Fastrack modem M12 series

Fastrack modem M1206
User Guide

Reference: **WM_PRJ_M12_UGD_001**
Revision: **002**
Date: **18th September 2003**

Document Information

Revision	Date	History of the evolution	
001	10/06/03	Creation	
002	18/09/03	Delete the mention of "preliminary"	

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Overview

This document describes the FASTRACK E-GSM 900 / DCS 1800 GPRS Class 10 modem referenced as M1206.

It is based on a WISMO Quik Q2406B module.

Reference documents

[1]   AT Commands Interface Guide
WM_ASW_OAT_UGD_004

[2]   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.

List of abbreviations

ACM	Accumulated Call Meter
AT	ATtention (prefix for modem commands)
CS	Coding Scheme
CTS	Clear To Send
DC	Direct Current
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DCS	Digital Cellular System
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTR	Data Terminal Ready
EMI	ElectroMagnetic Interference
ESD	ElectroStatic Discharges
FAQ	Frequently Asked Question
GND	GrouND
GPRS	General Packet Radio Service
GSM	Global System for Mobile communications
I/O	Input / Output
ISDN	Integrated Service Digital Network
LED	Light Emitting Diode
ME	Mobile Equipment
MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
NC	Not Connected
PCL	Power Control Level
PDP	Packet Data Protocol
PDU	Protocol Data Unit
PIN	Personal Identification Number
PLMN	Public Land Mobile Network
PSTN	Public Switched Telephone Network
PUK	Personal Unblocking Key

RF	Radio Frequency
RFI	Radio Frequency Interference
RI	Ring Indicator
RTS	Request To Send
RX	Receive
SIM	Subscriber Identification Module
SMS	Short Message Service
TX	Transmit
VRMS	Volt Root Mean Square
VSWR	Voltage Standing Wave Ratio

Contents

1 General description

1.1 Presentation

FASTRACK M1206 modem is a self-contained E-GSM/GSM-GPRS 900/1800 dual-band modem and is GPRS class 10 capable.

This modem supports the following transmissions:

- Data,
- Fax,
- Short Messages (Point to point and Cell Broadcast),
- Voice calls.

The modem comprises several interfaces:

- LED function indicating the operating status,
- External antenna (via SMA connector),
- RS232 Serial and control link (via 15-pin SUB HD connector),
- Power supply (via 4-pin Micro-Fit^{TM} connector),
- SIM card holder.

The main features of the modem are the following:

- 2 Watts E-GSM 900 radio section.
- 1 Watt GSM1800 radio section.
- 32 Mbits of Flash memory and 4 Mbits of SRAM,
- Real Time Clock with calendar.
- Echo Cancellation + noise reduction.
- Full GSM or GSM / GPRS software stack.
- Hardware GPRS class 10 capable.
- Complete shielding.
- A DC Power supply,
- A RS232 serial link,
- Audio interface for:
    - microphone,
    - speaker.
- A 3V / 5V SIM interface.

Modem mechanical case is made out of aluminium profile ended by two holding bridles at each extremity.
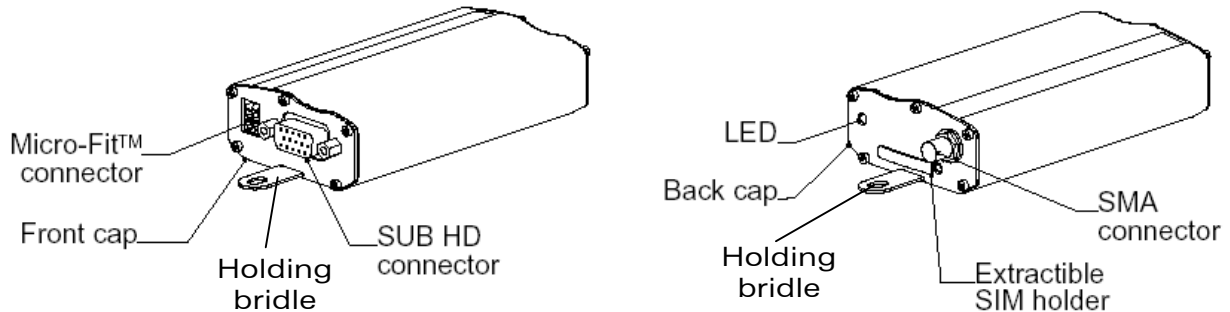
Figure 1: FASTRACK M1206 modem presentation

1.2 External connections

1.2.1 Connectors

1.2.1.1 General

FASTRACK M1206 modem has three external connections:

- Antenna connector: SMA connector for RF connection to the antenna,
- Sub D high density 15-pin connector for:
  o RS232 serial link connection,
  o Audio lines (microphone and speaker) connection,
  o BOOT and RESET signals connection.
- Power supply connector: 4-pin Micro FIT connector for DC Power Supply.

