EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines   The command usage is the same for GSM and CDMA, though the output is different for each.

Examples   The following example shows output for code division multiple access (CDMA) for slot 0, WIC slot 0, port 0:

```
# show cellular 0/0/0 hardware
Modem Firmware Version = p2005300
Modem Firmware built = 09-13-06
Hardware Version = 1.0
Electronic Serial Number (ESN) = 0x6032692A
Preferred Roaming List (PRL) Version = 10
Current Modem Temperature = 31 degrees Celsius
```

Table 4   Output Description for show cellular hardware command for CDMA

Field	Description
Modem Firmware Version	Firmware version of the modem.
Modem Firmware Built	Date firmware was built in *mm-dd-yy* format
Hardware Version	Modem hardware version.
Electronic Serial Number	Unique serial number of the modem.

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Table 4   Output Description for show cellular hardware command for CDMA (continued)

Field	Description
Preferred Roaming List (PRL) Version	PRL version is unique to a service provider. This indicates to the modem which channels the modem should scan.
Current Modem Temperature	Radio temperature of the modem in celsius.

The following example shows output for global system for mobile communication (GSM) for slot 0, WIC slot 0, port 0:

```
# show cellular 0/0/0 hardware
Modem Firmware Version = H1_0_0_1MCAP C:/WS/
Modem Firmware built = 09/08/06
Hardware Version = 1.0
International Mobile Subscriber Identity (IMSI) = <number>
International Mobile Equipment Identity (IMEI) = <number>
Factory Serial Number (FSN) = X2819460254100D
Modem Status = Online
Current Modem Temperature = 33 deg C, State = Normal
```

Table 5   Output Description for show cellular hardware command for GSM

Field	Description
Modem Firmware Version	Firmware version of the modem.
Modem Firmware Built	Date firmware was built in *mm-dd-yy* format
Hardware Version	Modem hardware version.
International Mobile Subscriber Identity (IMSI)	IMSI is stored in the SIM. IMSI consists of MCC (mobile country code, 3 digits), MNC (mobile network code, 3 for N. America and 2 digits for rest of the world) and MSIN (mobile station identification number). The MCC and MNC in the IMSI identify the subscribers PLMN (Public Land Mobile Network).
International Mobile Equipment Identity (IMEI)	Number that uniquely identifies the modem in a GSM/UMTS network.
Factory Serial Number (FSN)	Unique serial number of the modem.
Modem Status	Will be online if the modem has booted up fine, otherwise will be offline and the modem will be unusable.
Current Modem Temperature	Radio temperature of the modem in celsius. State is normal when temperature is between -15 deg C to 85 deg C. If state reaches critical (108 deg C), the modem will be shutdown.

Related Commands	**Command**	**Description**
	cellular cdma profile activate	Displays all the show cellular information in one listing.
	cellular cdma otasp	Displays the current active connection state and statistics.
	debug cellular messages data	Displays the cellular network (base station) information.

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Command	Description
debug cellular messages management	Displays the cellular profile information.
show cellular radio	Displays the cellular modem radio statistics.
show cellular security	Displays the modem lock state.
show controllers cellular	Displays the SMS messages received by the cellular modem.

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show cellular network

To display the cellular network (base station) information, use the **show cellular network** command in EXEC mode.

> **show cellular** *slot/wic_slot/port* **network**

Syntax Description	*slot/wic_slot/port* Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   There is no default for this command.

Command Modes   EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines   The command usage is the same for GSM and CDMA, though the output is different for each.

Examples   The following example shows output for code division multiple access (CDMA) for slot 0, WIC slot 0, port 0:

```
# show cellular 0/0/0 network
Current Service = 1xEV-DO and 1xRTT
Current Roaming Status(1xRTT) = HOME, (HDR) = HOME
Current Idle Digital Mode = HDR
Current System Identifier (SID) = 40
Current Network Identifier (NID) = 2
Serving Base Station Longitude = 0 deg 0 min 0 sec
Serving Base Station Latitude = 0 deg 0 min 0 sec
Current System Time = Tue Sep 26 13:49:22 2006
```

Table 6   Output Description for show cellular hardware command for GSM

Field	Description
Current Service	Service attached by the modem.
Current Roaming Status	Indicates whether the modem is in the home network or roaming.
Current Idle Digital Mode	Idle mode of the modem.
Current System Identifier	SID received by the modem (applicable only for 1xRTT)
Current Network Identifier	NID received by the modem (applicable only for 1xRTT).

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Table 6   Output Description for show cellular hardware command for GSM (continued)

Field	Description
Current BSS Longitude/Latitude	Geographic location of the BSS (if this information is received from the BSS).
Current System Time	System time received from the base station.

