MAESTRO 100 CDMA

QUICK START GUIDE & USER MANUAL REV. 0.4

Revision history

Rev.	Date	Details	Originated by
0.1	26 January 2011	First release	Frank Tang
0.2	16 March 2012	Added details on the activation process	Pierre-Emmanuel Surga
0.3	17 April 2012	Activation process for Aeris, editing	Pierre-Emmanuel Surga
0.4	22 May 2012	Edit activation process for Verizon, add TCP testing section	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 or CDMA 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 26.6cm 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/CDMA 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

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Chapter 1

Introduction

Maestro 100 CDMA is a AT command-driven modem built-in a Sierra Wireless Q26 Elite CDMA engine. Different versions of the modem are available:

- – For SPRINT network: M100CDMA-S

- – For VERIZON network: M100CDMA-V

- – For AERIS network: M100CDMA-A

- – Generic version (Provisioning for Carrier Requirement).

The modem is based on CDMA 2000 / 1XRTT dual band technology. Depending on the service subscribed, Maestro 100 CDMA supports async data, circuit switch data and packet data. Data rates are up to 153Kbps.

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Chapter 2

Equipments Description

2.1 Package

The M100CDMA package includes the following:

– M100CDMA modem x 1

– Power cord with fuse x 1

2.2 Reference documents

The M100 CDMA use a Sierra Wireless Q26 Elite module, so please refer to the Sierra Wireless User Manual and Applications Notes list below for further details, on:

– How to use the CDMA specific AT command: *AirPrime Q26 Elite Software User Guide and AT Commands Interface Specification.*

– Apps notes on CMUX features: *AirPrime CMUX Feature for Q26 Elite.*

– Apps notes on network registration details: *AirPrime Q26 Elite Activation on the Sprint Network* and *AirPrime Q26 Elite Activation on the Verizon Network.*

You can find those documents in the package given by Maestro Wireless Solution, or directly for the Sierra Wireless website: `http://www.sierrawireless.com/en/sitecore/content/Sierra%20Wireless/Support/ Downloads/AirPrime/Q_Series/AirPrime_Q26_Elite.aspx`

2.3 Interfaces

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2.3.1 Status indicator

The LED indicates different status of the modem:

– OFF: modem is switched off

– ON: modem is power-up

– Flashing slowly: modem is in idle mode

– Flashing rapidly: modem is in transmission/communication

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2.3.2 CDMA antenna connector

Connect this to an external CDMA antenna with SMA male connector. Make sure the antenna is for the correct frequency with impedance of 50 Ohm, and also that the connector is tightly secured.

Characteristics	Cellular	PCS
Frequency	Tx 824-849	Tx 1850-1910
	Rx 869-894	Rx 1930-1990
Impedance (Ohm)	50	
VSWR	1.5:1 max	
Typical Radiated Gain	0 dBi	

2.3.3 GPS antenna connector

Connect this to an Active GPS antenna with SMA male connector.

Characteristics of the GPS antenna	nominal value
Frequency (MHz)	1575
Impedance (Ohm)	50
VSWR	1.5:1 max
DC bias voltage (V)	5
Current consumption (mA)	40mA max

2.3.4 15-Pin D-Sub Female connector (RS232)

This connector provides serial link to the modem.

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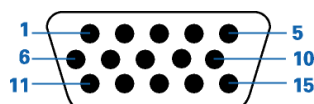
Pin Number	Name	EIA designation	Type	Note
1	DCD	Data Carrier Detect	Output	
2	TX	Transmit Data	Input	
3	NC	-	-	No Connection
4	NC	-	-	No Connection
5	NC	-	-	No Connection
6	RX	Receive Data	Output	
7	DSR	Data Set Ready	Output	
8	DTR	Data Terminal Ready	Input	
9	GND	Ground	Ground	
10	NC	-	-	No Connection
11	CTS	Clear To Send	Output	
12	RTS	Request To Send	Input	
13	RI	Ring Indicator	Output	
14	RESET		Input	Pull low to reset
15	NC	-	-	No Connection

2.3.5   4-Pin connector (Power input/output)

A cable, included in the package shall be used for power supply connection:
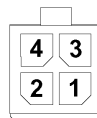
Pin assignment of 4-Pin connector:

Pin number	Name	Functions
1	-	No Connection
2	-	No Connection
3	POWER -	DC power negative input (or ground)
4	POWER +	DC power positive input

