



Maestro Smart Pack User Manual



maestro100evo



Revision history

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0.95a	31Mar2010	First release for new Maestro 100evo	Wallace Lee

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1. INTRODUCTION

Maestro Smart Pack (MSP) package is a software solution for Maestro 100evo series modems. New functions added to increase application range of various industrial and automated applications:

- Automatic and self-recovery TCP/UDP socket connection
- AT command driven TCP/UDP socket connection
- Ping service
- Dynamic DNS (* note 1)
- Remote AT command through SMS and TCP Terminal (* note 1)
- I/O triggered AT command execution
- Call screening (reject call made by unauthorized phone number)
- Modem status check and monitoring
- Remote program updating (Maestro 100evo and Maestro 100evo EXT only)

Users can configure and use the above features by AT commands.

Note 1: Special GPRS service from network recommended. See Chapter 8 and 9 for details

2. INSTALLATION

2.1. Identifying your Maestro 100evo

First check the Maestro 100evo firmware before installation.

2.1.1. Identifying Maestro 100evo by AT command

Start HyperTerminal, choose correct baud rate to communicate with the modem

Then enter the following and see the response according to the following table:

Model	Command	Expected response (first 8 characters)
Maestro 100evo	ATI3	R73a00gg

If you get the same response then this modem is ready for installation.

2.2. Installing the Smart Pack

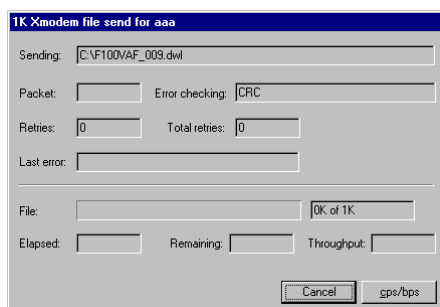
2.2.1. Erasing embedded program

You may need to erase embedded program (if any) before downloading the Smart Pack. Again, on HyperTerminal enter the following commands step by steps:

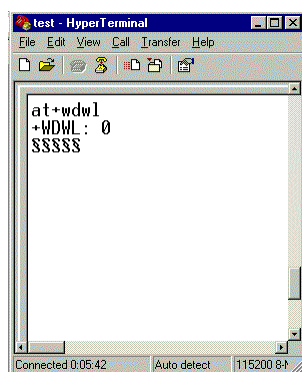
Command entered	Expected response
AT+WOPEN=0	(modem may reset)
AT+WOPEN=3	OK
AT+WOPEN=4	(modem may reset)

2.2.2. Downloading the file

- Check the HyperTerminal is configured with setting “8 data bits, no parity, 1 stop bit, and hardware flow control (CTS/RTS)
- It is suggested to set the baud he RS232 link is changed to 115200 bps. You can first start HyperTerminal session with 9600 bps. The on the screen type command AT+IPR = 115200 and then press “Enter”. Then change the HyperTerminal speed to 115200bps.
- On the screen type the command AT+WDWL and then press “Enter”. The modem should answer +WDWL: 0, and then a series of strange characters appear or the cursor is just moving forward slowly. (the modem is sending the first characters of the Xmodem protocol).
- Then on HyperTerminal you choose “Transfer” –“Send File”



- When you see the dialog box, on the “Filename” you choose file according to the modem:



Maestro 100evo : M100_VAF_095_OATS320_1M+.dwl

Then on “Protocol” choose “Xmodem”, then press “OK”

Then the downloading process will start:

- After finishing downloading enter command AT+CFUN=1 to restart modem
- After restarting enter command AT+WOPEN=1 to start the MSP program (modem will restart).
- Enter MSP version command **AT+VAFV** to verify :

Command	Expected response
AT+VAFV	M100evo_VAF_095a_OATS320 Mar 31 201012:42:04
	OK

Now the Maestro Smart Pack installation has been done. You can follow other chapters to use the features.

3. GPRS AND TCP/UDP PARAMETERS SETUP

GPRS related functions (Automatic and AT command driven TCP/UDP connection, PING service, DDNS support, Remote program update described in Chapter 5, 6, 7, 8, 9 and 14) requires GPRS connection and TCP / UDP parameters setup. This chapter will describe those required setups.

3.1. GPRS Network Parameters

User need to enter the following parameters for GPRS connection:

- Access point name (APN)
- User name
- Password

They are to be entered by using **AT+IPGPRS** command. Contact your network operator for these parameters.

3.1.1. AT+IPGPRS command

Description:

This command is used to setup GPRS network parameters for the TCP/UDP connection feature.

Command Syntax

AT+IPGPRS=<Cid>,<APN>,<UN>,<PW>

Response Syntax

+IPGPRS: <Cid>,<APN>,<UN>,<PW>

Command	Possible responses:
AT+ IPGPRS?	+IPGPRS: 1,"INTERNET","" , "" OK <i>Note: show current settings</i>
AT+ IPGPRS=1,	OK <i>Note: set Cid value to 1</i>
AT+ IPGPRS =1,"INTERNET"	OK <i>Note: set the PDP value to 1 and APN to "INTERNET"</i>
AT+ IPGPRS=?	+IPGPRS: (1-4),(100),(50),(50) OK <i>Note: possible values</i>

Defined Values :

<Cid>

PDP context identifier.

Note: to use with MSP TCP/UDP connection feature this value must be set to 1.

<APN>

Access point name of the GPRS network. Max 100 characters.

<UN>

User name to access the GPRS service. Max 50 characters.

<PW>

Password used to access the GPRS service. Max 50 characters.

3.2. Activating GPRS Connection

For using AT command driven TCP/UDP connection (described in Chapter 5), you need to first activate the MSP GPRS connection. There are two AT commands:

- **AT+CGATT**
- **AT+IPCONNECT**

3.2.1. AT+CGATT command

This standard AT command is to make the modem to attach to or detach GPRS network. For details please read AT command document.

Command Syntax

AT+CGATT=<state>

Response Syntax

+CGATT: <state>

Command	Possible responses:
AT+ CGATT?	+CGATT: 0 OK <i>Note: display current status</i>
AT+ CGATT=1	OK <i>Note:GPRS attach success</i>
AT+ CGATT =0	OK <i>Note:GPRS detach success</i>

Defined Values:

<state>

- 1: attach GPRS
- 0: detach GPRS.

3.2.2. AT+IPCONNECT command

This MSP AT commands is to make the modem to activate or deactivate GPRS connection . Once IPCONNECT is success you can perform TCP/UDP connection as described on other chapters. Please read note below on using this command.

Command Syntax

AT+IPCONNECT = <Bearer>,<Connect>

Response Syntax

+IPCONNECT: <Bearer>,<Connect>

Command	Possible responses:
AT+ IPCONNECT=?	+IPCONNECT: (0-1) , (0-1) OK <i>Note: display possible values</i>
AT+ IPCONNECT?	+IPCONNECT: 1,0 OK <i>Note: display current status</i>
AT+IPCONNECT=1,1	OK OK OK <i>Note: Activate GPRS connection success</i>

AT+IPCONNECT=1,1	+CME ERROR: 3 <i>Note: Activate GPRS connection fail</i>
AT+ IPCONNECT =1,0	OK <i>Note: Deactivate GPRS connection success</i>

Defined Values:

<Bearer>

- 0: using GSM Bearer (**Note: do NOT use this for MSP**)
- 1: using GPRS Bearer.

<Connect>

- 0: to stop connection
- 1: to start connection.

Note: Before you making GPRS connection by this command make sure you have finished the following first:

1. Entered APN settings by AT+IPGPRS command Chapter 3.1.1)
2. Attached to GPRS network by AT+CGATT command (Chapter 3.2.1)

It is suggested after modem power up wait about 20 seconds before making GPRS connection.

3.3. TCP/UDP Parameters Setup

For using automatic or AT command driven TCP/UDP connection (described in Chapter 4 and 5), you need to first enter the target TCP/UDP peer parameters. There are

- AT+IPTCP
- AT+IPUDP
- AT+IPBUFF
-

3.3.1. AT+IPTCP command

This command specifies the TCP socket parameters and mode that to be used by automatic or AT command driven TCP connection (described in Chapter 4 and 5).

Command Syntax

AT+IPTCP=<port>,<mode>,<server>,<TCPTxDelay>

Response Syntax

+ IPTCP: <port>,<mode>,<server>,<TCPTxDelay>

Command	Possible responses:
AT+ IPTCP?	+IPTCP: 0,"S", "",0 OK <i>Note : show current settings</i>
AT+ IPTCP =23	OK <i>Note: set the TCP port to 23</i>
AT+ IPTCP =23,"C",202.144.111.222",0	OK <i>Note: to set the modem to connect TCP socket Client (caller) mode to target :address 202.144.111.222 and port 23</i>

AT+ IPTCP =23,"S",255.255.255.255",0	OK to set the modem to wait for TCP socket connection request (Server (listening) mode) any calling IP address allowed, port 23
AT+ IPTCP =?	+IPTCP: (0-65535),("C","S"),(120),(0-1) OK Note : possible argument

Defined Values:

<port>

The port number to be used for the TCP socket connection. Default value is 0. Valid range is 0 to 65535.

<mode>

Mode of TCP operation. Default value is "S".

"S" Server (Listening) mode. This configures Maestro 100evo to open a listening TCP connection on the specified **<port>** . The TCP connection will be active upon getting socket connection request from the allowed remote TCP peer (see **<address>**)

"C" Client (caller) mode. This configures Maestro 100evo to request opening a TCP connection to the server with the specified **<address>** and **<port>** .

Note: This parameter is used by Auto TCP connection (see Chapter 4) only.

<address>

The address of the TCP server (or host). Default value is empty. Legal values could be 32-bit in dotted-decimal notation (i.e. xxx.xxx.xxx.xxx) or alphanumeric ASCII test string up to 120 characters (only if DNS is available on the GPRS network)

Note: In "Server" (Listening) mode the modem will only accept TCP connection request for the caller with address specified in the **<address>** field. Yet if the it is set to "255.255.255.255" the modem will accept request from ANY address.

<TCPTxDelay>

This parameter determines if there is time delay introduced before sending a TCP frame that has not been entirely filled with user data. If it is set to 0 initiates the sending of a TCP frame as soon as possible after the reception of a single character value from the host. If it is set to 1 initiate a delay will be introduced before the sending of a TCP frame
The default value is 0.