1.2.1.2 Antenna connector
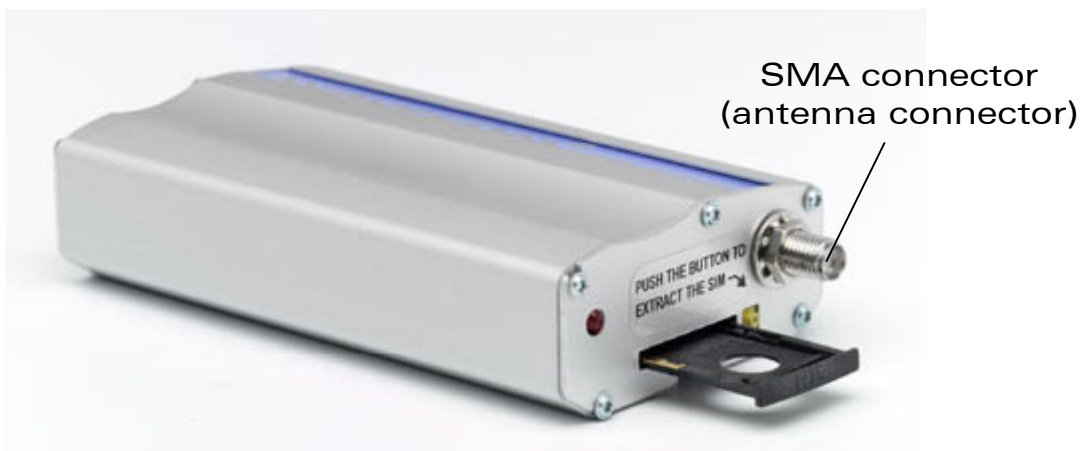
Figure 2: Antenna connector

1.2.1.3   Sub HD 15-pin connector

Figure 3: Sub HD 15-pin connector

Pin #	Signal (CCITT / EIA)	I/O	I/O type	Description	Comment
1	CT109 / DCD	O	STANDARD RS232	RS232 Data Carrier Detect	
2	CT103 / TX	I	STANDARD RS232	RS232 Transmit serial data	
3	BOOT	I	CMOS	Boot	Active low. Pull down through 1K for Flash downloading
4	Microphone (+)	I	Analog	Microphone positive line	
5	Microphone (-)	I	Analog	Microphone negative line	
6	CT104 / RX	O	STANDARD RS232	RS232 Receive serial data	
7	CT107 / DSR	O	STANDARD RS232	RS232 Data Set Ready	
8	CT108-2 / DTR	I	STANDARD RS232	RS232 Data Terminal Ready	
9	GND	-	GND	Ground	
10	Speaker (+)	O	Analog	Speaker positive line	

Pin #	Signal (CCITT / EIA)	I/O	I/O type	Description	Comment
11	CT106 / CTS	O	STANDARD RS232	RS232 Clear To Send	
12	CT105 / RTS	I	STANDARD RS232	RS232 Request To Send	
13	CT125 / RI	O	STANDARD RS232	RS232 Ring Indicator	
14	RESET	I/O	Schmitt	Modem reset	Active low
15	Speaker (-)	O	Analog	Speaker negative line	

1.2.1.4 Power supply connector

Figure 4: Power supply connector

Pin #	Signal	I/O	I/O type	Description	Comment
1	V+BATT	I	Power supply	Battery input	High current
2	GND		Power supply	Ground	
3	NC				Reserved
4	NC				Reserved

1.2.2 Power supply cable
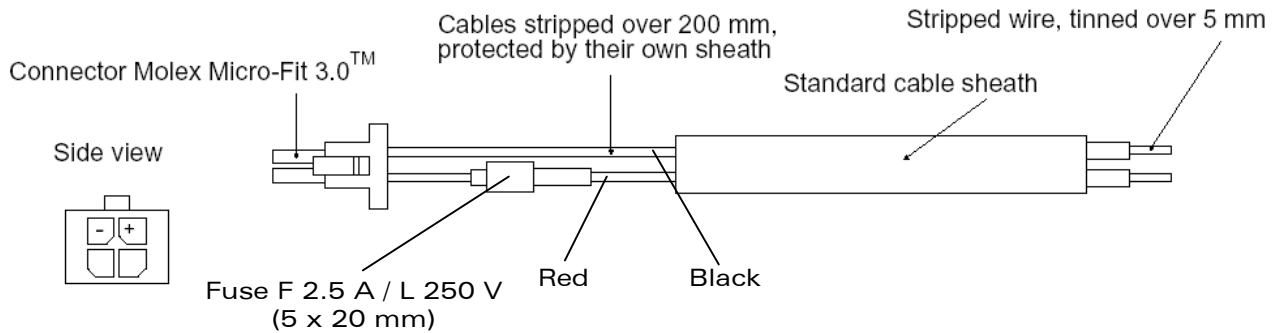
Figure 5: Power supply cable

Component	Characteristics
MICRO FIT connector 4-pin	Part number: MOLEX 43025-0400
Cable	Cable length: ~1.5 m
Wire	Core: tinned copper 24 x 0.2 mm
	Section: 0.75 mm^2

1.3 Package content

The Fastrack modem M1206 package includes:

- 1 Fastrack Modem M1206,
- 2 holding bridles,
- 1 Power supply cable + integrated fuse,
- 1 specification sheet of the modem.

