

# How to Configure the GW9000 Service Managed Gateway



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<b>1</b>	<b>About this document</b>	<b>3</b>
1.1	Scope	3
1.2	Readership	3
1.3	Terminology	3
<b>2</b>	<b>Introduction</b>	<b>4</b>
<b>3</b>	<b>Configuring the GW9000 SMG</b>	<b>5</b>
3.1	Configuring the multi-I/O on the GW9000 SMG	5
3.1.1	Configure the analog inputs	6
3.1.2	Configuring the digital inputs	10
3.1.3	Configuring digital outputs	11
<b>4</b>	<b>Diagnostics</b>	<b>14</b>
4.1	Web commands	14
4.1.1	Analogue inputs	14
4.1.2	Digital inputs	14
4.1.3	Digital outputs	15
4.2	Command line commands	15
4.2.1	Analogue inputs	15
4.2.2	Digital inputs	16
4.2.3	Digital outputs	16
<b>5</b>	<b>Serial interfaces</b>	<b>17</b>
5.1	RS-232 configuration	17
5.2	RS232 diagnostics	18
5.3	RS-232 debug	19
5.3.1	Command line syntax	19
5.4	RS-485 configuration	19
5.5	RS485 diagnostics	20
5.6	RS485 debug	21
5.6.1	Command Line syntax	21

# 1 About this document

This document describes how to configure the Multi-I/O and Serial interfaces on the GW9000 Service Managed Gateway (SMG).

## 1.1 Scope

This document explains how to:

- Configure the Multi-I/O and serial interfaces on the GW9000 SMG

## 1.2 Readership

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

## 1.3 Terminology

<b>SLA</b>	Service Level Agreement
<b>SMG</b>	Service Managed Gateway
<b>Multi-I/O</b>	Multiple types of inputs and outputs
<b>GPIO</b>	General Purpose Input / Output

## 2 Introduction

The GW9000 Service Managed Gateway (SMG) is a remote site management router which includes serial interfaces, analogue inputs, digital inputs and digital outputs. The I/O can be used to remotely monitor and manage non-IP onsite equipment such as generators, batteries, fuel level sensors and temperature sensors. The device can also connect to equipment with serial interfaces which will also allow monitoring and management.

### 3 Configuring the GW9000 SMG

The GW9000 SMG contains an internal web server that is used for your configurations. Before you can access the internal web server and start the GW9000 SMG configuration, you must ensure that your PC has the correct networking set up.

When your router is correctly connected to your PC, type the Ethernet IP address of the router into the URL line of your browser to display the home page. The default IP address is 192.168.100.1/24.

If a login page appears, type in the login password you received from your distributor.

If you have not received a password, contact the Virtual Access Support team.

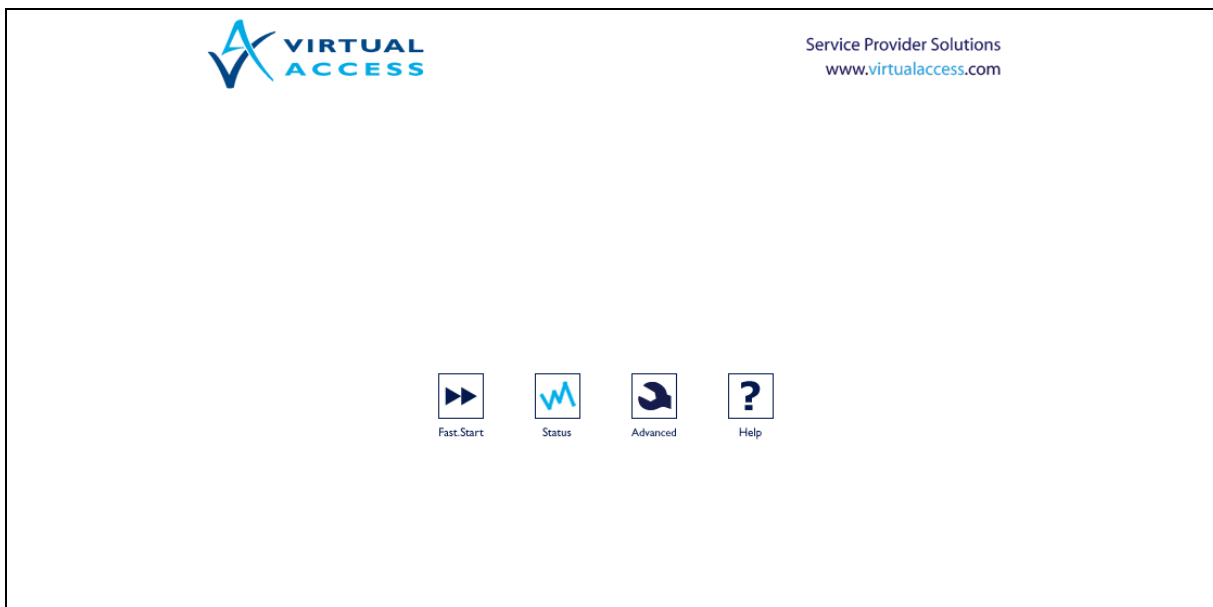


Figure 1: The Start page

#### 3.1 Configuring the multi-I/O on the GW9000 SMG

To configure the analogue inputs, access the Expert View menu by clicking **Advanced** on the Start page. The Advanced menu page appears.

