CRITICAL
APPLICATION
CONNECTIVITY

GW1000M Series User Manual

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1 Introduction

This user manual describes the features and how to configure Virtual Access GW1000M Series routers.

Virtual Access GW1000M Series routers enable 3G or LTE connectivity in vehicles such as buses, taxis and fleet vehicles for applications such as passenger WiFi internet access, telemetry and employee WiFi access to corporate network services.

Designed for managed network providers, GW1000M Series routers provide secure WAN connectivity for internet and private networking environments over 3G or 4G broadband paths and incorporate optional 802.11n WiFi connectivity.

1.1 Document scope

This document covers models in the GW1000M Series.

The Virtual Access GW1000M Series router is a compact 3G, 4G/LTE router with WiFi, designed with a rugged metal housing for use in vehicles and a wide range of site-based applications.

GW1032M:	Dual Ethernet, 3G, Dual SIM, Dual WiFi SMA female connectors
GW1042M:	Dual Ethernet, 4G/LTE, Dual SIM, Dual WiFi SMA female connectors

1.2 Using this documentation

You can configure your router using either the router's web interface or via the command line using UCI commands. Each chapter explains first the web interface settings, followed by how to configure the router using UCI. The web interface screens are shown along with a path to the screen for example, 'In the top menu, select **Service -> SNMP**.' followed by a screen grab.

After the screen grab there is an information table that describes each of the screen's fields.

1.2.1 Information tables

We use information tables to show the different ways to configure the router using the router's web and command line. The left-hand column shows three options:

- **Web:** refers the command on the router's web page,
- **UCI:** shows the specific UCI command, and
- **Opt:** shows the package option.

The right-hand column shows a description field that describes the feature's field or command and shows any options for that feature.

Some features have a drop-down menu and the options are described in a table within the description column. The default value is shown in a grey cell.

Values for enabling and disabling a feature are varied throughout the web interface, for example, 1/0; Yes/No; True/False; check/uncheck a radio button. In the table descriptions, we use **0** to denote Disable and **1** to denote Enable.

Some configuration sections can be defined more than once. An example of this is the routing table where multiple routes can exist and all are named 'route'. For these sections, the UCI command will have a code value [**0**] or [**x**] (where x is the section number) to identify the section.

Web Field/UCI/Package Option	**Description**
Web: Metric UCI: network.@route[0].metric Opt: metric	Specifies the route metric to use.

Note: these sections can be given a label for identification when using UCI or package options.

```
network.@route[0]=route

network.@route[0].metric=0
```

can be witten as:

```
network.routename=route

network.routename.metric=0
```

However, the documentation usually assumes that a section label is not configured.

The table below shows fields from a variety of chapters to illustrate the explanations above.

Web Field/UCI/Package Option	**Description**
Web: Enable UCI: cesop.main.enable Opt: enable	Enables CESoPSN services. 0 Disabled. 1 Enabled.
Web: Syslog Severity UCI: cesop.main.severity Opt: log_severity	Selects the severity used for logging events CESoPSN in syslog. The following levels are available. 0 Emergency 1 Alert 2 Critical 3 Error 4 Warning 5 Notice 6 Informational 7 Debug
Web: Agent Address UCI: snmpd.agent[0].agentaddress Opt: agentaddress	Specifies the address(es) and port(s) on which the agent should listen. [(udp|tcp):]port[@address][,…]

Table 1: Example of an information table

1.2.2 Definitions

Throughout the document, we use the host name 'VA_router' to cover all router models.

UCI commands and package option examples are shown in the following format:

```
root@VA_router:~# vacmd show current config
```

1.2.3 Diagnostics

Diagnostics are explained at the end of each feature's chapter.

1.2.4 UCI commands

For detailed information on using UCI commands, read chapters 'Router File Structure' and 'Using Command Line Interface'.

1.3 Safety

Virtual Access routers must be installed by authorised personnel only.

The router is complicated electronic equipment that may be repaired only by authorised and qualified personnel.

- Do not try to open or repair the router yourself
- Do not place the router in a damp or humid place
- Do not stack the router

The router should be used in a sheltered area, within a temperature range of -20°C to 70°C.

Do not expose the router to direct sunlight.

HIGH VOLTAGES

Under no circumstances is the router to be operated with the cover removed.

