

M100 CDMA *plus*



Quick Start Guide

Version 1.4 Beta
Firmware R7.52.0.A3
SmartPack_097k_SL3010T

Version	Date	Details	Author
0.1	29 Apr. 2014	First issue	Matthieu Boulanger
0.2	22 Oct. 2014	Added power consumption	Matthieu Boulanger
0.3	23 Oct. 2014	Updated AVMS section	Matthieu Boulanger
1.0	30 Oct. 2014	Updated Linux driver and PPP issue	Matthieu Boulanger
1.1	2 Dec. 2014	Updated I/O specification Update LED behavior	Matthieu Boulanger
1.2	9 Dec. 2014	Updated I/O description	Matthieu Boulanger
1.3	16 Jan. 2015	Updated activation procedure	Matthieu Boulanger
1.4	28 Avr. 2015	Updated international number	Matthieu Boulanger

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Contents

Table of Contents

Contents	3
Table of Contents	3
Chapter 1	5
Known Issues	5
Chapter 2	6
Specifications	6
Power supply requirement:	6
Typical current consumption:	6
Interfaces:	6
Dimensions:	6
Temperature range:	7
Front label:	8
Back label:	8
Packing:	8
Chapter 3	9
Related documents	9
Chapter 4	10
Hardware installation	10
Mounting the modem:	10
Connecting the external antennas (SMA type):	10
Connecting the modem to external device:	11
Connecting the DC power supply:	11
Chapter 5	12
Registration to the network	12
Carrier requirement:	12
First time activation on	12
Verizon Wireless Network:	12
Chapter 6	13
M100 CDMA <i>plus</i> quick setup guide	13
Downloading the Maestro Configuration Software:	13
Using the Maestro Configuration Software	13
Chapter 7	16
Equipment Description	16
Interfaces:	16
Status indicator:	16

SMA female antenna connector:	16
Mini-USB B female connector:	16
15-pin D-sub antenna connector (RS-232):	17
4-pin Micro-Fit Molex connector (Power and input):	17
Digital inputs wiring diagram:	18
Optional accessories:	19
DB15 Serial cable - ACC-CA01	19
USB 'X' cable – ACC-CA41	19
Mini USB B male to USB A male cable - ACC-CA42	19
Power cord with fuse - ACC-CA10.....	19
Penta-band L-shape antenna - ACC-A11	19
Penta-band antenna - ACC-A17A.....	20
Penta-band antenna - ACC-A03.....	20
DIN rail mount - ACC-DIN.....	20
DB15 to DB9 adapter - OTH-004	20
Chapter 8	21
Default Firmware settings	21
Factory setting:	21
Digital input ports	21
RS232 auto-online mode (power saving)	21
Chapter 9	22
Troubleshooting	22
Known Issues	22
The modem's LED does not blink.....	22
The modem does not respond to the terminal program.....	22
Debug, or further command using Smart Terminal as example.....	22

Chapter 1

Known Issues

Beware of the difference between M100 2G, M100evo, M100 3G and M100 CDMA ^{plus} GPIO type on the 4-pin Micro-Fit connector.

Below known issues on **M100 CDMA ^{plus}** :

- . DCD, DSR, DTR signals are not currently available on the serial port, firmware R7.53 will solve this issue and is planed for release by Sierra Wireless for 2015.

Chapter 2

Specifications

- Dual band CDMA 1XRTT 800/1900MHz
- M100 CDMA *plus* SKU is
- M100CDMAPLUS-V
- Memory size: 64Mbits Flash and 16Mbits RAM
- Support Data, SMS, and Fax
- AT command set (GSM 07.05, GSM 07.07 and Sierra Wireless proprietary)

Power supply requirement:

- Input voltage range: 5-32V
- Rated current: 650mA

Typical current consumption:

Mode	@5V	@12V	@32V
IS-2000 PCS 1900MHz	642mA	233mA	101mA
IS-2000 cellular 800MHz	520mA	217mA	91mA
IS-95B PCS 1900MHz	582mA	232mA	99mA
IS-95B cellular 800MHz	578mA	221mA	90mA
Idle (RS232 & USB connected)	68mA	32mA	15mA
Idle (RS232 & USB not connected)	45mA	22mA	10mA

