

# LR70/71 Command Reference Guide

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# 1. AT Commands

- All AT commands should terminate with a CRLF.
- AT commands may be sent over the BLE link (typical) or the main module UART.
- Commands are non-case sensitive, except when device names or passwords/passcodes are involved.
- Command parameters use ASCII format, unless stated in ASCII hex format. ASCII hex uses
   2 characters per hex byte.

### 1.1. FlashloaderStart

The FlashloaderStart command is used to execute the flash loader firmware when the application is running. Note, the "default" application selection is automatically removed when this command is used. This command is NOT allowed over the BLE link

### **Syntax**

AT+AB FlashloaderStart

## Responses

If the operation is successful, the flashloader menu will appear.

#### 1.2. HexMode

The HexMode command switches from AT command interface mode, to hex command interface mode. To exit this mode, an escape sequence "^#^\$^\%" must be entered (6 characters, no CR or LF), and return back to AT command mode.

### **Syntax**

AT+AB HexMode

#### 1.3. GetRSSI

The GetRSSI command will return the signal strength received from a remote Node using the given Node address.

#### **Syntax**

```
AT+AB GetRSSI [Address]
```

[Address] is the destination Node, ASCII hex format.

# Responses

## The reply is in the format:

AT-AB rssi [Address] [RSSI value]

[Address] is the remote Node, ASCII hex format.

[RSSI value] is the signal strength in dBm.



# 1.4. LeDisconnect

The LeDisconnect command is used to disconnect from a remote LE device once connected.

# **Syntax**

AT+AB LeDisconnect

### Responses

If the operation is successful, the response is:

AT-AB -BLE-ConnectionDown

# 1.5. LeDiscovery

The LeDiscovery command is used to scans for remote devices. This command is valid in central mode (ProfileRole = c).

# **Syntax**

AT+AB LeDiscovery

### Responses

### If the operation is successful, the response is:

```
AT-AB lescan pending

O. P [bd address] [Remote Device Name]

1. P [bd address] [Remote Device Name]

Total 2 devices found
```

Where [bd address] is the remote device's address.

### 1.6. LoraDiscovery

The LoraDiscovery command is used to scans for remote devices.

# **Syntax**

```
AT+AB LorsDiscovery [Address]
[Address] is the destination Node or Group, ASCII hex format.
```

### Responses

# If the operation is successful, the response is:

```
AT-AB LoRaDiscoveryPending
AT-AB LoRaDivice [NodeID]
...
AT-AB LoRaDiscoveryComplete
```



### 1.7. Reset

The Reset command is used to reset the module.

# **Syntax**

AT+AB Reset

# Responses

If the operation is successful, the response is:

AT-AB ResetPending

### 1.8. RmtChangeBaud

The RmtChangeBaud command is used to change the remote device's UART baud rate remotely.

## **Syntax**

```
AT+AB RmtChangeBaud [Pin] [Address] [Baudrate]
[PIN] is the security PIN needed to allow this command.

[Address] is the destination Node or Group, ASCII hex format.

[Baudrate] is the new UART baudrate.
```

### **Example**

```
AT+AB RmtChangeBaud [1234] [0003] [9600]
```

### Responses

If the operation is successful, the response is:

AT-AB DevChangeBaudDone [Address]

#### 1.9. RmtReset

The RmtReset command is used to reset destination module remotely.

### **Syntax**

```
AT+AB RmtReset [Pin] [Address]

[PIN] is the security PIN needed to allow this command.

[Address] is the destination Node or Group, ASCII hex format.
```

#### **Example**

```
AT+AB RmtReset [1234] [0003]
```

#### Responses

If the operation is successful, the response is:



AT-AB DevReset [Address]

#### 1.10. Send

The Send command is used to send data from BLE or serial UART over the LoRa network using the default destination Node address: DefaultDstAddr

# **Syntax**

```
AT+AB Send [Data]
```

[Address] is the address in DefaultDstAddr or AT+AB SessionDST [Addr].

[Data] is the hex data, ASCII hex, or ASCII data if preceded by a double-quote (")

# Example

AT+AB Send 31323334 (needs a CR LF to terminate)

#### 1.11. SendAPIData

The SendAPIData command is used to send data from the serial UART over the LoRa network, and is formatted with an API style hex format (as seen on the remote destination).

