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MAESTRO HERITAGE 3G SERIES

QUICK START GUIDE & USER MANUAL REV. 0.1

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Revision history

Rev.	Date	Details	Originated by
0.1	8 April 2011	First release	Samuel Chereau

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Safety precautions

General precautions

- The modem generates radio frequency (RF) power. When using the modem care must be taken on safety issues related to RF interference as well as regulations of RF equipment.
- Do not use your phone in aircraft, hospitals, petrol stations or in places where using GSM products is prohibited.
- Be sure that the modem will not be interfering with nearby equipment. For example: pacemakers or medical equipment. The antenna of the modem should be away from computers, office equipment, home appliance, etc.
- An external antenna must be connected to the modem for proper operation. Only used approved antennas with the modem. Please contact authorized dealer on finding an approved antenna.
- Always keep the antenna with minimum safety distance of 26.6 cm or more from human body. Do not put the antenna inside metallic box, containers, etc.

Using the modem in vehicle

- Check for any regulation or law authorizing the use of GSM in vehicle in your country before installing the modem
- Install the modem by qualified personnel. Consult your vehicle dealer for any possible interference of electronic parts by the modem.
- The modem should be connected to the vehicle's supply system by using a fuse-protected terminal in the vehicle's fuse box
- Be careful when the modem is powered by the vehicle's main battery. The battery may be drained after extended period.

Protecting your modem

To ensure error-free usage, please install and operate your modem with care. Do remember the following:

- Do not expose the modem to extreme conditions such as high humidity/rain, high temperatures, direct sunlight, caustic/harsh chemicals, dust, or water.
- Do not try to disassemble or modify the modem. There is no user serviceable part inside and the warranty would be void.
- Do not drop, hit or shake the modem. Do not use the modem under extreme vibrating condition.
- Do not pull the antenna or power supply cable. Please attach or detach by holding the connector.
- Connect the modem only according to the instruction manual. Failure to do it will void the warranty.

Chapter 1

Introduction

Maestro Heritage 3G is a ready-to-use 3G/GSM[1] modem for data and SMS services. It also supports 3G HSPA (Down link: Cat 8, 7.2Mbps; Up link: Cat 5, 2Mbps) GPRS (Class 12) and EDGE (Class 12) for high speed data transfer. Maestro Heritage 3G can be easily controlled by using AT command for all kinds of operations. With standard 9 pins RS232 port, the Maestro Heritage 3G can be set up with minimal effort.

Maestro Heritage 3G is also having an Expansion Slot to make the modem becomes even more powerful. You can plug into it some Maestro Heritage Add-on unit such as Input/Output, Ethernet Router, GPS, Analog/Pulse, etc. . .

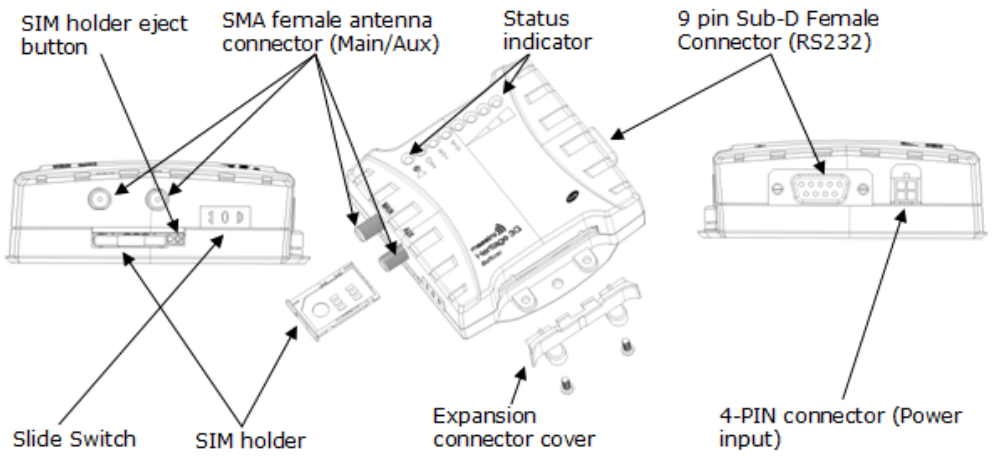
1.1 Package

The Maestro Heritage 3G package should include the following:

- Maestro Heritage 3G modem x1
- Power cord with fuse x1
- Safety note x1
- DIN rail with screws x1

