Maestro Smart Pack
User Manual

maestro100evo

Rev.1.1

Revision history

Rev.	Date	Details	Originated by
0.95a	31Mar2010	First release for new Maestro 100evo	Wallace Lee
0.95a Rev.1	22 Nov 2011	Correct IO pin connection instruction Correct IOAT command direction parameter	Wallace Lee
097 Rev 1.1	12Dec 2011	Update for SmartPack II version 097	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
- Socket data sending (Raw TCP data)
- Email sending (SMTP)
- “Command String” programming scripts
- 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. Checking the SmartPack program

SmartPack for M100 evo have been installed and activated in factoryFirst check the Maestro 100evo firmware before installation. Enter MSP version command **AT+VAFV** to verify :

Command	**Expected response**
AT+VAFV	M100evo_SmartPackII_097_WMP100_R745_20111117 OK
(for M100evo lite)	M100evoL_SmartPackII_097_WMP100_R745_20111117 OK

If the above command returns ERROR, please try to enter command AT+WOPEN=1 and retry.

2.2. Erasing the Smart Pack

If you need to erase the Smart Pack 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)
AT&F	OK

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, 9and 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 *Note: show current settings*
AT+ IPGPRS=1,	OK *Note: set Cid value to 1*
AT+ IPGPRS =1,"INTERNET"	OK *Note: set the PDP value to 1 and APN to "INTERNET"*
AT+ IPGPRS=?	+IPGPRS: (1-4),(100),(50),(50) OK *Note: possible values*

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 *Note: display current status*
AT+ CGATT=1	OK *Note:GPRS attach success*
AT+ CGATT =0	OK *Note:GPRS detach success*

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 *Note: display possible values*
AT+ IPCONNECT?	+IPCONNECT: 1,0 OK *Note: display current status*
AT+IPCONNECT=1,1	OK OK OK *Note: Activate GPRS connection success*

AT+IPCONNECT=1,1	+CME ERROR: 3 *Note: Activate GPRS connection fail*
AT+ IPCONNECT =1,0	OK *Note: Deactivate GPRS connection success*

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

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

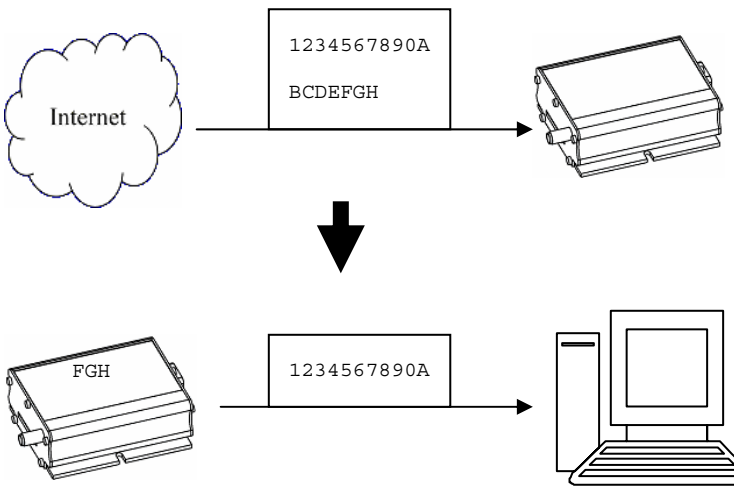
The default value is 0.

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**



18 bytes of data sent from TCP or UDP socket to modem

15 bytes (multiple of 5) data sent out to serial port, remaining data buffered inside

Command Syntax

AT+IPBUFF = <buff>

Response Syntax

+IPBUFF: <buff>

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

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

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.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 :

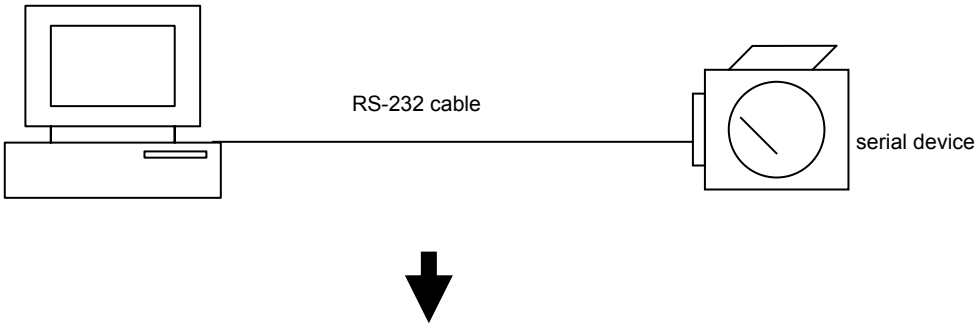
- Before enabling periodic ping action (+IPOPT=4,1,…) be sure to setup Ping parameters properly. See Chapter for details.
- Periodic ping action is enabled with GPRS disconnection (+IPOPT:4,x,1) then Automatic TCP/UDP connection should be also enabled, so that those functions will try to re-connect GPRS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

4. AUTOMATIC AND SELF-RECOVERY TCP/UDP CONNECTION

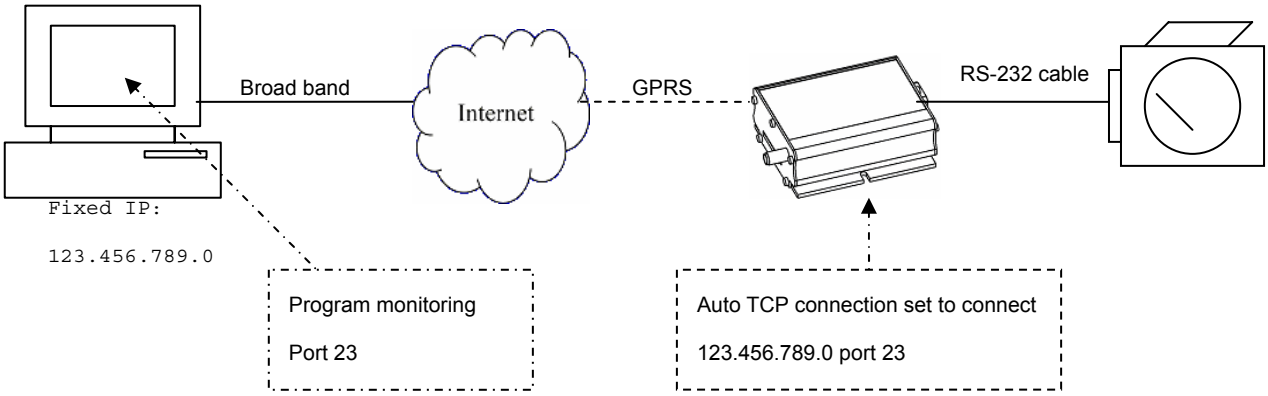
The Auto TCP/UDP connection feature is defined for accessing serial devices over the Internet. Maestro 100evo can be configured that after power up it will connect to a remote TCP/UDP socket (client mode) or to wait for the TCP/UDP socket connection request from remote peer (server mode).

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.

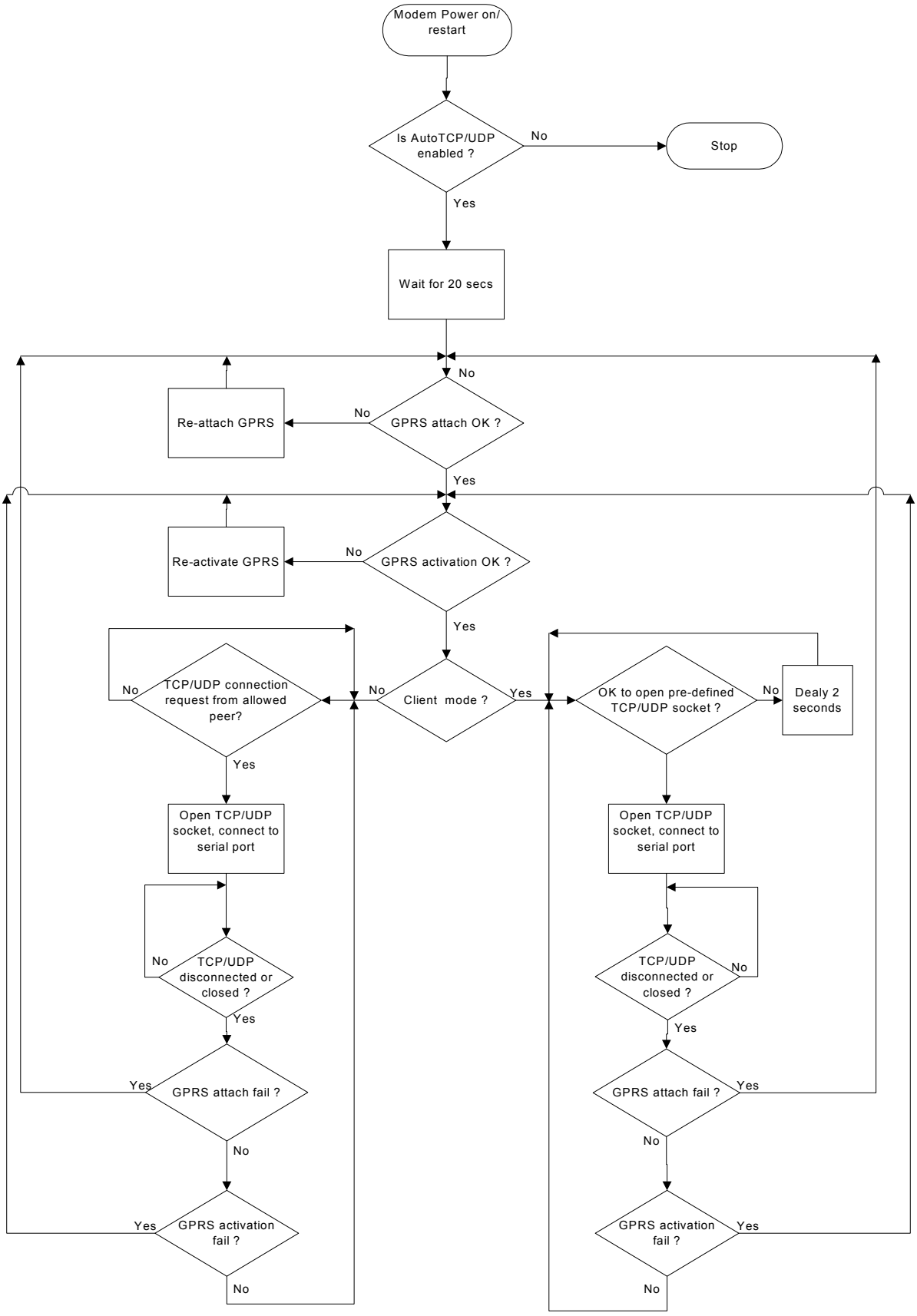
Direct serial connection



TCP Socket connection via the Internet /GPRS network



4.1. Flow diagram of Auto TCP/UDP connection function



4.2. AT commands for Auto TCP/UDP connection

4.2.1. 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 *Note : disable AutoTCP*
AT+AUTOTCP=1	OK *Enable AutoTCP*
AT+ AUTOTCP?	+AUTOTCP : 1 OK *Note display current status*
AT+AUTOTCP=?	+AUTOTCP : (0-1) *Note : possible argument*

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)

4.2.2. 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 *Note : disable AutoUDP*
AT+AUTOUDP=1	OK *Note: Enable AutoUDP*
AT+ AUTOUDP?	+AUTOUDP : 1 *OK* *Note: display current status*
AT+AUTOUDP=?	+AUTOUDP : (0-1) *Note : possible argument*

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.

4.3. AT commands for tuning Auto TCP/UDP connection

4.3.1. AT+AUFCM 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+AUFCM=<delay>

Response syntax:

+AUFCM: <delay>

Command	Possible responses:
AT+AUFCM=1	OK *Note : set the +AUFCM value to 1*
AT+ AUFCM?	+AUFCM : 2 *OK* *Note: display current status*
AT+AUFCM=?	+AUFCM : (1-255) *Note : possible argument*

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.

