HOW TO SET UP THE 30001505CEU TO WORK WITH THE DEMO GUI

USER GUIDE

Description

This document will guide you through an example setup of the hardware and the LoRaMipot GUI.

Contents

1. Overview

The LoRa Mipot modules will be controlled by a PC software connecting via the serial port.

The devices will be configured to form a network and some messages will be exchanged between them.

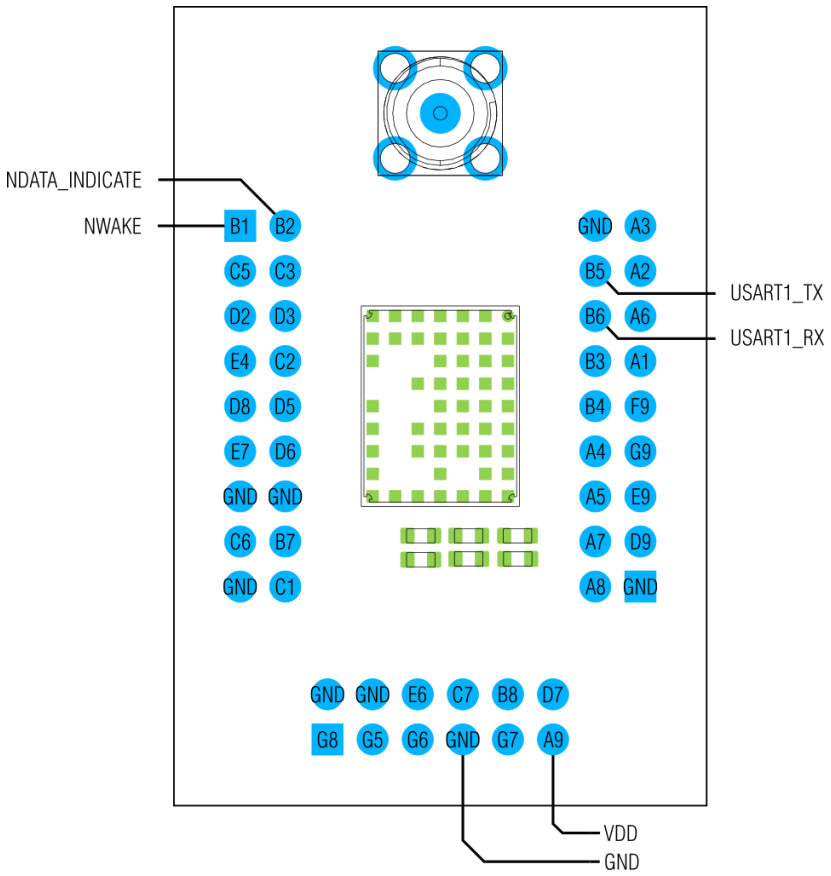
The required material is:

- 2 x 30001505CEU DevKit mounting a 32001505CEU
- 2 x USB to UART 3v3 adapter (e.g.: FTDI TTL-232R-3V3)
- Power supply
- LoRaMipot GUI

For details about the commands, please see the 32001505CEU command reference.