Interfaces:

- 15 pin sub-D connector
- 4 pin power supply connector
- SMA Cellular antenna connector (50Ω)
- mini-USB Female port
- SMA GPS antenna connector (50Ω)

Dimensions:

- Overall size: 74.3mm x 60mm x 21.7mm - 2.47" x 2.36" x 0.86"
- Weight: 90g – 0.2 lb

Temperature range:

- Operating: -40°C to +85°C with relative humidity below 95%
- Storage: -40°C to +85°C

CAUTION

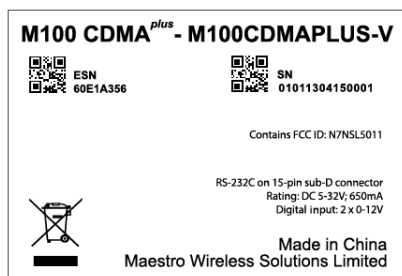
In accordance with the European directive EN60590, if the ambient temperature exceeds or might exceed 65°C, it is required that the installer:

- Avoid physical contact with the Maestro 100 3G when the temperature exceeds 65°C.
- Adds a marking on the assembly indicating that this part is hot (for example showing the "symbol IEC 60417-5041: *Caution, hot surface*"; and/or having a wording similar to "CAUTION - HOT SURFACE - DO NOT TOUCH").

Front label:



Back label:



Packing:

- Bulk carton box of 50 pieces
- Each M100 CDMA *plus* in single plastic bag without any accessories
- Overall size: 522mm x 212mm x 150mm
- Weight: 4.3kg

Chapter 3

Related documents

This document presents technical and hardware specifications of the M100 CDMA *plus* industrial modem. It covers a hardware installation, quick start guide, accessories listing, and troubleshooting details.

This document will not cover the embedded application details, neither the common 3GPP AT command list, for more information please refer to the following documentations available on our website:

- Maestro M100 Series SmartPack User manual version3 or higher, intelligent embedded application
- AirPrime - SL3010T - Product Technical Specification and Customer Design Guidelines - Rev3.0 or higher
- AirPrime_SL5011_and_SL3010T_AT_Commands_Interface_Guide_Rev6_0 or higher
- AT_Command_Interface_Guide for Firmware 7.52.0.A3 or higher

Please download related documents on <http://www.maestro-wireless.com/m100cdmaplus>

Chapter 4

Hardware installation

Mounting the modem:

If delivered with the DIN clip accessory, detailed on page 22, use two M3 screws to mount the DIN clip on the back of the modem as shown on figure 1.

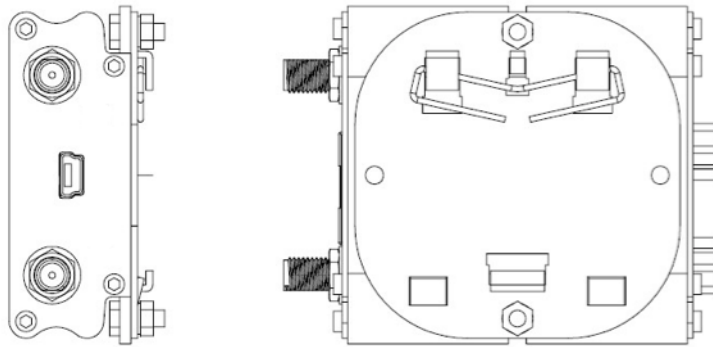


Figure 1: DIN clip mounted on M100 CDMA *plus*

Connecting the external antennas (SMA type):

Connect both antennas with SMA male connector on the modem, make sure antennas are tightly secured. Select a CDMA antenna with the right CDMA frequency and an impedance of 50Ω; incorrect antenna will affect communication and even damage the modem. Select a GPS antenna with an impedance of 50Ω; incorrect antenna will affect GPS sensitivity and time to fix.

Note: Make sure to install CDMA and GPS antennas with an angle of at least 90° to avoid disturbance. Refer to the drawing on Figure 2 below.

