



# ethertronics<sup>®</sup>

AN **AVIX**<sup>®</sup> GROUP COMPANY

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## **Application Note 002**

Firmware Update for ETH-LORA-M-AX-01 (V1.2)

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## Firmware Update for ETH-LORA-M-AX-01 (V1.2)

### OVERVIEW

The purpose of this document is to explain in detail how to perform the firmware update of the module EtherLoRa ETH-LORA-M-AX-01 (V1.2).

EtherLoRa is built with the integrated In Application Programming (IAP) bootloader to update the firmware without using a programmer adaptor. The latest update can be uploaded to EtherLoRa using this IAP bootloader via UART interface. Hence, the UART lines are recommended to have an external access in the final product design.

The bootloader uses the UART pins (RxD and TxD) and the power lines (VDD and GND) of the EtherLoRa.

This document is divided in three main parts:

- Hardware information
- Software information
- Instruction

### REQUIREMENT

To perform the firmware update, the items below are needed.

#### Hardware Tools:

- EtherLoRa module ETH-LORA-M-AX-01 (V1.2).
- USB-UART Cable (FTDI USB-UART TTL Cable)
- Computer

#### Software Tools:

- Driver for USB-UART cable
- Ethertronics Update Firmware Tool
- Tera Term

### SCOPE

This document focuses on the process to update the firmware of EtherLoRa using the built in IAP Bootloader Tool independently of the functionality of the module.

## HARDWARE INFORMATION

### ETHERLORA

Ethertronics' LoRa Module ETH-LORA-M-AX-01 (V1.2) is a SMT mounted cost efficient radio module that operates in the unlicensed 868 MHz band. It combines a LoRa™ transceiver SX1272 of Semtech Corporation with Ethertronics chipset and technologies to maximize link budget and RF performances.

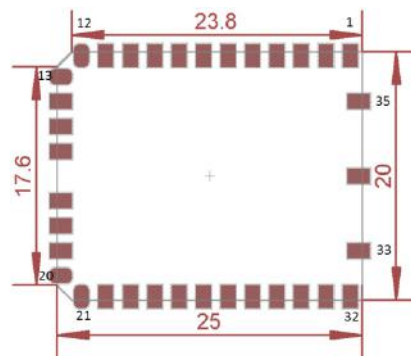


Figure 1: EtherLoRa ETH-LORA-M-AX-01 (V1.2) pin out

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### ETHERLORA PIN DESCRIPTION

Pin Number	Pin Name	Pin Type	Description
1	GND	Supply	Ground Connection
2	SWCLK	Digital In/Out	Digital IO / JTCK / SWCLK
3	SWDIO	Digital In/Out	Digital IO / JTMS / SWDIO
4	VDD-SX	Supply	Supply Voltage for SX1272 part
5	VDD-SX	Supply	Supply Voltage for SX1272 part
6	GND	Supply	Ground Connection
7	nRESET	D In	nReset, internally pulled-up, internally filtered with capacitor
8	P5	Digital In/Out	Digital IO / USART1 CTS / MIPI DATA (See Table 2)
9	P6	Digital In/Out	Digital IO / USART1 RTS / MIPI CLK (See Table 2)
10	VDD-ST	Supply	Supply Voltage for ST part
11	GND	Supply	Ground Connection
12	P7	Digital In/Out	Digital IO / SPI2 MISO
13	P8	Digital In/Out	Digital IO / SPI2 MOSI / MIPI DATA (See Table 2)
14	P9	Digital In/Out	Digital IO / SPI2 CLK / MIPI CLK (See Table 2)
15	P10	Digital In/Out	Digital IO / SPI2 NSS / MIPI VIO (See Table 2)
16	GND	Supply	Ground Connection
17	VDD-ST	Supply	Supply Voltage for ST part
18	RxD	Digital In/Out	Digital IO / USART1 RX
19	TxD	Digital In/Out	Digital IO / USART1 TX / MIPI VIO (See Table 2)
20	P11	Digital In/Out	Digital IO
21	P12	Digital In/Out	Digital IO / I2C1-SCL / Interface Selection (See Table 2)
22	GND	Supply	Ground Connection
23	P13	Digital In/Out	Digital IO / I2C1-SDA / Interface Selection (See Table 2)
24	P14	Digital In/Out	Digital IO / MIPI AS VDD / WakeUp Pin
25	NC	NC	
26	BOOT	D In	Bootloader Pin 0, internally pulled down
27	GND	Supply	Ground Connection
28	NC	NC	
29	NC	NC	
30	GND	Supply	Ground Connection
31	RF	RF In/Out	LoRa Antenna Port
32,33,34,35	GND	Supply	Ground Connection

