M110 Series
Cellular Modem
mPACK Command Reference

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Revision history

Date	Revision	Comments
August 2018	1.1	Initial Release
November 2018	1.2	Added commands: AT#USBDENB
March 2019	1.3	Added commands: AT#PASS, AT#
September 2019	A	Added Lantronix part number, contact information, and branding

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1: Introduction

The aim of this document is to provide users of Lantronix M110 Modems running mPACK, a detailed description of the commands supported by mPACK and various configuration / operation modes in which M110 series Modems could be used.

Safety Precautions

General Precautions

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

Protecting your modem

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

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

1.1 M110 series supported by mPACK

Please consult the sales representative of Lantronix for the most update information.

** Uplink / Downlink maximum data rates:

- 3G: 5.76 / 7.2 Mbps
- NB-IoT: 62.5 / 27.2 kbps
- LTE-M1: 375 / 375 kbps
- LTE cat. 1: 5 / 10 Mbps

2: Basic Operation

2.1 Modes of Operation

M110 running mPACK can be operated in the following modes:

- PPP Dial up over RS232 (Linux)
- PPP Dial up over USB (Linux)
- Generic AT commands over RS232
- Generic AT commands over USB
- mPACK commands over RS232
- mPACK commands over USB

Thanks to the wide range of operating modes, mPACK transforms the M110 Modem into a versatile modem which is capable of providing data connectivity to serial devices in almost any situation be it an Intelligent connected serial device with full TCP/IP stack capable of PPP connection or an intelligent connected serial device capable of sending commands but without a TCP/IP stack or be it a non-intelligent connected serial device only pumping out data on serial port.

In addition, a function of mPACK as listed below provides extra functionality and greatly improves the robustness of the wireless connected system.

- Automatic and self-recovery TCP/UDP socket connection
- AT command driven TCP/UDP socket connection
- Ping Service
- Network Watchdog
- Input/output and Analog triggered AT command
- Remote AT command through SMS and TCP Terminal
- Remote program updating
- Socket data sending

2.2 Getting Started

Before putting the M110 in operation, it must be configured first. The configuration commands can be given to the modem over Serial port or by sending an SMS.

To send command over the serial port, please connect M110 to a computer over Serial port. Use standard software available on a Windows PC (e.g. hyper terminal) to send serial commands to M110. SMS would have to be sent to the mobile number corresponding to the SIM card inserted in M110 device. In either case, the commands are mPACK AT commands as described below.

2.3 Default settings

The default settings of the UART and USB ports are as follows:

- Baudrate: 115200
- Character Framing: 8
- Parity: None
- Stop Bit: 1
- Flow Control: None

2.4 Basic Command Syntax

All commands starting with AT+ entailed in documents:

- u-blox-ATCommands_Manual_(UBX-13002752) for M111, M114, M115
- SARA-N2_ATCommandsManual_UBX-16014887 for M112, and
- SARA-R4_ATCommandsManual_(UBX-17003787) for M113

All mPACK commands start with AT# are the only ones covered in this document, e.g.

```
AT#INFO
```

Error codes for uBlox commands are as described in the uBlox AT command manual

Error codes for mPACK commands are as follows:

- “ERROR BAD PARAMETER” for wrong parameters or out of range values
- “ERROR UNKNOWN COMMAND” for wrong command syntax

2.5 LED Status Indicator

The LED will indicate different status of the modem:

- For Orange LED:
  - OFF: No cellular connection
  - ON: Cellular connection
  - Blinking: Data transfer
- For Green LED:
  - OFF: No power
  - Slow blink: No signal or CSQ < 4,99
  - Fast blink: Bad CSQ < 9
  - ON: Good signal or CSQ > 10

2.6 Factory reset

To factory reset the device, hold the reset pin for over 30 seconds.

- Initially both LED's are off
- After 5 seconds the green LED will go on (and the orange LED remains off)
- After 30 seconds the orange LED will go on (and the green LED goes off)

3: Administration Commands

3.1 AT#INFO

Returns device information

ALLOWED: exec-state-info

AT#INFO

exec :

```
AT#INFO
#HW_version:  M110Series-01V
#Cellular_Module:u-blox-SARA-U201-23.60
#Bootcode_version:  mPACK_boot_1.0_rc1_b2017112301
#SW_build:  mPACK_m110_2.1_rc0_2018022601ALPHA01
#FLASH ID: 0xef,0x4015

OK
```

state :

```
AT#INFO?
#HW_version:  M110Series-01V
#Cellular_Module:u-blox-SARA-U201-23.60
#Bootcode_version:  mPACK_boot_1.0_rc1_b2017112301
#SW_build:  mPACK_m110_2.1_rc0_2018022601ALPHA01
#FLASH ID: 0xef,0x4015

OK
```

info :

```
AT#INFO=?
OK
```

3.2 AT#CONFIGDEL

Factory reset device configuration

ALLOWED: exec

Note: Device restarts after this command is executed

AT#CONFIGDEL

exec :

```
AT#CONFIGDEL
OK
```

3.3 AT#RESET

Software reset the M11X device

ALLOWED: exec

AT#RESET

exec :

```
AT#RESET
OK
```

3.4 AT#MRST

This command resets the M11x module after a programmed delay. The M11x module will reset cyclically until this mode is disabled.

ALLOWED: exec-state-info

AT#MRST=(mode),(delay)

- mode: timer reset mode
  - 0: disabled
  - 1: enabled
- delay: time set to reset the embedded module
  - range: "000:01" - "167:59" (format hhh:mm)
- remainTime: time before next reset
  - range: "000:01"- "167:59" (format hhh:mm)

exec :

```
AT#MRST=1,"100:00"
OK
```

state (1 minute after executing the exec command):

```
AT#MRST?
#MRST: 1,"100:00","099:59"

OK
```

info :

```
AT#MRST=?
OK
```

3.5 AT#NWRST

Controls reset of the modem in case of network failure conditions

ALLOWED: exec-state-info

Note: Network failure conditions are defined to be cases where registration to cellular/data network fails, or bad signal quality. Each time only one of the above network conditions are checked

AT#NWRST=(option),(timer),(counter)

