Configuring 3G Wireless for Modular and Fixed Cisco Integrated Services Routers (HWIC-3G-CDMA, HWIC-3G-CDMA-*x,* and PCEX-3G-CDMA-*x*)

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The Cisco 880G series integrated services routers (Cisco ISRs) provide Internet, VPN, voice, data, and backup capability to corporate teleworkers and remote and small offices of fewer than 20 users. These fixed routers are capable of bridging and multiprotocol routing between LAN and WAN ports, and provide advanced features such as antivirus protection.

The Third Generation (3G) Wireless High-Speed WAN Interface Card (HWIC) is a multiband, multiservice WAN card for use over CDMA Radio Access Networks (RAN). It is used as the primary WAN connectivity and as a backup for critical applications. The 3G HWIC can also be used as the primary WAN connection.

Both the fixed and the modular 3G routers can be used as the primary WAN connectivity and as a backup for critical applications, and can also be used as the primary WAN connection.

It is supported on the following modular Cisco ISRs:

- Cisco 1841
- Cisco 1861
- Cisco 2800 series
- Cisco 3800 series
- Cisco 1900
- Cisco 2900
- Cisco 3900
- Cisco 880

The 3G wireless Modular and Fixed Cisco ISR provides the following functionality:

- Broadband WAN connectivity using high speed cellular data technology
- Support for the following technologies:
  - CDMA2000 Evolution-Data Optimized (EVDO) Revision (Rev) A
  - CDMA2000 EVDO Rev 0
  - CDMA Single channel Radio Transmission Technology (1xRTT)
- Automatic best-network selection
- Always-on capability
- Multiple antenna and cable options:
  - Diversity antenna
  - Indoor and outdoor external antennas
  - Radio Frequency Ultra-Low Loss (RF-ULL) cable length from 10 ft to 75 ft
- IOS-based Mobile IP including network mobility(NEMO)
- Supports over-the-air service provisioning (OTASP), Internet over-the-air (IOTA) data profile provisioning, and Open Mobile Alliance device management (OMA-DM).
- Multiple product SKUs for multiple CDMA carriers
- Multiple external antenna options
- Support for diversity antenna
- Static and dynamic IP addressing
- Modem-based support for mobile IP
- Cellular interface based on the async interface in Cisco IOS
- Mobile IP profile management for CDMA
- Network Address Translation (NAT) and Port Address Translation (PAT) support
- Security features such as firewall, intrusion-detection systems (IDS), and intrusion-prevention systems (IPS)
- Support for enhanced security features, such as GET VPN, EZ VPN, DMVPN, Multi-point GRE (mGRE), and IPSec VPN
- Auto-detecting optimized WAN switchover
- Support for Hot Standby Router Protocol (HSRP) and Virtual Router Redundancy Protocol (VRRP)
- Cellular WAN management information base (MIB)
- Diagnostic and monitoring capability
- Complete Cisco IOS feature capability

The Cisco 3G wireless Modular and Fixed Cisco ISR provides the following software functionality:

- Modem activation—You can activate the modem either by using Cisco IOS commands either manually or by using over-the-air service provisioning (OTASP), Internet over-the-air (IOTA) data profile provisioning or the device management protocol specified by OMA-DM.
- Modem management—You can access modem software and hardware information, radio and network status, and data profile information by using Cisco IOS commands and SNMP MIBs.
- Dial on Demand Routing (DDR)—This allows you to set up a data call when there is data traffic to be sent over the wireless network.

- Fallback connection (DDR backup)—The 3G Modular and Fixed Cisco ISR allows you 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)—After a primary connection has failed and the cellular connection is in fallback mode, the 3G Modular and Fixed Cisco ISR tears down the fallback-mode connection when the primary connection is available.

- Automatic teardown—After a configurable timeout, the 3G Modular and Fixed Cisco ISR automatically tears down a connection if there has been no activity.

- Autodetect—The 3G Modular and Fixed Cisco ISR automatically detects and uses the best available service.

- Firmware upgrade—You can upgrade the firmware on the modem by using Cisco IOS commands.

- 3G HWIC support on Cisco Integrated Services Router (ISR) platforms, namely Cisco 1841, Cisco 1861, Cisco 2801, Cisco 2811, Cisco 2821, Cisco 2851, Cisco 3825, and Cisco 3845.

- Comprehensive Cisco IOS MIB support including Interface (IF) MIBs and Entity MIBs.

- 3G cellular MIB support.

Table 1 shows the SKU and the frequencies supported by the 3G wireless WAN HWICs.

Table 1   SKU Description and Supported Frequencies

SKU Number	Description	Region	Frequency Bands
HWIC-3G-CDMA-*x*	EVDO Rev A/Rev 0/1xRTT, where *x* is an initial for a specific carrier	US	800/1900MHz
HWIC-3G-CDMA	Generic SKU for worldwide CDMA network	Worldwide	800/1900MHz
PCEX-3G-CDMA-*x*	Cisco 880G Series 3G Wireless Integrated Services Router, where *x* is an initial for a specific carrier.	North America	800/1900 MHz

Figure 1 shows the front panel of the HWIC-3G-CDMA-*x*.

Figure 1   Front Panel of HWIC-3G-CDMA-x

1	Mounting Screws	4	LEDs
2	Diagnostic Port	5	Diversity Antenna Connector
3	Main Antenna Connector		

Note The diagnostic port is not required for normal operation. It is used only for advanced radio diagnostics. Please refer to "Modem Troubleshooting Using the Diagnostic Port" section on page 104 for details on enabling this port and the diagnostic tools that are supported.

Table 2 explains each of the LEDs with their functionality and the different states. The LEDs provide a visual indication of your available services. Please refer to Chapter 13 in the *Cisco Interface Cards Hardware Installation Guide* for details on hardware installation.

Table 2   3G Wireless HWIC (CDMA) LED Descriptions

LED	Description
RSSI	Off: Low RSSI (under -100 dBm).
	Slow Green Blink: Low or medium RSSI (-99 to -90 dBm).
	Fast Green Blink: Medium RSSI (-89 to -70 dBm).
	Solid Green: High RSSI (-69 dBm or higher).
	Solid Yellow: No service.
WWAN	Off: HWIC in reset mode or not powered.
	Slow blink: Searching for service.
	Solid Green: Active service; no traffic detected.
	Fast Blink: Active service, and traffic detected proportional to blink rate.
1xRTT	1xRTT is the active service.
EVDO	1xEVDO is the active service.

Note Both 1xRTT and EVDO Off: No service is active.

Note If the RSSI LED is solid yellow, it means that there is no service.

Note Active service means the currently available service. Your 3G WAN wireless HWIC automatically selects the best available connection.

Feature History

Release	Modification
12.4(11)XV	This feature was introduced. (This image is not supported any longer.)
12.4(15)T	This feature was integrated into Cisco IOS Release 12.4(15)T.
12.4(22)YB1	This feature was revised.
15.1(1)T	This feature was integrated into Cisco IOS Release 15.1(1)T

PCEX-3G-CDMA-*x*

Figure 2 shows the front panel of the PCEX-3G-CDMA.

Figure 2 **Front Panel of PCEX-3G--CDMA**

1	LEDs	**3**	USB port
2	3G express card slot—Supports third-party[1] 3G card (Cisco 88xG models only)		

1. See the *Cisco 880 Series Integrated Services Routers* data sheet for supported vendors.

Table 3 lists the LEDs and describes their functionality and different states. The LEDs provide a visual indication of your available services. Please see the *Cisco 880 Series ISR Hardware Installation Guide* for details on hardware installation.

Table 3 **LED Description for PCEX-3G-HSPA-x**

LED	Color	Description	880 Series
3G[1] WWAN[2]	Green	On—Service is established. Slow Blinking—Searching for service. Fast Blinking—Data is either being received or being transmitted.	3G models
3G RSSI[3]	Green	Off—Low signal strength (lower than -100 dBm). On—High RSSI (-69 dBm or higher). Slow Blinking—Low or medium RSSI (-99 to -90 dBm). Fast Blinking—Medium RSSI (-89 to -70 dBm).	3G models
	Amber	On—No service.	3G models

LED	Color	Description	880 Series
3G GSM[4]	Green	On—Service is established. Off—No service.	3G models
3G CDMA[5]	Green	On—Service is established. Off—No service.	3G models

1. 3G = Third-Generation.
2. WWAN = wireless WAN.
3. RSSI = Received Signal Strength Indicator.
4. GSM = Global System for Mobile Communication.
5. CDMA = code division multiple access.

The PCEX-3G-CDMA supports the AC501 and the AC880E modem. Table 4 shows the LED information for the LEDs located on the modem.

Table 4   Modem LED Descriptions

LED	Description
Power	Indicates one of the following states: • The modem has detected or is connected to a 2G or 3G network. • The modem is not inserted in the PC. • The computer is off or in "suspend and resume mode". • The modem has been turned off using Watcher (Tools > Turn Radio Off) or another connection client.
	Solid Blue: The power is on, the modem is working normally, and the firmware is not being updated.
	Blinking Blue: The firmware is being updated. Do not remove the modem from the PC.
	Blinking Amber: The modem is searching for service (initializing).
	Solid Amber: Error—either the modem is having a problem initializing (searching for service) or is offline because of a failure. Contact your service provider.
2G	Off: The modem is unable to detect 2G service.
	Blinking Amber: The modem has detected a 2G network (EDGE, GPRS, GSM) and is ready to connect.
	Solid Amber: The modem is connected to a 2G network and is able to send and receive data.
3G	Off: The modem is unable to detect 3G service.
	Blinking Blue: The modem has detected a 3G network (UMTS, HSDPA) and is ready to connect.
	Solid Blue: The modem is connected to a 3G network and can send and receive data.

Feature History

Release	Modification
12.4(11)XV	This feature was introduced for HWIC-3G-CDMA. (This image is not supported any longer.)
12.4(15)T	This feature was integrated into Cisco IOS Release 12.4(15)T.
12.4(15)T1	This feature was updated.
15.0(1)M	The HSPA feature was introduced.
15.1(1)T	The CDMA feature was integrated into the Cisco 880 Series Integrated Service Routers with Cisco IOS Release 15.1(1)T.

Finding Support Information for Platforms and Cisco IOS Software Images

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

Contents

Prerequisites for Configuring 3G Wireless

The following are prerequisites to configuring the 3G wireless HWICs:

- You must have service availability from a wireless service provider, and you must have network coverage where your router will be physically located. For a complete list of supported carriers, see the data sheet at the following URL: http://www.cisco.com/go/3g

- You must subscribe to a service plan with a wireless service provider. For manual activation, you will need the following specific information from the provider:

    – Master Subsidy Lock (MSL) number

    – Mobile Directory number (MDN)

    – MSID

The ESN number is on the modem itself, as shown in Figure 3. Make sure that your service is registered with the ESN number. You can also obtain the ESN by using the **show cellular hardware** command.

- You must install the required antennas before you configure the 3G wireless HWIC. See the following URLs for instructions on how to install the antennas:
  - 3G-ANTM1919D—See the *Cisco Multiband Swivel Mount Dipole Antenna (3G-ANTM1919D)*
  - 3G-ANTM1916-CM—See the *Cisco Multiband Omnidirectional Ceiling Mount Antenna (3G-ANTM1916-CM)*
  - 3G-AE015-R (Antenna Extension)—See the *Cisco Single-Port Antenna Stand for Multiband TNC Male-Terminated Portable Antenna (3G-AE015-R)*
  - 3G-ANTMOUT-OM—See the *Cisco 3G Omnidirectional Outdoor Antenna (3G-ANTM-OUT-OM)*
  - 3G-ANTM-OUT-LP—See the *Cisco 3G Low Profile Outdoor Antenna (3G-ANTM-OUT-LP)*
  - 3G-ACC-OUT-LA—See the *Cisco 3G Lightning Arrestor (3G-ACC-OUT-LA)*
- You must make sure to check your LEDs for signal reception as described in Table 2.
- You should be familiar with Cisco IOS.

Figure 3   Location of the ESN Number

| 1 | The ESN is located on the modem that is attached to the back of the 3G wireless HWIC. The ESN is just below the barcode. |

Restrictions for Configuring 3G Wireless

The following restrictions apply to the Cisco 3G Wireless HWICs:

- Data connection can be originated only by the 3G wireless Modular and Fixed Cisco ISRs. Remote dial-in is not supported.
- Throughput—Because of the shared nature of wireless communications, the amount of throughput that is experienced varies, depending on the number of active users or congestion in a network.

- Cellular networks have higher latency, compared to wired networks. Latency rates depend on the technology and carrier. Latency can increase because of network congestion.

- Any restrictions that are a part of the terms of service from your carrier.

Technology Overview

This section contains the following topics:

- CDMA Network Overview, page 9
- Overview of SNMP MIBs, page 10
- 3G Cellular WAN MIB Architecture, page 10
- Supported Cisco Antennas and Cables, page 13

CDMA Network Overview

CDMA is a standard for mobile communication. A typical CDMA network includes terminal equipment, mobile termination, base transceiver station (BTS), base station controller (BSC), packet data serving node (PDSN), and other data network entities. The PDSN is the interface between a BSC and a internet gateway.

Figure 4 shows the relationship of the components of a typical CDMA network, including a PDSN and a branch office with the 3G wireless Modular and Fixed Cisco ISRs.

As the figure shows, the branch office connects to a radio tower and a BTS. The BTS connects to a BSC, which contains a component called the packet control function (PCF). The PCF communicates with the Cisco PDSN for data communication and with the mobile switching center (MSC) for voice.

Figure 4   Overview of the CDMA Network
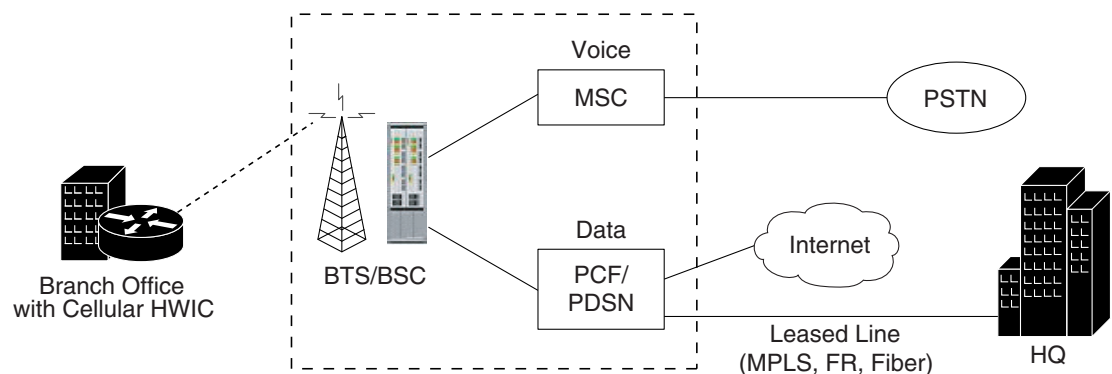
Carrier Network
BTS: Base Transceiver Stations
BSC: Base Station Controller
MSC: Mobile Switching Center
PCF: Packet Control Function
PDSN: Packet Data Serving Node

230350

Overview of SNMP MIBs

Simple Management Network Protocol (SNMP) development and use is centered around the Management Information Base (MIB). An SNMP MIB is an abstract data base, i.e., a conceptual specification for information that a management application may read and modify in a certain form. This does not imply that the information is kept in the managed system in that same form. The SNMP agent translates between the internal data structures and formats of the managed system and the external data structures and formats defined for the MIB.