Table 1

To perform the firmware update, only four pins are needed

1. Ground connection (GND)
2. Supply voltage (VDD)
3. UART line USART1 RX (RxD)
4. UART line USART1 TX (TxD)

### USB UART CABLE

The transfer of the new firmware data is using UART interface and YMODEM protocol. To send the data to EtherLoRa module, the USB to TTL serial UART converter cable with virtual COM port driver is necessary. FTDI TTL-232RG-VSW3V3-WE or TTL-232RG-VREG3V3-WE is recommended for this purpose. The datasheet of this product can be found the FTDI website.

Link: <http://www.ftdichip.com/Products/Cables/USBTTLSerial.htm>, FTDI USB TTL UART Cables

Since this cable is wire ended, user needs to make the connectors to connect with the EtherLoRa module pins.



Figure 2

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## Firmware Update for ETH-LORA-M-AX-01 (V1.2)

### FTDI GENERIC CABLES SIGNAL DESCRIPTIONS

Color	Name	Type	Description
Black	GND	GND	Device ground supply pin.
Brown	CTS	Input	Clear to Send Control input / Handshake signal.
Red	VCC	Output	Power Supply Output
Orange	TXD	Output	Transmit Asynchronous Data output
Yellow	RXD	Input	Receive Asynchronous Data input
Green	RTS	Output	Request To Send Control Output / Handshake signal

Table 2

### COMPUTER

The software tool is developed to be used on the computer that runs on windows operating system. Otherwise user can use the open source serial terminal such as Tera Term to perform the upgrade. (See next chapter 4.2)

### CONNECTION

The connection of the four pins between the FTDI USB-UART cable and the EtherLoRa module is as below:

#### USB-UART CABLE AND ETHERLORA CONNECTION

Color	Description	Pin no	Description
Red	Voltage Supply Output (VDD)	10 or 17*	Voltage Supply Input (VDD)
Black	Device ground supply (GND)	1, 6, 11, 16, 27, 30 or 32*	Ground Connection (GND)
Orange	Transmit UART Data output	18	USART1 RX Input
Yellow	Receive UART Data input	19	USART1 TX Output

Table 3

**Note 1:** Pin 10 and 17 for VDD are connected internally, user can choose either one of them to connect with RED wire of FTDI. In the picture below Pin 17 is used.

**Note 2:** Pin 1, 6, 11, 16, 27, 30 and 32 for GND are connected internally, user can choose either one of them to connect with BLACK wire of FTDI. In the picture below Pin 16 is used

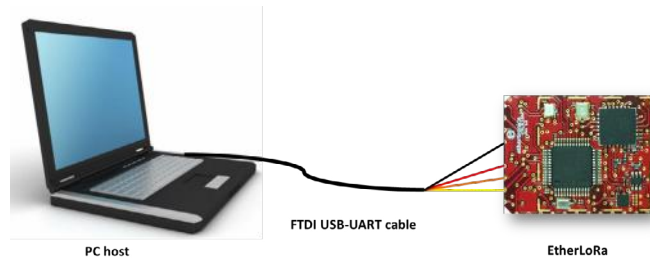


Figure 3

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## Firmware Update for ETH-LORA-M-AX-01 (V1.2)

### SOFTWARE INFORMATION

Two software products are needed for the update processes which are VCP driver for USB-UART Cable and EtherLoRa Update Firmware Tool or Tera Term. This document won't discuss the VCP driver in details. The VCP driver can be found on FTDI website as well as the instruction to install it.

Link: <http://www.ftdichip.com/Drivers/VCP.htm>, VCP Driver for FTDI USB-UART Cable

User can download EtherLoRa Update Firmware Tool installer from Ethertronics website or contact the developers from Ethertronics.