4.4. AT commands for TCP/UDP connection control

4.4.1. AT+AUOPT command

This command lets user to set option parameters to control socket connection. There are three option parameters:

1. Socket idle period:

period of connected socket but zero data traffic, close socket when timeout

2. Server idle period:

period of connected socket but zero data traffic, de-activate GPRS and reactivate GPRS when timeout

3. Socket connect period:

period of maximum allowed connection time, close socket when timeout.

Option	Applicable mode	Serial port behavior if option enabled
1	Client / Server	as client: in data mode all the time, data buffered as server: in data mode when socket connected, command mode when not (data not buffered)
2	Server	(n/a)
3	Client / Server	Depends on <**option**> #1 setting

Command Syntax

AT+AUOPT=<option>,<val>

Response syntax:

+AUOPT: <option>,<val>

Command	Possible responses:
AT+AUOPT=1,5	OK *Note : set the socket idle period to value to 5 (mins)*
AT+AUOPT=2,720	OK *Note : set the server idle period to value to 720 (mins)*
AT+AUOPT=3,15	OK *Note : set the socket connect period to value to 5 (minute)*
AT+AUOPT=1,0	OK *Note : set the socket idle period to value to 0 (disable)*
AT+ AUOPT?	+AUOPT : 1,5 +AUOPT : 2,15 +AUOPT : 3,750 *OK* *Note: display current status*
AT+AUOPT=?	+AUOPT : (1-3),(0-65535) *Note : possible argument*

Defined Values:

<option>

1 socket idle period. (for client and server mode)

After AutoTCP/UDP socket is connected , if there is no data transport in **both direction** for the time longer than the <**val**> (in minutes) of this <**option**> the socket will be disconnected. Please read notes below when using it with TCP client mode.

2 server idle period. (for server mode only)

If the unit set as a server have stayed in listening mode for the time longer than the <**val**> (in minutes) of this <**option**> the GPRS PDP context will be deactivated and then re-activated, and server listening modem will be resumed. This Is to prevent GPRS network closing of GPRS becausee of zero data flow after some period.

3 socket connect period. (for client and server mode)

If a AutoTCP/UDP socket stays connected for longer longer than the <**val**> (in minutes) of this <**option**> the socket will be disconnected

<val>

Value of the corresponding option. Unit is in minute. Default value is 0 (connection control disabled). Valid range is 0 to 65535.

Note :

- When <**option**> #1 is enabled with client mode, the serial port of the modem will be changed into data mode without waiting socket connection. And once data enter to serial port data will be buffered and then start connecting remote TCP server. This option is good when remote TCP server is not good for keeping socket all the time.
- New entered option values will become valid only after AutoTCP/UDP is disabled then re-enabled.
- When socket for TCP Terminal is connected GPRS de-activation by <**option**>#2 timeout will be deferred.

5. 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).

5.1. AT commands for Auto TCP/UDP connection

5.1.1. 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 *Note : disable DLEMODE*
AT+ DLEMODE =1	OK *Note: Enable DLEMODE*
AT+ DLEMODE?	+DLEMODE : 1 *OK* *Note: display current status*
AT+ DLEMODE =?	+DELMODE : (0-1) *Note : possible argument*

Defined Values:

<mode>

1 enable DLEMODE

0 disable DLEMODE

Note :

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

5.1.2. 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 *Note : TCP connection made successfully*
AT+ OTCP	+CME ERROR 3 *Note: fail, either IPCONNECT is not ready or socket service is used already*
AT+ OTCP	NO CARRIER *Note: possibly remote server no response*

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.

5.1.3. 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+OTCP

Response syntax:

CONNECT 115200

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

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.

6. 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.

6.1. AT command for setting up and execute ping

6.1.1. AT+IPPING command

Command Syntax

AT+IPPING

AT+IPPING= <mode>,<target>, <nb>, <delay>, <timeout>

Response syntax:

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

OK

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

Defined Values:

<mode>

0,1 reserved

2 configure ping address and parameters below

<target>

URL or IP address (dot-decimal notation xxx.xxx.xxx.xxx) of the target to be pinged.

<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.

7. DYNAMIC DNS

Note:

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

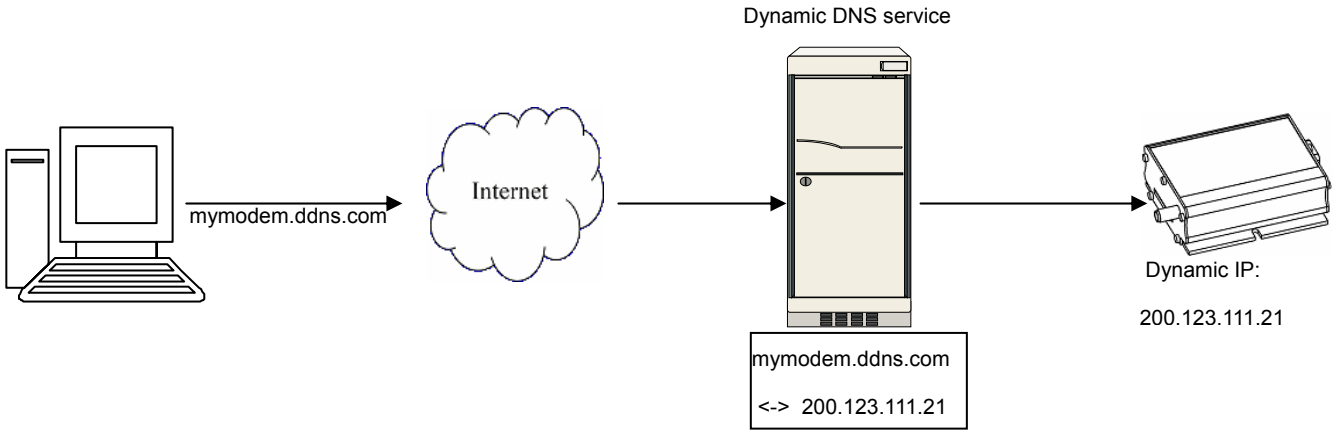
a. <u>Network will assign a true public IP address to M100evo upon GPRS activations, and</u>

b. <u>that GPRS connection allows incoming access from public Internet to Maestro</u>

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.

7.1. 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.

7.2. AT command for configuring Dynamic DNS

7.2.1. 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 *Note : enter DDNS service provider’s update server information*
AT+ IPDDNSSERV?	+IPDDNSSERV: ”members.dyndns.org”,80 OK *Note display current status*
AT+ IPDDNSSERV =?	+ IPDDNSSERV: (64),(0-65535) OK *Note : possible argument*

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

7.2.2. AT+IPDDNSACCT command

Command Syntax

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

Response syntax:

OK

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

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.

7.2.3. 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 *Note : enable automatic DDNS update*
AT+IPDDNSUPD=0	OK *Note : disable automatic DDNS update*
AT+IPDDNSUPD	+IPDDNSUPD: 1, "good 203.111.111.111" OK *Note : perform DDNS update, successful*
AT+IPDDNSUPD	+IPDDNSUPD: 3, "badauth" OK *Note : perform DDNS update, unsuccessful*
AT+IPDDNSUPD?	+IPDDNSUPD: 0, 3, "badauth" OK *Note : display current setting :* *automatic DDNS update disabled* *result of last DDNS update since power up*
AT+ IPDDNSUPD=?	+ IPDDNSUPD: (0-1) OK *Note : possible argument*

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 maximium. User can enter AT+IPDDNSUPD? to check the result of last update result.

8. TCP TERMINAL

Note:

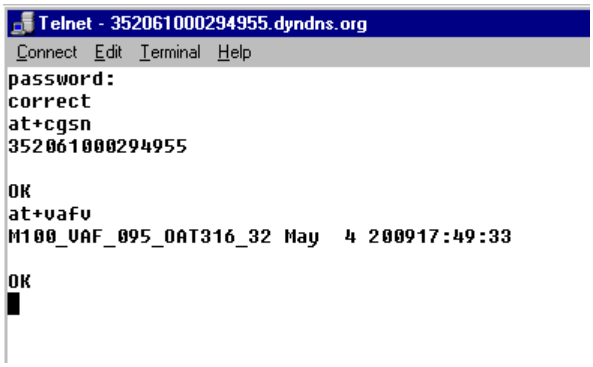
To use this feature, we strongly suggest to get special GPRS service from your network operator :

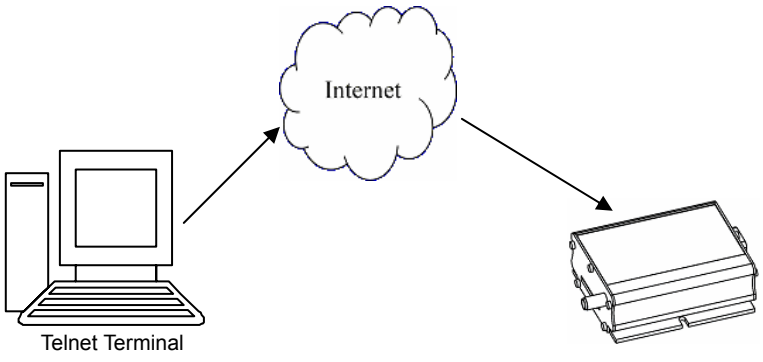
a. Network will assign a true public IP address to M100evo upon GPRS activations, and

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.

8.1. Description of the Operation





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.

8.2. AT command for TCP Terminal

8.2.1. 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 *Note : configure TCP Terminal, password: 123456, port: 23, timeout:30(secs)*
AT+TCPTERM=1	OK *Note: enable TCP terminal*
AT+TCPTERM=0	OK *Note: disable TCP terminal*
AT+TCPTERM ?	+TCPTERM: 1,"123456",23,30 OK *Note display current status*
AT+TCPTERM =?	+TCPTERM: (0-1),(16),(1-65535),(1-65535) OK *Note : possible argument*

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.

9. EMAIL SENDING (SMTP) SERVICE

To use this feature, make sure there is a SMTP server which can serve you. The network service provider may have her own dedicated SMTP server. For using other SMTP server, please check if the service connection is possible or not.

This enables M100evo to send an email via a SMTP server. This feature can save parameters like of SMTP sever name, address of sender and recipient, email subject and email body (content). Then with AT command this function will construct and email using the above stored Information. The above information will also be used by Command String email sending service (Chapter 19.6).

9.1. Description of the Operation

1. Enter the following information by AT commands (see following sections)
   - SMTP server Information (address, port, login Info)
   - Email addresses of sender; recipient (s)
   - Email subject
   - Email body (content)

   Valid “minimal” emails contain sender address and one recipient address with no subject and no content (empty email).
2. Make IP connection (see Chapter 3.2.2).
3. Use AT+EMSEND command to send out email.
4. An email can contain
   - maximum up to 1024(pre-stored)+128(command line additional) characters,
   - three (sets of) recipient: "To","cc" and "bcc". Each set have 64 characters of email address(es)
   - .Subject (title) up to 128 characters, from a choice 10 pre-store subject record.

9.2. AT command for email sending

9.2.1. AT+IPSMTP command

This command is to set SMTP server parameters

Command Syntax:

AT+IPSMTP= <port>,<auth >,<server>,<id>,<pwd>

Response syntax:

+IPSMTP= <port>,<auth >,<server>,<id>,<pwd>

OK

Command	Possible responses:
AT+IPSMTP=25,1,”smtp.network.com”,”login”,”pssd”	OK *Note : setup SMTP parameter (using authentication with no encryption)*
AT+IPSMTP=25,0,”smtp.network.com”	OK *Note : setup SMTP parameter (no authentication)*
AT+IPSMTP?	+IPSMTP: 25,0,”smtp.network.com” OK *Note : display current setting*
AT+IPSMTP=?	+IPSMTP: (0-65535),(0-2),(120),(64),(64) oK *Note : Possible arguements*

Defined Values:

<port>

Port number of the SMTP server. Default value is 25.

