



Service Managed Gateway™

How to Configure a GSM Modem on the GW8000 series SMG

Issue 2.1
Date 14 August 2007

1	About this document	3
1.1	Scope	3
1.2	Readership	3
2	Introduction	4
2.1	Typical uses of the GSM modem	4
2.2	Types of data bearers that the GSM modem supports	5
2.2.1	GPRS 5	
2.2.2	HSCSD 5	
2.2.3	CSD in EGSM900/GSM1800 MHz	5
3	Setting up the GSM modem for a primary WAN link.....	6
3.1	Assigning a PPP interface to the GSM modem	6
3.2	Configuring the GW8000 to use the GSM modem interface	7
3.2.1	Configure the IP default route	7
3.2.2	Configure address translation.....	8
3.2.3	Configure the PPP interface.....	8
3.2.4	Select asynchronous PPP operation	9
3.2.5	Set dialling options	11
3.2.6	Configure the serial interface	12
3.2.7	Configure the GSM modem	12
4	Performing GSM monitoring and diagnostics	13
4.1	Monitoring the GSM modem	13
4.1.1	View the Connection Monitor.....	13
4.1.2	Monitor modem call history.....	14
4.1.3	Trace modem events in the event log.....	16
4.2	Performing diagnostics	18

© 2007 Virtual Access (Irl) Ltd. This material is protected by copyright. No part of this material may be reproduced, distributed, or altered without the written consent of Virtual Access. All rights reserved. All trademarks, service marks, registered trademarks and registered service marks are the property of their respective owners. Virtual Access is an ISO 9001 certified company.

HIFN



1 About this document

1.1 Scope

This configuration guide explains how to configure a primary WAN on a Service Managed Gateway (SMG) that has already been Activated.

This guide does not explain how to Activate an SMG or how to set up a backup WAN link.

- For information about how to Activate a GW8000 Series SMG with a GSM modem, read [How to Configure an IDSL Connection](#).
- For information about how to set up a backup WAN link on a GW8000 Series SMG with a GSM modem, read [Configuring the Analog Modem](#).

1.2 Readership

This document is for engineers who have previous experience configuring and managing SMGs.

2 Introduction

The GW8000 Service Managed Gateway (SMG) contains a GSM (Global System for Mobile communications) wireless modem. The modem uses a sim card to create a dial-up WAN connection to the Internet.

2.1 Typical uses of the GSM modem

You can use the GSM modem on the GW8000 in two ways.

- You can create a primary WAN link over the GSM modem instead of using a DSL or ISDN connection.
- You can use the GSM modem as a backup WAN link. If the primary WAN link fails, the GW8000 uses the GSM modem to transfer data across the Internet.

This guide explains how to set up a primary link using the GSM modem on the GW8000 SMG.

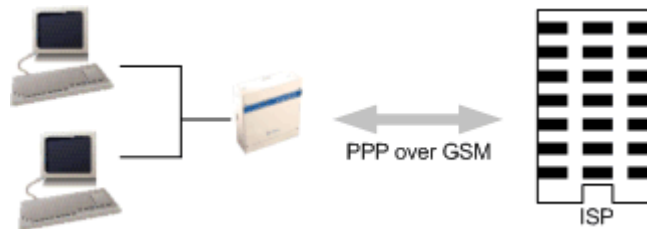


Figure 1: A primary link using the GSM modem on the GW8000 SMG

2.2 Types of data bearers that the GSM modem supports

Data bearers are frame protocols that transport data streams.

2.2.1 GPRS

GPRS (General Packet Radio Service) uses packet-switched technology to transmit small bursts of data. The GSM modem on the GW8000 SMG supports multi-slot class 6, which allows a maximum data rate of 56-114 kbps. The maximum data rate available to the GSM modem depends on provisioning by the network operator.

2.2.2 HSCSD

HSCSD (High-Speed Circuit-Switched Data) uses circuit-switched technology to transmit data at speeds of up to 43.2 kbps.

