

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.



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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.

🚺 LoRa Modem	- 🗆 X
File Help	
Module Tree NB-2401000419 COM39 COM38 COM33 COM42	Log Viewer 11:47:10 VRB "COM33": Tx -> "AA-34-00-22" : "?4\u00000"" 11:47:10 DBG "COM33": A <- "AA-84-04-02-00-00-00-9C" : "??\u0004\u0002\u0008\u0000 \u0000?" 11:47:11 DBG "COM33": Ix -> "AA-35-00-21" : "?5\u0000!" 11:47:11 DBG "COM33": Ix -> "AA-85-04-93-0D-00-00-FD" : "??\u0004?\r\u0000?" 11:47:21 VRB OnReadCommandClick 11:47:21 VRB "COM42": Ix -> "AA-33-02-00-05-1C" : "?3\u0002\u0000\u0005\u001C" 11:47:21 DBG "COM42": Ix -> "AA-33-02-00-05-1C" : "?3\u0000\u0005\u0001C"
HE-TECH COMPANY	\u0002\u0000\n\u0001?" 11:47:21 VRB Read Physic Power: 14, Frequency Band 2, Bandwidth 0, Spreading Factor 10, Code Rate 1 11:47:37 VRB OnSendCommandClick 11:47:37 VRB "COM42": 1x -> "AA-50-03-AA-BB-CC-D2" : "?P\u0003????" 11:47:37 DBG "COM42": 1x <- "AA-D0-01-00-85" : "??\u0001\u0000?" 11:47:37 DBG "COM42": 1x <- "AA-52-05-00-CF-00-00-03" : "?R\u0005\u0000?\u0000 10:407:37 DBG "COM42": 1x <- "AA-52-05-00-CF-00-00-03" : "?S\u0007\u0000?\u0000 11:47:37 DBG "COM43": 1x <- "AA-53-07-00-F5-FF-0A-AA-BB-CC-CD" : "?S\u0007\u0000?\u0000? 11:49:26 VRB OnSendCommandClick 11:49:26 VRB OnSendCommandClick 11:49:26 VRB "COM33": 1x -> "AA-50-03-00-11-22-D0" : "?P\u0003\u00008\u00011"?" 11:49:27 DBG "COM33": 1x <- "AA-50-01-00-85" : "??\u0003\u00008\u00011"?" 11:49:27 DBG "COM43": 1x <- "AA-52-05-00-CF-00-00-03" : "?R\u0005\u0000?\u0000 \u00004\u00008\u0000?\u

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,

Idouble Selected Idouble Selected Network Configuration Network Configuration Radio Configuration Reconstructure Device type (): Unconfirmed Tk attempts (): Confirmed tetry attempts (): Pair request payload (HEQ): Paired master address (HEQ): Physical Parameters Power (d8m) Frequency band (MHz): V Rasi threshold (d8m): V Module Parameters Data Indicate Time (mst:	dule Selected cted port: COM42 d rate: (bps) 115200 bps ×	Network Configuration Radio Configuration	Transmission Testing	
Selected port COM42 Baudi rate: (bps) 115200 bps v Open Radio Configuration Module Information Open Device type (): v Close V V Finite Tix attempts (): v w Close V V Physical Parameters Paired master address (HEX): v Paired master address (HEX): Pirequency band (MHz): v Proyect (dBm) v Res Frequency band (MHz): v With Obdule Parameters Dower (dBm): v Data Indicate Time (ms): Data Indicate Time (ms): Enders	d rate: (bps) 115200 bps ×	Radio Configuration	Industriission resung	Application
Baud rate: (bp) 115200 bps v Open Radio Configuration Close Device type (): Close Vinconfirmed Tx attempts (): Origination Vinconfirmed Tx attempts (): End Node Parameters Write Paired master address (HEQ): Vinconfirmed Tx attempts (): Privacial Parameters Paired master address (HEQ): Privacial Parameters Vinconfirmed Tx attempts (): Paired master address (HEQ): Vinconfirmed Tx attempts (): Paired master address (HEQ): Vinconfirmed Tx attempts (): Paired master address (HEQ): Vinconfirmed Tx attempts (): Physical Parameters Vinconfirmed Tx attempts (): Paired master address (HEQ): Vinconfirmed Tx attempts (): Paired master address (HEQ): Vinconfirmed Tx attempts (): Paired master address (HEQ): Vinconfirmed Tx attempts (): Physical Parameters Data holdicate Time (min):	d rate: (bps) 115200 bps 🔻	nadio conigatation	Module Information	AFS Configuration
Baud rate (bpt) 115200 bps Radio Parameters Device type (): V V Close Image: Close Confirmed Tk attempts (): V V V	d rate: (bps) 115200 bps 🔻	Radio Configuration		ALS COMINGUIDAN
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Close Confirmed retry attempts (): Confirmed		Unconfirmed Tx attempts ():		~
End Node Parameters Pair request payload (HEX): Paired master address (HEX): Prysical Parameters Power (dBm) Frequency band (MHz): Rssi threshold (dBm): Module Parameters Data Indicate Time (ms): Rest	Close	Confirmed retry attempts ():		 Write
Paired master address (HEX): Paired master address (HEX): Physical Parameters Power (dBm) Frequency band (MHz): Rssi threshold (dBm): Module Parameters Data Indicate Time (ms): Res		End Node Parameters		
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Paired master address (HEX): Physical Parameters Power (dBm): Frequency band (MHz): Rss threshold (dBm): Module Parameters Data Indicate Time (ms): Rest		Tun request payload (ries).		
Physical Parameters Power (dBm)	d d	Paired master address (HEX):		
Power (dBm) Power (dBm)	e e e e e e e e e e e e e e e e e e e	Physical Parameters		
Frequency band (MHz): Frequency band (MHz): Kass ithreshold (dBm): Module Parameters Data Indicate Time (ms): Res	<u>.</u>	Power (dBm)		~ Read
Rssi threshold (dBm): VWn Module Parameters Data Indicate Time (ms): Ree	i i selle tar fi	Frequency band (MHz):		~
Module Parameters Data Indicate Time (ms): Rec	IIPOT 🗄	Rssi threshold (dBm):		× Write
Data Indicate Time (ms):		Madula Darameters		
		Data Indicate Time (ms):		Read
		Baud Data (haa)		
		acc c		1
	URA	ALS ENABLE ():	AES Cryptogr	rapny Write
Factory Reset	S	Factory Reset	Factory Reset	