The following example shows output for global system for mobile communication (GSM) for slot 0, WIC slot 0, port 0:

```
# show cellular 0/0/0 network
Current Service Status = Normal, Service Error = None
Current Service = Combined
Packet Service = UMTS/WCDMA (Attached)
Packet Session Status = Inactive
Current Roaming Status = Roaming
Network Selection Mode = Automatic
Country = USA, Network = CINGULAR
Mobile Country Code (MCC) = 310
Mobile Network Code (MNC) = 380
Location Area Code (LAC) = 56997
Routing Area Code (RAC) = 253
Cell ID = 4503
Primary Scrambling Code = 169
PLMN Selection = Automatic
Registered PLMN = Cingular , Abbreviated =
Service Provider =
```

Table 7   Output Description for show cellular hardware command for GSM

Field	Description
Current Service Status	Indicates whether service is available.
Current Service Error	Shows the error in case there is no service
Current Idle Digital Mode	Idle mode of the modem.
Packet Service	Indicates the type of service available. For normal operation, the modem should be attached.
Packet Session Status	Status of PDP session. When data transfer is taking place, packet session will be active.
Current Roaming Status	Indicates whether the modem is in the home network or roaming.
Network Selection Mode	Can be manual or automatic selection mode. Set to automatic by default.
Country	Country string given by the base station.
Network	Network string given by the base station.
Mobile Country Code	Country code given by the base station. Only if the country code given by the base station matches the MCC of the IMSI and the network code given by the base station matches the MNC of the IMSI, the modem will be in the home network.

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Table 7   Output Description for show cellular hardware command for GSM (continued)

Field	Description
Mobile Network Code	Network code given by the base station. Only if the country code given by the base station matches the MCC of the IMSI and the network code given by the base station matches the MNC of the IMSI, the modem will be in the home network.
Location Area Code	LAC given by the base station.
Routing Area Code	RAC given by the base station.
Cell ID	Cell ID given by the base station.
PLMN Selection	Default is automatic.

Related Commands

Command	Description
cellular cdma profile activate	Displays all the show cellular information in one listing.
cellular cdma otasp	Displays the current active connection state and statistics.
debug cellular messages all	Displays the cellular modem hardware information.
debug cellular messages management	Displays the cellular profile information.
show cellular radio	Displays the cellular modem radio statistics.
show cellular security	Displays the modem lock state.
show controllers cellular	Displays the SMS messages received by the cellular modem.

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show cellular profile

To display the cellular profile information, use the **show cellular profile** command in EXEC mode.

show cellular *slot/wic_slot/port* **profile**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   Profile 1 is the default for this command.

Command Modes   EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines   The command usage is the same for GSM and CDMA, though the output is different for each.

Examples   The following example shows output for code division multiple access (CDMA) for slot 0, WIC slot 1, port 1:

```
# show cellular 0/1/1 profile
Electronic Serial Number (ESN) = 12637162381
Modem activated = YES
Profile   Prov Date       MDN            MIN
=======  ==========  ===============  ===========
  *1     2005/04/10  123456789012345  1234567890
   2     2005/01/10  687679789898977  7877886775
```

"*" indicates the default profile.

Table 8 describes the output fields from the command for CDMA:

Table 8   Field Description

Field	Description
Electronic Serial Number	A unique serial number of the CDMA modem.
Modem Activated	Indicates the activation status of the modem. Yes indicates that the modem is activated by the carrier.
Profile	Profile supported by MC57*xx* modems. **Note** MC57*xx* modems support two profiles. Only one profile can be active at a time.

Table 8   Field Description (continued)

Field	Description
ProvDate	Date the modem was provisioned, in *YYYY/MM/DD* format.
MDN	Mobile Directory Number assigned to the modem by the carrier during provisioning.
MIN	Mobile Identity Number assigned to the modem by the carrier during provisioning

The following example shows output for global system for mobile communication (GSM) for slot 0, WIC slot 1, port 1:

```
# show cellular 0/1/1 profile
Profile 1 = ACTIVE
--------
PDP Type = IPv4, Header Compression = ON
Data Compression = ON
PDP address = 0x7F000201
Access Point Name (APN) = enzo.cisco.com
Authentication = CHAP
Username: cisco, Password: lab
Primary DNS address = 127.0.2.1
Source Address = 127.0.2.1 255.255.255.0

Profile 2 = INACTIVE
---------
PDP Type = IPv4, Header Compression = ON
Data Compression = ON
PDP address = 0x7F000202
Access Point Name (APN) = enzo.cingular.com
Authentication = CHAP
Username: cisco, Password: lab
Primary DNS address = 127.0.2.1
Source Address = 127.0.2.2 255.255.255.0
```

Table 9 describes the output for the GSM modem:

Field Description

Table 9   Field Description

Field	Description
Profile <number>	Shows whether a particular profile is ACTIVE or INACTIVE. The profile is ACTIVE when the PDP context is active. This happens when a data call is successfully established.
PDP Type	Indicates the PDP type. Supported type is IPv4.
PDP Address	Shows the IP address assigned for the PDP context during PPP negotiation
Access Point Name	PDP AddressAccess Point Name for the profile This information is provided by the service provider.

