DRAFT EDITION

WAVECOM

WMO2 Modem Series
GSM 900 / 1800 / 1900

USER MANUAL

SUMMARY

SUMMARY

1. PRODUCT DESCRIPTION

1.1 Package content

The Wavecom GSM modem package comprises:
- Modem
- 2 holding bridles
- Power supply cable + fuse
- User manual (this document)

1.2 Product presentation

The Wavecom GSM modem is a terminal for fax and data transmission, short message service mobile originated, short message service mobile terminated and voice calls.
Connectors binded to the body guarantee output and input connections.
An extractible holder is used to insert the SIM card (Micro-SIM type).
A LED function indicates the working mode. No cordon is fixed to the case.

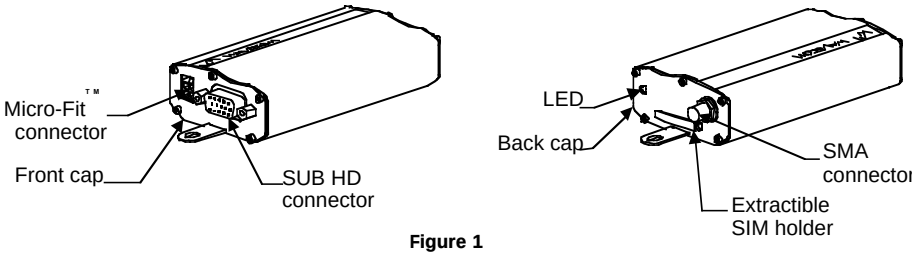


Figure 1
Modem presentation schema

1.3 Physical characteristics

Dimensions	98x54x25 mm (excluding connectors)
Overall dimensions	110x54x25 mm
Weight	< 140 grammes
Volume	13.23 cm3
Housing	Aluminium profiled

1.4 Functions - GSM Modes

Standard	900 MHz Class 4 (2W) - 1800 / 1900 MHz Class 1 (1W) GSM Phase 2
Interface	Serial interface RS232 V.24/V.28 Autobauding function AT command set based on V.25ter and GSM 07.05 & 07.07
SMS	Mobile Originated (MO) and Mobile Terminated (MT). Mode Text & PDU point to point. Cell broadcast. In accordance with GSM 07.05.
Data	Asynchronous 2400, 4800, 9600 bits/s. Transparent and Non Transparent mode . In Non Transparent Mode : 300, 1200, 1200/75 bauds. Mode 3.1 KHz (PSTN) and V110 (ISDN).
Fax	2400/4800/7200/9600 bits/s GSM teleservice 62 in Transparent Mode. Class 1. Groupe 3 compatible.
Audio	FR + EFR - Accessories: 1 : Head set (in option) 2 : Car kit (in option)

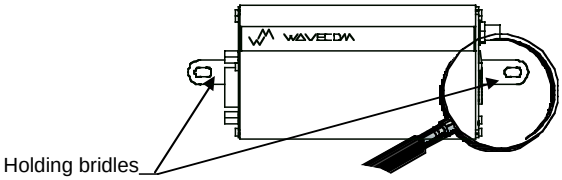
1.5 Temperature range

Operating conditions : From -20°C to +55°C
Storage conditions : From -25°C to +70°C

2 INSTALLATION/START-UP

2.1 Mounting the modem

For mounting the modem, bind to the body the holding bridles according to the schema below :



Note :
- To be attached to a plain surface
- Screw head max. height: 2mm

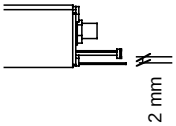


Figure 2
Modem mounting

2.2 Installing the modem

To install the modem, plug the device on a DC power supply (for automotive application, connect the device on the permanent « + » and insert the SIM card in the holder).

Make sure that an antenna is connected.

In order to extract or to insert the Micro SIM card, it is imperative to press the SIM holder ejector with a sharp element (a pen for example).
If this order is not respected, the SIM holder could be damaged.