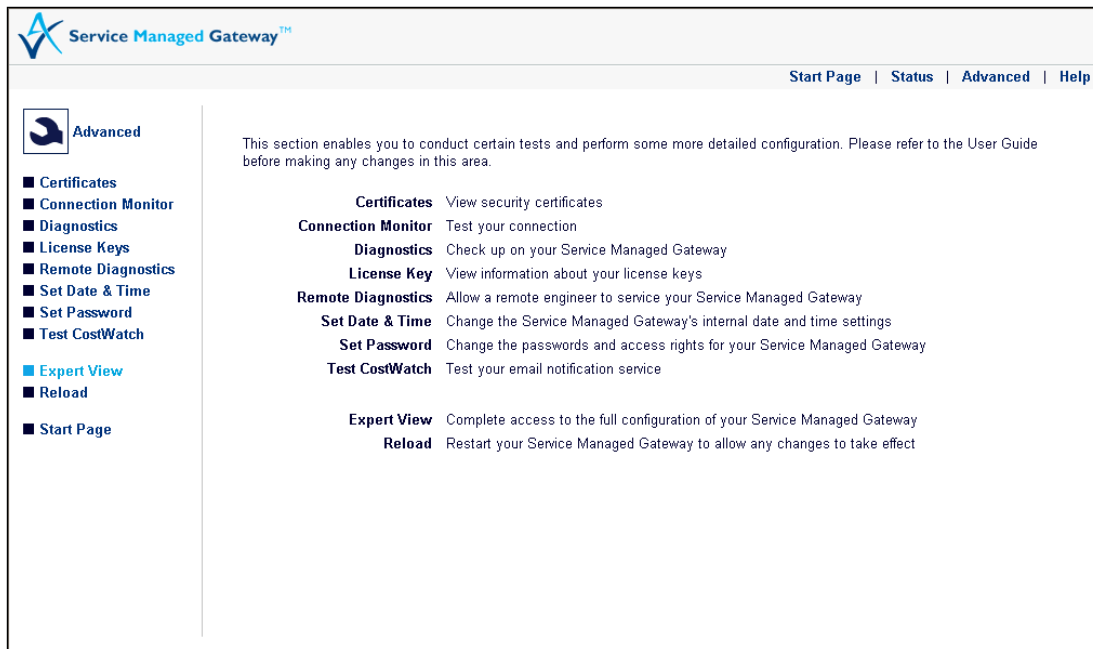


Figure 2: The advanced menu showing expert view

In the left-hand menu, click **Expert View**.

### 3.1.1 Configure the analog inputs

In the Expert View menu, select **Interfaces -> GPIO -> analog input**.

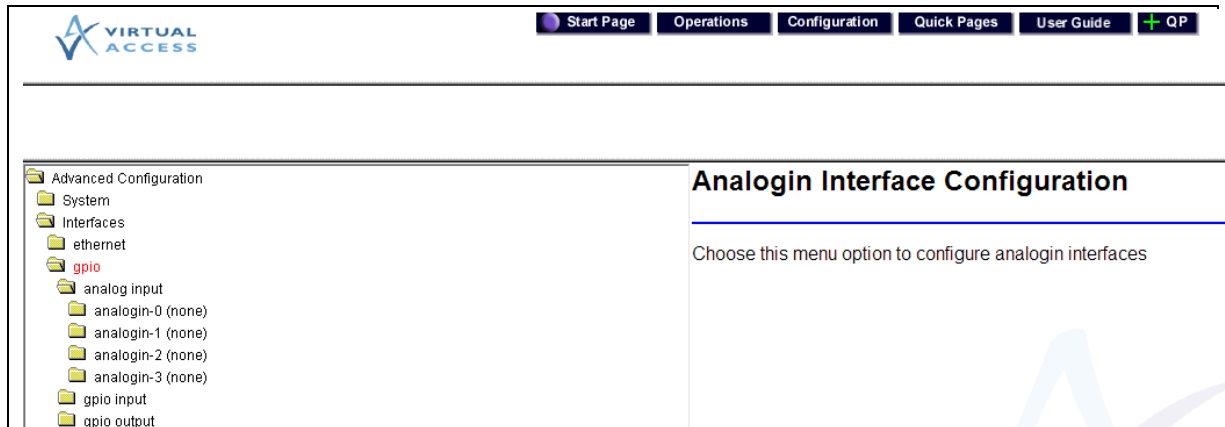


Figure 3: The Analog Input page

The configuration parameters for each analogue input are the same. Here is an example for Analogin-0.