- option: 0 to disable, 1 to enable, 2 to configure. Default disabled
- timer : 5-120 second interval at which network conditions are checked (different network conditions are checked each time). Default 5
- counter: 10-1000; count of consecutive network failures, after which the device will reset if option = 1. Default 10

exec :

```
AT#NWRST=2,10,18
OK
```

state :

```
AT#NWRST?
#NWRST: 0,10,18

OK
```

info :

```
AT#NWRST=?
#NWRST: (0-2),(5-120),(10-1000)

OK
```

3.6 AT#MATSCR

Enters a list of modem-internal AT commands (cannot be mPACK AT# commands) that will be executed at each start up

ALLOWED: exec-state-info

AT#MATSCR=(list_of_commands)

- list of commands: one or more uBlox-AT commands, separated by '; ' as typed (i.e. "" are OK)

exec :

```
AT#MATSCR
> (a list of uBlox AT commands separated by '; ' , terminated by ctrl-Z)
OK
```

state :

```
AT#MATSCR?
#MATSCR: "(commands as entered, no formatting)"

OK
```

info :

```
AT#MATSCR=?
#MATSCR: (180)

OK
```

3.7 AT#USBATCOM

Enables/Disables cellular AT command over USB.

ALLOWED: exec-state-info

Note: When turning on, sometimes it depends on behaviour of the device driver on the computer whether the port can be found. If not found, user needs to detach and re-attach the USB port

AT#USBATCOM=(flag)

- flag: 0 to disable cellular AT commands on the USB port (and allow cellular AT commands on the serial port); 1 to reverse the ports

exec :

```
AT#USBATCOM=1
OK
```

state :

```
AT#USBATCOM?
#USBATCOM: 1

OK
```

info :

```
AT#USBATCOM=?
#USBATCOM: (0-1)

OK
```

3.8 AT#PASS

Enables / Disables pass-through mode.

ALLOWED: exec-state-info

Note:

- This command applies to a specific version of software only.
- In M113-NB, user can enter either mPACK commands (usually beginning with AT#) or u-Blox commands (usually beginning with AT+, or just AT) at one time, but not both. In order to enter the other set of command, the user need to use AT#PASS to switch between the 2 modes:

  - PASS mode set to 0 : pass-through mode disabled; only mPACK commands are accepted.
  - PASS mode set to 1 : pass-through mode enabled; only u-Blox commands are accepted.
- If pass-through mode is disabled (can check with AT#PASS?) and enabling pass-through mode is desired:
  - AT#PASS=1 to change to pass-through mode
- If pass-through mode is enabled (cannot check with AT#PASS?, which returns ERROR, as this is not u-Blox command), and exit pass-through mode is desired:
  - Issue +++ (and the modem should exit pass-through mode)
  - AT#PASS=0 to make the switch permanent (otherwise, the modem will be in pass-through mode again when it restarts)

AT#PASS=(flag)

- flag: 0 to disable pass through mode, 1 to enable. Default 0
- Note all commands work only when pass-through mode is 0.

exec :

```
AT#PASS=1
OK
```

state :

```
AT#PASS?
#PASS: 0

OK
```

info :

```
AT#PASS=?
#PASS: (0-1)

OK
```

3.9 AT#STRUPMSG

Edits the startup message of mPACK software.

ALLOWED: exec-state-info

Note:

- The startup sequence of unsolicited response of the mPACK software is always :

  ```
  length:0

  (startup message)
  ```

AT#STRUPMSG=(text)

– text : text for the startup message, up to 60 printable ASCII characters. Note that there is always a startup message, and the default startup message is “READY”, which can be selected using “*” as the text argument (and shown as “*” in state query).

exec :

```
AT#STRUPMSG="Hello"
OK
```

state :

```
AT#STRUPMSG?
#STRUPMSG: "Hello"

OK
```

info :

```
AT#STRUPMSG=?
#STRUPMSG: (60)

OK
```

4: Hardware commands

4.1 AT#SERIAL

Configure the user-side UART baudrate, character-framing and flow control

ALLOWED: exec-state-info

Note:

- Bauds 300, 600 are not supported
- The character-framing of 7 data-bytes does work with current configuration, but unreliably.
- Note that modem will reset if AT#SERIAL exec command is issued

AT#SERIAL=(baud),(charFraming),(flowCtrl)

- baud: one of (1200,2400,4800,9600,19200,38400,57600,115200)
- charFraming: one of ("8N1","8N2","9O1","9E1"). See also note above.
- flowCtrl
  - 0: disable
  - 1: enable

exec :

```
AT#SERIAL=115200,"8N1",0
OK
```

state :

```
AT#SERIAL?
#SERIAL: 115200,"8N1",0

OK
```

info :

```
AT#SERIAL=?
#SERIAL: (1200,2400,4800,9600,19200,38400,57600,115200),("8N1","8N2","9O1","9E1"),(0-1)

OK
```

4.2 AT#HFLW

Enable or disable hardware flow control

ALLOWED: exec-state

AT#HFLW=option

- option
  - 0: disable flow control
  - 1: enable flow control

exec :

```
AT#HFLW=1
OK
```

state :

```
AT#HFLW?
#HFLW: 1

OK
```

info :

```
AT#HFLW=?
ERROR
```

4.3 AT#SETRTC

Set (or stop) the real time clock

ALLOWED: exec-state-info

AT#SETRTC=(op),(value1),(value2),(value3)

- op:
  - 0 = enter time, (value1,value2,value3) = (hh:mm:ss)
  - 1 = enter date, (value1,value2,value3) = (YY:MM:DD)
  - 2 = start or stop the RTC clock
- value1:
  - hour if op is 0; year if op is 1;
  - 1 to enable RTC and 0 to disable RTC, if op is 2
- value2:
  - minute if op is 0; month if op is 1
- value3:
  - second if op is 0; day if op is 1

exec :

```
AT#SETRTC=1,18,03,05
OK
```

state :

```
AT#SETRTC?
ERROR
```

info :

```
AT#SETRTC=?
#SETRTC: (0-2),((0-23)/(0-99)),((0-59)/(1-12)),((0-59)/(1-31))

OK
```

4.4 AT#GETRTC

Get the real time clock

ALLOWED: exec-state-info

AT#GETRTC

exec :

```
AT#GETRTC
#GETRTC: 2018/03/05,16:50:48

OK
```

state :

```
AT#GETRTC?
ERROR
```

info :

```
AT#GETRTC=?
ERROR
```

4.5 AT#VIO

Command to configure Versatile I/O

ALLOWED: exec-state-info

AT#VIO=(channel),(mode)

