THE GSM EMBEDDED MODEM USER'S GUIDE ME30

Contents

1 Introduction

The ME20 is designed to provide a quick and easy solution to systems that need to access GSM/GPRS network/functionality. The modem is full type approved and ready to use. It employs the proven GSM WISMO™ technology from WAVECOM.

1.1 Scope of this manual

This document describes the hardware interface and the technical specification of the GEM. For information about controlling the modem via the AT commands, refer to the ' AT command manual'.

1.2 Electrical characteristics

- Dual band GSM modem E-GSM 900/1800 or E-GSM 900/1900
- Class 4: 2W for GSM 900
- Class 1: 1W for GSM 1800/1900
- Voice, SMS, Fax and data
- Tricodec: Full Rate, Enhanced Full Rate and Half Rate
- 3V SIM interface
- Power supply: 5V @ 2A
- 300mA average current consumption
- 9mA in idle mode
- Operating temperature: -20°C to + 50°C
- Storage temperature: -35°C to +85°C

1.3 Mechanical characteristics

- Small size: 70mm(L) x 41mm(W) x 10mm(H)
- Mounting: 2 screw holes

1.4 Features

1.4.1 Telephony

- Telephony (TCH/FS) and Emergency calls
- Full Rate, Enhanced Full Rate and Half Rate
- DTMF functions

1.4.2 Short Message Service

- Point to Point MT and MO
- SMS Cell Broadcast

1.4.3 Data

- Data circuit asynchronous, transparent and non-transparent up to 14.4kbps
- Automatic fax group 3 (Class 1 and 2)
- Alternate speech and fax
- MNP2, V.42bis

1.4.4 GPRS packet data features

- GPRS class 2 / Class B
- Coding schemes CS1 to CS4
- Compliant with SMG31bis

1.4.5 GSM Supplementary Service

- Call Forwarding
- Call Barring
- Multi Party
- Call Waiting and Call Hold
- Calling Line Identity
- Advice of Charge
- USSD
- Closed User Group
- Explicit Call Transfer

1.4.6 Others

- ME + SIM phone book management
- Fixed Dialling Number
- SIM Toolkit Class 2
- SIM, network and service provider locks
- Real Time Clock
- Alarm management
- Software upgrade through Xmodem protocol
- UCS2 character set management

1.5 Interfaces

- Single Antenna Interface
- 3V only internal SIM interface
- two 20-pin general purpose connector
- RS232 Interface(Optional)

2 Hardware Description

2.1 Overview

The GEM includes a Wavecom Wismo2C2/2D module, two 20-pin header, a SIM card holder , a IDC10-pin header and a RF connector.