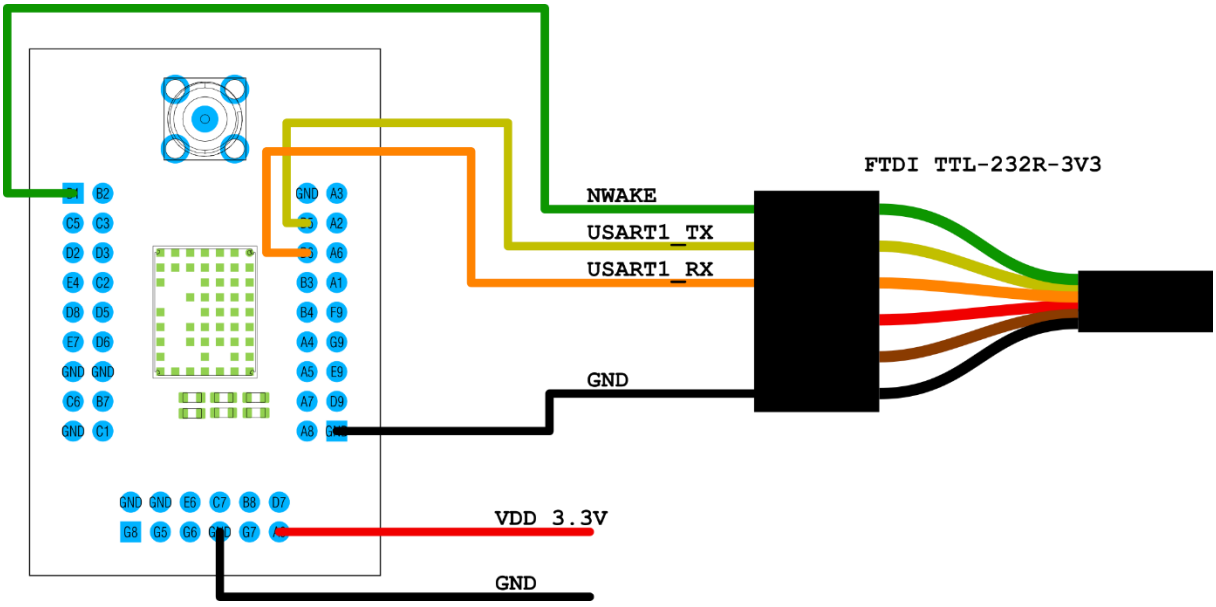
2. Hardware setup

The minimal connection with a host device uses the lines indicated in the following image and are comprised of the following pin:



PIN NAME	DIR	DESC
LPUART_TX	Out	UART TX pin, connect to RX pin of the adapter
LPUART_RX	In	UART RX pin, connect to TX pin of the adapter
NDATA_INDICATE	Out	Goes low when the module has data to send on the serial
NWAKE	In	Pull down to wake up the module from sleep.
VDD	Pwr	2.1 V to 3.6 V
GND	Pwr	Ground pin

2.1. Example of connection with USB to serial cable

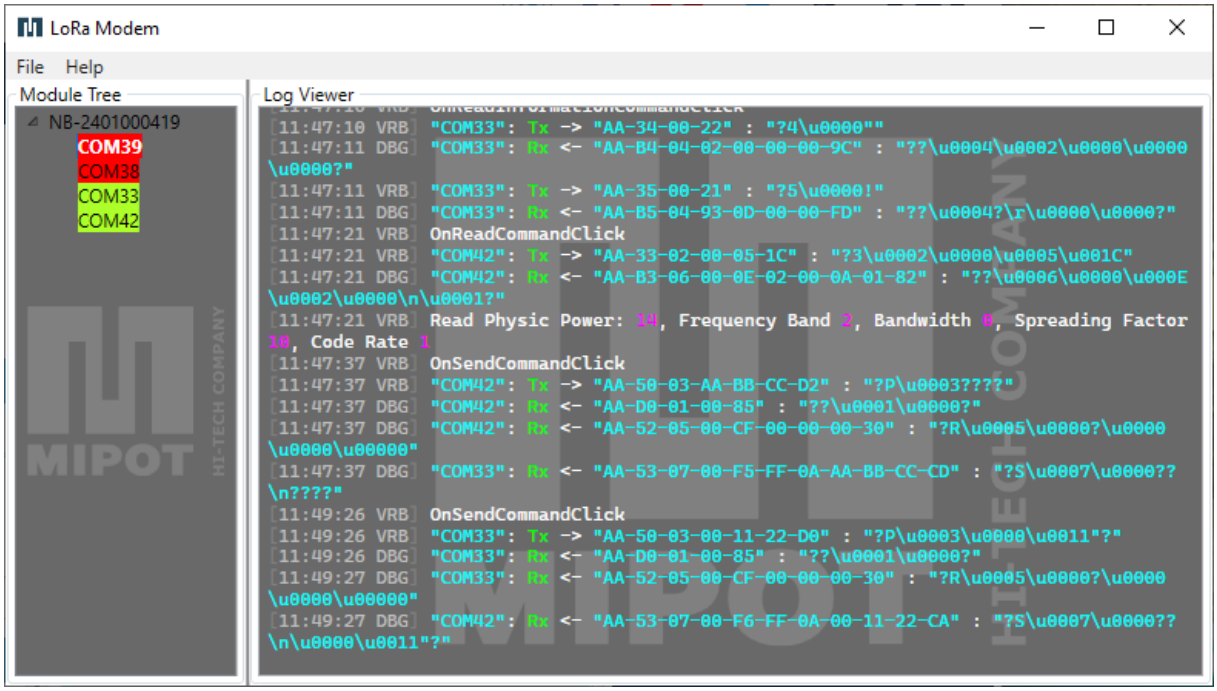


The NWAKE pin is connected to the RTS signal. The LoRaMipot GUI pull down the signal to wake up the module before sending data.