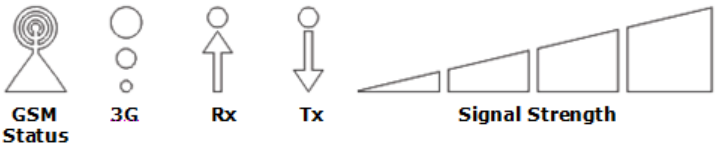
1.2 Interfaces

[1]
- Tri-band UMTS/HSPA (I, II, V) connectivity
- Quad-band GSM, GPRS and EDGE (850, 900, 1800, 1900MHz) connectivity



1.2.1 Status indicator

The LED will indicate different status of the modem:



- GSM status:
  - off: modem is switched off
  - on: modem is connecting to the network
  - flashing slowly: modem is in idle mode
  - flashing rapidly: modem is in transmission/communication (GSM only)
- 3G: availability of 3G network
- Rx: data received over TCP/UDP
- Tx: data transmitted over TCP/UDP
- Signal strength:
  - strong: CSQ 27 or higher
  - medium: CSQ 23 – 26
  - low: CSQ 14 – 22
  - weak: CSQ 1 – 13

1.2.2 SMA female antenna connector (Main)

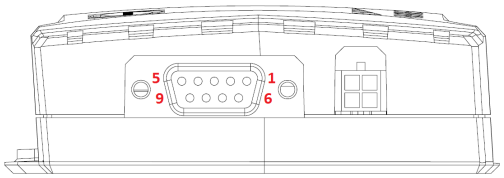
Connect it to an external antenna with SMA male connector. Make sure the antenna is tuned for the frequency band(s) used (one or more of 850/900/1800/1900/2100MHz) with impedance of 50Ohm, and also connector is secured tightly.

1.2.3 SMA female antenna connector (Aux)

The purpose of the second connector is an optional diversity antenna when 3G network is used. Connect it to an external antenna with SMA male connector. Make sure the antenna is tuned for the frequency band(s) used (one or more of 850/1900/2100MHz) and with impedance of 50Ohm, and also connector is secured tightly.

1.2.4 Serial port: 9 pins D-Sub Female connector (RS232)

The connector provides serial link to the modem:

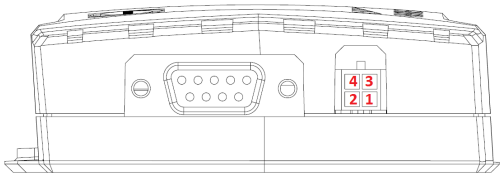


Pin Number	Name	EIA designation	Type
1	DCD	Data Carrier Detect	Output
2	RXD	Receive Data	Output
3	TXD	Transmit Data	Input
4	DTR	Data Terminal Ready	Input
5	GND	Ground	Ground
6	DSR	Data Set Ready	Output
7	RTS	Request To Send	Input
8	CTS	Clear To Send	Output
9	RI	Ring Indicator or 6V[a]	Output

[a]Refer to section1.2.6 for more details

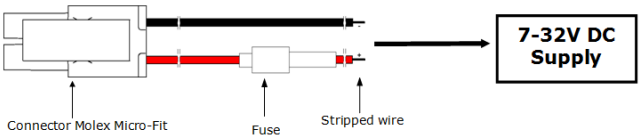
1.2.5 Power input: 4 pins connector

Pin assignment:



Pin number	Name	Functions
1	Not used	None
2	Not used	None
3	POWER -	DC power negative input
4	POWER +	DC power positive input

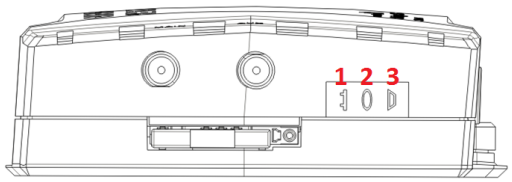
A cable, included in the package shall be used for power supply connection:



1.2.6 Slide switch

The Heritage 3G version adds a new hardware feature selectable through the slide switch. That will give you the ability to power an external equipment without the need of another power supply (e.g. RS485 converter, Bluetooth adapter, sensors, etc...). For that purpose you have two choices of enabling the 6V output: on the serial port or on the add-on board connector; see below for more details on the switch selection.

Note: 6VDC output maximum current is 900mA.