The SNMP MIB is conceptually a tree structure with conceptual tables. Cisco 3G MIB is discussed in more detail in the next section. Relative to this tree structure, the term MIB is used in two senses. In one sense it is actually a MIB branch, usually containing information for a single aspect of technology, such as a transmission medium or a routing protocol. A MIB used in this sense is more accurately called a MIB module, and is usually defined in a single document. In the other sense a MIB is a collection of such branches. Such a collection might comprise, for example, all the MIB modules implemented by a given agent, or the entire collection of MIB modules defined for SNMP.

A MIB is a tree where the leaves are individual items of data called objects. An object may be, for example, a counter or a protocol status. MIB objects are also sometimes called variables.

MIBs for the 3G cellular Modular and Fixed Cisco ISRs can be classified into three categories:

- IF MIBs—describes interface statistics
- Cisco-Entity-Vendortype-OID-MIB.my—ENTITY-MIBs are used to provide general hardware type for both the Modular and Fixed Cisco ISRs and the modem. CISCO-ENTITY-VENDORTYPE-OID-MIB assigns OIDs for Cisco components (including the HWICs & the modems). The OIDs are then used as the values of entPhysicalVendorType in the ENTITY-MIB.
- 3G cellular MIBs—cellular or wireless-specific MIBs

3G Cellular WAN MIB Architecture

This section describes the MIB definition and implementation support for Cisco's cellular 3G WAN products on the customer premises equipment (CPE) end.

The 3G Cellular WAN MIB supports both CDMA and GSM set of cellular standards and includes the following technologies:

- GSM—GPRS/EDGE/UMTS/HSPA
- CDMA—1xRTT/EVDO RevA/EVDO Rev0

The 3G cellular MIB uses indexes from the cellular interface and from the modem. You can obtain the interface index using IF-MIBs and the modem index using the ENTITY MIBs.

The 3G MIB definition includes the following major sub-trees:

- Common objects
- CDMA objects
- GSM objects
- Notifications

You can use MIB object c3gStandard defined in the c3gWanCommonTable to distinguish between CDMA or GSM and implementing MIB for CDMA or GSM.

Note	Cisco 3G MIB supports both SNMP V3 and V2.

At a high level, the Cisco 3G WAN MIBs are divided into two groups and have the following structure:

1. ciscoWan3gMIBObjects—this group defines all the MIB objects for Cisco 3G WAN MIBs
2. ciscoWan3gMIBNotifs—this group defines all the notification events for Cisco 3G WAN MIBs

ciscoWan3gMIBObjects

The ciscoWan3gMIBObjects group has three sub-groups:

- c3gWanCommonTable—defines the common MIB objects for both CDMA and GSM
- c3gWanCdma—defines the MIB objects specific for CDMA 2000 standards (3GPP2)
- c3gWanGsm—defines the MIB objects specific for GSM/UMTS standards (3GPP)

c3gWanCdma

Under c3gWanCdma, there are seven sub-groups:

- c3gCdmaSessionTable for session related objects
- c3gCdmaConnectionTable for connection related objects
- c3gCdmaIdentityTable for user identity related objects
- c3gCdmaNetworkTable for network related objects
- c3gCdmaProfile for user profile related objects
- c3gCdmaRadio for radio related objects
- c3gCdmaSecurityTable for security related objects

c3gWanGsm

Under c3gWANGsm, there are five sub-groups:

- c3gGsmIdentityTable for user identity related objects.
- c3gGsmNetworkTable for network related objects.
- c3gGsmPdpProfile for PDP profile related objects.
- c3gGsmRadio for radio related objects.
- c3gGsmSecurityTable for security related objects.

ciscoWan3gMIBNotifs

Cisco Cellular 3G WAN MIB implementation supports SNMP GET (read operation) for all MIB objects, and SNMP SET (write operation) for the following RW (read-write) objects and more:

- c3gRssiOnsetNotifThreshold
- c3gRssiAbateNotifThreshold
- c3gEcIoOnsetNotifThreshold
- c3gEcIoAbateNotifThreshold
- c3gModemTemperOnsetNotifThreshold
- c3gModemTemperAbateNotifThreshold
- c3gModemReset

- c3gModemUpNotifEnabled
- c3gModemDownNotifEnabled
- c3gServiceChangedNotifEnabled
- c3gNetworkChangedNotifEnabled
- c3gConnectionStatusChangedNotifFlag
- c3gRssiOnsetNotifFlag
- c3gRssiAbateNotifFlag
- c3gEcIoOnsetNotifFlag
- c3gEcIoAbateNotifFlag
- c3gModemTemperOnsetNotifEnabled
- c3gModemTemperAbateNotifEnabled

Note By default, all notifications are disabled. To receive notifications, you must enable these notifications.

Note The IF MIBs also have traps for the cellular interface objects that are used in conjunction with the notification type. When you get a notification, you must check the associated objects.

Table 5 shows various notifications and what they mean.

Table 5 Traps and Notifications

Traps	Details
ModemUpNotification	Modem successfully recognized.
ModemDown	Crash or power-cycle.
Change Notification	Notifies about changes in service objects related to this notification—previous service type to current service type.
ConnectionStatus	Shows the connection status. Service type is included in this notification.

Restrictions

- For the router that runs the SNMP agent, you must configure appropriate access control (e.g. SNMP-server community) using the Cisco IOS CLI for the NMS and agent to work properly.
- It is strongly recommended that you configure SNMP V3 with authentication/privacy when implementing SNMP GET and SET operation.

Supported Cisco Antennas and Cables

Table 6 lists the Cisco antennas that are supported for use on the 3G Modular and Fixed Cisco ISRs.

Table 6   ***Cisco Antennas Supported on Modular 3G ISRs***

Cisco Part Number	Antenna Type	Maximum Gain and Frequency Range	Description
3G-ANTM1919D	Dipole omnidirectional	0 dBi (806–960 MHz) 0 dBi (1710–2170 MHz)	This is the default antenna. Multiband faceplate-mounted dipole antenna. For more information, see the *Cisco Multiband Swivel Mount Dipole Antenna (3G-ANTM1919D)* document.
3G-ANTM1916-CM	High-gain ceiling-mount omnidirectional	1.5 dBi (806–960 MHz) 2.5 dBi (1710–2170 MHz)	Multiband ceiling-mounted omnidirectional antenna. For more information, see the *Cisco Multiband Omnidirectional Ceiling Mount Antenna (3G-ANTM1916-CM)* document.
3G-AE015-R (Antenna Extension)	Extension base	0.8–6.0 GHz	This antenna extension is a base with a 15-foot cable included for use with a dipole omnidirectional antenna. For more information, see the*Cisco Single-Port Antenna Stand for Multiband TNC Male-Terminated Portable Antenna (3G-AE015-R)* document.
3G-ANTM-OUT-OM	Outdoor Omnidirectional	+2 dBi 800/900 MHz +4 dBi 1800/1900/2100 MHz	This is an outdoor low profile omindirectional mast antenna. For more information, see *Cisco 3G Omnidirectional Outdoor Antenna (3G-ANTM-OUT-OM)*
3G-ANTM-OUT-LP	Low Profile Stick Antenna	- 1.5 dBi 850, 900 MHz - 2.5 dBi 1800, 1900, 2100 MHz	This is an omindirectional stick antenna. For more information, see *Cisco 3G Low Profile Outdoor Antenna (3G-ANTM-OUT-LP)*
3G-ACC-OUT-LA (Lightning Arrestor)	Lightning Arrestor	800 MHz to 2200 MHz	This is a quarter-wave lightning protector with integrated high-pass filter. For more information, see *Cisco 3G Lightning Arrestor (3G-ACC-OUT-LA)*

Table 7 lists insertion loss information for the ultra-low-loss (ULL) LMR 400 extension cables available from Cisco for use with 3G Modular and Fixed Cisco ISR antennas.

Table 7   ***Cisco Extension Cables for Use with Antennas***

Cisco Product Number	Cable Length	Insertion Loss	Frequency (MHz)
3G-CAB-ULL-20	20 ft (6 m)	1.50 dB max.	2100
3G-CAB-ULL-50	50 ft (15 m)	3.50 dB max.	2100
3G-CAB-LMR240-25	25 ft (7.5 m)	3.50 dB max.	2200
3G-CAB-LMR240-50	50 ft (15 m)	6.90 dB max.	2200
3G-CAB-LMR240-75	75 ft (23 m)	10.5 dB max.	2200

Table 8 lists loss information for the ultra-low-loss (ULL) LMR 400 cables available from Cisco for use with 3G fixed platforms.

Table 8   *Cisco Adapter Cables for using HWIC cables with 3G Fixed*

Cisco Product Number	Antenna Adapter Length	Insertion Loss	Frequency (MHz)
3G-ACC-SSMB-TNC	14.5 inches	0.66 dB	2100
3G-ACC-TS9-TNC	13.5 inches	0.62 dB	2100

Note   You can use the RG-174/U type cables to adapt the modem external antenna connection to any of the HWIC cables and antennas.

Figure 5 and Figure 6 show some antenna options for the 3G Modular and Fixed Cisco ISRs.

Figure 5   Antenna Options

Figure 6   *Antenna Options*

Configuring the 3G Wireless Modular and Fixed Cisco ISRs

To configure the 3G wireless Modular and Fixed Cisco ISRs, follow these procedures:

-
-

✎
Note   The procedure to configure 3G on both modular and fixed Cisco ISRs is the same except for slot numbering.
For example, for 3G HWICs, the numbering for slot 0, wic 0 and port 0 would be 0/0/0 for all commands. For a fixed Cisco ISR, it would be only 0.
Please refer to platform-specific documentation for details on slot numbering.

Modem Activation and Provisioning

To activate and provision your modem, follow these procedures:

-
-

Verifying Signal Strength and Service Availability

SUMMARY STEPS

To verify the signal strength and service availability on your modem, use the following commands beginning in the EXEC mode.

✎
Note   For modem activation, the modem should be attached to a 1xRTT/EVDO service.

1. **show cellular network**
2. **show cellular radio**
3. **show cellular hardware**
4. **show cellular all**

DETAILED STEPS

Use the following commands to verify the signal strength and service availability on your modem beginning in the EXEC mode:

	Command or Action	Purpose
Step 1	Router# **show cellular** *<slot/wic/port>* **network** **Example:** Router# show cellular *0/0/0* network	Displays information about the carrier network, cell site, and available service.
Step 2	Router# **show cellular** *<slot/wic/port>* **radio** **Example:** Router# show cellular *0/0/0* radio	Shows the radio signal strength. ✎ **Note** The RSSI should be better than -90 dBm for steady and reliable connection and better than -80 dBm for optimal data throughput.
Step 3	Router# **show cellular** *<slot/wic/port>* **hardware** **Example:** Router# show cellular *0/0/0* hardware	Shows the hardware details and modem type.
Step 4	Router# **show cellular** *<slot/wic/port>* **all** **Example:** Router# show cellular *0/0/0* all	Shows consolidated information about the modem, profiles created, radio signal strength, network security, and so forth.

Activating the Modem

The activation procedures may differ depending upon your carrier. Consult your carrier, and follow one of the following procedures:

- Manual Activation, page 19
- Activating Using OMA-DM, page 20
- Activating Using OTASP, page 21

Note Use the **show cellular controller** command to obtain information for the modem type for your Modular and Fixed Cisco ISRs.

Table 9 lists activation and provisioning process supported by different wireless carriers depepnding on the modem MC5725 and MC5727.

Table 9   *Support for Activation Procedures by SKUs and Modem Type*

Activation Procedure	Sprint (-S)		Verizon (-V)		Generic	
	MC5725	MC5727	MC5725	MC5727	MC5725	MC5727
Manual Activation using MDN/MSID/MSL	Yes	Yes	No	No	Yes	Yes
OTASP Activation	No	No	Yes	Yes	Yes	Yes
OMA-DM Activation	No	Yes	No	No	No	No
IOTA for Data Profile refresh	Yes	No	No	No	Yes	Yes

Manual Activation

Note You must have valid MDN, MSL, and MSID information from your carrier before you start this procedure.

To configure a modem profile manually, use the following command beginning in EXEC mode:

    cellular *slot/wic_slot/port* **cdma activate manual** *mdn msid sid nid msl*

For more infomation about the parameters, see the "cellular cdma activate manual" section on page 41

In addition to activation, the modem data profile provisioning is done using a process called IOTA. IOTA is initiated automatically when you use the **cellular cdma activate manual** command.

Here is a sample output from this command:

```
router#cellular 0/0/0 cdma activate manual 1234567890 1234567890 1234 12 12345
NAM 0 will be configured and will become Active
Modem will be activated with following Parameters
MDN :1234567890; MSID :1234567890; SID :1234; NID 12:
Checking Current Activation Status
Modem activation status: Not Activated
Begin Activation
Account activation - Step 1 of 5
Account activation - Step 2 of 5
```

```
Account activation - Step 3 of 5
Account activation - Step 4 of 5
Account activation - Step 5 of 5
Secure Commit Result: Succeed
Done Configuring - Resetting the modem
The activation of the account is Complete
Waiting for modem to be ready to start IOTA
Beginning IOTA
router#
*Feb  6 23:29:08.459: IOTA Status Message Received. Event: IOTA Start, Result: SUCCESS
*Feb  6 23:29:08.459: Please wait till IOTA END message is received
*Feb  6 23:29:08.459: It can take up to 5 minutes
*Feb  6 23:29:27.951: OTA State = SPL unlock, Result = Success
*Feb  6 23:29:32.319: OTA State = Parameters commited to NVRAM, Result = Success
*Feb  6 23:29:40.999: Over the air provisioning complete; Result:Success
*Feb  6 23:29:41.679: IOTA Status Message Received. Event: IOTA End, Result: SUCCESS
```

Note The IOTA start and end must have "success" as the resulting output. If you receive an error message, you can run IOTA independently by using the **cellular cdma activate iota** command.

Tip A periodic refresh of the data profile may be needed as required by your carrier. Use the following command to refresh the data profile: **cellular cdma activate iota**.

Activating Using OMA-DM

When you power up the modem for the first time, the modem automatically initiates Hands Free Activation (HFA) to receive over-the-air programming for the MDN and MSID numbers and refreshes mobile IP profile1 (MIP1). You will see the message "OMA DM Hands Free Activation session is active" on your device.