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Table 9   ***Field Description (continued)***

Field	Description
Authentication	PPP Authentication supported. CHAP and PAP are supported. The type of authentication to be used is provided by the service provider.
Username	Username to be used for PPP authentication. This information is provided by the service provider.
Password	Password to be used for PPP authentication. This information is provided by the service provider.

Related Commands

Command	Description
cellular cdma profile activate	Displays all the show cellular information in one listing.
cellular cdma otasp	Displays the current active connection state and statistics.
debug cellular messages all	Displays the cellular modem hardware information.
debug cellular messages data	Displays the cellular network (base station) information.
show cellular radio	Displays the cellular modem radio statistics.
show cellular security	Displays the modem lock state.
show controllers cellular	Displays the SMS messages received by the cellular modem.
show interfaces cellular	Displays statistics for the cellular interfaces.
show run interface cellular	Displays the current running configuration for the cellular interface.

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show cellular radio

To display the cellular modem radio statistics, use the **show cellular radio** command in user EXEC mode.

> **show cellular** *slot/wic_slot/port* **radio [history]**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.
history	Displays the RSSI history.

Command Default   There is no default for this command.

Command Modes   EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines   The command usage is the same for GSM and CDMA, though the output is different for each.

Examples   The following example shows output for code division multiple access (CDMA) for slot 0, WIC slot 0, port 0:

```
1xRTT related info
-----------------
Current RSSI = -85 dBm, ECIO = -7 dBm
Current Channel Number = 507
Current Channel State = Acquired
Current Band Class = Band Class 0

HDR related info
---------------
Current RSSI = -88 dBm, ECIO = -4 dBm
Current Channel Number = 1175
Current Band Class = Band Class 1
Sector ID (Hex) = 0080:0580:0000:0000:000A:CCC5:4501:0A02
Subnet Mask = 104, Color Code = 237, PN Offset = 174
Rx gain control(Main) = -86, Diversity = -104
Tx total power = -6 dBm, Tx gain adjust = -3072 dBm
Carrier to interference (C/I) ratio = 5
```

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Table 10   Output Description for show cellular radio command for CDMA

Field	Description
Current RSSI	Current radio signal strength in dbm (-125 dbm indicates no signal)
Current ECIO	Current energy per chip (ECIO) in dbm
Current Channel Number	Current channel number to which the modem is attached to the base station.
Current Channel State	Indicates whether the modem is scanning or has acquired the channel
Current Band Class	Band class attached
Sector ID	Sector ID of the base station to which the modem is attached
Subnet Mask	Subnet mask of the sector
Color Code	Color code of the sector
PN Offset	PN offset for the sector
Rx Gain Control	Rx gain control for the modem
Tx Total Power	Transmitted power

The following example shows output for global system for mobile communication (GSM) for slot 0, WIC slot 0, port 0:

```
# show cellular 0/0/0 radio
Current Band = WCDMA 1900, Channel Number = 9721
Current RSSI(RSCP) = -91 dBm
```

Table 11   Output Description for show cellular radio command for GSM

Field	Description
Current Band	Band attached by the modem
Channel Number	Channel number attached by the modem
Current RSSI	Current radio signal strength received by the modem

Related Commands

Command	Description
cellular cdma profile activate	Displays all the show cellular information in one listing.
cellular cdma otasp	Displays the current active connection state and statistics.
debug cellular messages all	Displays the cellular modem hardware information.
debug cellular messages data	Displays the cellular network (base station) information.
show cellular security	Displays the modem lock state.
show controllers cellular	Displays the SMS messages received by the cellular modem.

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Command	Description
show interfaces cellular	Displays statistics for the cellular interfaces.
show run interface cellular	Displays the current running configuration for the cellular interface.

show cellular security

To display the modem lock state, use the **show cellular security** command in user EXEC mode.

> **show cellular** *slot/wic_slot/port* **security**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   There is no default for this command.

Command Modes   EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines   The command usage is the same for GSM and CDMA, though the output is different for each.

Examples   The following example shows output for code division multiple access (CDMA) for slot 0, WIC slot 0, port 0:

```
# show cellular 0/0/0 security
Modem PIN Security LOCKED
Power-up lock ENABLED
```

Table 12 describes the output for this command:

Table 12   Output Description

Field	Description
Modem PIN Security	If the modem is locked, you cannot make calls without unlocking.
Power-up Lock	Shows whether the modem will be locked on power-up.

The following example shows output for global system for mobile communication (GSM) for slot 2, WIC slot 1, port 1:

```
# show cellular 0/0/0 security
Card Holder Verification (CHV1) ENABLED
SIM Status = OK
SIM User Operation Required = CHV1
Number of Retries remaining = 3
```

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Table 13 describes the output from this command:

Table 13   Output Description

Filed	Description
Card Holder Verification	If enabled, access to the SIM is restricted. For Enzo, it will always be disabled.
SIM Status	Indicates whether the SIM is present or removed from the SIM socket.
SIM User Operation Required	If the SIM is protected (e.g., because of CHV1 enabled), it will indicate the type of user operation required.
Number of Retries Remaining	Indicates the number of attempts remaining in case the SIM is locked. If the number of retries becomes zero, the SIM is blocked and becomes unusable.