<auth>

Authentication type used for authentication:

0 no authentification required (default)

1 authentification with no encryption

2 authentication used with encrypted username/password in MIME64 during AUTH LOGIN phase

<server>

IP address of SMTP server (in xxx.xxx.xxx.xxx format) or an alpha numeric string format (e.g. smtp.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.

9.2.2. AT+IPSMTP command

This command is to save, read and delete email addresses of sender, recipient, cc recipient and bcc recipient.

Command Syntax:

AT+EMADDR= <oper>,<id>,<address>

Response syntax:

+EMADDR : <oper><id>,<addr>

OK

Command	Possible responses:
AT+ EMADDR=0,0,"a@abc.com"	OK *Note: store email address id 0 (sender address)*
AT+ EMADDR=0,1,"b@abc.com"	OK *Note: store email address id1*
AT+ EMADDR=1,1	+EMADDR: 1, "b@abc.com" *Note: read stored address id 1*
AT+ EMADDR=2,1	OK *Note: erase email address id1*
AT+ EMADDR=?	+EMADDR: (0-2),(0-50), (64) *Note: possible argument*

Defined Values:

<oper>

Type of operation:

0 store email address to flash

1 read email address from flash

2 erase email address from flash

<id>

Identification number (id) of the email address. Valid value is 0 to 50

0 id of the sender address (mandatory)

1-50 id of recipient email address

<addr>

Email address to be stored

9.2.3. AT+EMSUBJ command

This command is to save, read and delete email subject (title).

Command Syntax:

AT+EMSUBJ= <oper>,<id>,<subj>

Response syntax:

+EMSUBJ : <oper><id>,<subj>

OK

Command	Possible responses:
AT+ EMSUBJ=0,1,"This is subj #1"	OK *Note: store email subject #1*
AT+ EMSUBJ=1,1	+EMSUBJ: 1, "This is subj #1" *Note: read stored email subject with <id>=1*
AT+ EMSUBJ=2,1	OK *Note: erase email subject with <id>=1*
AT+ EMSUBJ=?	+EMSUBJ: (0-2),(1-10), (128) *Note: possible argument*

Defined Values:

<oper>

Type of operation:

0 store email subject to flash

1 read email subject from flash

2 erase email subject from flash

<id>

Identification number (id) of the email subject. Valid value is 1 to 10

<subj>

Email subject to be stored. Maximum 128 characters for each subject.

Note:

- It is recommend using only alpha-numeric characters (ASCII value 32 to 127) for email subject content.

9.2.4. AT+EMBODY command

This command is to save, read and delete pre-stored email body (content). Up to 3 email bodies with 1024 characters max can be stored.

The <**id**> field is the id number of the email body to be stored. To save email body, first enter AT+EMBODY=0,<**id**> then <ENTER> and wait for "> " prompt.

Then simply type email body content, <ctrl-Z> (ASCII 26) to finish.

This command can be aborted using the <ESC> (ASCII 27) character when entering text.

Command Syntax:

AT+EMBODY= <oper>,<id>

text is entered <ctrl-z / ESC>

Response syntax:

+EMBODY : <id>,<len>

Email body entered

OK

Command	**Possible responses:**
AT+ EMBODY=0,1	>
This is email body #1<ctrl-Z> *Note: enter email body with <id>=1*	
	+EMBODY: 1,21 OK *Note: successful stored 21 characters as email body with <id>=1*
AT+ EMBODY=0,1	>
This is email <ESC> *Note: press <ESC> to abort email body entry*	
	OK *Note: abort to store email body with <id>=1*
AT+ EMBODY=1,1	+EMBODY: 1 This is email body #1 OK *Note: read stored email body with <id>=1*
AT+ EMBODY=2,1	OK *Note: erase email body with <id>=1*
AT+ EMBODY=?	+EMBODY: (0-2),(1-3) *Note: possible argument*

Defined Values:

<oper>

Type of operation:

0 store email body to flash

1 read email body from flash

2 erase email body from flash

<id>

Identification number (id) of the email body. Valid value is 1 to3

<len>

Length (number of characters) of the email body stored.

Note:

- As a standard smtp type email, the body should contain alpha-numeric characters only.
- Each email body can contain up to 1024 characters. If data entered is more than 1024 it will stop getting and saved.
- On saving email body to a same <id> old body will be over written.

9.2.5. AT+EMSEND command

This command is send an email with pre-saved email subject(using AT+EMSUBJ command); pre-saved email body (content) (using AT+EMBODY command), plus an additional email body to pre-saved email address(es) (using AT+EMADDR command). Maximum three (group of) reipent(s) can be sent for a single email:

- standard recipient,
- carbon copy (cc) recipient,
- blind carbon copy (cc) recipient.

Command Syntax:

AT+EMSEND= <to_id>,<cc_id>,<bcc_id>,<subj_id>,<body_id>,<add_body>

Response syntax:

+EMSEND : <result>

OK

+CME EORROR 3

Command	Possible responses:
AT+ EMSEND=1	+EMSEND: 0 OK *Note: minimum email (no subject and body)successfully sent email to email address stored <id>=1*
AT+ EMSEND=0,0,2	+EMSEND: 0 OK *Note: minimum email (no subject and body)successfully sent email to email address stored <id>=1 as "bcc" recipient*
AT+ EMSEND =1,2,3,1,1,"extra"	+ EMSEND: 0 OK *Note: email with subject stored with <id>=1; body stored with <id>=1 and additional body "extra" is sent to:* *Address with <id>=1 as recipient,* *Address with <id>=2 as cc recipient,* *Address with <id>=3 as bcc recipient*
AT+ EMSEND=1,2,3,1,1,"extra"	+CME ERROR:3 *Note: email sending fail (possible reason : IP not connected)*
AT+ EMSEND=1,2,3,1,1,"extra"	+EMSEND: 550 OK *email sending fail (smtp reply code: No such user here)*

Defined Values:

<to_id>

Identification number (id) of the email address(es) that as a normal email recipient. Valid value is 0 to 50.('0' or missing parameter means no recipient for this email).

<cc_id>

Identification number (id) of the email address(es) that as a "carbon copy" (cc) email recipient. Valid value is 0 to 50. ('0' or missing parameter means no cc recipient for this email).

<cc_id>

Identification number (id) of the email address(es) that as a "blind carbon copy" (cc) email recipient. Valid value is 0 to 50. ('0' or missing parameter means no recipient for this email)

<subj_id>

Identification number (id) of the email subject. Valid value is 0 to 10. ('0'or missing parameter means no subject for this email).

<body_id>

Identification number (id) of the email body (content). Valid value is 0 to 3. '0'or missing parameter means no saved body will be used for this email.

<add_body>

Additional email body (content) to be sent. Maximum 128 characters can be sent. **<add_body>** will be added just after body indicated by **<body_id>**(if available).

<id>

Identification number (id) of the email body. Valid value is 1 to 3

<result>

Result code of the email sending process:

Result code	explanation	Comments / countermeasure
0	Email sending successful	
-1	Reserved	Contact Maestro Wireless
-2	Reserved	Contact Maestro Wireless
-3	Smtp setup fail	Check +IPSMTP parameters
-4	Cannot resolve smtp server/ server not found	Check +IPSMTP parameters
-5	Connect smtp server timeout	Retry later
-99	Other error	Contact Maestro Wireless
4xx – 5xx	SMTP protocol reply code	Check SMTP document (RFC 821) for explanation

Note:

- As a standard SMTP type email, the body should contain alpha-numeric characters only.
- A "minimum" email contains at least sender's email address and one recipient address. Subject and body can be left empty.
- On save email body to a same <id> old body will be over written
- When one email is being sent you cannot send another email. To put a queue of emails please use Command String "EM" (email sending) service.

10. SOCKET COMMUNICATION SERVICE

Similar to email sending service, this feature lets M100evo to send raw TCP message, up to 256 bytes, to a TCP server. This is useful for M2M communication client to send data to server without any kind of protocol overhead. It can be also used with Command String for sending status of plug-in board.

The socket communication service is one way only. Data sent in the direction from server to modem during connection is discarded.

10.1. Description of the Operation

1. Enter the following information by AT commands (see following sections)
   - TCP server Information (address, port, retry Info
   - TCP message content
2. Make IP connection (see Chapter 3.1.b).
3. Use AT+SCSEND command to send out message.
4. An message can contain maximum up to 128(pre-stored)+128(command line additional) characters

10.2. AT command for socket communication

10.2.1. AT+SCHOST command

This command is to set TCP server parameters

Command Syntax:

AT+SCHOST= <oper>,<id>[,<address>,<portt>,<retry>,<delay>,<type>]

Response syntax:

+SCHOST= <id>,<address>,<portt>,<retry>,<delay>

OK

Command	Possible responses:
AT+SCHOST=0,1,"myhost.com",23,2,10,0	OK *Note : setup host " myhost.com" with< id>=1, <port>=23,<retry>=2 ,<delay>=10,<type>=0*
AT+SCHOST=1,1	+SCHOST: 1,"myhost.com",23,2,10,0 OK *Note : display host setting with <id>=1*
AT+SCHOST=2,1	OK *Note : erase host setting with <id>=1*
AT+SCHOST=?	+SCHOST: (0-2),(1-10),(128),(1-65535),(0-10),(1-60),(0-1) OK *Note : Possible arguements*

Defined Values:

<oper>

Type of operation:

0 enter host settings

1 read host settings

2 erase entered host settings

<id>

Identification number of the host setting to be accessed. Valid value is 1 to 10

<server>

IP address of host (in xxx.xxx.xxx.xxx format) or an alpha numeric string format (e.g. myhost.com)

Maximum 120 characters

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

<port>

Port number of the host server. Valid range is 1 to 65535..

<retry>

Number of retry after the first connection unsuccessful. Each retry will be delayed according to <delay> parameter. Default value is 0 (no retry). Valid range is 0 to 10.

<delay>

Time of delay before the next connection retry. Unit is in minute. Default value is 1. Valid range is 1 to 60.

<type>

Type of server connection:

0 TCP

1 UDP

10.2.2. AT+SCMESS command

This command is to save, read and delete socket communication message (content). Up to 3 messages with 1024 characters max can be stored.

The **<id>** field is the id number of the message to be stored. To save message body, first enter AT+SCMESS=0,**<id>** then <ENTER> and wait for "**>** " prompt.

Then simply type content, <ctrl-Z> (ASCII 26) to finish.

This command can be aborted using the <ESC> (ASCII 27) character when entering text.

Command Syntax:

AT+SCMESS= <oper>,<id>,<mess>

text is entered <ctrl-z / ESC>

Response syntax:

+SCMESS: <id>

message entered

OK

Command	**Possible responses:**
AT+ SCMESS=0,1	>
This is message #1<ctrl-Z> *Note: enter message body with <id>=1*	
	+SCMESS: 1,18 OK *Note: successful stored 18 characters as message with <id>=1*
AT+ SCMESS=0,1	>
This is email <ESC> *Note: press <ESC> to abort entry body entry*	
	OK *Note: abort to store message body with <id>=1*

AT+ SCMESS=1,1	+SCMESS: 1 This is message body #1 OK *Note: read stored message with <id>=1*
AT+ SCMESS=2,1	OK *Note: erase message body with <id>=1*
AT+ SCMESS=?	+SCMESS: (0-2),(1-3) *Note: possible argument*

Defined Values:

<oper>

Type of operation:

0 enter message body

1 read saved message

2 erase saved message

<id>

Identification number (id) of the message. Valid value is 1 to 3

Note:

- Each message can contain up to 128 characters. If data entered is more than 128 it will stop getting and saved automatically,
- On entering message to a same <id> old message will be over written.