At the end of the session, you may see one of the following three messages depending on the activation status:

- If activation is successful: "OMA DM Hands Free Activation completed successfully"

- If activation is unsuccessful, you will see the following message (up to 5 times) indicating that modem is retrying HFA: "OMA DM Hands Free Activation, waiting for retry in <x> seconds".

- If activation is still unsuccessful, user will see the message "OMA DM Hands Free Activation Failed - Error: <error_code>(<error_string>). Please try again later. If the problem persists, you may need to contact Customer Service."

To check if the account is provisioned and the modem is activated, use the **show cellular profile** command. If the account is not activated, use the user-initiated mode using the Cisco IOS CLI to activate your modem.

To activate using the Cisco IOS CLI, use the following command beginning in EXEC mode:

cellular *slot/wic/port* **cdma activate oma-dm device-config**

```
Router#cellular 0/0/0 cdma activate oma-dm device-config
Modem is activated
MIP profile 1 will be updated and will be active, if command is successful
Beginning OMA-DM.
```

```
Router#
*Feb  5 20:50:18.207: %CELLWAN-2-OMA_DM_ACTIVE: [Cellular0/0/0]: OMA DM Device
Configuration session is active
Enzo-sustaining_1841_Live#
*Feb  5 20:50:34.755: %CELLWAN-2-OMA_DM_SUCCESS: [Cellular0/0/0]: OMA DM Device
Configuration completed successfully
```

Activating Using OTASP

To provision and activate your modem using OTASP, use the following command beginning in EXEC mode:

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

✎

Note   You need to obtain the phone number for use with this command from your carrier. The standard OTASP calling number is *22899.

```
router# cellular 0/1/0 cdma activate otasp *22899

Beginning OTASP activation
OTASP number is *22899
router#
*Feb  6 23:18:45.393: OTA State = SPL unlock, Result = Success
*Feb  6 23:19:10.229: OTA State = PRL downloaded, Result = Success
*Feb  6 23:19:11.169: OTA State = Profile downloaded, Result = Success
*Feb  6 23:19:11.173: OTA State = MDN downloaded, Result = Success
*Feb  6 23:19:12.537: OTA State = Parameters commited to NVRAM, Result = Success
*Feb  6 23:19:14.613: Over the air provisioning complete; Result:Success
```

Data Call Set up

To set up a data call, use the following procedures:

- Configuring the Cellular Interface, page 22
- Configuring DDR, page 23
- Configuring DDR Backup, page 26
- Configuring Multiple Mobile IP Profiles, page 29
- Configuring Data DedicatedTransmission Mode (DDTM), page 29

Figure 7 shows a data call setup using the 3G wireless HWIC.

Figure 7   Data Call Setup with the HWIC-3G-CDMA

Configuring the Cellular Interface

To configure the cellular interface, enter the following commands in the cellular interface mode.

SUMMARY STEPS

1. **configure terminal**

2. **interface cellular** *<slot/wic/port>*

3. **encapsulation ppp**

4. **ppp chap password 0** *<password>*

5. **asynchronous mode interactive**

6. **ip address negotiated**

Note   The modem supports both mobile IP (MIP) and simple IP (SIP). In both modes, the modem authenticates with the network. However, when the modem is configured in MIP-preferred mode (ask your carrier which mode is supported), if MIP authentication fails, the modem tries to set up a SIP call. The modem uses SIP authentication parameters derived during modem provisioning and passes the CHAP authentication challenge to the cellular interface. The purpose of the authentication challenge is to keep the cellular interface informed of Link Control Protocol (LCP) negotiations between the modem and the network. The authentication challenge from the modem does not have a username, so under the cellular interface, you should configure a default CHAP password, i.e., configure only the **ppp chap password** and not the **ppp chap hostname**. If your carrier supports only MIP, you do not need to configure either of the two parameters.

DETAILED STEPS

	Command or Action	Purpose
Step 1	Router# **configure terminal** **Example:** Router# configure terminal	Enters global configuration mode from the terminal.
Step 2	Router(config)# **interface cellular** *<slot/wic/port>* **Example:** Router (config)# interface cellular 0/0/0	Specifies the cellular interface.
Step 3	Router(config-if)# **encapsulation ppp** **Example:** Router (config-if)# encapsulation ppp	Specifies PPP encapsulation for an interface configured for dedicated asynchronous mode or dial-on-demand routing (DDR).
Step 4	Router (config-if)# **ppp chap password** <password> **Example:** Router (config-if)# ppp chap password cisco	Defines an interface-specific CHAP password. **Note** You can set the password to any value. This password is used only when the modem has failed MIP authentication and fails over to SIP mode. The modem ignores the CHAP authentication response from the cellular interface.
Step 5	Router(config-if)# **async mode interactive** **Example:** Router (config-if)# async mode interactive	Returns a line that has been placed into dedicated asynchronous network mode to interactive mode, thereby enabling the slip and ppp EXEC commands.
Step 6	Router(config-if)# **ip address negotiated** **Example:** Router (config-if)# ip address negotiated	Specifies that the IP address for a particular interface is obtained via PPP/IPCP address negotiation.

Note When static IP address is required for the cellular interface, the address may be configured as **ip address negotiated**. During IPCP, the network ensures that the correct static IP address is allocated to the device. If a tunnel interface is configured with **ip address unnumbered** *<cellular interface>*, it is necessary to configure the actual static IP address under the cellular interface, in place of **ip address negotiated**. For a sample cellular interface configuration, see .

Configuring DDR

To configure DDR for the cellular interface, follow these steps:

SUMMARY STEPS

1. **configure terminal**

2. **interface cellular** *<slot/wic/port>*

3. **dialer in-band**

4. **dialer idle-timeout** *<seconds>*

5. **dialer string** *<string>*

6. **dialer group** *<number>*

7. **exit**

8. **dialer-list** *<dialer-group>* **protocol** *<protocol-name>* {**permit** | **deny** | **list** <access-list-number> | **access-group**}>

9. **ip access-list***<access list number>***permit** *<ip source address>*

10. **line** *<slot/wic/port>*

11. **script dialer** *<regexp>*

12. **exit**

13. **chat-script** *<script name>* **"" "ATDT#777" TIMEOUT** *<timeout value>* **CONNECT**

14. **interface cellular** *<slot/wic/port>*

15. **dialer string** *<string>*

	Command or Action	Purpose
Step 1	Router# **configure terminal** **Example:** Router# configure terminal	Enters global configuration mode from the terminal.
Step 2	Router(config)# **interface cellular** *<slot/wic/port>* **Example:** Router (config)# interface cellular 0/0/0	Specifies the cellular interface.
Step 3	Router(config-if)# **dialer in-band** **Example:** Router (config-if)# dialer in-band	Enables DDR and configures the specified serial interface to use in-band dialing.
Step 4	Router(config-if)# **dialer idle-timeout** *<seconds>* **Example:** Router (config-if)# dialer idle-timeout 30	Specifies the duration of idle time, in seconds, after which a line will be disconnected.
Step 5	Router(config-if)# **dialer string** *<string>* **Example:** Router (config-if)# dialer string cdma	Specifies the number or string to dial. Use the name of the CHAT script here.

	Command or Action	Purpose
Step 6	Router(config-if)# **dialer-group** *<number>* **Example:** Router (config-if)# dialer-group 1	Specifies the number of the dialer access group to which the specific interface belongs.
Step 7	Router(config-if)# **exit** **Example:** Router (config-if)# exit	Enters the global configuration mode.
Step 8	Router(config)# **dialer-list** *<dialer-group>* **protocol** *<protocol-name>* {**permit** | **deny** | **list** <access-list-number> | **access-group**}> **Example:** Router (config)# dialer-list 1 protocol ip list 1	Creates a dialer list for traffic of interest and permits access to an entire protocol.
Step 9	Router(config)# **ip access-list**<*access list number*>**permit** *<ip source address>* **Example:** Router (config)# ip access list 1 permit any	Defines traffic of interest.
Step 10	Router(config)# **line** *<slot/wic/port>* **Example:** Router (config-line)# line 0/0/0	Specifies the line configuration mode.
Step 11	Router(config-line)**script dialer** *<regexp>* **Example:** Router (config-line)# script-dialer cdma	Specifies a default modem chat script.
Step 12	Router(config-line)**exit** **Example:** Router (config-line)# exit	Exits line configuration mode.
Step 13	Router(config)# **chat-script** *<script name>* **""** **"ATDT#777"** **TIMEOUT** *<timeout value>* **CONNECT** **Example:** Router (config)# chat-script cdma "" "ATDT#777" TIMEOUT 60 "CONNECT"	Defines the ATDT commands when the dialer is initiated.
Step 14	Router(config)# **interface cellular** *<slot/wic/port>* **Example:** Router (config)# interface cellular 0/1/0	Specifies the cellular interface.
Step 15	Router(config-if)# **dialer string** *<string>* **Example:** Router (config)# dialer string cdma	Specifies the dialer script (defined using the **chat script** command).

Configuring DDR Backup

To monitor the primary connection and initiate the backup connection when needed, the router can use one of the following methods:

- Backup Interface—The backup interface that stays in standby mode until the primary interface line protocol is detected as down and then is brought up.

- Floating Static Route—The route through the backup interface has an administrative distance that is greater than the administrative distance of the primary connection route and therefore would not be in the routing table until the primary interface goes down.

- Dialer Watch—Dialer watch is a backup feature that integrates dial backup with routing capabilities.

Configuring Interfaces to Use a Backup Interface

To configure one or more interfaces to use a backup interface, use the following commands, beginning in global configuration mode.

SUMMARY STEPS

1. **interface** *type number*

2. **backup interface cellular** *number*

3. **backup delay** *enable-delay disable-delay*

DETAILED STEPS

	Command or Action	Purpose
Step 1	Router(config)# **interface** type number **Example:** Router(config)# interface ATM0/0/0	Specifies the interface to be backed up and begins interface configuration mode.
Step 2	Router(config-if)# **backup interface cellular** <number> **Example:** Router(config-if)# backup interface cellular0/3/0	Specifies the cellular interface as backup.
Step 3	Router(config-if)# **backup delay** enable-delay disable-delay **Example:** Router(config-if)# backup delay enable delay	Specifies delay between the physical interface going down and the backup interface being enabled, and between the physical interface coming back up and the backup being disabled.

Note   You cannot configure a backup interface for the cellular interface and any other asynchronous serial interface.

Configuring DDR Backup Using Dialer Watch

To initiate dialer watch, you must configure the interface to perform DDR and backup. Use traditional DDR configuration commands, such as dialer maps, for DDR capabilities. To enable dialer watch on the backup interface and create a dialer list, use the following commands in interface configuration mode.

SUMMARY STEPS

1. **configure terminal**

2. **interface** *type number*

3. **dialer watch group** *group-number*

4. **dialer watch-list** *group-number* **ip** *ip-address address-mask*

5. **dialer-list** *<dialer-group>* **protocol** *<protocol name>* {**permit** | **deny** | **list** *<access list number>* | **access-group**}

6. **ip access-list** *<access list number>* **permit** *<ip source address>*

7. **interface cellular** *<slot/wic/port>*

8. **dialer-group** *<dialer group number>*

DETAILED STEPS

	Command or Action	Purpose
Step 1	Router# **configure terminal** **Example:** Router# configure terminal	Enters global configuration mode from the terminal.
Step 2	Router(config)# **interface** type number **Example:** Router (config)# interface ATM0/0/0	Specifies the interface.
Step 3	Router(config-if)**# dialer watch-group** group-number **Example:** Router(config-if)# dialer watch-group 2	Enables dialer watch on the backup interface.
Step 4	Router(config)# **dialer watch-list** group-number **ip** ip-address address-mask **Example:** Router(config-if)# dialer watch-list 2 ip 10.4.0.254 255.255.0.0	Defines a list of all IP addresses to be watched.
Step 5	Router(config)# **dialer-list** *<dialer-group>* **protocol** *<protocol-name>* {**permit** | **deny** | **list** <access-list-number> | **access-group**}> **Example:** Router(config)# dialer-list 2 protocol ip permit	Creates dialer list for traffic of interest and permits access to an entire protocol.

	Command or Action	Purpose
Step 6	Router(config)# **ip access-list**<*access list number*>**permit** <*ip source address*> **Example:** Router(config)# access list 2 permit 10.4.0.0	Defines traffic of interest. ✎ **Note** Do not use the **access list permit all** command to avoid sending traffic to the IP network. This may result in call termination.
Step 7	Router(config)# **interface cellular**<*slot/wic_slot/port*> **Example:** Router(config)# interface cellular 0/1/0	Enters the interface configuration mode.
Step 8	Router(config-if)# **dialer-group** <*dialer group number*> **Example:** Router(config-if)# dialer-group 2	Maps a dialer list to the dialer interface.

Configuring DDR Backup Using Floating Static Route

To configure a floating static default route on the secondary interface beginning in the global configuration mode, perform the following tasks.

✎
Note Make sure you have ip classless enabled on your router.

SUMMARY STEPS

1. **configure terminal**
2. **ip route** *network-number network-mask* {ip address | interface} [administrative distance] [**name** *name*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	Router# **configure terminal** **Example:** Router# configure terminal	Enters global configuration mode from the terminal.
Step 2	Router(config)# **ip route** network-number network-mask {ip-address | interface} [administrative distance] [**name** name] **Example:** Router (config)# ip route 0.0.0.0 Dialer 2 track 234	Establishes a floating static route with the configured administrative distance through the specified interface. ✎ **Note** A higher administrative distance should be configured for the route through the backup interface, so that it is used only when the primary interface is down.

Configuring Multiple Mobile IP Profiles

This procedure is for the HWIC-3G-CDMA-S and HWIC-3G-CDMA SKUs only.

Note Please verify with your carrier if mobile IP is supported on your HWIC.

SUMMARY STEPS

1. **cellular cdma profile configure**
2. **cellular cdma profile select**

DETAILED STEPS

	Command or Action	Purpose
Step 1	Router# **cellular** <slot/wic/port> **cdma profile configure** <profile number> <primary home agent address> <secondary home agent address> <mobile home agent address> <NAI> <MN-AAA SS> <MN-HA SS> <MN-AAA SPI> <MN-HA SPI> <Reverse Tunneling Preference> **Example:** Router# cellular 0/0/0 cdma profile configure 1 1.1.1.1 2.2.2.2 3.3.3.3 test@xyz.com aaa bbb 1234 1234 1	Configures data (MIP) profile. **Note** Parameters for this command may be different for different SKUs. Please refer to the cellular cdma profile configure command for details.
Step 2	Router# **cellular** <slot/wic/port> **cdma profile select** <profile number> **Example:** Router# cellular 0/0/0 cdma profile select 1	Sets a profile as the current active profile.

Configuring Data DedicatedTransmission Mode (DDTM)

On CDMA modems, data transmission is disrupted by incoming voice calls if data dedicated transmission mode (DDTM) is disabled. You can enable DDTM mode so the modem will ignore incoming voice calls.