The screenshot shows the 'Analog Input Interface System on Analogin-0' configuration page. The left sidebar contains a tree view of configuration categories: Advanced Configuration, System, Interfaces, ethernet, gpio, analog input, analogin-0 (none), system, analogin-1 (none), analogin-2 (none), analogin-3 (none), gpio input, gpio output, gre, loopback, modem, ppp, serial, File System, reload, and logout. The main content area is titled 'Analog Input Interface System on Analogin-0' and contains the following configuration fields:

Alarm Events Enabled	yes
Input Name	Fuel Level
Upper Limit Alarm Event Message	Fuel Level Above 75%
Upper Limit Alarm Event Severity	Debug
Upper Limit Clear Alarm Event Message	Fuel Level Below 75%
Upper Limit Clear Alarm Event Severity	Notice
Lower Limit Alarm Event Message	Fuel Level Below 25%
Lower Limit Alarm Event Severity	Warning
Lower Limit Clear Alarm Event Message	Fuel Level Above 25%
Lower Limit Clear Alarm Event Severity	Notice
Mode	voltage
Gain	1
Hysteresis Level	5
Sensor Units	Litres
Maximum Value	0.02
Maximum Sensor Value	1000
Minimum Value	0.004
Minimum Sensor Value	0
Upper Limit	200
Lower Limit	100

At the bottom right of the configuration area, there are 'Update' and 'Delete' buttons.

**Figure 4: The analog input page**

The table below describes the fields on the Analog Input page.

Field	Description	Command Line				
<b>Alarm events enabled</b>	Enables the generation of events whenever a threshold is exceeded or cleared. <table border="1"> <tr> <td><b>Yes</b></td> <td>Enables alarm events.</td> </tr> <tr> <td><b>No</b></td> <td>Disables alarm events.</td> </tr> </table>	<b>Yes</b>	Enables alarm events.	<b>No</b>	Disables alarm events.	set analog input alarm events enabled = analogin-x, [Where x is 0,1,2 or 3]
<b>Yes</b>	Enables alarm events.					
<b>No</b>	Disables alarm events.					
<b>Name</b>	Gives an alternative name for the input. If specified, this name will be used in the events instead of the generic 'analog-[0...3]'. 	set analog input name = analogin-x,				
<b>Upper limit alarm event message</b>	Alternative message for the generated event when the upper limit is exceeded.	set analog input upper limit alarm event message = analogin-x,				
<b>Upper limit alarm event severity</b>	Severity for the generated event when the upper limit is exceeded. The severity corresponds to the severity levels defined in RFC 5424. 0 - Emergency: system is unusable 1 - Alert: action must be taken immediately 2 - Critical: critical conditions 3 - Error: error conditions 4 - Warning: warning conditions 5 - Notice: normal but significant condition 6 - Informational: informational messages 7 - Debug: debug-level messages	set analog input Upper limit alarm event severity = analogin-x,				
<b>Upper limit clear alarm event message</b>	Alternative message for the generated event when the upper limit is no longer exceeded.	set analog input upper limit clear alarm event message = analogin-x,				
<b>Upper limit clear alarm event severity</b>	Severity for the generated event when the upper limit is no longer exceeded. 0 - Emergency: system is unusable 1 - Alert: action must be taken immediately 2 - Critical: critical conditions 3 - Error: error conditions 4 - Warning: warning conditions 5 - Notice: normal but significant condition 6 - Informational: informational messages 7 - Debug: debug-level messages	set analog input Upper limit clear alarm event severity = analogin-0,				
<b>Lower limit alarm event message</b>	Alternative message for the generated event when the lower limit is exceeded.	set analog input lower limit alarm event message = analogin-x,				
<b>Lower limit alarm event severity</b>	Severity for the generated event when the lower limit is exceeded. 0 - Emergency: system is unusable 1 - Alert: action must be taken immediately 2 - Critical: critical conditions 3 - Error: error conditions 4 - Warning: warning conditions	set analog input Lower limit alarm event severity = analogin-x,				