DANGEROUS SUBSTANCES

Semiconductor devices contain dangerous substances, such as beryllium and arsenic. Electronic devices must not be opened. If they become damaged, they must only be handled using protective gloves. If the substances inside the electronic devices come into contact with broken skin or wounds, hospital care must be sought immediately. Electronic components must be disposed of as hazardous toxic waste and must not be incinerated.

1.4 Product disposal

The United Kingdom and Republic of Ireland are under an obligation to minimise the disposal of Waste Electrical and Electronic Equipment (WEEE) in domestic waste and encourage recycling, recovery and environmentally-sound disposal.

Virtual Access is committed to meeting the requirements of the European Union (Waste Electrical and Electronic Equipment) Regulations 2014. These regulations require producers of electrical and electronic equipment to finance the takeback of WEEE resulting from products that we place on the Irish and EU markets. This helps us to ensure that WEEE is reused or recycled safely.

In line with that commitment, our product packaging is marked with the crossed out wheeled bin symbol to indicate that the product must not be disposed of in domestic waste but disposed of through an approved WEEE take back scheme.

Virtual Access has agreements in place with recyclers in the EU and Ireland, who will take back WEEE from you. Please contact us for details of recyclers in your area.

Virtual Access WEEE registration number: WEE/CA2530XZ.

Virtual Access Producers Registration List (Ireland) no: IE03414W

1.5 Approvals and statements

As part of the GW1000M Series, the GW1042M-X-OFR and GW1042M-QFR are approved for use in the EU block, the U.K, Brazil, Morroco and the USA.

The sections below describe each country's regulations and their application to the GW1042M-X-QFR and GW1042M-QFR.

1.5.1 Brazil: Anatel Regulation on Restricted Radiation Radiocommunication Equipment (Resolution No. 680)

Este produto não é apropriado para uso em ambientes domésticos, pois poderá causar interferências eletromagnéticas que obrigam o usuário a tomar medidas necessárias para minimizar estas interferências.

This is a class A Product. This product is not suitable for use in a domestic environment, as it may cause radio interference, causing the end user to take appropriate measures to minimize such interference. For more information, visit Anatel website: https://www.gov.br/anatel/pt-br

1.5.2 Morocco: ANRT regulations for low power, short range (A2FP) devices (Law No 24-96/Decision ANRT/DG/ N°07/20)

AGREE PAR L'ANRT MAROC

Numéro d'agrément : MR00036706ANRT2023

Date d'agrément : 10/02/2023

Approved by ANRT Morocco

Approval Number: MR00036706ANRT2023

Approval Date: 10/10/2023

For more information, visit ANRT website: https://www.anrt.ma/en/

1.5.3 USA: FCC Part 15 Regulations

Operating requirements and conditions

The design of the GW1042M-QFR complies with U.S Federal Communications Commision (FCC) guidelines respecting safety levels of radio frequency (RF) exposure for mobile or fixed devices.

1.5.3.1 Caution statement for modifications

CAUTION

Any changes or modifications not expressly approved by Virtual Access (Ireland) Lts., could void the user's authority to operate the equipment.

1.5.3.2 FCC ID

The GW1042M-QFR has been approved for the following regulation:

FCCID: 2ACWY1042QFR

1.5.3.3 Labelling

A label showing the following FCCID number is affixed on the outside of the equipment:

FCCID: 2ACWY1042QFR

1.5.3.4 FCC Part 15 statement

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation. Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For more information, visit the FCC website: https://www.fcc.gov/

2 GW1000M Series router hardware

2.1 GW1000M Series router hardware model features

2.1.1 GW1000M with standard locking DC power connector

Figure 1: GW1000M Series router front

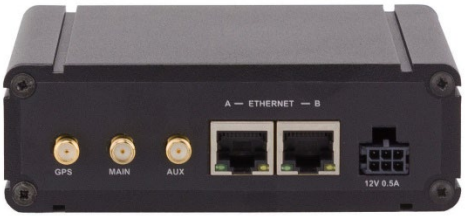


Figure 2: GW1000M Series router back

GW1032M	Dual SIM sockets
	Dual antenna SMA connectors for 3G main and aux
	GPS antenna with 3.3V active power feed
	Two 10/100 Mbps Ethernet ports
	Dual WiFi internal antennas
	Dual WiFi SMA female connectors
	Concurrent Access Point and Station mode
	Metal casing
	Carrier bracket
GW1042M	Dual SIM sockets
	Dual antenna SMA connectors for LTE main and aux
	GPS antenna with 3.3V active power feed
	Two 10/100 Mbps Ethernet ports
	Dual WiFi internal antennas
	Dual WiFi SMA female connectors
	Concurrent Access Point and Station mode
	Metal casing
	Carrier bracket