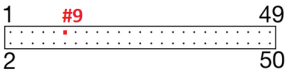


1. 6V output is enabled on the add-on board connector on pin 9[2]
2. 6V output is disabled DB9 pin 9 is in normal state (i.e. ring notification; RI)
3. 6V output is enabled on the serial port DB9 pin 9 (i.e. ring notification; RI)

1.3 Optional accessories

You may contact your sales agent for the following optional accessories.

[2]Pin #9: is the #5 top left pin on the add-on board connector



External antenna

- Magnetic mount type
- Frequency GSM 900/1800 band (3dBi) - **Ref: ACC-A01**
- Frequency GSM 850/1900 band (0dBi) - **Ref: ACC-A05**
- VSWR < 1.5:1
- Height ~ 236 mm (including magnetic base)
- Cable: Type RG-174U length 2.5m
- SMA male connector on cable end
- Color: back (SMA connector silver)

RS232 cable - Ref: ACC-CA07

- Direct connection with standard 9-pin RS-232 port (DTE)
- Shielded cable
- Cable length 1m (w/ connector)

Chapter 2

Installation

2.1 Install the SIM card

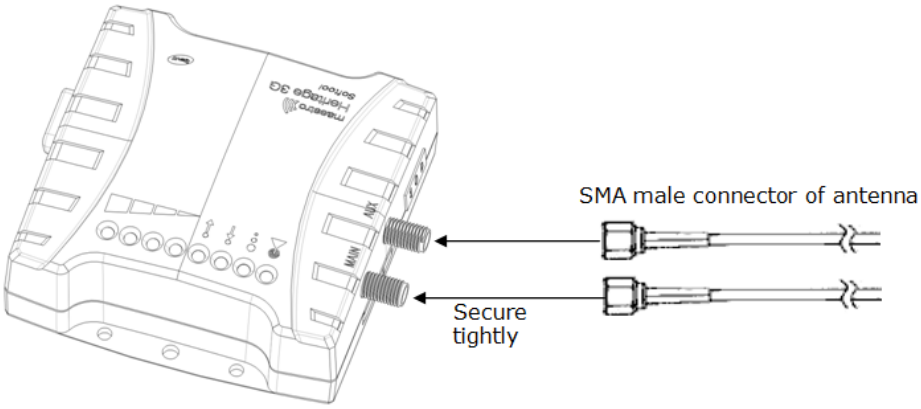
Use a ball pen or paper clip to press the SIM card holder eject button. The SIM card holder will come out a little, take it out and put the SIM card in the tray. Make sure the SIM card is fully inserted inside the tray, and put it back into the slot.

> **Note:** DO NOT pull out the SIM holder without pushing the ejector.

2.2 Connect the external antenna (SMA type)

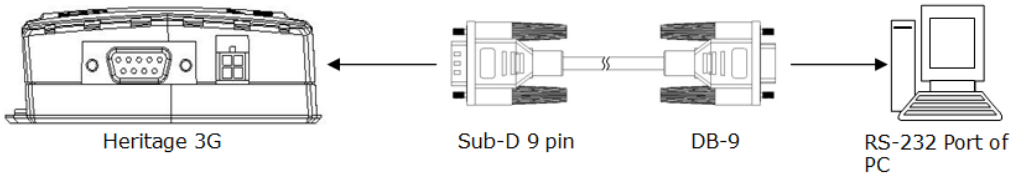
Connect this to an external antenna with SMA male connector and secure it tightly. Make sure the antenna is tuned for the frequency band(s) used (one or more of 850/900/1800/1900/2100Mhz) and with impedance of 50Ohm.

> **Note:** Incorrect antenna will affect communication and even damage the modem.
>
> Diversity antenna for "AUX" is optional when used with 3G network.



2.3 Connect the modem to external device

You can use the RS232 cable to connect the modem's Sub-D connector to external controller/computer. Connection example using RS232 cable:

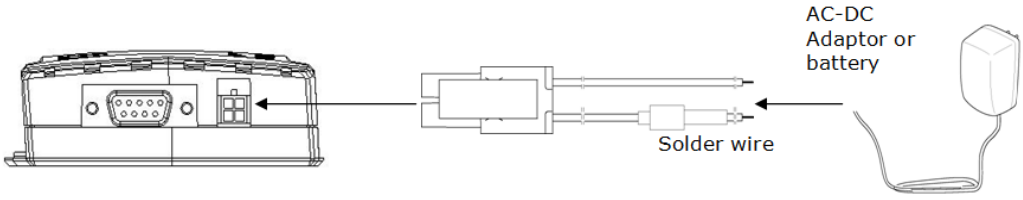


Note: The Heritage modem is a DCE, meaning that Tx pin is an input, and Rx pin is an output. If your serial equipment is also a DCE, you have to use an RS-232 crossed cable (also known as “null modem cable”) to connect it to the modem. If your serial equipment is a DTE, you need to use a straight cable. An easy way to identify your equipment is to remember that a PC is a DTE. If you use a straight cable to connect the PC to the serial equipment, then you will use a crossed cable to connect the modem to the serial equipment, and vice-versa.