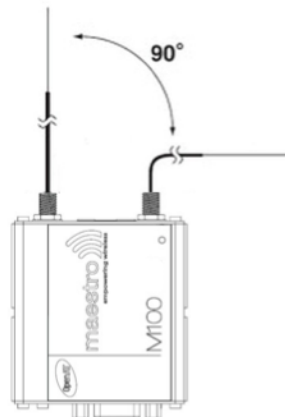


Figure 2: Antenna positions

Note: Respect a safety distance of at least 26.6cm to the antenna during the modem operation.

Connecting the modem to external device:

Use Maestro standard DB15 to DB9 straight cable, detailed on page 21 or a common USB to mini-USB cable, to connect an external controller or a computer. Refer to chapter 7 for more details on some other cable option or adapter.

!! You will need driver to connect via USB. Please register on Maestro Wireless website to access technical documentation and visit [maestro M100CDMA^{plus} webpage](#) to download latest drivers.

Note: If the M100 CDMA *plus* is connected with another DCE device please use a cross cable.

Connecting the DC power supply:

If delivered with the power cord accessory, detailed on page 20, use the open ending of the power cord to connect a DC supply. Refer to the following for power supply requirement:

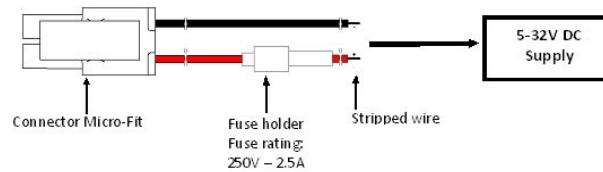


Figure 3: Power cord connection (ACC-CA10, not included in standard package)

!! Failure to use a fuse while connecting your device to a power source will void the warranty and may damage the device.

Plug the DC Molex connector of the power cord in the modem and it will turn on automatically. The status indicator led will light when power is applied. After few seconds it will blink slowly, meaning the modem is registered on the network.

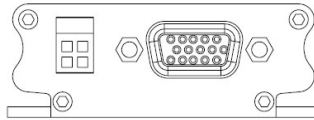


Figure 4: Side view showing power and serial connector

Note: Modem can also be powered and connected by USB only using the ACC-CA41 Maestro 'X' Cable as detailed on page 21.

Chapter 5

Registration to the network

Carrier requirement:

Before the modem can be use, it is necessary to supply the Electronic Serial Number (ESN) of the modem to the carrier and set up an account on their network.

First time activation on Verizon Wireless Network:

The M100 CDMA *plus* will only work on the Verizon network. Prior to the first activation of the modem, make sure that a service plan has been secured with Verizon or a MVNO using their network.

To activate the modem, you need to type commands on the serial port (or USB port after installation of USB driver). A Terminal software is necessary. Maestro Configuration Software utility can be used using the "Terminal" tab of the tool (see Chapter 6 for installation and use of this tool).

Then, before starting the actual activation procedure, please check that the modem is powered up, the antenna is well fixed on the "Cellular" connector and signal strength is good with the AT command "AT+CSQ" (wait 20s after it is powered up to have a stable value). A good signal is a value >11 for the 1st parameter of the command result.

If signal is below 11, it is recommended to move the equipment to a better area.

When signal is good enough, check the registration status with the command AT+CREG? .

The 2nd parameter should be 1 or 5 meaning that it is registered on the network and ready for operation. If it is not the case and if the signal strength is good, you might need to check the registration of your modem with the network operator.

The activation procedure on the Verizon network is triggered by the command < ATD*22899; > the following messages will display:

OK

After several second you will see:

NO CARRIER

Then to check if the activation was successful, you can use the AT!ACTSTAT? Command. If !ACTSTAT is 1 the device is well activated on Verizon.

!/\ Note: If device is already registered to the network (+IPCONNECT=1,1) the !ACTSTAT command won't work.

Details of current serving network is given by the command AT!STATUS.

Current band: Cellular Sleep
Current channel: 507
SID: 40 NID: 6 1xRoam: 64 HDRRoam: 0
Temp: 25 State: 200 Sys Mode: CDMA
Pilot acquired
Modem has registered

Chapter 6

M100 CDMA *plus* quick setup guide

Compact & intelligent industrial modem :

The M100 is the perfect solution for M2M applications facing tough environmental conditions and extended lifetime requirements. This compact and intelligent modem running Open AT[®] Application Framework supports specific protocols and accessories specifically developed by Maestro to ease integration with industrial equipment such as electricity meters, programmable logic controllers, lifts and vending machines. The M100 is fully type approved in 2G, CDMA or 3G and ready for global deployment.

