



Service Managed Gateway™

Configuring the Analog Modem

Issue 1.5
Date 16 July 2008

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1 About this document

1.1 Scope

This document describes how to configure and use the analog modem.

1.2 Readership

The document is for engineers who plan to configure and manage Service Managed Gateways (SMGs).

1.3 More information

1.3.1 Assigned interface number

Throughout this document, we have used (n) as the assigned interface number.

- modem(n), where n is the interface number, for example, modem-0
- PPP-n, where n is the interface number, for example, PPP-1

2 Introduction

The Virtual Access Service Managed Gateway GW4000 and GW5000 product range is optionally fitted with an analog modem.

The modem conforms to ITU V.92 specification, which is an enhancement of the V.90 modem. The V.92 modem offers two main functions over the V.90 modem:

1. Quick connect: the connection time may be reduced by 50% compared to the V.90 modem.
2. Faster upstream rate: upload speeds may reach 48kbps, compared to 31.2kbps with the V.90 modem. It is also capable of data speeds of up to 56kbps downstream.

The following standards are supported:

Data modem	V.92/V.90 V.34 V.32bis V.32 V.29 V.22bis V.22 V.22 Fast Connect V.23 V.21 Bell212a Bell103
Data compression	V.44 V.42bis and MNP5 V.42 LAPM and MNP2-4 error correction

The analog modem interface on SMG products is available for use in several scenarios.

Scenario	Description
As a normal WAN interface	The analog modem can be used in the same way other WAN interfaces such as DSL and ISDN are used
As a backup WAN interface	The analog modem can be set up to come into operation if the primary WAN interface becomes unusable for some reason.
As an out-of-band management interface	The analog modem can access the SMG management functions by dialing into the SMG, for example, using Virtual Access Activator. It is also possible for the SMG to dial out via the analog modem interface under some conditions.

A number of low-level maintenance functions are available by dialing the SMG analog modem interface if the SMG does not boot up correctly, or otherwise fails to start up properly.

3 Setting up and configuring the analog modem

3.1 Setting up the physical port connection

To set up the physical modem interface, connect your analog line cable to your phone line wall-socket on one side and to the SMG RJ-11 modem port on the other side.

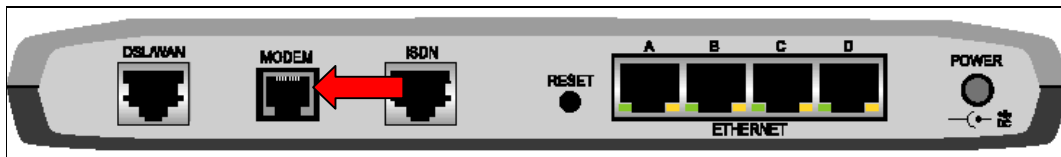


Figure 1: The physical port connection for the GW4000 series

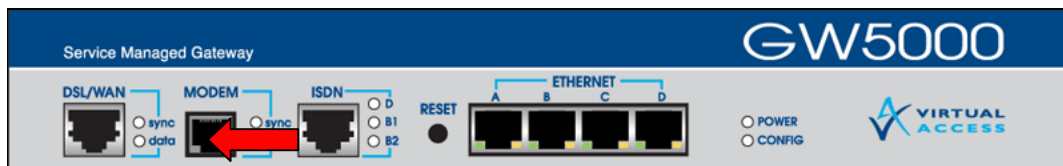


Figure 2: The physical port connection for the GW5000 series

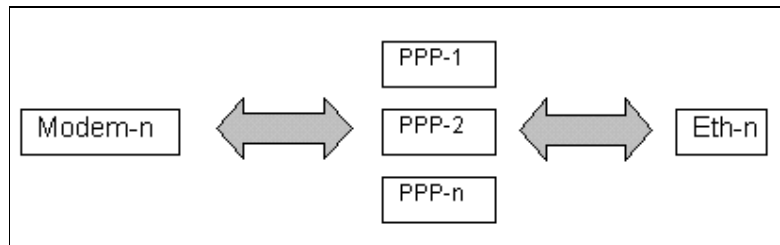
3.2 Configuring the analog modem

The modem is configured as a logical interface `modem-n`, for example, `modem-0`.

The modem interface has the following configuration attributes:

Enabled: yes, no

The logical modem interface is connected to a PPP interface by configuring the PPP WAN interface as described in section 3.3.2 below.



3.3 Configuring the SMG to use the analog modem interface

To configure the SMG to use the analog modem interface, follow the steps in sections 3.3.1 to 3.3.9. When you have committed all the settings, you must save the configuration as described in section 3.3.10.