2.2.3 CSD in EGSM900/GSM1800 MHz

CSD (Circuit-Switched Data) mode enables the GSM modem to transmit data over the EGSM(Extended Global System for Mobile communications) frequency or the GSM frequency. The modem behaves as a dual-band mobile phone behaves.

3 Setting up the GSM modem for a primary WAN link

You set up the GSM modem for a primary WAN link in the Expert View of the Advanced section of the web of the SMG.

To open the Expert View of the SMG web:

1. On the SMG home page, click **Advanced**. The Advanced page appears.
2. In the Advanced menu, click **Expert View**.

3.1 Assigning a PPP interface to the GSM modem

1. In the Expert View of the Gateway web, select **interfaces -> ppp-2 -> wan interface**
2. On the PPP WAN Interface on ppp-2 page, select **modem (n)**, where **n** is the logical interface number of the modem you have configured
3. Click **Update**.

3.1 Configuring the GW8000 to use the GSM modem interface

When the GW8000 uses the GSM modem to create a WAN link to the internet, the interface assigned to the GSM modem becomes the default interface or route for all data passing in and out of the GW8000. You must configure the GW8000 to use this interface.

3.1.1 Configure the IP default route

1. In the Expert View of the Gateway web, select **system -> ip -> default route**.
2. On the IP Default Route page, configure the settings as outlined in Table 1.
3. Click **Update**.

Field name	Configuration
Configured	Enables or disables the default route. Set to yes .
Route Type	Indicates whether the route type is over a numbered or unnumbered link. A numbered link is a link that has been assigned an IP address. Set to unnumbered .
Next Hop For Numbered Interfaces	When Route Type is set to numbered , you enter the IP address, in dotted-decimal notation, of an adjacent router. The local device sends traffic to this router when a route to a destination is not known.
Next Hop For Unnumbered Interfaces	Selects the interface as the default route. Set the default route to interface ppp-2 , as the GSM modem is assigned to this interface.

Table 1: IP Default Route fields and values

3.1.2 Configure address translation

1. In the Expert View of the Gateway web, select **interfaces -> ppp-2 -> ip -> address translation -> outgoing**.
2. On the Outgoing Address Translation on ppp-2 page, set Enabled to **yes**.
3. Click **Update**.

3.2.3 Configure the PPP interface

The modem uses the serial interface at layer 1 of the OSI model, so you need to configure ppp-2 to send and receive data using the serial interface.

1. In the Expert View of the Gateway web, select **interfaces -> ppp-2 -> wan interface**
2. On the PPP WAN Interface on ppp-2 page, select **Serial (0)** from the Wan Interface drop-down list.
3. Click **Update**.

3.2.4 Select asynchronous PPP operation

The GW8000 allows asynchronous data transfer, which transfers data in both directions at different speeds.

1. In the Expert View of the Gateway web, select **interfaces -> ppp-2 -> ppp -> ppp**
2. Click the **Advanced** button to display all fields
3. On the PPP Interface on ppp-2 page, set Asynchronous Link Enabled to **yes**
4. Click **Update**.

Table 2 below explains the fields on the page.