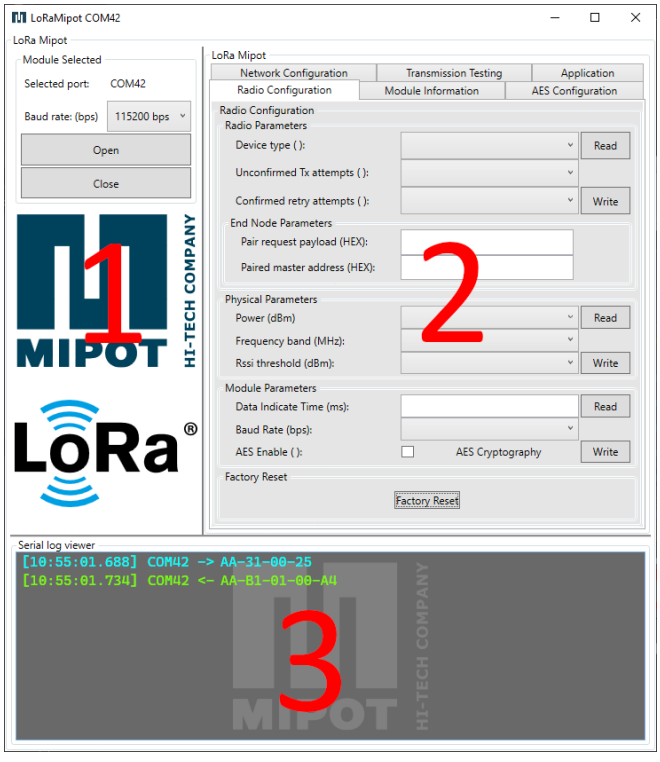
3. Software setup

3.1. Starting the GUI

Once all connections are made and the module are powered, start the LoRaModem GUI. At startup, it will scan available serial ports looking for connected devices. It is possible to connect multiple devices to the same PC.



Once the scan is finished, the serial ports with the module connected will be highlighted in green. To use one of the module, double click on the appropriate Com port. For this HowTo, open the interface on both modules.



The view that will open is divided in 3 main zones:

1)Serial port control

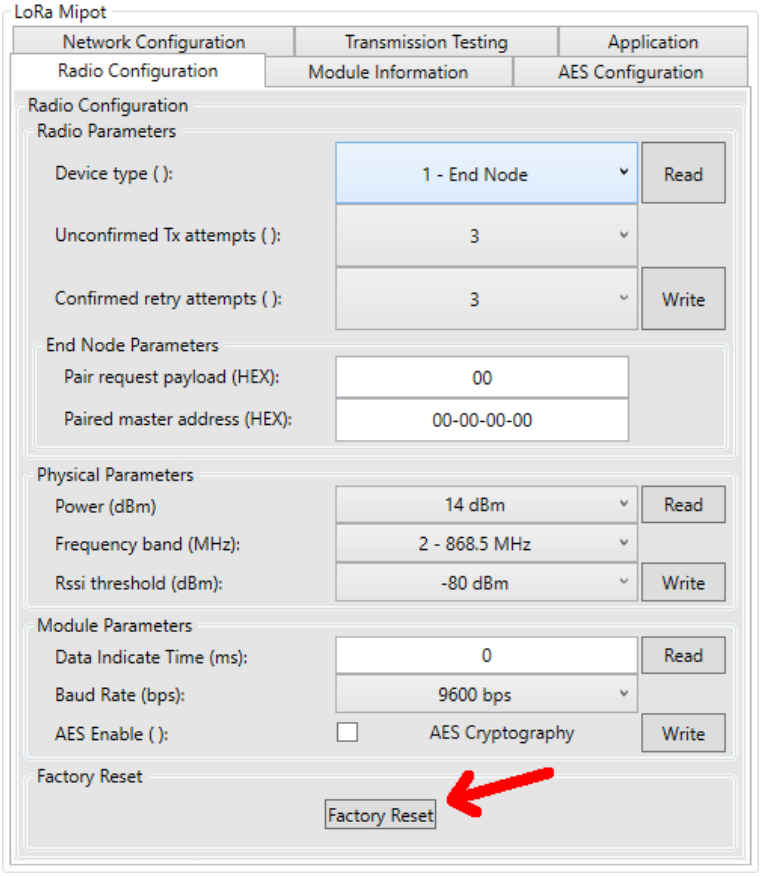
2)Module control

3)Log of the messages exchanged on the serial port.

In the log, the cyan text is about messages from the pc to the module and are indicated with an arrow pointed right, while the green messages are from the module and have an arrow pointing left.

3.2. Module reset

To start with a known configuration reset the module using the "*Factory Reset*" button in the "*Radio Configuration*" tab of the GUI.



This will configure the module with the default parameters as shown in the next table.

Parameter	Value
Device type	1 (End Node)
Confirmed retry attempts	3
Paired master address	0x00000000
Frequency Band	2 (868.5 MHz)
Data indicate time	5 ms
AES Enabled	0

Parameter	Value
Unconfirmed Tx attempts	3
Pair request payload	0x00
Power	14 dBm
RSSI threshold	-80 dBm
Baud rate	4 (115200)

Before writing a parameter, read them with the appropriate button so all the fields are filled with the values configured in the module.