3.3.1 Configure the IP default route

1. In the Expert View menu, select **system -> ip -> default route**.

- On the IP Default Route page, set Configured to **Yes**, Route Type to **unnumbered**, Next Hop For Numbered Interfaces fields to **0.0.0.0**, and Next Hop For Unnumbered Interfaces to **<portnumber>**.
- Click **Update**. The Configuration Update Result page appears. Proceed to section 3.3.2 to set the next configuration.

Figure 3: The IP default route page

The table below describes the fields and drop-down lists in the IP default route page.

Field name	Description
Configured	Enables or disables the default route.
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.
Next Hop For Numbered Interfaces	When Route Type is set to numbered , 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	Sets the interface as the default route. Select the default route to interface <portnumber> .

Table 1: IP default route fields and values

3.3.2 Configure the IP interface

- In the Expert View menu, select **interfaces -> ppp-2 -> ip -> ip**.
- On the ip on ppp-2 page, set Enabled to **yes**, Type to **unnumbered**, IP Address to **0.0.0.0**, Mask to **255. 255. 255. 0**, Remote IP Address to **0.0.0.0**, Remote Mask to **255.255.255.0**, MTU to **1500**, and BOOT enabled to **no**.
- Click **Update**. The Configuration Update Result page appears. Proceed to section 3.3.3 to set the next configuration.

IP Interface on ppp-2

Enabled

Type

IP Address numbered interfaces only

Mask

Remote IP Address numbered interfaces only

Remote Mask

MTU bytes

BOOTP enabled

Figure 4: The IP interface on ppp-2 page

3.3.3 Configure address translation

1. In the Expert View menu, 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**. The Configuration Update Result page appears. Proceed to section 3.3.4 to set the next configuration.

Outgoing Address Translation on ppp-2

Enabled

Figure 5: The outgoing address translation page

3.3.4 Configure IPCP options

1. In the Expert View menu, **select interfaces -> ppp-2 -> ip -> ipcp options -> local address**.
2. On the Local IP Address page, set Enabled to **yes**, Required to **no**, Negotiable to **yes**, and Address to **0.0.0.0**.
3. Click **Update**. The Configuration Update Result page appears.

Local IP Address Negotiation on ppp-2

Enabled

Required

Negotiable

IP Address

Figure 6: The local IP address page

The table below describes the fields and drop-down lists in the local IP address page.

Field name	Description
Enabled	Enables or disables the IP address negotiation on the local end of the link.
Required	Specifies whether or not negotiation of the local IP address is required.
Negotiable	Indicates whether the IP address is negotiable or not negotiable.
IP Address	If negotiation is enabled, enter the IP address to use for local IP address negotiation. Enter the IP address in dotted decimal notation.

Table 2: Fields in the local IP address page

1. In the Expert View menu, **select interfaces -> ppp-2 -> ip->ipcp options-> local primary dns.**
2. On the Local Primary DNS page, set Enabled to **yes**, Required to **no**, Negotiable to **yes**, and Address to **0.0.0.0**.
3. Click **Update**. The Configuration Update Result page appears.

Local Primary DNS Negotiation on ppp-2

Enabled

Required

Negotiable

Address

Figure 7: The local primary DNS page

Field name	Description
Enabled	Enables or disables negotiation of the primary DNS IP address on the local end of the link.
Required	Enables or disables primary DNS negotiation on the local end of the link.
Negotiable	Indicates whether primary DNS negotiation is negotiable or not negotiable by the local end of the link.
IP Address	Enter the IP address of the primary DNS server to be used by the local end of the link. Setting the IP address to 0.0.0.0 is an explicit request that the remote end

	provides the address information.
--	-----------------------------------

Table 3: Fields in the local primary DNS page

1. In the Expert View menu, select **interfaces ->ppp-2 ->ip->ipcp options->local secondary dns**.
2. On the Local Secondary DNS page, set Enabled to **yes**, Required to **no**, Negotiable to **yes**, and Address to **0.0.0.0**.
3. Click **Update**. The Configuration Update Result page appears. Proceed to section 3.3.5 to set the next configuration.

Local Secondary DNS Negotiation on ppp-2

Enabled

Required

Negotiable

Address

Figure 8: The local secondary DNS page

Field name	Description
Enabled	Enables or disables negotiation of the primary DNS IP address on the local end of the link.
Required	Enables or disables primary DNS negotiation on the local end of the link.
Negotiable	Indicates whether primary DNS negotiation is negotiable or not negotiable by the local end of the link.
IP Address	Enter the IP address of the primary DNS server to be used by the local end of the link. Setting the IP address to 0.0.0.0 is an explicit request that the remote end provides the address information.