# **Syntax**

```
AT+AB SendApiData [Type] [Address] [Data] [Type] type of message,
```

TX data = 01

RX data = 02

ACK = 03

ACK Timeout = 04

[Address] is the 4 char destination Node or Group, ASCII hex format.

[Data] is the Ascii hex data.

#### Example

AT+AB SendAPIData 01 0011 48656c6c6f

Remote device will receive: 7e000f01220000000000001748656c6c6fxx

# **HexMode Syntax**

This command is supported in hex mode.

#### Tx Frame

| Start | Length |       | Frame Data             |                      |                       |                 | Checksum |
|-------|--------|-------|------------------------|----------------------|-----------------------|-----------------|----------|
| 0x7E  | HByte  | LByte | Frame Type<br>(1 Byte) | Frame ID<br>(1 Byte) | DST Addr<br>(8 Bytes) | Data (Variable) | 1 Byte   |



#### Rx Frame

| Start | Length |       | Frame Data             |  |                       |                 | Checksum |
|-------|--------|-------|------------------------|--|-----------------------|-----------------|----------|
| 0x7E  | HByte  | LByte | Frame Type<br>(1 Byte) |  | SRC Addr<br>(8 Bytes) | Data (Variable) | 1 Byte   |

### **HexMode Example**

SRC Node 0013:

(Send) 7e000f012200000000000001748656c6c6fxx

DST Node 0017:

(Receive) 7e000f0208000000000000001348656c6c6fxx

(ACK) 7e000b032200000000000001701xx (ACK Addr: 17, ID: 08)

#### 1.12. SendData

The SendData command is used to send data from BLE or serial UART over the LoRa network.

# **Syntax**

AT+AB SendData [Address][Data]

[Address] is the 4 char destination Node or Group, ASCII hex format.

[Data] is the hex data, ASCII hex, or ASCII data if preceded by a double-quote (")

#### Example

AT+AB SendData C001 31323334 (needs a CR LF to terminate)

#### 1.13. SessionDST

The SessionDST command is used to set the destination Node address. Which may be a Node or Group address. In Group address usage cases, ACK will not be received unless the node's Subscribe address is configured as well.

# **Syntax**

AT+AB SessionDST [Address]

Where [Address] is the 4 character Node or Group address to be used by the AT+AB Send command, ASCII hex format.

#### 1.14. SetBdAddress

The SetBdAddress command is used to change the Bluetooth Address. The BD Address may only be changed one time from it's default setting.

### **Syntax**

AT+AB SetBdAddress [mac address]



Where [mac address] is the new 6 byte MAC Address which will be set, ASCII hex format.

# Responses

If the operation is successful, the response is:

```
AT-AB ResetPending
AT-AB -CommandMode-
AT-AB MACAddress [mac address]
```

#### 1.15. Sleep

The Sleep command is used to switch a device from normal mode to low power mode.

# **Syntax**

```
AT+AB Sleep [When HostDeepSleepEn = 1]
```

### Responses

No response

### 1.16. Unprovision

The Unprovision command is used to remove a Node from the mesh network.

# **Syntax**

```
AT+AB Unprovision [Node ID]
```

Where [Node ID] is the Node to be removed from the mesh network.

### Responses

```
AT-AB Node [ID] removed
```

# 2. Configuration Commands

The section describes the system configuration variables of with their defaults and ranges. These values are stored in the non-volatile memory of the module. A reset is necessary for any new parameters to take effect.

# 2.1. Set/update

To set a configuration variable enter:

```
at+ab config xxxx = yyyy
```

Where "xxxx" is the variable name and "yyyy" is the value to set. A variable name may also be specified as "varzz". Where zz is the sequence number of the variable.

### 2.2. Inquiry

An inquiry may be made using:

```
at+ab config xxxx
```



Where "xxxx" is the variable name. The reply will be the current setting.