3.3.2. AT+IPUDP command

This command specifies the UDP socket parameters and mode that to be used by automatic or AT command driven UDP connection (described in Chapter 4 and 5).

Command Syntax

AT+IPUDP=<port>,<mode>,<server>,<UDPTxDelay>

Response Syntax

+ IPUDP: <port>,<mode>,<server>,<UDPTxDelay>

Command	Possible responses:
AT+ IPUDP?	+IPUDP: 0,"S","",0 OK <i>Note : show current settings</i>
AT+ IPUDP =23	OK <i>Note: set the UDP port to 23</i>
AT+ IPUDP =23,"C",202.144.111.222",0	OK <i>Note: to set the modem to connect UDP socket Client (caller) mode to target :address 202.144.111.222 and port 23</i>
AT+ IPUDP =23,"S",255.255.255.255",0	OK <i>to set the modem to wait for UDP socket connection request (Server (listening) mode) any calling IP address allowed, port 23</i>
AT+ IPUDP=?	+IPUDP: (0-65535),("C","S"),(120),(0-1) OK <i>Note : possible argument</i>

Defined Values:

<port>

The port number to be used for the UDP socket connection. Default value is 0. Valid range is 0 to 65535.

<mode>

Mode of UDP operation. Default value is "S".

"S" Server (Listening) mode. This configures Maestro 100evo to open a listening UDP connection on the specified <port> . The UDP connection will be active upon getting socket connection request from the allowed remote UDP peer (see <address>)

"C" Client (caller) mode. This configures Maestro 100evo to request opening a UDP connection to the server with the specified <address> and <port> .

Note: This parameter is used by Auto UDP connection (see Chapter 4) only.

<address>

The address of the UDP server (or host). Default value is empty. Legal values could be 32-bit in dotted-decimal notation (i.e. xxx.xxx.xxx.xxx) or alphanumeric ASCII test string up to 120 characters (only if DNS is available on the GPRS network)

Note: In "Server" (Listening) mode the modem will only accept UDP connection request for the caller with address specified in the <address> field. Yet if it is set to "255.255.255.255" the modem will accept request from ANY address.

<UDPTxDelay>

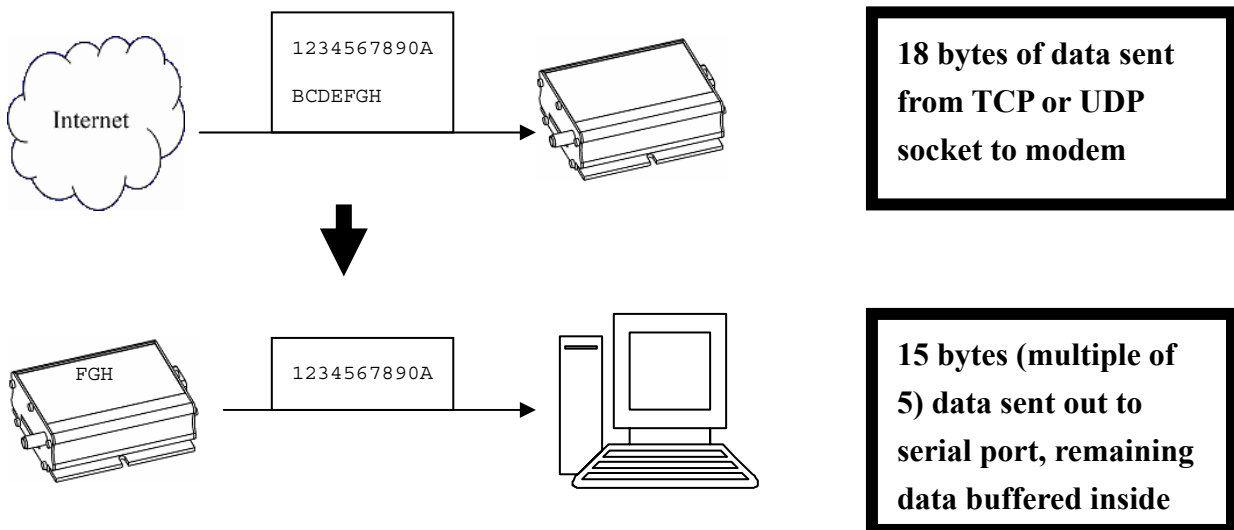
This parameter determines if there is time delay introduced before sending a UDP frame that has not been entirely filled with user data. If it is set to 0 initiates the sending of a UDP frame as soon as possible after the reception of a single character value from the host. If it is set to 1 initiates a delay will be introduced before the sending of a UDP frame. The default value is 0.

3.3.3. AT+IPBUFF command

This command specifies the number of bytes of payload data from remote peer buffered inside the modem when automatic or AT command driven TCP / UDP connection is made.

- If the quantity of buffered data reaches this value, the whole buffered data will be sent out to the serial port.
- If the data from remote is large enough at one time, only multiple of this value data will be sent out to the serial port. Remainder will be kept inside buffer.

Example: **AT+IPBUFF=5**



Command Syntax

AT+IPBUFF = <buff>

Response Syntax

+IPBUFF: <buff>

Command	Possible responses:
AT+ IPBUFF=?	+IPBUFF: 0-100 OK <i>Note: display possible values</i>
AT+ IPBUFF?	+IP BUFF: 0 OK <i>Note: display current status</i>
AT+IPBUFF = 5	OK <i>Note: Set IPBUFF value to 5</i>

Defined Values:

<buff>

The number of bytes of data to be buffered. Default value is 0 (i.e. no buffering). Valid range is 0 to 100.

Note: If the TCP or UDP socket connection is broken, buffered data will be lost.

3.4. Extra TCP/UDP Parameters Setup

User can set additional parameters of TCP/UDP connection, including “keep alive” packet, maximum packet size, TTL and periodic PING action to monitor Internet connection

3.4.1. AT+IPOPT command

This command specifies the extra TCP/UDP socket parameters.

Command Syntax

AT+IPOPT=<CMDType>,<parameter>[,<action>]

Response Syntax

+ IPOPT: <CMDType>,<parameter>[,<action>]

Command	Possible responses:
AT+ IPOPT?	+IPOPT: 1, 0 +IPOPT: 2, 536 +IPOPT: 3, 64 +IPOPT: 4, 0, 0 OK <i>Note: display current settings</i>
AT+ IPOPT =1,1	OK <i>Note: enable the keep alive packet feature</i>
AT+IPOPT=2,512	OK <i>Note: set the size of maximum packet that to be sent to 512 bytes</i>
AT+ IPOPT=3,128	OK <i>Note:set TTL to 128</i>
AT+IPOPT=4,60,1	OK <i>Note: Enable Ping action every 60 seconds, if ping fail then disconnect GPRS</i>
AT+ IPOPT=?	+IPOPT: (1-4),(0-65535)[,(0-2)] OK <i>Note : possible argument</i>

Defined Values:

<CMDType>

- 1 setup “keep alive” packet feature:
when <parameter> is 0, the feature is disabled
when <parameter> is 1 and a TCP socket connected, every 7200 seconds (2 hours) an empty “keep alive” packet will be sent out from the modem to avoid socket being closed because of idle timeout.
- 2 specify the maximum size of the outgoing packet to <parameter>. The size can be set from 1 to 65535(0xFFFF) default value is 536.
- 3 specify the TTL value of the socket connection to <parameter>. The value can be set from 1 to 255. default value is 64.

4. specify weather to use ping function to check Internet connectivity:

<parameter> is the period in second of calling ping function after GPRS connected (+IPCONNECT: 1,1)

default value is 0 (ping action disabled)

<action> is to specify the action will be taken if a set of ping action fail :

0: do nothing (default)

1: disconnect GPRS (+IPCONNECT=1,0)

2: reset Maestro

Note :

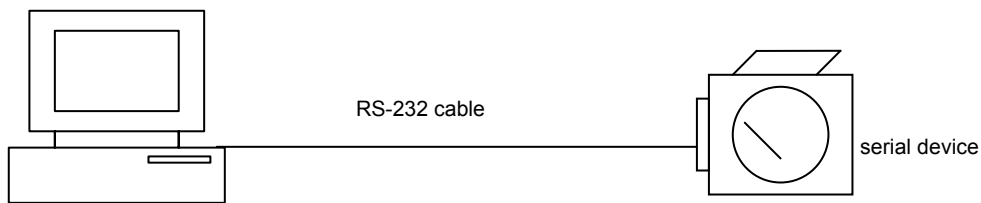
- Before enabling periodic ping action (+IPOPT=4,1,...) be sure to setup Ping parameters properly. See Chapter for details.
- Periodic ping action is enabled with GPRS disconnection (+IPOPT:4,x,1) then Automatic TCP/UDP connection should be also enabled, so that those functions will try to re-connect GPRS after disconnection caused by ping fail.
- Period of ping action should be set larger than the maximum time of one set of ping action.

5. AUTOMATIC AND SELF-RECOVERY TCP/UDP CONNECTION

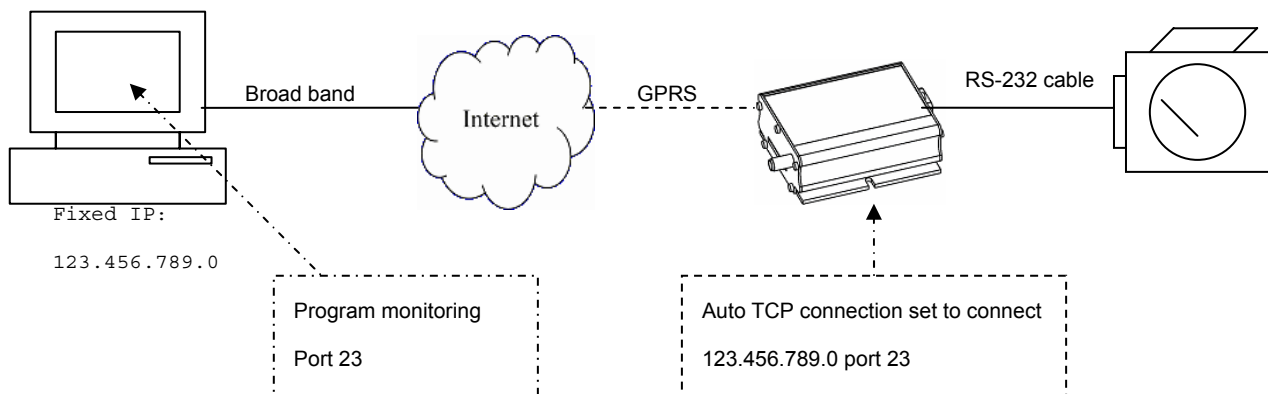
The Auto TCP/UDP connection feature is defined for accessing serial devices over the Internet. Maestro 100evo can be configured that after power up it will connect to a remote TCP/UDP socket (client mode) or to wait for the TCP/UDP socket connection request from remote peer (server mode).