10.2.3. AT+SCSEND command

This command is send an message to a saved TCP host with or without one pre-saved message content, , plus additional message entered on command line. A minimum 1 byte of message has to be sent otherwise will get error.

GPRS connection (+IPCONNECT=1,1) must to be made and host parameters have to be entered properly before sending otherwise will return +CME ERROR: 3 . When finishing a result code will be returned. Result code "0" means message transferred success, otherwise there is error. See following for more explanation.

Command Syntax:

AT+SCSEND= <to_id>,<mess_id>,<add_mess>

Response syntax:

+SCSEND : <result>

OK

+CME EORR 3

Command	**Possible responses:**
AT+ SCSEND=1,0,"A"	+SCSEND: 0 OK *Note: minimum message(1 character))successfully sent to hostl address stored <id>=1*
AT+ SCSEND =1,1,"extra"	+ SCSEND: 0 OK *Note: message content saved with <id>=1; and additional message "extra" is sent to: host <id>=1*
AT+ SCSEND =1,1,"extra"	+CME ERROR:3 *Note: message sending fail (possible reason : IP not connected)*

AT+ SCSEND=1,1,"extra"	+EMSEND: -4 OK *Message sending fail (cannot find host)*
AT+SCSEND=?	+SCSEND: (1-10),(1-3)[,{128}] *Note: possible argument*

Defined Values:

<to_id>

Identification number (id) host entered using AT+SCHOST command. Valid value is 1 to 50.

<mess_id>

Identification number (id) of the saved message. Valid value is 1 to 3..

<add_mess>

Additional message (content) to be sent. Maximum 128 characters can be sent. **<add_body>** will be added just after message indicated by **<mess_id>**(if available).

<result>

Result code of the email sending process:

Result code	explanation	Comments / countermeasure
0	Message sending successful	
-1	Reserved	Contact Maestro Wireless
-2	Reserved	Contact Maestro Wireless
-3	Host setup fail	Check +SCHOST parameters
-4	Cannot resolve host server/ host not found	Check +SCHOST parameters
-5	Connect host server timeout	Retry later
-99	Other error	Contact Maestro Wireless

Note:

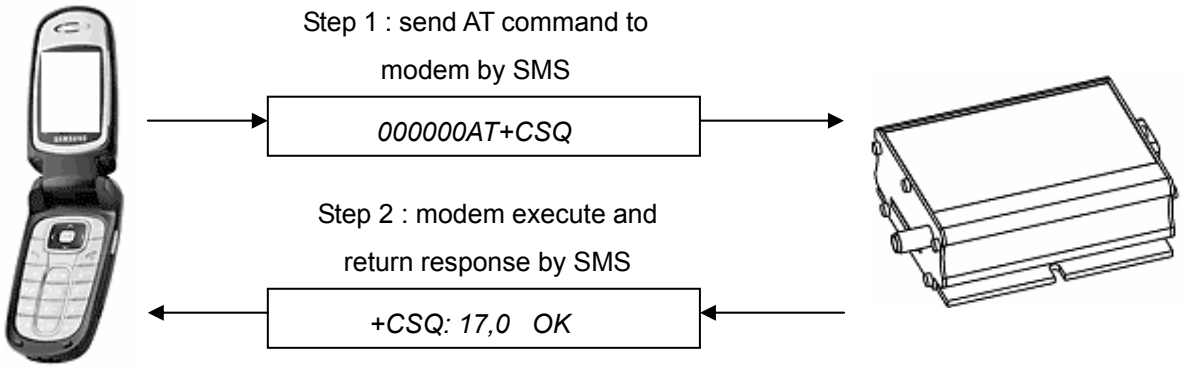
- A "minimum" message should contain at least one byte(character) either from saved or additional message.

11. 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.

11.1. Description of the Operation



5. When enabled, **the modem will treat the incoming SMS as a source of AT command only if <u>all</u> 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.

11.2. AT command for configuring AT command by SMS

11.2.1. AT+SMSAT command

Command Syntax

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

Response syntax:

+SMSAT: <mode>,<key>

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

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.

11.3. 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:

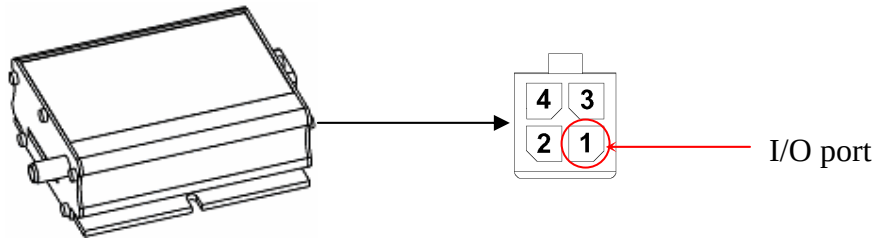
1. Never send 'interactive' AT command by SMS, e.g. AT+CMGS=…. This feature cannot return the prompt to the sender for second input
2. Always wait for the return SMS with AT responses before you send another SMS AT command.
3. It could be in some case (e.g. network failure) the modem cannot return response 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.

12. I/O TRIGGERED AT COMMAND

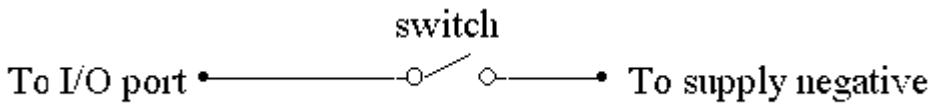
This feature makes use of the Maestro 100evo Input/Output port as a sensor. If the signal to the port match the pre-defined condition a stored AT command will be executed.

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

12.1. Description of the Operation

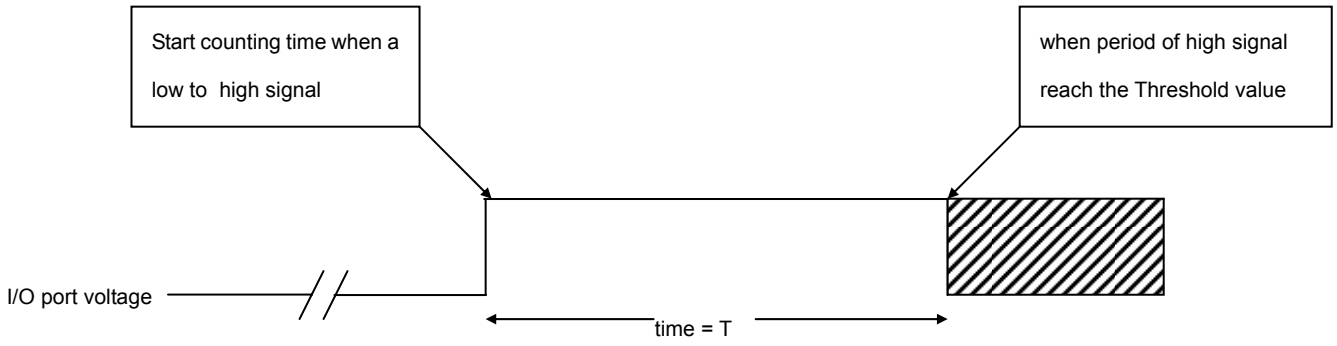


Wiring Diagram :

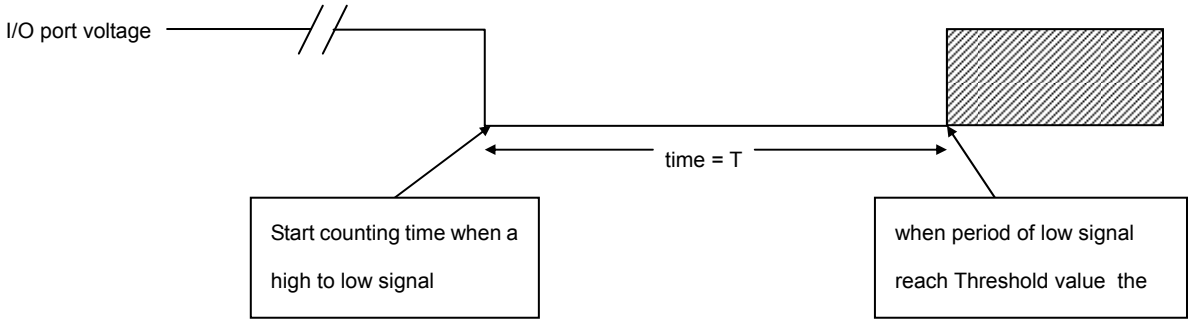


1. When the I/O port is connected to high 3V signal,
   Switch closed : logic level low
   Switch opened : logic level high
2. The switch can be placed as a triggering device, e.g. to detect door opening.
3. According to the setting of AT+IOAT command, the stored AT command will be executed either I/O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

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

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

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>

1 configure as low-to-high triggering

0 configure as high-to-low triggering

<Threshold>

Time required for the detected state to trigger the AT command exestuation. 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.

12.3. 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.

13. 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.

13.1. AT command for configuring call screening

13.1.1. 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 *Note : disable call screening*
AT+CSRN=1	OK *Enable call screening*
AT+CSRN?	+CSRN : 1 *Note display current status*
AT+CSRN=?	+CSRN: (0-1) *Note : possible argument*

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.

13.1.2. 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 *Note : enter authorized number to location 1*
AT+CSNW=11,”12345678”	+CME ERROR: 3 *Note : location out of range*
AT+CSNW=3,”1qaaa”	+CME ERROR: 3 *Note : non-numeric characters not allowed*
AT+CSNW=?	+CSRN: (1-10),(20) *Note : possible argument*

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.

13.1.3. 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 *Note : display authorized number in location 1*
AT+CSNR=1,8	+CSNR: 1, “12345678” +CSNR: 3, “123456” +CSNR: 6, “12345678” +CSNR: 8, “12345678” OK *Note : display authorized number in from location 1 to 8*
AT+CSNR=?	+CSNR=(1-10),(1-10) OK *Note: possible argument*

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.

13.1.4. 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 *Note : erase authorized number in location 1*
AT+CSNR=1,8	OK *Note : erase authorized number in from location 1 to 8*
AT+CSND=?	+CSND=(1-10),(1-10) OK *Note: possible argument*

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.

14. 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)

14.1. AT command for Modem Status Check and Monitoring

14.1.1. 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 *Note : execute status check (“one shot” mode)*
AT+TMODE=?	+TMODE: (0-4), (15) *Note : possible argument*
AT+TMODE?	+TMODE: 1, 1234567, 10, 3500 OK *Note: display current setting*
AT+TMODE=0	OK *Note: disable periodic mode check*
AT+TMODE=1	OK *Note: enable periodic mode check*
AT+TMODE=2,”1234567”	OK *Note: set telephone number for periodic mode reporting*
AT+TMODE=3,10	OK *Note: set network signal trigger level for remote reporting*
AT+TMODE=4,3450	OK *Note: set input voltage trigger level for remote reporting*

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

14.1.2. 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

15. AUTOMATIC PIN ENTRY

The Automatic Pin entry feature lets user to save a PIN code into M100 evo. When M100 evo detects a PIN (PIN1) enabled SIM on starting it will use this saved PIN code to unlock the SIM. To prevent further PIN blocking user can set minimum PIN Remaining Attempt Number as a prerequisite for the automatic PIN entry operation.

15.1. AT command for Automatic PIN Entry

15.1.1. AT+AUTOPIN command

This command is to configure and enable/disable Automatic PIN Entry feature.

