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Crypto Provisioner

Firmware Specification Document

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1. SUMMARY

DOCUMENT INFO

This document provides information about the specifications of all blocks that will compose the system in package.

REVISION

Version	History	Date	Authors
00	- Initial draft	28/11/2022	Christian R Lehmen

APPROVAL

Position	Name	Date	Remarks

2. INTRODUCTION

This document has the objective of instructing the use of the Key Provisioner Firmware, meant to be run on the first contact with a HTLBL32L chip. If you have not opted for the hardware secure module version or do not intend to use it, you can skip this document.

By using this firmware, you will be able to set all the required LoRaWAN keys (both OTAA or ABP) through serial AT commands. These keys will then stay safely stored within our secure module, not being able to be read by anyone except HTLRBL32L's crypto library. Note: You can overwrite any of the LoRaWAN keys written on the device, but you cannot retrieve them.

2.1. Flashing the Firmware

To be able to run the firmware, the binary file "HTLRBL32L_Provisioner.bin" must be flashed to the device. Please refer to document "HTLRBL32L_Flashing", which will instruct you on how to flash firmware to the chip.

2.2. Serial Terminal Setup

The UART interface can be used by connecting the pins TX(PA9) and RX(PA8) to a USB-Serial converter and connecting to a computer or simply connecting it to another microcontroller with a UART interface.

UART configuration required to connect:

- Baud rate: 115200
- Data bits: 8
- Stop bits: 1
- Parity: none
- Flow Control: none
- Transmitted text: Append LF

2.3. Termite Setup

One of the most widely used software for UART communication using a computer is Termite. Figure 1 – Termite setup displays the configuration required to connect to the HTLRBL32L.

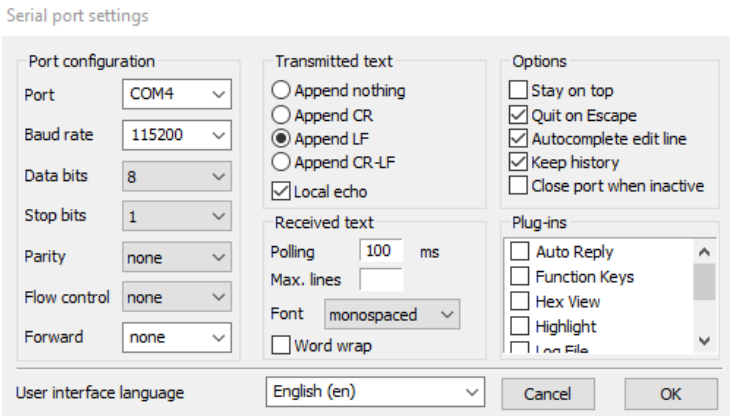

FIGURE 1 – TERMITE SETUP

3. COMMAND LIST

You can run these commands in any order and rewrite them if needed. It is mandatory to enter the DevEui command and the keys referred to your chosen activation type (ABP or OTAA). You don't need to enter keys for the activation mode you're not planning to use.

3.1. General Command

Command	Parameter	Description
AT+DEVEUI=<param>	16 charactere hexadecimal	Sets the unique DevEUI

Eg.: AT+DEVEUI=1122334455AABBCC

3.2. ABP Keys Commands

ABP keys configuration is not required when using OTAA activation mode.

Command	Parameter	Description
AT+ABP_DEVADDR=<param>	8 charactere hexadecimal	Sets the DevAddr
AT+ABP_APPSKEY=<param>	32 charactere hexadecimal	Sets the AppSKey
AT+ABP_NWKSKEY=<param>	32 charactere hexadecimal	Sets the NwkSKey

Eg.: AT+ABP_DEVADDR=A1B2C3D4

Eg.: AT+ABP_APPSKEY=AABBCCDDEEFF11223344556677881122

Eg.: AT+ABP_NWKSKEY=AABBCCDDEEFF11223344556677881122

3.3. OTAA Keys Commands

OTAA keys configuration is not required when using ABP activation mode.

Command	Parameter	Description
AT+OTAA_JOINEUI=<param>	16 charactere hexadecimal	Sets the AppEUI
AT+OTAA_APPKEY=<param>	32 charactere hexadecimal	Sets the AppKey

Eg.: AT+OTAA_JOINEUI=11223344667788

Eg.: AT+OTAA_APPKEY=AABBCCDDEEFF11223344556677881122

4. RETURN CODES

Every command returns a 4 byte code, the first two bytes are represented by the tables below. Bytes 3 and 4 are unused.

4.1. Command Error codes

The first byte is related to command syntax and parameter validations.

Code	Description
0x00	No errors
0x01	Invalid command
0x02	Parameter missing
0x03	Parameter overflow
0x04	Invalid command header
0x05	Expected hexadecimal value

TABLE 1 – COMMAND ERROR CODES

4.2. UART Error codes

The second byte is related to possible UART errors.

Code	Description
0x00	No errors
0x01	Command max size violated
0x02	Empty command

TABLE 2 – UART ERROR CODES