All M100 CDMA *plus* also features two digital inputs pins, a mini-USB connector and GPS feature.

Downloading the Maestro Configuration Software:

Start the web browser of your choice and download the Maestro Configuration Software at this address:
<http://software.maestro-wireless.com/maestro-configuration-software/setup.exe>.

Please start the setup.exe application and follow instructions shown on screen. It will also create a shortcut on your desktop.

Using the Maestro Configuration Software

The window shown on Figure 5 on the following page will appear when the application starts, you need to enter your COM port settings and click "Connect" button. Default settings are 115200, 8 data 1 stop, parity none, detailed on page 23. The serial configuration settings will be saved upon connection.

Details of Figure 5:

1. **Com port:** select the correct COM port to use. The box will auto-refresh on click. Selected COM port will be saved after connection.
2. **Serial configuration:** select the correct settings for the serial port, and click "Connect". Settings will be saved on connection. If modem reply to AT+VAFV command it will automatically switch the window to the "Modem Status" page and if it only reply to AT command the window will switch to "Terminal" page.
3. **Update your modem:** use this tool to upgrade your modem that handles both firmware and latest Maestro application.
4. **Diagnostics to contact support:** as stated please use this button to generate a report of all common AT command that will help us solve any issue you have with the modem easily.
5. **Auto-detect serial configuration:** will detect your modem serial configuration automatically, though it may take some time.

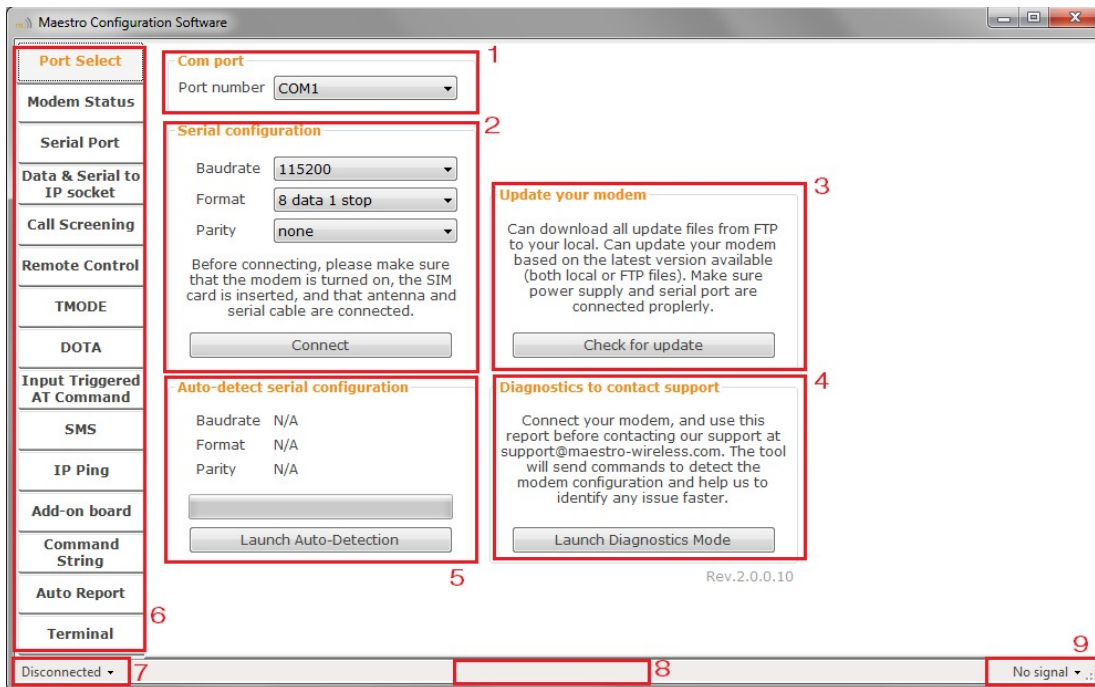


Figure 5: Start page – Maestro configuration software

6. **Menu tab page:** once connected menu will show ready for use and could do configuration of all modem features.
7. Quick connect/disconnect button.
8. **AT command sent status message:** will show the current AT command sent to the modem for a quick debug.
9. Quick signal strength overview, which can be deactivated.