2.3 Electrical characteristics

2.3.1 Switching the GSM modem on/off

The device is permanently powered (when connected to the power supply).

2.3.2 Voltage range

Voltage range	:	5 to 32V DC (GSM 900) - 6 to 32V DC (GSM 1800/1900)
GND	:	0V

2.3.3 Overvoltage/undervoltage

Correct operation of the GSM Wavecom modem in send mode is not guaranteed if input voltage fall below 5V (GSM 900) - 6V (GSM 1800/1900). The modem is protected against voltage over 32V.
When input voltages exceed 32V, the supply voltage is disconnected in order to protect the electronic components from an overvoltage.

TWO CASES ARE POSSIBLE:

- IF THE OVERVOLTAGE IS CONTINUOUS, THE PROTECTION IS GUARANTEED BY THE FUSE.
- IN THE CASE OF TRANSIENT PEAKS, THE MODEM GUARANTEES ITS OWN PROTECTION.

2.3.4 Power supply cable

A cable, included in the package shall be used for power supply connection.

The wires are marked as follows:

Cable	:	1 wire
Ame	:	tinned copper 24x0.2 mm
Section	:	0.75 mm˜

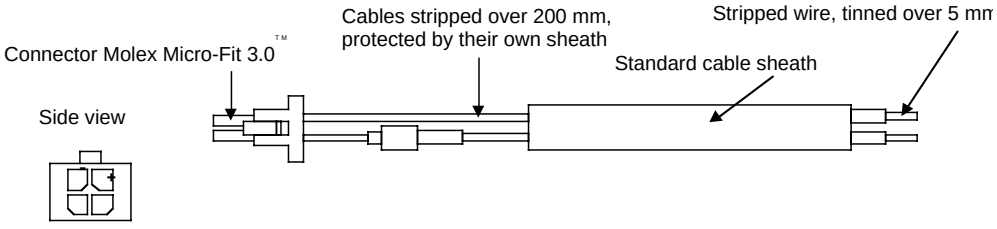


Figure 3
Power supply cable schema

2.3.5 Electrical characteristics defined in input/output for all external connections

Parameters	GSM 900			GSM 1800/1900			Unit
	Min.	Typ.	Max.	Min.	Typ.	Max.	
Power supply :							
- Input supply voltage	5		32	6		32	V
- Input supply voltage with Car Kit option			18			18	V
- Input peak supply current			2.5			1	A
- Input average supply current in communication mode			450			200	mA
- Input average supply current in idle mode			30			35	mA
Serial link : - RS232							
Audio (head set) :							
- Microphone input current @2V/2KΩ		0.5			0.5		mA
- Absolute microphone input voltage			100			100	mVp
- Speaker output current 150Ω/1nF		16			16		mA
- Absolute speaker impedance			32			32	Ω
SIM		3 or 5					V

2.3.6 Protection/on-board network connection

The modem installed is protected by a fuse directly binded on the power supply cable.

3. DESCRIPTION OF THE INTERFACES

The modem comprises several interfaces:
- SIM card holder
- Control and data transmission
- Power supply
- External antenna
- LED function indicating operating statuses

= > For pin assignment description, see the section entitled « Getting started ».

3.1 SIM card holder

A SIM card is needed to operate in a GSM network.

To install the card:
- Press the yellow button to eject the holder.
- Insert the SIM card into.
- Check that it fits into place correctly.