If the socket connection is unsuccessful or disconnected it will repeat the connection request and back to waiting stage. This make remote peer can access serial device connected to Maestro 100evo.

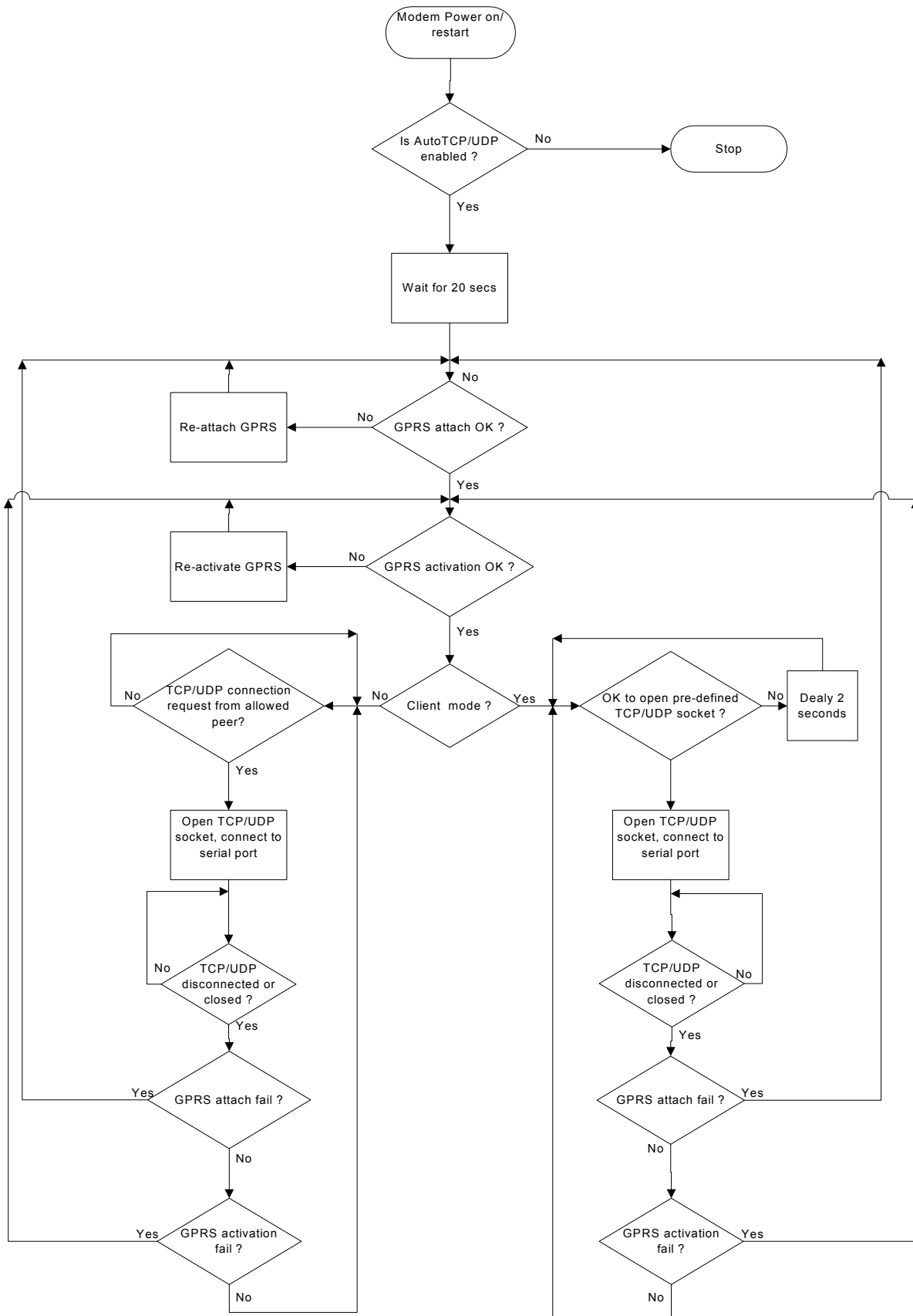
Direct serial connection



TCP Socket connection via the Internet /GPRS network



5.1. Flow diagram of Auto TCP/UDP connection function



5.2. AT commands for Auto TCP/UDP connection

5.2.1. AT+AUTOTCP command

This command controls the Maestro 100evo to start TCP socket connection automatically

Before using **AT+AUTOTCP** TCP and GPRS settings MUST be setup properly using **AT+IPTCP** and **AT+IPGPRS** command respectively.

Command Syntax

AT+AUTOTCP=<mode>

Response syntax:

+AUTOTCP: <mode>

Command	Possible responses:
AT+AUTOTCP=0	OK <i>Note : disable AutoTCP</i>
AT+AUTOTCP=1	OK <i>Enable AutoTCP</i>
AT+ AUTOTCP?	+AUTOTCP : 1 OK <i>Note display current status</i>
AT+AUTOTCP=?	+AUTOTCP : (0-1) <i>Note : possible argument</i>

Defined Values:

<mode>

- 1 enable auto TCP
- 0 disable auto TCP

Note :

- Before enabling Auto TCP, it **MUST** be properly set the GPRS settings by **AT+IPGPRS** command and TCP settings by **AT+IPTCP** command (see Chapter 3)
- **ONLY** GPRS PDP context # 1 will be used. So please setup +IPGPRS settings with **<cid>=1**
- Once AutoTCP is enabled, it will start the TCP socket connection automatically after 20 seconds.
- Once the TCP connection is established successfully, the serial port will go to data mode, all data entered to the serial port will be sent to remote TCP peer. No more AT commands will be accepted then.
- In TCP connected data mode, the DSR and DCD signals of the serial port will go to high.
- If the TCP connection is broken the modem will try to reconnect automatically. During re-connection period serial port will go back to command mode, and DSR/DCD signal back to low.
- The setting will be saved, and after power off, the AUTOTCP will be restarted with the 20 seconds delay after power up.
- To stop auto TCP connection, you need to enter the command **AT+AUTOTCP=0** by either 1: within 20 seconds after power up, or 2: during reconnection (serial port back to command mode), or 3: by SMS (see Chapter 10, SMS AT command).
- Auto TCP connection is exclusive to other TCP/UDP feature. See Chapter 16 (Q&A)

5.2.2. AT+AUTOUDP command

This command controls the Maestro 100evo/100 Lite to start UDPacket connection automatically.

Before using **AT+AUTOUDP** TCP and GPRS settings **MUST** be setup properly using **AT+IPUDP** and **AT+IPGPRS** command respectively.

Command Syntax

AT+AUTOUDP=<mode>

Response syntax:

+AUTOUDP: <mode>

Command	Possible responses:
AT+AUTOUDP=0	OK <i>Note : disable AutoUDP</i>
AT+AUTOUDP=1	OK <i>Note: Enable AutoUDP</i>
AT+ AUTOUDP?	+AUTOUDP : 1 OK <i>Note: display current status</i>
AT+AUTOUDP=?	+AUTOUDP : (0-1) <i>Note : possible argument</i>

Defined Values:

<mode>

- 1 enable auto UDP
- 0 disable auto UDP

Note :

- Before enabling Auto UDP, it **MUST** be properly set the GPRS settings by **AT+IPGPRS** command and UDP settings by **AT+IPUDP** command
- **ONLY** GPRS PDP context # 1 will be used. So please setup +IPGPRS settings with <cid>=1
- Once AutoUDP is enabled, it will start the UDP socket connection automatically after 20 seconds.
- Once the UDP connection is established successfully, the serial port will go to data mode, all data entered to the serial port will be sent to remote UDP peer. No more AT commands will be accepted then.
- In UDP connected data mode, the DSR and DCD signals of the serial port will go to high.
- If the UDP connection is broken the modem will try to reconnect automatically. During re-connection period serial port will go back to command mode, and DSR/DCD signal back to low.
- The setting will be saved, and after power off, the AUTOUDP will be restarted with the 20 seconds delay after power up.
- To stop auto UDP connection, you need to enter the command **AT+AUTOUDP=0** by 1: within 20 seconds after power up, or 2: during reconnection (serial port back to command mode) or 3: by SMS (see Chapter , SMS AT command).
- Auto TCP connection is exclusive to other TCP/UDP feature. See Chapter 16 (Q&A)
- Due to the nature of UDP socket connection, **AT+AUTOUDP=0** may not be able to disconnection. in this case you may send command **AT+IPCONNECT=1,0** to disconnect GPRS connection.

5.3. AT commands for tuning Auto TCP/UDP connection

5.3.1. AT+AUFM command

This command controls the buffering time of TDP/UDP data sent to remote peer. Data coming towards UART will be buffered for a “delay” period before being sent out.

Command Syntax

AT+AUFM=<delay>

Response syntax:

+AUFM: <delay>

Command	Possible responses:
AT+AUFM=1	OK <i>Note : set the +AUFM value to 1</i>
AT+ AUFM?	+AUFM : 2 OK <i>Note: display current status</i>
AT+AUFM=?	+AUFM : (1-255) <i>Note : possible argument</i>

Defined Values:

<delay>

Default value: 0

Possible value: 1 to 255

Delay units between sending buffered data to TCP/UDP peer. The actual delay time is calculated by the value of **<delay>** times 18.5 ms. So if **<delay>** is equal to 2 that means data will be sent to remote peer every 39ms (or immediately if internal buffer is full) Increasing this value can make the data packet size bigger especially when data flow is slow, thus reducing overhead.

Note :

- If the value is set too high the maximum data transfer speed may be decreased.

6. AT COMMAND DRIVEN TCP/UDP CONNECTION

This feature let user to make a TCP or UDP connection upon the **AT+OTCP** or **AT+OUDP** command.

This socket connection feature do support DLE/ETX character coding. See

Make sure you have made the GPRS connection by **AT+IPCONNECT** command before making socket connection (see Chapter 11, setup examples).

6.1. AT commands for Auto TCP/UDP connection

6.1.1. AT+DLEMODE command

When performing the AT command driven TCP or UDP socket connection, the attached host has the choice to code or not the ETX character.