GW1000M with isolated DC power connector

Figure 3: GW1000M Series router front	**Figure 4: GW1000M Series router back**

GW1032M	Dual antenna SMA connectors for 3G main and aux
	GPS antenna with 3.3V active power feed
	Two 10/100 Mbps Ethernet ports
	Concurrent Access Point and Station mode
	No WiFi
	Metal casing
	Carrier bracket
GW1042M	Dual SIM sockets
	Dual antenna SMA connectors for LTE main and aux
	GPS antenna with 3.3V active power feed
	Two 10/100 Mbps Ethernet ports
	Concurrent Access Point and Station mode
	No WiFi
	Metal casing
	Carrier bracket

2.2 GW1000M Series router dimensions

Unit size:	114W 114D 38Hmm
Unit size with carrier:	120W 120D 42Hmm
Unit weight:	450g

2.3 GSM technology

- LTE
- HSPA+
- EDGE/GPRS
- GPS

2.4 WiFi technology

- 802.11 b/g/n
- Single band 2.4GHz
- Up to 20dBm output power
- Internal antenna

2.5 Power supply

The GW1000M Series router has four power supply options:

- External standard 12V DC 0.5 A
- External standard 12V DC 0.5 A with extended temp (-20°C to -70°C)
- Internal isolated 18-36V DC input
- Power lead with 3 connectors for 12V permanent, 12V switched (ignition sense) and ground

2.6 Compliance

The GW1000M Series router is compliant and tested to the following standards:

Safety	EN60950-1: 2006
EMC	EN55022:1998 Class B and EN55024:1998 ETSI 301489-17
Environmental	ETSI 300 019-1-3 Sinusoidal Vibration and Shock ETSI 300 019-2-3 Random Vibration.
WiFi 2.4GHz	ETSI EN 300 328 V1.9 (2015-02)

2.7 Operating temperature range

The operating temperature range depends on the RF band of the module. Refer to the Radio Bands datasheet.

2.8 Antenna

The GW1000M Series router standard locking DC power connector model has two additional SMA female WiFi antenna sockets.

2.8.1 Antennas on the GW1000M Series router

- 2 x LTE SMA female antenna connectors
- MIMO support in LTE versions
- 1 x GPS SMA female antenna connector with 3v3 active power feed
- 2 x SMA female WiFi antenna sockets*

*No WiFi on GW1000M isolated DC power connector models.

2.9 GW1000M Series components

To enable and configure connections on your router, it must be correctly installed.

The routers contain an internal web server that you use for configurations. Before you can access the internal web server and start the configuration, ensure the components are correctly connected and that your PC has the correct networking setup.

2.9.1 Standard components

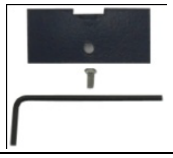
1 x GW1000M Series router	
1 x plastic carrier	
1 x lockable SIM cover	

Table 2: GW1000M Series router standard components

2.9.2 Optional components

Ethernet cable. RJ45 connector at both ends.		
Power supply unit.		
Right angle antenna for 3G or 4G network.		Virtual Access supplies a wide range of antennas for 3G or 4G networks. Please visit our website: www.virtualaccess.com or contact Virtual Access for more information.
Right angle or straight stubby antenna for WiFi connection		Virtual Access supplies a wide range of antennas for WiFi. Please visit our website: www.virtualaccess.com or contact Virtual Access for more information.
1 x fused automotive cable		
1 x non-fused automotive cable		

Table 3: GW1000M Series router optional components

2.10 Inserting a SIM card

1. Ensure the unit is powered off.
2. Hold the SIM 1 card with the chip side facing down and the cut corner front left.
3. Gently push the SIM card into SIM slot 1 until it clicks in.
4. If using SIM 2 then hold the SIM with the cut corner front right
5. Gently push the SIM card into SIM slot 2 until it clicks in.

2.11 Connecting the SIM lock

Connect the SIM lock using the Allen key provided.

2.12 Connecting cables

Connect one end of the Ethernet cable into port A and the other end to your PC or switch. For information on connecting cables for a vehicle installation, read chapter 4, 'Installing a router into a vehicle'.