Field name	Configuration
Enabled	Enables the ppp-2 interface.
Maximum Receive Unit (MRU)	The SMG sends the MRU to the end device or peer to inform it that the router can receive larger packets, or to request that the peer send smaller packets. Enter the MRU for the specified PPP interface. Minimum value is 512 bytes. Default/Maximum value is 1524 bytes.
Maximum Remote Receive Unit	The peer sends the Maximum Remote Receive Unit (MRRU) to the SMG to inform it that the remote router can receive larger packets, or to request that the peer send smaller packets. Enter the MRRU for the specified PPP interface. Minimum value is 512 bytes. Default/Maximum value is 1524 bytes.
Period Authentication Time	Indicates the length of time, up to 3600 seconds, between successive attempts to authenticate the PPP peer associated with the selected PPP interface.
Maximum Authentication Retries	Indicates the maximum number of authentication retries after the first authentication attempt fails. When the maximum number of retries is exceeded, the connection is terminated on the selected PPP interface. The maximum number of retries allowed is 64; the default is 3. Minimum value is 0 and maximum value is 64.
IP Enabled	Enables IP on the interface.
Bridging Enabled	Enables or disables bridging negotiation and operation on the selected PPP interface.
Time to Send LQR	Indicates the length of time in seconds to send the LQR. The maximum allowed is 3600 seconds; the default is 0 seconds.
Send Time Remaining Enabled	Enables or disables the option to send of a notice indicating the amount of time remaining for the connection on the selected interface.
Send Identifier String Enabled	Enables or disables the option to send an identifier string on the selected interface. When this option is enabled, enter the identifier string in the Identifier String field.
Identifier String	Used when Send Identifier String Enabled is set to yes , to enter the identifier string.

Asynchronous Link Enabled	Enables the interface to communicate in asynchronous mode.
Primary DNS IP Address	Address of the primary DNS server.
Secondary DNS IP Address	Address of the secondary DNS server.

Table 2: PPP Interface on ppp-2 fields and values

3.1.3 Set dialling options

1. In the Expert View of the Gateway web, select **interfaces -> ppp-2 -> call control -> call**
2. On the Call Details on ppp-2 page, type the phone number of your ISP in the Outgoing Call Destination Number field.
3. Click **Update**.

Table 3 below explains the fields on the page.

Field name	Configuration
Outgoing Call Destination Number	Enter the ISP number to call in order to establish a connection to the internet..
Outgoing Call Destination Subaddress	Specifies the device's subaddress, or extension, if the call destination device has a subaddress defined. No spaces are allowed.
Incoming Call Remote Number	Specifies the number of one of the locations that is allowed to place calls on this interface. No spaces are allowed.
Incoming Call Local Number	Specifies the device's local subaddress, or extension, if the call source has a subaddress defined. No spaces are allowed.
ISDN Call Type	If using ISDN, defines the call type.
Permissions	Assigns the GW8000 permissions to call, answer, call and answer, or call back.
Auto Connect Enabled	Allows the GSM modem to bring up the link automatically when the GW8000 is restarted.
Inactivity Timer	Period of inactivity elapsed before the call connection is disconnected.
Minimum Duration	Minimum connection time before the inactivity timer becomes active.
Maximum Duration	Maximum time that the connection should be maintained.

Table 3: Call Details on ppp-2 fields and values

3.1.4 Configure the serial interface

1. In the Expert View of the Gateway web, select **interfaces -> serial-0 -> serial interface**.
2. On the Serial Interface on serial-0 page, set Async Flow Control Enabled to **yes**
3. Click **Update**.

Table 4 below explains the fields on the page.

Field name	Configuration
Synch Enabled	Enables synchronous communications on the interface.
Async Speed	Sets the speed of the asynchronous communications.
Async Flow Control Enabled	Enables flow control for asynchronous communications.
Async Max Idle Period	Maximum time that the buffers keep data during idle periods.

Table 4: Serial Interface on serial-0 fields and values

3.1.5 Configure the GSM modem

1. In the Expert View of the Gateway web, select **interfaces -> serial-0 -> gsm**
2. On the Serial Interface on serial-0 page, set Async Flow Control Enabled to **yes**
3. Click **Update**.

Table 5 below explains the fields on the page.