When DLEMODE is set to 0, no specific process is needed on ETX characters. It means that it is not possible for a host to request a end of connection or to receive a clear indication of end of connection from the TCP/IP stack.

When DLEMODE is set to 1, the ETX character means a request or an indication of end of connection.

As a consequence, ETX characters that belongs to the payload data must be sent by the host on the serial port preceded by a DLE

character. Similarly ETX characters received by the TCP/IP stack from the Internet are sent to the host through the serial port preceded by a DLE character

“ETX” is character hex 03, “DLE” character is hex 10 (Dec 16)

Default value is 0.

Command Syntax

AT+DLEMODE=<mode>

Response syntax:

+DLEMODE: <mode>

Command	Possible responses:
AT+ DLEMODE =0	OK <i>Note : disable DLEMODE</i>
AT+ DLEMODE =1	OK <i>Note: Enable DLEMODE</i>
AT+ DLEMODE?	+DLEMODE : 1 OK <i>Note: display current status</i>
AT+ DLEMODE =?	+DELMODE : (0-1) <i>Note : possible argument</i>

Defined Values:

<mode>

- 1 enable DLEMODE
- 0 disable DLEMODE

Note :

- DLEMODE is not available for Automatic TCP/UDP connection.

6.1.2. AT+OTCP command

This command sent by the attached host to open a TCP connection to the TCP server specified by the **AT+IPTCP** command. If socket connection is made successfully it will response CONNECT 115200 and the serial port will go to data mode, all data entered to the serial port will be sent to remote TCP/UDP peer.

If socket connection is unsuccessful or socket is disconnected afterwards the modem will send out NO CARRIER message and back to command mode.

Command Syntax

AT+OTCP

Response syntax:

CONNECT 115200

Command	Possible responses:
AT+ OTCP	CONNECT 115200 <i>Note : TCP connection made successfully</i>
AT+ OTCP	+CME ERROR 3 <i>Note: fail, either IPCONNECT is not ready or socket service is used already</i>
AT+ OTCP	NO CARRIER <i>Note: possibly remote server no response</i>

Note :

- AT+OTCP connection is exclusive to other TCP feature. See Chapter (Q&A)
- If TCP connection is unsuccessful or broken after connection the GPRS connection will also be disconnected. (+IPCONNECT: 1,0). So please enter AT+IPCONNECT=1,1 to reconnect GPRS before entering AT+OTCP.

6.1.3. AT+OUDP command

This command sent by the attached host to open a UDP connection to the UDP server specified by the **AT+IPUDP** command. If socket connection is made successfully it will response CONNECT 115200 and the serial port will go to data mode, all data entered to the serial port will be sent to remote UDP peer.

If socket connection is unsuccessful or socket is disconnected afterwards the modem will send out NO CARRIER message and back to command mode.

Command Syntax

AT+OUDP

Response syntax:

CONNECT 115200

Command	Possible responses:
AT+ OUDP	CONNECT 115200 <i>Note : UDP connection made successfully</i>
AT+ OUDP	+CME ERROR 3 <i>Note: fail, either IPCONNECT is not ready or socket service is used already</i>
AT+ OUDP	NO CARRIER <i>Note: possibly remote server no response</i>

Note :

- AT+OUDP connection is exclusive to other TCP/UDP feature. See Chapter (Q&A)
- If UDP connection is unsuccessful or broken after connection the GPRS connection will also be disconnected. (+IPCONNECT: 1,0). So please enter AT+IPCONNECT=1,1 to reconnect GPRS before entering AT+OUDP.
- Due to the nature of UDP socket connection, sending ETX characters (when DLEMODE is 1) may not be able to make disconnection.

7. PING SERVICE

This feature is to make a ping (ICMP Echo Request) to a specified IP address and get back the echo result. Ping service can also be called by IPCONNECT as a tool to check Internet connection. See **AT+IPOPT** command in Chapter 3 for details.

7.1. AT command for setting up and execute ping

7.1.1. AT+IPING command

Command Syntax

AT+IPING

AT+IPING= <mode>,<address>, <nb>, <delay>, <timeout>

Response syntax:

+IPING : ,<address>, time=<echo time>

OK

Command	Possible responses:
AT+ IPING=2, "210.103.11.18",3,1,15	OK <i>Note : configure ping target (210.103.11.18), 3 ping trials total, 1 second between each trial, timeout limit 15 seconds</i>
AT+ IPING	+IPING : "210.103.11.18", time=562ms +IPING : "210.103.11.18", time=662ms +IPING : "210.103.11.18", time=762ms OK <i>Execute ping action (no argument)</i>
AT+IPING=?	+IPING: (0-2),(15),(1-10),(1-10),(1-60)
AT+ IPING?	+IPING: "210.103.11.18", 3, 1, 15 OK <i>Note display current status</i>

Defined Values:

<mode>

0,1 reserved

2 configure ping address and parameters below

<address>

IP address of the target to be pinged. Must be in form of dot-decimal notation (xxx.xxx.xxx.xxx).

<nb>

Numbers of ping trials for each ping action. E.g. if the value is 3 will ping the target for 3 times.

Default value is 3. Valid range is 1 to 10.

(When used with IPCONNECT check the ping is assumed fail if all ping trails fail.)

<delay>

Time in second between each ping trial.

Default value is 3. Valid range is 1 to 10.

<timeout>

Timeout value in second for ping request. Recommended to be more than 10.

Default value is 15. Valid range is 1 to 60.

Note :

- Ping target must be in dot-decimal notation format, URL format is not supported.
- Before making command driven ping action (AT+IPPING w/o argument) make sure GPRS is connected (+IPCONNECT: 1,1) and ping target and parameters are set properly.

8. DYNAMIC DNS

Note:

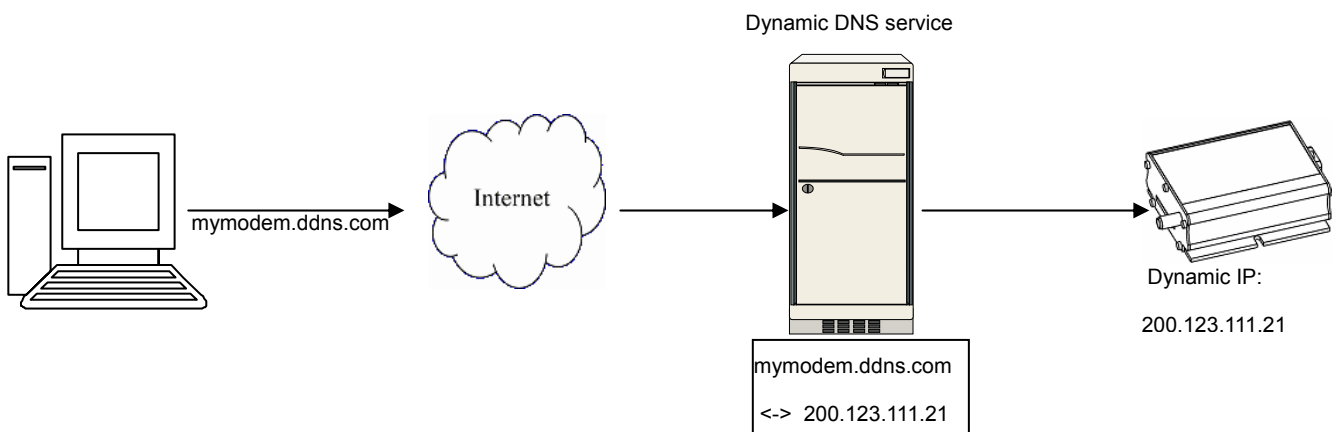
To use this feature, we strongly suggest to get special GPRS service from your network operator :

- a. Network will assign a true public IP address to M100evo upon GPRS activations, and**
- b. that GPRS connection allows incoming access from public Internet to Maestro**

This feature lets Maestro 100evo to login to certain Dynamic DNS service providers, to update the hostname with M100evo current IP address. So user can access M100evo with pre-registered hostname. User can use this function together with “TCP Terminal” (see Chapter 9) and can use Telnet to access M100evo and send AT command over Internet.

Maestro Wireless Solution Ltd does not have affinity with any Dynamic DNS service providers. Maestro Wireless Solution Ltd does not guarantee any service provided by DDNS service providers and not liable to any loss or damage caused by such service.

8.1. Description of the Operation



1. User need to create an account on DDNS service providers and register a hostname. Following providers are tested working correctly:
www.dyndns.com
www.no-ip.com
2. Use **AT+IPDDNSSERV** command to enter DDNS update server URL and port no. Use **AT+IPDDNSACCT** to enter own account login, password and hostname.
3. When IPCONNECT is ready, use **AT+IPDDNSUPD** command to update the above hostname with modem’s current IP address.
4. User can also use **AT+IPDDNSUPD** command to configure automatic DDNS update upon each time of IPCONNECT established.

8.2. AT command for configuring Dynamic DNS

8.2.1. AT+IPDDNSSERV command

Command Syntax

AT+IPDDNSSERV= <serv_url>,<serv_port>

Response syntax:

+IPDDNSSERV: <serv_url>,<serv_port>

OK

Command	Possible responses:
AT+IPDDNSSERV="members.dyndns.org",80	OK <i>Note : enter DDNS service provider's update server information</i>
AT+ IPDDNSSERV?	+IPDDNSSERV: "members.dyndns.org",80 OK <i>Note display current status</i>
AT+ IPDDNSSERV =?	+ IPDDNSSERV: (64),(0-65535) OK <i>Note : possible argument</i>

Defined Values:

<serv_url>

URL of the update server. For example it is "members.dyndns.org" for www.dyndns.com. Check with your DDNS service provider for correct name.

<serv_port>

Port number of the update server. For example it is 80 or 8080 for www.dyndns.com. Check with your DDNS service provider for correct port number.

List of parameters of verified DDNS service providers:

Provider	<serv_url>	<serv_port>
www.dyndns.com	members.dyndns.org	80
www.no-ip.com	dynupdate.no-ip.com	80

8.2.2. AT+IPDDNSACCT command

Command Syntax

AT+IPDDNSACCT=<hostname>,<login>,<psswd>

Response syntax:

OK

Command	Possible responses:
AT+IPDDNSACCT="12345678.dyndns.org", "maestro", "maestro"	OK <i>Note : enter DDNS account and host name info</i>
AT+ IPDDNSACCT?	+IPDDNSACCT: "12345678.dyndns.org", "maestro", "maestro" OK <i>Note display current status</i>
AT+ IPDDNSACCT=?	+ IPDDNSACCT: (64),(32),(32) OK <i>Note : possible argument</i>

Defined Values:

<hostname>

Hostname to be associated with M100evo's IP address. Should register the hostname in your account and verified it on your DDNS service provider. Maximum length is 64 characters.