2.4 Connect the DC power supply

Connect the open ending of the inducted power cord to a DC supply. Refer to the following for power supply requirement.

Input voltage range	7V – 32V
Rated current	900 mA



Connect the connector to the modem. The modem will turn on automatically.

The status indicator on the modem will be lit when power on. After a few seconds it will go flashing slowly (registered to the network successfully refer to 1.2.1 on page 6).

Chapter 3

Configuration

3.1 Download the SofTool configuration software

First find the SofTool configuration software at this address: `http://software.maestro-wireless.com/`.

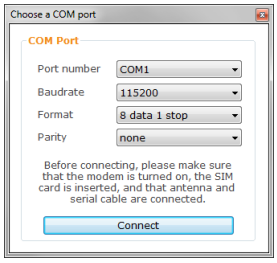
Proceed and follow the instructions on screen.

> **Note:** Your computer needs Windows XP or further, up to date, and with .NET 4.0 client installed[1].

Then open the software, you can find the shortcut on your desktop, or access it by the Start menu > All Programs > Maestro Wireless Solutions > HER010 Heritage SofTool Configuration Software.

3.2 Use of the SofTool configuration software

3.2.1 COM port



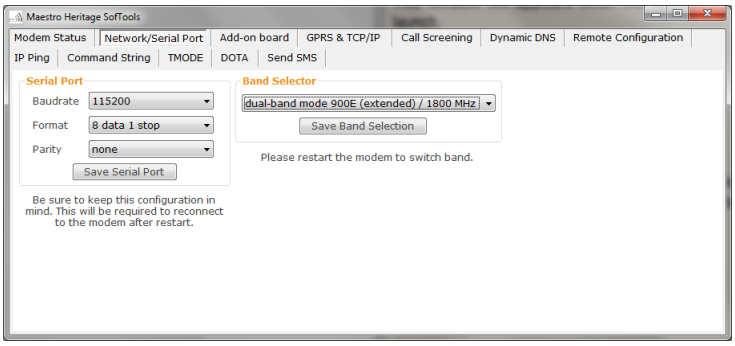
Once open you will have to select the good serial port configuration, it is always set on the default value when launch. (By default: COM1, 115200, 8 data 1 stop, none, with hardware flow control)

3.2.2 Modem status

[1] http://www.microsoft.com/downloads/en/details.aspx?FamilyID=9cfb2d51-5ff4-4491-b0e5-b386f32c0992&displaylang=en

After connection check you will first arrive on this Modem Status tab. It displays the reception signal strength (refreshed every 5sec.), your SIM card network name. And all the versions of the embedded application. Useful to send a screen shot of this tab to your distributor, or Maestro contact, when you encounter any problem with your modems.

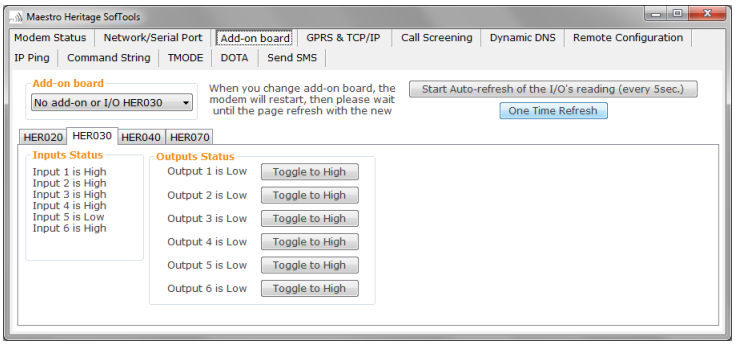
3.2.3 Network and Serial port



In this second tab you can change all the settings of the serial port, and GSM band.