2.13 Connecting the antenna

If you are connecting only one antenna, screw the antenna into the MAIN SMA connector.

If you are using two antennas, screw the main antenna into the MAIN SMA connector and the secondary antenna into the AUX SMA connector.

2.14 Installing the GW1000M

You can install the GW1000M in a vehicle or on a wall. To read how to install the GW1000M in a vehicle read the Chapter 'Installing the router in a vehicle'.

2.15 Installing the GW1000M on a wall

You can mount the router on a wall using the supplied carrier and suitable mounting fixtures for the wall type (not supplied). You must not mount it more than 2 metres above floor level.

2.16 Powering up

The router takes approximately 2 minutes to boot up. During this time, the PWR/CONFIG LED flashes in a double flash pattern – 2 quick fashes followed by a pause.

Other LEDs display different diagnostic patterns during boot up.

Booting is complete when the PWR/CONFIG LED stops double flashing and stays solid or flashing steady, indicating the particular running configuration is loaded. Read the chapter 'GW1000 LED behaviour', for PWR/CONFIG LED states.

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2.17 Reset button

The reset button is used to request a system reset.

When you press the reset button the PWR/CONFIG LED will display different patterns depending on how long you press the button. The flashing patterns will be different for the 2 flashing phases indicated below. The length of time you hold the reset button will determine the router behaviour.

Press duration	PWR/CONFIG LED behaviour	Router behaviour on depress
0-3 seconds	Solid on	Normal reset to running config. No special LED activity.
Between 3 and 15 seconds	Flashing fast	Releasing between 3-15 seconds switches the router back to factory configuration.
Between 15 and 20 seconds	Solid on	Releasing between 15-20 seconds performs a normal reset to running config.
Between 20 seconds and 30 seconds	Flashing slowly	Releasing between 20-30 seconds reboots the router in recovery mode.
Over 30 seconds	Solid on	Releasing after 30 seconds performs a normal reset.

Table 4: GW1000M Series router reset behaviour

2.17.1 Recovery mode

Recovery mode is a fail-safe mode where the router can load a default configuration from the router's firmware. If your router goes into recovery mode, all config files are kept intact. After the next reboot, the router will revert to the previous config file.

You can use recovery mode to manipulate the config files but should only be used if all other configs files are corrupt. If your router has entered recovery mode, contact your local reseller for access information.

3 GW1000M Series LED behaviour

3.1 Main LED behaviour

There are five LEDs on the GW1000M Series router

Figure 5: LEDs on the GW1000M Series router

The possible LED states are:

- Off
- Flashing slowing (2 flashes per second)
- Flashing quickly (5 flashes per second)
- Double flash (2 quick flashes then a pause)
- On

The following table describes the possible LED behaviours and meanings on the GW1000M Series router.

Booting		The router takes approximately 2 minutes to boot up. During this time, the power LED flashes. Other LEDs display different diagnostic patterns during boot up. Booting is complete when the power LED stops flashing and stays on steady.
PWR/CONFIG LED	Off	No power/boot loader does not exist.
	Double flash	Unit is booting from power on.
	Flashing slowly	Unit is in recovery mode.
	Flashing quickly	Unit is in factory configuration.
	Solid on	Unit has completed booting up process and is in either config 1 or config2.
SIM LEDs	Off	Not selected or SIM not inserted.
	Flashing	SIM selected and data connection is being established.
	Solid on	SIM selected and registered on the network.
Signal LEDs	Both LEDs off	Not connected or signal strength <= -113dBm.
	Left LED on Right LED off	Connected and signal strength <= -89dBm.
	Left LED off Right LED on	Connected and signal strength between -89dBm and -69dBm.
	Both LEDs on	Connected and signal strength >-69dBm.
WiFi LEDs	Off	WiFi not enabled.
	Flashing	Data activity on WiFi interface.
	Solid on	WiFi is enabled.

Table 5: LED behaviour and descriptions

Note: when a data connection does not exist, none of the signal LEDs will light regardless of signal strength.

3.2 GW1000M Series Ethernet port LED behaviour

The Ethernet port has two physical LEDs, one is green and one is amber. When looking at the port the green LED is on the left and is the only active LED.

Figure 6: Ethernet LED on the rear of the GW1000M Series router

Link LED (green)	Off	No physical Ethernet link detected
	On	Physical Ethernet link detected
	Flashing	Data is being transmitted/ received over the link

Table 6: The Ethernet LEDs activity descriptions