Command example

Reset the module to start with a known configuration of the module with the command FACTORY_RESET_CMD (0x31):

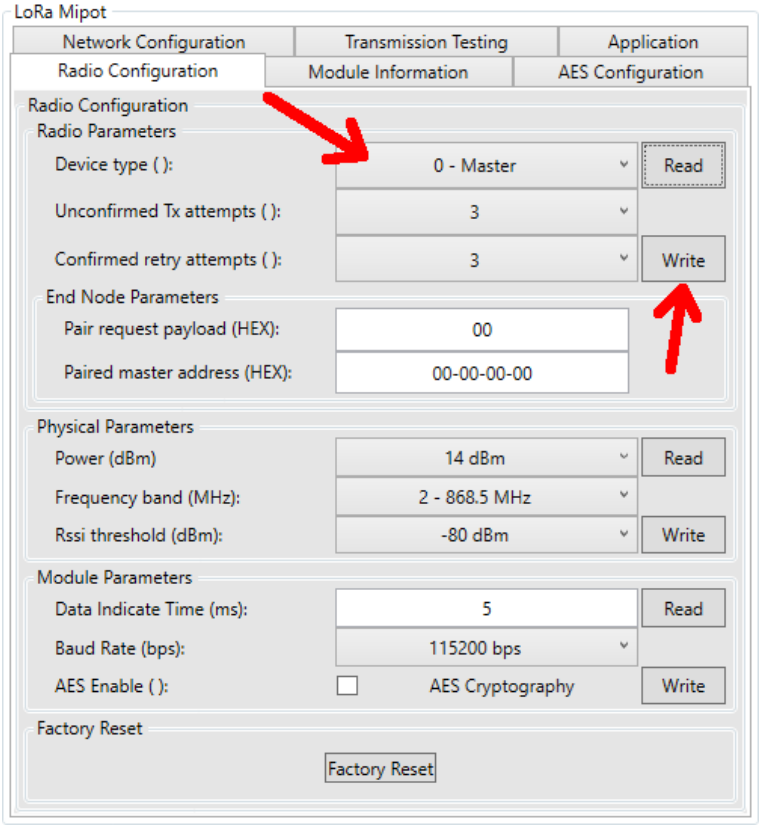
Host: 0xAA, 0x31, 0x00, 0x25

Device:0xAA, 0xB1, 0x01, 0x00, 0xA4

3.3. Configuring the master

To create the network, one of the modules should be configured as Master.

In this example the module configured as master has the address 0x0000148F, while the module configured as end node has the address 0x00000D93



On one of the modules should be configured as "*Master*", while the other must be left "*End Node*".

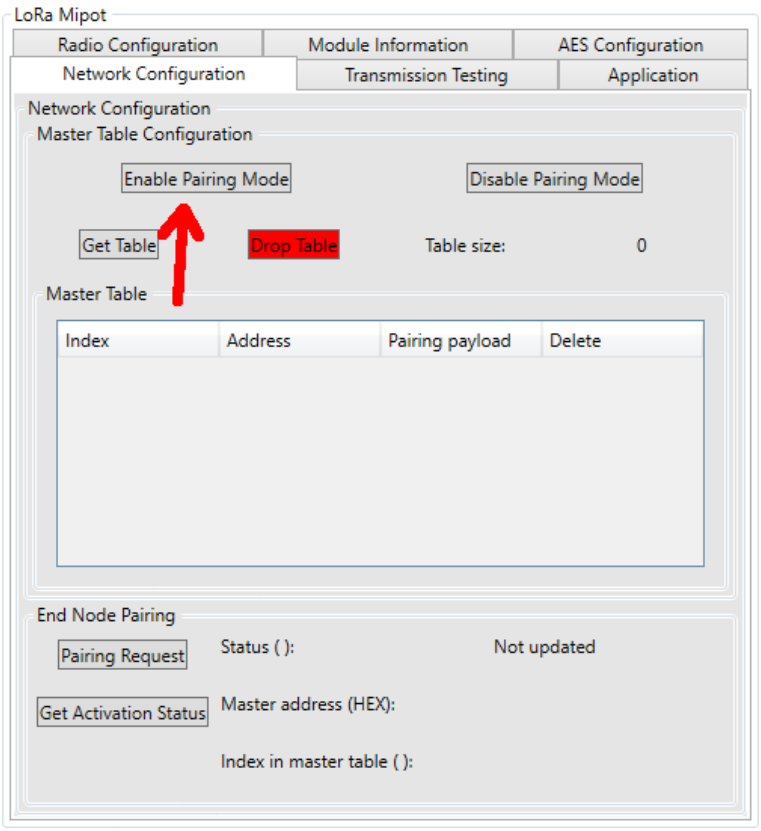
Command example

Write the value 0x00 at the position 0x00 (Device type) using the EEPROM_WRITE_CMD (0x32):