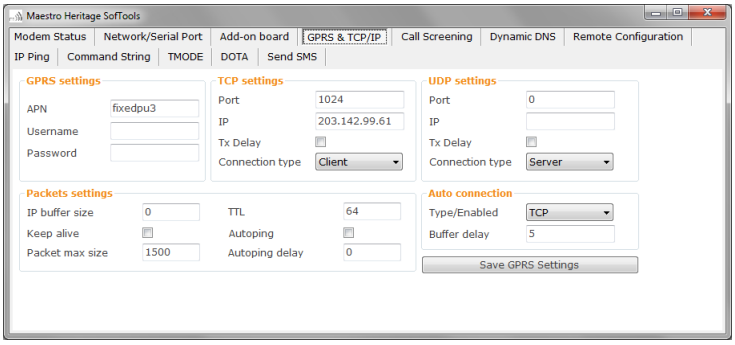
> **Note:** Be aware that changing your serial port settings will need reloading of the application with the selected settings after the modem reboot.

3.2.4 Add-on board



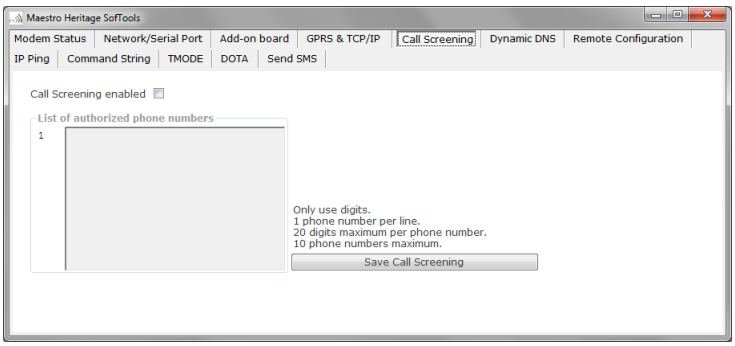
This tab allow you to switch to your add-on board, and set up the main feature of it. You also have a quick look at all the inputs/outputs status and can use the auto-refresh function that will refresh the tab value every 5 seconds. Allow you to test quickly your setup and check your connections.

3.2.5 GPRS & TCP/IP connection



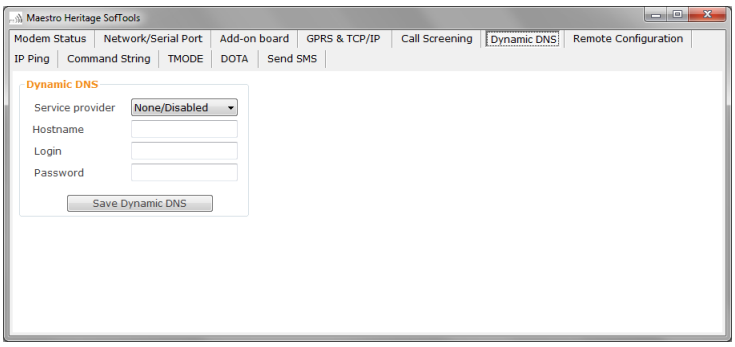
In this tab you will be able to setup the most features of the SofTool. Most important is the APN. And for example the Auto TCP connection, please refer to the 'Maestro Apps Note - Automatic connections - rev0.3' for more details. See Chapter 5 on page 21 for the Related Documents.

3.2.6 Call screening



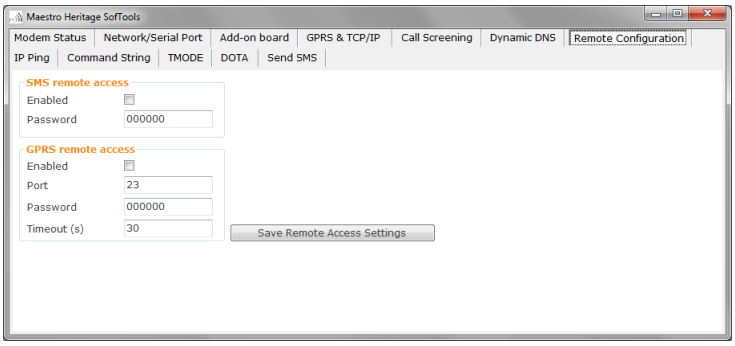
This tab is reserved for the call screening settings, allow you to filter the incoming call to your modem up to 10 phone numbers.