Figure 6: Status page – Maestro Configuration software

Once connected, the interface will switch to the "Modem Status" page, see Figure 6, displays the reception signal strength (RSSI, refreshed every five seconds), your network name, as well as the revision number for the embedded application and firmware.

The Maestro Configuration Software add an easy to configure interface to all the SmartPack features, detailed as:

- Data & Serial to IP socket: auto TCP/UDP, IP packet settings, ...
- Call screening,
- Remote control: Both SMS and TCP terminal, and dynamic DNS,
- TMODE,
- DOTA,
- SMS: for both reading and sending in Text mode, and auto PIN,
- IP Ping,
- Command String, scripting language
- GPS.

The last and not least page of the Maestro Configuration Software is the Terminal, which is a Windows HyperTerminal replacement with log, quick command features, see Figure 7.

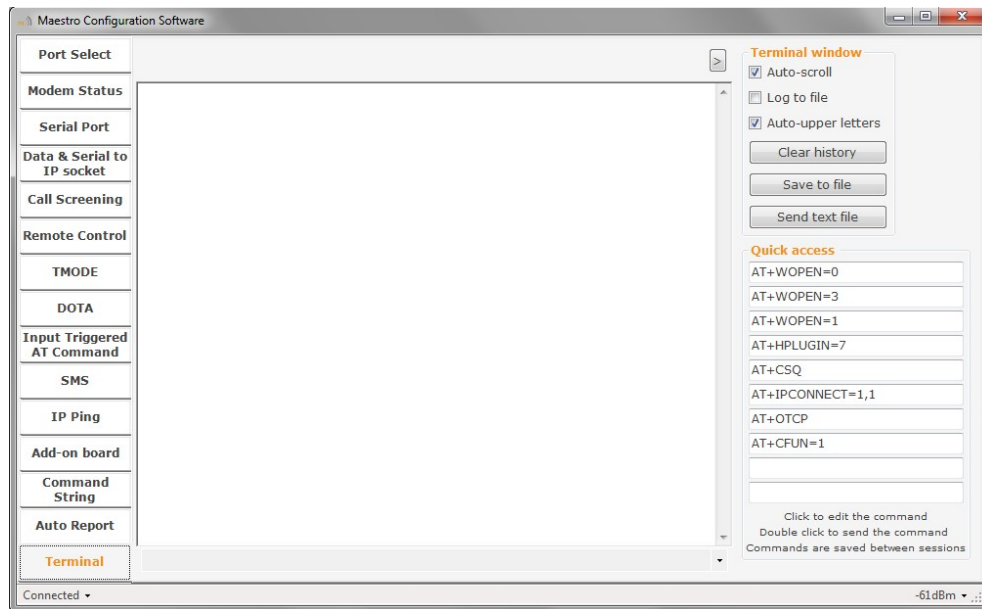
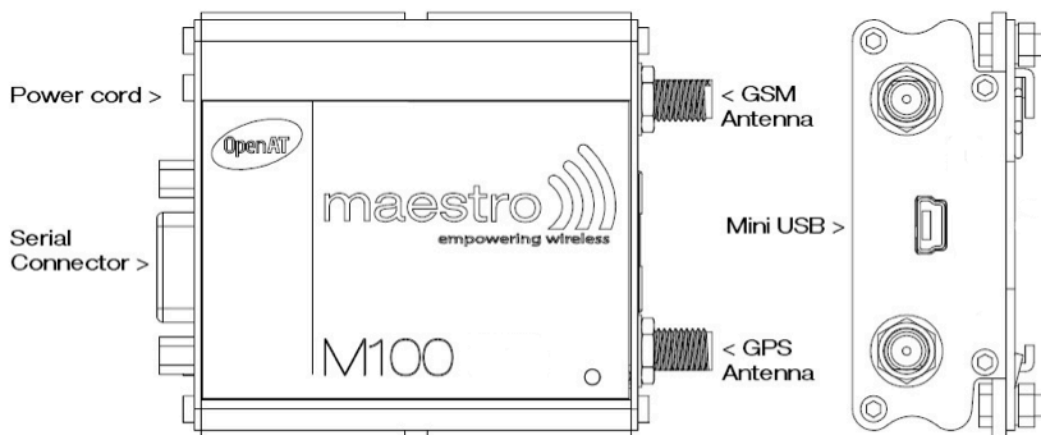