2 Functional description

2.1 Architecture
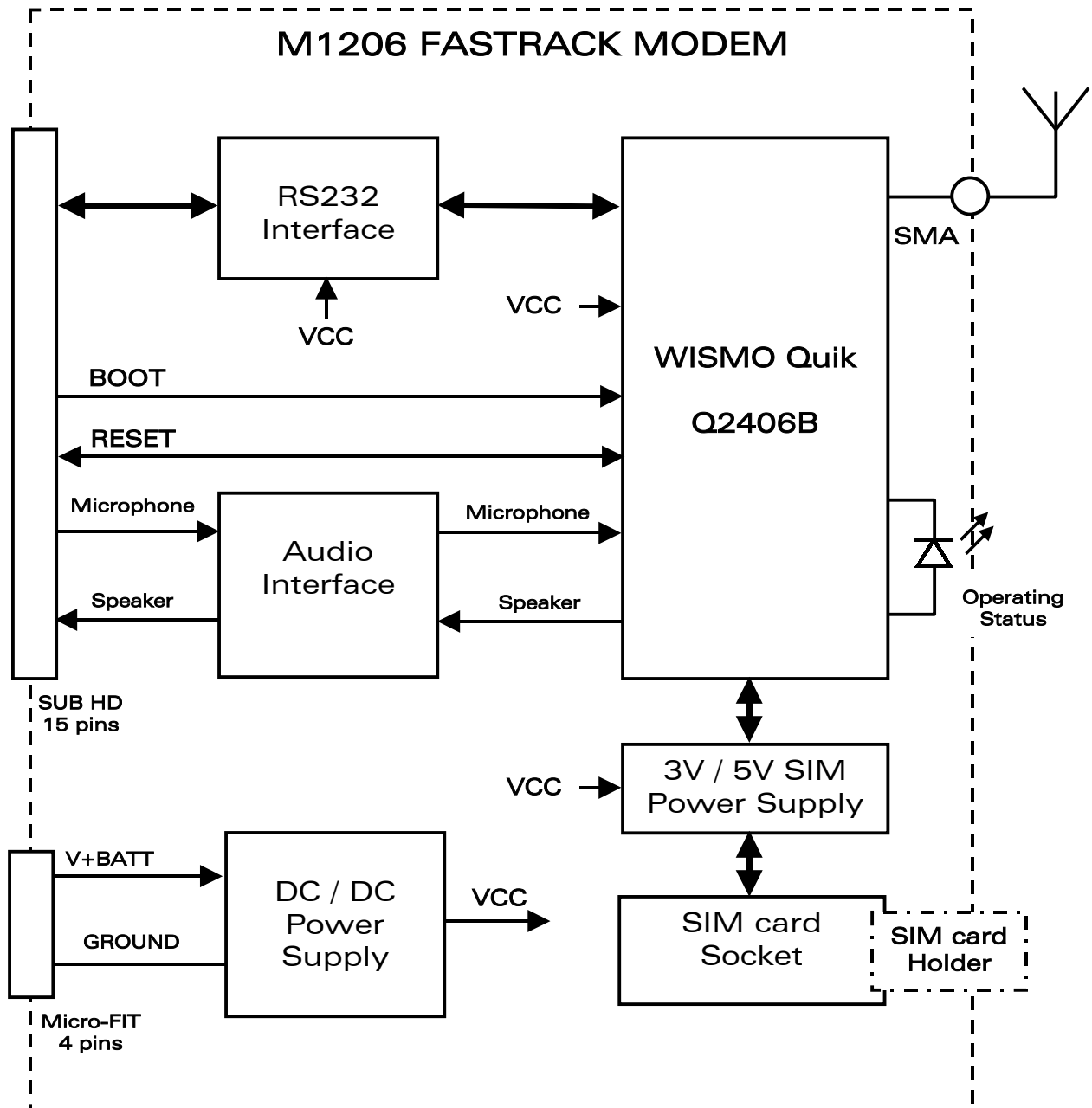
Figure 6: Functional architecture

2.2 RS232 serial link

2.2.1 General presentation

The RS232 interface performs the voltage level adaptation (V24/CMOS ⇔ V24/V28) between the internal WISMO module (DCE) and the external world (DTE).

The RS232 interface is protected (by ESD protection) against electrostatic surges on the RS232 lines.

Filtering guarantees:

- EMI/RFI protection in input and output,
- Signal smoothing.

A flexible 6-wire serial interface is available complying with RS232 protocol signaling.

The signals available are:

- TX data (CT103/TX),
- RX data (CT104/RX),
- Request To Send (CT105/RTS),
- Clear To Send (CT106/CTS),
- Data Terminal Ready (CT108-2/DTR),
- Data Set Ready (CT107/DSR).

The 2 additional signals are Data Carrier Detect (CT109/DCD) and Ring Indicator (CT125/RI).

Figure 7: RS232 Serial Link signals

RS232 interface has been designed to allow a certain flexibility in the use of the serial interface signals. However, the use of TX, RX, CTS and RTS signals is mandatory which is not the case for DTR, DSR, DCD and RI signals which can be not used.