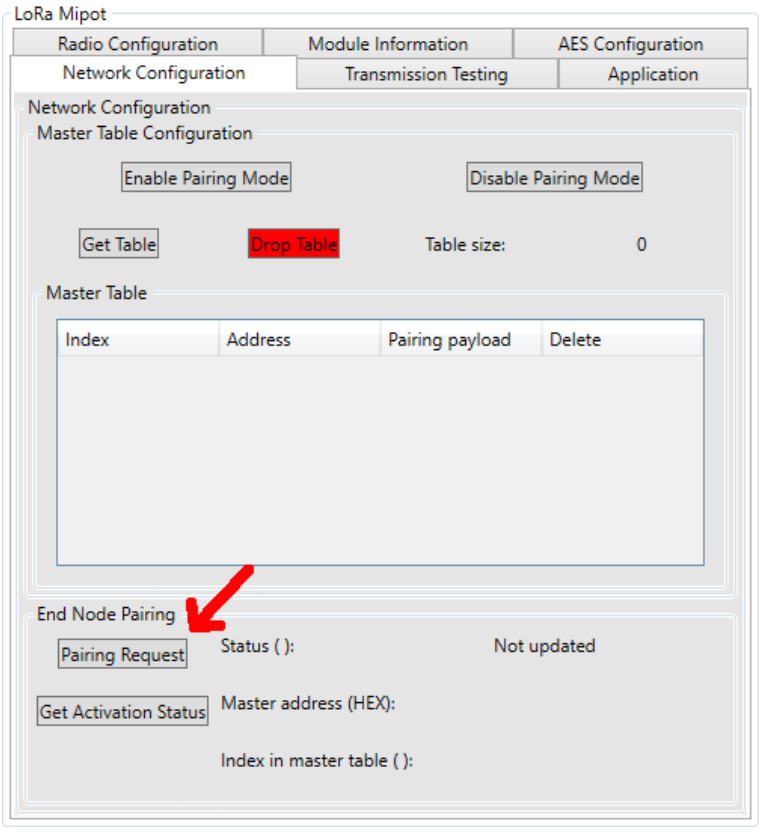
Host: 0xAA, 0x32, 0x02, 0x00, 0x00, 0x22

Device:0xAA, 0xB2, 0x01, 0x00, 0xA3

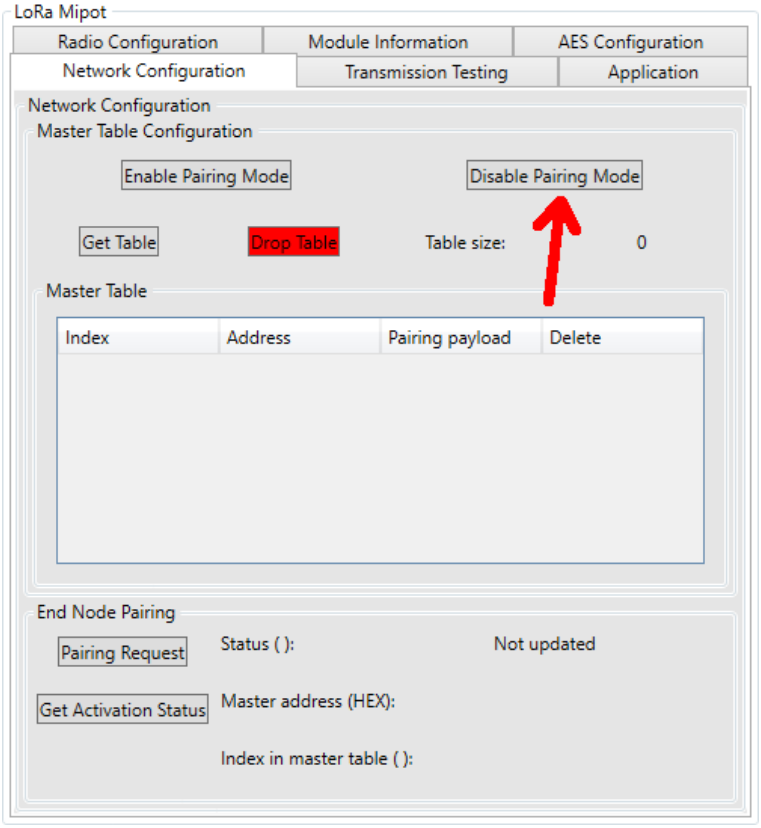
3.4. Pairing the End Node



On the master device, enable the pairing mode in the "*Network Configuration*" tab.



On the end node device, start the pairing request



Once paired, disable the pairing mode on the master device.