<login>

Login name of the DDNS service account. Maximum length is 32 characters.

<psswd>

Login password of the DDNS service account. Maximum length is 32 characters.

8.2.3. AT+IPDDNSUPD command

Command Syntax

AT+IPDDNSUPD

AT+IPDDNSUPD = <auto_upd>

Response syntax:

OK

+IPDDNSUPD: <result>, <ret_code>

Command	Possible responses:
AT+IPDDNSUPD=1	OK <i>Note : enable automatic DDNS update</i>
AT+IPDDNSUPD=0	OK <i>Note : disable automatic DDNS update</i>
AT+IPDDNSUPD	+IPDDNSUPD: 1, "good 203.111.111.111" OK <i>Note : perform DDNS update, successful</i>
AT+IPDDNSUPD	+IPDDNSUPD: 3, "badauth" OK <i>Note : perform DDNS update, unsuccessful</i>
AT+IPDDNSUPD?	+IPDDNSUPD: 0, 3, "badauth" OK <i>Note : display current setting : automatic DDNS update disabled result of last DDNS update since power up</i>
AT+ IPDDNSUPD=?	+ IPDDNSUPD: (0-1) OK <i>Note : possible argument</i>

Defined Values:

<auto_upd>

0 disable automatic DDNS update

1 enable automatic DDNS update (see notes for details)

<result>

result of DDNS update process. it is related to the return code of DDNS update server. If <result> is 1 or 2 the update is assumed successful

<ret_code>

return code of DDNS update server.

Following table list the relationship between <result> and <ret_code>

Result	1	2	3	4	5	6	7	8	9	10	11
Ret_code	good	no_chg	badauth	donator	notfqdgn	Nohost	numhost	abuse	badagent	dnserr	911

Visit Website of DDNS service providers for the explanation of return code.

Note :

- If the DDNS update process fails because of failure to get server response the <result> maybe a negative value, contact Maestro to get details.
- Before making command driven ping action (AT+IPPING w/o argument) make sure GPRS is connected (+IPCONNECT: 1,1) and ping target and parameters are set properly.
- If automatic DDNS update enabled, Smart Pack will detect GPRS connection and start DDNS update once connection is established. If update is fail it will retry for 3 times maximum. User can enter AT+IPDDNSUPD? to check the result of last update result.

9. TCP TERMINAL

Note:

To use this feature, we strongly suggest to get special GPRS service from your network operator :

- a. Network will assign a true public IP address to M100evo upon GPRS activations, and**
- b. that GPRS connection allows incoming access from public Internet to Maestro**

This feature lets Maestro 100evo can be connected through TCP channel, and AT commands can be sent over this channel. User can use Telnet type terminal service to “login” to M100evo and control it by sending AT commands through the telnet.

9.1. Description of the Operation

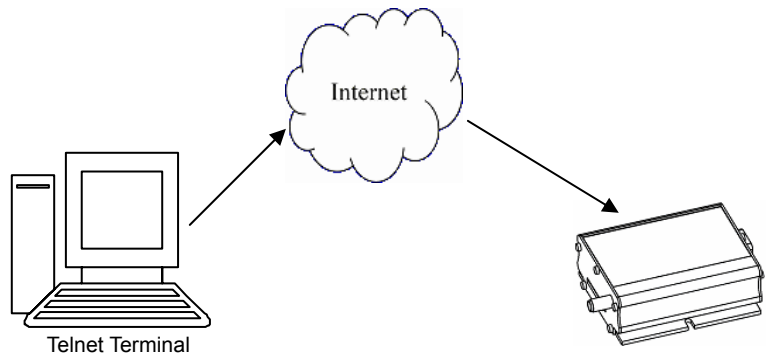
```

Telnet - 352061000294955.dyndns.org
Connect Edit Terminal Help
password:
correct
at+cgsn
352061000294955

OK
at+uafv
M100_UAF_095_0AT316_32 May  4 200917:49:33

OK

```



1. Uses **AT+TCPTERM** command to configure password port for the TCP terminal, and enable TCP terminal function.
2. After about 20 seconds M100evo will connect to the Internet automatically. And then it will check the TCP port.
3. User from outside Internet can use Telnet application to connect the port of M100evo TCP terminal. User need to know the IP address of the M100evo. Or with the aid of Dynamic DNS (Chapter) user can use the hostname associated the M100evo for connection.
4. Once connected user need to enter password. If password is correct user can send AT command to the M100evo on Telnet program.

9.2. AT command for TCP Terminal

9.2.1. AT+TCPTERM command

Command Syntax

AT+TCPTERM =<mode>[,<psswd>,<port>,<timeout>]

Response syntax:

OK

+TCPTERM =<stat>,<psswd>,<port>,<timeout>

Command	Possible responses:
AT+TCPTERM =2,"123456",23,30	OK <i>Note : configure TCP Terminal, password: 123456, port: 23, timeout:30(secs)</i>
AT+TCPTERM=1	OK <i>Note: enable TCP terminal</i>
AT+TCPTERM=0	OK <i>Note: disable TCP terminal</i>
AT+TCPTERM ?	+TCPTERM: 1,"123456",23,30 OK <i>Note display current status</i>
AT+TCPTERM =?	+TCPTERM: (0-1),(16),(1-65535),(1-65535) OK <i>Note : possible argument</i>

Defined Values:

<mode>

- 0 disable TCP Terminal.
- 1 enable TCP Terminal. (See Note)
- 2 configure TCP Terminal parameters

<psswd>

Login password for TCP Terminal. When user opens the M100evo TCP Terminal port it will prompt "password". User need to enter the password set with this parameter. User has 3 times of chance to enter correct password. If password is correct user can enter AT command otherwise TCP connection will be closed.

It can be consisting 1 to 16 alphanumeric characters. Default is "000000" (6 zeros).

<port>

Port number of TCP Terminal. Please do not set to the same value of port number in +IPTCP and +IPUDP command.

Default is 23. Valid value is 1 to 65535.

<timeout>

Maximum time in second TCP terminal will wait for an entry after TCP terminal opened. If no data received in this period the connection will be closed. Default is 30. Valid value is 1 to 65535.

Note :

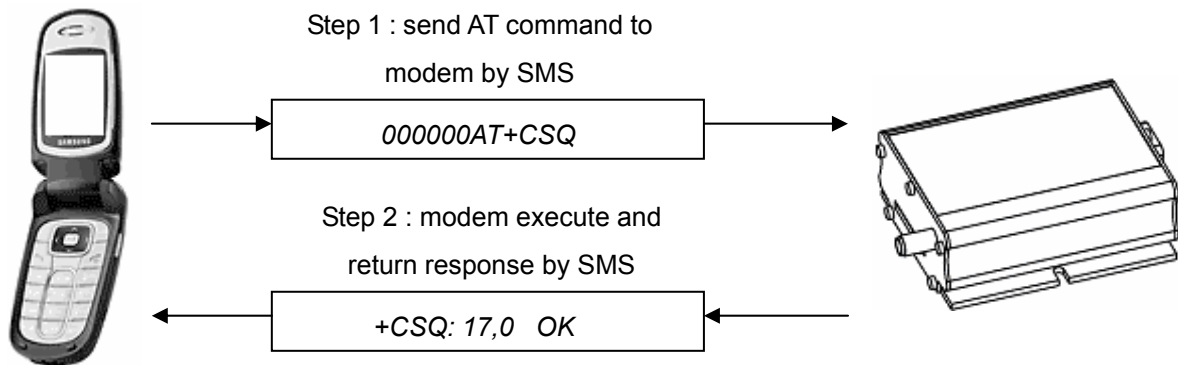
- If TCP terminal is enabled the M100evo will connect to GPRS (+IPCONNECT=1,1) about 15 seconds after power up.
- Only one TCP terminal connection can be made at a time. Any further connection requested will be refused.
- Not all AT commands could be executed. If un-allowed command is entered "command not allowed" message will be returned.
- Command echo feature is always enabled (except entering password).
- Unsolicited codes like "RING", "+CMTI", etc will not be displayed on TCP terminal.
- Never send 'interactive' AT command by SMS, e.g. AT+CMGS=.... This feature cannot return the prompt to the sender for second input.
- Always think twice before you send AT command. For example if you send AT+CPOF it will turn off the modem, and you need to go to access the modem to reset it.

10. REMOTE AT COMMAND BY SMS

This feature is to control the modem to interpret AT command from incoming SMS, executing it, and return the result to sender by SMS.

The user can enable the modem to receive AT command by incoming SMS. See following about **AT+SMSAT** command.

10.1. Description of the Operation



5. When enabled, **the modem will treat the incoming SMS as a source of AT command only if all of the following conditions (a,b and c) are fulfilled :**
 - a. The content of SMS sent to the modem is using standard 7-bit GSM data decoding scheme,
 - b. The first 6 characters of the SMS content matches the **<key>** parameter set by **AT+SMSAT** command, (default key is "000000")
 - c. The 7th and 8th characters of the SMS content is "AT" (in capital letters)
6. If SMSAT is enabled , the modem will read each incoming SMS, if the conditions mentioned in 1 are matched the message will be executed, even it is an invalid AT command
7. When using SMSAT feature, only +CNMI:x,1,x,x,x setting could be used (i.e. incoming message will be stored in SIM card).
8. The maximum length of the AT command is limited by length of SMS, i.e. 160-6 = 154 characters
9. When the SMS AT command is executed , all intermediate and final responses will be buffered recorded, then return to the sender's phone number in one single SMS.
10. If response(s) of the AT command is(are) more than 160 characters, only the first 160 characters will be returned.
11. In case the modem cannot get terminal response within 26 seconds, the modem will then abort the command, and return intermediate responses (if present).
8. If the SMSAT feature is enabled, all incoming SMS, either with valid AT command or not, will be erased. This is to prevent SIM card memory from fully filled, such the modem will not receive new SMS.