2.2.2 Pin out description

Pin description
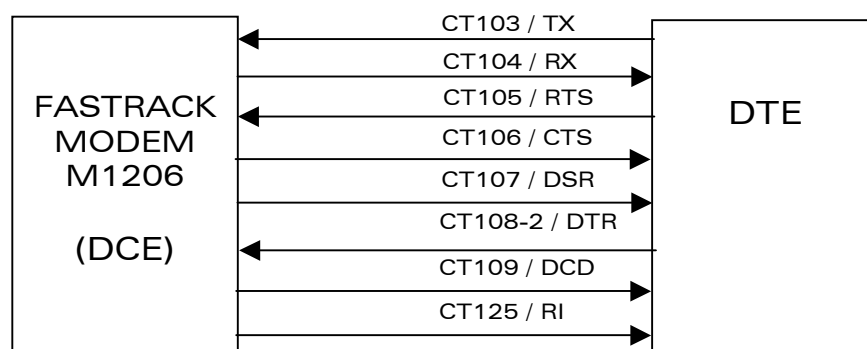
Signal	Sub HD connector Pin number	I/O	I/O type RS232 STANDARD	Description
CT103/TX	2	I	TX	Transmit serial data
CT104/RX	6	O	RX	Receive serial data
CT105/RTS	12	I	RTS	Request To Send
CT106/CTS	11	O	CTS	Clear To Send
CT107/DSR	7	O	DSR	Data Set Ready
CT108-2/DTR	8	I	DTR	Data Terminal Ready
CT109/DCD	1	O	DCD	Data Carrier Detect
CT125/RI	13	O	RI	Ring Indicator
CT102/GND	9			Ground

2.3 RESET

2.3.1 General presentation

This signal is used to force a reset procedure by providing low level during at least 500 µs.

This signal has to be considered as an emergency reset only. A reset procedure is automatically driven by an internal hardware during the power-up sequence.

This signal can also be used to provide a reset to an external device. It then behaves as an output. If no external reset is necessary this input can be left open, if used (emergency reset), it has to be driven by an open collector or an open drain output:

- RESET pin 14 = 0, for Modem Reset,
- RESET pin 14 = 1, for normal mode.

Pin description

Signal	Sub HD 15-Pin connector Pin number	I/O	I/O type	Description
RESET	14	I/O	SCHMITT	Modem Reset

<u>Additional comments on RESET:</u>

The RESET process is activated <u>either</u> by the external RESET signal <u>or</u> by an internal signal (coming from a RESET generator). This automatic reset is activated at Power-up.

The modem remains in RESET mode as long as the RESET signal is held low.

<u>This signal should be used only for "emergency" resets</u>.

A software reset is always preferred to a hardware reset.

2.3.2 Reset sequence

To activate the « emergency » reset sequence, the RESET signal has to be set to low for 500 μs minimum.

As soon as the reset is complete, the AT interface answers « OK » to the application. For this, the application has to send *AT↵*.

If the application manages hardware flow control, the AT command can be sent during the initialisation phase. Another solution is to use the AT+WIND command to get an unsolicited status from the modem.

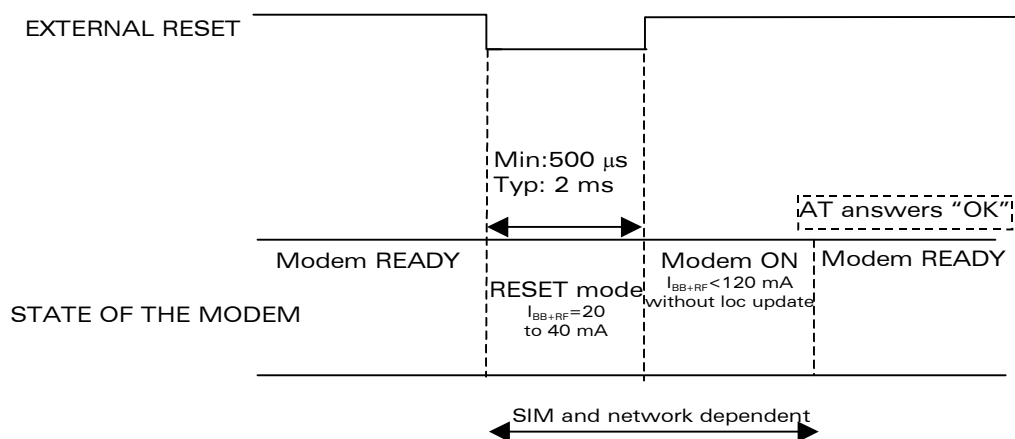For further details, refer to AT commands documentation [1].

Figure 8: Reset sequence diagram

2.4 BOOT

The use of this function is reserved to WAVECOM SA.

3 Characteristics

3.1 Basic services

The basic services of the Fastrack modem M1206 are given in the table below.