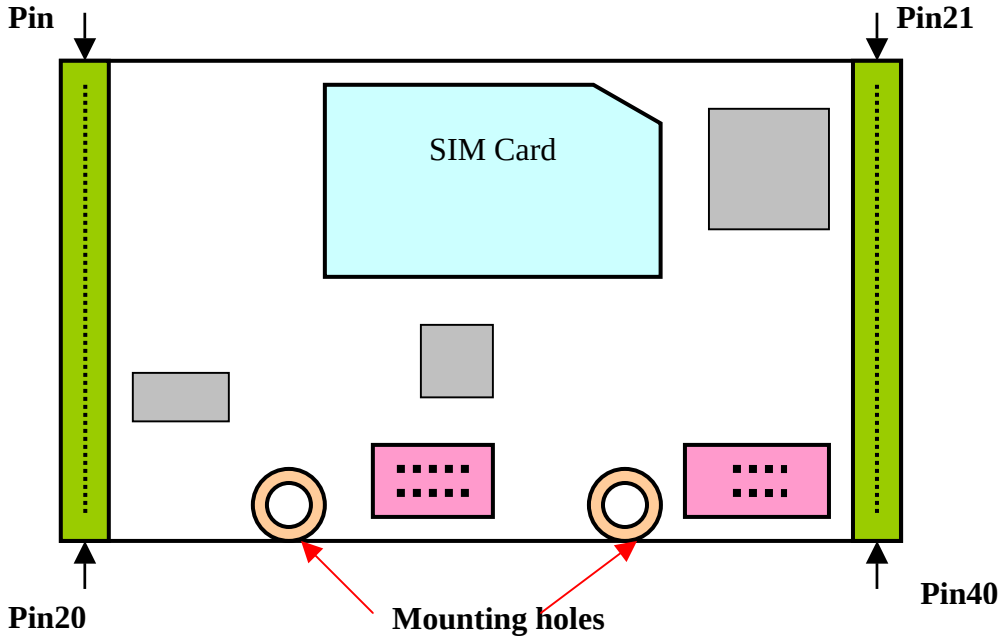


Figure : Top view

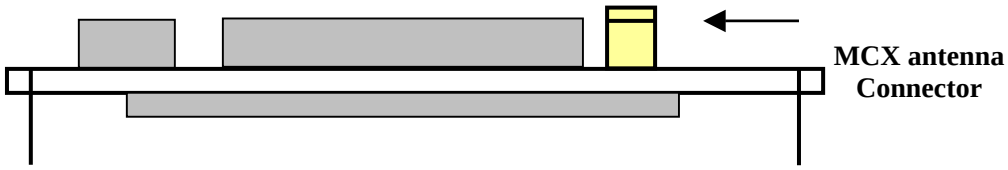


Figure : side view

- Connector : two 20-pin 2.0mm pitch
- Antenna connector: SMA

2.2 The two 20-pin connector

This connector consists of all signals, necessary for system integration. It consists of TXD and RXD signals, audio input/output, general I/O, keypad, power supply and modem control signals.

Pin number	I/O type	Description	
1	SIM_CLK	Output, SIM clock, 2X	**Pin1 or 21**
2	SIM_RESET	Output, SIM reset, 2X	
3	SIM_DATA	I/O , SIM data, COMS 3X	
4	SIM_VCC	Output, SIM card supply voltage	
5	Key_Row0	I/O, Keypad Row 0, COMS 1X	
6	Key_Row1	I/O, Keypad Row 1, COMS 1X	
7	Key_Row2	I/O, Keypad Row 2, COMS 1X	
8	Key_Row3	I/O, Keypad Row 3, COMS 1X	
9	Key_Row4	I/O, Keypad Row 4, COMS 1X	
10	Key_Column0	I/O, keypad Column 0, COMS 1X	
11	Key_Column1	I/O, keypad Column 1, COMS 1X	
12	Key_Column2	I/O, keypad Column 2, COMS 1X	
13	Key_Column3	I/O, keypad Column 3, COMS 1X	
14	Key_Column4	I/O, keypad Column 4, COMS 1X	
15	AUXV0	Analogue input signal, A/D converter	
16	GPIO5	General Purpose input/Output 5, COMS 2X	
17	SPEAKER2+	Speaker2, positive output	
18	SPEAKER2-	Speaker2, negative output	
19	BUZZER	Analogue Buzzer output	
20	GPIO4	General Purpose input/Output 4, COMS 2X	
Pin number	**I/O type**	**Description**	
21	ON/OFF	Input, modem on/off control signal, COMS	
22	**CHG_IN**	**Supply for battery charging, High current**	
23	**SDA/SPI_IO**	**Wire interface or SPI Data**	
24	**SCL/SPI_CLK**	**Wire interface or SPI Clock**	
25	RESET	Input, modem reset control signal	
26	INTR	Input, external Interrupt, COMS	
27	GPIO0	General Purpose input/Output 0, COMS 2X	
28	SPI_EN	Output, SPI enable, 1X	
29	MIC2+	Microphone2, positive input	
30	MIC2-	Microphone2 negative input	
31	LED	Output, Working Indication	
32	VCC_RTC	Supply voltage to Real-Time clock, MAX 2.75V	
33	VBATT	Battery Input, High current	**Pin20 or 40**
34	**5V**	**Supply voltage**	
35	**5V**	**Supply voltage**	
36	**TXD**	**Transmit serial data, TTL level, input**	
37	**RXD**	**Receive serial data, TTL level, output**	
38	RI	Ring Indicator	
39	**GND**	**Ground, high current**	
40	**GND**	**Ground, high current**	

Signal description

2.2.1 Power supply:

Pin38/Pin39/Pin40 = Supply Ground.
Pin34/Pin35 = Supply voltage 5VDC

Power supply design is an important factor. The GSM modem transmits in burst sequences, therefore the power supply must be able to deliver high current peaks in short period of time.

Supply voltage = 5V
Supply current = 2 amperes.

2.2.2 SPI bus

Pin 23 = SPI_CLK
Pin 28 = SPI_EN
Pin 22 = SPI_IO

The SPI bus complies with the SPI bus standard. The maximum speed is 3.25Mb/s.

2.2.3 Keypad interface

Pin 5 = Key row0	Pin 10 = Key column0
Pin 6 = Key row1	Pin 11 = Key column1
Pin 7 = Key row2	Pin 12 = Key column2
Pin 8 = Key row3	Pin 13 = Key column3
Pin 9 = Key row4	Pin 14 = Key column4

The modem provides scanning, debouncing functions. The key is reported using +CMER command.

2.2.4 Serial link (TTL Level)

The 2 wire serial link due to 5V TTL level

Pin 37 = RXD
Pin 36 = TXD

2.2.5 SIM interface

The modem controls a 3V SIM. 5V SIM can be implemented using an external SIM driver.

Pin 2 = SIM_RESET	Pin 3 = SIM_DATA
Pin 1 = SIM_CLK	Pin 4 = SIM_VCC

2.2.6 General purpose input / output

The modem provide 3 digital input/output signals and 1 analogue input signal. The digital I/O signals associated with +WIOR/+WIOW command. The 10bit analogue input (0V to 2.8V) associated with +ADC command.