Figure 7: Terminal page – Maestro Configuration Software

Chapter 7

Equipment Description

Interfaces:



Status indicator:

The LED will indicate status of the modem:

!! LED will not light up when the unit will be powered, it will only blink once the antenna is attached and connected to the Verizon CDMA network

- Blinking: Verizon CDMA network is available

SMA female antenna connector:

- CDMA SMA female connector: fits dual band 800/1900 MHz antenna with impedance of 50Ω.
- GPS SMA antenna female connector: fits active or passive GPS antenna with impedance of 50Ω.

Note: Make sure to install CDMA and GPS antennas with an angle of at least 90° to avoid disturbance.

Mini-USB B female connector:

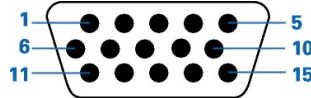
USB port is used for data communication and configuration; driver package is available for Windows XP, 7, Android and Linux. Please make sure you install the driver package (File: *USBDriverInstallerV3841.exe*) before plugging the device in. If you already plug it in, please reinstall the driver using those from the package, and plug your unit back.

USB will enable and emulate a Device, a Network Adapter and multiple COM Port on computer to access:

- CNS port
- DM port
- NMEA port
- and AT command port

15-pin D-sub antenna connector (RS-232):

This connector provides serial link and to the modem.



Pin Number	Name	EIA designation	Type	Note
1	N/A	Data Carrier Detect		Available with R7.53 firmware
2	TxD	Transmit Data	Input	
3	NC			
4				
5				
6	RxD	Receive Data	Output	
7	N/A	Data Set Ready		Available with R7.53 firmware
8	N/A	Data Terminal Ready		Available with R7.53 firmware
9	GND	Ground	Ground	
10				
11	CTS	Clear To Send	Output	
12	RTS	Request To Send	Input	
13	RI	Ring Indicator	Output	
14	RESET		Input	Pull low for 100ms to reset, module require 5-7s to reboot
15				

4-pin Micro-Fit Molex connector (Power and input):

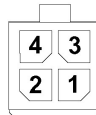


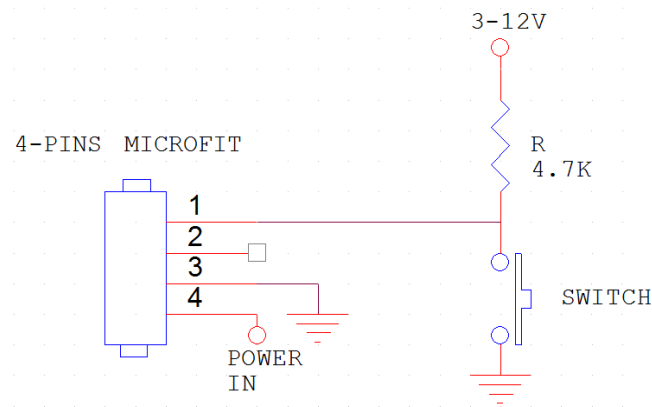
Figure 8: Pin Assignment of 4-pin connector

Pin number	Name	Functions
1	DI2	Digital input (3V for input detection, 12V max.)
2	DI1	Digital input (3V for input detection, 12V max.)
3	POWER -	DC power negative input (or ground)
4	POWER +	DC power positive input (5V to 32V max.)

The 4-pin Micro-Fit Molex connector comes with only the power supply connector by default. If you need to add wires for to use the input/output pin please use a Female Terminal 43030 from Molex, we recommend using 20-24AWG wire.

