

# **Mesh Bee AT Command Manual**

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# Introduction

Mesh Bee communicates with outside through UART1 including data and command communicating. The default setting of UART1 is: 115200 baud rate, data bits 8, parity none, stop bit 1. “+++<CR>” can put Mesh Bee into AT mode, and “ATEX<CR>” can bring Mesh Bee out of AT mode, into data mode.

AT command can be classified into two types: Register RW AT and Action AT.

The pattern of AT command is “ATXX[DDDD]<CR>” in which XX stands for the register/action name and DDDD stands for the written value of a register. All letters' case is ignored.

Register RW AT can operate a virtual register of Mesh Bee. Absence of DDDD means reading the register value out and meanwhile ATXXDDDD means setting the register value to DDDD.

Action AT can trigger a specific action. The execution of command may be immediate or time-consuming.

## Node information commands

### ATIF

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- Action AT, immediate execution, for any zigbee role.
- Get node InFormation
- ATIF command will print information of node including: supported AT commands, node's firmware version, node's zigbee short address, node's MAC address, node's radio channel, node's zigbee role, etc.
- Example:

```
1.supported at cmds:
ATPA ATLA ATTM ATDA ATBR
ATIF ATAP ATEX ATOT ATOR
ATOA ATTT

2.node info:
FW Version      : 0x0002
Short Addr      : 0x0000
Mac Addr        : 0x00158d0000356645
RadioChnl       : 11
Device Type     : Co-ordinator
Uart1 BaudRate  : 115200
Unicast Dest Addr: 0x1ad4

3.belonging to:
PANID: 0xb178   EXPANID: 0x00158d0000356645
OK
```

## ATLA

- Action AT, time-consuming execution, for any zigbee role
- List All nodes within the network
- ATLA will broadcast a topology query packet into the whole network. All alive nodes will response that. The querying node will print responding nodes' short address, MAC address, Link-Quality-Indication (LQI), etc. LQI is a positive integer, the bigger LQI the better link quality.
- Example:

```
topo discovery has been sent.
This may take a little bit more time, please wait patiently.
OK
+--Node resp--
|--0x7c16 @ 00158d0000356641 LQI: 90
+--Node resp--
|--0x3643 @ 00158d0000356643 LQI: 33
```

## Data transmit commands

### ATTM

- Register RW AT, for any zigbee role

- bits: 1, decimal, max: 1, default: 0
- Set node's Tx Mode
- 0 – broadcast, 1 – unicast (need setting destination address by ATDA command first)

## ATDA

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- Register RW AT, for any zigbee role
- bits: 4, hex, max: ffff, default: 0000
- Set node's unicast Destination Address
- This address will also be used as the OTA target address, means that this destination address will be used for ATOT and ATOS command. It has a pattern of HHHH that is 4 bits of HEX number ignoring case.
- Example: ATDA14ad<CR>

## ATBR

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- Register RW AT, for any zigbee role
- bits: 1, decimal, max: 5, default: 5
- Set UART1's Baud Rate
- 0- 4800, 1-9600, 2-19200, 3-38400, 4-57600, 5-115200。
- Example: ATBR5<CR>

# Network formation commands

## ATPA

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- Register RW AT, for any zigbee role but with different effect.
- bits: 1, decimal, max: 1, default: 0
- Set node's Power up Action
- The node's default power-up behavior is restoring the last network state before power down. But when setting PA register to 1 and then reboot,

the node will not restore the last network. In this case, coordinator node will re-create a network and router/enddevice will re-scan the network. The PA register will be cleared to 0 after reboot.

## ATRS

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- Action AT, time-consuming execution, for router/enddevice
- Re-Scan network
- The scanning process will take a while and you can use ATLN command to monitor the scan result. If node finds nothing after a long time scanning, retry ATRS command or reset Mesh Bee. The node will automatically join the first found network when AJ register has a value of 1.

## ATLN

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- Action AT, immediate execution, for router/enddevice
- List Network scanned
- The index value will be used by ATJN command.

## ATJN

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- Register RW AT, for router/enddevice
- bits: 1, decimal, max: 8, default: 0
- Join a Network with specific index
- ATJN command is also an action trigger command. The node will join the network specified by the index of ATLN output. ATJN will return error when the node's already in that network.

## ATAJ

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- Register RW AT, for router/enddevice

- bits: 1, decimal, max: 1, default: 1
- Whether Auto Join network scanned
- If AJ register has a value of 1, the node will automatically join the first network scanned after ATRS command or power up with PA register equals to 1.

## OTA commands

### ATOT

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- Action AT, immediate execution, for coordinator
- OTA Trigger
- Non-coordinator nodes can upgrade firmware over-the-air. This is called OTA. ATOT command will trigger the OTA upgrade download of a destination node. OTA architecture consists of OTA server and client. Coordinator will be the server side and router/enddevice is the client side. To OTA a client node, you should firstly enter the AT mode on server side and set the unicast destination address (DA register) to the short address of the client node, and then execute the ATOT command. And now trace serial port (usually UART0) will print some information about OTA process if trace is enabled. After downloading all image blocks which are saved in the external Flash, the client node will trigger the upgrade process automatically. The process is: mark the internal firmware invalid, then reboot, and then the bootloader will copy the new image from the external Flash into the internal Flash, and then run the new firmware.

### ATOR

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- Register RW AT, for coordinator
- bits: 5, decimal, max: 60000, default: 1000
- OTA block request Rate
- Set the interval of two image block requests. The value's unite is milliseconds. The smaller, the faster.

## ATOA

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- Action AT, immediate execution, for coordinator
- OTA Abort
- Abort the OTA downloading process of a specific node specified by the DA register.

## ATOS

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- Action AT, time-consuming execution, for coordinator
- Query OTA Status
- Query the status of the OTA downloading process of a specific node specified by the DA register.

## Others

### ATRB

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- Action AT, immediate execution, for any zigbee role.
- Reboot Mesh Bee
- Perform a software reset. May be used after ATPA1 commands to re-form or re-join a network.

### ATTT

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- Action AT, immediate execution, for any zigbee role.
- Test functionality
- Totally for the manufactory test, you may not execute this command.

If you have any question, please follow the Mesh Bee discussion group <https://groups.google.com/d/forum/seeedstudio-mesh-bee-discussion-group> and post topics.