To enable dedicated data transmission mode (DDTM) on a CDMA modem, use the **cdma ddtm** command in configuration mode

This command is enabled by default. You can disable this feature by using the **no cdma ddtm** command.

Note When DDTM is enabled, only voice calls will be blocked for the MC5728v modems, while on the AC597E and MC5725 and MC 5727, incoming SMS messages will also be blocked.

Configuration Examples for the 3G Wireless Modular and Fixed Cisco ISRs

This section provides the following configuration examples:

- Basic Cellular Interface Configuration: Example
- Tunnel over Cellular Interface Configuration: Example
- 3G Wireless Modem as Backup with NAT and IPSec: Example

Basic Cellular Interface Configuration: Example

The following is an example configuration where the cellular interface is used as a primary and is configured as the default route:

```
chat-script cdma "" "ATDT#777" TIMEOUT 60 "CONNECT"

!
interface Cellular0/0/0
 ip address negotiated
 encapsulation ppp
 dialer in-band
 dialer string cdma
 dialer-group 1
 async mode interactive
 ppp chap password 0 cisco
ppp ipcp dns request
!

!
!
access-list 1 permit any
dialer-list 1 protocol ip list 1
!
line 0/0/0
 exec-timeout 0 0
 script dialer cdma
 login
 modem InOut
```

Tunnel over Cellular Interface Configuration: Example

The following sample configuration shows the configuration of the static IP address when a tunnel interface is configured using the **ip address unnumbered** *<cellular interface>* command:

```
interface Tunnel2
 ip unnumbered GigabitEthernet0/1
 tunnel source Cellular0/3/0
 tunnel destination 128.107.248.254

interface Cellular0/3/0
!
 ip address negotiated


 encapsulation ppp

 dialer in-band
 dialer idle-timeout 0
 dialer string cdma
 dialer-group 1
 async mode interactive
```

```
 ppp chap password 0 cisco
 ppp ipcp dns request


 ! traffic of interest through the tunnel/cellular interface
 ip route 10.10.0.0 255.255.0.0 Tunnel2
```

3G Wireless Modem as Backup with NAT and IPSec: Example

The following sample configuration shows the configuration of the 3G wireless modem on the router as backup with NAT and IPSec:

```
ip dhcp excluded-address 10.4.0.254
!
ip dhcp pool cdma-pool
   network 10.4.0.0 255.255.0.0
   default-router 10.4.0.254
!
chat-script cdma "" "atdt#777" TIMEOUT 20 "CONNECT"
!
track 234 rtr 1 reachability
!
crypto isakmp policy 1
 encr 3des
 authentication pre-share
!
crypto isakmp key mykey address 20.20.241.234
!
crypto ipsec transform-set mytransformset ah-sha-hmac esp-3des
!
crypto map vpn1 10 ipsec-isakmp
 set peer 20.20.241.234
 set transform-set mytransformset
 match address 103
!
interface GigabitEthernet0/0
 ip address 10.4.0.254 255.255.0.0
 duplex auto
 speed auto
!
interface ATM0/0/0
 no ip address
 ip virtual-reassembly
 load-interval 30
 no atm ilmi-keepalive
 dsl operating-mode auto
!
interface ATM0/0/0.1 point-to-point
 ip nat outside
 ip virtual-reassembly
 no snmp trap link-status
 pvc 0/35
  pppoe-client dial-pool-number 2
 !
interface Cellular0/3/0
 ip address negotiated
 ip nat outside
 encapsulation ppp
```

```
 dialer in-band
 dialer idle-timeout 0
 dialer string cdma
 dialer-group 1
 ppp chap hostname host@apn
 ppp chap password 0 cisco123
 ppp ipcp dns request
 crypto map vpn1
!
interface Dialer2
 ip address negotiated
 ip nat outside
 encapsulation ppp
 dialer pool 2
 dialer-group 2
 ppp chap hostname cisco@dsl.net
 ppp chap password 0 cisco123
 ppp pap sent-username Cisco@dsl.net password 0 cisco123
 ppp ipcp dns request
 crypto map vpn1
!
ip local policy route-map track-primary-if
!
ip route 0.0.0.0 0.0.0.0 Dialer2 track 234
!
ip route 0.0.0.0 0.0.0.0 Cellular0/3/0 254
!
ip nat inside source route-map nat2cell interface Cellular0/3/0 overload
ip nat inside source route-map nat2dsl interface Dialer2 overload
!
ip sla 1
 icmp-echo 209.131.36.158 source-interface Dialer2
 timeout 1000
 frequency 2
ip sla schedule 1 life forever start-time now
!
access-list 1 permit any
access-list 101 deny ip 10.4.0.0 0.0.255.255 20.20.0.0 0.0.255.255
access-list 101 permit ip 10.4.0.0 0.0.255.255 any
!
access-list 102 permit icmp any host 209.131.36.158
!
access-list 103 permit ip 10.4.0.0 0.0.255.255 20.20.0.0 0.0.255.255
!
dialer-list 1 protocol ip list 1
dialer-list 2 protocol ip permit
!
route-map track-primary-if permit 10
 match ip address 102
 set interface Dialer2 null0
!
route-map nat2dsl permit 10
 match ip address 101
 match interface Dialer2
!
route-map nat2cell permit 10
 match ip address 101
 match interface Cellular0/3/0
!
event manager applet pri_back
 event track 234 state any
 action 2.0 cli command "clear ip nat trans forced"
!
line 0/3/0
```

```
script dialer cdma
modem InOut
```

Modem Firmware Upgrade

The 3G wireless Modular and Fixed Cisco ISR modem firmware can be upgraded by using Cisco IOS commands. The firmware is packaged in a tar distribution file and can be downloaded from the wireless software download page on Cisco.com. Use the following procedure to upgrade the modem firmware:

⚠

Caution   Before upgrading the modem to a new firmware version, please check whether the new firmware version has been certified by your wireless service provider. Using an uncertified firmware version on the modem may affect the wireless service provider network adversely.

✎

Note   Perform modem upgrade only if necessary. Downgrade is generally not supported, and may or may not work.

Refer to the following website for the latest certified firmware version for your carrier and IOS compatibility:

http://www.cisco.com/en/US/products/hw/routers/networking_solutions_products_generic_content0900aecd80601f7e.html

SUMMARY STEPS

1. Go to the CDMA/EVDO firmware download website at:

   http://software.cisco.com/download/navigator.html?mdfid=279119319&flowid=6999

   and in the third column, select Verizon or Sprint, depending on the type of card you have.

2. Download the appropriate CDMA firmware release under Wireless Integrated Switches and Routers.

3. Use the archive command to extract the firmware distribution into the router flash memory:

   archive tar /xtract *source-url destination-url*

4. Use the following command to initiate the firmware upgrade process:

   microcode reload cellular *pa-bay slot* cdma modem-provision

DETAILED STEPS

	Command or Action	Purpose
Step 1	Go to the Download Software site at: http://software.cisco.com/download/navigator.html and select Wireless > Wireless Integrated Switches and Routers. In the third column, select Verizon or Sprint, depending on the type of card you have.	Provides access to Cisco Wireless WAN software downloads. Select firmware for Cisco 3G wireless Modular and Fixed Cisco ISRs. **Note** This website is only available to registered Cisco.com users.
Step 2	Download the appropriate CDMA firmware release under Wireless Integrated Switches and Routers.	Downloads the modem firmware package to a TFTP/FTP server that is accessible from the router in which the 3G wireless Modular and Fixed Cisco ISRs is installed.

	Command or Action	Purpose
Step 3	router# **archive tar /xtract** *source-url* *destination-url* **Example:** Router# **archive tar /xtract tftp://192.168.1.1/MC5725_00_57_00_vzw_package.t ar flash:**	Uncompresses the files of the modem firmware package and copies them to a location that is accessible by the router in which the 3G wireless Modular and Fixed Cisco ISR is installed. *source-url*—URL of the source location with the firmware TAR filename. Valid URLs can refer to TFTP or HTTP servers or to router flash memory. *destination-url*—URL of the destination where the tar file would be extracted. Use router flash.
Step 4	router# **microcode reload cellular** *pa-bay slot* **cdma modem-provision**	Initiates the firmware upgrade process. *pa-bay*—Use 0 for HWIC. *slot*—Slot number where the HWIC is plugged in. ✎ **Note** This command automatically shuts down the cellular interface. The firmware upgrade process may take up to 15 minutes, during which the modem is inaccessible. After the command is complete, the interface is brought up again.

⚠
Caution   Do not disconnect power or switch the router off during the firmware upgrade process. Either action may result in permanent modem failure.

Command Reference

This section documents new commands only.

- cdma ddtm
- cellular cdma activate iota
- cellular cdma activate manual
- cellular cdma activate oma-dm device config
- cellular cdma activate oma-dm ni-alert
- cellular cdma activate oma-dm prl-update
- cellular cdma activate otasp
- cellular cdma mode
- cellular cdma profile configure
- cellular cdma profile select
- debug cell-hwic driver

- debug cell-hwic firmware
- debug cell-hwic virt-con
- debug cellular messages all
- debug cellular messages async
- debug cellular messages data
- debug cellular messages dm
- debug cellular messages management
- debug cellular messages oma-dm
- show cellular all
- show cellular connection
- show cellular connection
- show cellular hardware
- show cellular network
- show cellular oma-dm
- show cellular profile
- show cellular radio
- show cellular security
- show controllers cellular
- show interfaces cellular
- show run interface cellular

cdma ddtm

On CDMA modems, data transmission is disrupted by incoming voice calls if data dedicated transmission mode (DDTM) is disabled. You can enable DDTM mode so the modem will ignore incoming voice calls.

To enable DDTM on a CDMA modem, use the **cdma ddtm** command in configuration mode.

cdma ddtm

To disable DDTM, use the no form of this command.

Command Default DDTM is enabled by default.

Command Modes Configuration.

Command History

Release	Modification
15.1(4)M1	This command was introduced.

Usage Guidelines Disable this feature only if you require the voice-initiated data callback feature.

Examples The following example shows the configuration to enable the **cdma ddtm** command:

```
Router(config)#controller cellular 0/0
Router(config-controller)#cdma ddtm
```

The following example shows how to configure the **no cdma ddtm** command:

```
Router(config)#controller cellular 0/0
Router(config-controller)#no cdma ddtm
Router(config-controller)#end
```

The following output for the **show cellular connection** command shows that DDTM is enabled:

```
Router#show cellular 0/0/0 connection
Phone number of outgoing call =
HDR AT State = Inactive, HDR Session State = Close
HDR Session Info:
    UATI (Hex) = 0000:0000:0000:0000:0000:0000:0000:0000
    Color Code = 0, RATI = 0x0
    Session duration = 0 msecs, Session start = 0 msecs
    Session end = 0 msecs, Authentication Status = Not authenticated
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 = 376179855 seconds
Current Call Type =
Last Call Disconnect Reason = Modem offline
Last Connection Error = None
```

```
HDR DDTM (Data Dedicated Transmission Mode) Preference = On
Mobile IP Error Code (RFC-2002) = 0 (Registration accepted)
```

cellular cdma activate iota

To periodically refresh the modem data profile using Internet-based over-the-air provisioning (IOTA), use the **cellular cdma activate iota** command in privileged EXEC mode. IOTA is used to activate the modem data profile by certain wireless service providers. Use this command to display the current active connection state and statistics. (Ask your carrier whether IOTA is supported and how often a refresh is needed.)

cellular *slot/wic_slot/port* **cdma activate iota**

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

Command Default   None.

Command Modes   EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

Usage Guidelines   You can verify the updated modem data profile by using the **show cellular** *slot/wic_slot/port* **profile** command.

✎
Note   Use this command only if you are using an HWIC-3G-CDMA-S interface card.

Examples   The following example shows output from the **cellular cdma activate iota** command:

```
router # cellular 0/0/0 cdma activate iota
Begin IOTA
router#
*Feb  6 23:32:21.339: IOTA Status Message Received. Event: IOTA Start, Result: SUCCESS
*Feb  6 23:32:21.339: Please wait till IOTA END message is received
*Feb  6 23:32:21.339: It can take up to 5 minutes
*Feb  6 23:32:40.867: OTA State = SPL unlock, Result = Success
*Feb  6 23:32:45.235: OTA State = Parameters commited to NVRAM, Result = Success
*Feb  6 23:32:52.087: Over the air provisioning complete; Result:Success
*Feb  6 23:32:52.615: IOTA Status Message Received. Event: IOTA End, Result: SUCCESS
```

Related Commands	Command	Description
	cellular cdma activate manual	Manually activates a cellular account using the over the air service (OTA) procedure.
	show cellular profile	Displays the cellular profile information.

cellular cdma activate manual

To manually activate the modem, use the **cellular cdma activate manual** command in privileged EXEC mode.

> **Note** The modem activation process is specific to the carrier. Ask your carrier whether manual activation—using MDN, MSID, and MSN—or activation using over-the-air service provisioning (OTASP) is supported.

cellular *slot/wic_slot/port* **cdma activate manual** *mdn msid sid nid msl*

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.
mdn	Ten digit mobile directory number (MDN).
msid	Ten digit mobile subscriber identification number (MSID).
sid	System ID (SID) number between 0 and 32767. **Note** Use the **show cellular network** command to obtain the system ID.
nid	Network ID (NID) number between 0 and 65535. **Note** Use the **show cellular network** command to obtain the network ID.
msl	Mobile subscriber lock, to be obtained from your service provider.

Command Default None.

Command Modes EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

Usage Guidelines Use the **show cellular network** command to obtain the SID and NID.

You can verify whether the modem has been activated using the **show cellular** *slot/wic_slot/port* **all** command.

> **Note** Use this command only if you have an HWIC-3G-CDMA-S interface card.