10.2. AT command for configuring AT command by SMS

10.2.1. AT+SMSAT command

Command Syntax

AT+SMSAT=<mode>(,<key>)

Response syntax:

+SMSAT: <mode>,<key>

Command	Possible responses:
AT+SMSAT=0	OK <i>Note : disable remote AT command by SMS</i>
AT+SMSAT =1	OK <i>Enable remote AT command by SMS</i>
AT+SMSAT?	+SMSAT : 1,000000 OK <i>Note display current status</i>
AT+SMSAT=2,123456	OK <i>Note: set the <key> value</i>
AT+SMSAT =?	+SMSAT : (0-2),(6) OK <i>Note : possible argument</i>

Defined Values:

<mode>

- 0 disable remote AT command by SMS
- 1 enable remote AT command by SMS
- 2 change the value of the <key>

<key>

A 6-digit numeric character key from 000000 to 999999. Only incoming SMS with the first 6 characters matching with this key will be treated as a valid source of remote AT command.

10.3. Limitation and caution to be taken when using remote AT command

This feature will not 'judge' the result of executing the command, so care has to be taken not to enter improper command that make the modem becoming out of control:

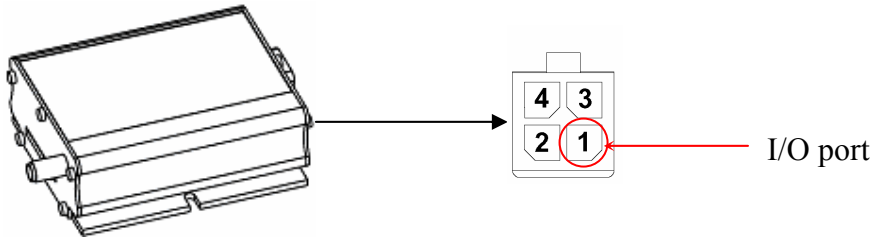
1. Never send 'interactive' AT command by SMS, e.g. AT+CMGS=.... This feature cannot return the prompt to the sender for second input
2. Always wait for the return SMS with AT responses before you send another SMS AT command.
3. It could be in some case (e.g. network failure) the modem cannot return response SMS. The modem will try sending response SMS for three times max. If still not successful it will abort.
4. Always think twice before you send AT command by SMS. For example if you send AT+CPOF it will turn off the modem, and you need to go to access the modem to reset it.
5. Some MSP AT commands can be sent over SMS. See Chapter 15.

11. I/O TRIGGERED AT COMMAND

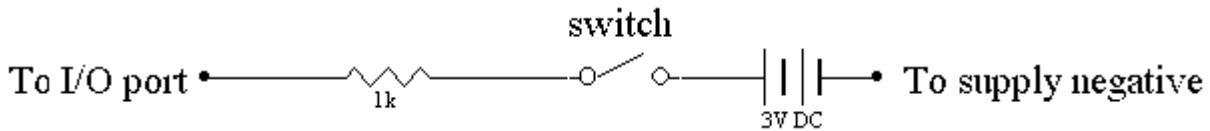
This feature makes use of the Maestro 100evo Input/Output port as a sensor. If the signal to the port match the pre-defined condition a stored AT command will be executed.

User can use **AT+IOAT** command to set the condition and store AT command to be executed.

11.1. Description of the Operation

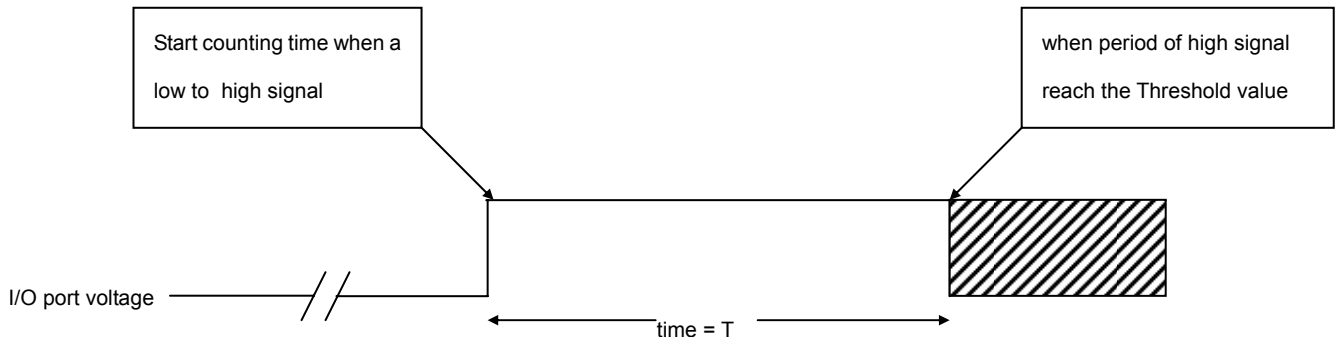


Wiring Diagram :

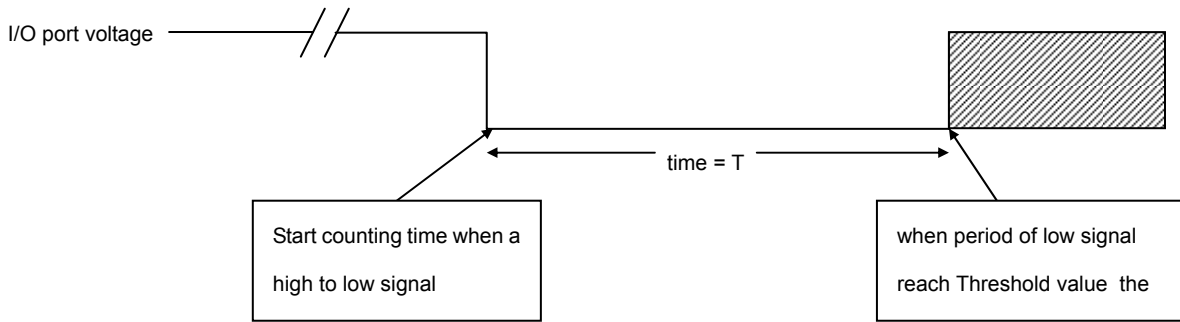


1. When the I/O port is connected to high 3V signal,
Switch closed : logic level high
Switch opened : logic level low.
2. The switch can be placed as a triggering device, e.g. to detect door opening.
3. According to the setting of AT+IOAT command, the stored AT command will be executed either I/O signal from high to low, or from low to high :

When set as low-to-high triggering:



When set as high-to-low triggering :



* See **AT+IOAT** command on setting Threshold value T.

11.2. AT command for configuring I/O triggered AT command

11.2.1. AT+IOAT command

Command Syntax

AT+IOAT=<action>(<dir>,<Threshold>,<cmd>)

Response syntax:

+SMSAT: <action>,<dir>,<Threshold>,<cmd>

Command	Possible responses:
AT+IOAT=0	OK <i>Note : disable I/O triggered AT command execution</i>
AT+IOAT =1	OK <i>Enable remote I/O triggered AT command execution</i>
AT+ IOAT?	+IOAT : 1,1, 10,"AT+CMSS=5" OK <i>Note display current status</i>
AT+IOAT=2,1,10,"AT+IPR=115200"	OK <i>Note: set the parameters < dir>, <Threshold>, <cmd> low-to-high triggering, Threshold=1000 ms command is "AT+IPR=115200"</i>
AT+ IOAT =?	+IOAT : (0-2),(0-1),(1-50),(128) OK <i>Note : possible argument</i>

Defined Values:

<action>

- 0 disable I/O triggered AT command execution
- 1 enable I/O triggered AT command execution
- 2 configure I/O triggered AT command parameters

<dir>

- 0 configure as low-to-high triggering
- 1 configure as high-to-low triggering

<Threshold>

Time required for the detected state to trigger the AT command execution. Unit is in millisecond.

Valid value from 1 to 50 (0.1 sec to 5 sec). Refer to the above timing diagram in section 5.1.

<cmd>

AT command to be executed when the I/O port is triggered successfully. The length of the command is limited to 128 characters. See section 11.3 for more details.

11.3. Notes and cautions to be taken when using I/O triggered AT command

1. The I/O port is limited to drain current 10mA max. Never give too high input voltage to the I/O port or the modem will be damaged.
2. Use only cable/metal contact designed for Molex MicroFit™ connector. Using incompatible connector will damage the modem. Contact your dealer or Maestro Wireless Solutions if you need wire for the I/O port connection.
3. The modem will NOT check the command you entered to the <cmd> field. It will be executed even it is not a valid AT command (or even not an AT command). Check by yourself when you enter the command.
4. When triggered, the command will be executed in 'quiet' mode, i.e. without any response like "OK" or "ERROR" will be sent to external application.
5. Do not enter "interactive" AT command (e.g. AT+CMGS=...), otherwise when the command is executed, the modem will in a state of waiting further input, not to do other jobs.
6. With this feature enabled user cannot control the I/O port by other AT commands anymore.
7. Due to product limitation the modem cannot detect switching action with period less than 100ms. If the switch's open/close action is done in less than 100ms this feature will not be able to detect accurately.

12. CALL SCREENING

This feature enable Maestro 100evo to reject incoming call if the phone number does not match one of the entries of authorized phone number list. Unauthorized incoming call will be hanged up within one ring.

Up to 10 authorized phone numbers can be stored. Each number can be as long as characters

Waiting call can also be rejected.

12.1. AT command for configuring call screening

12.1.1. AT+CSRN command

This command is to enable or disable call screening feature.

Command Syntax:

AT+CSRN=<mode>

Response syntax:

+CSRN: <mode>

Command	Possible responses:
AT+CSRN=0	OK <i>Note : disable call screening</i>
AT+CSRN=1	OK <i>Enable call screening</i>
AT+CSRN?	+CSRN : 1 <i>Note display current status</i>
AT+CSRN=?	+CSRN: (0-1) <i>Note : possible argument</i>

Defined Values :

<mode>

0 disable call screening

1 enable call screening

Note :

- To use call screening make sure Caller ID service is enabled otherwise all incoming call will be rejected.
- To apply call screening to waiting call please first enable Call waiting indication by command AT=CCWA=1,1
- Rejected incoming will not be diverted to voice mail.

12.1.2. AT+CSNW command

This command is to enter authorized phone number.