	GSM	DCS
Standard	900 MHz. E-GSM compliant Class 4 (2W). GSM phase 2.	1800 MHz E-GSM compliant Class 1 (1W) GSM phase 2..
Interface	Serial interface RS232 V.24/V.28	Serial interface RS232 V.24/V.28
	AT command set based on V.25ter and GSM 07.05 & 07.07.	AT command set based on V.25ter and GSM 07.05 & 07.07.
	Auto-bauding function between 2400 bits/s and 19200 bits/s	Auto-bauding function between 2400 bits/s and 19200 bits/s
	No auto-framing available	No auto-framing available
SMS	Mobile Originated (MO) and Mobile Terminated (MT). Mode Text & PDU point to point. Cell broadcast.	Mobile Originated (MO) and Mobile Terminated (MT). Mode Text & PDU point to point. Cell broadcast.
	In accordance with GSM 07.05	In accordance with GSM 07.05
Data	Asynchronous 2400, 4800, 9600 and 14400 bits/s.	Asynchronous 2400, 4800, 9600 and 14400 bits/s.
	Transparent and Non Transparent mode	Transparent and Non Transparent mode
	In Non Transparent Mode: 300, 1200, 1200/75 bauds.	In Non Transparent Mode: 300, 1200, 1200/75 bauds.
	Mode 3.1 kHz (PSTN) and V110 (ISDN)	Mode 3.1 kHz (PSTN) and V110 (ISDN)
Fax	2400/4800/7200/9600 bits/s, GSM teleservice 62 in Transparent Mode.	2400/4800/7200/9600 bits/s, GSM teleservice 62 in Transparent Mode.
	Class 1 & Class 2.	Class 1 & Class 2.
	Group 3 compatible.	Group 3 compatible.
Audio	Half rate / Full rate / Enhanced Full rate operation.	Half rate / Full rate / Enhanced Full rate operation.
	Accessories (options): ▪ Handset, ▪ Car Kit.	Accessories (options): ▪ Handset, ▪ Car Kit.
GPRS	Class 10.	Class 10.
	Coding schemes: CS1 to CS4	Coding schemes: CS1 to CS4
	Compliant with SMG31bis	Compliant with SMG31bis

3.2 Physical characteristics

Dimensions	98 x 54 x 25 mm (excluding connectors)
Overall Dimension	110 x 54 x 25 mm
Weight	<105 grams
Volume	132.3 cm^3
Housing	Aluminium profiled

3.3 Electrical characteristics

3.3.1 Power supply

Table 1: Electrical characteristics

Operating Voltage ranges	5 V to 32 V DC (GSM or DCS).
	5.5 V to 32 V DC (GPRS Class 10).
Maximum current	480 mA Average at 5.5V. 1.7 A Peak at 5V.

Note: the modem is permanently powered once the power supply is connected. The following table describes the consequences of overvoltage and undervoltage with the Fastrack Modem.

Table 2: Effects of power supply defect

If the voltage :	Then:
▪ falls below 5V	▪ The GSM communication is not guaranteed.
▪ falls below 5.5V	▪ The GPRS Class 10 is not guaranteed.
▪ Voltage over 32V (Transient peaks)	▪ The modem guarantees its own protection.
▪ Voltage over 32V (continuous overvoltage)	▪ Protection of the modem by the fuse (the supply voltage is disconnected).

The following table provides information on power consumption of the Fastrack modem, assuming an operating temperature of +25 °C and using a 3 V SIM card.

Table 3: Power consumption

Power Consumption in E-GSM/GPRS 900 MHz and DCS/GPRS 1800 MHz mode class 10		E-GSM 900	DCS 1800
		I_{MAX}	I_{MAX}
Input Peak Supply Current	@ 5.5 V	1.7 A	1.04 A
Power = 32.8 dBm GSM900	@ 13.2 V	0.64 A	0.4 A
Power = 29.16 dBm DCS1800 During 2TX bursts @Pcl5	@ 32 V	0.3 A peak	0.2 A
Input average supply current	@ 5.5 V	480 mA	340 mA
communication mode	@ 13.2 V	164 mA	125 mA
Average 3Rx/2Tx @Pcl5	@ 32 V	78 mA	54 mA
Input Peak Supply Current	@ 5.5 V	1.52 A	0.88 A
Power = 32.8 dBm GSM900	@ 13.2 V	0.56 A	0.36 A
Power = 29.16 dBm DCS1800 During 1TX bursts @Pcl5	@ 32 V	0.28 A	0.2 A
Input average supply current	@ 5.5 V	250 mA	160 mA
communication mode	@ 13.2 V	100 mA	70 mA
Average 1Rx/1Tx @Pcl5	@ 32 V	40 mA	30 mA
Input average supply current	@ 5.5 V	26 mA	26 mA
idle mode	@ 13.2 V	12 mA	12 mA
	@ 32 V	5.1 mA	5.1 mA
Input average supply current	@ 5.5 V	8.8 mA	8.8 mA
idle mode with RS232 autoshutdown(*)	@ 13.2 V	4.1 mA	4.1 mA
	@ 32 V	2.2 mA	2.2 mA
Input average supply current	@ 5.5 V	5.1 mA	5.1 mA
idle mode with full autoshutdown(**)	@ 13.2 V	2.5 mA	2.5 mA
	@ 32 V	1.5 mA	1.5 mA

(*) RS232 driver (MAX3238) automatically shuts down after 30 s of inactivity on the serial link.

(**) RS232 driver in auto-shutdown and AT command.

The power consumption might vary by 5 % over the whole operating temperature range (-20 °C to +55 °C).