- channel: 1 or 2
- mode:
  - "DI": digital input "
  - “DO": digital output

- "AN": analogue input

exec :

```
AT#VIO=2,"DO"
OK
```

state :

```
AT#VIO?
#VIO: 1,"AN"
#VIO: 2,"DO"

OK
```

info :

```
AT#VIO=?
#VIO: (1,2),("DI","AN","DO")

OK
```

4.6 AT#VAMODE

Command to set current or voltage mode

ALLOWED: exec-state-info

AT#VAMODE=(channel),(AN_mode)

- channel: 1or 2
- AN_mode: mode within Analogue
  - 0: voltage mode
  - 1: current mode

exec :

```
// Set channel 1 to current mode
AT#VAMODE=1,1
OK
```

state :

```
AT#VAMODE?
#VAMODE: 1,0
#VAMODE: 2,0

OK
```

info :

```
AT#VAMODE=?
#VAMODE: (1-2),(0-1)

OK
```

4.7 AT#RDIO

Command to read versatile I/O status

ALLOWED: exec-info

AT#RDIO=(channel)

- channel: 1 or 2
- mode:
  - "DI": digital input
  - "DO": digital output
  - "AN": analogue input
- status:
  - for mode = "DI" or "DO" : 0 or 1
  - for mode = "AN" : voltage in mV or current in mA (which one depends on AT#VAMODE)

exec :

```
AT#RDIO=1
#RDIO: 1,"AN",35

OK
```

state :

```
AT#RDIO?
ERROR
```

info :

```
AT#RDIO=?
#RDIO: (1-2)

OK
```

4.8 AT#OPSET

To control versatile I/O in output mode

ALLOWED: exec-info

Note:

- On Power up the device output state will be reset.
- Before setting the output value, the channel need to be configured as digital output first

AT#OPSET=(channel),(status)

- channel: 1 or 2
- status: 0 or 1

exec :

```
AT#OPSET=1,1
OK
```

state :

```
AT#OPSET?
ERROR
```

info :

```
AT#OPSET=?
#OPSET: (1-2),(0-1)

OK
```

5: Last Gasp Commands

NOTE: Last Gasp is an optional feature on M110 series of product. Please consult Lantronix sales for availability.

5.1 AT#LGPARA

Last gasp SMS configuration

ALLOWED: exec-state-info

AT#LGPARA=(mode),(argument)

- mode:
  - 0: Disable all last gasp SMS
  - 1: Enable last gasp SMS. 2nd argument specifies which situation applies.
  - 2: Edt the mobile number
- argument:
  - for mode=1 : 1 to enable power-down SMS, 2 to enable power-up SMS, 3 to enable both.
  - for mode=2 : mobile number to which Last Gasp SMS is sent

exec :

```
AT#LGPARA=2,"+919876543210"
OK
AT#LGPARA=1,3
OK
```

state :

```
AT#LGPARA?
#LGPARA: 3,"+919876543210"

OK
```

info :

```
AT#LGPARA=?
#LGPARA: (0-2),(1-3)/(10-29)

OK
```

5.2 AT#LGMSG

Last gasp SMS message content configuration

ALLOWED: exec-state-info

AT#LGMSG=(opt),(message)

- opt:
  - 1: Configure last gasp SMS for power down
  - 2: Configure last gasp SMS for power up
- arg: for message content of the SMS, up to 60 printable ASCII characters

exec :

```
AT#LGMSG=2,"M110 modem powered up"
OK
```

state :

```
AT#LGMSG?
#LGMSG: 1,"M110 modem powered down"
#LGMSG: 2,"M110 modem powered up"

OK
```

info :

```
AT#LGMSG=?
#LGMSG: (1-2),(60)

OK
```

6: Cellular Commands

6.1 AT#IPCELLULAR

Configure cellular parameters for both the SIM slots: APN, username and password.

ALLOWED: exec-state-info

AT#IPCELLULAR=(slot),(APN)[,(username),(password)[,(cid)]]

- slot: SIM slot (NOTE: slot 2 is only available on selected models)
- APN : Access Point Name
- username : username for cellular data access. If no username is needed, can omit the argument and mPACK software will use a non-null but meaningless value when state is read
- password : password for cellular data access. If no password is needed, can omit the argument and mPACK software will use a non-null but meaningless value when state is read
- CID : context ID. Please consult Lantronix team on when to use this parameter and what value to use

exec :

```
AT#IPCELLULAR=1,"CMHK"
OK
```

state :

```
AT#IPCELLULAR?
#IPCELLULAR: 1,"internet","*","*",8

OK
```

info :

```
AT#IPCELLULAR=?
#IPCELLULAR: (1),(64),(25),(25),[(1-11)]

OK
```

6.2 AT#IPCONNECT

The 1st parameter in this command is only for format correspondence with the older SmartPack version

ALLOWED: exec-state-info

Note:

- The 1st parameter in this command is only for format correspondence with the older SmartPack version.

AT#IPCONNECT=(1),(mode)

- mode:
  - 0: disconnect cellular data
  - 1: connect cellular data

exec :

```
AT#IPCONNECT=1,1
OK
```

state :

```
AT#IPCONNECT?
#IPCONNECT: 1,1

OK
```

info :

```
AT#IPCONNECT=?
#IPCONNECT: (1),(0-1)

OK
```

6.3 AT#GETBRIP

Get the IP address (when data activated)

ALLOWED: state-info

NOTE: The command returns only IPv4 address for now.

AT#GETBRIP

state :

```
AT#GETBRIP?
#GETBRIP: 1,1,"182.153.105.197"

OK
```

info:

```
AT#GETBRIP=?
#GETBRIP: (1),(0-1),(IPV4 or IPV6)

OK
```

6.4 AT#IPPING

IP PING configuration

ALLOWED: exec-state-info

AT#IPPING=(option),(address),(num),(interval),(timeout)

- option
  - 0, 1: reserved
  - 2: configure ping address and parameters
- address: IP address of the target to be pinged
- interval: time in second between each ping trial. Default value is 3. Valid range is 1 to 10.
- timeout: time in ms before ping is timed out. Default value is 10. Valid range is 5000 to 60000.