Field name	Configuration
Enabled	Enables GSM modem interface.
Connection Type	Specifies the connection type: CSD (circuit switched data), HSCSD (high-speed circuit switched data), or GPRS (general packet radio service).
Access Point Name	For GPRS operation only, an Access Point Name as given by network operator for connection into GPRS network.
PIN	SIM PIN number. This may or may not be required, depending on SIM card type.
PIN2	SIM PIN2 number. This may or may not be required, depending on SIM card type.
PUK	SIM personal unlock key. This may or may not be required, depending on SIM card type.
PUK2	SIM personal unlock key 2. This may or may not be required, depending on SIM card type.
Signal Quality Poll Time	Poll time for a signal when the GSM modem is not connected

Table 5: GSM on serial-0 fields and values

4 Performing GSM monitoring and diagnostics

The GW8000 incorporates tools to help monitor the line and diagnose problems.

4.1 Monitoring the GSM modem

You access the monitoring tools in the Advanced and Status sections of the web of the SMG.

- To open the Advanced section of the SMG web, click **Advanced** on the SMG home page.
- To open the Status section of the SMG web, click **Status** on the SMG home page.

4.1.1 View the Connection Monitor

1. In the Advanced section of the SMG web, click **Connection Monitor**

Below is a screenshot of the Connection Monitor tool. The GSM modem interface is shown as **Serial** on the Connection Monitor interface.

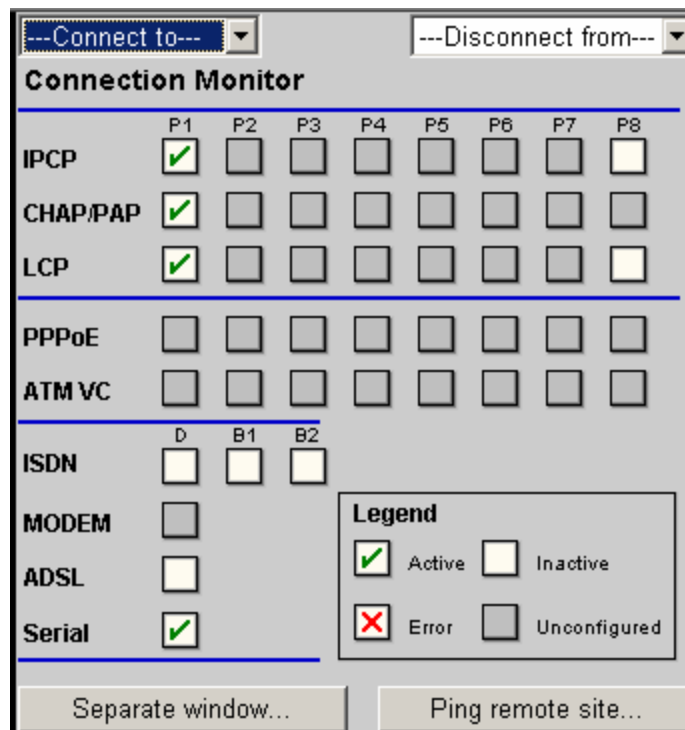


Figure 1: Connection Monitor

4.1.2 Monitor modem call history

1. In the Status section of the SMG web, click **Call History**

The Call History applet displays, as illustrated in Figure 2. Table 6 explains the fields in the Outgoing Data Call box.