3.2.7 Dynamic DNS



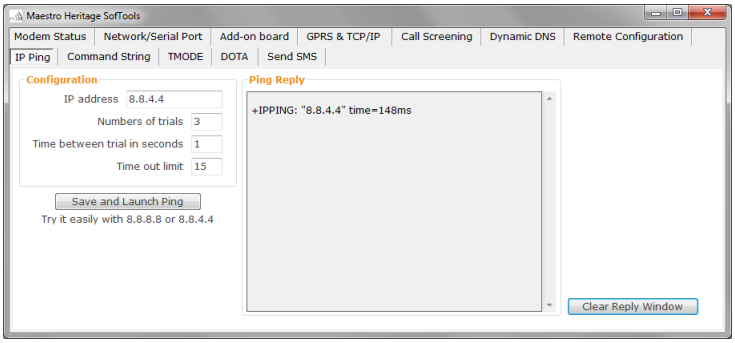
This tab allow you to setup your Dynamic DNS account. SofTool support the main Dynamic DNS provider DynDNS and NoIP.

3.2.8 Remote Configuration



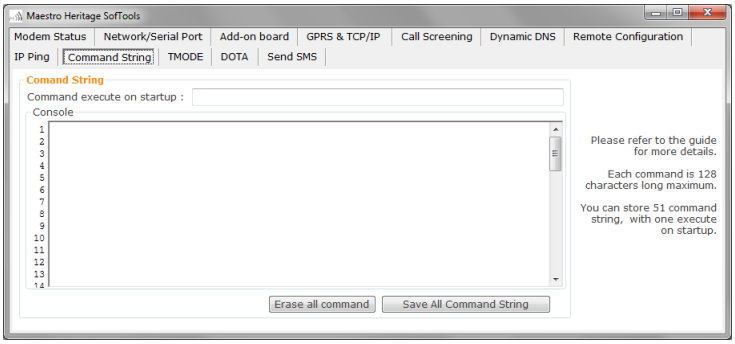
This tab allow you to setup the remote access settings for your modem. Enable to access it from outside, and change AT command without the need to go on field. You can do that either via SMS or remote Telnet connection.

3.2.9 IP ping



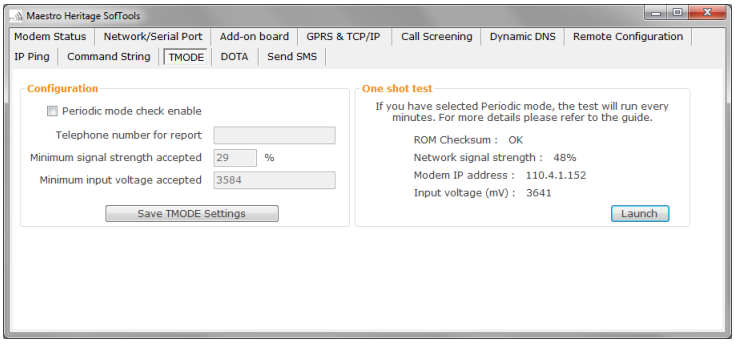
This tab allow you to ping a IP address on the internet, for test and debug purpose, it is then easy to check your are well connected to your GPRS network.

3.2.10 Command String



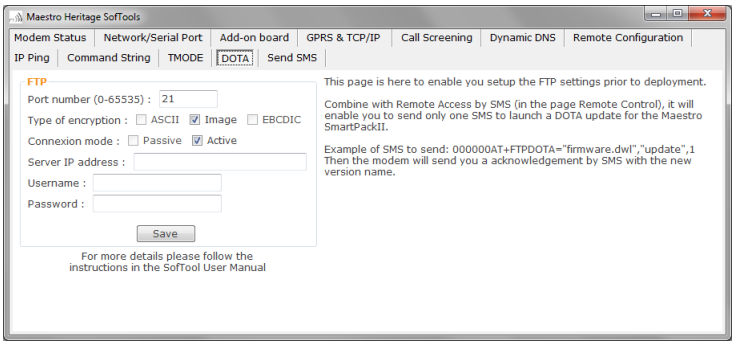
This tab allow you to enter command string script easily in the modem. For more details refer to the Annex of the SofTool software manual. See Chapter 5 on page 21 for the Related Documents.