Related Commands

Command	Description
cellular cdma profile activate	Displays all the show cellular information in one listing.
cellular cdma otasp	Displays the current active connection state and statistics.
debug cellular messages all	Displays the cellular modem hardware information.
debug cellular messages data	Displays the cellular network (base station) information.
show cellular radio	Displays the cellular modem radio statistics.
show controllers cellular	Displays the SMS messages received by the cellular modem.
show interfaces cellular	Displays statistics for the cellular interfaces.
show run interface cellular	Displays the current running configuration for the cellular interface.

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show controllers cellular

To display high-speed WAN interface card (HWIC) hardware and driver specific information, use the **show controllers cellular** command in EXEC mode.

show controllers cellular *slot/wic_slot/port*

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   There is no default for this command.

Command Modes   EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines   Use this command to capture the output for debugging or troubleshooting purposes only.

Examples   The output is variable.

Related Commands

Command	Description
cellular cdma profile activate	Displays all the show cellular information in one listing.
cellular cdma otasp	Displays the current active connection state and statistics.
debug cellular messages all	Displays the cellular modem hardware information.
debug cellular messages data	Displays the cellular network (base station) information.
show cellular radio	Displays the cellular modem radio statistics.
show cellular security	Displays the modem lock state.
show interfaces cellular	Displays statistics for the cellular interfaces.
show run interface cellular	Displays the current running configuration for the cellular interface.

show interfaces cellular

To display statistics for the cellular interfaces, use the **show interfaces cellular** command in EXEC mode.

show interfaces cellular *slot/wic_slot/port*

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default There is no default for this command.

Command Modes EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines When you enter this command, encapsulation should be PPP and all signals, like DCD, DSR, DTR, RTS and CTS should be up during normal operation.

Examples The following example shows the cellular interface statistics for slot 0, WIC slot 0, port 0; the encapsulation in the example is SLIP and DTR is down:

```
c2800# show interfaces cellular 0/0/0
Cellular0/0/0 is down, line protocol is down
  Hardware is HSDPA North America
  MTU 1500 bytes, BW 9 Kbit, DLY 100000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation SLIP, loopback not set
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
     Conversations  0/0/16 (active/max active/max total)
     Reserved Conversations 0/0 (allocated/max allocated)
     Available Bandwidth 6 kilobits/sec
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
     DCD=up  DSR=up  DTR=down  RTS=up  CTS=up
c2800#
```

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Related Commands

Command	Description
cellular cdma profile activate	Displays all the show cellular information in one listing.
cellular cdma otasp	Displays the current active connection state and statistics.
debug cellular messages all	Displays the cellular modem hardware information.
debug cellular messages data	Displays the cellular network (base station) information.
show cellular radio	Displays the cellular modem radio statistics.
show cellular security	Displays the modem lock state.
show controllers cellular	Displays the SMS messages received by the cellular modem.
show run interface cellular	Displays the current running configuration for the cellular interface.

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show run interface cellular

To see the current running configuration for the cellular interface, use the **show run interface cellular** command in EXEC mode.

show run interface cellular *slot/wic_slot/port*

Syntax Description		
	slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default There is no default for this command.

Command Modes EXEC

Command History	Release	Modification
		This command was introduced.

Usage Guidelines None

Examples The following example shows the output of the command for slot 0, WIC slot 2, port 0:

```
c2800#sh running-config interface cellular 0/2/0
Building configuration...

Current configuration : 278 bytes
!
interface Cellular0/2/0
 ip address negotiated
 encapsulation ppp
 no ip mroute-cache
 dialer in-band
 dialer idle-timeout 2147000
 dialer string umts
 dialer-group 1
 async mode interactive
 no peer default ip address
 ppp chap hostname bombor
 ppp chap password 0 enzo
end

c2800#
```

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Related Commands

Command	Description
cellular cdma profile activate	Displays all the show cellular information in one listing.
cellular cdma otasp	Displays the current active connection state and statistics.
debug cellular messages all	Displays the cellular modem hardware information.
debug cellular messages data	Displays the cellular network (base station) information.
show cellular radio	Displays the cellular modem radio statistics.
show cellular security	Displays the modem lock state.
show controllers cellular	Displays the SMS messages received by the cellular modem.
show interfaces cellular	Displays statistics for the cellular interfaces.

test cellular cnm-process-enqueue

To debug the control and management (CNM) process in the router, use the **test cellular cnm-process-enqueue** command in privileged EXEC mode.

test cellular *slot/wic_slot/port* **cnm-process-enqueue**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   There is no default for this command.

Command Modes   Privileged EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines   Use this command to capture output for debugging. After you enter the command, make sure you see the modem upmessage on the console. This indicates that the modem has booted properly.