Command example

On the master device, enable the pairing mode with the command ENABLE_PAIRING_CMD (0x40):

Host: 0xAA, 0x40, 0x01, 0x01, 0x14

Device:0xAA, 0xC0, 0x00, 0x96

On the other device, start the join request with the PAIRING_REQ_CMD (0x48):

Host: 0xAA, 0x48, 0x00, 0x0E

Device:0xAA, 0xC8, 0x01, 0x00, 0x8D

If the join is successful, the master device will report the new device with the DEVICE_PAIRING_IND (0x41):

Device:0xAA, 0x41, 0x05, 0x93, 0x0D, 0x00, 0x00, 0x00, 0x70

The end node will report the join with the PAIRING_CONFIRM_IND (0x49):

Device: 0xAA, 0x49, 0x06, 0x00, 0x8F, 0x14, 0x00, 0x00, 0x00, 0x64

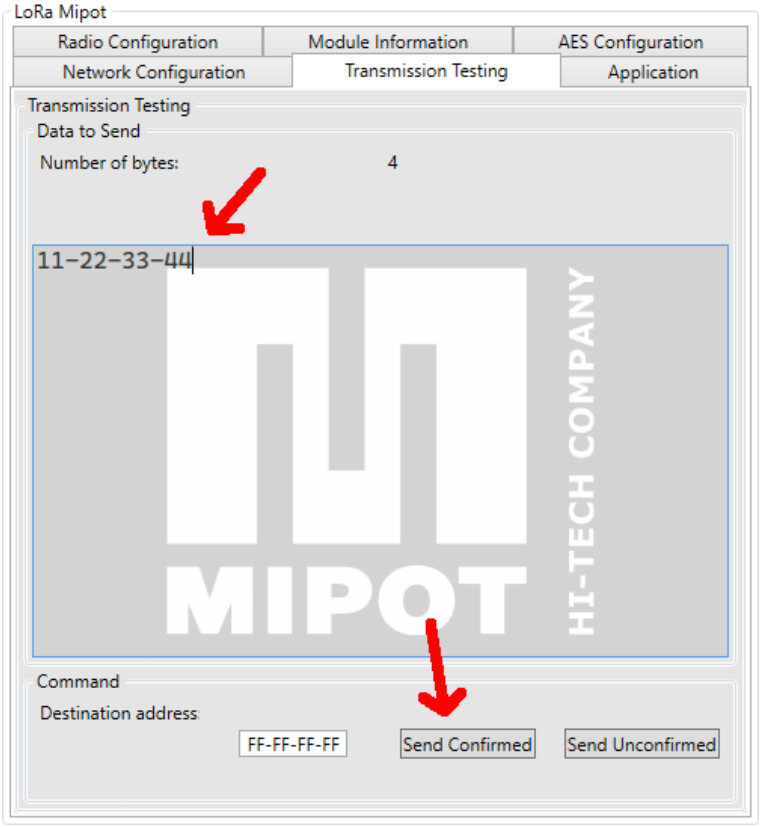
To disable the pairing mode on the master device, use again the ENABLE_PAIRING_CMD (0x40):

Host: 0xAA, 0x40, 0x01, 0x00, 0x15

Device:0xAA, 0xC0, 0x00, 0x96

4. Sending and receiving a message

4.1. Sending a confirmed message from the end node



On the end node, write a payload in the "*Transmission Testing*" tab and click on "*Send Confirmed*" button.

On the master device, the received message will be visible in the log viewer.

In case of an end node, the destination address is ignored as all messages are sent to the master.

Command example

To send a confirmed message from the end node, use the TX_MSG_CMD (0x50). For example, to send the payload "**0x11, 0x22, 0x33, 0x44**":

Host: 0xAA, 0x50, 0x09, 0x01, 0xFF, 0xFF, 0xFF, 0xFF, **0x11, 0x22, 0x33, 0x44**, 0x56

Device:0xAA, 0xD0, 0x01, 0x00, 0x85

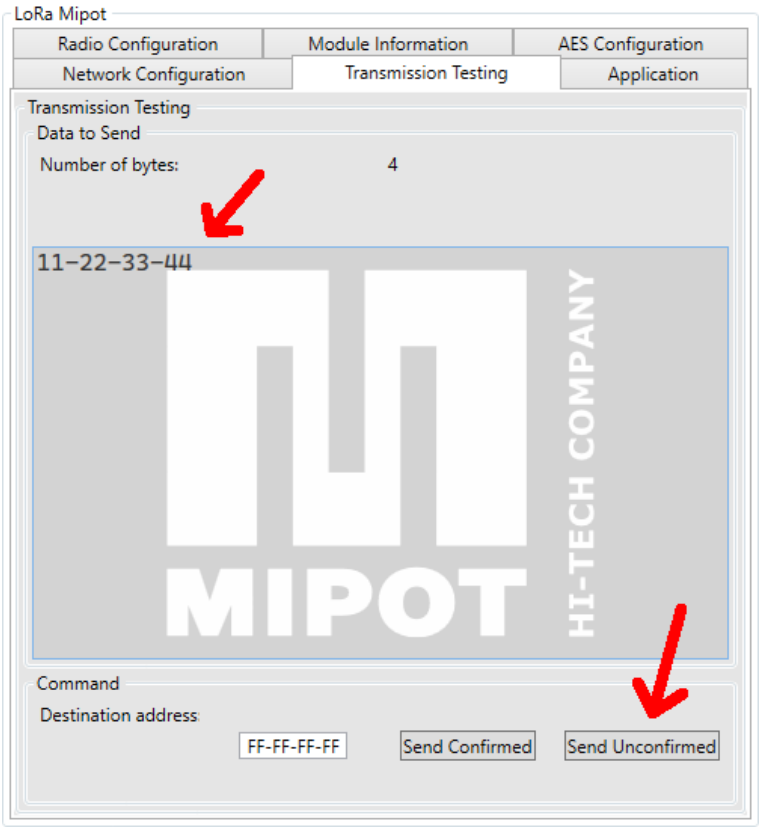
Once the transmission is complete, the end node will report it with the TX_MSG_CONFIRMED_IND (0x51):