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

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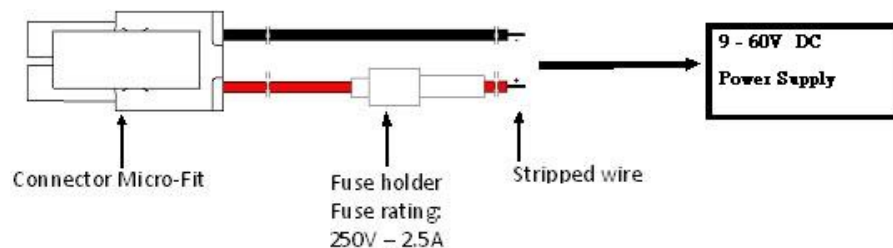
2.4 Optional accessories

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

External antenna

- – 800-1900MHz dual band
- – SMA connector
- – 0dBi

RS232 cable
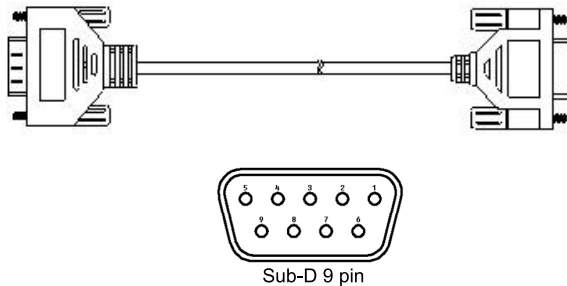
Sub-D 9 pin

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

Pin assignment:

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Sub-D 15 (male)	Sub-D 9 (female)
1	1
2	3
3	
4	
5	
6	2
7	6
8	4
9	5
10	
11	8
12	7
13	9
14	
15	

DIN rail mount
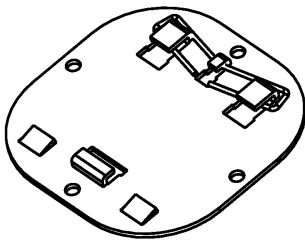
– Quick attachment / detachment to standard 35mm DIN rail

– Zinc plated steel

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Chapter 3

Installation

3.1 Mounting the modem

Use 2 pieces of M3 screw to mount the modem on the DIN rail mount.mount if you are using it. Please refer to document "Installation of DIN rail mount" for details.
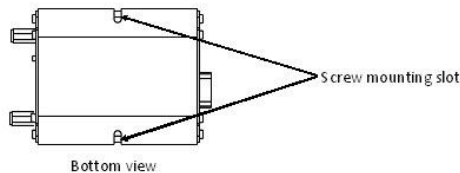
3.2 Connect the CDMA antenna (SMA type)

Connect this to CDMA antenna with SMA male connector. Make sure the antenna conforms to requirement stipulated in Section 2.3.2

3.3 Connect the modem to external device

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

Connection example using optional RS232 cable

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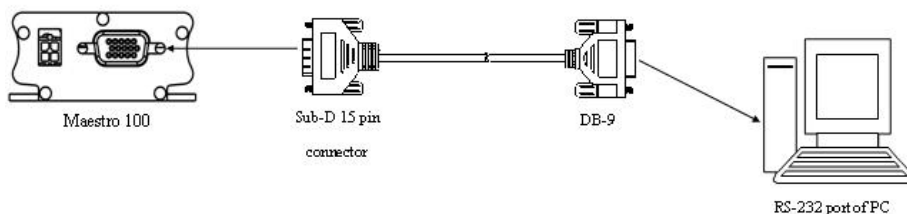
3.4   Connect the DC power supply

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

– Input voltage range : 9-60V DC

– Rated current: 350mA
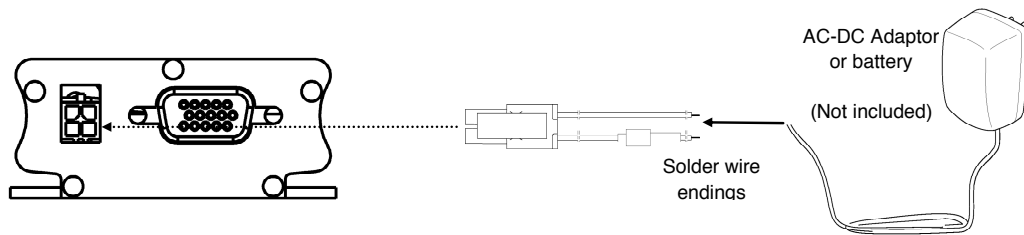
Plug the molex ending of the power cable to the modem DC connector.