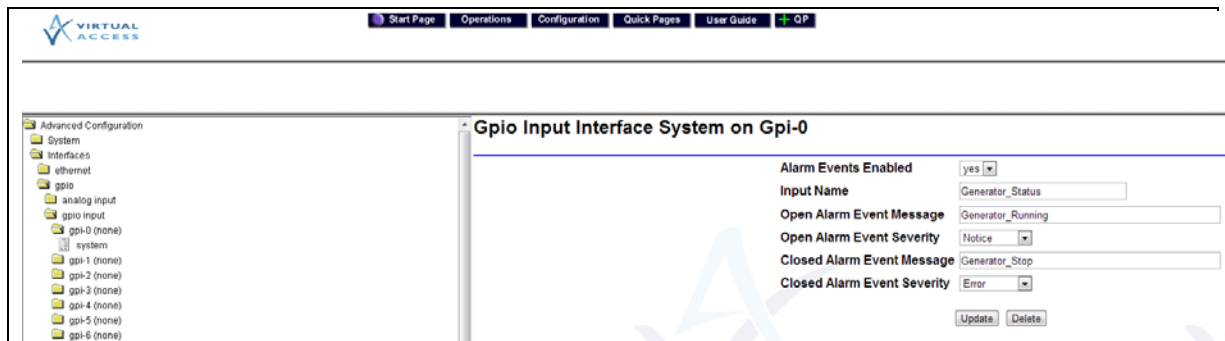
	<p>5 - Notice: normal but significant condition</p> <p>6 - Informational: informational messages</p> <p>7 - Debug: debug-level messages</p>									
<b>Lower limit clear alarm event message</b>	Alternative message for the generated event when the lower limit is no longer exceeded.	set analog input lower limit clear alarm event message = analogin-x,								
<b>Lower limit clear alarm event severity</b>	<p>Severity for the generated event when the lower limit is no longer exceeded.</p> <p>0 - Emergency: system is unusable</p> <p>1 - Alert: action must be taken immediately</p> <p>2 - Critical: critical conditions</p> <p>3 - Error: error conditions</p> <p>4 - Warning: warning conditions</p> <p>5 - Notice: normal but significant condition</p> <p>6 - Informational: informational messages</p> <p>7 - Debug: debug-level messages</p>	set analog input lower limit clear alarm event severity = analogin-x,								
<b>Mode</b>	<p>Specifies whether the port measures voltage or current.</p> <table border="1"> <tr> <td><b>Voltage</b></td> <td>Sets the measurement to voltage.</td> </tr> <tr> <td><b>Current</b></td> <td>Sets the measurement to current.</td> </tr> </table>	<b>Voltage</b>	Sets the measurement to voltage.	<b>Current</b>	Sets the measurement to current.	set analog input mode = analogin-x,				
<b>Voltage</b>	Sets the measurement to voltage.									
<b>Current</b>	Sets the measurement to current.									
<b>Gain</b>	<p>Gain of the analogue input port. You can set this to 1, 2, 4 or 8.</p> <table border="1"> <tr> <td><b>Minimum value</b></td> <td>1</td> </tr> <tr> <td><b>Default value</b></td> <td>1</td> </tr> <tr> <td><b>Maximum value</b></td> <td>8</td> </tr> <tr> <td><b>Units</b></td> <td>Unspecified</td> </tr> </table>	<b>Minimum value</b>	1	<b>Default value</b>	1	<b>Maximum value</b>	8	<b>Units</b>	Unspecified	set analog input Gain = analogin-x,
<b>Minimum value</b>	1									
<b>Default value</b>	1									
<b>Maximum value</b>	8									
<b>Units</b>	Unspecified									
<b>Hysteresis level</b>	<p>Defines the multi exit discriminator the router puts on directly connected routes when it is sending them to a neighbour. Only use this with eBGP.</p> <table border="1"> <tr> <td><b>Minimum value</b></td> <td>0</td> </tr> <tr> <td><b>Default value</b></td> <td>5</td> </tr> <tr> <td><b>Maximum value</b></td> <td>100</td> </tr> <tr> <td><b>Units</b></td> <td>Percentage</td> </tr> </table>	<b>Minimum value</b>	0	<b>Default value</b>	5	<b>Maximum value</b>	100	<b>Units</b>	Percentage	set analog input hysteresis level = analogin-x,
<b>Minimum value</b>	0									
<b>Default value</b>	5									
<b>Maximum value</b>	100									
<b>Units</b>	Percentage									
<b>Sensor units</b>	Specifies the units presented by the sensor connected to the analogue input port, that is. 'Degrees'.	set analog input sensor units = analogin-x,								
<b>Maximum value</b>	Specifies the maximum input value for the value conversion. This is used in conjunction with the 'maximum sensor value' to establish the conversion function.	set analog input maximum value = analogin-x,								
<b>Maximum sensor value</b>	Sensor value corresponding to the maximum input value. Use this in conjunction with the	set analog input maximum sensor value = analogin-x,								

	'maximum value' to establish the conversion function.	
<b>Minimum value</b>	Specifies the minimum input value for the value conversion. Use this in conjunction with the 'minimum sensor value' to establish the conversion function.	set analog input minimum value = analogin-x,
<b>Minimum sensor value</b>	Sensor value corresponding to the minimum input value. Use this in conjunction with the 'minimum value' to establish the conversion function.	set analog input minimum sensor value = analogin-x
<b>Upper limit</b>	Upper limit, in sensor units if a conversion is specified, triggering the generation of an event.	set analog input upper limit = analogin-x,
<b>Lower limit</b>	Lower limit, in sensor units if a conversion is specified, triggering the generation of an event.	Set analog lower limit = analogin-x,

**Table 1: Analog Input fields and their descriptions**

### 3.1.2 Configuring the digital inputs

It is possible to configure up to 28 digital inputs. In the Expert View menu, select **Interfaces -> GPIO -> GPIO Input**. The configuration parameters for each digital input are the same.