NOTE: The IPPING command is just used for setting the PING address and parameters (interval, timeout) for use by oher functions. This command cannot be used to directly PING a given address in the current implementation.

exec :

```
AT#IPPING=2,"8.8.8.8",4,10,5000
OK
```

state :

```
AT#IPPING?
#IPPING: "8.8.8.8",4,10,5000

OK
```

info :

```
AT#IPPING=?
#IPPING: (0-2),(120),(1-10),(1-10),(5000-60000)

OK
```

7: Socket Commands

7.1 AT#IPTCP

Command to set TCP socket parameters

ALLOWED: exec-state-info

Note:

- Mode & IP address should be entered in quotes
- Currently only the "client" mode has been implemented
- The "delay" parameter is deprecated and has no effect (suggested not to use)

AT#IPTCP=(idx),(port),(mode),(ip)[,(delay)]

- idx
  - 1: set primary IP of remote TCP server (client mode only)
  - 2: set backup IP of remote TCP server (client mode only)
- port: number from 0 to 65535
- mode
  - "C": Modem as client to remote server
  - "S": Modem as server for remote client to connect
- ip: IP address of remote partner (IPv4 dotted notation)
- delay: (deprecated, no need to enter)

exec :

```
AT#IPTCP=1,50002,"C","162.242.170.48"
OK
```

state :

```
AT#IPTCP?
#IPTCP: 1,50002,"C","162.242.170.48",1
#IPTCP: 2,0,"C","",1

OK
```

info :

```
AT#IPTCP=?
#IPTCP: (1-2),(0-65535),("C","S"),(120),(0,1)

OK
```

7.2 AT#IPUDP

Command to set UDP socket parameters

ALLOWED: exec-state-info

Note:

- Mode & IP address should be entered in quotes
- Currently only the "client" mode has been implemented
- The "delay" parameter is deprecated and has no effect (suggested not to use)

AT#IPUDP=(idx),(port),(mode),(ip)[,(delay)]

- idx
  - 1 or 2, just mirror of AT#IPTCP command, not applicable to UDP
- port: number from 0 to 65535
- mode
  - "C": Modem to connect to remote UDP server
  - "S": Modem waiting for remote UDP client to connect
- ip: IP address of remote partner (IPv4 dotted notation)
- delay: delay: (deprecated, no need to enter)

exec :

```
AT#IPUDP=1,50003,"C","162.242.170.47"
OK
```

exec :

```
AT#IPUDP?
#IPUDP: 1,50003,"C","162.242.170.47",1
#IPUDP: 2,0,"C","",1

OK
```

exec :

```
AT#IPUDP=?
#IPUDP: (1-2),(0-65535),("C","S"),(120),(0,1)

OK
```

7.3 AT#AUTOTCP

Command to Start Auto TCP functionality

ALLOWED: exec-state-info

AT#AUTOTCP=(mode)

- mode
  - 0: AUTOTCP connection OFF
  - 1: AUTOTCP connection ON

exec :

```
AT#AUTOTCP=0
OK
```

state :

```
AT#AUTOTCP?
#AUTOTCP: 0

OK
```

info :

```
AT#AUTOTCP=?
#AUTOTCP: (0,1)

OK
```

7.4 AT#AUTOUDP

Command to Start Auto UDP functionality

ALLOWED: exec-state-info

AT#AUTOUDP=(mode)

- mode
  - 0: AUTOUDP connection OFF
  - 1: AUTOUDP connection ON

exec :

```
AT#AUTOUDP=0
OK
```

state :

```
AT#AUTOUDP?
#AUTOUDP: 0

OK
```

info :

```
AT#AUTOUDP=?
#AUTOUDP: (0,1)

OK
```

7.5 AT#OTCP

On-demand TCP socket connection.

ALLOWED: exec-state-info

AT#OTCP=(mode)

- mode
  - 0: TCP connection OFF
  - 1: TCP connection ON

exec :

```
AT#OTCP=0
OK
```

Note: In the current implementation, “OK” means command is accepted. It does not mean that the device is connected to the server. “CONNECT” should appear on the appropriate terminal (UART or USB) if connection is successful.

state :

```
AT#OTCP?
#OTCP: 0

OK
```

info :

```
AT#OTCP=?
#OTCP: (0,1)

OK
```

7.6 AT#OUDP

On-demand UDP socket connection.

ALLOWED: exec-state-info

AT#OUDP=(mode)

- mode
  - 0: UDP connection OFF
  - 1: UDP connection ON

exec :

```
AT#OUDP=0
OK
```

state :

```
AT#OUDP?
#OUDP: 0

OK
```

info :

```
AT#OUDP=?
#OUDP: (0,1)

OK
```

7.7 AT#SCHOST

Configure, erase & read remote TCP server parameter

ALLOWED: exec-state-info

AT#SCHOST=(oper),(id)[,(server),(port),[(retry),(delay),(type)]]

- oper:
  - 0 = enter host setting
  - 1 = read host setting
  - 2 = erase host setting
- id: only 1 for now
- server: IP address of host (IPv4 or text notation)
- port: port number on host
- retry, delay, type: DEPRECATED. Not settable

exec :

```
AT#SCHOST=0,1,"162.242.170.59",8888
OK
```

state :

```
AT#SCHOST=1,1
#SCHOST: 1,"162.242.170.59",8888,1,1,0

OK
```

info :

```
AT#SCHOST=?
(0-2),(1),(120),(0-65535),(0-10),(1-60),(0-1)

OK
```

7.8 AT#IPOPT

Optional IP socket parameters

ALLOWED: exec-state-info

Note: Some options are not yet implemented, and will be implemented stage by stage. Therefore, ERROR may be returned for some of the options

AT#IPOPT=(option),(value),[(action)/(string)]

- option:
  - 1: Keep alive packet
  - 2: Packet size
  - 3: (deprecated)
  - 4: Enable ping & configure ping period. When enabled, the modem will PING the address set by the AT#IPPING command, and will perform the specified action upon PING failure.
  - 5: Data on first connection
- value
  - for option 1 : 0-43200. Duration to send keep alive packet, in seconds; 0 disables the feature
  - for option 2 : 0-1472. TCP Packet size; if 0, default size is used
  - for option 4 : 1 - 65535. Time period of PING. If 0, then PING is disabled
  - for option 5 : 0 to disable; 1 to enable data on first connection; 2 to edit the string to be sent
- action : To specify the action will be taken if a set of ping action fail:
  - 0: do nothing (default). If ping fails the timer will reload & no action will be taken.
  - 1: reactivate data connection.
  - 2: reset modem.
- string:
  - for option 5 : maximum 120 hex characters and only even length

exec :

```
AT#IPOPT=1,30
OK
AT#IPOPT=5,2,"414243444546474849"
OK
```

state :

```
AT#IPOPT?
#IPOPT:
#IPOPT: 1,30
#IPOPT: 2,0
#IPOPT: 3,
#IPOPT: 4,0,0
#IPOPT: 5,0,"",1

OK
```

info :

```
AT#IPOPT=?
#IPOPT: (1-4),(0-60000)[,(0-1)]

OK
```

7.9 AT#AUOPT

Optional parameters for AUTOTCP/AUTOUDP connection

ALLOWED: exec-state-info

Note:

- Option 2 depends upon the availability of the server mode
- Some options are not yet implemented, and will be implemented stage by stage. Therefore, ERROR may be returned for some of the options

AT#AUOPT=(option),(value),(string)

- option:
  - 1: Connection idle period
  - 2: Server idle
  - 3: Connection period
  - 4: Connection prefix (only sent upon first connection)
  - 5: Heartbeat packet
  - 6: Serial prefix
- value:
  - for option 1 : 0-43200. Duration of connection without data transfer, in seconds; 0 disables the feature
  - for option 2 : 0-43200. Duration of SERVER without a connected remote client, in seconds; 0 disables the feature
  - for option 3 : 0-43200. Duration of connection, in seconds; 0 disables the feature
  - for option 4 : 0 to disable; 1 to enable connection prefix; 2 to edit the string to be sent
  - for option 5 : 0-180. Period of inactivity after which the heartbeat packet is sent, in seconds
  - for option 6: 0 to disable, 1 to enable (and hex byte follows as the next parameter)
- string:
  - hexadecimal string (e.g. 0AFF) required. One byte for option 6; and up to 16 bytes for option 4

exec :

```
AT#AUOPT=1,3600
OK
AT#AUOPT=4,2,"4149"
OK
```

state :

```
AT#AUOPT?
#AUOPT: 1,3600
#AUOPT: 2,0
#AUOPT: 3,0
#AUOPT: 4,0,"4149"
#AUOPT: 5,0
#AUOPT: 6,0,"01

OK
```

info :

```
AT#AUOPT=?
OK
```

7.10 AT#SERVAUTH

Parameter configuration for enabling password protected access for remote TCP client (when M11x modem is in TCP-server mode).

ALLOWED: exec-info

Note: Please refer to AT#TCPTERM on the sequence for AT#SERVAUTH

AT#SERVAUTH=(mode)[,(password)]

- mode:
  - 0: Disable server authentication
  - 1: Enable server authentication
  - 2: Configure password
- password: 6 characters enclosed in double quotes. Default "000000"

exec :

```
AT#SERVAUTH=2,"123456"
OK
```

info :

```
AT#SERVAUTH=?
#SERVAUTH: (0-2),(6)

OK
```

7.11 AT#MURC

Enables/Disables “CONNECT” message upon Socket connection and “DISCONNECT” message upon socket disconnection.s

ALLOWED: exec-state-info

AT#MURC=(flag)

– flag: 0 to disable cellular AT commands on the USB port (and allow cellular AT commands on the serial port); 1 to reverse the ports

exec :

```
AT#MURC=1
OK
```

state :

```
AT#MURC?
#MURC: 1

OK
```

info :

```
AT#MURC=?
#MURC: (0-1)

OK
```

8: Remote Control Commands

8.1 AT#SMSAT

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.

Description of the operation:

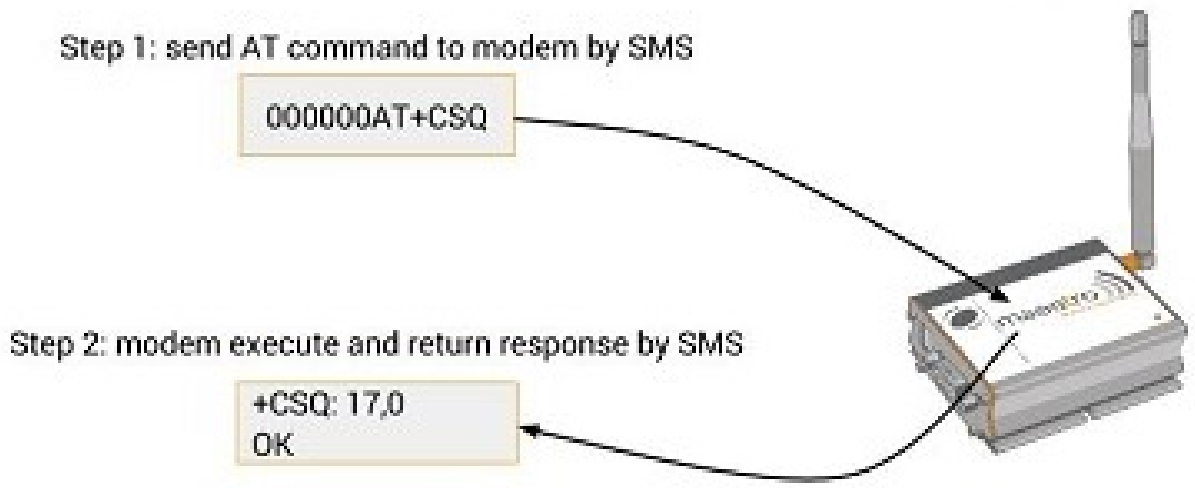

Figure 8.1.1: Example of remote AT command by SMS

1. When enabled, the modem will treat the incoming SMS as a source of AT command only if all of the following conditions (a, b and c) are fulfilled:
   (a) The content of SMS sent to the modem is using standard 7-bit GSM data decoding scheme
   (b) The first 6 characters of the SMS content matches the <key> parameter set by AT+SMSAT command (default key is “000000”)
   (c) The 7th and 8th characters of the SMS content is “AT” (in capital letters).
2. 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.
3. 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).
4. The maximum length of the AT command is limited by length of SMS, i.e. 160-6 = 154 characters.
5. When the SMS AT command is executed, all intermediate and final Read Responses will be buffered recorded, then return to the sender’s phone number in one single SMS.
6. If Read Response(s) of the AT command is (are) more than 160 characters, only the first 160 characters will be returned.

7. In case the modem cannot get terminal Read Response within 26 seconds, the modem will then abort the command, and return intermediate Read 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.