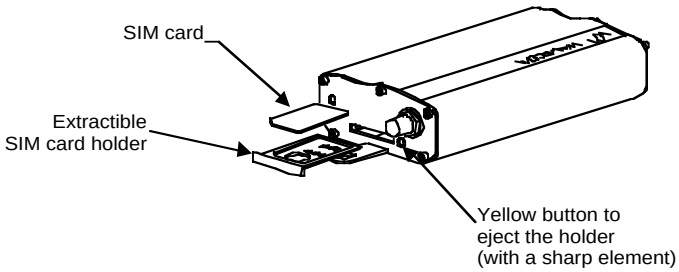


Figure 4
SIM card schema

3.2 LED Function

- LED off — Device switched off - Not ready
- LED on — Device switched on - Connecting to network
- LED flashing slowly — Device switched on - Idle mode
- LED flashing rapidly — Device switched on - Transmission mode

3.3 Connectors

Connector	Function
SMA	RF antenna connector
15 pins SUB D (high density)	RS232 link AUDIO link BOOT RESET
4 pins Micro-Fit™	Power supply connector
« SIM »connector	SIM card connection

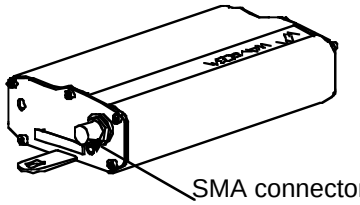
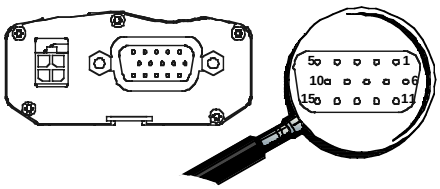


Figure 5
SMA connector schema

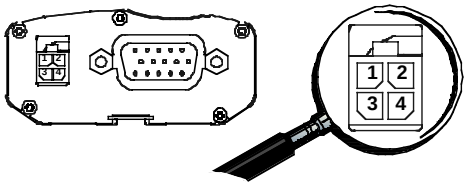
Figure 6
15 pins SUB D connector schema (high density)



Pins assignment for 15 pins SUB D Connector

	PIN	EIA	CCIT	Designation
RS 232	1	DCD	109	Data Carrier Detect
	6	RX	104	Receive Data (out)
	2	TX	103	Transmit Data
	8	DTR	108.2	Data Terminal Ready
	9	GND		Signal ground
	7	DSR	107	Data Set Ready
	12	RTS	105	Request to send
	11	CTS	106	Clear to send
	13	RI	125	Ring indicator
Audio	4	MICROPHONE (+)		
	5	MICROPHONE (-)		
	10	SPEAKER (+)		
	15	SPEAKER (-)		
Boot	3	BOOT		
Reset	14	RESET		

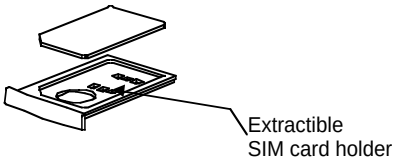
Figure 7
4 pins Micro-Fit™ connector schema



Connector	Pins layout		Comments
4 pins Micro-Fit 3.0™	1 2 3-4	V+ BATTERY GROUND AUXI	Power supply NC

The 4 pins Micro-Fit 3.0 ™ can be ordered from a supplier called MOLEX .
The address can be obtained on the following internet site : www.wavecom.fr

Figure 8
SIM connector



4. GETTING STARTED

Description	AT commands	Module	Comments
Module synchro checking	AT+CREG ?	CREG=<mode>, 1	Modem synchronized on the network
		CREG=<mode>, 2	Synchronization lost, re-synchronization in attempt
		CREG=<mode>, 0	Network synchronization attempt
Receiving an incoming call		RING	
	ATA		Answer the phone
		OK	
Initiate a call	ATD1234;		Don't forget the « ; »at the end for « voice »call
		OK	Communication established
		CME ERROR : 11	PIN code not entered (with +CMEE : 1 mode)
		CME ERROR : 3	AOC credit exceeded or a communication is already established
Initiate an emergency call	ATD112;		Don't forget the « ; »at the end for « voice »call
		OK	
Communication loss		NO CARRIER	
Ang up	ATH		
		OK	
Enter PIN Code	AT+CPIN=1234		
		OK	PIN Code accepted
		+CME ERROR : 16	Incorrect PIN Code
		+CME ERROR : 3	PIN already entered (with +CMEE : 1 mode)
Store the parameters in E2P	AT&W		
		OK	The configuration settings are stored in E2P

5. TROUBLESHOOTING

5.1 Specific defaults possibly encountered

5.1.1 The modem does not answer through the serial link

A) Is the modem correctly supplied with power?