3.3.2 RF characteristics

3.3.2.1 Frequency ranges

Table 4: Frequency ranges

Characteristic	E-GSM 900	DCS 1800
Frequency TX	880 to 915 MHz	1710 to 1785 MHz
Frequency RX	925 to 960 MHz	1805 to 1880 MHz

3.3.2.2 RF performances

RF performances are compliant with the ETSI recommendation GSM 05.05.

The RF performances for receiver and transmitter are given in the table below.

Table 5: Receiver and transmitter RF performances

Receiver	
E-GSM900 Reference Sensitivity	-104 dBm Static & TUHigh
DCS1800 Reference Sensitivity	-102 dBm Static & TUHigh
Selectivity @ 200 kHz	> +9 dBc
Selectivity @ 400 kHz	> +41 dBc
Linear dynamic range	63 dB
Co-channel rejection	>= 9 dBc
Transmitter	
Maximum output power (E-GSM 900) at ambient temperature	33 dBm +/- 2 dB
Maximum output power (DCS1800 at ambient temperature	30 dBm +/- 2 dB
Minimum output power (E-GSM 900) at ambient temperature	5 dBm +/- 5 dB
Minimum output power (DCS1800) at ambient temperature	0 dBm +/- 5 dB

3.3.2.3 External antenna

The external antenna is connected to the modem via the SMA connector.

The external antenna must fulfill the characteristics listed in the table below.

Table 6: External antenna characteristics

Antenna frequency range	Dual-band GSM 900/DCS 1800 MHz
Impedance	50 Ohms
Gain (antenna + cable)	0 dBi
VSWR (antenna + cable)	-10 dB

Note: refer to chapter 8 for recommended antenna.

3.3.3 SIM card

Table 7: SIM card characteristics

SIM card	3V or 5V

3.3.4 Audio interface

The audio interface is available through the Sub HD 15-pin connector.

The following table provides electrical information of the audio interface for handset.

Table 8: Audio interface characteristics for handset

For GSM 900/DCS 1800	Min	Typ	Max	Unit
Microphone input voltage at minimum gain			43.8	mVrms
Speaker output voltage at maximum gain			1.74	Vrms
Speaker impedance	32	50		Ω

3.4 Environmental characteristics

To ensure the proper operation of the Fastrack Modem, the operating environment must be within a specific temperature as described in the table below.

Table 9: Ranges of temperature

Operating temperature range	-20 ℃ to +55 ℃
Storage temperature range	-25 ℃ to +70℃

3.5 Protections

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

The model of fuse used is: **F 2.5 A L 250 V**.

The modem is also protected against voltage over +32 V.

When input voltages exceed +32 V, the supply voltage is disconnected in order to protect the internal electronic components from an overvoltage.

Filtering guarantees:

- EMI/RFI protection in input and output,
- Signal smoothing.

4 Using the modem

4.1 Getting started with the modem

4.1.1 Mounting the modem

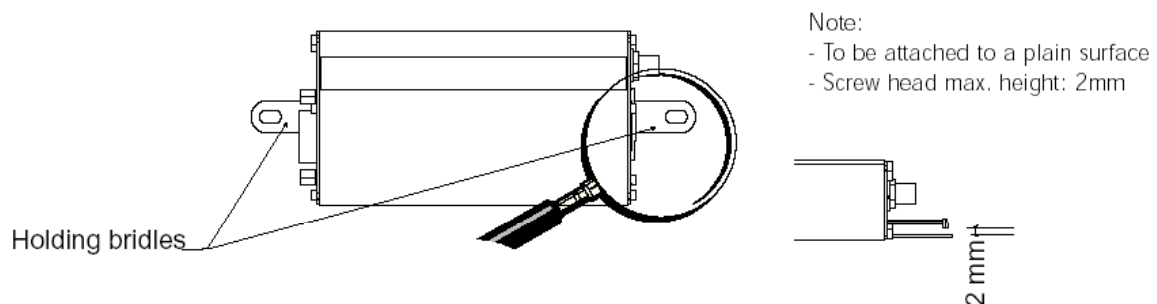To mount the modem, bind it using the holding bridles as shown in the diagram below.

Figure 9: Modem mounting

4.1.2 Setting up the Fastrack modem

To set up the modem, do the following:

- Press SIM card holder ejector (yellow button) with a sharp object (the tip of a pen for example).

- Insert the SIM card in the holder.

- Verify the SIM card fits in the holder properly.

- Connect the antenna to the SMA connector.

- Connect both sides of the serial and control cable (15-pin Sub HD connector on the modem side).

- Connect the power supply cable to the power supply source.

  Note: for automotive application, it is recommended to connect the V+BATT line of the modem directly to the positive terminal of the battery.

- Plug the power supply cable into the modem and switch on the external power supply.

- Now the modem is ready to work. Refer to chapter 5 for some AT commands to configure the modem.

4.1.3 Checking the communication with the modem

- Connect the RS232 link between the DTE (port COM) and the modem (DCE).

- Configure the RS232 port of the DTE as follows:

  - Bits per second: **115.200 kbps**,

  - Data bits: **8**,

  - Parity: **None**,

  - Stop bits: **1**,

  - Flow control: **Hardware Flow control**.