**Figure 5: The digital input page**

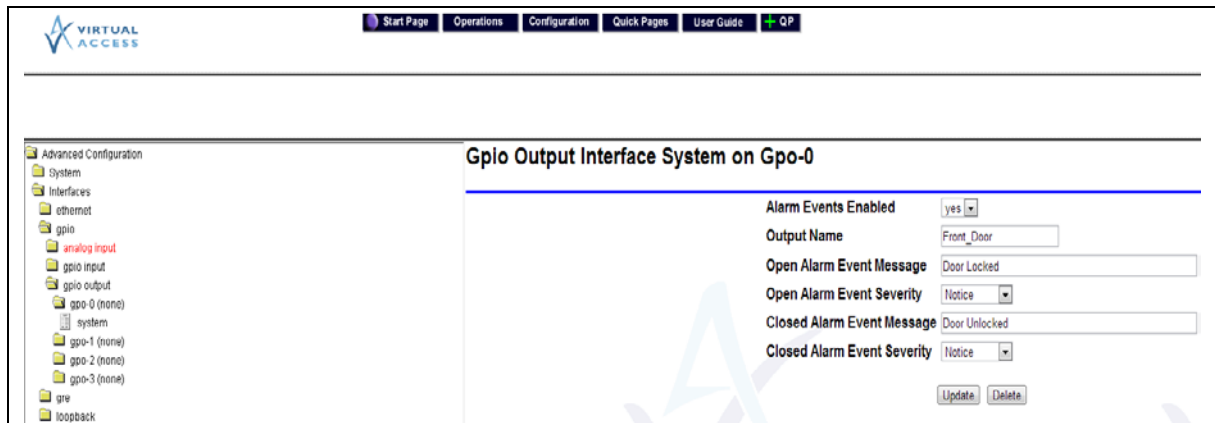
The table below describes the fields on the Digital Input page.

Field	Description	Command Line
<b>Alarm events enabled</b>	Enables the generation of events whenever a threshold is exceeded or cleared.	set gpio input alarm events enabled = gpi-x, [Where x is 0 to 27]
	<b>Yes</b> Enables alarm events.	
	<b>No</b> Disables alarm events.	
<b>Name</b>	Gives an alternative name for the input. If specified this name will be used in the events instead of the generic 'gpi-[0...27]'.	set gpio input name = gpi-x,
<b>Open alarm event message</b>	Alternative message for the generated event when the input changes into the 'open' state.	set gpio input Open alarm event message = gpi-x,
<b>Open alarm event severity</b>	Severity for the generated event when the input changes into the 'open' state. 0 - Emergency: system is unusable 1 - Alert: action must be taken immediately 2 - Critical: critical conditions 3 - Error: error conditions 4 - Warning: warning conditions 5 - Notice: normal but significant condition 6 - Informational: informational messages 7 - Debug: debug-level messages	Set gpio input open alarm event severity = gpi-x,
<b>Closed alarm event message</b>	Alternative message for the generated event when the input changes into the 'closed' state.	Set gpio input closed alarm event message = gpi-x,
<b>Closed alarm event severity</b>	Severity for the generated event when the input changes into the 'closed' state. 0 - Emergency: system is unusable 1 - Alert: action must be taken immediately 2 - Critical: critical conditions 3 - Error: error conditions 4 - Warning: warning conditions 5 - Notice: normal but significant condition 6 - Informational: informational messages 7 - Debug: debug-level messages	Set gpio input closed alarm event severity = gpi-x,

Table 2: Digital Input fields and their descriptions

### 3.1.3 Configuring digital outputs

It is possible to configure up to 4 digital outputs. In the Expert View menu, select **Interfaces -> GPIO -> GPIO output**. The configuration parameters for each digital output are the same.



**Figure 6: The GPIO digital output page**

The table below describes the fields in the GPIO digital output page.

Field	Description	Command Line				
<b>Alarm events enabled</b>	Enables the generation of events whenever a threshold is exceeded or cleared. <table border="1"> <tr> <td><b>Yes</b></td> <td>Enables alarm events.</td> </tr> <tr> <td><b>No</b></td> <td>Disables alarm events.</td> </tr> </table>	<b>Yes</b>	Enables alarm events.	<b>No</b>	Disables alarm events.	set gpio output alarm events enabled = gpo-x, [Where x is 0 to 3]
<b>Yes</b>	Enables alarm events.					
<b>No</b>	Disables alarm events.					
<b>Name</b>	Gives an alternative name for the input. If specified this name will be used in the events instead of the generic 'gpi-[0...3]'.	set gpio output name = gpo-x,				
<b>Open alarm event message</b>	Alternative message for the generated event when the input changes into the 'open' state.	set gpio output Open alarm event message = gpo-x,				
<b>Open alarm event severity</b>	Severity for the generated event when the input changes into the 'open' state. 0 - Emergency: system is unusable 1 - Alert: action must be taken immediately 2 - Critical: critical conditions 3 - Error: error conditions 4 - Warning: warning conditions 5 - Notice: normal but significant condition 6 - Informational: informational messages 7 - Debug: debug-level messages	Set gpio output open alarm event severity = gpo-x,				
<b>Closed alarm event message</b>	Alternative message for the generated event when the input changes into the 'closed' state.	Set gpio output closed alarm event message = gpo-x,				
<b>Closed alarm event severity</b>	Severity for the generated event when the input changes into the 'closed' state. 0 - Emergency: system is unusable 1 - Alert: action must be taken immediately 2 - Critical: critical conditions 3 - Error: error conditions 4 - Warning: warning conditions 5 - Notice: normal but significant condition 6 - Informational: informational messages 7 - Debug: debug-level messages	Set gpio output closed alarm event severity = gpo-x,				

**Table 3: Digital output fields and their descriptions**

## 4 Diagnostics

The Service Managed Gateway supports a number of show commands that you can use to give a summary view of the status of the analogue inputs, digital inputs and digital outputs.