- ❏ If not, the correct power supply is 5 to 32V (GSM 900) - 6 to 32V (GSM 1800/1900).

B) Is the serial cable suitable and adjusted in the modem and PC sockets?

- ❏ A suitable cable is a standard serial link cable.
- ❏ Check in particular, that Rx et Tx are properly connected.

C) Check that your communication program is properly configured:

- ❏ Modem factory setting for the character framing are:

  Data Bits : 8
  Parity : None
  Stop Bits : 1

- ❏ The factory baud rate is in autobauding mode.

D) Does any other program interfere with your communication program (conflict on communication port access)?

- ❏ If yes, close any application likely to interfere (e.g. mouse or printer driver).

5.1.2 The modem always returns " Error " when trying to issue a communication

A) Issue AT+CMEE=1 to have extended error cause and retry

Cause value	Diagnostic	Hint
0	Phone failure	Call your technical support
3	Operation not allowed	
4	Operation not supported	
10	SIM not inserted	→ Insert the SIM card in the SIM holder of the modem, → If SIM card is inserted, insure that it is properly inserted.
11	SIM PIN required	Enter PIN code
12	SIM PUK required	Enter PUK code (call your network provider if you don' t know this code)
13	SIM Failure	Check validity of your SIM card. If SIM damaged, call your network provider
16	Incorrect password	Check the code you entered
17	SIM PIN2 required	Enter PIN2 code
18	SIM PUK2 required	Enter PUK2 code (call your network provider if you don' t know this code)
26	Dial string too long	Check your phone number (max 20 digits)
30	No network service	

For all other codes, and/or details, see AT commands manual.

B) Additional hints

❑ Is the modem registered on the network?

Does the AT-Command AT + CREG? answers 0,1 (registered) or 0,5 (registered roaming)?

➪ If no, check that the received signal is strong enough to synchronize on the Network (use AT+CSQ).

- ❑ Is the modem receiving an incoming call or already in communication?
  - ⇨ With some software versions, you must release any incoming or active call (with ATH) before being able to make an outgoing call.

5.1.3 The modem always returns “No carrier ” when trying to issue a communication

A) After a failed attempt (“no carrier”), issue AT+CEER to have extended error cause

Cause value	Diagnostic	Hint
1	Unallocated phone number	
16	Normal call clearing	
17	User busy	
18	No user responding	
19	User alerting, no answer	
21	Call rejected	
22	Number changed	
31	Normal, unspecified	
50	Requested facility not subscribed	Check your subscription (data subscription available?)
68	ACM equal or greater than ACMmax	Credit of your pre-paid SIM card expired
252	Call baring on outgoing calls	
253	Call baring on incoming calls	
3, 6, 8, 29, 34, 38, 41, 42, 43, 44, 47, 49, 57, 58, 63, 65, 69, 70, 79, 254	Network causes	See AT commands manual for detail or call network provider

For all other codes, and/or details, see AT commands manual.

B) Additional hints

- Is the antenna properly connected?
  - For GSM 900 : use a 870 to 960 MHz / 50 Ohms antenna.
  - For GSM 1800 : use a 1710 to 1880 MHz / 50 Ohms antenna.
  - For GSM 1900 : use a 1850 to 1990 MHz / 50 Ohms antenna.

- Is the received signal strong enough?
  - With the AT-Command AT+CSQ check that the received signal (1st parameter of the response) is strong enough to be able to establish a call.