Command Syntax:

AT+AUTOPIN=<mode> [,<pin>,<remain>,<unso>))

Response syntax:

OK

Command	Possible responses:
AT+AUTOPIN=1	OK *Note : enable Automatic PIN Entry*
AT+AUTOPIN=0	OK *Note : disable Automatic PIN Entry*
AT+AUTOPIN?	+AUTOPIN: 1, “1234”, 3, 0 OK *Note: display current setting*
AT+AUTOPIN=?	+AUTOPIN: (0-2),(4),(1-3),(0-1) *Note: possible arguments*
AT+AUTOPIN=2,”8888”,3,0	OK *Note: set saved PIN as “8888”, PIN Remaining Attempt Number as 3, disable unsolicited message*
AT+AUTOPIN=1 AT+AUTOPIN=2,,2,1 AT+CFUN=1 +AUTOPINE: 1	OK OK *Note: enable Automatic PIN Entry and unsolicited message and set PIN Remaining Attempt Number to 2* OK *Note: after reset PIN Remaining Attempt Number is 1, Automatic PIN Entry aborted and display unsolicted message*

Defined Values :

<mode>

0 disable Automatic PIN Entry (default value)

1 enable Automatic PIN Entry

2 configure parameters

<pin>

Four digit PIN code for Automatic PIN Entry, default value is "0000"

<remain>

Minimum value of PIN Remaining Attempt Number. If PIN Remaining Attempt Number is less than the value of <remain>, Automatic PIN Entry will not operate.

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

<unso>

0 no unsolicited message (default)

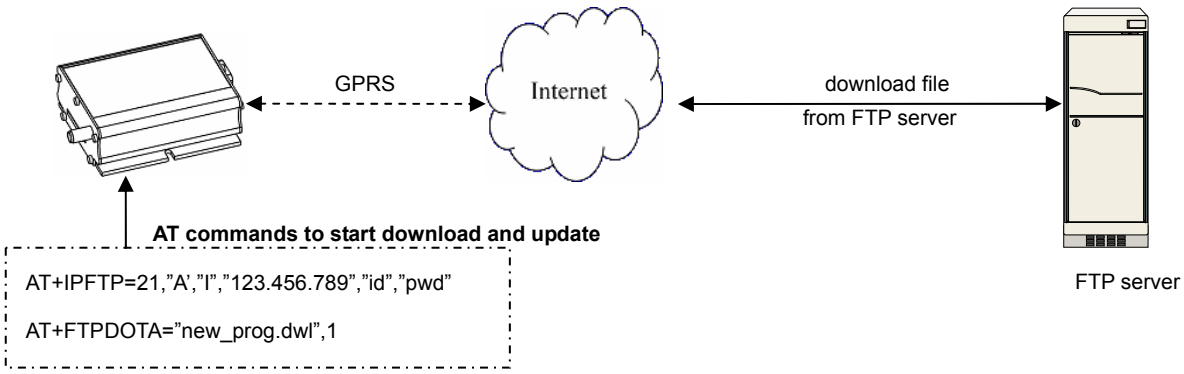
1 unsolicited message +AUTOPINE: <pin_remain> will be displayed if <remain> is larger than PIN Remaining Attempt Number.

Note:

- Be VERY careful on using this feature as normally a SIM card have 3 times of PIN entry attempts. Further Incorrect attempt will lead to the card become SIM blocked and need PUK to unblock the cad.
- This feature is only for SIM card that is PIN1 enabled. It will not work for PIN2 or PUK locked SIM card.
- The Automatic PIN Entry operation will be performed only after power up or restart. Enabling AUTOPIN after power up will not make it operate immediately.
- The AT+AUTOPIN command cannot be entered remotely (SMS, TCP Terminal). I can only be entered via local physical port.
- The AT+AUTOPIN command is not password protected. Be cautious of saved PIN entry read by other people.

16. 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

16.1. AT command for Remote program update

16.1.1. 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 *Note : setup FTP parameter*
AT+IPFTP=?	+IPFTP: (0-65535), ("A","I","E"),("P","A"),(120),(64),(64) *Note : possible argument*
AT+IPFTP?	+IPFTP: 21,"I","A","201.222.222.222","userid","pssd" OK *Note: display current setting*

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,

16.1.2. 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 *Note : download “update.dwl” file from FTP root directory, file size is 17000 bytes*
AT+FTPDOTA=”update1.dwl,”sub”	+FTPDOTA: 0, update.dwl, 17001 OK *Note : download “update1.dwl” file from FTP “sub” directory, file size is 17001 bytes*
AT+FTPDOTA=”update1.dwl,”sub”,1	+ADINSTALL: 2 M100_VAF_094d_OAT316_32 Nov 11 200718:01:42 *Note : download “update1.dwl” file from FTP “sub” directory, and perform program update successfully*
AT+FTPDOTA?	+FTPDOTA: update.dwl, 17001 OK *Note : check downloaded file ready for update*
AT+FTPDOTA?	+FTPDOTA: OK *Note : no downloaded file*

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

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

16.1.3. 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 *Note : update successful, show existing version of Maestro Smart Pack*
AT+ADINSTALL	+ADINSTALL: 3 M100_VAF_094b_OAT314_32 Jun 11 200718:01:42 *Note : update unsuccessful, show existing version of Maestro Smart Pack*
AT+ADINSTALL	+CEE ERROR: 3 *Note : update unsuccessful, no update file available*

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.

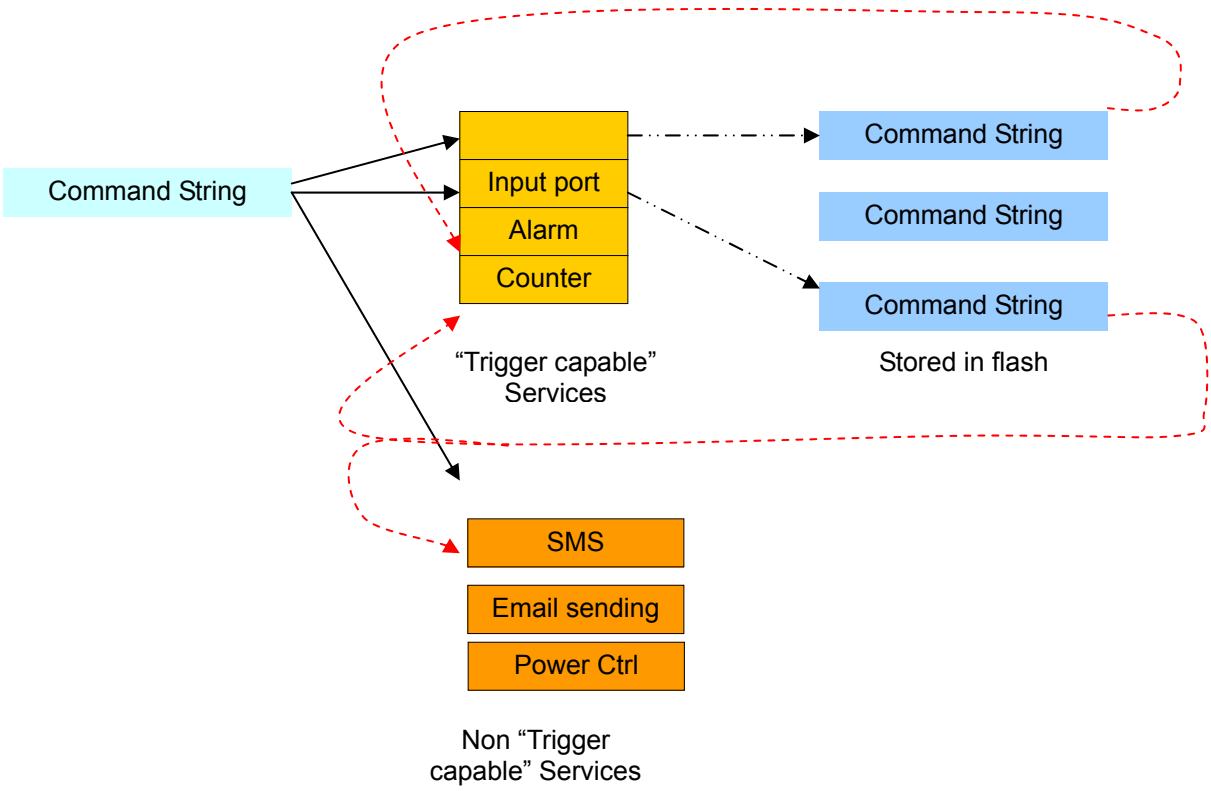
16.2. Notes and cautions to be taken on using remote program update

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+FTPDOTA 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 3o minutes. Be patient to wait for response after entering AT+FTPDOTA 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+FTPDOTA command over TCP Terminal (see Chapter 9), make usre you have set <timeout> value of +TCPTERM command to a large value e.g. >50000, to avoid TCP Terminal closed during downloading process.

17. COMMAND STRING - INTRODUCTION

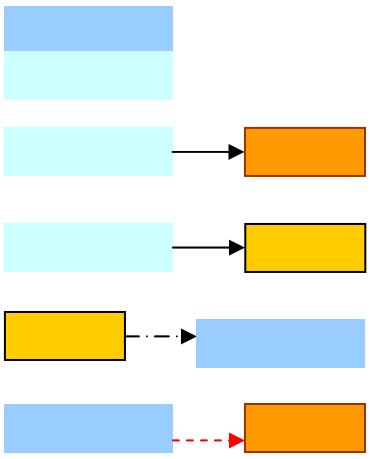
"Command String" is a set of programmable scripts originally for Maestro Heritage modem. And now it is incorporated to M100evo. User can input sets of Command Strings to control various kinds of "Service". Unlike AT command, Command strings can be stored inside M100evo and can be executed upon output of certain services.

17.1. Command String and "Service" Concept



"Command String" and "Service" operation mechanism

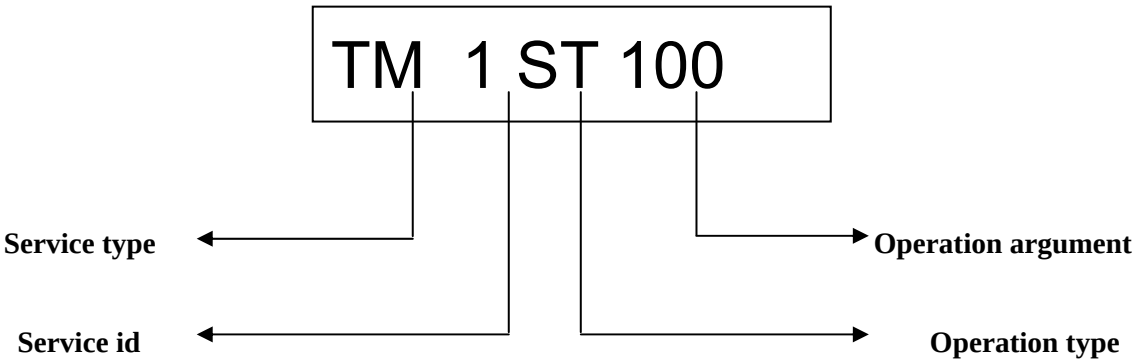
1. Use AT command to enter preset Command Strings
2. Command strings can be executed upon power up or directly by AT commands
3. Executed Command Strings will drive some Services to be done (e.g. sending SMS or setting output pins)
4. Executed Command Strings can also configure and control some Services that have "trigger" capability.
5. These Services, when a certain pre-defined condition is matched (e.g. timer reach zero) can "trigger" a stored Command String.
6. Execute stored Command String to control Services again



18. COMMAND STRING – WRITING AND USING

18.1. Structure of Command String

A single Command String is a text string composed with four fields, for example:



18.1.1. Service type

This field has two capital characters indicates the type of Service to be chosen:

Field entry	AL	CT	TM	IP (*)	SM	EM	AI(*)	SC
Service	alarm	Counter	Countdown timer	input ports	SMS	Email	Analogue input	Socket Comm
See Chapter	19.1	19.2	19.3	19.4	19.6	19.7	19.9	19.10

18.1.2. Service Id

Each type of Service there has more than one unit; e.g. there are 5 counters available so the id range is 1 to 5.

18.1.3. Operation type and Operation argument

For each type of Service there are few kinds of operations; e.g. “TM 1 ST 100” means to set the value or countdown timer #1 to 100 seconds. See further chapters for the explanation of each service.