- Using a communication software such as Hyperterminal program, enter the *AT↵* command. The response of the modem must be *OK* displayed in the Hyperterminal window.

- If the communication cannot be established with the modem, do the following:

  - Check the RS232 connection between the DTE and the modem (DCE),

  - Check the configuration of the port COM used on the DTE.

- Example of AT commands which can be used after getting started the modem:

  - *AT+CGMI*: modem answer is "WAVECOM MODEM" when serial link is OK.

  - *AT+CPIN=<Pin Code>*: to enter a PIN code (if activated).

  - *AT+CSQ*: to verify the received signal strength.

  - *AT+CREG?*: to verify the registration of the modem on the network.

  - *ATD<phone number>;*: to initiate a call.

  - *ATH*: to hang up (end of call).

  For further information about these AT commands and their associated parameters, refer to document [1].

4.1.4 Resetting the modem

For resetting the modem, a hardware reset signal is available on pin 14 of the Sub HD 15-pin connector (RESET).

The reset of the modem is carried out when this pin is low for at least 500 μs.

For further details about the reset of the modem, refer to paragraph 2.3.

4.2 Operational status of the modem

The operational status of the modem is given by the LED light located on the front panel of the modem.

The table below gives the meaning of the various statuses available.

Table 10: Operational status of the modem

LED Status	LED light activity	Modem status
ON	LED ON permanent	Modem is switched on Not registered on the network
	LED Flashing slowly	Idle mode Connected to the network
	LED Flashing rapidly	Transmission mode
OFF	LED OFF	Modem is switched off.

4.3 Verifying the received signal strength

The Fastrack modem establishes a call only if the received signal is sufficiently strong.

To verify the received signal strength, do the following:

- Using a communication software such as HyperTerminal program, enter the AT command *AT+CSQ*. Value appears for the received signal strength.

- Verify the result with the values given in the table below.

Table 11: Values of received signal strength

Value of received signal strength (AT+CSQ response)	Interpretation of the received signal strength
0 - 10	Insufficient(*)
11 - 31	Sufficient(*)
Greater than 99	Insufficient(*)

(*) Based on general observations.

4.4 Verifying the network registration of the modem

1. Make sure a valid SIM card has been previously inserted in the SIM card holder of the modem.

2. Using a communication software such as HyperTerminal program, enter the following AT command: *AT+CREG?*. Value appears as a response.

3. Verify the result with the values given in the table below.

Table 12: Values of network registration

Value(*)	Network registration
0,1	Yes
0,5	Yes (registered roaming)

(*) refer to AT commands documentation [1] for further information about the other returned values and their meaning.

If the modem is not registered, perform the following procedure:

▪ Check the connection between the modem and the antenna.

▪ Verify the signal strength to determine the strength of the received signal (refer to paragraph 4.3).

5 AT commands for the modem

The table below reminds the main AT commands required for getting started the modem.

For other AT commands available or further information about the AT commands, refer to document [1].

Description	AT commands	Modem's response	Comment
Enter PIN Code	AT+CPIN=1234	OK	PIN Code accepted.
		+CME ERROR: 16	Incorrect PIN Code (with +CMEE = 1 mode).
		+CME ERROR: 3	PIN already entered (with +CMEE = 1 mode).
Modem synchronization checking	AT+CREG?	CREG=<mode>, 1	Modem synchronised on the network.
		CREG=<mode>, 2	Synchronization lost, re-synchronization attempt.
		CREG=<mode>, 0	Modem not synchronised on the network, no synchronization attempt.
Receiving an incoming call	ATA	OK	Answer the call.
Initiate a call	ATD<phone number>; (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 established.
Communication loss		NO CARRIER	
Hang up	ATH	OK	
Store the parameters in EEPROM	AT&W	OK	The configuration settings are stored in EEPROM.

6 Troubleshooting

This section of the document describes possible problems encountered when using the Fastrack modem and their solutions.

To review other troubleshooting information, refer the 'FAQs' (Frequently Asked Questions) page at www.wavecom.com or use the following link:

> http://www.wavecom.com/support/faqs.php

6.1 No connection with the modem through the serial link

If the Fastrack modem does not answer through the serial link, refer to the table below for possible causes and solutions.

Table 13: Solutions for no connection with modem through serial link

If the modem returns...	Then ask	Action
Nothing	Is the modem powered correctly?	Provide a power supply in the range of 5 V (5.5V for GPRS Class 10) to 32 V.
	Does the serial cable follow correctly pin assignment shown in paragraph 1.2.1.3.	Connect the cable by following pin assignment given in paragraph 1.2.1.3.
	Is the communication program properly configured?	Ensure the setting of the communication program is fit to setting of modem. Modem factory setting is: Data bits = 8 Parity = none Stop bits = 1 Baud = 115.200 kbps. Flow control = Hardware
	Is there another program interfering with the communication program (i.e. Conflict on communication port access)	Close the application (e.g. mouse or printer driver).

6.2 Receiving "ERROR" message

If the Fastrack modem returns a message of **ERROR** upon an attempted transmission of data, or voice signals, then refer to the table below for possible causes and solutions.