# 2.3. Configuration Parameters

| Name                   | Default      | Description   |  |  |
|------------------------|--------------|---|--|--|
| BuildVersion           | 250123A      | Date code of the firmware (read only).  |  |  |
| DeviceName ART[node ad |              | Bluetooth name, up to 15 characters are allowed (case sensitive).                               |  |  |
| BDADDR                 | 00043e261122 | Device BD address (read only).  |  |  |
| MeshName               | Amp'ed LoRa! | Name of the mesh node   |  |  |
| MeshKey                | 12345678     | Code used for secure connection.Up to 20 characters are allowed (case sensitive).               |  |  |
| AuthType               | 0            | 0=NONE, 1=AES-128   |  |  |
| UartBaudrate           | 115200       | Main UART baudrate: 1200 to 921,600 baud.   |  |  |
| UartParity             | none         | Enable/disable parity on the main UART.   |  |  |
| UartDataBits           | 8            | Main UART data bits per character.  |  |  |
| UartStopBits           | 1            | Main UART number of stop bits.  |  |  |
| UartFlowControl        | false        | Enabled use RTS/CTS flow control, disabled does not uses flow control.                          |  |  |
| MeshRelay              | false        | true: enables Relay feature False: disables Relay feature                                       |  |  |
| MeshProxy              | true         | true: enables Proxy feature False: disables Proxy feature                                       |  |  |
| MeshBle                | true         | true: enables BLE feature False: disables BLE feature   |  |  |
| MeshFriend             | false        | true: enables Friend feature False: disables Friend feature                                     |  |  |
| MeshLPN                | false        | true: enables LPN feature False: disables LPN feature   |  |  |
| ProvisionStatus        | false        | true: provisioned false: unprovisioned  |  |  |
| BLETxPower             | 0            | dBm   |  |  |
| LoraTxPower            | 6            | 1-10, this is not in dBm. 10 is max power, about 28 d   |  |  |
| LoraChannel            | 45           | 0-60, sets operating frequency at 780 MHz + N * 3 MH<br>A value of 45 is 780 + 45*3 = 915 MHz   |  |  |
| LoraCADInterval        | 500          | 100 -5000ms, CAD interval.  |  |  |
| LoraLoraBand           | 915          | Operating frequency, MHz (read only).   |  |  |
| LoraAirDataRate        | 4800         | 1200, 2400, 4800, 9600, 19200, 38400  |  |  |
| HostEvents             | true         | All host events are sent when True.   |  |  |
| HardwareType           | LR70         | Module part number (read only).   |  |  |
| BLEChannel             | 1            | BLE channel 1-7   |  |  |
| MaxTTL                 | 4            | Time-to-live, maximum number of mesh node hops, 0-1   |  |  |
| HostDeepSleepEn        | false        | Enables deep sleep mode.  |  |  |
| NodeAddr 0001          |              | Unique unicast address. Value is 0001 – 7FFF (ASCII he format, 4 characters each, zero padded). |  |  |
| PublishAddr            | C001         | Publish address. Value is C000 – FFEF, (ASCII hex forma 4 characters each, zero padded).        |  |  |



| SubscribeAddr  | C001   | Subscribe addresses. Value is 0xC000 – FFEF, up to 8 addresses, comma separated, may be entered: C001,C002,C003,etc (ASCII hex format, 4 characters each, zero padded). |  |
|----------------|--|---|--|
| DefaultDSTAddr | 0001   | Unique unicast address value is 0001 – 7FFF. Publish address value is C000 – FFEF, (ASCII hex format, 4 characters each, zero padded).                                  |  |
| AckTimeout     | auto   | Timeout for ACKs, in seconds. Automatically set.  |  |
| LoraTxRpt      | 1  | Number of times a packet is sent, 1-5 (1 means it's not repeated).  |  |
| LoraTxInt      | auto   | Allows spacing between repeated packets, in ms. Automatically set. Hidden config.   |  |
| GrpAckWindow   | 4 Number of time frames allowed for Group Acks, rang |   |  |
| AckEn          | True   | Acks are send from this node when enabled. Each node much set this as desired.  |  |
| MeshEn         | False  | Mesh networking mode is supported when enabled. Each node mush have this set while in a mesh network.   |  |
| LoRaRmtPin     | 123456   | Security pin needed to enable remote parameter changes and resets. 6 digits.  |  |
| WTDEnable      | true   | Enables the watchdog timer.   |  |
| LoraMsgMax     | 200  | Sets the maximum length per message. Up to 200 bytes.   |  |
| TermChar       | 126  | The character used to signify the termination of a data sequence. Default is the tild "~" character. Displayed in decimal.  |  |
| EscSeq         | ^#^\$^%  | This is the sequence needed to escape from bypass mode, into command mode.  |  |
| BypassMode     | false  | When true, the device will send data transparently over the RF network. No commands are allowed in bypass mode.   |  |
| BypassTimeout  | 5  | A ms timeout, 1-255, to terminate the current packet in bypass mode. 0 will disable this, and use the termination character setting instead.                            |  |