Figure 9: Fields in the secondary DNS page

3.3.5 Configure the PPP interface

You must configure the ppp-n interface to send and receive data using the modem interface.

1. In the Expert View menu, select **interfaces -> ppp-n -> wan interface**.
2. On the PPP WAN Interface on ppp-n page, select **modem (0)** from the Wan Interface drop-down list.

Figure 10: The WAN interface page

3. Click **Update**. The Configuration Update Result page appears. Proceed to section 3.3.6 to set the next configuration.

3.3.6 Select asynchronous PPP operation

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

1. In the Expert View menu, select **interfaces -> ppp-2 -> ppp -> ppp**.
2. On the ppp page, click **Advanced** to display all fields.
3. On the PPP Interface on ppp-2 page, set Enabled to **yes**, and Asynchronous Link Enabled to **yes**.
4. Click **Update**. The Configuration Update Result page appears. Proceed to section 3.3.7 to set the next configuration.

Figure 11: The PPP interface page

The table below describes the fields and drop-down lists on the PPP interface on ppp-2 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 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 to enter the identifier string when Send Identifier String Enabled is set to yes.
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 4: PPP Interface on ppp-2 fields and values

3.3.7 Configure authentication options

1. In the Expert View menu, **select interfaces -> ppp-2 -> ppp->authentication->name and password.**
2. On the name and password page, set the local username and password.
3. Click **Update**. The Configuration Update Result page appears.

Username and Password on ppp-2

Local Username	<input type="text" value="Provider"/>
Local Password	<input type="password" value="••••••••"/>
Local Password Confirm	<input type="password" value="••••••••"/>
Remote Username	<input type="text"/>
Remote Password	<input type="password"/>
Remote Password Confirm	<input type="password"/>

Figure 12: The username and password page

- In the Expert View menu, select **interfaces -> ppp-2 -> ppp->authentication->send PAP**.
- On the Send PAP page, set enabled to **yes**, required to **no**, and Negotiable to **yes**.
- Click **Update**. The Configuration Update Result page appears.

Send PAP Password on ppp-2

Enabled	<input type="text" value="yes"/>
Required	<input type="text" value="no"/>
Negotiable	<input type="text" value="yes"/>

Figure 13: The send PAP page

- In the Expert View menu, select **interfaces -> ppp-2 -> ppp->authentication->Send CHAP**.
- On the Send CHAP page, set enabled to **yes**, required to **no**, and Negotiable to **yes**.
- Click **Update**. The Configuration Update Result page appears. Proceed to section 3.3.8 to set the next configuration.

Send CHAP Password on ppp-2

Enabled

Required

Negotiable

Figure 14: The send CHAP page

3.3.8 Set the dialling options

1. In the Expert View menu, 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. In the Permissions drop-down menu, select **call**.
4. Click **Update**. The Configuration Update Result page appears. Proceed to section 3.3.9 to set the next configuration.

Call Details on ppp-2

Outgoing Call Destination Number

Outgoing Call Destination Subaddress

Incoming Call Remote Number

Incoming Call Local Number

ISDN Call Type

Permissions

Auto Connect Enabled

Inactivity Timer secs

Minimum Duration secs

Maximum Duration secs

Figure 15: The call details page

The table below describes the fields and drop-down lists on the call details page.

Field name	Configuration
Outgoing Call	Enter the ISP number to call in order to establish a

Destination Number	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. ISDN only.
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. ISDN only.
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 only.
ISDN Call Type	If using ISDN, defines the call type.
Permissions	Assigns the SMG permissions to call, answer, call and answer, or call back.
Auto Connect Enabled	Allows the V90 modem to bring up the link automatically when the SMG is restarted. Set to no .
Inactivity Timer	Period of inactivity elapsed before the call connection is disconnected. Set to 0 to stay up permanently.
Minimum Duration	Minimum connection time before the inactivity timer becomes active.
Maximum Duration	Maximum time that the connection should be maintained.

Table 5: The call details on ppp-2 fields and values

3.3.9 Configure the modem interface

1. In the Expert View menu, **select interfaces -> modem-0 -> modem interface**.
2. On the Modem Interface on modem-0 page, click Advanced.
3. Set Enabled to **no**, and type in boot initialised string.
4. Click **Update**. The Configuration Update Result page appears. Proceed to section 3.3.10 to set the next configuration.

Modem Interface on modem-0

Enabled yes ▾

Boot Initialisation String

Update Delete Standard

Figure 16: The modem interface on modem-0 page

The table below describes the fields and drop-down lists on the serial interface page. For information on how to configure the settings for a particular provider, see Appendix, section ii, 'Configuring the settings for the serial interface page'.