18.2. Concatenating Command String

You can concatenate Command Strings update 128 bytes long totally (including space). They will be executed sequentially. However, if one Command String is incorrect or invalid execution will be stopped and successive Command Stings will not be executed.

For example: TM 1 ST 100 TM 1 TR 99 TM 1 SW 1

- First String “TM 1 ST 100” will be executed
- Second String “TM 1 TR 99” will not be executed because “99” is out of range
- Third String “TM 1 SW 1” is correct but will not be executed because execution is stopped on 2nd String

18.3. Entering and executing Command String

You can use the following AT commands to store and execute Command String

18.3.1. AT+CSTR command

Description:

This command is used to execute a Command String directly.

Command Syntax:

AT+CSTR= <string>

Response Syntax:

OK

+CME ERROR : 3

Command	Possible responses:
AT+ CSTR=”TM 1 ST 3”	OK *Note: entire Command String executed successfully*
AT+ CSTR=”TM 1 ST 3 TM 30 ST 4”	+CME ERROR: 3 *Note: one Command String cannot be executed*

Defined Values:

<string>

Command String

Note: When there is error in between concatenated Command String +CME ERROR: 3 will be returned. See 18.2.

18.3.2. AT+CSTRSET command

Description:

This command is used to store, read and delete Command String. It can also used to execute stored Command String.

Command Syntax:

AT+CSTRSET= <oper>,<id>[,<string>]

Response Syntax:

OK

+CME ERROR: 3

Command	Possible responses:
AT+ CSTRSET=0,1,”TM 1 ST 3”	OK *Note: store Command String with String id = 1*
AT+ CSTRSET=0,99,”TM 1 ST 3”	+CME ERROR: 3 *Note: id out of range*
AT+CSTRSET=1,1	+CSTRSET : 1, “TM1 ST 3” *Note: read stored Command String id 1*
AT+CSTRSET=3,1	OK *Note: execute stored Command String id 1*
AT+CSTRSET=2,1	OK *Note: erase Command String id 1 from flash memory*
AT+CSTRSET=3,1	+CME ERROR: 3 *Note: id 1 is empty*

Defined Values:

<oper>

Define type of operation:

0 store Command String to flash

1 read Command String from flash

2 erase Command String from flash

3 execute Command String stored in flash

<id>

Identification number (id) of the Command String. Valid value is 1 to 50, and 80; i.e.

- up to 51 Command Strings can be stored.
- Command String with id = 80 will be executed when modem power up

<string>

Command String

Note:

- Each Command String is limited to 128 bytes.
- The program will NOT check if the input Command String is valid or not.

19. COMMAND STRING – SERVICES

"Service" is a kind function or tool that can be made use by Command String. There are two kinds of Services:

- **Trigger capable**

When a certain pre-defined condition is matched (e.g. timer reach zero) "trigger" a stored Command String.

These Services include: Alarm, Counter, Input Port, and Countdown Timer

- **Non-Trigger capable**

Can only perform job when called by Command String.

These Services include: SMS

19.1. Alarm Service

Alarm is used to execute a Command String when the real-time clock of the M100evo meets the set time of the Alarm.

To use Alarm it is required to set the real-time clock of the modem properly, see AT+CCLK in AT command manual.

There are total of 5 Alarms can be used.

19.1.1. Alarm Service Command String Syntax and explanation

1st field Service type	2nd field Service id	3rd field Operation type	4th field Operation argument	Explanation
AL	(1 to 5)	ST	09/10/10,12:00:00	Set alarm date/time yy/mm/dd,hh:mm:ss format
		ST	0	Cancel preset
		TR	(1 to 50) 0	Set Command String to be run, 0 to cancel setting

Example: Set alarm #1 to execute Command String #20 at 01OCT2008, 01:00:00

AL 1 TR 1 AL 1 ST 08/10/01,01:00:00

Example: Cancel #1 Alarm setting

AL 1 ST 0

Example: Cancel #1 Alarm executing Command String

AL 1 TR 0

Note:

- The Alarm date time input MUST to fulfill the following requirements:
  1. In *yy/mm/dd,hh:mm:ss* format, program will also check if input date/time is valid or not
  2. At least 4 minutes later than current modem's real-time clock time (check by AT+CCLK command)
- Do not concatenate after **ST** operation; set time operation should be at the last part of Command String
- After alarm time, the **ST** setting of that Alarm will be lost
- This service will make use of M100evo internal alarm command (AT+CALA) so please avoid using AT+CALA command by yourself when Alarm Service is used.
- If the modem is restarted, date time setting of each Alarm will be checked against real-time clock time. If time is passed the setting will be cancelled.
- Alarm Service is "one-shot" type. There is no periodic alarm like "daily" or "weekly"

19.1.2. Reading Alarm Service Status

See Chapter for details.

19.2. Counter Service

Counter is used to execute a Command String when the Counter value equals a preset value. There are total of 5 Counters.

19.2.1. Counter Service Command String Syntax and explanation

1st field Service type	2nd field Service id	3rd field Operation type	4th field Operation argument	Explanation
CT	(1 to 5)	DE	1 TO 255	Decrement the value of Counter with argument value
		IN	1 TO 255	Increment the value of Counter with argument value
		RS	0	Reset the Counter value to zero
		ST	-32768 to 32767	Set the "trigger" value If Counter value equal this value, will execute Command String
		TR	(1 to 50) 0	Set Command String to be run, 0 to cancel setting

Example: Set Counter #1 to execute Command String #10 if Counter value equal 100

CT 1 ST 100 CT 1 TR 10

Example: Increase Counter #1 value by 20

CT 1 IN 20

Example: Reset Counter #1 value to 0

CT 1 RS 0

Note:

- Initial Counter and trigger values are zero.
- The Counter is recorded by a signed 16 bit register, if the Counter value is 32767 and you increase it by 1, the value will change to -32768
- There is no limit on no. of times of triggering. E.g. If you first set trigger value to 2 and reset Counter to 0, then you increment counter by 2, then decrement by 2 and increment by 2 again. Then the associated Command String will be executed twice.

19.2.2. Reading Counter Service Status

See Chapter for details.

19.3. Countdown Timer Service

Countdown Timer is used execute a Command String when the Timer value reach zero. Counting period is 1 second. There are total of 10 Countdown Timers.

19.3.1. Countdown Timer Service Command String Syntax and explanation

1st field Service type	2nd field Service id	3rd field Operation type	4th field Operation argument	Explanation
TM	(1 to 10)	ST	1 TO 2147483647	Initial value of Countdown Timer (in seconds)
		SW	0 TO 1	Start (1) or Stop (0) Timer
		TR	(1 to 50) 0	Set Command String to be run, 0 to cancel setting

Example: Set Countdown Timer #1 to execute Command String #10 and start 600 seconds countdown

TM 1 ST 600 TM 1 SW 1 TM 1 TR 10

Example: Stop Countdown Timer #1

TM 1 SW 0

Example: Cancel Countdown Timer #1 to trigger Command String

TM 1 TR 0

Note:

- When the Countdown Timer expires (reach 0) it will stop automatically (SW 0).
- If two or more Timers expire at the same timer, Timer with smaller id has higher priority, i.e. Command String related to that Timer will be executed first.
- These are not precision Timers, if the Modem is busy (e.g. with network communication). The execution time may be delayed.

19.3.2. Reading Countdown Timer status

See Chapter 20 for details.

19.4. Input Port Service

Input Port Service can use the signal of Input port to control the execution of Command String. Please refer Chapter 13.1 for locating and connecting input port.

19.4.1. Input Port Service Command String Syntax and explanation

1st field Service type	2nd field Service id	3rd field Operation type	4th field Operation argument	Explanation
IP	1	DR	0 to 1	Direction of I/P signal change to trigger
		TH	1 to 255	Duration of the I/P state to trigger, unit in 0.1s
		TR	(1 to 50) 0	Set Command String to be run, 0 to cancel setting

Example: Configure Input Port #1 with detection “high to low” and threshold value 0.1s, and trigger Command String #5 if signal condition match:

IP 1 DR 1 IP 1 TH 1 IP 1 TR 5

Example: cancel Input Port#1 to trigger Command String

IP 1 TR 0

19.4.2. Input Port operation mechanism

The Input Port will give out a high or low signal depending on the input connection to the port (see 13.1)

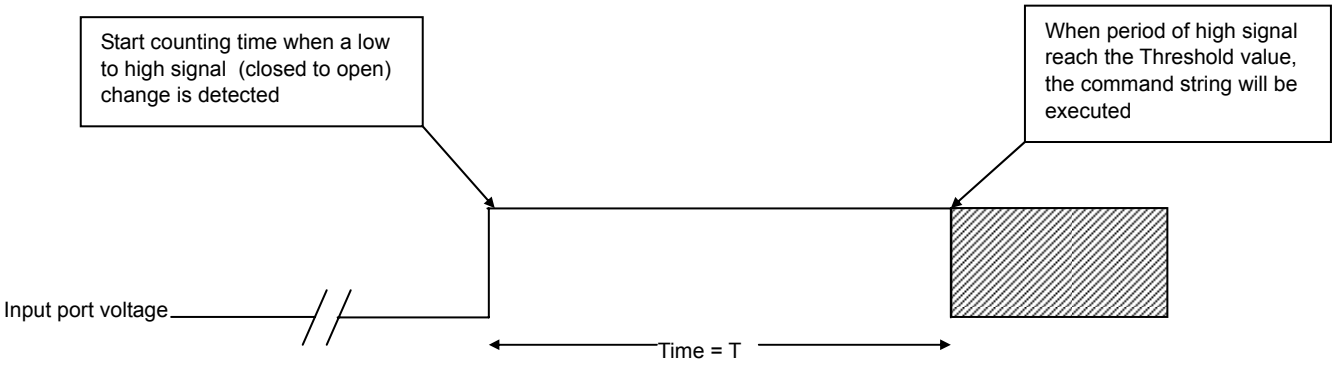
The Command String can check the change of Input port Signal (operation “DR”):

IP 1 DR 0 → detect a low-to-high input voltage change

IP 1 DR 1 → detect a high-to-low input voltage change

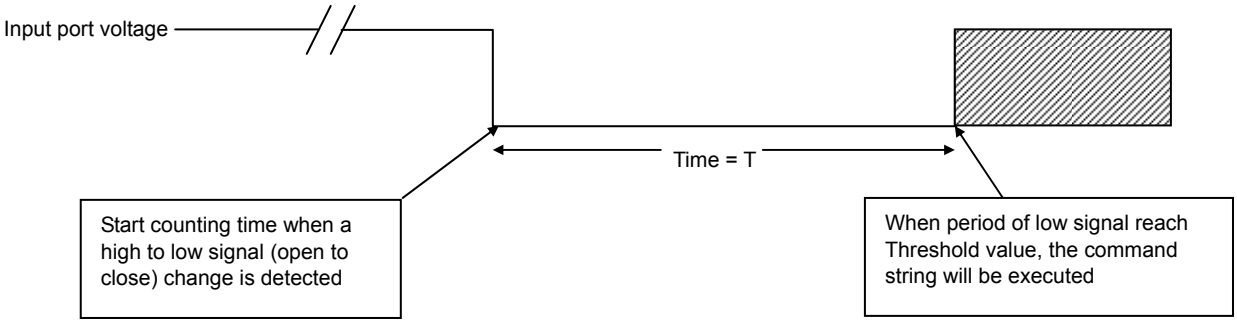
To prevent transient noise signal, a threshold value can be set (operation “TH”). This is the time period required for the detected state to trigger Command String execution. Unit is in 1 millisecond. Valid value from 1 to 50 (0.1 sec to 5 sec) . E.g. TH 10 → Threshold value is 1 sec.

