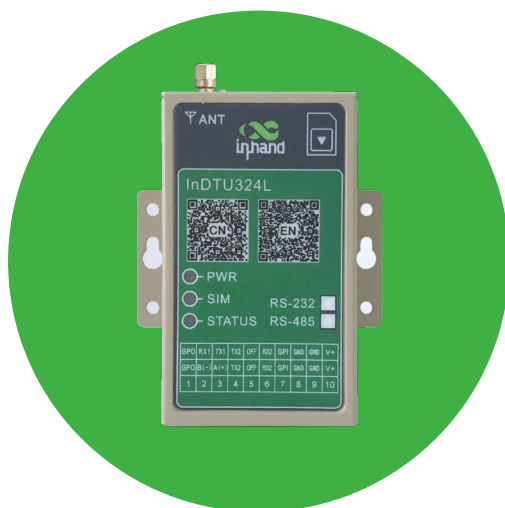




InHand Networks



InDTU324 Series Cellular Modem AT Command Reference

Revision A September 2020

About Us

InHand Networks is a global leader of Industrial IoT, with a record of tremendous success following groundbreaking innovation since our inception in 2001.

InHand serves world-class partners and customers with industrial M2M routers, gateways, industrial Ethernet switches, rugged computers and IoT management platforms. We provide IoT solutions for various vertical markets including Smart Grid, Industrial Automation, Remote Machine Monitoring, Smart Vending, Smart City, Retail and more.

Proudly bearing the marks of both Rockwell Automation Encompass Product Partner in Asia-Pacific and Schneider Electric CAPP Technology Partner, while listed on NEEQ 430642 as of February 18, 2014, InHand Networks defines industrial innovation and reliability.

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Revision history

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1: Introduction

The aim of this document is to provide users of InDTU324 series Modems running AT command, a detailed description of the commands supported by AT and various configuration / operation modes in which InDTU324 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.

2: Administration Commands

2.1 AT#INFO

Returns device information

ALLOWED: exec-state-info

AT#INFO

exec :

```
AT#INFO
OK#sw:InDTU3XX_AT_V1.0.0_beta_V1.4 Apr 22 2020 16:55:26
#bootloader:InBoot-V2.1
#sn:DL3242015550094
#device:324LQ25-232-LP

OK
```

state :

```
AT#INFO?
OK#sw:InDTU3XX_AT_V1.0.0_beta_V1.4 Apr 22 2020 16:55:26
#bootloader:InBoot-V2.1
#sn:DL3242015550094
#device:324LQ25-232-LP

OK
```

info :

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

2.2 AT#CONFIGDEL

Factory reset device configuration

ALLOWED: exec

Note: Device restarts after this command is executed

AT#CONFIGDEL

exec :

```
AT#CONFIGDEL
OK
```

2.3 AT#RESET

Software reset the M11X device ALLOWED:

exec

AT#RESET

exec :

```
AT#RESET
OK
```

2.4 AT#MRST

This command resets the InDTU324 module after a programmed delay. The InDTU324 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" - "02:00" (format hhh:mm)
- remainTime: time before next reset
 - range: "000:01"- "02:00" (format hhh:mm)

exec :

```
AT#MRST=1,"02:00"
OK
```

state (1 minute after executing the exec command):

```
AT#MRST?
#MRST: 1,"2:0","1:59"
OK
```

info :

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

2.5 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
```

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

2.6 AT#PASS

Enables / Disables pass-through mode.

ALLOWED: exec-state-info

Note:

- This command applies to a specific version of software only.
- In InDTU324, usually beginning with AT#. 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 AT# commands are accepted.
 - PASS mode set to 1 : pass-through mode enabled; only AT+ 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 AT+ 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 :

state

```

AT#PASS=1
OK
AT#PASS?
#PASS: 0
OK

```

info :

```

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

```

2.7 AT#STRUPMSG

Edits the startup message of InDTU software.

ALLOWED: exec-state-info

Note:

- The startup sequence of unsolicited response of the InDTU324 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
```

3: Hardware commands

3.1 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 (1200,4800,9600,14400,19200,38400,57600,115200)
- 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: (1200,4800,9600,19200,38400,57600,115200),("8N1","8N2","9O1","9E1"),(0-1)
OK
```

3.2 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)
- value1:
 - hour if op is 0; year if op is 1;
- 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=1,20,05, 20
AT#SETRTC=0,12,12,12

OK
```

state :

```
AT#SETRTC?
#GETRTC:2020-5-20 12:12:35;
```

info :

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

OK
```

3.3 AT#GETRTC

Get the real time clock

ALLOWED: exec-state-info

AT#GETRTC

exec :

```
AT#GETRTC
#GETRTC: 2020/05/20,16:50:48

OK
```

state :

```
AT#GETRTC?
ERROR
```

info :

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

4: Device Status SMS Commands

4.1 AT#LGPARA

SMS configuration

ALLOWED: exec-state-info

AT#LGPARA=(mode),(argument)

– mode:

- 0: Disable all DS 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 DS SMS is sent

exec :

```
AT#LGPARA=2,"18212345678 "  
OK  
AT#LGPARA=1,3  
OK
```

state :

```
AT#LGPARA?  
#LGPARA: 3," 18212345678"  
  
OK
```

info :

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

4.2 AT#LGMSG

DS SMS message content configuration

ALLOWED: exec-state-info

AT#LGMSG=(opt),(message)

- opt:
 - 1: Configure DS SMS for power down
 - 2: Configure DS 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,"DTU modem powered down"  
#LGMSG: 2,"DTU modem powered up"  
  
OK
```

info :

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

5: Cellular Commands

5.1 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 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 software will use a non-null but meaningless value when state is read
- CID : context ID. Please consult Inhand team on when to use this parameter and what value to use

exec :

```
AT#IPCELLULAR=1,"internet","AAA" ,"123456"
OK
```

state :

```
AT#IPCELLULAR?
#IPCELLULAR: 1,"internet","AAA" ,"123456","1"
OK
```

info :

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

5.2 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,"10.227.129.84"
OK
```

info:

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

5.3 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 other 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
```

6: Socket Commands

6.1 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=1,30006,"C","52.81.2.255"  
OK
```

state :

```
AT#IPTCP?  
#IPTCP: 1,30006,"C","52.81.2.255",1  
#IPTCP: 2,0,"C","0.0.0.0",1  
OK
```

info :

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

6.2 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","52.81.2.255"  
OK
```

exec :

```
AT#IPUDP?  
#IPUDP: 1,50003,"C","52.81.2.255",1  
#IPUDP: 2,0,"C","0.0.0.0",1  
OK
```

exec :

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

6.3 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
```

6.4 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
```

6.5 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 if connection is successful.
```

state :

```
AT#OTCP?
#OTCP: 0
OK
```

info :

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

6.6 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: Remote Control Commands

7.1 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.

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: DM Platform Commands

8.1 AT#D2S

Enable or disable Inhand DM Platform 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
```