Examples The following is sample output from the **cellular cdma activate manual** command:

```
router# cellular 0/0/0 cdma activate manual 9135938079 9135938079 4183 87 907148
```

```
NAM 0 will be configured and will become Active
Modem will be activated with following Parameters
MDN :9135938079; MSID :9135938079; SID :4183; NID 87:
Checking Current Activation Status
Modem activation status: Not Activated
Begin Activation
Account activation - Step 1 of 5
Account activation - Step 2 of 5
Account activation - Step 3 of 5
Account activation - Step 4 of 5
Account activation - Step 5 of 5
Secure Commit Result: Succeed
Done Configuring - Resetting the modem
The activation of the account is Complete
Waiting for modem to be ready to start IOTA
Beginning IOTA
router#
*Feb  6 23:29:08.459: IOTA Status Message Received. Event: IOTA Start, Result: SUCCESS
*Feb  6 23:29:08.459: Please wait till IOTA END message is received
*Feb  6 23:29:08.459: It can take up to 5 minutes
*Feb  6 23:29:27.951: OTA State = SPL unlock, Result = Success
*Feb  6 23:29:32.319: OTA State = Parameters commited to NVRAM, Result = Success
*Feb  6 23:29:40.999: Over the air provisioning complete; Result:Success
*Feb  6 23:29:41.679: IOTA Status Message Received. Event: IOTA End, Result: SUCCESS
```

The following is sample output from the **show cellular profile** command after the modem has been activated:

```
router# show cellular 0/3/0 profile

Profile Information
===================
Electronic Serial Number (ESN) = 0x603C6426
Modem activated = YES

Account Information:
====================
Activation Date: 20070221
Phone Number (MDN) : 2029976763
Mobile Station Identifier (MSID) : 2029976763

Data Profile Info:
===================
Number of data profiles configured : 1
Current active data profile : 0

Data Profile 0 Information (Active)
==================================
NAI (Network Access Identifier) = 2029976763@vzw3g.com
MN-HA SS = Set
MN-HA SPI = 300
MN-AAA SS = Set
MN-AAA SPI = 2
Reverse Tunneling Preference = Set
Home Address = 0.0.0.0
Primary Home Agent Address = 255.255.255.255
Secondary Home Agent Address = 255.255.255.255
```

Related Commands

Command	Description
cellular cdma activate iota	Manually activates a cellular account using the Internet over-the-air service procedure.
show cellular profile	Displays the cellular profile information.

cellular cdma activate oma-dm device config

To start a user-initiated OMA-DM session to provision an account and MIP1 (Mobile IP) profile update, use the **cellular cdma activate oma-dm device config** command in privileged EXEC mode.

cellular *slot/wic_slot/port* **cdma activate oma-dm device config**

This refreshes the MDN and MSID numbers on the account.

Syntax Description

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

Command Default   None

Command Modes   Privileged EXEC

Command History

Release	Modification
12.4(22)YB1	This command was introduced.

Usage Guidelines   Before you execute this command, terminate any existing active or dormant data connection. The modem is activated automatically when it powers up using Hands Free Activation. Use this command only when activation fails or you need to update your account parameters.

To view profile and MIB information, use the **show cellular profile** command.

Examples   This section contains sample output for **cellular** *slot/wic_slot/port* **cdma activate oma-dm device-config** command:

Sample Output for HWIC-3G-CDMA

The following example shows output for HWIC-3G-CDMA for slot 0, WIC slot 0, port 0:

```
Router#cellular 0/0/0 cdma activate oma-dm device-config
Modem is activated
MIP profile 1 will be updated and will be active, if command is successful
Beginning OMA-DM.

Router#
*Feb  5 20:50:18.207: %CELLWAN-2-OMA_DM_ACTIVE: [Cellular0/0/0]: OMA DM Device
Configuration session is active
Router_1841_Live#
*Feb  5 20:50:34.755: %CELLWAN-2-OMA_DM_SUCCESS: [Cellular0/0/0]: OMA DM Device
Configuration completed successfully
```

Related Commands	Command	Description
	show cellular oma-dm	Displays an OMA-DM session details.
	cellular cdma activate oma-dm ni-alert	Allows or denies a network initiated alert (NIA) queued in the modem.
	cellular cdma activate oma-dm prl-update	Starts a user initiated OMA-DM session to get an over-the-air PRL update.
	debug cellular messages oma-dm	Starts OMA-DM debugging.
	show cellular profile	Displays cellular profile information.

cellular cdma activate oma-dm ni-alert

To allow or deny a network initiated alert (NIA) queued in the modem, use the **cellular cdma activate oma-dm ni-alert [allow | deny]** command in privileged EXEC mode.

cellular *slot/wic_slot/port* **cdma activate oma-dm ni-alert [allow | deny]**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.
allow	Allow a network initiated alert.
deny	Deny a network initiated alert.

Command Default   None

Command Modes   Privileged EXEC

Command History

Release	Modification
12.4(22)YB1	This command was introduced.

Usage Guidelines   On execution of this command, a warning message appears that the current data connection will be interrupted. You must confirm if you want to proceed with this command.

Note   If you deny the NIA, depending on the SKU of the modem, the NIA may be available for a later attempt or permanently deleted from the system.

Examples   This section contains sample output for **cellular** *slot/wic_slot/port* **cdma activate oma-dm ni-alert** command:

Sample Output for HWIC-3G-CDMA

The following example shows output for HWIC-3G-CDMA for slot 0, WIC slot 0, port 0 with Network Initiated Alert while the modem is in dormant state (**cellular** *slot/wic_slot/port* **cdma activate oma-dm ni-alert allow**):

```
*Feb  5 20:57:04.827: %CELLWAN-2-OMA_DM_NI_ALERT: [Cellular0/0/0]: OMA DM NI Alert is
received for Device Configuration
Please execute 'cellular <unit> cdma activate oma-dm ni-alert [allow | deny]'
Router#cellular 0/0/0 cdma activate oma-dm ni-alert allow
Modem is activated
!!!WARNING: Data connection will be terminated. Service will be interrupted until the NI
session is completed.
Are you sure?(y/n) [confirm]
```

```
[Cellular0/0/0]:The interface will be shutdown to allow the Network-Initiated OMA DM
session. This will terminate any active data connection.

OMA DM NI alert: Interactive response accepted

*Feb  5 20:57:19.611: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cellular0/0/0,
changed state to down
*Feb  5 20:57:20.627: %LINK-5-CHANGED: Interface Cellular0/0/0, changed state to
administratively down
*Feb  5 20:57:26.063: %CELLWAN-2-OMA_DM_ACTIVE: [Cellular0/0/0]: OMA DM Device
Configuration session is active

*Feb  5 20:57:36.847: %CELLWAN-2-OMA_DM_SUCCESS: [Cellular0/0/0]: OMA DM Device
Configuration completed successfully
```

The following example shows output for HWIC-3G-CDMA for slot 0, WIC slot 0, port 0 for the
cellular *slot/wic_slot/port* **cdma activate oma-dm ni-alert deny command:**

```
*Feb  5 21:01:08.487: %CELLWAN-2-OMA_DM_NI_ALERT: [Cellular0/0/0]: OMA DM NI Alert is
received for Device Configuration
Please execute 'cellular <unit> cdma activate oma-dm ni-alert [allow | deny]'

Enzo-sustaining_1841_Live#cellular 0/0/0 cdma activate oma-dm ni-alert deny
Modem is activated
OMA DM NI alert: Interactive response accepted
```

Table 19 describes the output fields from the command.

Table 10   Field Description

Field	Description
Interactive response accepted	The alert response is accepted by the modem. You will see OMA-DM status messages in SYSLOG or console.
Fail: Interactive response not expected	No alert queued in the modem.
Fail: Invalid response	Not a valid response.

Related Commands

Command	Description
show cellular oma-dm	Displays an OMA-DM session details.
cellular cdma activate oma-dm device config	Starts a user initiated OMA-DM session to provision an account and profile update.
cellular cdma activate oma-dm prl-update	Starts a user initiated OMA-DM session to get an over-the-air PRL update.
debug cellular messages oma-dm	Starts OMA-DM debugging.
show cellular profile	Displays cellular profile information.

cellular cdma activate oma-dm prl-update

To start a user initiated OMA-DM session to get an over-the-air PRL update, use the **cellular cdma activate oma-dm prl-update** command in privileged EXEC mode.

cellular *slot/wic_slot/port* **cdma activate oma-dm prl-update**

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

Command Default   None

Command Modes   Privileged EXEC

Command History

Release	Modification
12.4(22)YB1	This command was introduced.

Usage Guidelines   PRL upates are available periodically by the Service Provider. If no updates are available, an empty session error message is returned.

> **Note**   If the PRL is updated successfully, the modem will be reset.

Examples   This section contains sample output for **cellular** *slot/wic_slot/port* **cdma activate oma-dm prl-update** command:

Sample Output for HWIC-3G-CDMA

The following example shows output for HWIC-3G-CDMA for slot 0, WIC slot 0, port 0 when the update is successful:

```
Router#cellular 0/0/0 cdma activate oma-dm prl-update
Modem is activated
Beginning OMA-DM
*Jan 27 18:32:08.087: %CELLWAN-2-OMA_DM_ACTIVE: [Cellular0/0/0]: OMA DM PRL Update session
is active
*Jan 27 18:32:31.643: %CELLWAN-2-OMA_DM_SUCCESS: [Cellular0/0/0]: OMA DM PRL Update
completed successfully
```

The following example shows output for HWIC-3G-CDMA for slot 0, WIC slot 0, port 0 when the update is unsuccessful:

```
Router#cellular 0/0/0 cdma activate oma-dm  prl-update
Modem is activated
Beginning OMA-DM.
```

```
*Feb  5 21:33:23.795: %CELLWAN-2-OMA_DM_ACTIVE: [Cellular0/0/0]: OMA DM PRL Update session
is active
*Feb  5 21:34:03.587: %CELLWAN-2-OMA_DM_ERROR: [Cellular0/0/0]: OMA DM PRL Update Failed -
Error:0x504(Unrecoverable network error)
```

Related Commands	Command	Description
	show cellular oma-dm	Displays an OMA-DM session details.
	cellular cdma activate oma-dm ni-alert	Allows or denies a network initiated alert (NIA) queued in the modem.
	cellular cdma activate oma-dm device config	Starts a user initiated OMA-DM session to provision an account and profile update.
	debug cellular messages oma-dm	Starts OMA-DM debugging.
	show cellular profile	Displays cellular profile information.

cellular cdma activate otasp

To activate a wireless account using over-the-air service provisioning (OTASP), use the **cellular cdma activate otasp** command in privileged EXEC mode.

Note The modem activation process is specific to the carrier. Check with your carrier if they support manual activation—using MDN, MSID, and MSN—or activation using OTASP.

cellular *slot/wic_slot/port* **cdma activate 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 that you must dial to begin activation using OTASP. This number is specific to a wireless provider. For Verizon Wireless, it is *22899.

Command Default None.

Command Modes Privileged EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

Usage Guidelines You can verify the modem activation using the **show cellular** *slot/wic_slot/port* **all** command.

Note Use this command only if you are using an HWIC-3G-CDMA-V interface card.

Examples The following example shows output of the **cellular cdma activate otasp** command:

```
router# cellular 0/1/0 cdma activate otasp *22899

Beginning OTASP activation
OTASP number is *22899
router#
*Feb  6 23:18:45.393: OTA State = SPL unlock, Result = Success
*Feb  6 23:19:10.229: OTA State = PRL downloaded, Result = Success
*Feb  6 23:19:11.169: OTA State = Profile downloaded, Result = Success
*Feb  6 23:19:11.173: OTA State = MDN downloaded, Result = Success
*Feb  6 23:19:12.537: OTA State = Parameters commited to NVRAM, Result = Success
*Feb  6 23:19:14.613: Over the air provisioning complete; Result:Success
```

The following is a sample output from the **show cellular profile** command after the modem has been activated:

```
router#show cellular 0/3/0 profile

Profile Information
===================
Electronic Serial Number (ESN) = 0x603C6426
Modem activated = YES

Account Information:
====================
Activation Date: 20070221
Phone Number (MDN) : 2029976763
Mobile Station Identifier (MSID) : 2029976763

Data Profile Info:
==================
Number of data profiles configured : 1
Current active data profile : 0

Data Profile 0 Information (Active)
===================================
NAI (Network Access Identifier) = 2029976763@vzw3g.com
MN-HA SS = Set
MN-HA SPI = 300
MN-AAA SS = Set
MN-AAA SPI = 2
Reverse Tunneling Preference = Set
Home Address = 0.0.0.0
Primary Home Agent Address = 255.255.255.255
Secondary Home Agent Address = 255.255.255.255
```

Related Commands	Command	Description
	show cellular profile	Displays the cellular profile information.

cellular cdma mode

To configure the modem mode to connect to 1xRTT, EVDO or hybrid services, use the **cellular cdma mode** command in privileged EXEC mode.

cellular *slot/wic_slot/port* **cdma mode <hybrid | EVDO-only | 1xRTT-only>**

Syntax Description	

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.
hybrid	Connect to EVDO/1xRTT services (Default Mode)
EVDO-only	Connect only to EVDO service
1xRTT-only	Connect only to 1xRTT service

Command Default Hybrid

Command Modes Privileged EXEC

Command History

Release	Modification
12.4(22)YB1	This command was introduced.

Usage Guidelines This command is executed only upon confirmation from the user. A service mode change is followed by a modem reset.

Examples This section contains sample output for **cellular** *slot/wic_slot/port* **cdma mode** command:

Sample Output for HWIC-3G-CDMA

The following example shows output for HWIC-3G-CDMA for slot 0, WIC slot 1, port 1:

```
Router#cellular 0/0/0 cdma mode ?
  1xRTT   Modem will connect to 1xRTT only service
  evdo    Modem will connect to EVDO only service
  hybrid  Modem will connect to EVDO and 1xRTT service (default behavior)
```

Table 19 describes the output fields from the command.

Table 11   Field Description

Field	Description
1xRTT	Modem will connect to 1xRTT only service
EVDO	Modem will connect to EVDO only service
Hybrid	Modem will connect to EVDO and 1xRTT service (default)

Related Commands	Command	Description
	cellular cdma activate manual	Manually activates a cellular account using the over-the-air service (OTA) procedure.
	cellular cdma activate otasp	Activates a cellular account using the over the air service provisioning (OTASP).
	cellular cdma activate iota	Provisions data profile using Internet-based over-the-air provisioning (IOTA).
		Note IOTA is supported only with certain wireless service providers. Please check with your wireless service provider.

cellular cdma profile configure

To manipulate CDMA modem data profile information, use the **cellular cdma profile configure** command in privileged EXEC mode.

> **cellular** *slot/wic_slot/port* **cdma profile configure** *<profile number> <primary HA address> <secondary HA address><mobile HA><NAI> <MN-AAA SS> <MN-HA SS> <MN-AAA SPI><MN-HA SPI> <rev-tunneling>*

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.
profile number	Profile number to be configured
primary HA address	Primary Home Agent Address as obtained from Service Provider
secondary HA address	Secondary Home Agent Address as obtained from Service Provider
mobile HA*	Mobile Home Agent. This parameter is only needed for generic SKUs.
NAI	Network Access Identifier
MN-AAA SS	Mobile Node AAA Shared Secret
MN-HA SS	Mobile Node Home Agent shared secret
MN-AAA SPI*	Mobile Node AAA Security Parameter Index
MN-HA SPI*	Mobile Node Home Agent Security Parameter Index
rev-tunneling*	Reverse tunneling preference
* denotes parameters not available in HWIC-3G-CDMA-S	

Command Default   None

Command Modes   Privileged EXEC

Command History

Release	Modification
12.4(22)YB1	This command was introduced.

Usage Guidelines   This command is not supported for the HWIC-3G-CDMA-V SKU.