Field name	Description		
Enabled	Specifies if the modem interface is enabled		
Boot Initialisation String	Defines an initialisation string that is sent to the modem on boot. Set the field to a string with: <table border="1" style="margin-top: 5px; width: 100%;"> <tr> <td style="text-align: center;">Minimum length</td> <td style="text-align: center;">0</td> </tr> </table>	Minimum length	0
Minimum length	0		

	Default Value	Unspecified
	Maximum length	64
	Units	Unspecified

Table 6: The modem interface on modem-0 fields and values

When you have committed all the necessary configurations, you can batch-save your configuration changes.

3.3.10 Save the configuration

1. In the Configuration Update Result page, click **saved to flash**.

Configuration Update Result

Status Configuration committed successfully

Errors None

Save Changes will be lost unless [saved to flash](#)

Reboot? The system must be [reloaded](#) before all changes will come into effect

[Return to previous page](#)

Figure 17: The configuration update results page

The Save Configuration to Flash page appears.

Save Configuration to Flash

The last flash configuration loaded was **config1**.
When the system is next rebooted, **config1** will be loaded.

Some of your [recent changes](#) have not yet been saved to flash.

Save Committed Changes To

Config 1 ▾

Config 1

Config 2

Alternate Config

Figure 18: The save configuration to flash page

2. In the drop-down menu select the config you want to save changes to and click **Save**.

There are 3 options to save to:

- Config 1
- Config 2
- Alternate Config

It is good practice to save to Alternate Config in case your committed configurations are unsuccessful.

If you select a different config option to the existing config, you will need to change the boot config to reload into the correct config.

3.3.11 Reload the configuration

1. In the Expert View menu, select **set boot configuration**.
2. In the drop-down menu, select the config option you have chosen to save to.
3. Click **Select**.

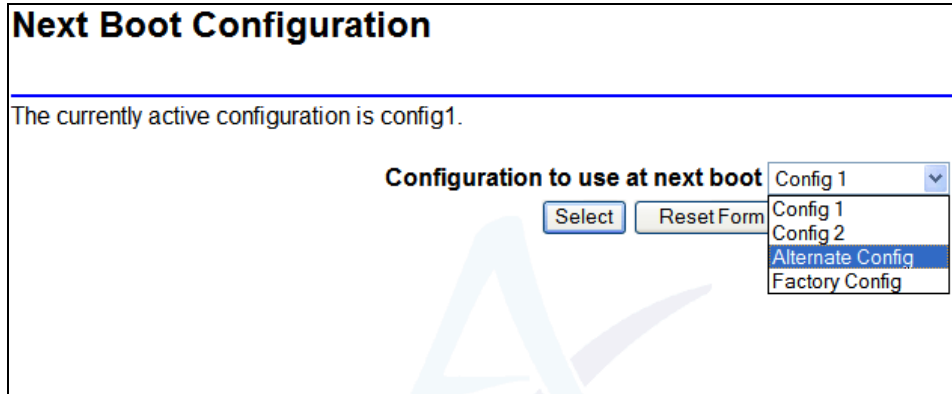


Figure 19: Next boot configuration page

3.4 Using the modem as a backup WAN interface

The analog modem can be used as a backup WAN interface. For example, if PPP-x is configured as the primary WAN interface using ADSL and becomes un-operational for longer than a specified amount of time, an outgoing PPP connection is established on PPP-y which has been configured as backup.

For more information on configuring the modem as a backup WAN interface, read 'How to Use the Backup Script' in the SMG full reference guide.

3.5 Caller ID restrictions

It may be necessary to restrict the modem to only answer dial calls from specific phone numbers or Calling Line Identifier (CLI).

4 Modem monitoring and diagnostics

4.1 Active data connections

When a modem call is established it can be monitored using the Active Data Connections applet. To view the Active Data Connections monitor, open the SMG home page and select **Status** -> **Active Data Connections**. The following information is available for monitoring:

Field name	Field description
Interface name	Descriptive PPP interface name (e.g. "PPP-1 Testing")
Interface port	PPP-n (n – PPP interface number)
Interface address	xxx.xxx.xxx.xxx – ppp interface address
Call Direction	Incoming or outgoing call direction
Connection Type	Modem
State	
Channels in use	
Called number	Called party number for outgoing call direction
Called sub-address	
Calling number	Calling party number for incoming call direction
Calling sub-address	
Connect time	Call establishment data and time
Duration	Call current duration
Transmitted packets	Number of transmitted packets
Transmitted bytes	Number of transmitted bytes
Received packets	Number of received packets
Received bytes	Number of received bytes
Initial IP source	
Initial IP destination	

4.2 Call history

Analog modem historical usage can be monitored using the Call History applet.