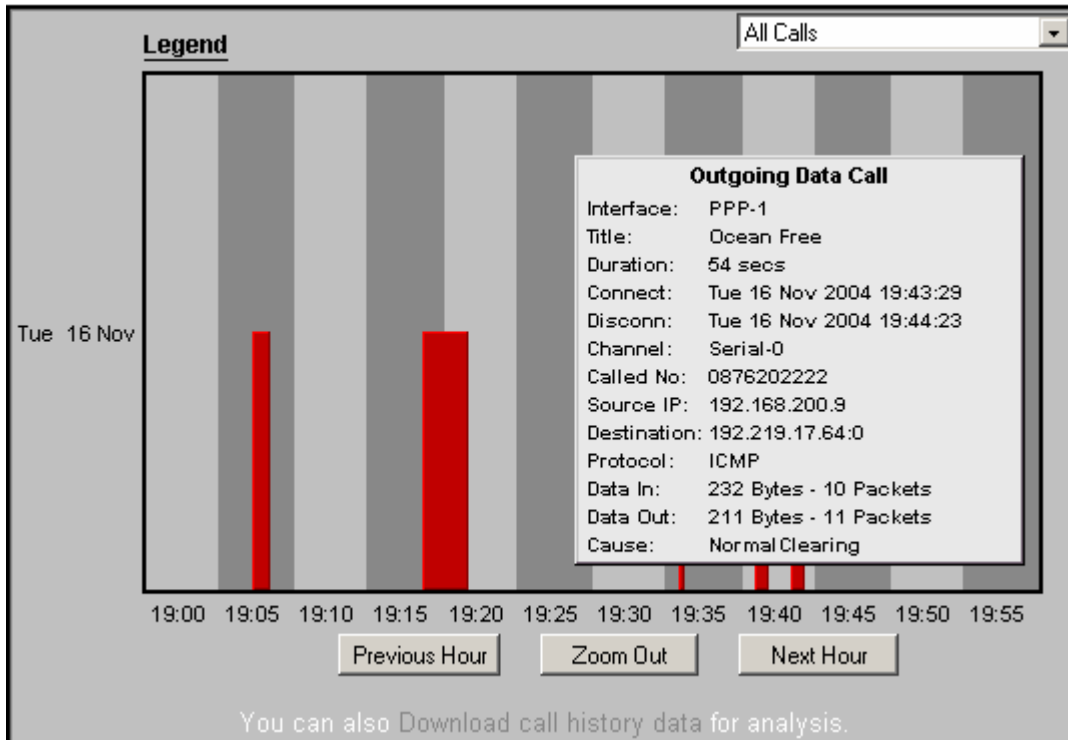


Figure 2: Call History applet

Field name	Configuration
Interface	PPP interface number
Title	Descriptive name of the PPP interface
Duration	Call duration
Connect	Connect time
Disconn	Disconnect time
Channel	Physical channel name – serial-0 is used for GSM modem
Called No	Called ISP phone number (not shown in case of GPRS mode connection).
Source IP	Source IP address of the packet that caused the router to bring up this call
Destination	Destination IP address of the packet that caused the router to bring up call
Protocol	Protocol carried by the IP packet that caused the router to bring up this call
Data In	Number of data bytes and packets received on this call
Data Out	Number of data bytes and packets transmitted on this call

Table 6: Call History fields

You can also monitor GSM modem calls using the Active Data Connections applet.

2. In the Status section of the SMG web, click **Active Data Connections**

The Active Data Connections applet displays, as illustrated in Figure 3.

Details	Data Call 1	Data Call 2	Data Call 3	Data Call 4
Interface Name	Vodafone			
Interface Port	ppp-1			
Interface Address	213.233.136.22			
Call Direction	Outgoing GSM			
Connection Type	GSM CSD			
State	Data Up			
Channels in Use				
Called Number	0876202222			
Called Subaddress				
Calling Number				
Calling Subaddress				
Connect Time	Nov 17 2004 00:32:12			
Duration	00:00:30			
Transmitted Packets	7			
Transmitted Bytes	135			
Received Packets	8			
Received Bytes	166			
Initial IP Source	0.0.0.0			
Initial IP Destination	0.0.0.0			

Figure 3: Active Data Connections applet

4.1.3 Trace modem events in the event log

1. In the Advanced section of the SMG web, click **Diagnostics**
2. On the Diagnostics page, click **Trace Analyzer**
3. In the Trace Analyzer, click **Select** to select custom events
4. In the Select Event Classes to Trace dialog box, add **Modem** to the list of selected events
5. Click **OK**.
6. Click **Start Trace**.

The modem call events display in the trace window. GSM calls are differentiated from V.90 calls by the prefix GSM12. Figure 4 shows the type of events that should display when the GSM modem establishes a link with the ISP. For a full list of GSM modem events, see Table 7.