Digital inputs wiring diagram:

Example of DI1 used as input to sense a switch:



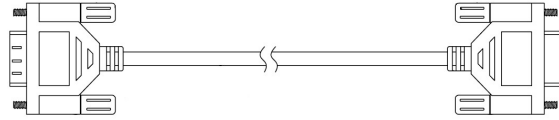
- Output needs to be open when using as an input.
- Input is high when voltage is over 3V and low when voltage is below 0.5V.

Optional accessories:

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

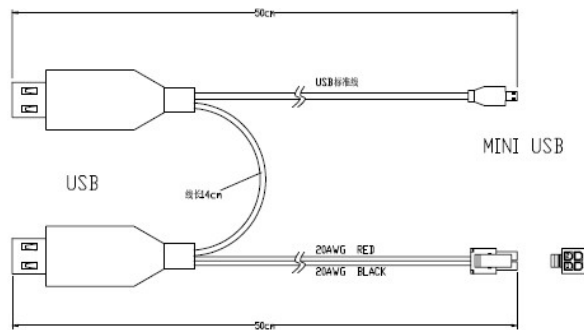
DB15 Serial cable - ACC-CA01

- Direct connection with standard 9-pin RS-232 port (DTE)
- Shielded cable
- Cable length 1.1m (w/ connector)



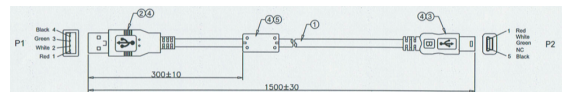
USB 'X' cable – ACC-CA41

- Direct connection with standard USB for power and data channels
- Shielded cable
- Cable length 50cm
- Make sure the current given to the USB connectors from computer is sufficient, especially while in 3G communication
- Using USB 'X' Cable may alter performance of the M100 3G if used in very poor area or with too low power supplied



Mini USB B male to USB A male cable - ACC-CA42

- Length : 1500 +/- 30mm



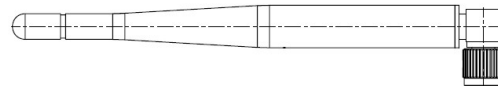
Power cord with fuse - ACC-CA10

- 4-pin Micro-Fit connector
- 1m AWG20 cables with stripped wire end
- 2.5A glass fuse with plastic holder



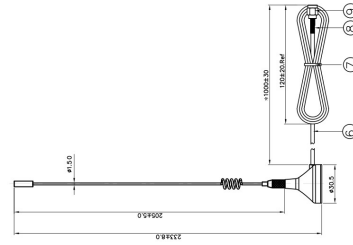
Penta-band L-shape antenna - ACC-A11

- Frequency bands:
850/900/1800/1900/2100MHz
- Antenna Gain
2.0 ± 0.7dBi @ 880MHz
1.0 ± 0.7dBi @ 1990MHz
- Polarization: linear



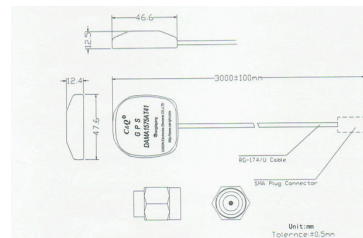
Penta-band antenna - ACC-A17A

- Frequency bands: 850/900/1800/1900/2100MHz
- Gain +1dBi – Antenna Gain
- 1.0 ± 0.7 dBi @ 824~960MHz
- 0.5 ± 0.7 dBi @ 1710~2170MHz
- Polarization Linear
- Cable length 1m (w/ connector)



Penta-band antenna - ACC-A03

- Frequency bands: 1575.42MHz
- Gain: 26dB
- 46.5 x 46.5 x 12.5 mm
- Mounting: magnetic base
- Material ABS
- Polarization Linear
- Cable length 3m RG-174/U



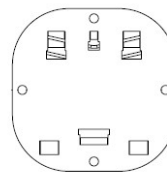
Switching Power Adaptor Industrial grade 1.25 A (with NEMA 2 Pins plug cable - USA) – ACC-PS09

- Size: L115mm*W34mm*H30mm
- Voltage Input: AC 100-240V 0.6A 50/60Hz
- Voltage Output: DC 12V 1.25A
- Standard: UL 60950/CUL/FCC/GS EN60950/ EN55022