E.g. When set as low-to-high triggering and threshold 1 second: **IP 1 DR 0 IP 1 TH 10 IP 1 TR 5**



When T=1second the Command String #5 will be executed

E.g. when set as high-to-low triggering and threshold 1 sec **IP 1 DR 1 IP 1 TH 10 IP 1 TR 5**



When T=1second the Command String #5 will be executed

Note:

- Due to product limitation the modem cannot detect switching action with period less than 100ms. If the input signal change is less than 100ms this feature will not be able to detect accurately.

19.4.3. Reading Input Port status

See Chapter 20 for details.

19.5. SMS Service

This service is used to send out a SMS to phone number recorded in the first 10 phonebook records in SIM card.

19.5.1. SMS Service Command String Syntax and explanation

1st field Service type	2nd field Service id	3rd field Operation type	4th field Operation argument	Explanation
SM	(1 to 10)	SN	(SMS content)	Send out the SMS to phone number inside SIM card
			%CTn %IP %TMn %AI	“%” to indicate “variable” options in SMS content

Example: Send a message “ALERT” to phone number store in SIM phonebook #1:

SM 1 SN ALERT

Example: Send a message “Counter#2_value_is_20" to phone number store in SIM phonebook #1:

SM 1 SN Counter#2_value_is_%CT2

19.5.2. Using “variable” options within SMS content

In the SMS content field you can use “%” and Service type to insert the current value of Service into the SMS content:

Variable	%CTn	%TMn	%IP	%AI
Description	Current value of counter Id#n	Current value of Timer Id#n	Current I/P Ports’ summing value	Current AI Ports values
Range of ‘n’	1 to 5	1 to 10	0 to 1	in mV

Invalid Service name or Id will be ignored.

Note:

1. Due to modem/SIM initialization it is recommended to send SMS 30 seconds after power up.
2. Only send SMS with “normal” characters. If SMS content has character with ASCII value outside the range between 11 and 127, the SMS may not be sent properly.
3. In case of sending SMS failure (e.g. network problem) the program will delay 0.5 second and try to resend the SMS. If the second time retry (i.e. 3 times total) fails this SMS delivery will be aborted.
4. The maximum length of the SMS content is limited by the maximum length of Command String (128 bytes). The more of Command Strings, the less of SMS length.

19.6. Email Sending Service

This service is used to send out an Email to one or more email saved address, with saved email subject and saved plus variable email content. Please read Chapter 10 for entering email address, subject and body. Up to 10 set of groups (service type EM, id 1 to 10) can be set with different combinations of "elements" : recipient(to,cc,bcc), subject and body.

19.6.1. Email Sending Service Command String Syntax and explanation

1st field Service type	2nd field Service id	3rd field Operation type	4th field Operation argument	Explanation
EM	(1 to 10)	TO	(0-50)	Id of recipient email address (see Chapter 10.2.2) 0 : no receipient
		CC	(0-50)	Id of “cc” recipient email address (see Chapter 10.2.2) 0 : no cc receipient
		BC	(0-50)	Id of “bcc” ecipient email address (see Chapter 10.2.2) 0 : no bcc receipient
		SU	(0-10)	Id of email subject (see Chapter 10.2.3) 0 : no subject
		BD	(0-3)	Id of email body (see Chapter 10.2.4) 0 : no body

		SN	(additional content)	Send out the email with above setting plus additional content
			%CTn %IP, %TMn %AI	"%" to indicate "variable" options in additional content

Example: Setting up EM set #1 with elements: recipient #1, cc #3, bcc #4, subject #1, content #2:

EM 1 TO 1 EM 1 CC 3 EM 1 BC 4 EM 1 SU 1 EM 1 BD 1

Example: Sending email EM set#1 with additional content "HELLO_WORLD":

EM 1 SN HELLO_WORLD

Example: Setting up EM set #2 with elements: recipient bcc #3, no subject and content only "0", and send out immediately:

EM 2 BC 3 EM 2 SN 0

Example: Send an email EM set #1 with content "Counter#2_value_is_20"

EM 1 SN Counter#2_value_is_%CT2

19.6.2. Using "variable" options within additional email content

In the SMS content field you can use "%" and Service type to insert the current value of Service into the SMS content:

Variable	%CTn	%TMn	%IP	%AI
Description	Current value of counter Id#n	Current value of Timer Id#n	Current I/P Ports' summing value	Current AI Ports values
Range of 'n'	1 to 5	1 to 10	0 to 1	in mV

Invalid Service name or Id will be ignored.

Note:

1. To use Email Sending Service make sure all parameters has been setup properly first:
   - APN (+IPGPRS)
   - SMTP server (+IPSMTP)
   - Sender and recipient address (+EMADDR)
   - Subject (+EMSUBJ)
   - Body (+EMBODY)

   It is strongly suggested you have tested the email sending function by using AT+EMSEND command to send test emails first before using EM Command Sting.
2. If Operation argument of TO,CC,BC,SU and BD is set to 0(default), the associated Email set will not contain that element
3. A minimum email contains one recipient (either TO, CC or BC) and one character of additional email content.
4. Unlike AT+EMSEND command, sending email use EM service will automatically making GPRS connection (+IPCONNECT=1,1)
5. In case email sending is unsuccessful due to any reason, the same email will be resent for max 2 more times. If all retries are fail that Email will be aborted

6. When using EM service maximum 10 emails can be put on sending queue, further Email sending requests will be aborted. Buffered email queue is volatile and will be lost If modem Is power off or reset. Also when there is EM service in queue AT+EMSEND command will not be allowed.

19.6.3. Reading Email Sending Service status

See Chapter 20 for details.

19.7. Analogue Input Service

Analogue Input Service can use the signal of Analogue Input to control the execution of Command String. Please read M100evo user guide for the connection of Analogue Input port.

19.7.1. Analogue Input Service Command String Syntax and explanation

1st field Service type	2nd field Service id	3rd field Operation type	4th field Operation argument	Explanation
AI	1 (1 AI only)	TP	1 to 3	Trigger Type of AI value change to trigger
		TH	1 to 255	Duration of the AI state to trigger, unit in 1s
		HL	0 to 5000	High Limit of AI to trigger (units mA or mV)
		LL	0 to 5000	Low Limit of AI to trigger (unit: mA or mV)
		TR	(1 to 50) 0	Set Command String to be run, 0 to cancel setting

Example: Configure AI#1 trigger condition that value is either higher than the high limit (3000)or lower than low limit (1000)and threshold value 1s, and trigger Command String #5 if signal condition match:

AI 1 TP 3 AI 1 TH 1 AI 1 HL 3000 AI 1 LL 1000 AI 1 TR 5

Example: Configure AI#3 trigger condition that value is higher than the high limit (1000) threshold value 2s, and trigger Command String #1 if signal condition match:

AI 3 TP 1 AI 3 TH 2 AI 3 HL 1000 AI 3 TR 2

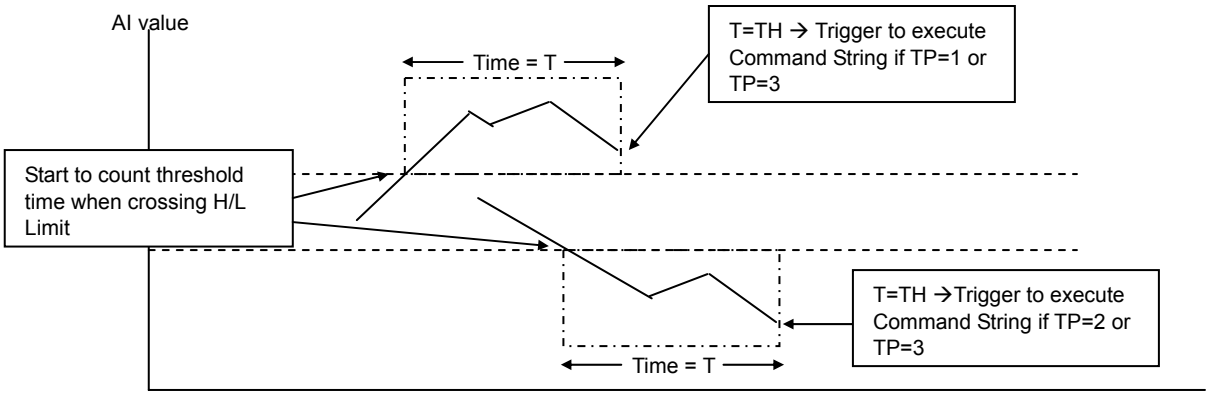
Example: cancel AI#1 to trigger Command String

AI 1 TR 0

19.7.2. Analogue Input operation mechanism

The Analogue Input Service will keep checking the AI once every one second. Depending on Trigger Type (TP) set, the service will trigger executing Command String if condition fulfilled:

Trigger Type **TP**	AI value change from lower than to higher than **HL** value	AI value change from higher than to lower than **LL** value
1	Trigger	-
2	-	Trigger
3	Trigger	Trigger



Note:

- Please read M100evo manual carefully before setup.
- The Service cannot detect AI value change period less than 1s. If the AI value change is less than 1 second this feature will not be able to detect accurately

19.7.3. Reading Analogue Input Service status

See Chapter 20 for details.

19.8. Socket Communication Service

This service is used to send out a message Email to one saved TCP host, with saved message content plus variable message. Please read Chapter 11 for entering host address and parameters, Up to 10 set of groups (service type SC, id 1 to 10) can be set with different combinations of "elements" : host , message content.

19.8.1. Socket Communication Service Command String Syntax and explanation

1st field Service type	2nd field Service id	3rd field Operation type	4th field Operation argument	Explanation
SC	(1 to 10)	TO	(1-10)	Id of host address (see Chapter 11.2a)
		BD	(0-3)	Id of email body (see Chapter 10.2b) 0 : no body
		SN	(additional content)	Send out the message with above setting plus additional content
			%CTn %IP , %TMn, %AI	"%" to indicate "variable" options in additional content

Example: Setting up SC set #1 with elements: host #1, content #2:

SC 1 TO 1 SC 1 BD 1

Example: Sending socket communication message SC set#1 with additional content "HELLO_WORLD":

SC 1 SN HELLO_WORLD

Example: Setting up SC set #2 with message "0", and send out immediately:

SC 2 BD 0 SC 2 SN 0

Example: Send a message SC #1 “Counter#2_value_is_20" (report counter # value):

SC 1 SN Counter#2_value_is_%CT2

19.8.2. Using “variable” options within additional email content

In the SC message additional content field you can use “%” and Service type to insert the current value of Service into the additional content:

Variable	%CTn	%TMn	%IP	%AI
Description	Current value of counter Id#n	Current value of Timer Id#n	Current I/P Ports’ summing value	Current AI Ports values
Range of ‘n’	1 to 5	1 to 10	0 to 1	in mV

Invalid Service name or Id will be ignored.

Note:

1. To use Socket Communication Service make sure all parameters has been setup properly first:
   - APN (+IPGPRS)
   - host server (+SCHOST)
   - pre-saved message (+SCMESS) (if needed)

   It is strongly suggested you have tested the socket communication function by using AT+SCSEND command to send test message first before using SC Command Sting.
2. When using SC service maximum 10 messages can be put on sending queue, further message sending requests will be aborted. Buffered message queue is volatile and will be lost If modem Is powered off or reset. Also when there is SC service in queue AT+SCSEND command will not be allowed.

19.8.3. Reading Input Port status

See Chapter 20 for details.

20. COMMAND STRING - READING STATUS OF SERVICES

20.1. Command for reading current information of Services

You can use AT command to read the info of trigger capable Services.

20.1.1. AT+CSTRSTAT Command

Description:

This command is to read current parameter or status of a particular service.

