

HT-AT62

## AT Command User's Manual

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## Release Notes

Versions	Modified items	Modify time
V0.1	First public release.	2022.09.15

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## 1. Overview

This document is applicable to HT-AT62 module, which have LoRaWAN protocol integrated in AT commands and can communicate directly with LoRa base stations for LoRaWAN communication.

The HT-AT62 module supports AT commands only in the AT version.

The WAKE pin needs to be pulled high to wake up the module when sending AT commands. When the WAKE pin is low, the module is in a low-power state.

## 2. Serial port settings

Communication baud rate: default is 115200, which can be modified by AT command.

Stop bit: 1

Data bits: 8

DTR, RTS requirements: none

## 3. AT command

### 3.1 Syntax Overview

- All AT command lines must begin with "AT+".
- No closing characters, do not send carriage returns, new lines, etc. as endings.
- The return response usually follows the command.
  - Returns "+OK" for successful execution.
  - If the execution fails or the syntax format is incorrect, "+E" is returned and the corresponding prompt is also returned.

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## 3.2 AT Command List

### Basic control commands

#### Query Chip ID

Command	Response
AT+ChipID=?	+OK +ChipID:13A*****622
Description	Reads the unique number of the chip, which can be used to query the corresponding serial number ( <a href="#">query address</a> ).

#### Reset

Command	Response
AT+RESET=1	Print the reset message.
Description	Device reset.

#### Restore factory settings

Command	Response
AT+DefaultSet=1	Print the reset message.
Description	Restores the parameters at the factory settings.

#### Set serial port baud rate

Command	Response
AT+Baud=a	+OK +Baud=a
Description	a:0-7corresponds to 1200,2400,4800,9600,19200,38400,57600,115200

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### Setting Pin Mode

Command	Response
<b>AT+PinMode=a,b</b>	+OK +PinMode=a,b
<b>Description</b>	a:Pin number 0-9. b:Pin mode 0:ANALOG;1:INPUT;2:OUTPUT.

Read the pin level (you need to set the pin to INPUT mode first using

**AT+PinMode=a,1)**

Command	Response
<b>AT+ReadPin=a</b>	+OK +PinLevel=S
<b>Description</b>	a:Pin number 0-9. S: pin state High level: 1,Low level: 0.

### Set pin pull-up/down mode

Command	Response
<b>AT+PinPull=a,b</b>	+OK +PinPull=a,b
<b>Description</b>	a:Pin number 0-9. b:pullup/pulldown mode 0: nopull; 1: pullup; 2: pulldown.

### Set pin level

Command	Response
<b>AT+SetPin=a,b</b>	+OK +SetPin=a,b
<b>Description</b>	a: Pin number 0-9.

	b:Pin level 0: LOW; 1: HIGH.
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LoRaWAN mode proprietary commands

Setting up DevEui

Command	Response
<b>AT+DevEui=?</b>	+OK +DevEui=2232330000888802
<b>Description</b>	Outputs the current DevEui in the system for OTAA mode.
<b>AT+DevEui=8888888888 8888888888</b>	+OK +DevEui=88888888888888888888
<b>Description</b>	Set DevEui to 88888888888888888888. Length 16 bits, parameters are limited to 0~F hexadecimal characters.

Set AppEui

Command	Response
<b>AT+AppEui=?</b>	+OK +AppEui=00000000000000000000
<b>Description</b>	Output of the AppEui in the current system for OTAA mode.
<b>AT+AppEui=8888888888 888888888888</b>	+OK +AppEui=88888888888888888888
<b>Description</b>	Setting AppEui to 88888888888888888888. Length 16 bits, parameters are limited to 0~F hexadecimal characters.





	+OTAA=1
	+OK +OTAA=0
<b>Description</b>	Return value 1 (default): OTAA mode. Return value 0: ABP mode.
<b>AT+OTAA=0</b>	+OK +OTAA=0
<b>Description</b>	Switches to ABP mode with parameter 0 or 1 only.

### Configuring ADR

Command	Response
<b>AT+Adr=?</b>	+OK +Adr=1
	+OK +Adr=0
<b>Description</b>	Return value 1 (default): the ADR function is turned on. Return value 0: ADR function is off.
<b>AT+Adr=0</b>	+OK +Adr=0
<b>Description</b>	Turn off the ADR function with the parameter 0 or 1 only.

### Configure LoRaWAN channel mask

For LoRaWAN channel masks, this document may be helpful to you:

[https://docs.heltec.org/general/sub\\_band\\_usage.html](https://docs.heltec.org/general/sub_band_usage.html)

Command	Response
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<b>AT+ChMask=?</b>	+OK +ChMask=000000000000000000000000000000FF
<b>Description</b>	The current LoRaWAN operating channels are 0~7.
<b>AT+ChMask=00000000 000000000000FF00</b>	+OK +ChMask=00000000000000000000000000FF00
<b>Description</b>	This command has set the LoRaWAN working channel to 8~15.  If this command is run prior to being on the network, the hardware must be rebooted. If the device is already on the network, it will take effect the next time.