AT+CSQ response (RSSI)		Signal quality
11 to 31	Õ	Should be sufficient*
0 to 10 and +99	Õ	Could be insufficient*

* based on general observations.

- The modem always returns “No carrier ” when trying to issue a voice communication?
  - Insure the character “ semicolon ” is present straight after the phone number on the AT-Command ATD######;

- The modem always returns “No carrier ” when trying to issue a data communication?
  - Insure the selected bearer type is supported by the called party.
  - Then, insure the selected bearer type is supported by the Network.
  - If no success, try bearer selection type : AT+CBST=0,0,3.
  - Insure the SIM Card is available for Data/Fax calls.

6. NOTES ON SAFETY

6.1 General Safety

It is important to follow any special regulations regarding the use of radio equipment due in particular to the possibility of radio frequency, RF, interference. Please follow the safety advice given below carefully.

- Switch OFF your GSM Modem when in an aircraft. The use of cellular telephones in an aircraft may endanger the operation of the aircraft, disrupt the cellular network and is illegal. Failure to observe this instruction may lead to suspension or denial of cellular telephone services to the offender, or legal action or both.
- Switch OFF your GSM Modem when at a refueling point.
- Switch OFF your GSM Modem in hospitals and any other place where medical equipment may be in use.
- Respect restrictions on the use of radio equipment in fuel depots, chemical plants or where blasting operations are in progress.
- There may be a hazard associated with the operation of your GSM Modem close to in adequately protected personal medical devices such as hearing aids and pacemakers. Consult the manufactures of the medical device to determine if it is adequately protected.
- Operation of your GSM Modem close to other electronic equipment may also cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers recommendations.

6.2 Vehicle Safety

- ❏ Do not use your GSM Modem while driving, unless equipped with a correctly installed vehicle kit allowing 'Hands-Free' Operation.
- ❏ Respect national regulations on the use of cellular telephones in vehicles. Road safety always comes first.
- ❏ If incorrectly installed in a vehicle, the operation of GSM Modem telephone could interfere with the correct functioning of vehicle electronics. To avoid such problems, ensure that the installation has been performed by a qualified personnel. Verification of the protection of vehicle electronics should form part of the installation.
- ❏ The use of an alert device to operate a vehicle's lights or horn on public roads is not permitted.

6.3 Car And Maintenance

Your GSM Modem is the product of advanced engineering, design and craftsmanship and should be treated with care. The suggestion below will help you to enjoy this product for many years.

- ❏ Do not expose the GSM Modem to any extreme environment where the temperature or humidity is high.
- ❏ Do not attempt to disassemble the GSM Modem. There are no user serviceable parts inside.
- ❏ Do not expose the GSM Modem to water, rain or spilt beverages, It is not waterproof.
- ❏ Do not abuse your GSM Modem by dropping, knocking, or violent shaking. Rough handling can damage it.
- ❏ Do not place the GSM Modem alongside computer discs, credit or travel cards or other magnetic media. The information contained on discs or cards may be affected by the phone.

- ❏ The use of third party equipment or accessories, not made or authorized by Wavecom may invalidate the warranty of GSM Modem.
- ❏ Do contact an authorized Service Center in the unlikely event of a fault.

6.4 Your Responsibility

This GSM Modem is under your responsibility. Please treat it with care respecting all local regulations. It is not a toy therefore keep it in a safe place at all times and out of the reach of children.
Try to remember your Unlock and PIN codes. Become familiar with and use the security features to block unauthorized use and theft.

7. GENERAL INFORMATIONS

GSM reference documents	:	GSM 03.40, GSM 03.45, GSM 04.11, GSM 04.21, GSM 05.08, GSM 07.01, GSM 07.02, GSM 07.05, GSM 07.07.
ETSI contact	:	ETSI Secretariat F-06921 Sophia Antipolis Cedex, France e-mail : secretariat@etsi.fr
Service	:	The AT commands manual is avalable on Wavecom web site: http://www.wavecom.com

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