Command Syntax:

AT+CSTRSTAT=”<type> <id>”

Response Syntax:

OK

+CME ERROR: 3

Command	Possible responses:
AT+ CSTSTAT=”AL 1”	AL 1 : ST 01/01/01,12:00:00 TR 2 OK *Note: read current setting of Alarm #1*
AT+ CSTRSTAT=”TM 10”	TM 10: CV 66 SW 1 TR 20 OK *Note: read current info of countdown timer #10*
AT+CSTRSTAT=”IP 9”	+CME ERROR: 3 *Note: id out of range*

Defined Values:

<type>

Define type of Service:

AL alarm

CT counter

IP Input Port

CT Countdown timer

EM email

AI Analogue input

SC Socket Communication

<id>

Service id

20.1.2. Reading Alarm Service

Enter AT+CSTRSTAT = “AL 1” will get Alarm #1 info:

AL 1 : ST 01/01/01,12:00:00 TR 3

a b c

a. Service id
b. datetime set (space if not set)
c. Command String id to be executed if trigger (0 if not to trigger)

20.1.3. Reading Counter Service

Enter AT+CSTRSTAT = “CT 1” will get Counter #1 info:

```
CT  1  :  ST 300   CV 20   TR  3
------    ------   ------  ------
  a         b        c       d
```

a. Service id
b. trigger value of the counter
c. current value of the counter
d. Command String id to be executed if trigger (0 if not to trigger)

20.1.4. Reading Countdown Timer Service

Enter AT+CSTRSTAT = “TM 1” will get Countdown Timer #1 info:

```
TM  1  :  CV 90   SW 0   TR  3
------    ------  ------ ------
  a         b       c      d
```

a. Service id
b. current value of the timer
c. timer is running (1) or stop (0)
d. Command String id to be executed if trigger (0 if not to trigger)

20.1.5. Reading Input Pin Service

Enter AT+CSTRSTAT = “IP 1” will get Input Pin #1 info:

```
IP  1  :    MS 1    DR 0    TH 5   TR 3
------      -------  -------  ------ ------
  a           b        c       d      e
```

a. Service id
b. Mask value (valid for multiple I/P trigger)
c. direction of detection
d. threshold value of the detection
e. Command String id to be executed if trigger (0 if not to trigger)

20.1.6. Reading Email Sending Service

Reading Enter AT+CSTRSTAT = “EM 1” will get Email set #1 info:

```
EM  1  :  TO 1   CC 0   BC 5   SU 3  BD 1
------    ------ ------ ------ ------ ------
  a         b      c      d      e      f
```

a. Service id
b. id of TO recipient
c. id of CC recipient
d. id of BC recipient
e. id of email subject
f. id of email body

20.1.7. Reading Analogue Input Service

Reading Enter AT+CSTRSTAT = “AI 1” will get AI #1 info:

```
AI  1  :  TP 1  HL 100  LL 10  TH 5  TR 1  CV 30
------    ------ -------  ------ -----  -----  -----
  a         b      c       d      e      f      g
```

a. Service id
b. Trigger Type (1-3)
c. High Limit (mV)
d. Low Limit (mV)
e. Threshold value (second)
f. Command String id to be executed if trigger (0 if not to trigger)
g. current value (mV)

20.1.8. Reading Socket Communication Service

Reading Enter AT+CSTRSTAT = “SC 1” will get Socket Communication set #1 info:

```
SC  1  :  TO 1    BD 1
-------   -------  -------
  a         b       c
```

a. Service id
b. id of TO recipient
f. id of message body

21. KNOWN ISSUES

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

21.1. 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

21.2. Sending Maestro Smart Pack AT commands over SMS and TCP

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

AT+AUTOPIN

AT+SCMESS

AT+EMBODY

22. QUESTIONS AND ANSWERS

22.1. 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.

22.2. 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 11).

22.3. AT command driven TCP/UDP connection

Q. After the TCP/UDP connection is stopped I wan 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.

22.4. 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 11.

22.5. 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 can be executed by this feature.

22.6. 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.

23. Examples of MSP setup and operation

23.1. 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 TCP server with IP 61.167.60.1 port 23 (client mode), with 2 minutes idle disconnection setting

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+AUOPT=1,2 *(socket idle periood 2 minutes)*	OK
AT+AUTOTCP=1 *(open TCP socket connection)*	OK
(UART go to data mode in 20 seconds)	

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)	

23.2. 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

23.3. To 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+IPOPT=4,1800,1 *(enable Ping every 1800secs, if ping fail then disconnect GPRS)*	OK

23.4. To 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","mypss wd" *(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

23.5. 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

23.6. Setup TCP Terminal and Dynamic DNS automatic update

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

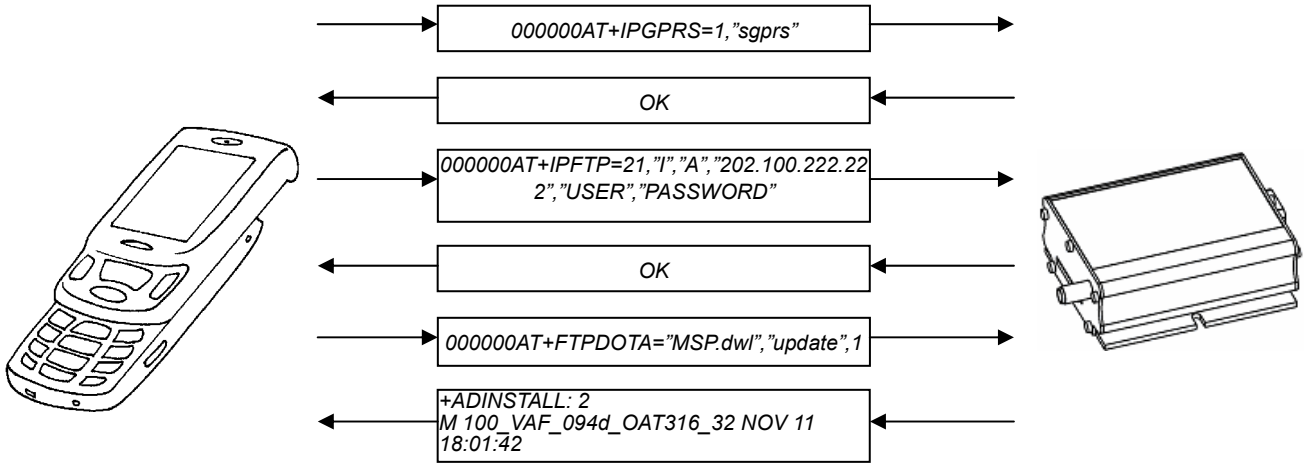
Commands to be entered	Modem response
AT+IPGPRS=1,"INTERNET" *(APN is INTERNET)*	OK
AT+IPDDNSSERV="members.dyndns.org",80 *(set DDNS server settings)*	OK
AT+IPDDNSACCT="mymodem.dyndns.org","mylogin","mypss wd" *(set DDNS account settigns)*	OK

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

23.7. 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")



23.8. Command String programming example 1

Input Port signal SMS triggering

To set if Input Port #1 has a low-to-high signal and last for 0.5 seconds, send a SMS to phone book number 1 to tell Input Pins status

Services used: IP #1

Command String to be entered	Explanation
AT+CSTRSET=0,2,"SM 1 SN PIN_1_HIGH_IP_STATUS:_%IP"	*CS2 : send SMS to phone #1 with content "PIN_1…."*
AT+CSTR="IP 1 DR 0 IP 1 TH 5 IP 1 TR 2"	*Input#1 low-to-high, 50mS threshold, trigger CS2,*

23.9. Command String programming example 2

Input Port signal email triggering

To set if Input Port #1 has a low-to-high signal and last for 0.5 seconds, send an email with config set with EM#1

Services used: EM #1, IP #1

AT Cmd/Cmd String to be entered	Explanation
AT+IPGPRS=1,"INTERNET" AT+IPSMTP=25,0,"smtp.netowk.com" AT+EMADDR=0,0,"me@netowrk.com" AT+EMADDR=0,1,to_1@netowrk.com , to_2@network.com" AT+EMADDR=0,2,"cc_1@netowrk.com , cc_2@network.com" AT+EMADDR=0,3,"bcc_1@netowrk.com , bcc_2@network.com" AT+EMSUBJ=0,1,"Email subj #1"	*Setup GPRS* *Setup SMTP server* *Setup sender address* *Setup recipient address* *Setup cc recipient address* *Setup bcc recipient address* *Setup email subject*
AT+CSTR="EM 1 TO 1 EM 1 CC 2 EM 1 BC 3 EM 1 SU 1"	*Set EM#1 using TO#1, CC#2, BCC #3, Subj #1*
AT+CSTRSET=0,3,"EM 1 SN PIN_1_HIGH_IP_STATUS:_%IP"	*CS3: send out email with setting using EM#1with add'l content "PIN_1…"*
AT+CSTR="IP 1 DR 0 IP 1 TH 5 IP 1 TR 3"	*Set Input#1 low-to-high, 50mS threshold, trigger CS3*

23.10. Command String programming example 3

Analogue Input signal counting and triggering

T o set if AI #1 value exceed 1V and last for 2 seconds, send an SMS with phone number stored in phonebook #1

Services used: SM #1, AI #1

AT Cmd/Cmd String to be entered	Explanation
AT+CSTRSET=0,2,"SM 1 SN *AI_1_over_1000mV*"	*CS2 : send SMS to phone #1 with content "AI_1_over_1000mV"*
AT+CSTR="AI 1 TP 1 AI 1 HL 1000 AI 1 TH 2 AI 1 TR 2"	*Set AI#1 exceed HL trigger, HL=1000mV, 50mS threshold, trigger CS2*

24. COMMAND STRING QUICK REFERENCE

ALARM "AL"

Service Id	Operation Type	Argument and Explanation
1 to 5	ST	yy/mm/dd,hh:mm:ss(Date time, 0 to cancel)
	TR	0 to 50 (CS to trigger, 0 to cancel)

COUNTER "CT"

Service Id	Operation Type	Argument and Explanation
1 to 5	DE	1 to 255 (Decrement)
	IN	1 to 255 (Increment)
	RS	0 (Reset)
	ST	-32768 to 32768 (value to trigger
	TR	0 to 50 (CS to trigger, 0 to cancel)

COUNTDOWN TIMER "TM"

Service Id	Operation Type	Argument and Explanation
1 to 10	ST	1 to 2147483647 (Timer initial value)
	SW	0 to 1 (stop or start timer)
	TR	1 to 50 (CS to trigger, 0 to cancel)

INPUT PORT "IP"

Service Id	Operation Type	Argument and Explanation
1	DR	0 to 1
	MS	1 to 63 (Mask value for multiple I/P, Id 101-106 only)
	TH	1 to 255 (Duration state to trigger unit in 0.1s)
	TR	1 to 50 (CS to trigger, 0 to cancel)

SMS "SM"

Service Id	Operation Type	Argument and Explanation
1 to 10	SN	(SMS CONTENT) (variable : %CTn counter value %IP input port value %TMn countdown timer value %AI Analogue input values)

EMAIL "EM"

Service Id	Operation Type	Argument and Explanation
1 to 10	TO	0-50 (recipient id, 0 to cancel)
	CC	0-50 (cc recipient id, 0 to cancel)
	BCC	0-50 (bcc recipient id, 0 to cancel)
	SU	0-10 (subject id, 0 to cancel)
	BD	0-3 (body/content id, 0 to cancel)
	SN	(additional email content) (variable : %CTn counter value %IP input port value %TMn countdown timer value %AI Analogue input values)

ANALOGUE INPUT "AI"

Service Id	Operation Type	Argument and Explanation
1 to 1	TP	1 to 3 (Trigger type: higher than HL, lower than LL, or both)
	TH	1 to 255 (threshold tp trigger unit in second)
	HL	0 to 5000 (High Limit unit mV)
	LL	0 to 5000 (Low Limit unit mV)
	TR	0 to 50 (CS to trigger, 0 to cancel)

SOCKET COMMUNICATION "SC"

Service Id	Operation Type	Argument and Explanation
1 to 10	TO	1 to10 (Host ID)
	BD	0-3 (body/content id, 0 to cancel)
	SN	(additional email content) (variable : %CTn counter value %IP input port value %TMn countdown timer value %AI Analogue input values)