On the Fast.Start page, select **Status** -> **Call History**. Click the desired day and hour, or click **zoom in** if you need to see a more detailed view of the history. The detailed call view includes the following fields:

Field name	Description
Interface	PPP interface. For example, PPP-1.
Title	Interface descriptive name. For example, Testing.
Duration	Call duration.
Connect	Date and time the connection was established.

Disconn	Date and time the connection was terminated.
Channel	Local interface. For example, modem-0.
Called no	Called number for outgoing calls
Source IP	
Destination	
Protocol	
Data In	Number of bytes and packets received
Data Out	Number of bytes and packets received
Cause	Termination cause. For example, Normal clearing.

4.3 Connection Monitor

The connection monitor enables you to view the current status of IPCP, CHAP/PAP and LCP protocol, as well as modem data status.

On the Fast.Start page, select **Advanced** -> **Connection Monitor**. Then select **Modem Interface**.

Connection Monitor								
	P1	P2	P3	P4	P5	P6	P7	P8
IPCP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CHAP/PAP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LCP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Modem	<input type="checkbox"/>
--------------	--------------------------

The boxes represent the current status of the monitored entities.

<input checked="" type="checkbox"/>	Active	<input type="checkbox"/>	Inactive
<input checked="" type="checkbox"/>	Error	<input type="checkbox"/>	Unconfigured

4.4 Modem events

You can use the SMG web trace applet to monitor the log of modem-related events.

To access the trace analyzer, on the Fast.Start page, select **Advanced** -> **Diagnostics**. Click **Trace Analyzer**. The Trace Analyzer pop-up window appears.

To select custom events, check Custom Events and click **Select**. The select events to trace pop-up window appears.

In the scroll-down Events Available menu, select **MODEM** to the list of selected events. Click **ADD** and then click **OK** to start the trace. The modem call events appear in the trace window.

Time	Class	Severity	Dir	Details
11:44:44	MODEM	INFO		Modem: Dial (904121288284128)
11:44:44	MODEM	DEBUG	Out	Modem Tx: atv0w2e0
11:44:44	MODEM	DEBUG	In	Modem Rx: 0
11:44:44	MODEM	DEBUG	Out	Modem Tx: ats7=30dt904128078284128
11:45:13	MODEM	DEBUG	In	Modem Rx: 64
11:45:13	MODEM	INFO		Modem: Outgoing Call Connected 28800 bps
11:45:34	MODEM	INFO		Modem: Outgoing Call Local Disconnect
11:45:35	MODEM	DEBUG	In	Modem Rx: .)#!)4)1) }\$eg.3
11:55:07	MODEM	INFO		Modem: Dial (904121288412128)
11:55:07	MODEM	DEBUG	Out	Modem Tx: atv0w2e0
11:55:08	MODEM	DEBUG	In	Modem Rx: 0
11:55:08	MODEM	DEBUG	Out	Modem Tx: ats7=30dt904128078284128
11:55:37	MODEM	DEBUG	In	Modem Rx: 64
11:55:37	MODEM	INFO		Modem: Outgoing Call Connected 28800 bps

Figure 20: The trace analyzer window

4.5 Modem events list

The following table lists common modem events.

Severity	Text	Description
INFO	Dial (<called number>)	Outgoing modem call in progress to called number.
INFO	Incoming Ring	Incoming ring signal detected by modem interface on the line.
INFO	Incoming Call Answering	SMG answered the incoming modem call, connection negotiation in progress.
INFO	<Incoming Outgoing >Call Connected <DCE speed>	Modem call connected with displayed line speed in bits per second.
NOTICE	<Incoming Outgoing >Call Failed <DCE reason>	Modem call failed to establish. DCE reason is given, for example, NO DIALTONE.
NOTICE	Dial failed (<reason>). Retrying (n)	Outgoing modem call dial failed. DCE reason is given, for example, BUSY and a dial command is being re-tried, n is the retry number.
NOTICE	Dial Failed (outgoing calls not allowed)	Outgoing dial did not proceed, because the PPP port permission is not set to make outgoing calls
NOTICE	Dial Failed (no number configured)	Outgoing dial did not proceed because the PPP port dial neighbour originate address (called number) is not configured.
INFO	<Incoming Outgoing >Call Local Disconnect	Modem call has been locally terminated.
INFO	<Incoming Outgoing >Call Remote Disconnect <reason>	Modem call remotely terminated. DCE reason is given, for example, NO CARRIER.