Device:0xAA, 0x51, 0x07, 0x00, 0x43, 0x00, 0x00, 0x00, 0x01, 0x01, 0xB9

On the master device, the RX_MSG_IND (0x53) will indicate the reception of a radio message from an end node:

Device:0xAA, 0x53, 0x0C, 0x00, 0xF5, 0xFF, 0x03, 0x93, 0x0D, 0x00, 0x00, **0x11, 0x22, 0x33, 0x44**, 0xB6

4.2. Sending an unconfirmed message from the end node



On the end node, write a payload in the "*Transmission Testing*" tab and click on "*Send Unconfirmed*" button.

On the master device, the received message will be visible in the log viewer.

In case of an end node, the destination address is ignored as all messages are sent to the master.

Command example

To send a confirmed message from the end node, use the TX_MSG_CMD (0x50). For example, to send the payload "**0x11, 0x22, 0x33, 0x44**":

Host: 0xAA, 0x50, 0x09, 0x00, 0xFF, 0xFF, 0xFF, 0xFF, **0x11, 0x22, 0x33, 0x44**, 0x57
Device:0xAA, 0xD0, 0x01, 0x00, 0x85

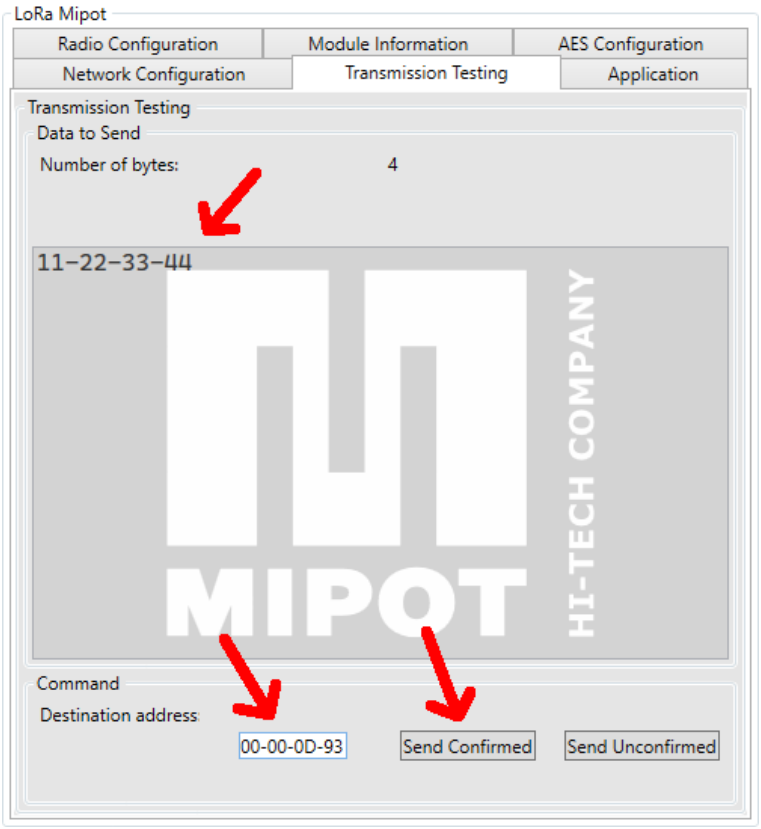
Once the transmission is complete, the end node will report it with the TX_MSG_IND (0x52):

Device:0xAA, 0x52, 0x05, 0x00, 0xC9, 0x00, 0x00, 0x00, 0x36

On the master device, the RX_MSG_IND (0x53) will indicate the reception of a radio message from an end node:

Device:0xAA, 0x53, 0x0C, 0x00, 0xF1, 0xFF, 0x03, 0x93, 0x0D, 0x00, 0x00**, 0x11, 0x22, 0x33, 0x44**, 0xBA

4.3. Send a confirmed message from the master



The confirmed messages from the master can be sent only to a specific end node, so the destination address should contain the serial number of that end node.