Examples   The following example resets the modem for slot 0, WIC_slot 1, port 1:

```
c2800#test cellular 0/2/0 cnm-process-enqueue messages ?
  <0-5>  0 - Heartbeat, 1 - Call disc, 2 - too hot,
      3 - reset, 4 - modem up, 5 - undefined
```

Related Commands

Command	Description
test cellular modem-power-cycle	Displays modem power cycle.
test cellular modem-reset	Resets modem.

test cellular modem-power-cycle

To recycle the power on the modem, use the **test cellular modem-power-cycle** command in privileged EXEC mode. The modem will disconnect the calls and then cycle the power.

test cellular *slot/wic_slot/port* **modem- power-cycle**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   There is no default for this command.

Command Modes   Privileged EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines   Use this command to capture output for debugging. After you enter the command, make sure you see the modem UP message on the console. This indicates that the modem has booted properly.

Examples   The following example cycles the power for the modem in slot 0, WIC_slot 2, port 0:

```
c2800#test cellular 0/2/0 modem-power-cycle
Modem Power cycled successfully
c2800#
01:01:01: %CELLWAN-2-MODEM_UP: Cellular0/2/0 modem is now UP
```

Related Commands

Command	Description
test cellular cnm-process-enqueue	Enqueues to CNM process.
test cellular modem-reset	Resets modem.

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test cellular modem-reset

To do a software reset on the modem, use the **test cellular modem-reset** command in privileged EXEC mode. If a call is active, the modem will disconnect the call and then do a reset.

test cellular *slot/wic_slot/port* **modem- reset**

Syntax Description		
	slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.

Command Default   There is no default for this command.

Command Modes   Privileged EXEC

Command History	Release	Modification
		This command was introduced.

Usage Guidelines   Use this command to capture output for debugging. After you enter the command, make sure you see the modem UP message on the console. This indicates that the modem has booted properly.

Examples   The following example resets the modem for slot 0, WIC_slot 1, port 1:

```
# test cellular 0/1/1 modem-reset
Modem reset successfully
#
```

Related Commands	Command	Description
	test cellular cnm-process-enqueue	Enqueues to CNM process.
	test cellular modem-power-cycle	Displays modem power cycle.

Supported Standards, MIBs, and RFCs

The following section will provide references related to the HWIC:

Standards

- TBD
- TBD

MIBs

- TBD
- TBD
- TBD

Troubleshooting

If you are encoutering issues with your system, this section will help you troubleshoot and pinpoint the cause of failure.

Verifying Configuration

To verify your configuration and to make sure that your connection is up and running, follow these step:

Step 1 After creating a profile with the **create cellular profile** command, send a ping from a router or attached host.

Step 2 If you do not get any response, to find where failure is occuring, run the following debug commands:

- **debug chat script**
- **debug PPP negotiation**
- **show cellular all**
- **show interface cellular**
- **show running-config**
- **show controllers cellular**

Step 3 Save the output from all these commands and contact your system administrator.

Checking Signal Strength

If the RSSI level is very low, for example, if it is less than -110 dBm, it means one of the following:

- Your antenna is not connected
- The antenna is not working properly
- There is no service in your area

If all the above are working correctly, contact your system administrator.

Troubleshooting Profile Creation

You must make sure that your profile is created correctly using the cellular cdma profile create command. Sample outputs for the different scenarios you may encouter are:

- No profile created, low RSSI

- Profile created; antenna disconnected

No profile created, Low RSSI

The following is a sample output from this command if the antenna is disconnected and a profile has not been created. The errors in this case have been highlighted with >>>>>>>:

```
3825_GSM_3#sh cellular 0/3/0 all
Load for five secs: 0%/0%; one minute: 0%; five minutes: 1%
Time source is hardware calendar, 19:40:43.239 UTC Wed Nov 8 2006

Hardware Information
====================
Modem Firmware Version = H1_0_0_7MCAP G:/WS/
Modem Firmware built = 10/26/06
Hardware Version = 1.0
International Mobile Subscriber Identity (IMSI) = <specific sim number>
International Mobile Equipment Identity (IMEI) = <specific modem number>
Factory Serial Number (FSN) = X2819460388100D
Modem Status = Online
Current Modem Temperature = 38 deg C, State = Normal

Profile Information
===================
 * - Default profile >>>>>>>> no profile here.

Data Connection Information
===========================

Profile 1, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 2, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 3, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 4, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 5, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 6, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 7, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 8, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 9, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 10, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 11, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 12, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 13, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 14, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 15, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state
Profile 16, Packet Session Status = INACTIVE
        Inactivity Reason = Normal inactivate state


Network Information
```

```
====================
Current Service Status = No service, Service Error = None    >>>>>>> no service means not
connected to the network.
Current Service = Combined
Packet Service = None
Packet Session Status = Inactive
Current Roaming Status = Home
Network Selection Mode = Automatic
Country = USA, Network = Cinglr
Mobile Country Code (MCC) = 310
Mobile Network Code (MNC) = 380
Location Area Code (LAC) = 6042
Routing Area Code (RAC) = 255
Cell ID = 0
Primary Scrambling Code = 0
PLMN Selection = Automatic

Radio Information
=================
Current Band = None, Channel Number = 0
Current RSSI = -110 dBm        >>>>>>> either no antenna, or bad antenna or out of
network.

Modem Security Information
==========================
Card Holder Verification (CHV1) = Disabled
SIM Status = OK
SIM User Operation Required = None
Number of Retries remaining = 3
```