Configure, enable and disable remote AT command by SMS; ALLOWED: exec-state-info

AT#SMSAT=(mode)[,(param)]

- mode
  - 0: Disable SMSAT
  - 1: Enable SMSAT
  - 2: Change the password for SMSAT
  - 3: Change the SMS response trigger
- param
  - for mode=2 : password, 6 alphanumeric characters in quotes
  - for mode=3 : 0 to disable SMS response; 1 to enable SMS response
  - (not needed for modes = 0 or 1)

exec :

```
AT#SMSAT=2,"123456"
OK
```

state :

```
AT#SMSAT?
#SMSAT: 0,"123456",0

OK
```

info :

```
AT#SMSAT=?
#SMSAT: #SMSAT: (0-3),((6)/(0-2))

OK
```

8.2 AT#TCPTERM

Parameter configuration for enabling configuration over cellular data network; and start/stop TCP Terminal for remote commands over TCP.

ALLOWED: exec-state-info

Note:

- Network watchdog ping is used by application when the device enters data mode

AT#TCPTERM=(mode)[,(password),(port),(timeout)]

- mode:
  - 0: Disable TCP Terminal
  - 1: Enable TCP Terminal
  - 2: Configure password, port, timeout
- password: max 16 characters. Default "000000"
- port: port used on the modem for incoming TCP connection. Default 23
- timeout: specified in seconds. Default 30

exec :

```
AT#TCPTERM=2,"000000",23,30
OK
```

state :

```
AT#TCPTERM?
#TCPTERM: 0,"000000",23,30
OK
```

info :

```
AT#TCPTERM=?
#TCPTERM: (0-2),(16),(1-65535),(1-43200)

OK
```

9: Firmware Update Commands

9.1 AT#WEBUPDATE

Command to congfigure DOTA parameter & initiate HTTP DOTA for firmware update

ALLOWED: exec-state-info

Note:

- If only the filename is given, default IP and port are "updates.d2sphere.com" and 80 respectively
- If the filename is correct, the download starts immediately.

AT#WEBUPDATE=(filename)[,(port),(ip)]

- filename: up to 120 characters, in quotes
- port: port of the server on which the update file is stored (the default value is updates.d2sphere.com)
- ip: IP address of the server on which the update file is stored (the default value is 80)

exec :

```
AT#WEBUPDATE="/mpack/mpack_R0100.bin",80,"3.252.19.23"
OK
```

state :

```
AT#WEBUPDATE?
#WEBUPDATE: "/mpack/mpack_R0100.bin",80,"3.252.19.23"

OK
```

info :

```
AT#WEBUPDATE=?
#WEBUPDATE: (120),(0-65535),(120)

OK
```

9.2 AT#UPDATE

Controls the update process

ALLOWED: exec-state

AT#UPDATE=(value)

- option

- 0: stop the update process
- 1: stop the update process

exec :

```
AT#UPDATE=0
OK
```

state :

```
AT#UPDATE?
#UPDATE: 0

OK
```

info :

```
AT#UPDATE=?
ERROR
```

10: D2Sphere Commands

10.1 AT#IPD2S

D2Sphere configuration command

ALLOWED: exec-state-info

Note:

- Device restarts after this exec command is accepted.

AT#IPD2S=(port),(IP-address),(delay)

- port: port on the D2sphere server
- IP-address: IP address of D2sphere server, in IPv4 dotted-notation
- delay: delay to start in seconds. Range 0-43200

exec :

```
AT#IPD2S=4444,"5.35.253.3",1000
OK
```

exec :

```
AT#IPD2S?
#IPD2S: 4444,"5.35.253.3",1000

OK
```

exec :

```
AT#IPD2S=?
#IPD2S: (0-65535),(120),(0-43200)

OK
```

10.2 AT#D2S

Enable or disable D2Sphere function

ALLOWED: exec-state-info

AT#D2S=(mode)

- mode
  - 0: disable

- 1: enable

exec :

```
AT#D2S=1
OK
```

state :

```
AT#D2S?
#D2S: 1

OK
```

info :

```
AT#D2S=?
#D2S: (0,1)

OK
```

10.3 AT#DVNAME

Configure device name for D2Sphere

ALLOWED: exec-state-info

AT#DVNAME=(name)

- name: name of the device, in quotes

exec :

```
AT#DVNAME="M11x_001"
OK
```

state :

```
AT#DVNAME?
#DVNAME: "M11x_001"

OK
```

info :

```
AT#DVNAME=?
#DVNAME: (23)

OK
```

10.4 How to add a M110 modem to D2sphere platform (feature)

For D2sphere support for the M110 modem, please consult Lantronix representative for enabling the support and obtaining a D2sphere account.

- Use AT+CGSN command to get the IMEI of the device :

```
AT+CGSN
357364080023467

OK
```

- Set the name of the device using the `AT#DVNAME` command
- Set the IP address and the port of the D2sphere server using the `AT#IPD2S` command
- Enable the connection of the device to the data network. The IP address of the device should be public.
- Enable D2sphere support on the modem using the `AT#D2S=1` command
- Log in to D2sphere (account need to be created by Lantronix)
- Go to the "administrate" page, which shows a list of all devices under the control of the current user
- Press "Add" at the upper right. Fill in the IMEI of the device to be added. Press Register.
- Refresh the administrate page. Note that it may take a few minutes for the device to be registered, and then a few more minutes for information about the device to be obtained.

10.5 Operation of D2sphere

The most updated information are on the following web pages. Note that some items on the list of commands or supported operations listed on the web pages may not be available on all platforms - please check with the technical support team:

- D2Sphere Console Commands: https://git.falcom.de/pub/wiki/wikis/d2s_wiki_console_cmd

11: I/O Triggering Commands

11.1 AT#DITRIG

Configure DI high low threshold parameter

ALLOWED: exec-state-info

AT#DITRIG=(pin_number),(min_val),(max_val),(debounce)

- pin_number: 1-2
- min_val: 0-32, in V
- max_val: 0-32, in V (must be >= min_val)
- debounce: 0-500 (in seconds)

exec :

```
AT#DITRIG=1,3000,11250,10
OK
```

state :

```
AT#DITRIG?
#DITRIG: 1,3000,11250,10
#DITRIG: 2,0,3200,0

OK
```

info :

```
AT#DITRIG=?
#DITRIG: (1,2)(0-32),(0-32),(0-500)

OK
```

11.2 AT#DITRIGENB

Enable DI trigger parameters

ALLOWED: exec-state-info

AT#DITRIGENB=(pin_number),(enb),(trigger_type)