Link: [www.avx.com/products/modules/lora-module](http://www.avx.com/products/modules/lora-module), LoRa Update Firmware Tool's Installer download

For the Tera Term downloading, user can find various download links on the internet.

Link: <https://osdn.net/projects/ttssh2/releases/>, Tera Term Installer download

### INSTRUCTION

#### ETHERLORA MODULE UPDATING FIRMWARE TOOL

Using the integrated bootloader (IAP) and the EtherLoRa Update Firmware Tool, the firmware of the module can be updated in the most convivial way.

- Download the VCP Driver of the FTDI USB-UART cable and install the driver.
- Download the installer of the EtherLoRa Update Firmware Tool and run the installer.
- Connect the FTDI USB-UART Cable and the EtherLoRa module. See details in Section 2.4 Connection.
- Connect the FTDI USB-UART Cable to the PC host and verify the COM Port:
  - Right click Computer → Properties → Device manager

#### DEVICE MANAGER INTERFACE

- Run the EtherLoRa Update Firmware Tool, Select the right COM port and click Initialize Button.

#### ETHERLORA UPDATE FIRMWARE TOOL - INITIALIZATION

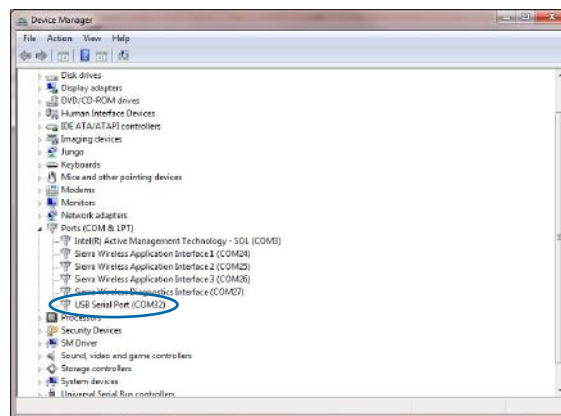


Figure 4

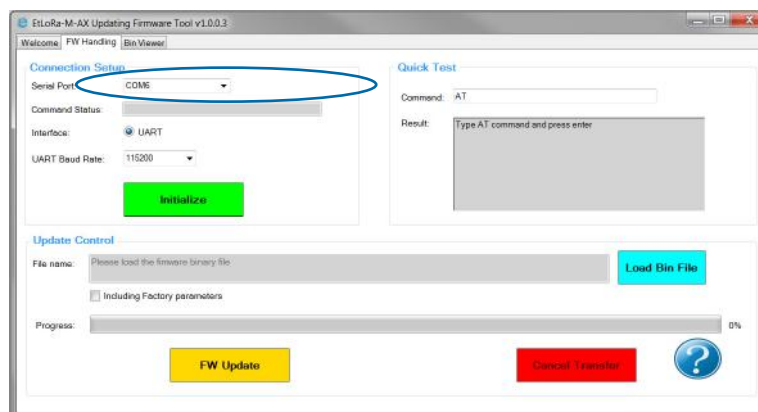


Figure 5



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## Firmware Update for ETH-LORA-M-AX-01 (V1.2)

- Load the new firmware binary file.
- Select if you want to update factory parameters came along with the Firmware file or not.
- Click the button Upload to EtherLoRa, the progress bar will show the progression of the uploading based on size of the firmware.
- In case of wrong image file, click cancel to abort the ongoing transfer, otherwise will until the end of the transfer.

### TRANSFER IN PROGRESS



Figure 6

- Once the transfer is completed, user can verify the version of the firmware using the AT command panel. "ATI" shows the information of the firmware.