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.

Network Configuration		Transmission Testing	Appl	lication
Radio Configuration M		dule Information	AES Config	juration
ladio Configuration				
Radio Parameters				
Device type ():		1 - End Node	v	Read
Unconfirmed Tx attempts ():		3	Ŷ	
Confirmed retry attempts ():		3	v	Write
End Node Parameters				
Pair request payload (HEX):		00		
Paired master address (HEX)):	00-00-00)	
Physical Parameters				
Power (dBm)		14 dBm	Ý	Read
Frequency band (MHz):		2 - 868.5 MHz		
Rssi threshold (dBm):		-80 dBm ~		Write
Module Parameters				
Data Indicate Time (ms):		0		Read
Baud Rate (bps):		9600 bps	Ŷ	
AES Enable ():		AES Cryptography		Write
Factory Reset		-	-	
	F	actory Reset		

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	0x0000000
Frequency Band	2 (868.5 MHz)
Data indicate time	5 ms
AES Enabled	0

Parameter	Value
Unconfirmed Tx	3
Bair request payload	0×00
Pail 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

Ra Mipot					
Radio Configuratio	n	Module I	nformation	AES	Configuration
Network Configura	ation	Tran	smission Testing		Application
letwork Configuration Master Table Configur Enable Pair	ration ring Mode		Disabl	e Pairing	Mode
Get Table	Drop	Table	Table size:		0
Master Table					
Index	Address		Pairing payload	Delet	e
End Node Pairing	Status ():		No	t undated	
Pairing Request	50003 ().		110	r upuuteo	·
Get Activation Status	Master ad	ldress (HE)	X):		
	Index in n	naster tabl	e ():		
Ra Mipot					
Radio Configuratio	n	Module I	nformation	AES	Configuration
Network Configuration	ation	Iran	smission lesting		Application
Master Table Configuration	ration				
Enable Pair	ring Mode		Disabl	e Pairing	Mode
Get Table	Drop	Table	Table size:		0
Master Table					
Index	Address		Pairing payload	Delet	e
	_				
	/				
End Node Pairing	Status ():		No	t updated	
End Node Pairing Pairing Request	Status (): Master ac	Idress (HF)	No Ri:	t updated	

Index in master table ():

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

On the end node device, start the pairing request



Radio Configuratio	n Mo	dule Information	AES Configuration	
Network Configura	ation	Transmission Testing	Application	
etwork Configuratior Aaster Table Configu Enable Pai Get Table	ration ing Mode	Disable Table size:	Pairing Mode	Once paired, disable the pairin mode on the master device.
Master Table				
		21.2		
		21.7		
nd Node Pairing				
nd Node Pairing Pairing Request	Status ():	Notu	updated	
nd Node Pairing Pairing Request Get Activation Status	Status (): Master addres	s (HEX):	updated	

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

Radio Configuration	Module Information	AES Configuration
Network Configuration	Transmission Testing	Application
ansmission Testing		
Data to Send		
Number of bytes:	4	
11-22-33-44		
		Z
		A
		Σ
		<u> </u>
		5
		쁜
	IPQT	H
Command		
Destination address:		
00-0	0-0D-93 Send Confirmed	Send Unconfirmed

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



Radio Configuration	Module Information	AES Configuration
Network Configuration	Transmission Testing	Application
ransmission Testing Data to Send		
Number of bytes:	4	
11-22-33-44		►
		A N
		MP
		0
		H
		Щ
	ΙΡΟΤ	Ė
Command		7
Destination address: FF	- -FF-FF-FF Send Confirmed	d Send Unconfirmed

4.4. Sending an unconfirmed broadcast message from master

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"