In this example, the device configured as end node has the address 0x00000D93

Command example

To send a confirmed message, use the TX_MSG_CMD (0x50). For example, to send the message "**0x11, 0x22, 0x33, 0x44**" to the end node 0x00000D93:

Host: 0xAA, 0x50, 0x09, 0x01, 0x93, 0x0D, 0x00, 0x00, **0x11, 0x22, 0x33, 0x44**, 0xB2

Device:0xAA, 0xD0, 0x01, 0x00, 0x85

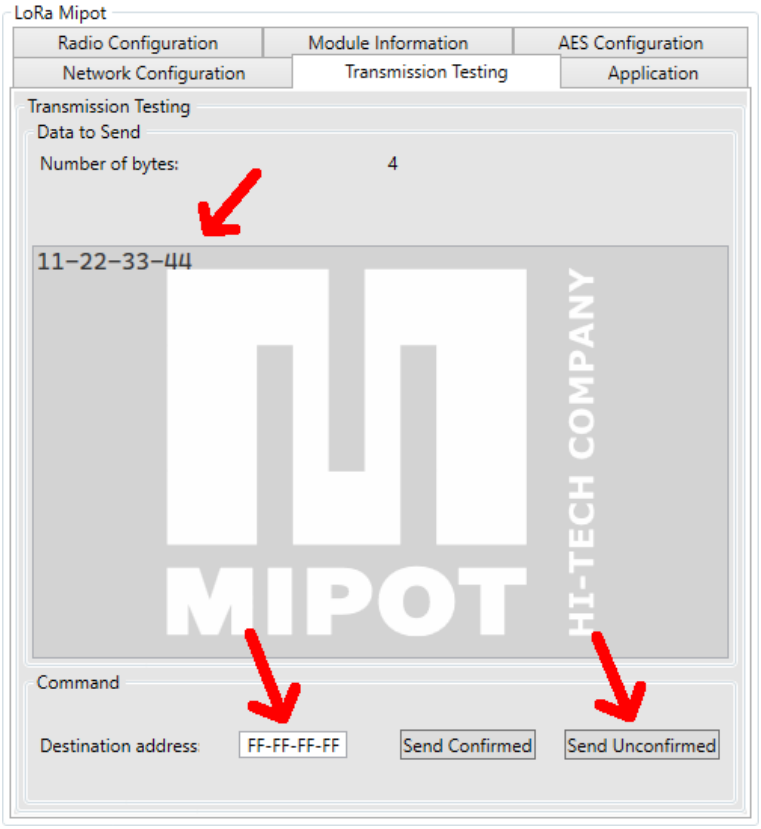
Once the transmission is complete, the master will report it with the TX_MSG_CONFIRMED_IND (0x51):

Device:0xAA, 0x51, 0x07, 0x00, 0x83, 0x04, 0x00, 0x00, 0x01, 0x01, 0x75

The end node, will report the received message with the RX_MSG_IND (0x53):

Device:0xAA, 0x53, 0x0C, 0x00, 0xF0, 0xFF, 0x03, 0x8F, 0x14, 0x00, 0x00, **0x11, 0x22, 0x33, 0x44**, 0xB8

4.4. Sending an unconfirmed broadcast message from master



The device configured as master can send an unconfirmed message to all end nodes. To do so, put the broadcast address 0xFFFFFFFF and click on "*Send unconfirmed*".

The received message will be shown in the log viewer of the end node.

Note: broadcast messages can only be unconfirmed.

Command example

To send a confirmed message, use the TX_MSG_CMD (0x50). For example, to send the message "**0x11, 0x22, 0x33, 0x44**" to all end nodes in the network:

Host: 0xAA, 0x50, 0x09, 0x00, 0xFF, 0xFF, 0xFF, 0xFF, **0x11, 0x22, 0x33, 0x44**, 0x57
Device:0xAA, 0xD0, 0x01, 0x00, 0x85

Once the transmission is complete, the end node will report it with the TX_MSG_IND (0x52):

Device:0xAA, 0x52, 0x05, 0x00, 0x89, 0x0D, 0x00, 0x00, 0x69

The end node, will report the received message with the RX_MSG_IND (0x53):

Device:0xAA, 0x53, 0x0C, 0x00, 0xE3, 0xFF, 0x03, 0x8F, 0x14, 0x00, 0x00, **0x11, 0x22, 0x33, 0x44**, 0xC5

5. Revision History

Revision	Date	Description
0.1	15.11.2022	First version
0.2	22.11.2022	Change image and product code in the title
0.3	06.12.2022	Change the image on the first page Change the name of the document to “User Guide"