### VERIFICATION OF THE FIRMWARE VERSION

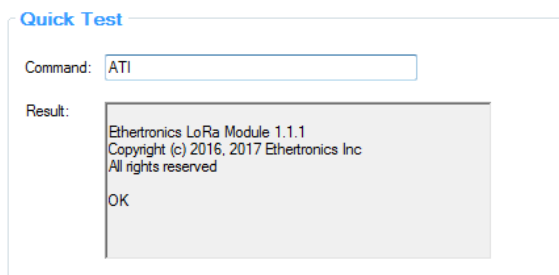


Figure 7

### TERA TERM

An alternative tool to perform the upgrade is to use open source serial terminal such as Tera Term. Once the connection is done, user can run the Tera Term application and the connection windows will be displayed automatically. Otherwise, user can open manually the new connection:

- File → New Connection → Select the correct COM Port

### TERA TERM COM PORT SELECTION



Figure 8



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## Firmware Update for ETH-LORA-M-AX-01 (V1.2)

User needs to change the parameters of the Serial COM port as follows:

- File → Serial port... → adjust the parameters

### TERA TERM SERIAL PORT SETUP

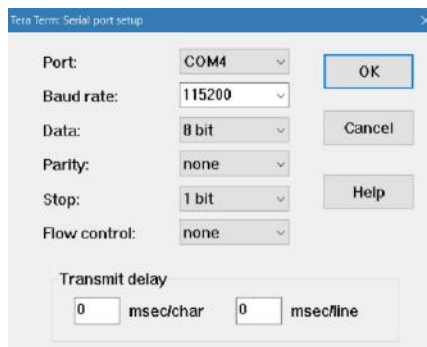


Figure 9

User can also adjust the setup of the terminal to display the answer correctly

- Setup → Terminal... → adjust New line receive to LF the terminal setup

### TERA TERM TERMINAL SETUP

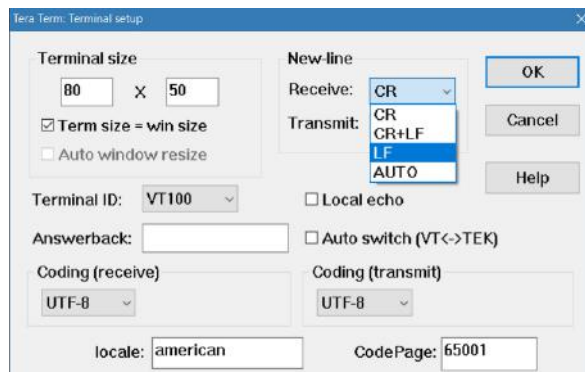


Figure 10

When everything is set up, user can start sending AT command to perform the upgrade, **AT#FLASH**, the menu will be displayed.

### UPGRADE MENU

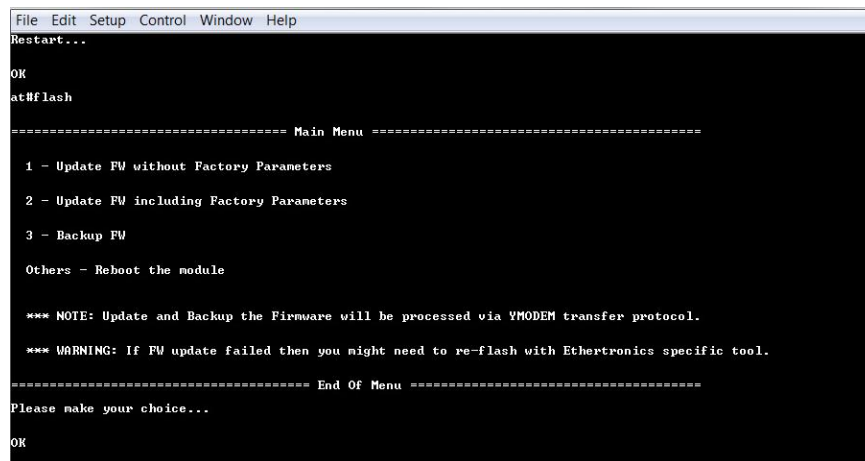


Figure 11



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User must type '1', then use the YMODEM transfer feature of the Tera Term.