Profile Created Correctly; Antenna Disconnected

The following is a sample output when a profile has been created correctly, but the antenna is not working properly, or there is no RSSI. The errors to look for are highlighted with >>>>>>:

```
3825_GSM_3#show cell 0/3/0 all
Load for five secs: 0%/0%; one minute: 0%; five minutes: 0%
Time source is hardware calendar, 19:54:03.919 UTC Wed Nov 8 2006

Hardware Information
====================
Modem Firmware Version = H1_0_0_7MCAP G:/WS/
Modem Firmware built = 10/26/06
Hardware Version = 1.0
International Mobile Subscriber Identity (IMSI) = 310410070721403
International Mobile Equipment Identity (IMEI) = 352678010006713
Factory Serial Number (FSN) = X2819460388100D
Modem Status = Online
Current Modem Temperature = 38 deg C, State = Normal

Profile Information
====================
Profile 1 = INACTIVE*          >>>>>>> one profile created
--------
PDP Type = IPv4
Access Point Name (APN) = <provided by ISP>
Authentication = <PAP or CHAP, depending on the ISP>
Username: <ISP provided>, Password: <ISP Provided>

 * - Default profile

Data Connection Information
===========================
```

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```
        Profile 1, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 2, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 3, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 4, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 5, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 6, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 7, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 8, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 9, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 10, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 11, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 12, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 13, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 14, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 15, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state
        Profile 16, Packet Session Status = INACTIVE
                Inactivity Reason = Normal inactivate state

        Network Information
        ===================
        Current Service Status = No service, Service Error = None
        Current Service = Combined
        Packet Service = None
        Packet Session Status = Inactive
        Current Roaming Status = Home
        Network Selection Mode = Automatic
        Country = USA, Network = Cinglr
        Mobile Country Code (MCC) = 310
        Mobile Network Code (MNC) = 380
        Location Area Code (LAC) = 6042
        Routing Area Code (RAC) = 255
        Cell ID = 0
        Primary Scrambling Code = 0
        PLMN Selection = Automatic

        Radio Information
        =================
        Current Band = None, Channel Number = 0
        Current RSSI = -110 dBm            >>>>>>>>>no antenna, bad antenna or out of network

        Modem Security Information
        ==========================
        Card Holder Verification (CHV1) = Disabled
        SIM Status = OK
        SIM User Operation Required = None
        Number of Retries remaining = 3
```

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Call Setup Using CHAT Script

The following is a sample output when a call is set up using CHAT script. It shows a received ip address from network and call setup is successful and data path is open:

```
Debugs

debug modem
debug chat
debug ppp negotiation
debug ppp event
debug ppp error



3825_GSM_3#
Nov  8 20:04:42.295: CHAT0/3/0: Attempting async line dialer script
Nov  8 20:04:42.295: CHAT0/3/0: Dialing using Modem script: cingular & System script: none
Nov  8 20:04:42.299: CHAT0/3/0: process started
Nov  8 20:04:42.299: CHAT0/3/0: Asserting DTR
Nov  8 20:04:42.299: CHAT0/3/0: Chat script cingular started        >>>>> chat script
invoked
Nov  8 20:04:42.299: CHAT0/3/0: Sending string: atdt*98*1#
Nov  8 20:04:42.299: CHAT0/3/0: Expecting string: CONNECT
Nov  8 20:04:42.343: CHAT0/3/0: Completed match for expect: CONNECT
Nov  8 20:04:42.343: CHAT0/3/0: Chat script cingular finished, status = Success  >>>>
successful communication with modem
Nov  8 20:04:42.395: TTY0/3/0: no timer type 1 to destroy
Nov  8 20:04:42.395: TTY0/3/0: no timer type 0 to destroy
Nov  8 20:04:42.395: TTY0/3/0: no timer type 2 to destroy
Nov  8 20:04:44.395: %LINK-3-UPDOWN: Interface Cellular0/3/0, changed state to up
Nov  8 20:04:44.395: Ce0/3/0 PPP: Using dialer call direction
Nov  8 20:04:44.395: Ce0/3/0 PPP: Treating connection as a callout
Nov  8 20:04:44.395: Ce0/3/0 PPP: Session handle[7E000089] Session id[46]
Nov  8 20:04:44.395: Ce0/3/0 PPP: Phase is ESTABLISHING, Active Open
Nov  8 20:04:44.395: Ce0/3/0 PPP: No remote authentication for call-out
Nov  8 20:04:44.395: Ce0/3/0 LCP: O CONFREQ [Closed] id 75 len 16
Nov  8 20:04:44.395: Ce0/3/0 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Nov  8 20:04:44.395: Ce0/3/0 LCP:    MagicNumber 0x179E8E46 (0x0506179E8E46)
Nov  8 20:04:44.395: Ce0/3/0 LCP: I CONFREQ [REQsent] id 83 len 25
Nov  8 20:04:44.395: Ce0/3/0 LCP:    ACCM 0x00000000 (0x020600000000)
Nov  8 20:04:44.395: Ce0/3/0 LCP:    AuthProto CHAP (0x0305C22305)
Nov  8 20:04:44.395: Ce0/3/0 LCP:    MagicNumber 0x374C7C61 (0x0506374C7C61)
Nov  8 20:04:44.395: Ce0/3/0 LCP:    PFC (0x0702)
Nov  8 20:04:44.395: Ce0/3/0 LCP:    ACFC (0x0802)
Nov  8 20:04:44.395: Ce0/3/0 LCP: O CONFREJ [REQsent] id 83 len 8
Nov  8 20:04:44.395: Ce0/3/0 LCP:    PFC (0x0702)
Nov  8 20:04:44.395: Ce0/3/0 LCP:    ACFC (0x0802)
Nov  8 20:04:44.399: Ce0/3/0 LCP: I CONFACK [REQsent] id 75 len 16
Nov  8 20:04:44.399: Ce0/3/0 LCP:    ACCM 0x000A0000 (0x0206000A0000)
Nov  8 20:04:44.399: Ce0/3/0 LCP:    MagicNumber 0x179E8E46 (0x0506179E8E46)
Nov  8 20:04:44.399: Ce0/3/0 LCP: I CONFREQ [ACKrcvd] id 84 len 21
Nov  8 20:04:44.399: Ce0/3/0 LCP:    ACCM 0x00000000 (0x020600000000)
Nov  8 20:04:44.399: Ce0/3/0 LCP:    AuthProto CHAP (0x0305C22305)
Nov  8 20:04:44.399: Ce0/3/0 LCP:    MagicNumber 0x374C7C61 (0x0506374C7C61)
Nov  8 20:04:44.399: Ce0/3/0 LCP: O CONFACK [ACKrcvd] id 84 len 21
Nov  8 20:04:44.399: Ce0/3/0 LCP:    ACCM 0x00000000 (0x020600000000)
Nov  8 20:04:44.399: Ce0/3/0 LCP:    AuthProto CHAP (0x0305C22305)
Nov  8 20:04:44.399: Ce0/3/0 LCP:    MagicNumber 0x374C7C61 (0x0506374C7C61)
Nov  8 20:04:44.399: Ce0/3/0 LCP: State is Open
Nov  8 20:04:44.399: Ce0/3/0 PPP: Phase is AUTHENTICATING, by the peer
```

Cisco IOS Release TBD

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Nov  8 20:04:44.403: Ce0/3/0 CHAP: I CHALLENGE id 1 len 35 from "UMTS_CHAP_SRVR"
Nov  8 20:04:44.403: Ce0/3/0 CHAP: Using hostname from interface CHAP
Nov  8 20:04:44.403: Ce0/3/0 CHAP: Using password from interface CHAP
Nov  8 20:04:44.403: Ce0/3/0 CHAP: O RESPONSE id 1 len 40 from "<username configured on
the cellular interface>"
Nov  8 20:04:44.407: Ce0/3/0 CHAP: I SUCCESS id 1 len 4
Nov  8 20:04:44.407: Ce0/3/0 PPP: Phase is FORWARDING, Attempting Forward
Nov  8 20:04:44.407: Ce0/3/0 PPP: Phase is ESTABLISHING, Finish LCP
Nov  8 20:04:44.407: Ce0/3/0 PPP: Phase is UP                               >>>>>
pap/chap succeeded
Nov  8 20:04:44.407: Ce0/3/0 IPCP: O CONFREQ [Closed] id 1 len 22
Nov  8 20:04:44.407: Ce0/3/0 IPCP:    Address 0.0.0.0 (0x030600000000)
Nov  8 20:04:44.407: Ce0/3/0 IPCP:    PrimaryDNS 0.0.0.0 (0x810600000000)
Nov  8 20:04:44.407: Ce0/3/0 IPCP:    SecondaryDNS 0.0.0.0 (0x830600000000)
Nov  8 20:04:44.407: Ce0/3/0 PPP: Process pending ncp packets
Nov  8 20:04:45.411: Ce0/3/0 IPCP: I CONFNAK [REQsent] id 1 len 16
Nov  8 20:04:45.411: Ce0/3/0 IPCP:    PrimaryDNS 10.11.12.13 (0x81060A0B0C0D)
Nov  8 20:04:45.411: Ce0/3/0 IPCP:    SecondaryDNS 10.11.12.14 (0x83060A0B0C0E)
Nov  8 20:04:45.411: Ce0/3/0 IPCP: O CONFREQ [REQsent] id 2 len 22
Nov  8 20:04:45.411: Ce0/3/0 IPCP:    Address 0.0.0.0 (0x030600000000)
Nov  8 20:04:45.411: Ce0/3/0 IPCP:    PrimaryDNS 10.11.12.13 (0x81060A0B0C0D)
Nov  8 20:04:45.411: Ce0/3/0 IPCP:    SecondaryDNS 10.11.12.14 (0x83060A0B0C0E)
Nov  8 20:04:45.459: Ce0/3/0 IPCP: I CONFREQ [REQsent] id 25 len 4
Nov  8 20:04:45.459: Ce0/3/0 IPCP: O CONFACK [REQsent] id 25 len 4
Nov  8 20:04:45.459: Ce0/3/0 IPCP: I CONFNAK [ACKsent] id 2 len 22
Nov  8 20:04:45.459: Ce0/3/0 IPCP:    Address 166.138.186.119 (0x0306A68ABA77)
Nov  8 20:04:45.459: Ce0/3/0 IPCP:    PrimaryDNS 66.102.163.231 (0x81064266A3E7)
Nov  8 20:04:45.459: Ce0/3/0 IPCP:    SecondaryDNS 66.102.163.232 (0x83064266A3E8)
Nov  8 20:04:45.459: Ce0/3/0 IPCP: O CONFREQ [ACKsent] id 3 len 22
Nov  8 20:04:45.459: Ce0/3/0 IPCP:    Address 166.138.186.119 (0x0306A68ABA77)
Nov  8 20:04:45.459: Ce0/3/0 IPCP:    PrimaryDNS 66.102.163.231 (0x81064266A3E7)
Nov  8 20:04:45.459: Ce0/3/0 IPCP:    SecondaryDNS 66.102.163.232 (0x83064266A3E8)
Nov  8 20:04:45.463: Ce0/3/0 IPCP: I CONFACK [ACKsent] id 3 len 22
Nov  8 20:04:45.463: Ce0/3/0 IPCP:    Address 166.138.186.119 (0x0306A68ABA77)
Nov  8 20:04:45.463: Ce0/3/0 IPCP:    PrimaryDNS 66.102.163.231 (0x81064266A3E7)
Nov  8 20:04:45.463: Ce0/3/0 IPCP:    SecondaryDNS 66.102.163.232 (0x83064266A3E8)
Nov  8 20:04:45.463: Ce0/3/0 IPCP: State is Open
Nov  8 20:04:45.463: Ce0/3/0 IPCP: Install negotiated IP interface address 166.138.186.119
```