3.2.11 TMODE



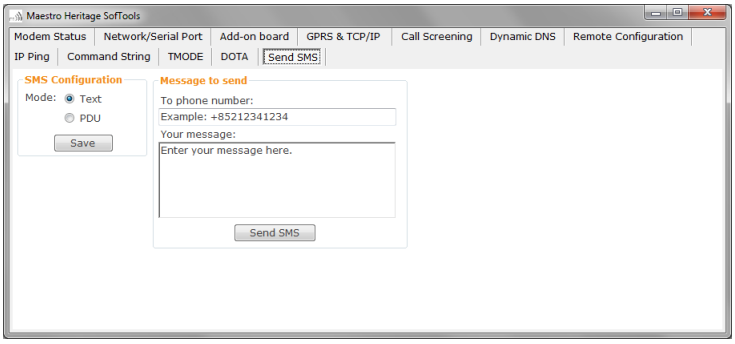
This tab is for the SofTool Tmode that allow to check your modem ROM, signal strength, IP address and input voltage, and send alert by SMS if there is threshold on these values.

3.2.12 DOTA



This tab allow you to first setup your FTP server for DOTA upgrade, then combine with remote access, this will allow you to update your modem firmware with only one SMS !

3.2.13 Send SMS



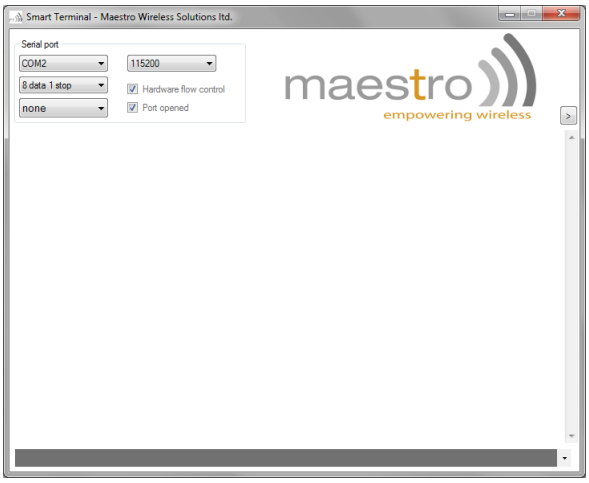
The tab allow you to send SMS easily using your Maestro Heritage modem.

3.3 Debug, or further command using Smart Terminal as example

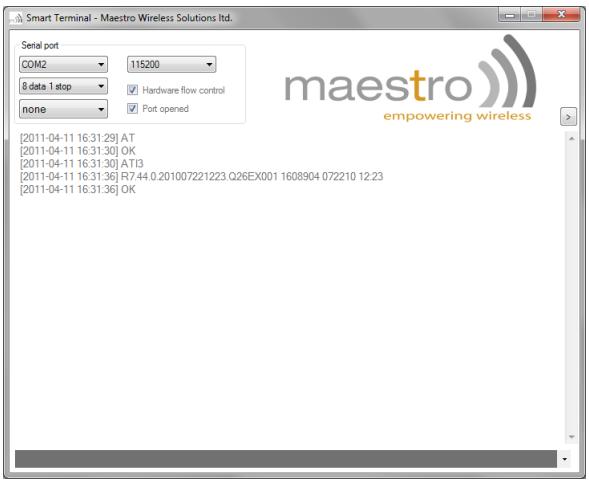
First, you can find our Hyper Terminal substitute at the following address: `http://software.maestro-wireless.com/`

Then follow the steps:

- Open the software, you can find the shortcut on your desktop, or access it by the Start menu > All Programs > Maestro Wireless Solutions > Smart Terminal.
- Once open you will have to select the good serial port configuration (By default: COM1, 115200, 8 data 1 stop, none, with hardware flow control)
- Open the port by ticking the Port opened box :



- Then you can type command like “AT” and check the "OK" response from the modem. You can also use any other AT commands.



3.4 Basic operation

Followings are examples of some AT commands. Please refer to the AT command document for a full description.

Note: Issue AT+CMEE=1 to have extended error code (+CME ERROR)

Description	AT commands	Modem response	Comments
Network registration checking	AT+CREG?	CREG=<mode>,1	Modem registered to the network
		CREG=<mode>,2	Registration lost, re-registration attempt
		CREG=<mode>,0	Modem not registered on the network, no registration attempt
Receiving signal strength	AT+CSQ	+CSQ:20,0	First parameter has to be at least 15 for normal communication
Receiving an incoming call		RING	An incoming call is waiting
	ATA	OK	Answer the call
Make a call	ATD1234567;	OK	Communication established (Remember the ";" at the end for "voice" call)
		+CME ERROR: 11	PIN code not entered (with +CME=1 mode)
		+CME ERROR: 3	AOC credit exceeded or a communication is already established
Make an emergency call	ATD 112;	OK	Communication established (Remember the ";" at the end for "voice" call)
Communication loss		NO CARRIER	
Hang up	ATH	OK	
Enter PIN code	AT+CPIN=1234	OK	PIN Code accepted
		+CME ERROR: 16	Incorrect PIN code (with +CME=1 mode)
		+CME ERROR: 3	PIN already entered (with +CME=1 mode)
Saves parameters in non-volatile memory	AT&W	OK	Configuration settings are stored