- File → Transfer → YMODEM → Send

### TERA TERM YMODEM TRANSFER

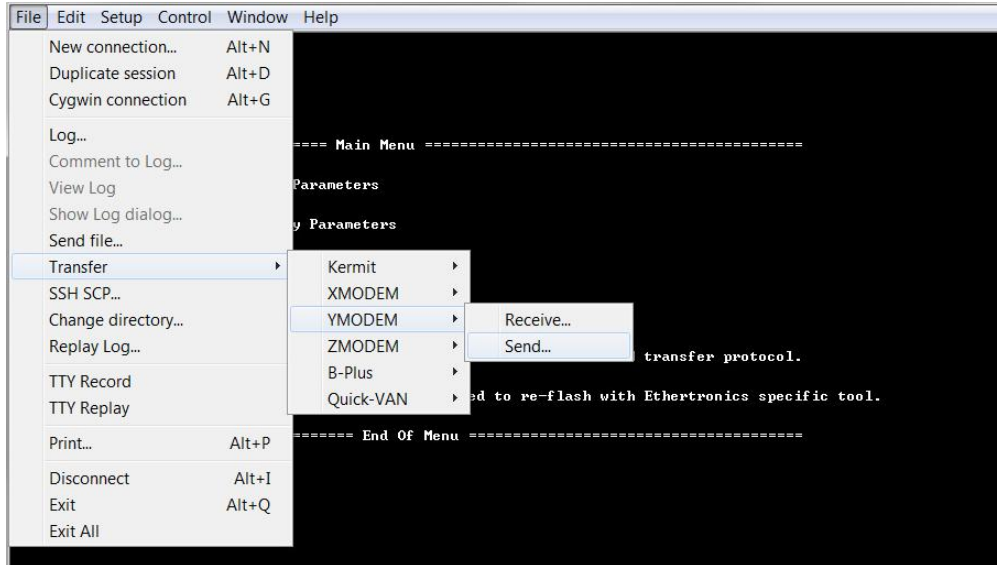


Figure 12

Open file dialog will be popped up, and user needs to locate the updated firmware binary file and click open. User must locate the binary file within 2 minutes, otherwise the timeout will occur, and the module will reboot to the latest available firmware. Once user click open, the transfer should start.

### TERA TERM YMODEM TRANSFER PROGRESS WINDOW

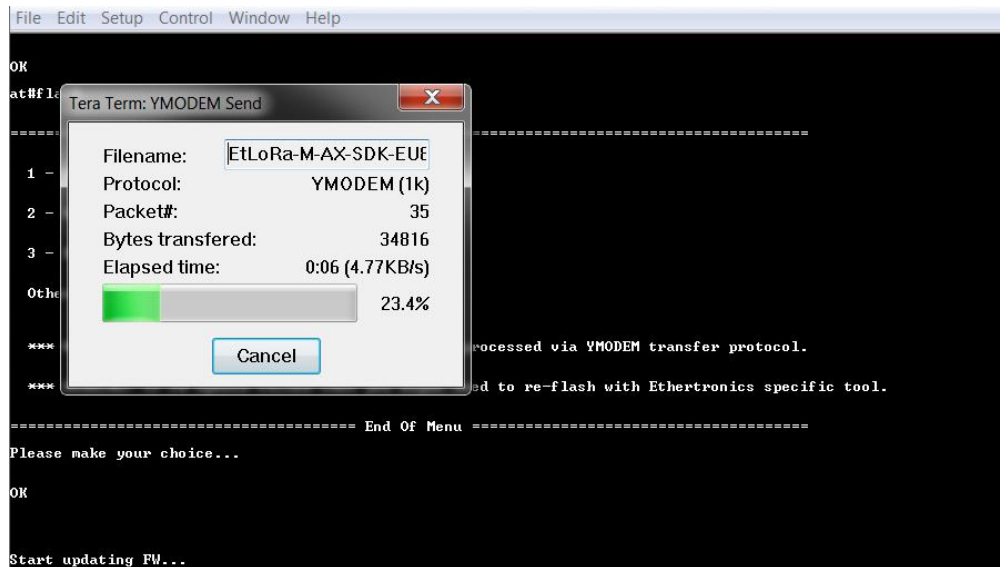


Figure 13

If there is any problem, please retry again. If the problem persists, please contact Ethertronics for the support.

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## Firmware Update for ETH-LORA-M-AX-01 (V1.2)

### LIST OF ABBREVIATIONS

IAP: In Application Programming  
UART: Universal Asynchronous Receiver/Transmitter  
USART: Universal Synchronous/Asynchronous Receiver/Transmitter  
USB: Universal Serial Bus  
TTL: Transistor–transistor logic level  
SMT: Surface-Mount Technology  
LoRa: Long range  
OS: Operating System  
VCP: Virtual COM Port  
COM: Communication port

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