Command Syntax:

AT+CSNW=<id>,<num>

Response syntax:

OK

Command	Possible responses:
AT+CSNW=1,"12345678"	OK <i>Note : enter authorized number to location 1</i>
AT+CSNW=11,"12345678"	+CME ERROR: 3 <i>Note : location out of range</i>
AT+CSNW=3,"1qaaa"	+CME ERROR: 3 <i>Note : non-numeric characters not allowed</i>
AT+CSNW=?	+CSNR: (1-10),(20) <i>Note : possible argument</i>

Defined Values :

<id>

Location of the authorized phone number to be stored. Valid range is from 1 to 10

<num>

Authorized phone number. First digit can be "+", others must be numeric digits. Maximum length is 20

Note :

- Enter phone number exactly same as the incoming one, especially if entering International phone number. Use AT+CLIP command to check incoming call number first.
- Enter empty phone number in the **<num>** field will erase the record of that location.

12.1.3. AT+CSNR command

This command is to read authorized phone number entered.

Command Syntax:

AT+CSNR=<id1>(<id2>)

Response syntax:

+CSNR: <id>,<num>....

Command	Possible responses:
AT+CSNR=1	+CSNR: 1, "12345678" OK <i>Note : display authorized number in location 1</i>
AT+CSNR=1,8	+CSNR: 1, "12345678" +CSNR: 3, "123456" +CSNR: 6, "12345678" +CSNR: 8, "12345678" OK <i>Note : display authorized number in from location 1 to 8</i>
AT+CSNR=?	+CSNR=(1-10),(1-10) OK <i>Note: possible argument</i>

Defined Values :

<id1>

Beginning location of the authorized phone number to be read. Valid range is from 1 to 10.

<id2>

Ending location of the authorized phone number to be read. Valid range is from 1 to 10.

12.1.4. AT+CSND command

This command is to erase authorized phone number entered.

Command Syntax:

AT+CSND=<id1>(,<id2>)

Response syntax:

+CSNR: <id>,<num>....

Command	Possible responses:
AT+CSND=1	OK <i>Note : erase authorized number in location 1</i>
AT+CSNR=1,8	OK <i>Note : erase authorized number in from location 1 to 8</i>
AT+CSND=?	+CSND=(1-10),(1-10) OK <i>Note: possible argument</i>

Defined Values :

<id1>

Beginning location of the authorized phone number to be erased. Valid range is from 1 to 10.

<id2>

Ending location of the authorized phone number to be erased. Valid range is from 1 to 10.

13. MODEM STATUS CHECK AND MONITORING

The Modem Status Check and Monitoring feature makes the modem can check the status of the modem in either “one shot” or periodic (per minute) mode. Modem will also report check result by SMS if result is beyond preset limit, and reset automatically if losing network connection.

Following items will be checked:

- network registration (periodic mode only, triggering reset)
- rom test
- signal strength (can trigger reporting)
- IP address of modem (only when GPRS connection activated)
- module battery voltage (can trigger reporting)

13.1. AT command for Modem Status Check and Monitoring

13.1.1. AT+TMODE command

This command is to perform and setup modem status check and monitoring feature

Command Syntax:

AT+TMODE (=<mode>(<para>))

Response syntax:

+TMODE: <test1>,<test2>....

Command	Possible responses:
AT+TMODE	+TMODE: 1, 15, "10.111.222.33", 3814 OK <i>Note : execute status check ("one shot" mode)</i>
AT+TMODE=?	+TMODE: (0-4), (15) <i>Note : possible argument</i>
AT+TMODE?	+TMODE: 1, 1234567, 10, 3500 OK <i>Note: display current setting</i>
AT+TMODE=0	OK <i>Note: disable periodic mode check</i>
AT+TMODE=1	OK <i>Note: enable periodic mode check</i>
AT+TMODE=2,"1234567"	OK <i>Note: set telephone number for periodic mode reporting</i>
AT+TMODE=3,10	OK <i>Note: set network signal trigger level for remote reporting</i>
AT+TMODE=4,3450	OK <i>Note: set input voltage trigger level for remote reporting</i>

Defined Values :

<mode>

- 0 disable periodic mode check
- 1 enable periodic mode check
- 2 to set the number in <para> field as telephone number for periodic mode check reporting. See section 9.1.2 for details
- 3 to set the number in <para> field as network signal trigger level for periodic mode check reporting. See section

9.1.2 for details

- 4 to set the number in <para> field as input voltage trigger level for periodic mode check reporting. See section 9.1.2 for details

13.1.2. Operation of Modem Status Check and Monitoring

“One Shot” mode:

When user enter AT+TMODE command the modem will perform a single check and will send back the result like this:

```
+TMODE: 1, 15, "10.111.222.33", 3814
OK
```

Meaning of parameters

Check item	Result field #	Result	Remark
Rom data checksum	1	0 fail 1 pass	
network signal strength	2	range from 1-32 (or 99)	same as AT+CSQ
modem IP address	3	In xxx.xxx.xxx.xxx format	Only shown when GPRS session is activated
Input voltage	4	Voltage to the modem’s internal module (times 1000)	See * below

* Note. For Maestro modem user :

This is NOT the input voltage of the external power supply for the mode, it is an internal input voltage inside modem circuit. Since there is voltage regulation inside, modem user should not change this trigger value

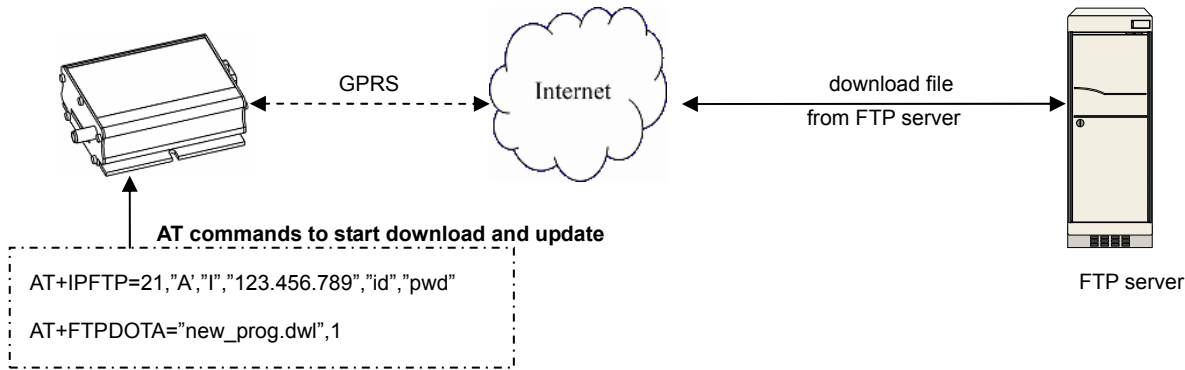
“Periodic” mode:

When user enter AT+TMODE=1 command the modem will perform periodic check every one minute :

- firstly it will check if the modem is registered to the network; if the modem is not registered to the network it will increase a counter by one. If the counter reach 5 (i.e. not registered for consecutive 5 minutes) the modem will reset
- if the modem is registered to the network the counter will be reset to 0 and perform check same as “one shot” mode
- if the result of the network signal strength is lower than the setting of AT+TMODE=3,x the test result will be sent over SMS to the telephone number set by AT+TMODE=2,xxxxxxx (max number of digit is 20)
- if the result of the input voltage is lower than the setting of AT+TMODE=4,x the test result will be sent over SMS to the telephone number set by AT+TMODE=2,xxxxxxx
- if 3 consecutive check fails (i.e. 3 SMS sent) then the periodic mode check will be disabled automatically.
- network signal trigger level range is from 1-31
- input voltage trigger level is from 3500 to 4100

14. REMOTE PROGRAM UPDATE

By using this feature, user can download the new version of Maestro Power Pack program from a FTP server and upgrade the program. By combining Remote AT command by SMS feature user can control the Maestro to complete the program downloading and updating process remotely.



To perform the whole program update process, several AT commands (steps) have to be sent:

1. AT+IPGPRS to set network parameters (APN)
2. AT+IPFTP to set FTP server parameters (name, user id, password)
3. AT+FTPDOTA to set filename and FTP path and start downloading (*)
4. AT+ADINSTALL to install the downloaded new program (*)

(*) Note: by adding one extra parameter after step 3 complete, step 4 will be executed automatically. See following sections for details

14.1. AT command for Remote program update

14.1.1. AT+IPFTP command

This command is to set FTP server parameters

Command Syntax:

AT+IPFTP=<port>,<type>,<mode>,<server>,<id>,<pwd>

Response syntax:

OK

Command	Possible responses:
AT+IPFTP= 21,"I","A","201.123.222.222", "userid","pssd"	OK <i>Note : setup FTP parameter</i>
AT+IPFTP=?	+IPFTP: (0-65535), ("A","I","E"),("P","A"),(120),(64),(64) <i>Note : possible argument</i>
AT+IPFTP?	+IPFTP: 21,"I","A","201.222.222.222","userid","pssd" OK <i>Note: display current setting</i>

Defined Values :

<port>

Port number of the FTP server. Default value is 21

<type>

Translation of carriage return, valid values are:

- I image (no translation, default),
- A ASCII
- E EBCDIC

<mode>

Passive or Active mode valid values are:

- P passive (default),
- A active

<server>

IP address of FTP server (in xxx.xxx.xxx.xxx format) or an alpha numeric string format (e.g. ftp.server.com)

Maximum 120 characters.

Note : if alpha numeric string format is used, make sure the GPRS network has proper DNS service available.

<id>

login name of the user. Maximum 64 characters,

<pwd>

password for the user. Maximum 64 characters,

14.1.2. AT+FTPDOTA command

This command is to inform the modem the filename and FTP path. The modem will login to the FTP server; download the update file, and optionally execute the update process.

Command Syntax:

AT+FTPDOTA =<filename>[,<path>],[,<update>]

Response syntax:

+FTPDOTA : 0, <filename>, <filesize>

+FTPDOTA : <result>

+ADINSTALL : <adinstall result>

Command	Possible responses:
AT+FTPDOTA="update.dwl"	+FTPDOTA: 0, update.dwl, 17000 OK <i>Note : download "update.dwl" file from FTP root directory, file size is 17000 bytes</i>
AT+FTPDOTA="update1.dwl,"sub"	+FTPDOTA: 0, update.dwl, 17001 OK <i>Note : download "update1.dwl" file from FTP "sub" directory, file size is 17001 bytes</i>
AT+FTPDOTA="update1.dwl,"sub",1	+ADINSTALL: 2 M100_VAF_094d_OAT316_32 Nov 11 200718:01:42 <i>Note : download "update1.dwl" file from FTP "sub" directory, and perform program update successfully</i>
AT+FTPDOTA?	+FTPDOTA: update.dwl, 17001 OK <i>Note : check downloaded file ready for update</i>
AT+FTPDOTA?	+FTPDOTA: OK <i>Note : no downloaded file</i>

AT+FTPDOTA="update1.dwl"	+FTPDOTA: -3 OK <i>Note : error on downloading file (FTP open fail)</i>
AT+FTPDOTA=?	+FTPDOTA: (128)[,(128)] <i>Note : possible argument</i>

Defined Values :

<filename>

File name of the file to be downloaded. Maximum 128 characters.