Chapter 4

Specifications

- 3GPP FDD Release 6 HSUPA Compliant
- Tri-band UMTS/HxDPA (WCDMA/FDD) 2100/1900/850MHz (band I, II and IV)
- Downlink data rates up to HSDPA Category 8 (7.2 Mbps)
- Uplink data rates up to HSUPA Category 5 (2 Mbps)
- Quad-Band GSM 850/900/1800/1900MHz
- Support Data, Voice
- ETSI GSM Phase 2 + compliant
- LED Bar indication of RSSI, Network Registration, Up/Down data Traffic and 3G availability
- GPRS Class 12 / EDGE Class 12
- Real time clock backup by Super-Capacitor
- Built-in watchdog chip to prevent modem lock-up
- Control via AT command (GSM 07.05, GSM 07.07 and Sierra Wireless proprietary)

Power supply requirement:

- Input voltage range : 7-32V
- Rated current: 900mA

Typical current consumption:

	@7V	@12V	@32V
GSM850/900MHz communication mode PCL=5	200mA	170mA	60mA
DCS1800/1900MHz communication mode PCL=0	250mA	150mA	50mA
GPRS850/900Mhz Transfer Mode class 12	450mA	260mA	90mA
GPRS1800/1900Mhz Transfer Mode class 12	380mA	200mA	80mA
UMTS Connected Mode BAND II @ +22 dBm	500mA	320mA	120mA
HSDPA Data Transfer2 Cat. 8 7.2Mbits/s BAND II @ +22 dBm	600mA	380mA	140mA
Idle mode	100mA	38mA	18mA

Interfaces:

- SIM Holder
- 9 pin sub-D connector
- 4 pin power supply connector
- SMA antenna connector (Main and Aux) (50 Ohm)
- Din rail mountable
- Slide switch
- Expansion slot for add-on module for customized functions

Dimensions:

- Overall size: 79mm x 84mm x 27mm
- Weight: 100g
- Temperature range:
  - Operating ETSI compliant: -20℃ to +55℃
  - Operating functional: -35℃ to +75℃
  - Storage: -40℃ to +75℃

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Chapter 5

Related Information

5.1 Related documents

- Sierra Wireless - AT Commands Interface Guide for Open AT Firmware
- Maestro Heritage - Software Tools - rev1.4
- Maestro Wireless Solutions - How to upgrade a modem in five easy steps
- Maestro Apps Note - Automatic connections - rev0.3

5.2 Related software

- SofTool configuration software
- SmarTerminal

5.3 Factory settings

The modem has the following factory settings. Please refer to the AT command document for the meaning of each setting.

Related AT commands	Factory settings	Description
AT+WMBS	7	Auto Quad Band Feature
AT+IPR	115200	DTE-DCE data rate
AT+IFC	2,2	DTE-DCE flow control
AT+ICF	3,4	DTE-DCE character framing
ATE	1	ECHO
AT&C	1	DCD signal
AT&D	2	DTR signal
ATQ	0	Result code suppression
ATV	1	Response format
AT&S	1	DSR signal
ATS0	0	Auto answer
AT+CLIP	0	Calling line ID presentation
AT+CRLP		Calling line ID restriction
AT+CSCS	“PCCP437”	Character Set
AT+CMGF	1	Short message format
AT+CSMP	1,67,0,0	Test mode parameters
AT+CNMI	0,1,0,0	New message indication

Chapter 6

Troubleshooting

6.1 The modem's LED does not light

- Check if the modem has been properly connected to a 7-32V power supply
- Check if the power connector is properly inserted
- Check the fuse on the power cord

6.2 The modem's LED lights but does not blink long time after power up

- Check if a valid SIM card has been properly inserted
- Check if the SIM card has been locked (refer to AT+CPIN command in AT command guide)
- Check if the external has been properly connected to the modem
- Check if the network coverage is available

6.3 The modem does not respond to the terminal program

- Check if the RS232 cable has been properly connected
- Check if your program has proper settings. Factory setting of the modem is:
  - 115200 bps
  - 8 data bits
  - No parity bit
  - 1 stop bit