Examples   This section contains sample output for **cellular** *slot/wic_slot/port* **cdma profile configure** command:

Sample Output for HWIC-3G-CDMA

```
router#cellular 0 cdma profile configure ?
  <1-5>  profile number
router#cellular 0 cdma profile configure 5 ?
  A.B.C.D  Primary HA Address
router#cellular 0 cdma profile configure 5 100.1.1.1 ?
  A.B.C.D  Secondary HA Address
```

```
router#cellular 0 cdma profile configure 5 100.1.1.1 200.1.1.1 ?
  WORD  Network Access Identifier (Ex:username@domain)
router#$le configure 5 100.1.1.1 200.1.1.1 testing@sp.com ?
  WORD  MN-AAA Shared Secret
router#$le configure 5 100.1.1.1 200.1.1.1 testing@sp.com kkk ?
  WORD  MN-HA Shared Secret
router#$le configure 5 100.1.1.1 200.1.1.1 testing@sp.com kkk mmm ?
  <cr>
router#$le configure 5 100.1.1.1 200.1.1.1 testing@sp.com kkk mmm
Profile 5 will be configured with following parameters:
NAI (Network Access Identifier) = testing@sp.com
Home Address = 0.0.0.0
Primary Home Agent Address = 100.1.1.1
Secondary Home Agent Address = 200.1.1.1
MN-AAA SS = Set
MN-HA SS = Set
MN-AAA SPI = 1234
MN-HA SPI = 1234
Reverse Tunneling Preference = Set
!!!WARNING: Modem will be reset
Are you sure? [confirm]
Done configuring - Please wait while the modem resets
*Feb 25 21:21:37.504: %CISCO800-2-MODEM_REMOVAL_DETECTED: Cellular0 modem is now REMOVED
*Feb 25 21:21:37.504: %CISCO800-2-CELLULAR_INTERFACE_NOT_SHUTDOWN: WARNING: Cellular0
interface should be shutdown before removing modem. Reload Required to reset interface
*Feb 25 21:21:38.508: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cellular0, changed
state to down
*Feb 25 21:21:43.264: %CELLWAN-2-HEART_BEAT_TIMEOUT: No heart beat signal from Cellular0
*Feb 25 21:21:43.540: %CISCO800-2-MODEM_INSERTED_DETECTED: Cellular0 modem is now INSERTED
*Feb 25 21:21:43.544: %CELLWAN-2-MODEM_DOWN: Cellular0 modem is DOWN
*Feb 25 21:21:45.540: %LINK-5-CHANGED: Interface Cellular0, changed state to reset
Profile 5 configured successfully
router#
router#
*Feb 25 21:21:48.648: %CELLWAN-2-MODEM_UP: Cellular0 modem is now UP
router#
router#sh
*Feb 25 21:21:50.540: %LINK-3-UPDOWN: Interface Cellular0, changed state to down
router#show cellu
router#show cellular 0 p
router#show cellular 0 profile 5
Electronic Serial Number (ESN) = 0x605F6982 [09606252930]
Modem activated = YES
Account Information:
======================
Activation Date: Not available
Phone Number (MDN) : 4084205046
Mobile Station Identifier (MSID) : 4084205046
Data Profile Info:
====================
Number of data profiles configurable : 5
Current active data profile : 1
Data Profile 5 Information
===================================
NAI (Network Access Identifier) = testing@sp.com
MN-HA SS = Set
MN-HA SPI = 1234
MN-AAA SS = Set
MN-AAA SPI = 1234
Reverse Tunneling Preference = Set
Home Address = 0.0.0.0
Primary Home Agent Address = 100.1.1.1
Secondary Home Agent Address = 200.1.1.1
router#
```

Related Commands	Command	Description
	cellular cdma activate manual	Manually activates a cellular account using the over-the-air service (OTA) procedure.
	cellular cdma activate otasp	Activates a cellular account using the over the air service provisioning (OTASP).
	cellular cdma activate iota	Provisions data profile using Internet-based over-the-air provisioning (IOTA). **Note** IOTA is supported only with certain wireless service providers. Please check with your wireless service provider.
	cellular cdma activate oma-dm device config	Starts a user-initiated OMA-DM session for modem activation. **Note** IOTA is supported only with certain wireless service providers. Please check with your wireless service provider.

cellular cdma profile select

To select a CDMA modem data profile, use the **cellular cdma profile select** command in privileged EXEC mode.

cellular *slot/wic_slot/port* **cdma profile select** *<profile number> <primary HA address> <secondary HA address><mobile HA><NAI> <MN-AAA SS> <MN-HA SS> <MN-AAA SPI><MN-HA SPI> <rev-tunneling>*

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.
profile number	Profile number to be configured
primary HA address	Primary Home Agent Address as obtained from Service Provider
secondary HA address	Secondary Home Agent Address as obtained from Service Provider
*mobile HA**	Mobile Home Agent. This parameter is only needed for generic SKUs.
NAI	Network Access Identifier
MN-AAA SS	Mobile Node AAA Shared Secret
MN-HA SS	Mobile Node Home Agent shared secret
*MN-AAA SPI**	Mobile Node AAA Security Parameter Index
*MN-HA SPI**	Mobile Node Home Agent Security Parameter Index
*rev-tunneling**	Reverse tunneling preference
* denotes parameters not available in HWIC-3G-CDMA-S	

Command Default   None

Command Modes   Privileged EXEC

Command History

Release	Modification
12.4(22)YB1	This command was introduced.

Usage Guidelines   This command is not supported for the HWIC-3G-CDMA-V SKU.

Examples   This section contains sample output for **cellular** *slot/wic_slot/port* **cdma profile select** command:

Sample Output for HWIC-3G-CDMA

```
router#cellular 0 cdma profile select 5 ?
  <cr>
router#cellular 0 cdma profile select 5
Profile 5 will become active
```

```
!!!WARNING: Modem will be reset
Are you sure? [confirm]
Done configuring - Please wait while the modem resets
*Feb 25 21:23:58.224: %CISCO800-2-MODEM_REMOVAL_DETECTED: Cellular0 modem is now REMOVED
*Feb 25 21:23:58.224: %CISCO800-2-CELLULAR_INTERFACE_NOT_SHUTDOWN: WARNING: Cellular0
interface should be shutdown before removing modem. Reload Required to reset interface
*Feb 25 21:23:58.232: %CELLWAN-2-MODEM_DOWN: Cellular0 modem is DOWN
*Feb 25 21:23:59.784: %CISCO800-2-MODEM_INSERTED_DETECTED: Cellular0 modem is now INSERTED
*Feb 25 21:24:04.900: %CELLWAN-2-MODEM_UP: Cellular0 modem is now UP
Profile 5 selected successfully
router#
router#
router#
router#
router#show cellular 0 profile 5
Electronic Serial Number (ESN) = 0x605F6982 [09606252930]
Modem activated = YES
Account Information:
======================
Activation Date: Not available
Phone Number (MDN) : 4084205046
Mobile Station Identifier (MSID) : 4084205046
Data Profile Info:
===================
Number of data profiles configurable : 5
Current active data profile : 5
Data Profile 5 Information (Active)
<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<
===================================
NAI (Network Access Identifier) = testing@sp.com
MN-HA SS = Set
MN-HA SPI = 1234
MN-AAA SS = Set
MN-AAA SPI = 1234
Reverse Tunneling Preference = Set
Home Address = 0.0.0.0
Primary Home Agent Address = 100.1.1.1
Secondary Home Agent Address = 200.1.1.1
router#
```

Related Commands

Command	Description
cellular cdma activate iota	Provisions data profile using Internet-based over-the-air provisioning (IOTA).
	Note IOTA is supported only with certain wireless service providers. Please check with your wireless service provider.
cellular cdma activate manual	Manually activates a cellular account using the over-the-air service (OTA) procedure.
cellular cdma activate oma-dm device config	Starts a user-initiated OMA-DM session for modem activation.
	Note IOTA is supported only with certain wireless service providers. Please check with your wireless service provider.
cellular cdma activate otasp	Activates a cellular account using the over the air service provisioning (OTASP).

debug cell-hwic driver

To debug the Cisco IOS driver for the cellular interface, use the **debug cell-hwic driver** command in EXEC mode.

debug cell-hwic *slot/wic_slot/port* **driver** {**crcdump** | **errdump** | **errors**}

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.
crcdump	CRC error details.
errdump	Other error details.
errors	Errors debugging.

Command Default   None

Command Modes   EXEC (#)

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

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 firmware	Displays Cisco IOS firmware information.
debug cellular messages management	Prints management path messages, such as CnS.
debug cellular messages dm	Prints diagnostics monitor (DM) messages from the Qualcomm CDMA chipset.
debug cell-hwic virt-con	Redirects the Nios II console driver messages to display them in the Cisco IOS router console environment.

debug cell-hwic firmware

To see the Cisco IOS firmware information, use the **debug cell-hwic firmware** command in EXEC mode.

debug cellular *slot/wic_slot/port* **firmware**

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

Command Default   None

Command Modes   EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.
12.4(22)YB1	This command was integrated into Cisco IOS Release 12.4(22)YB1.

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 cell-hwic driver	Debugs the Cisco IOS driver.
debug cellular messages management	Prints management path messages, such as CnS.
debug cellular messages dm	Prints diagnostics monitor (DM) messages from the Qualcomm CDMA chipset.
debug cell-hwic virt-con	Redirects the Nios II console driver messages to display them in the Cisco IOS router console environment.

debug cell-hwic virt-con

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

debug cell-hwic *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-structurs	(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 wraparound for virtual console log messages.
wrapper-off	(Optional) Enables wraparound for virtual console log messages.

Command Default   There is no default for this command.

Command Modes   EXEC (#)

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.4(22)YB1	This command was integrated into Cisco IOS Release 12.4(22)YB1.

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 cell-hwic driver	Debugs the Cisco IOS driver.
debug cell-hwic firmware	Displays Cisco IOS firmware information.

Command	Description
debug cellular messages management	Prints management path messages, such as CnS.
debug cellular messages dm	Prints diagnostics monitor (DM) messages from the Qualcomm CDMA chipset.

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   None

Command Modes   EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

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 driver	Debugs the Cisco IOS driver.
debug cellular firmware	Displays Cisco IOS firmware information.
debug cellular messages management	Prints management path messages, such as CnS.
debug cellular messages dm	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 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   None

Command Modes   EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

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 driver	Debugs the Cisco IOS driver.
debug cellular firmware	Displays Cisco IOS firmware information.
debug cellular messages management	Prints management path messages, such as CnS.
debug cellular messages dm	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 Cisco 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   None

Command Modes   EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

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 driver	Debugs the Cisco IOS driver.
debug cellular firmware	Displays Cisco IOS firmware information.
debug cellular messages management	Prints management path messages, such as CnS.
debug cellular messages dm	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
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

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 driver	Debugs the Cisco IOS driver.
debug cellular firmware	Displays Cisco IOS firmware information.
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   None

Command Modes   EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

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 driver	Debugs the Cisco IOS driver.
debug cellular firmware	Displays Cisco IOS firmware information.
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 oma-dm

To start OMA-DM debugging, use the **debug cellular messages oma-dm** command in privileged EXEC mode. This captures all the OMA DM control and status (CnS) packets.

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

Syntax Description

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

Command Default   None

Command Modes   Privileged EXEC

Command History

Release	Modification
12.4(22)YB1	This command was introduced.

Usage Guidelines   None

Related Commands

Command	Description
show cellular oma-dm	Displays an OMA-DM session details.
cellular cdma activate oma-dm device config	Starts a user initiated OMA-DM session to provision an account and profile update.
cellular cdma activate oma-dm ni-alert	Allows or denies a network initiated alert (NIA) queued in the modem.
cellular cdma activate oma-dm prl-update	Starts a user initiated OMA-DM session to get an over-the-air PRL update.

show cellular all

To display all the modem information in one listing, use the **show cellular all** command in privileged 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   None

Command Modes   Privileged EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

Usage Guidelines   The command usage is the same for Global System for Mobile Communications (GSM) and code division multiple acces (CDMA), although the output is different for each.

Examples   This section contains:

- Sample Output for 3G-HWIC-GSM
- Sample Output for 3G-HWIC-CDMA

Sample Output for 3G-HWIC-GSM

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

```
router# 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) = 001012345678901
International Mobile Equipment Identity (IMEI) = 352678010002779
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
        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
router#
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
router#
```

Sample Output for 3G-HWIC-CDMA

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

```
router# show cellular 0/0/0 all

Hardware Information
====================
Modem Firmware Version = p2005600
Modem Firmware built = 11-14-06
Hardware Version = 1.0
Electronic Serial Number (ESN) = 0x6032688F
Preferred Roaming List (PRL) Version = 20224
Current Modem Temperature = 32 degrees Celsius

Profile Information
===================
Electronic Serial Number (ESN) = 0x6032688F
Modem activated = YES

Account Information:
====================
Activation Date: Not available
Phone Number (MDN) : 9135938079
Mobile Station Identifier (MSID) : 9135938079

Data Profile Info:
==================
Number of data profiles configured : 2
Current active data profile : 1

Data Profile 0 Information
==================================
NAI (Network Access Identifier) = 6032688F@hcm.sprintpcs.com
MN-HA SS = Set
MN-HA SPI = 1234
MN-AAA SS = Set
MN-AAA SPI = 1234
Reverse Tunneling Preference = Set
Home Address = 0.0.0.0
Primary Home Agent Address = 68.28.15.12
Secondary Home Agent Address = 68.28.31.12

Data Profile 1 Information (Active)
==================================
NAI (Network Access Identifier) = productmarketing432@sprintpcs.com
MN-HA SS = Set
MN-HA SPI = 1234
MN-AAA SS = Set
MN-AAA SPI = 1234
Reverse Tunneling Preference = Set
Home Address = 0.0.0.0
Primary Home Agent Address = 68.28.81.76
Secondary Home Agent Address = 68.28.89.76


Data Connection Information
===========================
Phone number of outgoing call =
HDR AT State = Idle, HDR Session State = Open
HDR Session Info:
    UATI (Hex) = 0084:0AC0:0000:0000:000A:05DC:A821:DCFC
    Color Code = 32, RATI = 0xFFFFFFFF
```

```
        Session duration = 0 msecs, Session start = 0 msecs
        Session end = 0 msecs, Authentication Status = Not authenticated
HDR DRC Value = 11, DRC Cover = 0, RRI = Pilot only
Current Transmitted = 0 bytes, Received = 0 bytes
Total Transmitted = 0 KB, Received = 0 KB
Current Call Status = DISCONNECTED
Current Call Duration = 30 secs
Total Call Duration = 4482879 seconds
Current Call State =
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)

Network Information
===================
Current Service = 1xEV-DO (Rev A) and 1xRTT
Current Roaming Status(1xRTT) = HOME, (HDR) = HOME
Current Idle Digital Mode = HDR
Current System Identifier (SID) = 4183
Current Network Identifier (NID) = 87
Current Call Setup Mode = Mobile IP only
Serving Base Station Longitude = 0 deg 0 min 0 sec
Serving Base Station Latitude = 0 deg 0 min 0 sec
Current System Time = Tue Feb 6 15:12:18 2007

Radio Information
=================
1xRTT related info
------------------
Current RSSI = -94 dBm, ECIO = -8 dBm
Current Channel Number = 50
Current Channel State = Acquired
Current Band Class = Band Class 1

HDR (1xEVDO) related info
-------------------------
Current RSSI = -83 dBm, ECIO = -0 dBm
Current Channel Number = 25
Current Band Class = Band Class 1
Sector ID (Hex) = 0084:0AC0:0000:0000:000A:05DC:A801:1202
Subnet Mask = 104, Color Code = 32, PN Offset = 240
Rx gain control(Main) = 0 dBm, Diversity = Unavailable
Tx total power = -2 dBm, Tx gain adjust = 1536 dBm
Carrier to interference (C/I) ratio = 7

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

Related Commands	Command	Description
	cellular cdma activate otasp	Activates a cellular account using the over the air service provisioning (OTASP).
	show cellular hardware	Displays the cellular modem hardware information.
	show cellular network	Displays the cellular network (base station) information.
	show cellular profile	Displays the cellular profile information.

Command	Description
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 data statistics, use the **show cellular connection** command in privileged 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   None

Command Modes   Privileged EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.
15.1(1)T	This command was integrated into Cisco IOS Release 15.1(1)T.

Usage Guidelines   The command usage is the same for Global System for Mobile Communications (GSM) and code division multiple acces (CDMA), although the output is different for each.

Examples   This section contains:

- Sample Output for 3G-HWIC-GSM
- Sample Output for 3G-HWIC-CDMA

Sample Output for 3G-HWIC-GSM

The following is sample output for slot 1, wic 0, port 1.