<path>

Path (directory) name where the file is placed. Maximum 128 characters. If <path> is omitted, program will try to download from FTP's root (entry) directory. Maximum 128 characters.

<update>

If a third parameter '1' is entered, the program will execute the **AT+ADINSTALL** command if the download process is successful. This is useful for sending update commands over SMS, so that one SMS is saved in this case. See next section for the details of **AT+ADINSTALL** command.

<result>

Result code of the downloading process

Result code	explanation	Comments / countermeasure
0	Download successful	
-1	SIM card problem	Check SIM card and PIN
-2	Internal memory problem	Try reset modem
-3	FTP connection fail	Check network signal, check FTP status, check FTP address
-4	A&D Format error	Contact Maestro Wireless
-5	Download file size not same as FTP reported	Retry downloading
-6	Not enough space for downloading	Contact Maestro Wireless
-7	File format incorrect	Check file for downloading
-8	Error writing flash	Contact Maestro Wireless
4xx – 5xx	FTP protocol return code	Check FTP document (RFC 959) for explanation

14.1.3. AT+ADINSTALL command

This command is perform the program update process. File downloaded by AT+FTPDOTA command will replace the existing Maestro Smart Pack program. Modem will restart and then restart result and version will be displayed.

Command Syntax:

AT+ADINSTALL

Response syntax:

+ADINSTALL: <result>, <ver>

Command	Possible responses:
AT+ADINSTALL	+ADINSTALL: 2 M100_VAF_094d_OAT316_32 Nov 11 200718:01:42 <i>Note : update successful, show existing version of Maestro Smart Pack</i>
AT+ADINSTALL	+ADINSTALL: 3 M100_VAF_094b_OAT314_32 Jun 11 200718:01:42 <i>Note : update unsuccessful, show existing version of Maestro Smart Pack</i>
AT+ADINSTALL	+CEE ERROR: 3 <i>Note : update unsuccessful, no update file available</i>

Defined Values:

<result>

- 2 update process successful
- 3 update process unsuccessful (original program will be loaded)

Note: for other result code please contact Maestro Wireless Solutions

<ver>

Version number of existing running Maestro Smart Pack program.

14.2. Notes and cautions to be taken on using remote program update

1. **This feature is ONLY for updating new Maestro Smart Pack program. Do not use it for downloading other things.** Always contact Maestro Wireless or distributor for correct update file and information.
2. If you want to perform update for modem at remote site by AT command over SMS, make sure the feature is enabled by command AT+SMSAT=1 is entered.
3. Make sure you have setup GPRS settings by AT+IPGPRS command. When entering AT+FTPOTA command the program will make GPRS connection automatically if not connected before.
4. It is recommended to stop other Maestro Smart Pack's features such as AutoTCP/UDP connection during program downloading and updating.
5. Depending on the file size and network condition the download time could be a few minutes up to 30 minutes. Be patient to wait for response after entering AT+FTPOTA command.
6. Do not use "~" character on filepath because it cannot be transferred correctly over SMS.
7. No resume function on FTP downloading. The whole file has to be downloaded at one time otherwise the downloaded data will be discarded
8. If you perform update by entering AT+FTPOTA command over TCP Terminal (see Chapter 9), make sure you have set <timeout> value of +TCPTERM command to a large value e.g. >50000, to avoid TCP Terminal closed during downloading process.

15. KNOWN ISSUES

The Maestro 100evo Smart Pack will affect certain other AT commands operation. Please note.

15.1. Mutually exclusive TCP/UDP functions.

Following functions are exclusive to each other, i.e. if either is enabled others could not be then:

AT+AUTOTCP=1

AT+AUTOUDP=1

AT+OTCP

AT+OUDP

15.2. Sending Maestro Smart Pack AT commands over SMS

You can use the remote AT command by SMS feature to send Maestro Smart Pack AT commands mentioned in this document except the followings:

AT+OTCP

AT+OUDP

AT+IPCONNECT

16. QUESTIONS AND ANSWERS

16.1. Installation

- Q. Can I have the TCP/IP (IP connectivity) feature together with this MSP for Maestro 100evo?
- A. No. You can only choose one of them.
- Q. If I changed my Maestro 100evo with the MSP installed, can it be changed back to have TCP/IP feature?
- A. It depends. Contact Distributor or Maestro Wireless Solutions.
- Q. I have downloaded the dwl file, and entered AT+WOPEN=1, but I still cannot use MSP, why?
- A. It could be installation problem. You can issue command AT+WOPEN=0, then AT+WOPEN=4, then repeat the download procedure. If this still not help you may need to re-flash the main firmware first.
- Q. Can I disable the MSP ?
- A. Yes, you can enter AT+WOPEN=0 to disable.
- Q. I get "Invalid modem" message after downloading dwl file and issuing AT+WOPEN=1. Why?
- A. Maybe you have downloaded file into incorrect or damaged modem. Please contact Maestro Wireless Solutions.
- Q. I had download incorrect dwl file, and the modem is not responding after issuing AT+WOPEN=1. What should I do?
- A. You may need to re-flash the main firmware. Please contact Maestro Wireless Solutions or your distributor.

16.2. AutoTCP/UDP

- Q. Can I specify <server> by URL (e.g. xxxx.com) rather than IP address?
- A. Yes, but only if your GPRS network have proper DNS service. You cannot specify your own DNS server
- Q. If I enabled AutoTCP or AutoUDP, how can I stop it ?
- A. you need to enter the command **AT+AUTOTCP=0** or **AUTOUDP=0** by either 1: within 20 seconds after power up, or 2: during reconnection (serial port back to command mode), or 3: by SMS (see Chapter , SMS AT command).

16.3. AT command driven TCP/UDP connection

- Q. After the TCP/UDP connection is stopped I want to enter **AT+OTCP** or **AT+OUDP** to reconnect but I get message "+CME ERROR: 3". Why ?
- A. After TCP/UDP socket connection the GPRS connection session will also be disconnected. So please enter **AT+IPCONNECT=1,1** to reconnect GPRS first.

16.4. Remote AT command by SMS

- Q. Can I send any AT command by SMS to control other features described in this document?
- A. Yes. Please refer to Chapter 15.2.

16.5. I/O triggered AT command

- Q. Can I put any AT command to control other features described in this document?
- A. No. MSP AT commands described in this document cannot be executed by this feature.

16.6. TCP Terminal

- Q. I have entered **AT+TCPTERM=1** to enable TCP Terminal, but I cannot access Maestro by using Telnet, why?
- A. After power up or entering **AT+TCPTERM=1**, Maestro 100evo will wait for 15 seconds before starting TCP Terminal. So please try later.

17. Examples of MSP setup and operation

17.1. To setup an Automatic TCP connection

To setup Auto connect to TCP server with IP 61.167.60.1 port 23 (client mode)

Commands to be entered	Modem response
AT+IPGPRS=1,"INTERNET" (APN is INTERNET)	OK
AT+IPTCP = 23,"C","61.167.60.1",1 (target TCP is 61.167.60.1, port 23, client mode, TxDelay is enabled)	OK
AT+AUTOTCP=1 (open TCP socket connection)	OK
(TCP connection will start after 20 secs)	

To setup Auto connect to remote TCP client request with any IP address, port 23(server mode)

Commands to be entered	Modem response
AT+IPGPRS=1,"INTERNET" (APN is INTERNET)	OK
AT+IPTCP = 23,"S","255.255.255.255", 1 (to accept TCP connection from any IP address, port 23, client mode, TxDelay is enabled)	OK
AT+AUTOTCP=1 (open TCP socket connection)	OK
(Modem will start to monitor TCP port 23 after 20 secs)	

17.2. To make a AT command driven TCP connection

To connect to TCP server with IP 61.167.60.1 port 23

Commands to be entered	Modem response
AT+IPGPRS=1,"INTERNET" (APN is INTERNET)	OK
AT+IPTCP = 23,"C","61.167.60.1",1 (target TCP is 61.167.60.1, port 23, TxDelay is enabled)	OK
AT+DLEMODE=1	OK
AT+CGATT=1	OK
AT+IPCONNECT=1,1 (GPRS connection)	OK
AT+OTCP (open TCP socket connection)	CONNECT 115200

17.3. Setup periodic Ping

To setup to pin an IP address every 30 minutes, disconnect GPRS if fail

Commands to be entered	Modem response
AT+IPGPRS=1,"INTERNET" (APN is INTERNET)	OK
AT+IPPING = 2,"61.167.60.1", 3,2,15 (ping is 61.167.60.1,no. of trial is 3, delay between pin is 2 secs, timeout is 15 secs)	OK
AT+IPPING=4,1800,1 (enable Ping every 1800secs, if ping fail then disconnect GPRS)	OK

17.4. Setup TCP Terminal and Dynamic DNS automatic update

Open TCP Terminal with port 1024, and enable DDNS update with hostname "mymodem.dyndns.org"

Commands to be entered	Modem response
AT+IPGPRS=1,"INTERNET" (APN is INTERNET)	OK
AT+IPDDNSSERV="members.dyndns.org",80 (set DDNS server settings)	OK
AT+IPDDNSACCT="mymodem.dyndns.org","mylogin","mypsswd" (set DDNS account settings)	OK
AT+IPDDNSUPD=1 (enable automatic DDNS update)	OK
AT+TCPTERM=2,"mypsswd",1024,30 (set TCP Terminal password to "mypsswd",port 1024 and timeout 30 secs)	OK
AT+TCPTERM=1 (enable TCP Terminal)	OK

17.5. Perform Remote program update by sending Command over SMS

To download update file from <ftp.maestro.com>, directory "update", filename "MSP.dwl", login id : USER, password : PASSWORD

(Remember to enter AT+SMSAT=1 to enable AT command over SMS first, default key = "000000")

SMS Flow and response (min three SMS to be sent) :