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

Chapter 4

Registration to the Network

4.1 Carrier requirements

Before the modem can be use, it is necessary to supply the Mobile Equipement Identifier (MEID) of the modem to the carrier and set up an account on their network.

4.2 First Time Activation

4.2.1 Sprint network

The M100CDMA-S model will only work on the network of Sprint. Prior to the first activation of the modem, make sure that a service plan has been secured with Sprint or a MVNO using their network.

Sprint supports OMA-DM for the first time activation. The activation procedure will take place automatically once the modem is powered on and registered onto the Sprint home network. For subsequent service provisioning, you need to send the command AT+WDSS=1,1 to trigger the activation. The following message will display:

```
+WORG: #777 << Initiate Data call
+WCNT: 33   << 1xRTT Data call
+WDSI: 4    << The Wireless CPU starts sending data to the server.
+WDSI: 6    << The authentication has succeeded, a session
               with the server started.
+WDSI: 8,1  << The session with the server is finished.
+WEND: 29   << Release all call
```

To update the PRL, send the command AT+WDSS=1,3. The following messages display:

```
+WORG: #777  << Initiate Data call
+WCNT: 33    << 1xRTT Data call
+WDSI: 4     << The module starts sending data to the server.
+WDSI: 6     << The authentication has succeeded, a session with the
                server started.
+WDSI: 8,1   << The session with the server is finished.
+WDSI: 21,10 << A provisioning was made by the server with
                Preferred Roaming List (PRL)
+WEND: 0     << Phone is Off-Line
OFFLINE
RESET
```

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4.2.2 Verizon network

The M100CDMA-V model will only work on the network of Verizon. 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.

The activation procedure on the Verizon network is triggered by the command ATD*22899;

The following messages will display:

```
+WOT1: "Programming in Progress"
+WOTS: "SPL unlocked"
+WOTP: "PRL Download OK"
+WOTN: "NAM Download OK"
+WOTM: "MDN Download OK"
+WOTC: "Commit Successful"
+WOT2: "Programming Successful!"
+WEND: 25
OFFLINE
RESET
```

4.2.3 Aeris network

To use the M100CDMA-A on the Aeris network, MDN and MIN need to be programmed (these are provided by Aeris upon registration). All other MIP settings are programmed at the factory and should not be modified. After the device is activated using AerPort, enter the device parameters following the steps below, where:

XXXXXXXXXX = Device MDN

YYYYYYYYYY = Device MIN

Step	AT command	Response	Comment
01	AT+WSPC=1,000000	OK	SPC unlock code
02	AT +WMDN=XXXXXXXXXX	OK	MDN
03	AT+WIMI=31000YYYYYYYYYY	OK	MIN
04	AT+WCMT=1	OK	Commit changes

4.2.4 Generic modems

For the **generic** version (M100CDMA-G), the modem must have the right provisioning of the target carrier. Provisioning can be done using software tool WPST[1] through the RS232 port.

Consult the carrier for setting up an account and the steps for automatic activation.

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[1]Wavecom Product Support Tool can be requested from Maestro Wireless Solutions

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Chapter 5

Troubleshooting

5.1 The modem's LED does not light

– Check the command AT+CGMR, if firmware is R3A its a known issue. Modem works properly, except LED when modem is not activated on the carrier network.

– Check if the modem has been properly connected to a 9-60V power supply.

– Check if the power connector is properly inserted.

– Check the fuse on the power cord.

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

– Check if the CDMA antenna has the right characteristics & that the antenna is correctly connected to the modem.

– Check if the network coverage is available.

– For GENERIC version, make sure the valid PRL is loaded in the modem and the modem has the right provisioning.

– For VERIZON, SPRINT and AERIS version, make sure an account is set up with the carriers and the first activation done.

5.3 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:

- baudrate at 115200 bps
- 8 data bits
- no parity bit
- 1 stop bit

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5.4 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 :
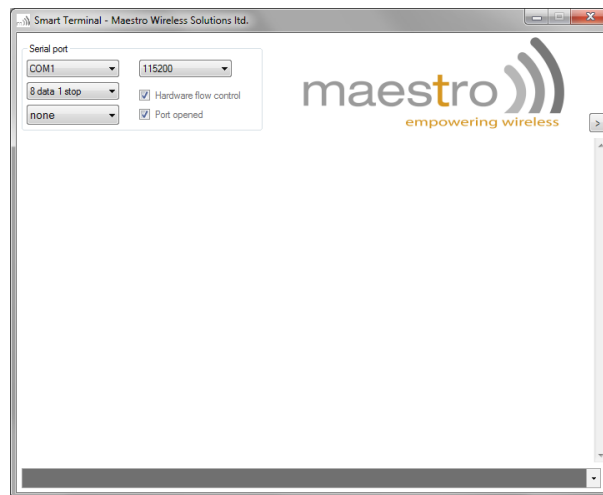
- Then you can type command like "AT" and check the "OK" response from the modem.
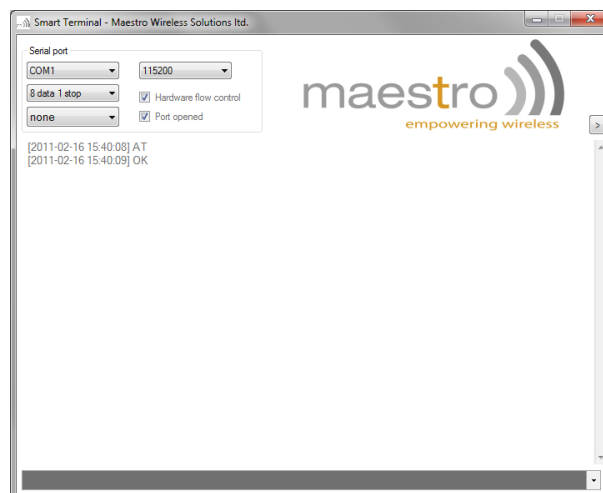
5.5 Basic operations

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

Description	AT commands	Modem response	Comments
Network registration checking	AT+CREG?	+CREG: 0,1	Modem registered to the network
Receiving signal strength	AT+CSQ	+CSQ: 20,0	The first parameter has to be at least 15 for normal communication
Check identity of PRL loaded	AT+WPRL?	+WPRL: 65535 +WPRL: 50568 +WPRL: 57003	65535 represents GENERIC version 50568 represents SPRINT version 57003 represents VERIZON version
Check ESN & MEID	AT+CGSN	+CGSN: A10000094119D8, 808FFD36	MEID: A1000094119D8 ESN: 808FFD36

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5.6 TCP connection test

Following is an example of AT commands procedure to enable a TCP link to our demo server and test communication. Please refer to the AT command guide document for a full description.

Description	AT commands	Modem response	Comments
Start TCP/IP Stack	AT+WIPCFG=1	OK	
Enable Error reporting messages	AT+CMEE=1	OK	
Start PPP session	AT+WIPBR=4,6	OK +WORG: #777 +WCNT: 33 +WIPBR: 6,1 +WEND: 25	
Get IP address of PPP session	AT+WIPBR=3,6,15	+WIPBR: 6, 15, "72.62.190.80"	IP address will change depending on your unit
Create TCP client on m2mgateway server	AT+WIPCREATE=2,1, "61.93.240.149",60000	OK +WORG: #777 +WCNT: 33 +WIPREADY: 2,1 +WEND: 25	
Open TCP channel	AT+WIPDATA=2,1,2	CONNECT	Now your serial port is connected in data mode to Maestro Wireless demo server TCP socket
Description	Text to enter	Server response	Comments
Send test string to server	@TEST!	@TEST,OK!	Please send the string in one hit. Server will acknowledge any string with the following format @<STRING>! by a string @<STRING>,OK!
Close data mode	+++	OK +WORG: #777 +WCNT: 33 +WEND: 25	

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Chapter 6

Specifications

- – CDMA 2000 / 1XRTT Dual Band 800 / 1900 MHz

- – Band Class 0 (Tx: 824~849MHz, Rx: 869~894MHz)

- – Band Class 1 (Tx:1850~1910MHz, Rx 1930~1990MHz)

- – Supports Async Data Service, Circuit Switched Data, Packet Data

- – Data rates up to153 kbps forward & reverse

- – TCP/IP

- – IS-637 Short Message Service (MO & MT)

- – GPS One

Power supply requirement:

- – Input voltage range : 9-60V DC

- – Rated current: 350mA

Typical current consumption:

	@12V
Idle mode	26mA
Communication mode @23dBm RF power	180mA

Interfaces:

- – Status Indicator

- – CDMA antenna SMA female connector

- – GPS antenna SMA female connector

- – 15 pin sub-D connector

- – 4-pin power supply connector

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Dimensions:

- Overall size: 88mm x 60mm x 26mm

- Weight: 100g

Temperature range:

- Operating: -30℃ to +70℃

- Storage: -40℃ to +80℃

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