Pin 15 = AUXV0 Pin 20 = GPIO4 Pin 16 = GPIO5 Pin 27 = GPIO0

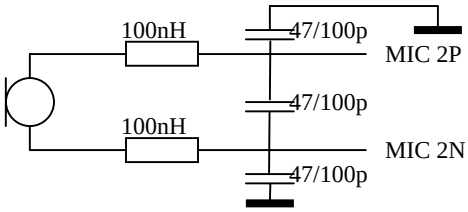
Pin 31 = LED: The LED output can be used to drive a LED indicator via a transistor.

LED Status	Modem Status	
OFF	Modem in download mode or modem OFF	
ON	Permanent	Modem switched ON, not registered on the network
	Slow flash	Modem switched ON, registered on the network
	Quick flash	Modem switched ON, registered on the network, communication in progress

2.2.7 Audio

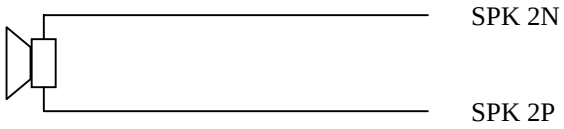
The Microphone-2 inputs are differential. They include the biasing for an electret microphone (0.5mA and 2V). The electret microphone's impedance has to be around 2KΩ and can be connected directly.

Pin 29 = Microphone2 + Pin 30 = Microphone2 –



The Spekaer2 outputs are push-pull amplifiers and can be loaded down to 150Ω and up to 1nF. These outputs are differential and the output power can be adjusted by 2dB steps.

Pin 17 = Speaker2 + Pin 18 = Speaker2 –



2.2.8 Buzzer output

The Buzzer output is a digital one. A buzzer can be directly connected between this output and supply voltage .

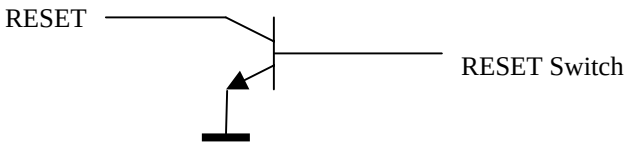
Pin 19 = Buzzer output

2.2.9 Control signals

Pin 21 = ON/OFF : This input is used to switch the modem on or off. A high level signal (3V6) has to be applied to this input for at least 1 second, to turn the modem on. The high signal can be left until modem is switched off.

Pin 24 = BOOT input : his input is used to download the firmware into the modem's Flash memory. The internal boot procedure starts when this input is low during the modem reset. This input should be left open when not used. If used, it must be driven by an open collector/drain.

Pin 25 = RESET input: This input is used to force a cold reset. It has to be driven by an open collector or open drain.



2.2.10 Real time clock supply

Pin 21 = VCC_RTC: This pin is used as a back-up power supply for the internal real-time clock when the modem is switched off.

3 The Optional RS232 Interface (Optional)

3.1 Overview:

The development board is designed for system integrators to explore the modem's functionality. It consists of a power supply, V.28 serial port, buzzer, connector for microphone + earpiece, general I/O DIP switches, connector for 5x5 keypad, Reset button, Boot button and ON/OFF button.

3.2 Functional description

3.2.1 The serial port connector

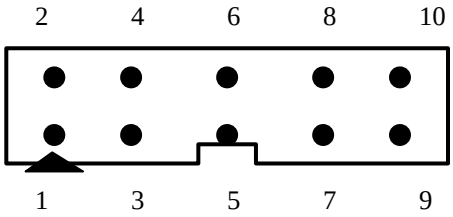
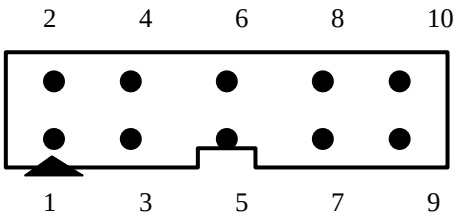


Figure : The IDC 10-pin header of V.28 serial port

	Type	Description		Type	Description
1	RTS	RS232 interface, input	**6**	CTS	RS232 interface, output
2	RX	RS232 interface, output	**7**	TX	RS232 interface, input
3	RX	RS232 interface, output	**8**	CTS	RS232 interface, output
4	RTS	RS232 interface, input	**9**	GND	GND
5	TX	RS232 interface, input	**10**	GND	GND

3.2.2 The serial port connector



	Type	Description		Type	Description
1	GND	GND	**6**	RX	TTL/COMS Output
2	GND	GND	**7**	CHG	Supply charging for battery
3	NC	NC	**8**	TX	TTL/COMS Input
4	RI	TTL/COMS Output	**9**	VBATT	Battery Input
5	NC	NC	**10**	5V	5V Input