### 4.1 Web commands

#### 4.1.1 Analogue inputs

To view the analogue input information, open a web session to the router. Select **Advanced -> Expert view**.

In the top menu, click **Operations**.

In the Operations menu, click **Interface -> Multi-IO -> Analog Inputs**. The Analog Input Statistics page appears.

Interface	Name	Real Value	Converted Value
analogin-0	Fuel Level	0.008850 V	303.131165 Litres
analogin-1	-	0.009155 V	0.009155 V
analogin-2	-	0.009766 V	0.009766 V
analogin-3	-	0.010681 V	0.010681 V

Figure 7: The analog input statistics page

#### 4.1.2 Digital inputs

To view the digital input information, open a web session to the router. Select **Advanced -> Expert view**.

In the top menu, click **Operations**.

In the Operations menu, click **Interface -> Multi-IO -> GPIO Inputs**. The GPIO Inputs page appears. The stats list runs from 0 to 27.

Interface	Name	Current State
gpi-0	Generator_Status	OPEN
gpi-1	-	OPEN
gpi-2	-	OPEN
gpi-3	-	OPEN
gpi-4	-	OPEN
gpi-5	-	OPEN

Figure 8: The GPIO input statistics page

### 4.1.3 Digital outputs

To view the digital output information, open a web session to the router. Select **Advanced -> Expert view**.

In the top menu, click **Operations**.

In the Operations menu, click **Interface -> Multi-IO -> GPIO -> Outputs**. The GPIO Output State page appears.

Interface	Name	Current State	Change State
gpo-0	Front_Door	CLOSED	closed <input type="button" value="Set"/>
gpo-1	-	OPEN	open <input type="button" value="Set"/>
gpo-2	-	OPEN	open <input type="button" value="Set"/>
gpo-3	-	OPEN	open <input type="button" value="Set"/>

Figure 9: The GPIO Output Statistics page

You can also control digital outputs from this web page. You can set each output to open or closed.

## 4.2 Command line commands

You can set commands to see the values of the analogue inputs and states of the digital I/O from the command line.

### 4.2.1 Analogue inputs

```
Show analog input value analogin-x
```

Where x is 0, 1, 2 or 3, you can use this command to see the value of all inputs. For example:

```
show analog input value all
```

The command above shows the calculated value based on the value conversion, if it is enabled. To see the real value when the conversion scale is enabled, use the command below:

```
Show analog input real value analogin-x
```

Or

```
Show analog input real value all
```

## 4.2.2 Digital inputs

```
Show gpio input state gpi-x
```

Where x is between 0 and 27, you can use this command to see the value of all inputs. For example:

```
show gpio input state all
```

## 4.2.3 Digital outputs

```
Show gpio output state gpo-x
```

Where x is between 0 and 3, you can use this command to see the value of all outputs. For example:

```
show gpio output state all
```

You can also set the state of an output from the command line.

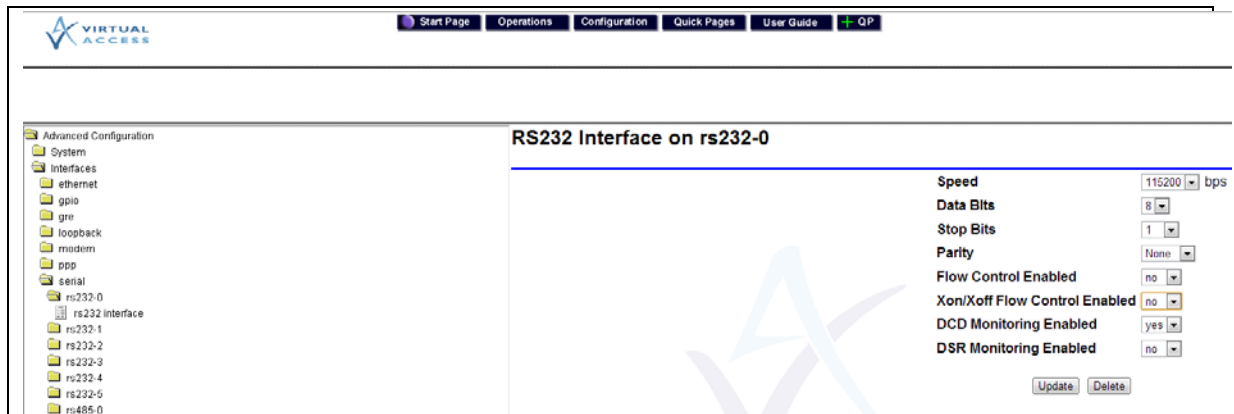
```
set gpio output state gpo-x [open|closed]
```



## 5 Serial interfaces

### 5.1 RS-232 configuration

It is possible to configure up to 6 RS232 ports. In the Expert View menu, select **Interfaces -> serial -> RS232-x**. The configuration parameters for each serial interface are the same.