```
router# 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 12 describes each output field.

Table 12   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. A total of 16 profiles can be configured.
Packet Session Status	Packet Data Protocol (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.

Sample Output for 3G-HWIC-CDMA

The following example is sample output for slot 0, WIC slot 0, port 0 from the **show cellular connection** command:

```
router# show cellular 0/0/0 connection

Phone number of outgoing call =
HDR AT State = Idle, HDR Session State = Open
HDR Session Info:
    UATI (Hex) = 0084:0AC0:0000:0000:000A:05DC:A821:DCFC
    Color Code = 32, RATI = 0xFFFFFFFF
    Session duration = 0 msecs, Session start = 0 msecs
    Session end = 0 msecs, Authentication Status = Not authenticated
HDR DRC Value = 11, DRC Cover = 0, RRI = Pilot only
Current Transmitted = 0 bytes, Received = 0 bytes
Total Transmitted = 0 KB, Received = 0 KB
Current Call Status = DISCONNECTED
Current Call Duration = 30 secs
Total Call Duration = 4482879 seconds
Current Call State =
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)
router#
```

Table 13 describes each output field.

Table 13   Description of Sample Output for CDMA

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.

Table 13 *Description of Sample Output for CDMA (continued)*

Field	Description
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 or access terminal (AT) from the base station during session establishment.
Color Code	HDR session color code for the sector.
RATI	HDR Random Access Terminal Identifier used for opening a 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 or 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, such as CONNECTED, DISCONNECTED, DORMANT, CONNECTING, or 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. A call status of DISCONNECTED displays the call duration of the last call.
Total Transmitted	Total number of kilobytes transmitted from the modem. This will be cleared by the **clear counters** command.
Total Received	Total number of kilobytes received by the modem. This will be cleared by the **clear counters** command.

Table 13   *Description of Sample Output for CDMA (continued)*

Field	Description
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.
Last Call Disconnect Reason	Indicates why the last call was disconnected.
Last Connection Error	Indicates the error code if the call status indicates an error.
Mobile IP Error Code	Indicates the error code in accordance with RFC-2002 if the call is a mobile IP call. **Note** The current call setup mode is in Simple IP only. In this case **show cellular connection** will not display Mobile IP Error Code. Mobile IP error code is displayed when call setup mode is either "Mobile IP only" mode or "Mobile IP Preferred with SIP fallback" mode.

Related Commands

Command	Description
cellular cdma activate manual	Manually activates a cellular account using the over-the-air service (OTA) procedure.
show cellular hardware	Displays the cellular modem hardware information.
show cellular network	Displays the cellular network (base station) information.
show cellular profile	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 HWIC hardware- and driver-specific information.

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#show cellular 0/0/0 connection personality
No Active Personalities Negotiated
c2800#
```

Related Commands

Command	Description
cellular cdma activate iota	Activates a cellular account unsing the internet over the air service (OTA) procedure.
cellular cdma activate manual	Manually activates a cellular account unsing the over the air service (OTA) procedure or over the air service provisioning (OTASP).
cellular cdma activate otasp	Activates a cellular account unsing the over the air service (OTA) procedure or over the air service provisioning (OTASP).
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 privileged 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 None

Command Modes Privileged EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

Usage Guidelines The command usage is the same for Global System for Mobile Communications (GSM) and code division multiple acces (CDMA), although the output is different for each.

Examples This section contains:

- Sample Output for HWIC-3G-GSM
- Sample Output for HWIC-3G-CDMA

Sample Output for HWIC-3G-GSM

The following example shows output for slot 0, WIC slot 0, port 0:

```
router# 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 14　　　*Output Description for show cellular hardware command*

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 digits 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 in the 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 correctly; otherwise will be offline and the modem will not be usable.
Current Modem Temperature	Radio temperature of the modem in degrees Celsius. State is normal when temperature is between 5 to 185°F (-15° to 85°C). If state reaches critical 226.4°F (108°C), the modem will be shutdown.

Sample Output for HWIC-3G-CDMA

The following example shows output for slot 0, WIC slot 0, port 0:

```
router# show cellular 0/0/0 hardware

Modem Firmware Version = p2005600
Modem Firmware built = 11-14-06
Hardware Version = 1.0
Electronic Serial Number (ESN) = 0x6032688F
Preferred Roaming List (PRL) Version = 20224
Current Modem Temperature = 32 degrees Celsiuss
```

Table 15 describes each output field.

Table 15　　　*Output Description for show cellular hardware command*

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.

Table 15   *Output Description for show cellular hardware command (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 degrees Celsius.

Related Commands

Command	Description
show cellular radio	Displays the cellular modem radio statistics.
show cellular security	Displays the modem lock state.
show controllers cellular	Displays HWIC hardware- and driver-specific information.

show cellular network

To display information about the carrier network and service, use the **show cellular network** command in privileged 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 None

Command Modes Privileged EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

Usage Guidelines The command usage is the same for Global System for Mobile Communications (GSM) and code division multiple acces (CDMA), although the outputs differ.

Examples This section contains:

-
-

Sample Output for HWIC-3G-GSM

The following example shows output for HWIC-3G-GSM in slot 0, WIC slot 0, port 0:

```
router# 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 16 describes each output field.

Table 16   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 is roaming.
Network Selection Mode	Can be manual selection mode 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. The modem will be in the home network 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.
Mobile Network Code	Network code given by the base station. The modem will be in the home network 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.
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.

Sample Output for HWIC-3G-CDMA

The following example shows output for slot 0, WIC slot 0, port 0:

```
router# show cellular 0/0/0 network

Current Service = 1xEV-DO (Rev A) and 1xRTT
Current Roaming Status(1xRTT) = HOME, (HDR) = HOME
Current Idle Digital Mode = HDR
Current System Identifier (SID) = 4183
Current Network Identifier (NID) = 87
Current Call Setup Mode = Mobile IP only
Serving Base Station Longitude = 0 deg 0 min 0 sec
Serving Base Station Latitude = 0 deg 0 min 0 sec
Current System Time = Tue Feb 6 15:16:9 2007
```

Table 17   *Output Description for show cellular hardware command for CDMA*

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).
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.

Related Commands

Command	Description
show cellular radio	Displays the cellular modem radio statistics.
show cellular security	Displays the modem lock state.
show controllers cellular	Displays HWIC hardware and driver-specific information.

show cellular oma-dm

To display an OMA-DM session details, use the **show cellular oma-dm** command in privileged EXEC mode.

show cellular *slot/wic_slot/port* **oma-dm**

Syntax Description

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

Command Default None

Command Modes Privileged EXEC

Command History

Release	Modification
12.4(22)YB1	This command was introduced.

Usage Guidelines None

Examples This section contains sample output for **show cellular** *slot/wic_slot/port* **oma-dm** command:

Sample Output for HWIC-3G-CDMA

The following example shows output for HWIC-3G-CDMA for slot 0, WIC slot 3, port 0:

```
Router#sh cellular 0/3/0 oma-dm
Configuration info
------------------
DM Support = Enabled
Max DM account = 1, DM account in use = 1
DM account changed = No
Device Configuration:
        Client-Initiated  = Supported, Enabled
        Network-Initiated = Supported, Enabled
PRL Update:
        Client-Initiated  = Supported, Enabled
        Network-Initiated = Supported, Enabled
Firmware Update:
        Client-Initiated  = Not supported, Disabled
        Network-Initiated = Not supported, Disabled
Hands Free Activation:
        Device-Initiated  = Supported, Enabled
        Hands Free Activation attempted = Yes


DM session state info
---------------------
DM session state = Session not active
Last session type = Unspecified
```

```
Last session initiator = Unspecified
Last session UI mode = Unspecified
Last session result = Success
Last session updated = No

Network-Initiated alert info
----------------------------
NIA state = No NIA pending
Session type = Unspecified
Standard UI mode = Unspecified
Special UI mode = Unspecified
Router#
```

Related Commands	Command	Description
	cellular cdma activate oma-dm device config	Starts a user initiated OMA-DM session to provision an account and profile update.
	cellular cdma activate oma-dm ni-alert	Allows or denies a network initiated alert (NIA) queued in the modem.
	cellular cdma activate oma-dm prl-update	Starts a user initiated OMA-DM session to get an over-the-air PRL update.
	debug cellular messages oma-dm	Starts OMA-DM debugging.

show cellular profile

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

show cellular *slot/wic_slot/port* **profile** *<profile number>* | **all**

Syntax Description

slot/wic_slot/port	Numeric values that indicate the router slot, WAN interface card (WIC) slot, and port.
profile number	Profile number for the profile to be displayed.
all	Displays information of all profiles in the modem. The maximum number of supported profiles is 6.

> ✎
>
> **Note** In case of HWIC-3G-CDMA-V, only one profile is supported, so only one profile is displayed.

Command Default None

Command Modes Privileged EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.
12.4(22)YB1	This command was modified to display all profiles in the modem.

Usage Guidelines The command usage is the same for Global System for Mobile Communications (GSM) and code division multiple acces (CDMA), although the output is different for each.

Examples This section contains:

- Sample Output for HWIC-3G-GSM
- Sample Output for HWIC-3G-CDMA

Sample Output for HWIC-3G-GSM

The following example shows output for HWIC-3G-GSM for slot 0, WIC slot 1, port 1:

```
router# 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 18   Field Descriptions for show cellular profile command

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 packet data protocol (PDP) type. Supported type is IPv4.
PDP Address	Shows the IP address assigned for the PDP context during PPP negotiation.
Access Point Name	Access Point Name for the profile. This information is provided by the service provider.
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.

Sample Output for HWIC-3G-CDMA

The following example shows output for HWIC-3G-CDMA for slot 0, WIC slot 1, port 1:

```
router# show cellular 0/0/0 profile

Electronic Serial Number (ESN) = 0x6032688F [09603303567]
Modem activated = YES

Account Information:
=====================
Activation Date: Not available
Phone Number (MDN) : 1234567890
Mobile Station Identifier (MSID) : 1234567890

Data Profile Info:
===================
Number of data profiles configured : 2
```

```
Current active data profile : 1

Data Profile 0 Information
=================================
NAI (Network Access Identifier) = 6032688F@hcm.sprintpcs.com
MN-HA SS = Set
MN-HA SPI = 1234
MN-AAA SS = Set
MN-AAA SPI = 1234
Reverse Tunneling Preference = Set
Home Address = 0.0.0.0
Primary Home Agent Address = 68.28.15.12
Secondary Home Agent Address = 68.28.31.12

Data Profile 1 Information (Active)
=================================
NAI (Network Access Identifier) = productmarketing432@sprintpcs.com
MN-HA SS = Set
MN-HA SPI = 1234
MN-AAA SS = Set
MN-AAA SPI = 1234
Reverse Tunneling Preference = Set
Home Address = 0.0.0.0
Primary Home Agent Address = 68.28.81.76
Secondary Home Agent Address = 68.28.89.76
```

"*" Indicates the default profile.

Table 19 describes the output fields from the command.

Table 19   Field Description

Field	Description
Electronic Serial Number	A unique serial number for the CDMA modem displayed in decimal and hexadecimal formats.
Modem Activated	Indicates the activation status of the modem. Yes indicates that the modem is activated on the carrier network.
Data Profile	A data profile consists of the mobile IP (MIP) settings for the data connection. These settings are populated on the modem by the network using OTASP/IOTA.
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

Related Commands

Command	Description
cellular cdma activate manual	Manually activates a cellular account using the over-the-air service (OTA) procedure.
cellular cdma activate otasp	Activates a cellular account using the over the air service provisioning (OTASP).

Command	Description
cellular cdma activate iota	Provisions data profile using Internet-based over-the-air provisioning (IOTA).
	Note IOTA is supported only with certain wireless service providers. Please check with your wireless service provider.
cellular cdma activate oma-dm device config	Starts a user-initiated OMA-DM session to provision an account.

show cellular radio

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

show cellular *slot/wic_slot/port* **radio [history <all | per-hour | per-min | per-sec>]**

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.
all	Complete RSSI history.
per-hour	Per-hour RSSI history.
per-min	Per-minute RSSI history.
per-sec	Per-second RSSI history.

Command Default   None

Command Modes   Privileged EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

Usage Guidelines   The command usage is the same for Global System for Mobile Communications (GSM) and code division multiple acces (CDMA), although the output is different for each.

Examples   This section contains:

- Sample Output for HWIC-3G-GSM
- Sample Output for HWIC-3G-CDMA

Sample Output for HWIC-3G-GSM

The following example shows output for HWIC-3G-GSM in slot 0, WIC slot 0, port 0:

```
router# show cellular 0/0/0 radio

Current Band = WCDMA 1900, Channel Number = 9721
Current RSSI(RSCP) = -91 dBm
```

Table 20   *Output Description for show cellular radio command for GSM*

Field	Description
Current Band	GPRS/UMTS band to which the modem is attached.
Channel Number	Channel number to which the modem is attached.
Current RSSI	Current radio signal strength on the modem. (-125 dbm indicates no signal.)