Time	Class	Severity	Dir	Details
04:46:59	MODEM	INFO		MODEM: GSM12 Dial (0876202222)
04:46:59	MODEM	INFO		MODEM: GSM12: SIM READY
04:46:59	MODEM	INFO		MODEM: GSM12: REGISTERED TO NTKW
04:47:20	MODEM	INFO		MODEM: GSM12: Outgoing Call Connected (9600)
04:47:30	MODEM	INFO		MODEM: GSM12: Outgoing Call Local Disconnect

Figure 4: Web trace analyzer event log

Severity	Text	Meaning
INFO	GSM12: Dial (<called number>)	Outgoing GSM modem call in progress to called number
DEBUG	GSM12: error creating timer	Debug messages logged if GSM driver failed to allocate memory for internal timer
NOTICE	GSM12: Dial Failed (outgoing calls not allowed)	Call permissions does not allow dial-out
NOTICE	GSM12: Dial Failed (no number configured)	No destination number is configured
INFO	GSM12: Outgoing Call Connected (<speed>)	Outgoing GSM connection established
INFO	GSM12: Disconnected	GSM modem disconnected
INFO	GSM12: SIM READY	SIM status is ready for operation, no PIN is necessary
INFO	GSM12: SIM PIN2?	SIM is present, but PIN2 is required
INFO	GSM12: SIM PIN?	SIM is present, but PIN is required
INFO	GSM12: SIM PUK2?	SIM is present, but PUK2 is required
INFO	GSM12: SIM PUK?	SIM is present, but PUK is required
INFO	GSM12: REGISTERED TO NTWK	GSM modem registered to home network
INFO	GSM12: NETWORK NOT FOUND	GSM modem could not find mobile network
INFO	GSM12: SEARCHING FOR NTWK	GSM modem is searching for mobile network
INFO	GSM12: DENIED NTWK REGISTR.	GSM modem has been denied network registration
INFO	GSM12: NTWK STATUS UNKNOWN	The status of network registration is unknown
INFO	GSM12: REGISTERED ROAMING	GSM modem registered and is roaming on one of the networks
INFO	GSM12: Code accepted	PIN, PIN2, PUK or PUK2 code accepted
INFO	GSM12: Code rejected	PIN, PIN2, PUK or PUK2 code rejected
INFO	GSM12: Attached to GPRS network	GSM modem attached to GPRS network
INFO	GSM12: Connecting GPRS (<APN>)	GSM modem is connecting to GPRS network
INFO	GSM12: Outgoing Call Local Disconnect	GSM connection is terminated

Table 7: GSM modem events

4.2 Performing diagnostics

To use diagnostic tools, you need to start a telnet session to the GW8000. To do this:

1. Open a DOS window
2. Type `telnet <ip address of gateway>` at the command line prompt and press **Enter**.
3. Type a username and password if required.

Table 8 displays telnet commands that you can use for diagnostic purposes.

Command	Action performed by command
<code>++modem</code>	Traces GSM modem and prints the output to the telnet window
<code>-</code> (minus sign)	Stops debugging
<code>sh serial if</code>	Displays the status of the serial interface line signals
<code>sgw status</code>	Shows the status of DCD, RTS and CTS signals
<code>sh stats serial-0</code>	Shows transmit, receive and error statistics of the serial-0 interface
<code>gsm12 -i</code>	Displays information about the GSM modem
<code>gsm12 -o</code>	Opens a direct AT command session with the GSM modem, for diagnostics and troubleshooting
<code>gsm12 -s<string></code>	Sends a string to the GSM modem
<code>gsm12 -c</code>	Closes an AT session with the GSM modem.

Table 8: Telnet commands for performing GSM diagnostics

NOTE: While an AT session with the GSM modem is open, the modem cannot make normal PPP dial-out or GPRS calls