**Figure 10: RS232 configuration**

The table below describes the fields in the RS232 Interface page.

Field	Description	Command Line	
<b>Speed</b>	Specifies the speed of the interface in bits per second.	Set RS232 interface Speed rs232-x,	
	<b>Default speed</b>		9600
	<b>Units</b>		Bits per second
<b>Data Bits</b>	Specifies the number of async data bits. For asynchronous mode only.	Set RS232 interface Data rs232-x,	
<b>Stop Bits</b>	Specifies number of async stop bits. Select 1, 1.5 or 2 from the drop-down list.	Set RS232 interface Stop rs232-x,	
<b>Parity</b>	Specifies the parity. Select one of the options from the drop-down list.	Set RS232 interface Parity rs232-x,	
	<b>None</b>		No Parity bit is transmitted
	<b>Even</b>		Returns logic 0 if an even number of marks are sent
	<b>Odd</b>		Returns logic 0 if an odd number of marks are sent
	<b>Mark</b>		The parity bit is always logic 1
<b>Space</b>	The parity bit is always logic 0		
<b>Flow Control Enabled</b>	This parameter is only valid for an asynchronous connection. Enable this parameter if you require flow control RTS, CTS, which is hardware flow control.	Set RS232 interface Flow Control enabled rs232-x,	
<b>Xon/Xoff Flow Control Enabled</b>	This parameter is only valid for an asynchronous connection. Enable this parameter if you require flow control Xon/Xoff, which is software flow control.	Set RS232 interface XonXoff Flow Control enabled rs232-x,	
<b>DCD Monitoring Enabled</b>	Defines whether to always force DCD high regardless of the control line signal state.	Set RS232 interface DCD Monitoring enabled rs232-x,	
<b>DSR Monitoring Enabled</b>	Monitors the DSR signal	Set RS232 interface DSR Monitoring enabled rs232-x,	

Table 4: RS232 interface fields and their descriptions

## 5.2 RS232 diagnostics

To view the serial interface statistics open a web session to the router. Select **Advanced -> Expert view**.

In the top menu, click **Operations**.

In the Operations menu, click **Interface -> Serial -> rs232-0**. RS232-0 to RS232-5 represents the RS232 ports on the GW9000 SMG.

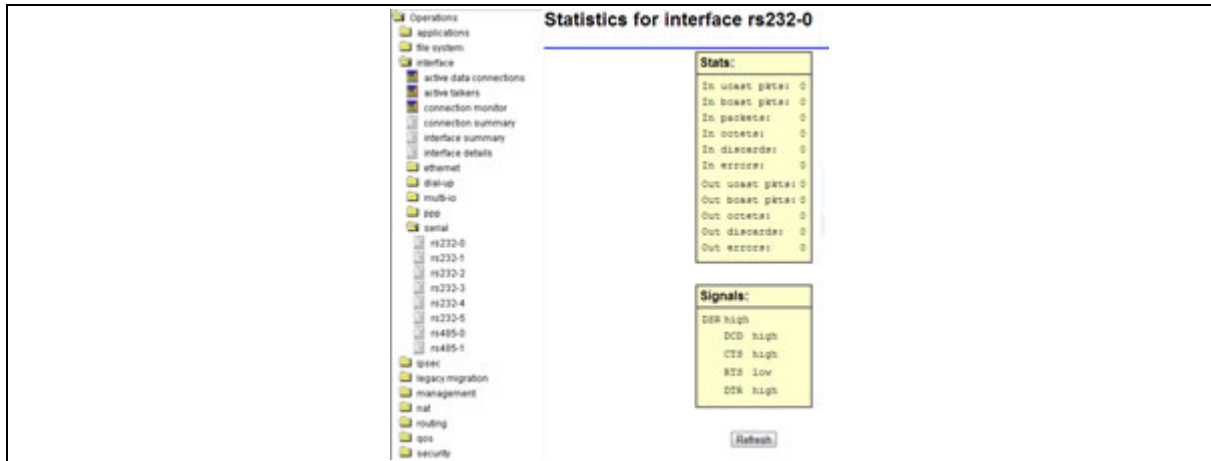


Figure 11: RS232-0 statistics

## 5.3 RS-232 debug

### 5.3.1 Command line syntax

To start tracing for a given event class, enter “+ +” followed by the event class.

To stop tracing, enter – (minus) followed by the event class to stop tracing for this event class.

Enter – (minus) on its own to stop all tracing.

Syntax	Description
<b>+ +serial</b>	Starts tracing serial interface events
<b>–serial</b>	Stops tracing serial interface events
<b>sh stats rs485-x</b>	Display statistics for rs485 interface x

Table 5: The command line tracing syntax and their descriptions

## 5.4 RS-485 configuration

It is possible to configure up to 2 RS485 ports. In the Expert View menu, select **Interfaces -> serial -> RS485-x**. The configuration parameters for each serial interface are the same.