Sample Output for HWIC-3G-CDMA

The following example shows output for HWIC-3G-CDMA in slot 0, WIC slot 0, port 0:

```
router#show cellular 0/0/0 radio
1xRTT related info
------------------
Current RSSI = -95 dBm, ECIO = -6 dBm
Current Channel Number = 50
Current Channel State = Acquired
Current Band Class = Band Class 1

HDR (1xEVDO) related info
-------------------------
Current RSSI = -88 dBm, ECIO = -2 dBm
Current Channel Number = 25
Current Band Class = Band Class 1
Sector ID (Hex) = 0084:0AC0:0000:0000:000A:05DC:A801:1202
Subnet Mask = 104, Color Code = 32, PN Offset = 240
Rx gain control(Main) = 0 dBm, Diversity = Unavailable
Tx total power = -2 dBm, Tx gain adjust = 1536 dBm
Carrier to interference (C/I) ratio = 2
```

Table 21   *Output Description for show cellular radio command for HWIC-3G-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	Current band class that the modem is attached to.
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	Received gain control for the modem.
Tx Total Power	Transmitted power.

Related Commands

Command	Description
show cellular all	Displays the consolidated information about the modem.
show controllers cellular	Displays HWIC-hardware and driver-specific information.

show cellular security

To display the SIM status (only for HWIC-3G-GSM) and modem lock state, use the **show cellular security** command in privileged 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   None

Command Modes   Privileged EXEC

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

Usage Guidelines   The command usage is the same for Global System for Mobile Communications (GSM) and code division multiple acces (CDMA), although the output is different for each.

Examples   This section contains:

- Sample Output for HWIC-3G-GSM
- Sample Output for HWIC-3G-CDMA

Sample Output for HWIC-3G-GSM

The following example shows output for an HWIC-3G-GSM in slot 0, WIC slot 0, port 0:

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

Table 22 describes the output from this command:

Table 22   Output Description

Filed	Description
Card Holder Verification	If enabled, access to the SIM is restricted.
SIM Status	Indicates whether the SIM is present or removed from the SIM socket.

Table 22   Output Description (continued)

Filed	Description
SIM User Operation Required	If the SIM is protected (for example, 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.

Sample Output for HWIC-3G-CDMA

The following example shows output for an HWIC-3G-CDMA in slot 0, WIC slot 0, port 0:

```
router# show cellular 0/0/0 security
Modem PIN Security UNLOCKED
Power-up lock DISABLED
```

Table 23 describes the output for this command.

Table 23   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.

Related Commands	**Command**	**Description**
	show cellular all	Displays the consolidated information about the modem.

show controllers cellular

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

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

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

Related Commands

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 interfaces cellular

To display statistics for the cellular interface, 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
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

Usage Guidelines

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

Examples

This section contains:

- Sample Output for 3G-HWIC-GSM
- Sample Output for 3G-HWIC-CDMA

Sample Output for HWIC-3G-GSM

The following example shows the cellular interface statistics for HWIC-3G-GSM in slot 0, WIC slot 0, port 0 for GSM:

```
router#

router# show interfaces cellular 0/0/0
Cellular0/0/0 is up, line protocol is up
  Hardware is HSDPA/UMTS/EDGE/GPRS-850/900/1800/1900/2100MHz
  Internet address is 1.5.97.2/32
  MTU 1500 bytes, BW 384 Kbit, RxBW 2400000 Kbit, DLY 100000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation PPP, LCP Open
  Open: IPCP, loopback not set
  Keepalive not set
  Time to interface disconnect: idle 3w3d
  Last input 00:20:21, output 00:20:21, output hang never
  Last clearing of "show interface" counters 00:00:01
  Input queue: 1/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
```

```
      Conversations  0/16/16 (active/max active/max total)
      Reserved Conversations 0/0 (allocated/max allocated)
      Available Bandwidth 288 kilobits/sec
  30 second input rate 0 bits/sec, 0 packets/sec
  30 second output rate 0 bits/sec, 0 packets/sec
      0 packets input, 0 bytes, 0 no buffer
      Received 0 b
*Feb  7 22:55:33.985: %CLEAR-5-COUNTERS: Clear counter on all interfaces by
consoleroadcasts, 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=up  RTS=up  CTS=up
```

Sample Output for HWIC-3G-CDMA

The following example shows the output for an HWIC-3G-CDMA in slot 0, WIC slot 0, port 0 for the **show interfaces cellular** command.

```
router#   show int cellular 0/0/0
Cellular0/0/0 is up (spoofing), line protocol is up (spoofing)
  Hardware is EVDO Rev A/Rel 0/1xRTT-800/1900MHz / SP
  Internet address will be negotiated using IPCP
  MTU 1500 bytes, BW 9 Kbit, DLY 100000 usec,
      reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation PPP, LCP Closed, loopback not set
  Keepalive 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
  30 second input rate 0 bits/sec, 0 packets/sec
  30 second 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=up  RTS=up  CTS=up
```

Related Commands	Command	Description
	show cellular radio	Displays the cellular modem radio statistics.
	show controllers cellular	Displays HWIC hardware and driver-specific information.
	show run interface cellular	Displays the current running configuration for the cellular interface.

show run interface cellular

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

Command History

Release	Modification
12.4(11)XV	This command was introduced.
12.4(15)T	This command was integrated into Cisco IOS Release 12.4(15)T.

Examples   The following example shows the output of the command for 3G HWIC in slot 0, WIC slot 0, port 0:

```
router#show running-config interface cellular 0/0/0
interface Cellular0/0/0
 ip address negotiated
 ip access-group 10 out
 ip nat outside
 ip virtual-reassembly
 encapsulation ppp
 no ip mroute-cache
 load-interval 30
 dialer in-band
 dialer idle-timeout 2147483
 dialer string cdma
 dialer-group 2
 async mode interactive
 no peer default ip address
 fair-queue
 ppp ipcp dns request
 routing dynamic
end router#
```

Related Commands

Command	Description
show controllers cellular	Displays HWIC hardware and driver-specific information.
show interfaces cellular	Displays statistics for the cellular interfaces.

Troubleshooting Tips

If you are encountering issues with the working of the 3G wireless Modular and Fixed Cisco ISRs, 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 occurring, 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, 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 connected and working as they should, contact your system administrator.

Call Setup Using CHAT Script

The following is a sample output for a call that is set up using CHAT script. It shows a received IP address from the network and indicates that the call setup is successful and the data path is open:

```
Debugs enabled:
debug modem
debug chat
debug ppp negotiation
debug ppp event
debug ppp error


router# ping www.yahoo.com
```

```
Translating "www.yahoo.com"...domain server (255.255.255.255)
*Mar  1 23:42:57.398: CHAT0/1/0: Attempting async line dialer script
*Mar  1 23:42:57.398: CHAT0/1/0: Dialing using Modem script: sprint & System script: none
*Mar  1 23:42:57.402: CHAT0/1/0: process started
*Mar  1 23:42:57.402: CHAT0/1/0: Asserting DTR
*Mar  1 23:42:57.402: CHAT0/1/0: Chat script sprint started
*Mar  1 23:42:57.402: CHAT0/1/0: Sending string: atdt#777
*Mar  1 23:42:57.402: CHAT0/1/0: Expecting string: CONNECT
*Mar  1 23:42:58.710: CHAT0/1/0: Completed match for expect: CONNECT
*Mar  1 23:42:58.710: CHAT0/1/0: Chat script sprint finished, status = Success
*Mar  1 23:42:58.878: TTY0/1/0: no timer type 1 to destroy
*Mar  1 23:42:58.878: TTY0/1/0: no timer type 0 to destroy
*Mar  1 23:42:58.878: TTY0/1/0: no timer type 2 to destroy
*Mar  1 23:43:00.878: %LINK-3-UPDOWN: Interface Cellular0/1/0, changed state to up
*Mar  1 23:43:00.878: Ce0/1/0 PPP: Using dialer call direction
*Mar  1 23:43:00.878: Ce0/1/0 PPP: Treating connection as a callout
*Mar  1 23:43:00.878: Ce0/1/0 PPP: Session handle[CD00000E] Session id[5]
*Mar  1 23:43:00.878: Ce0/1/0 PPP: Phase is ESTABLISHING, Active Open
*Mar  1 23:43:00.878: Ce0/1/0 PPP: No remote authentication for call-out
*Mar  1 23:43:00.878: Ce0/1/0 LCP: O CONFREQ [Closed] id 5 len 20
*Mar  1 23:43:00.878: Ce0/1/0 LCP:    ACCM 0x000A0000 (0x0206000A0000)
*Mar  1 23:43:00.878: Ce0/1/0 LCP:    MagicNumber 0x4597FB75 (0x05064597FB75)
*Mar  1 23:43:00.878: Ce0/1/0 LCP:    PFC (0x0702)
*Mar  1 23:43:00.878: Ce0/1/0 LCP:    ACFC (0x0802)
*Mar  1 23:43:00.878: Ce0/1/0 LCP: I CONFREQ [REQsent] id 12 len 20
*Mar  1 23:43:00.882: Ce0/1/0 LCP:    ACCM 0x00000000 (0x020600000000)
*Mar  1 23:43:00.882: Ce0/1/0 LCP:    MagicNumber 0x7F576333 (0x05067F576333)
*Mar  1 23:43:00.882: Ce0/1/0 LCP:    PFC (0x0702)
*Mar  1 23:43:00.882: Ce0/1/0 LCP:    ACFC (0x0802)
*Mar  1 23:43:00.882: Ce0/1/0 LCP: O CONFACK [REQsent] id 12 len 20
*Mar  1 23:43:00.882: Ce0/1/0 LCP:    ACCM 0x00000000 (0x020600000000)
*Mar  1 23:43:00.882: Ce0/1/0 LCP:    MagicNumber 0x7F576333 (0x05067F576333)
*Mar  1 23:43:00.882: Ce0/1/0 LCP:    PFC (0x0702)
*Mar  1 23:43:00.882: Ce0/1/0 LCP:    ACFC (0x0802)
*Mar  1 23:43:00.882: Ce0/1/0 LCP: I CONFACK [ACKsent] id 5 len 20
*Mar  1 23:43:00.882: Ce0/1/0 LCP:    ACCM 0x000A0000 (0x0206000A0000)
*Mar  1 23:43:00.882: Ce0/1/0 LCP:    MagicNumber 0x4597FB75 (0x05064597FB75)
*Mar  1 23:43:00.882: Ce0/1/0 LCP:    PFC (0x0702)
*Mar  1 23:43:00.882: Ce0/1/0 LCP:    ACFC (0x0802)
*Mar  1 23:43:00.882: Ce0/1/0 LCP: State is Open
*Mar  1 23:43:00.882: Ce0/1/0 PPP: Phase is FORWARDING, Attempting Forward
*Mar  1 23:43:00.882: Ce0/1/0 PPP: Phase is ESTABLISHING, Finish LCP
*Mar  1 23:43:00.882: Ce0/1/0 PPP: Phase is UP
*Mar  1 23:43:00.882: Ce0/1/0 IPCP: O CONFREQ [Closed] id 1 len 22
*Mar  1 23:43:00.882: Ce0/1/0 IPCP:    Address 0.0.0.0 (0x030600000000)
*Mar  1 23:43:00.882: Ce0/1/0 IPCP:    PrimaryDNS 0.0.0.0 (0x810600000000)
*Mar  1 23:43:00.882: Ce0/1/0 IPCP:    SecondaryDNS 0.0.0.0 (0x830600000000)
*Mar  1 23:43:00.882: Ce0/1/0 PPP: Process pending ncp packets
*Mar  1 23:43:00.882: Ce0/1/0 IPCP: I CONFREQ [REQsent] id 4 len 10
*Mar  1 23:43:00.886: Ce0/1/0 IPCP:    Address 68.28.57.69 (0x0306441C3945)
*Mar  1 23:43:00.886: Ce0/1/0 IPCP: O CONFACK [REQsent] id 4 len 10
*Mar  1 23:43:00.886: Ce0/1/0 IPCP:    Address 68.28.57.69 (0x0306441C3945)
*Mar  1 23:43:00.886: Ce0/1/0 IPCP: I CONFNAK [ACKsent] id 1 len 22
*Mar  1 23:43:00.886: Ce0/1/0 IPCP:    Address 70.12.159.189 (0x0306460C9FBD)
*Mar  1 23:43:00.886: Ce0/1/0 IPCP:    PrimaryDNS 68.28.58.11 (0x8106441C3A0B)
*Mar  1 23:43:00.886: Ce0/1/0 IPCP:    SecondaryDNS 68.28.50.11 (0x8306441C320B)
*Mar  1 23:43:00.886: Ce0/1/0 IPCP: O CONFREQ [ACKsent] id 2 len 22
*Mar  1 23:43:00.886: Ce0/1/0 IPCP:    Address 70.12.159.189 (0x0306460C9FBD)
*Mar  1 23:43:00.886: Ce0/1/0 IPCP:    PrimaryDNS 68.28.58.11 (0x8106441C3A0B)
*Mar  1 23:43:00.886: Ce0/1/0 IPCP:    SecondaryDNS 68.28.50.11 (0x8306441C320B)
*Mar  1 23:43:00.886: Ce0/1/0 IPCP: I CONFACK [ACKsent] id 2 len 22
*Mar  1 23:43:00.886: Ce0/1/0 IPCP:    Address 70.12.159.189 (0x0306460C9FBD)
*Mar  1 23:43:00.886: Ce0/1/0 IPCP:    PrimaryDNS 68.28.58.11 (0x8106441C3A0B)
```

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*Mar  1 23:43:00.886: Ce0/1/0 IPCP:    SecondaryDNS 68.28.50.11 (0x8306441C320B)
*Mar  1 23:43:00.886: Ce0/1/0 IPCP: State is Open
*Mar  1 23:43:00.886: Ce0/1/0 IPCP: Install negotiated IP interface address 70.12.159.189
*Mar  1 23:43:00.890: Ce0/1/0 IPCP: Install route to 68.28.57.69
*Mar  1 23:43:00.890: Ce0/1/0 IPCP: Add link info for cef entry 68.28.57.69
*Mar  1 23:43:01.878: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cellular0/1/0,
changed state to up
*Mar  1 23:43:01.890: %LINEPROTO-5-UPDOWN: Line protocol on Interface Tunnel1, changed
state to up (68.28.50.11) [OK]

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 209.131.36.158, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 188/196/204 ms
```

Modem Troubleshooting Using the Diagnostic Port

The RJ-45 port on the faceplate of the 3G wireless HWIC provides access to the debug port on the Sierra Wireless modem. By connecting an industry-standard diagnostic tool, such as Qualcomm CAIT/QXDM or Spirent UDM to this port, you can perform radio-level diagnostics and traffic monitoring on the modem. Use the following test command to turn diagnostics on:

router# **test cell-hwic** *slot/port/wic* **dm-port** *on*

The cable used to connect the PC/Laptop running the diagnostic tool is the standard Cisco router console cable (RJ-45 to DB-9).

Note To enable test commands, you must enter the **service internal** command in the global configuration mode.