Table 14: Solutions for "ERROR" message

If the modem returns	Then ask	Action
ERROR	Is the modem registered on the network?	Refer to paragraph 4.4 to verify that the modem is registered on the network.
	Is the modem receiving an incoming call or is it already in communication?	End any incoming by using ATH command.
	Is the selected bearer type supported by the called party? Is the selected bearer type supported by the network?	Enter *AT+CMEE* to view the extended error code. Note: Refer to Table 15. Ensure that the selected bearer type is supported by the called party. Ensure that the semicolon (;) is entered immediately after the phone number in the AT command. e.g. ATD######;
	Is the received signal strong enough?	Refer to paragraph 4.3 to verify the strength of the received signal.
	Is the antenna properly connected?	Refer to paragraph 3.3.2.3 for antenna requirements

If the Fastrack modem returns a message of **ERROR**, you can have the **extended error code** by using AT command *AT+CMEE=1*. Refer to the table below for interpretation of **extended error code**.

Table 15: Interpretation of extended error code

Error Code	Diagnostic	Hint
0	Phone failure	Call your technical support.
3	Operation not allowed	No action.
4	Operation not supported	
10	SIM not inserted	If SIM card is inserted, check the SIM card if it is clean and properly inserted.
11	SIM PIN required	Enter PIN code.
12	SIM PUK required	Enter PUK code. Note: Call your network provider if you don't know this code.
13	SIM Failure	Check validity of your SIM card. If SIM card 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	No action.
32	Network not allowed Emergency calls only	No action.
40	Network personalization PIN required (Network lock)	Enter Network lock code (call your network provider if you don't know this code).
103	Illegal MS (#3)	No action.
106	Illegal ME (#6)	No action.
107	GPRS services not allowed (#7)	Contact your network provider to subscribe to the GPRS services.
111	PLMN area not allowed (#11)	No action.

Error Code	Diagnostic	Hint
112	Location area not allowed (#12)	No action.
113	Roaming not allowed in this location area (#13)	No action.
132	Service option not supported (#32)	Check the service option.
133	Requested service option not subscribed (#33)	Call your network provider to subscribe to the requested service option.
134	Service option temporarily out of order (#34)	No action.
148	Unspecified GPRS error	No action.
149	PDP authentication failure	Call your network provider to know the right authentication parameters.
150	Invalid mobile class	Change the class of the mobile to a valid one.

Note: For all other codes, and/or details, refer to AT commands documentation.

6.3 Receiving "No carrier" message

If the Fastrack modem returns a message of **No carrier** upon an attempted transmission of data, or voice signals, then refer to the table below for possible causes and solutions.

Table 16: Solutions for "No carrier" message

If the modem returns...	Then ask...	Action...
No carrier	Is the received signal strong enough?	Refer to paragraph 4.3 to verify the strength of the received signal.
	Is the antenna properly connected?	Refer to paragraph 3.3.2.3 for antenna requirements.
No carrier (when trying to issue a voice communication)	Is the semicolon (;) entered immediately after the phone number in the AT command?	Ensure that the semicolon (;) is entered immediately after the phone number in the AT command. e.g. ATD######;

If the modem returns...	Then ask...	Action...
No carrier (when trying to issue a data communication)	Is SIM card configured for data / fax calls?	Configure the SIM card for data / fax calls (Ask your network provider if necessary).
	Is the selected bearer type supported by the called party? Is the selected bearer type supported by the network?	Ensure that the selected bearer type is supported by the called party. Ensure that the selected bearer type is supported by the network. If no success, try bearer selection type by AT command: AT+CBST=0,0,3

If the Fastrack modem returns a message of **No carrier**, you can get the **extended error code** by using AT command *AT+CEER*. Refer to the table below for interpretation of **extended error code**.

Table 17: Interpretation of extended error code

Error Code	Diagnostic	Hint
1	Unallocated phone number	Not applicable.
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 barring on outgoing calls	Not applicable.
253	Call barring on incoming calls	

Error Code	Diagnostic	Hint
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 further details or call network provider.

Note: For all other codes, and/or details, see AT commands documentation.

7 Safety recommendations

7.1 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 refuelling 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.

The modem is designed for and intended to be used in fixed and mobile applications:

- *"Fixed"* means that the device is physically secured at one location and is not able to be easily moved to another location.

- *"Mobile"* means that the device is designed to be used in other than fixed locations and generally in such a way that a separation distance of at least 20 cm (8 inches) is normally maintained between the transmitter's antenna and the body of the user or nearby persons.

The Modem is not designed for and intended to be used in portable applications (within 20 cm of the body of the user) and such uses are strictly prohibited.

7.2 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 vehicle's lights or horn on public roads is not permitted.

7.3 Care 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.

7.4 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.

8 Recommended accessories

The recommended accessories for the FASTRACK modem are given in the table below.

Table 18: List of recommended accessories

Designation	Part number	Supplier
Dual-band antenna	1140.26	ALLGON
SMA/FME Antenna adaptor		PROCOM
Power adaptor (Europe)	EGSTON N2 EFSW 12V 1A mounted with micro-fit connector	EGSTON (For Power supplier) MOLEX (For Micro-Fit connector)