- pin_number: 1-2
- enb:
  - 0: disable trigger

    - 1: specify timeout
  - trigger_type:
    - 0: unused
    - 1: high-to-low transition trigger
    - 2: low-to-high transition trigger
    - 3: unused

exec :

```
AT#DITRIGENB=1,0,1
OK
```

state :

```
AT#DITRIGENB?
#DITRIGENB:1,0,1
#DITRIGENB:2,1,3

OK
```

info :

```
AT#DITRIGENB=?
#DITRIGENB:(1-2),(0-1),(0-3)

OK
```

11.3 AT#MSGPER

Configure Message ID and message strings associated with the 2 pins

ALLOWED: exec-state-info

AT#MSGPER=(pin_number),(interval),(count)

- pin_number: 1-2
- interval: how often messages are generated, in sec. Value 0-60000
- count: number of messages generated. Value 0-100

exec :

```
AT#MSGPER=2,10,3
OK
```

state :

```
AT#MSGPER?
#MSGPER: 1,0,0
#MSGPER: 2,10,3

OK
```

info :

```
AT#MSGPER=?
#MSGPER: (1-2),(0-60000),(0-100)

OK
```

11.4 AT#MSGSTR

Configure Message ID and message strings associated with the 2 pins.

ALLOWED: exec-state-info

AT#MSGSTR=(op),(msg_ID),(msg1),(msg2)

- op
  - 0: disable message string (not yet implemented)
  - 1: enable message string (not yet implemented)
  - 2: configure message string
- msg_ID: message ID
- msg1: concatenated with msg_ID for DI1
- msg2: concatenated with msg_ID for DI2

exec :

```
AT#MSGSTR=2,"Lantronix","001","234"
OK
```

state :

```
AT#MSGSTR?
#MSGSTR: 2,"Lantronix","001","234"

OK
```

info :

```
AT#MSGSTR=?
#MSGSTR: (0-2),(120),(5),(5)

OK
```

11.5 AT#TRANSMODE

Configure I/O event reporting mode

ALLOWED: exec-state-info

AT#MSGSTR=(mode)

- op
  - 0: Disable reporting. Default
  - 1: SMS reporting mode
  - 2: TCP reporting mode
  - 3: UDP reporting mode
  - 4: FTP reporting mode
  - 5: HTTP reporting mode
  - 6: (customer specific mode, not available to general customer)
  - 7: D2sphere reporting mode

exec :

```
AT#TRANSMODE=1
OK
```

state :

```
AT#TRANSMODE?
#TRANSMODE: 1

OK
```

info :

```
AT#TRANSMODE=?
#TRANSMODE: (0-7)

OK
```

12: Location Commands

12.1 AT#MLOC

Get the location of the device. The following information are returned by the command:

date, time, latitude, longitude, altitude, uncertainty, speed, direction, vertical_acceleration, sensor_used, SV_used, antenna_status, jamming_status

ALLOWED: state-info

AT#MLOC

state :

```
AT#MLOC?
+MLOC: 31/07/2019,10:21:16.000,0.0000000,0.0000000,0,20000000,0,0,0,0,0,0,0

OK
```

info :

```
AT#MSGSTR=?
#MSGSTR: (0-2),(120),(5),(5)

OK
```

13: Applications Notes

13.1 Cellular Setup Example

The AT#IPCELLULAR command is used to setup cellular network parameters. The configuration of the cellular network is done by setting the following parameters:

```
AT#IPCELLULAR=<SIM>,"<APN>","<Username>","<Password>"
```

where:

- SIM : 1 for bottom SIM, 2 for top SIM. Use 1 for mono-SIM models
- APN : Access Point Name
- Username : If omitted, the modem will supply a non-blank value when it is read
- Password : If omitted, the modem will supply a non-blank value when it is read

Examples:

Command	Response	Description
`AT#IPCELLULAR=1,<APN>,"a","a"`	`OK`	This command is used to set the cellular/data network by configuring the sim slot, APN, Username and Password
`AT#IPCELLULAR?`	`#IPCELLULAR: SIM1: "internet","*","*",8` `OK`	This commands reads what is the current setting
`AT#IPCELLULAR?`	`#IPCELLULAR: (1),(64),(25),(25),[(1-11)]` `OK`	The command is used to give the valid range of all parameters

13.2 AutoTCP Client Setup Example

Note-1: AutoTCP should be disabled before changing any AT#IPCELLULAR and AT#IPTCP parameters

Note-2: AT#IPCELLULAR parameters must be set up correctly before AutoTCP can be used.

The AT#IPTCP command is used to setup TCP Client socket parameters:

```
AT#IPTCP=<UART/USB>,"<IP-port>","<Client/Socket>","<IP-address>"
```

where:

- UART/USB : 1 for UART; 2 for USB
- IP-port : port of the TCP Socket Server
- Client/Socket : Use "C" for modem as TCP client

– IP-address : IP address of TCP Socket server

Command	Response	Description
AT#IPTCP=?	#IPTCP: (1-2),(0-65535),("C","S"),"(120)",(0,1) OK	This command is used to give the valid range of all parameters.
AT#IPTCP=1,50000,"C","162.242.170.48"	OK	This command is used to set the IP address and port of the TCP Client Socket for UART.
AT#IPTCP?	#IPTCP: 1,50000,"C","162.242.170.48",1 #IPTCP: 2,0,"C","",1 OK	This command reads what is the current setting. Note an extra 5th parameter appears in the read response. This parameter is deprecated and can be ignored.

The AT#AUTOTCP command is used to enable or disable AutoTCP by :

AT#AUTOTCP=<enable/disable>

where:

– enable/disable : 1 to enable; 0 to disable

Command	Response	Description
AT#AUTOTCP=?	#AUTOTCP: (0,1) OK	This command is used to give the valid range of the parameter.
AT#AUTOTCP?	#AUTOTCP: 0 OK	This command checks the current status of AutoTCP.
AT#AUTOTCP=?	OK	This command turns on AutoTCP.

Notes: After enabling for client mode:

– "CONNECT" should appear on the UART/USB port of the modem approximately 20 seconds afterwards

– Thereafter, the port is turned into data mode, where no AT commands are accepted.