DIN rail mount - ACC-DIN

- SPCC steel
- Thickness: 1.2mm



DB15 to DB9 adapter - OTH-004

- Plastic molded with screws
- Length: 36mm (w/ connector)

Chapter 8

Default Firmware settings

Factory setting:

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+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
ATQ	0	Result code suppression
ATV	1	Response format
ATS0	0	Auto answer
AT+CSCS	"PCCP437"	Character Set
AT+CMGF	1	Short message format

Digital input ports

// **Important notice:** This section concern only OpenAT developer that will need to control GPIOs from their application, else the Maestro SmartPack will control GPIOs through SmartPack AT commands.

Inputs are mapped in OpenAT to: **GPIO1** for DI1, **GPIO3** for DI2.

To setup DI1 as an input, type **AT+WIM=1,"GPIO1",0** on the serial port. Then to read the status of the input, type **AT+WIOR="GPIO1"**. **+WIOR: 1** means input is below 0.5V while **+WIOR: 0** means a positive voltage of more than 3V. Higher voltage than 12V will damage the unit.

RS232 auto-online mode (power saving)

When on auto-online mode, the RS-232 transceiver will shut down most of its hardware, to save power, if it does not detect a valid input for more than 100µs. The RS-232 transceiver will wake up when valid input is detected again. By default, auto-online mode is not active. To activate it, issue **AT+WIM=1,"GPIO2",1,1** followed by **AT+WIM=4**. This setting needs to be set once, and will be saved in memory.

Chapter 9

Troubleshooting

Known Issues

- When connection is active (+IPCONNECT=1,1) the AT! Commands are not working. (AT!ACTSTAT?, AT!STATUS, etc...)
- DSR, DCD, DTR are not supported yet.
- When sending SMS to international number the + is not handle properly, please use number with 00 instead.

The modem's LED does not blink

- Check if the antenna is well connected to the device.
- Check if the modem has been registered on the network (Chapter 7 of this user manual)
- Check if the external power has been properly connected to the modem
- Check if the network coverage is available
- Make sure that the CTS and DTR pins of the serial port are not connected together

The modem does not respond to the terminal program

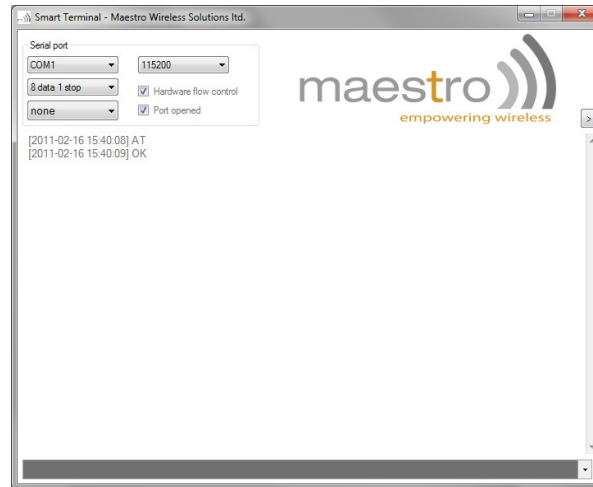
- Check if the RS-232 cable has been properly connected
- Check if your program has proper settings. Factory setting of the modem is:
 - 115200 bps
 - 8 data bits
 - No parity bit
 - 1 stop bit

Debug, or further command using Smart Terminal as example

- First, you can find our Hyper Terminal substitute at the following address: <http://www.maestro-wireless.com/smart-terminal>. 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



- Then you can type command like "AT" and check the "OK" response from the modem.



Basic operations

Followings are examples of some AT commands. Please refer to the AT command document for a full description. **Note:** Issue AT+CME=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	The 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 (Don't forget 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 (Don't forget the ";" at the end for "voice" call)
Communication loss		NO CARRIER	
Hang up	ATH	OK	
Saves parameters in non-volatile memory	AT&W	OK	The configuration settings are stored

Failsafe factory reinstall using USB Binary Update Tool

In case your modem firmware is crash or can't be flash via Serial port, Maestro Wireless can provide a binary update tool using USB, please contact support@maestro-wireless.com to receive those files.