#### Trigger OTAA access

Command	Response	
<b>AT+Join=1</b>	Start getting into the net	+OK joining.
	Successful access to the network	+OK joining. .joined
<b>Description</b>	After the device is powered off or reset, it needs to be re-entered into the network.	

#### Set the communication mode Class A/C

Command	Response
<b>AT+Class=?</b>	+OK +Class=A

<b>Description</b>	The return value is Class A or Class C, representing the corresponding working mode.
<b>AT+Class=C</b>	+OK +Class=C
<b>Description</b>	Only AT+Class=A or AT+Class=C is valid. The setting will take effect the next time the data is sent.

### Turn on/off ACK

<b>Command</b>	<b>Response</b>
<b>AT+IsTxConfirmed=?</b>	+OK +IsTxConfirmed=1
<b>Description</b>	The ACK acknowledgement (communication confirmation) function is enabled by default. The gateway will send a Downlink after receiving the uplink to inform the node that the data has been received.
<b>AT+IsTxConfirmed=0</b>	+OK +IsTxConfirmed=0
<b>Description</b>	Close the ACK return. Due to the ADR function, Downlink data will still be printed in this mode if the node's rate and other parameters are automatically adjusted.
<b>AT+IsTxConfirmed=1</b>	+OK +IsTxConfirmed=1
<b>Description</b>	Turn on ACK acknowledgement and set it to take effect the next time you send data.

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## Configuring fPort

Command	Response
<b>AT+AppPort=?</b>	+OK +AppPort=2
<b>Description</b>	Queries the current uplink data port.
<b>AT+AppPort=5</b>	+OK +AppPort=5
<b>Description</b>	Configure fport to 5, with parameters ranging from 0 to 255.  The setting will take effect the next time the data is sent.

## Set the number of retransmissions (if sending fails)

Command	Response
<b>AT+ ConfirmedNbTrials=?</b>	+OK +ConfirmedNbTrials=8
<b>Description</b>	If the communication fails, the system will retransmit the data to the gateway 7 times (8 times in total) by default, changing the rate every 2 times to try to optimize the transmission.
<b>AT+ ConfirmedNbTrials=3</b>	+OK +ConfirmedNbTrials=3
<b>Description</b>	Set the number of retransmissions to 2, with a parameter range of 1 to 8.  The setting will take effect the next time the data is sent.

### Configuring DR under non-ADR

Command	Response
AT+DR=?	+OK +DR=2
Description	Currently DR2.
AT+DR=0	+OK +DR=0
Description	Set the DR to DR0, the DR range may be different for different regions.

### Query sending status

Command	Response
AT+Busy=?	+OK +Busy=1
	+OK +Busy=0
Description	Queries whether the message can be sent now. If the feedback "+Busy=1", it is not possible to send now, if the feedback "+Busy=0", then it is possible to send now.

### Sending data

#### Sending hexadecimal data

Command	Response
AT+	+OK
SendHexStr=AABBCC	+Send Hex Data:AABBCCDD012345

<b>DD012345</b>	confirmed uplink sending .  <i>When the node communicates successfully with the gateway and receives an ACK from the gateway, it prints</i>  receive data: rssi = -xx, snr = -x, datarate = x
<b>Description</b>	Send the hexadecimal string, "0xAA, 0xBB, 0xCC, 0xDD, 0x01, 0x23, 0x45".  <b>Only 0~F hexadecimal characters, must be bit even bit, two for one byte, maximum 64 bytes.</b>
	+E: not joined // Not joined the network.  +E: busy //The previous process of LoRaWAN is not finished.  +E: format // Format error, send content not in hex format or odd length.

### Send any data

Command	Response
<b>AT+Send=abcdefghijkl</b>	+OK  +Send String:abcdefghijkl  confirmed uplink sending .  <i>When the node communicates successfully with the gateway and receives an ACK from the gateway, it prints</i>  receive data: rssi = -47, snr = -1, datarate = 0
<b>Description</b>	Send the string, "abcdefghijkl".  <b>ASCII characters only, up to 64 bytes.</b>

	+E: not joined // Not joined the network. +E: busy //The previous process of LoRaWAN is not finished. +E: format // Format error.
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## 4. Application examples

### 4.1 Sending data via LoRaWAN mode

This mode requires a LoRa gateway to work.

- 1) APT power-up.
- 2) WAKE UP device: pull up the WAKE pin.
- 3) Switch to OTAA operating mode: **AT+OTAA=1**
- 4) DevEui, AppKey and other parameters can be left as default, but ensure that they correspond to the parameters registered on the server.
- 5) Access to the network (*if no power failure occurs at the gateway, access to the network once*): **AT+Join=1**
- 6) Send data after successful access to the internet, for example:  
**AT+SendHex=AABBCCDD012345**
- 7) The next time you send data, you can send it directly without having to access the network again.

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