– Every byte sent in data mode goes to the remote peer

– If +++ is sent in data mode, preceded and followed by 1-second of no activity on the data channel, connection to the remote peer will be broken. "DISCONNECT" will be seen and the port will go back to AT command (where AT commands are expected)

13.3 AutoTCP Server Setup Example

Note-1: AutoTCP should be disabled before changing any AT#IPCELLULAR and AT#IPTCP parameters

Note-2 : AT#IPCELLULAR parameters must be set up correctly before AutoTCP can be used

The AT#IPTCP command is used to setup TCP Client socket parameters:

AT#IPTCP=<UART/USB>,"<IP-port>","<Client/Socket>","<IP-address>"

where:

- UART/USB : 1 for UART; 2 for USB
- IP-port : port on the modem for TCP Socket Server
- Client/Socket : Use "S" for modem as TCP server
- IP-address : IP address of TCP Socket client that is accepted for connection. (Note: “255.255.255.255” means all client connections are accepted)

Command	Response	Description
`AT#IPTCP=1,6000,"S","255.255.255.255"`	`OK`	This command is used to set the port on the local modem and the client address of the TCP Server Socket for UART

`AT#IPTCP?`	`#IPTCP: 1,6000,"S","255.255.255.255",1`
	`#IPTCP: 2,0,"C","",1`
	`OK`
		This command reads what is the current setting. Note an extra 5th parameter appears in the read response. This parameter is deprecated and can be ignored.

The AT#AUTOTCP command is used to enable or disable AutoTCP by :

`AT#AUTOTCP=<enable/disable>`

where:

- enable/disable : 1 to enable; 0 to disable

Notes: After enabling for server mode

- After at most 30 seconds, the modem is ready as server
- When external client connects to the modem, the serial/USB port is turned into data mode
- Every byte sent in data mode goes to the remote socket peer
- If +++ is sent in data mode, preceded and followed by 1-second of no activity on the data channel, connection to the remote peer will be broken. "DISCONNECT" will be seen and the port will go back to AT command (where AT commands are expected)

Command	Response	Description
(See table above)		

13.4 Flow diagram of Auto TCP/UDP Connection

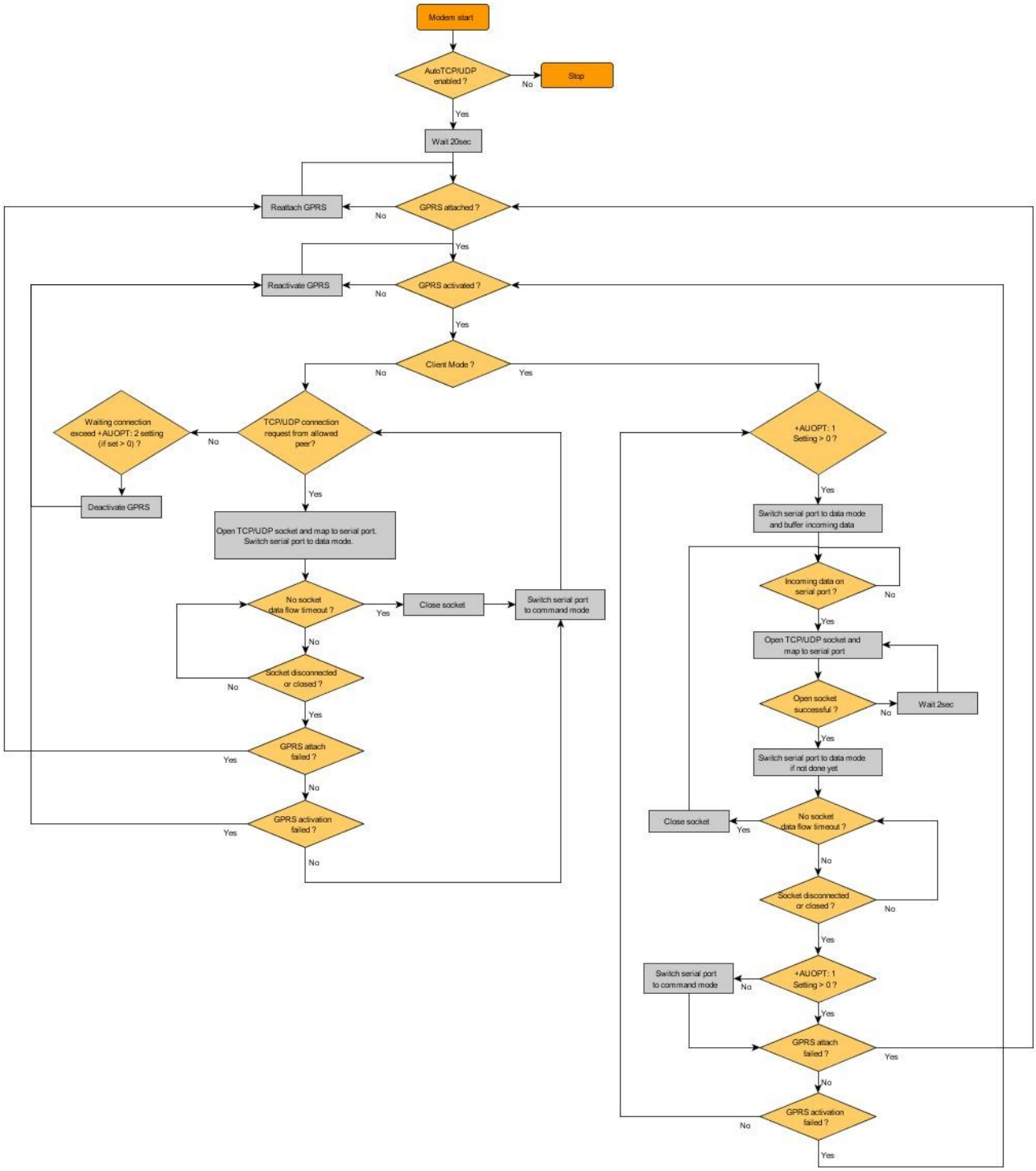

Figure 13.4.1: Auto TCP / UDP Flow Diagram

14: Troubleshooting

14.1 The modem's LED does not light

- Check if the modem has been properly connected to a 5-32V power supply
- Check if the power connector is properly inserted
- Check the fuse in the power cord

14.2 The modem's GREEN LED blinks but does not become stable for a long time after power up

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

14.3 The modem does not respond to the terminal program

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