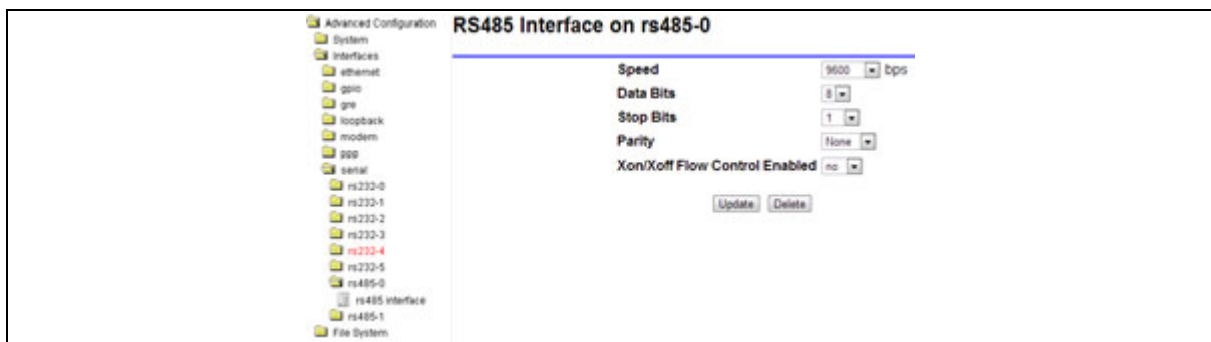


Figure 12: RS485 configuration

Field	Description	Command Line	
<b>Speed</b>	Specifies the speed of the interface in bits per second.	Set RS232 interface Speed rs232-x,	
	<b>Default speed</b>		9600
	<b>Units</b>		Bits per second
<b>Data Bits</b>	Specifies the number of async data bits. For asynchronous mode only.	Set RS232 interface Data rs232-x,	
<b>Stop Bits</b>	Specifies number of async stop bits. Select 1, 1.5 or 2 from the drop-down list.	Set RS232 interface Stop rs232-x,	
<b>Parity</b>	Specifies the parity. Select one of the options from the drop-down list.	Set RS232 interface Parity rs232-x,	
	<b>None</b>		No Parity bit is transmitted
	<b>Even</b>		Returns logic 0 if an even number of marks are sent
	<b>Odd</b>		Returns logic 0 if an odd number of marks are sent
	<b>Mark</b>		The parity bit is always logic 1
<b>Space</b>	The parity bit is always logic 0		
<b>Xon/Xoff Flow Control Enabled</b>	This parameter is only valid for an asynchronous connection. Enable this parameter if you require flow control Xon/Xoff, which is software flow control.	Set RS232 interface XonXoff Flow Control enabled rs232-x,	

**Table 5: RS485 interface fields and their descriptions**

## 5.5 RS485 diagnostics

To view the serial interface statistics open a web session to the router. Select **Advanced -> Expert view**.

In the top menu, click **Operations**.

In the Operations menu, click **Interface -> Serial -> rs485-0**. Rs485-0 to rs485-1 represents the RS-232 ports on the GW9000.

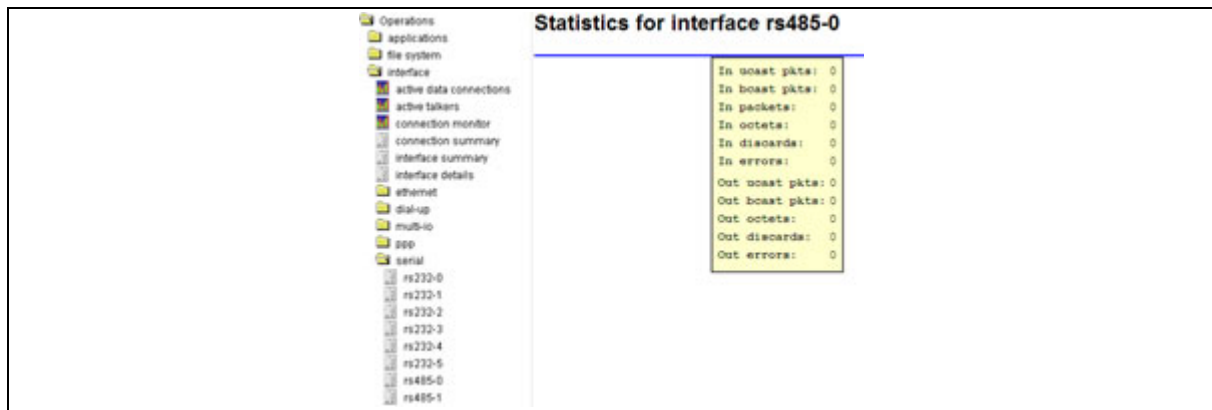


Figure 13: RS485-0 statistics

## 5.6 RS485 debug

### 5.6.1 Command Line syntax

To start tracing for a given event class, enter “+ +” followed by the event class.

To stop tracing, enter – (minus) followed by the event class to stop tracing for this event class.

Enter – (minus) on its own to stop all tracing.

Syntax	Description
<b>+ +serial</b>	Starts tracing serial interface events
<b>–serial</b>	Stops tracing serial interface events
<b>sh stats rs485-x</b>	Display statistics for rs485 interface x

Table 5: The command line tracing syntax and their descriptions