Glossary

BGP—Border Gateway Protocol. An inter-domain routing protocol that replaces Exterior Gateway Protocol (EGP). BGP exchanges reachability information with other BGP systems. It is defined by RFC 1163.

1xRTT—Single carrier Radio Transmission Technology.

1xEVDOt—Single carrier evolution data only (or data optimized).

3DES—Triple Data Encryption Standard.

AES—Advanced Encryption Standard.

BGP—Border Gateway Protocol.

CAR—Committed Access Rate.

CBWFQ—Class Based Weighted Fair Queuing.

CCOA—Collocated Care Of Address.

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CDMA—Code-Division Multiple Access. It is a technique for multiple-access digital communications that divides channels through unique code sequences.

CLI—Command Line Interface.

CN—Correspondence Node.

DES—Data Encryption Standard.

DSCP—Differentiated Services Code Point.

ECIO—Also written as Ec/Io. A notation used to represent a dimensionless ratio of the average power of a channel, typically the pilot channel, to the total signal power, measured in dBm.

EDGE—Enhanced Data GSM Environment.

ESN—Electronic Serial Number. A 32-digit number assigned by the mobile station maniufacturer used to identify a mobile station. It is unique for each station.

FA—Foreign Agent.

FIPS—General Information Processing Standards.

GPRS—General Packet Radio Service.

GSM—Global system for mobile communications.

HA—Home Agent.

HoA—Home Address.

HDR—High Data Rate

HSDPA—High-Speed Downlink Packet Access.

HWIC—High-Speed WAN Interface Card.

IKE—Internet Key Exchange.

IOS—Cisco Internetworking Operating System.

IP—Internet Protocol.

IPsec—IP security.

LFI—Link Fragmenting and Interleaving.

LLQ—Low latency Queueing.

MAC—Media Access Controller.

MAR—Mobile Access Router.

MIB—Management Information Base.

MN—Mobile Node.

MoIP—Mobile IP.

MR—Mobile Router.

NAM—Number Assignment Module.

NBAR—Network Based Application Recognition.

OTASP—Over The Air Service Provisioning.

PKI—Public Key Infrastructure.

PRL—Preferred Roaming List.

QoS—Quality of Service.

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RED—Random Early Detection.

RSSI—Receive Signal Strength Indicator.

SIM—Subscriber Identity Module.

TFTP—Trivial File Transfer Protocol.

ToS—Type of Service.

UMTS—Universal Mobile Telecommunications System.

VPN—Virtual Private Network.

WAN—Wide Area Network.

WRED—Weighted Random Early Detection.